THE OFFERING OF LIFE: HUMAN AND ANIMAL SACRIFICE AT THE WEST PLAZA OF THE SACRED PRECINCT

AN ABSTRACT

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FOR THE DEGREE

OF

DOCTOR OF PHILOSOPHY

BY

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ABSTRACT

For the Mexica (Aztec) Empire, religious life was not centered on sacrifice. This practice was part of a complex world vision shared with other -earlier and contemporary- Mesoamerican cultures. At the arrival of the Spaniards, sacrifice caught the attention of chroniclers, whose narratives were used to legitimize the conquest of the natives. During the excavations of the Sacred Precinct of Tenochtitlan human and animal remains with evidence of sacrifice have been recovered. In this dissertation I propose that sacrifice must be understood as an offering of life performed in a ritual setting that implies the destruction of humans, animals, plants, and sometimes objects. For this reason, I analyze the bones of both humans and animals recovered in the West Plaza, at the foot of the Great Temple. My goal is to answer how the Mexica performed sacrifice, treated the bodies and with which purposes, through direct bone analysis and the reconstruction of ritual sequences (chaîne opératoire). Sometimes their bones were reused, changing their original meaning. In addition, fragments resulting from skulls modifications were utilized in consecration and termination rituals. I also analyze the biological profiles of the victims, characterized by their diversity. In the case of humans, these correspond to men, women and children, while the faunal remains belong only to exotic animals. Along with the bioarchaeological perspective, I analyze historical sources, as well as theories on the function of sacrifice among the Mexica.

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Dedicated to Roberto Rojo García

and to the bugs of the underworld

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Introduction

The Sacred Precinct was the religious, economic and political center of Tenochtitlan, capital of the Mexica (Aztec) Empire. According to Fray Bernardino de Sahagún (1997: 158) this precinct was composed of 78 buildings, including temples, academies, ballgame courtyards, fountains, storage rooms, and plazas. Among these, the Templo Mayor was the most sacred space in the city. Thanks to recent archaeological excavations, the limits of the Sacred Precinct have been defined. It measured 460 m, north-south, and 430 m, east-west, and it was surrounded by a wide continuous platform with internal and external staircases, as well as doors. Inside the precinct, the spatial organization was ideal for celebrating the most important rituals (López Austin and López Luján 2009: 219).

The West Plaza was connected to the Templo Mayor. It was the path for accessing the platform and the temple. Also, from this plaza it was possible to witness all the rituals conducted on top of Templo Mayor. Dramatic sacrificial performances, including heart extraction at the shrines and the throwing of corpses down to the platform, was witnessed both by locals and foreigners (González Torres 1985). Sacrificial stones on top of the buildings suggest that eyewitness accounts were to some extent accurate.

The West Plaza was also important for rituals associated with other buildings, monuments and sculptures. Under the direction of archaeologist Leonardo López Luján, the area corresponding to the Mayorazgo de Nava Chávez was explored by the Templo Mayor Project, revealing numerous offerings with countless goods.

Oblation was a means for communicating with the sacred realm. The material expression of this act, related to a sacred space and other ritual acts, is the offering (López Luján, 1993: 52). This involves a payment to the supernatural world that can be made before or after receiving benefits, as a petition or an expression of gratitude. Sacred places demand offerings and these are similar not only in terms of their function, but in the nature of its materials and type of objects (Carmichael et al. 1994: 1). Sacrifice and oblation are two deeply related categories. Through ritual killing life was offered, and the remains were buried in the ritual deposits along with other ritual offerings.

Religious life in Tenochtitlan was not uniquely centered on sacrifice. On the contrary, this practice was part of a complex world vision, shared with other Mesoamerican cultures (Chávez Balderas 2017). But from the 16th century to the present, Mexica human sacrifice has been a controversial topic. Descriptions of Mexica religious practices made by friars and conquerors focused on human sacrifice and most research conducted on this topic has relied almost exclusively on the study of historical sources and iconography. It is only relatively recently that direct evidence of sacrificial practices has become available thanks to archaeological excavations. In this dissertation I analyzed human and faunal remains with evidence of sacrifice and post-sacrificial treatments, found at the West Plaza of the Sacred Precinct, practice which I have called the *offering of life*. My goal is to answer how the Mexica performed sacrifice, treated the bodies and with which purposes, through direct bone analysis and the reconstruction of ritual sequences (chaîne opératoire).

Numerous human remains have been discovered in the Templo Mayor excavations. Some of these assemblages were the result of funerary rituals, while others represent non-funerary rituals (Tiesler 2007; Chávez Balderas 2017). Funerary rituals were conducted for

mourning the death of a person, the disposal of the body and for helping the immaterial part of the body to reach its final destination (Thomas 1983). In funerals, individuals can be equated to "subjects". On the other hand, in non-funerary rituals individuals might be equated to "objects" (Nagao 1985). They can be used as offerings, trophies, tools, etc. Both categories may overlap in some cases (Coe 1975: 462; Becker 1988: 118-125) (Figure 1).

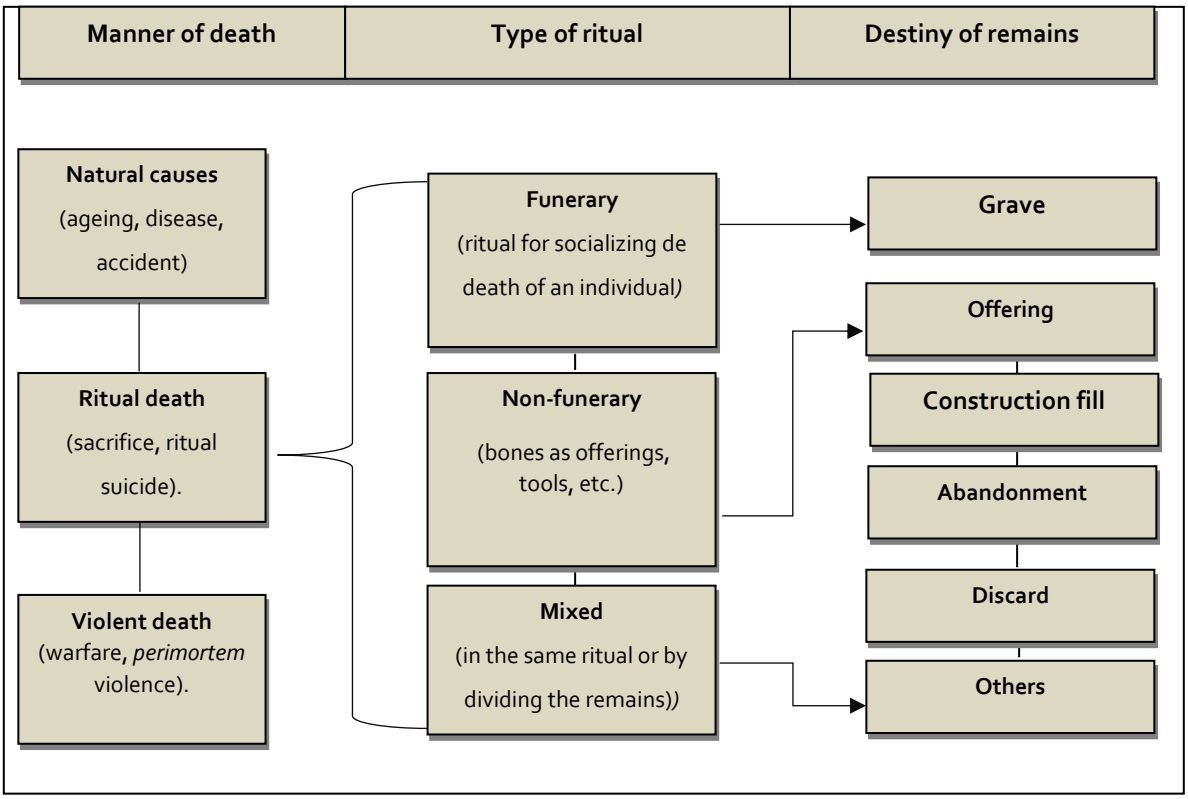


Figure 1. Manner of death, types of rituals and final destiny of the remains (modified from Chávez Balderas 2017).

Human remains found in Templo Mayor were analyzed in a previous research project (Chávez Balderas 2017), and most of these corresponded to decapitated victims.[1] Based on

[1] Ninety-nine individuals, including two found on the Plaza at the foot of the temple.

the analysis conducted by numerous researchers,[2] I proposed dividing these human sacrificial victims into four main categories: 1) primary burials dedicated to Tláloc, God of Rain; 2) primary burials dedicated to Huitzilopochtli, God of War; 3) severed heads for consecrating the building and 4) skull-effigies representing gods.

Animal remains are more abundant in the Templo Mayor offerings, particularly considering all the phyla discovered so far: Cnidaria, Echinodermata, Arthropoda, Mollusca and Chordata (López Luján *et al*. 2012). Of these phyla, mollusks are the most copious. Numerous investigations have been conducted on these materials from both biological and cultural perspectives, as I will discuss further in this dissertation. Taxonomical identification, minimum number of individuals, height, sex, age, paleopathology, habitat, distribution, and so forth have been analyzed from a biological perspective (Blanco 1978, Carramiñana 1988, Álvarez and Ocaña 1991, Polaco 1991, Gallardo 2000, Velázquez 2000, López Luján 2006, 2012, Chávez Balderas 2007, Chávez Balderas et al 2010, López Luján et al 2010, López Luján *et al* 2012: 13-14). However, sacrificial and post-sacrificial treatments in animals have been documented only in case studies,[3] but not systematically for the whole collection, due to the size of the sample and because the materials are not housed in the same storage facility.[4]

[2] These findings were analyzed by the following authors: skull-masks from offerings B1, B2 and CA by Carmen Pijoan and colleagues (2001); five decapitated victims from offering CA by María Elena Salas (Solís y Castillo 1975: 14-18); Offering 2, a primary disturbed burial, by Rosa María Peña (1978); Offering 48, a primary burial with 42 sacrificed children, by Juan Román Berrelleza (1990); Offering 111, a primary burial of a child by López Luján and colleagues (2010); 99 decapitated victims from 19 offerings by Ximena Chávez Balderas (2010a, 2012a), Bustos (2012), Barrera (2014); remains from the construction fill by Diana Bustos (2007), Chávez Balderas (2012a) and Chávez Balderas and García (2010).

[3] Aguirre 2002; Valentín and Gallardo 2006; Valentín and Zúñiga 2006; Chávez Balderas 2007, 2012a; Chávez Balderas et al 2010; López Luján *et al* 2010; Quezada et al 2010.

[4] Materials from early field seasons are housed at the Archaeozoology Lab, from INAH.

The Templo Mayor was not conceived as the unique burial place for all human and non-human offerings. On the contrary, only the heads of some individuals and the bodies of some animals were deposited in this space, for very specific purposes. For this reason, findings at the plaza level can solve many of the unanswered questions concerning sacrificial and post-sacrificial treatments, the biological characteristics of the victims and the symbolism of contexts, contributing to a more detailed understanding of the religious practices and the power of the Empire during this period.

In March of 2007, the Templo Mayor Seventh Field Season was begun under the direction of Leonardo López Luján (2012: 1939-1942). Five principal objectives were identified from the beginning: 1) analysis and conservation of the monolith; 2) mapping of uncovered buildings at the Sacred Precinct utilizing GIS; 3) Documentation of mural painting; 4) geophysical prospection; and 4) the excavation of the Mayorazgo de Nava Chávez, part of the West Plaza. My dissertation represents a contribution to the research conducted by the Templo Mayor Project.

Deposits discovered at the West Plaza are different from those buried at the Templo Mayor. Despite the fact that both groups of offerings represent cosmograms or models of the universe (López Luján 1993), configurations of the inner levels are different. For example, cult images inside offerings in the proximity of the Tlaltecuhtli monolith frequently were covered with marine organisms. More likely this alludes to the fact that these deposits were considered to be in a subterranean space, under the earth and the water.[5] In contrast, in the offerings found at Templo Mayor, marine organisms tend to be at the

[5] Offerings 125, 126 and 141 are among the best examples.

bottom of the deposits, below the celestial and terrestrial levels. These differences appear to reflect the symbolism of the Temple, the Plaza and the monolith itself.

In this research I characterize human and animal sacrifice, describing the different sacrificial and post-sacrificial techniques, the purpose of sacrificial practices, the ceremonies in which they were conducted, and the relationship of humans to their environment. Findings from the construction fill helped to develop some understanding of manufacturing processes and construction rituals.

The identity of victims is key for understanding sacrificial practices. For this project I analyzed both human and non-human remains found at the West Plaza. Direct analysis was conducted on the following archaeological contexts:

Context	**Description**	**Bones**
Offering 123	Human cremated remains	19 fragments
Offering 126	Non-human bones (scattered, secondary and primary burials)	9036 bones (85 individuals).
Offering 141	Effigy-skulls	7 skulls
Offering 149	Body parts (heads, feet and hands from two children) and 2 bird pelts	177 bones
Offering 151	1 skull (possible a recipient)	1 skull
Offering 166/Operation 1	Scattered bones in the construction fill	30 fragments
Operation 6 and 9	Bone fragments (manufacture waste) in the construction fill	2216 fragments
Operation 23	Scattered bones in the construction fill	5 fragments

Table 1. Bones analyzed in this dissertation (human and non-human).

Due to the amount and nature of the field season findings I proposed the hypothesis that human sacrifice was part of a larger phenomenon: *the offering of life*. Sacrifice, as the destruction of the victim with ritual purposes, involves humans, animals, plants and sometimes objects that were considered somehow to be alive. Life was the most precious

gift that could be offered to the supernatural world. However, sacrificial techniques, occasions and purposes were very different between these groups. Remains with cultural modifications reflect the complex relation between ritual ceremonies, the ideology of domination and the economic benefit of an expansionist state.

In this analysis the following questions were posed: Do all skeletal remains pertain to sacrificial victims? Were victims selected based on their biological profile? From what geographic regions were they drawn? How were they sacrificed and what posthumous treatments did they receive? Were their bones reused? In what kind of ceremonies were they buried and what is the symbolism they represent? These are the main questions that will be answered in the various chapters of this dissertation. As an adjunct to the osteological study, I conducted research on historical sources: Pre-Hispanic, early and late colonial from a critical point of view, taking into account who wrote them and for what purpose.

Numerous works were consulted on the theory of religion and sacrifice, with emphasis on those that consider ritual death as a polysemic[6] phenomenon (Nájera, 1987; López Austin, 1996; Graulich, 2005; Dehouve 2007, 2009; López Luján and Olivier, 2010). According to Daniele Dehouve (2007: 110, 219) not only sacrifice would reflect this polysemy, but also the posthumous treatments and the deposition of the remains. With reference to a particular focus on the Mexica I relied on the works of Yólotl González Torres (1985), David Carrasco (1999) and Michel Graulich (2005), as well as the edited volume by López Luján and Olivier (2010).

[6] With different meanings and functions.

For the analysis of bone remains, I utilized techniques for determining the biological profile of individuals, human and non-human. The objective was to identify the species, sex, age at death, and health conditions in order to explore whether any of these features influenced their selection. For the study of sacrificial procedures and posthumous treatments I applied the perspective of taphonomy, which was introduced in paleontology by Ivan Efremov in 1940 and brought to archaeology in 1982 by Diane Gifford, who defined it as the processes that occur after the death of an individual. In Mexico, taphonomy gained importance for the first time from the works of Carmen María Pijoan Aguadé (1997).

Taphonomy distinguishes three phases: necrology, bioestratinomy and diagenesis (Grupe, 2007: 247; Gastaldo, 2008). The first studies the moment of death, while the second deals with what happens from that point to the burial of remains. Finally, the third focuses on documenting both intrinsic and extrinsic transformations of bones, generally associated with its burial. Similar to previous investigations (Chávez Balderas 2017), for this dissertation I took into account the three phases, but focused on bioestratinomic processes, both natural and cultural. The former happens without direct human intervention and include decomposition, passive disarticulation, skeletonization, mummification, mineralization and weathering. Cultural processes involve human action, and include defleshing, active disarticulation, cutting, boiling, percussion, cremation, flaying, fracturing, surface modifications, applications, polychromy and other decorative treatments (Micozzi 1991; Botella et al., 2000; Pijoan Aguadé and Lizárraga, 2004). The taphonomic analysis focused on distinguishing whether the bone alterations correspond to the antemortem, perimortem or postmortem intervals, documenting whether bone

modifications were natural or cultural, anatomical location and the mechanism and instruments utilized. This information was compared to the distribution of soft tissues in the body in order to propose general sequences for the preparation of corpses.

To understand the original conditions in which the remains were buried (cadaveric, defleshed but articulated or skeletonized), I used an *archaeotanatology* (field osteoarchaeology) approach (Duday 1997, Pereira 1996, 1997, 2010, Pereira and Chávez 2006). All the bones found by the Templo Mayor Project were recovered using these field methods in order to understand the type of burial,[7] the original space,[8] the original orientation of the bodies,[9] as well as wall constriction, and compression effects. [10]

By this method it is possible to know if there was more than one sacrificial and depositional event. Henri Duday (1997) divides burials into the following categories: individual deposit, multiple (simultaneous) and collective (burial in the same space, but in different events). However, considering the nature of the Sacred Precinct deposits, it is clear that Mexica offerings usually reflect a single event. However, due to the fact that bone reutilization was common individuals deposited on a single occasion could correspond to different sacrificial events. This was assessed by documenting different

[7] It consists of determining if decomposition was *in situ* (primary burial) or in a different place (secondary burial). This was determined by observing bone articulations (strict, loose, dislocated or displaced) (Duday 1997, Pereira 1997).

[8] The evaluation of all the articulations and interior movements inside the deposit, allow to know if decomposition occurred in an empty or filled space (filled immediately or progressively) (Duday 1997).

[9] By analyzing articulations, the position of the body and each bone, it is possible to infer this aspect. This is especially useful for determining the original orientations of skulls that were displaced due to internal movements (Duday 1997).

[10] The first imply the preservation of bones in unstable positions in consequence of the sediment or a perishable element, in empty spaces. Constriction effects correspond to pressure on the corpses caused by the original architecture, body position or the presence of a perishable element like a shroud. Compression is a constant pressure on bones caused by a weight that, under certain circumstances, might cause bone deformation (Duday 1997).

decomposition stages. Individuals that were sacrificed in different moments, but buried simultaneously, suggest the existence of some location used to store remains for later deposition in other contexts.

This dissertation is divided into seven chapters. In the first, I define sacrifice and explore how it has become a negative stereotype associated with the Mexica. I then analyze in chronological order the various theories on the origin and function of sacrifice in different cultures world-wide, and then return to focus on theories on Mexica sacrifice, discounting those no longer considered valid and examining those most accepted by current Aztec scholarship using a polysemic approach.

The second chapter deals with the function of sacrifice among the Mexica, classifying it into categories previously explored by Martha Ilia Nájera (1987), which correspond to oblation, expiation, divinity, consecration, termination, and retainers' immolation. To examine these categories I use information from historical sources, comparing it with archaeological data for both human and animal remains. From this analysis I highlight concordances and discrepancies. In this chapter I also explore some of the most common questions surrounding Mexica sacrifice—for example if sacrifices were individual or collective, if they were massive as some sources mention, and how they were dramatic performances regardless of whether they were public or private. I examine these issues for human and animal victims.

In chapter 3 I return to the classic categories of Henri Hubert and Marcel Mauss (1964): sacrifier[11], sacrificer[12] and victim, as well as places and instruments for slaughter.

[11] The person or institution that offers the victim.
[12] The person who kills the victim.

For this purpose I compare information from historical sources with archaeological data, with emphasis on the victims, both human and animal. I evaluate the diversity in the ways in which individuals were obtained for sacrifice, which generally correlates with archaeological findings. Finally, I explore two important components: places and instruments. In particular I consider that certain sites are key to defining the practice as sacrifice because they must be sacred, otherwise such killings of humans would be considered murder.

Chapter 4 explores the Mexica sacrificial techniques, in which information contained in the historical sources is compared with the archaeological data. In this context I distinguish between pre-sacrificial and sacrificial practices, comparing the treatments received by humans and animals, with emphasis on heart extraction as it is the most frequently mentioned treatment in historical sources.

Chapter 5 deals with corpse treatment after ritual death. I compare historical sources with osteological evidence in both animals and humans. I focus on decapitation as it is the most important posthumous treatment for human victims throughout the Sacred Precinct.

Finally, in chapters 6 and 7 I present the results of my analysis of human and animal bone remains recovered during the Seventh Field Season of the Templo Mayor Project, which corresponds to a total of 11,491 bones and fragments. In both chapters I evaluate the biological profile of individuals, as well as sacrificial techniques and posthumous treatments they received.

Explorations of West Plaza and buildings aligned with the southern half of the Templo Mayor are still ongoing and new contexts corresponding to these practices have

yet to be discovered and analyzed. I hope that this study contributes to contextualizing some of the new findings whose study is by all means promising.

Chapter 1

Thinking sacrifice

Human sacrifice has been one of the most controversial topics in the history of humankind, because of its annihilating nature. It has been practiced worldwide in different time periods, with diverse motives. Anthropologists started studying sacrifice during late 19th Century, although beyond academia it has been a polemic topic since ancient times. The Mexica (Aztec)[13] are commonly identified with sacrifice, despite of the fact that the practice does not uniquely define this society. This is a reductionist point of view, because social dynamics in Tenochtitlan were very complex and the Mexica shared their religious beliefs and rituals with other Mesoamerican cultures (Chávez Balderas 2017). When did human sacrifice become a synonym of the Mexica culture?

Sacrifice and the "Aztec Image Problem"

According to Alfredo López Austin and Leonardo López Luján (2008), the origin of this problem is the existence of stereotypes. These correspond to:

[13] The Aztecs inhabited Aztlan, the mythical homeland of the Mexica. According to the myth, when they migrated to the south, their patron god Mexi (Huitzilopochtli) ordered them to change their name. Despite that they identified themselves as Mexica, during the 19th Century Alexander von Humboldt started the tradition of naming them Aztecs. Since then, this term has been used, even though it is ambiguous, because is also utilized to designate other inhabitants of the Basin of Mexico (López Luján 1993:171, López Austin 2001: 68).

> …persistent ideas of reality generally accepted by a social group. In many cases, they are conceptions that simplify and even caricaturize phenomena of a complex nature (López Austin and López Luján 2008:137).

The negative stereotype that equates Mexica with sacrifice has its origins in Pre-Columbian times. The expansionist period of the Mexica Empire (A.D. 1427-1521) was characterized by the prominent display of state-sponsored violence. The Mexica themselves were ostentatious in their display of power, conducting sacrificial performances in public arenas. When the Spaniards arrived to the New World they were astonished by the widespread practice of human sacrifice. Conquerors and friars devoted hundreds of pages to describe human immolations. In contrast, animal sacrifice received little attention. Sacrifice became a central issue in early colonial debates about Aztec society and had a central role in consolidating the notion that the Mexica were synonymous with cruel sacrifices.

Sacrifice, Early Colonial Accounts and the Exploitation of Native Populations

With the arrival of the Spaniards, numerous chronicles were written describing the life of the natives who occupied the American continent. These manuscripts blended feelings of admiration with strong criticism of local populations, most concerning religion and ritual practices. In historical sources sacrifice was a central topic and it became an indicator for Europeans of the natives' "degree of civilization".

These manuscripts were full of contradictory judgments. For example, the Anonymous Conqueror (1941:21), possibly one of Hernán Cortés' soldiers, praised the temples of Tenochtitlan, arguing that indigenous cities were better than those of Spain, composed of beautiful streets and plazas. On the other hand, when referring to the native inhabitants he stated:

> All in this province of New Spain, and even those in other neighboring provinces, eat human flesh, and have it in greater esteem that any other food, so much that they often go to war put their lives in danger, just to kill someone to eat it. They are commonly sodomites, as I said, and they drink without measure (Conquistador Anónimo 1941:49).[14]

Of course, the conquerors' principal goal was not to gain an understanding of indigenous ritual practices. Instead, they focused on describing their war accomplishments, which would bring them all kinds of rewards. Among these, Cortés boasted of having persuaded Mexica priests to avoid human sacrifice and affirms that "the entire time I was in the city, no creature was ever killed or sacrificed" (Cortés 1985:135). While this statement may be truthful, it is also possible that Cortés may not have witnessed these acts simply because he did not coincide with any calendrical celebration in which the human sacrifice was conducted. However, this claim may have had a very positive impact on the audience to whom his writings were intended: the Spanish Crown. The fact that Cortés claimed that he did not witness any sacrifices during his stay in the city, is a reminder that most of the

[14] "Todos los de esta provincia de la Nueva España, y aun los de otras provincias vecinas comen carne humana, y la tienen en más estima que cualquier otro alimento, tanto que muchas veces van a la guerra y ponen sus vidas en peligro, sólo por matar a alguno y comérselo. Son comúnmente sodomitas, como dejo dicho, y beben sin medida". The translation of all quotations from historical sources is mine.

chroniclers were not eyewitnesses to this practice: their descriptions were based on sources that are unknown to us. Beyond sacrifice, most of the deaths that the conqueror mentions throughout his writings occurred in the context of battles or epidemics such as smallpox (Cortés 1985:188).

News of the New World soon spread throughout Europe. Pedro Mártir de Anglería attracted European readers throughout the continent (Keen 1984:73-77), and his writings included accounts of human sacrifice. Anglería never visited the New World, but his interest in America was strong. His manuscript *Decades of Orbe Novo*, written around A.D. 1530, was based on conquerors' and navigators' accounts, among which Cortés and Christopher Columbus stand out.

In his prolific manuscript Anglería describes the exploration and conquest of the whole continent as a territory full of precious resources. With regard to native rituals he emphasized human sacrifice and cannibalism. He documented this practice in different territories such as the islands of Juana, Hispaniola, Mariagalante, San Juan and the Paria Peninsula, as well as some regions in present day Nicaragua and Panama (Angleria 1989:12, 18-19, 203, 406, 475). [15] When referring to the exploration of the Gulf of Mexico and the territory now known as Veracruz, he mentions heart extraction, child sacrifice and anthropophagy (Anglería 1989:262).

It is interesting to note that despite of the fact that his account was based on Cortés's stories, Anglería includes moral judgments and a sensationalism not found in the original

[15] Corresponding to Cuba (Isla Juana), Puerto Rico (Isla San Juan), Dominican Republic and Haiti (La Española), Venezuela (the Paria Peninsula). Isla Marigalante currently belongs to France.

sources. For example, in his famous description of the temples that comprised the Sacred Precinct of Tenochtitlan, Cortés stated:

> Bundles and bodies of the idols in which these people believe, are of much greater height than the body of a man. They are made of dough of all kinds of seeds and vegetables that they eat, grounded and mixed together, and kneaded them with heart blood of human bodies, which they open through their chests, alive and take out their hearts, and from that blood that comes out of, they knead that flour, and thus make as much quantity as is enough to make those great statues (Cortes 1985:136).[16]

In the version of the same excerpt Angleria exclaims:

> Oh, cruel malevolence! Oh, horrendous barbarity! Together with the flour they are going to knead, they tear apart children or slaves until they have gathered as much blood as is enough to make the dough, instead of hot water. The dough while it is wet and soft, those infernal butchers, without turning their stomachs, make it compact, and as a potter with the mud, or the waxer with the wax, a capricious master who was called for this nefarious job makes an idol" (Angleria 1989:328).[17]

Within a few decades a controversy was created. The most extreme positions were represented by the jurist and theologian Juan Ginés de Sepúlveda and the Dominican friar Bartolomé de las Casas. The former considered that war against the Indians was fair, while the latter was opposed to the encomienda and sought the liberation of the natives from any

[16] Los bultos y cuerpos de los ídolos en quienes estas gentes cree, son de muy mayores estaturas que el cuerpo de un hombre. Son hechos de masa de todas las semillas y legumbres que ellos comen, molidas y mezcladas unas con otras, y amasábanlas con sangre de corazón de cuerpos humanos, los cuales abren por los pechos, vivos y les sacan el corazón, y de aquella sangre que sale de él, amasan aquella harina, y así hacen tanta cantidad cuanta basta para hacer aquellas estatuas grandes (Cortés 1985:136).

[17] ¡Oh cruel maldad! ¡Oh barbarie horrenda! Junto a la harina que van a amasar, despedazan niños o niñas o esclavos hasta reunir tanta sangre cuanta sea suficiente para hacer la masa, en vez de agua caliente. La masa mientras está húmeda y blanda, esos carniceros infernales, sin que se les revuelva el estómago, la ponen bastante compacta, y como el alfarero con el barro o el cerero con la cera, un caprichoso maestro que llaman para esta obra nefanda hace un ídolo (Anglería 1989:328).

kind of slavery (Keen 1984:83-88). Both expressed their views in the Valladolid debate (A.D. 1550-1551), an unprecedented act that discussed indigenous rights. Although the background of this dispute was the justification of the Colony, its economic benefits and an attempt to socially organize the native population (Friede 1952), human sacrifice was used to promote colonialist arguments. By stressing the existence of sacrifice and cannibalism, Sepulveda argued that these crimes should be eradicated by whatever means, including war; [18] in fact, he considered the Conquest to be a divine punishment against the Mexica for their sins (Sepulveda 1940:140). [19] This historical moment is one of the most important for equating the Mexica with sacrifice, since the stereotype of natives as sacrificers was strengthened through this debate.

It should be noted that the stories of the conquistadors and chroniclers who came to America are usually more reasonable than those written by the Europeans who never visited it. In fact, Sepúlveda never travelled to the New World and his debate was based on the stories of other authors like Gonzalo Fernández de Oviedo, a Spanish-born chronicler of the Indies. Sepúlveda found this work very useful to his interests, as this source clearly belittled the natives. According to Alberto Salas (1959:120), the natives portrayed by Fernández de Oviedo are "dirty liars, cowards, individuals who commit suicide because of boredom, to impoverish Spaniards with their death; people who does not know or like to work". Of course, Sepúlveda only took up the data that best suited his interests. For example, he overlooked Fernández de Oviedo's (1945:54) estimate that five thousand

[18] On this Sepulveda (1951:27) stated that war has not to be blamed for deaths, because the ones who die would die anyway someday. If the do now, then the future victors may rule in peace (Sepulveda 1951:27).
[19] He also claimed that the discovery of the bodies of men slaughtered by heart extraction at Isla de Sacrificios is fair enough "to subjugate the Indians to royal sovereignty" (Sepulveda 1976:253).

people were sacrificed in Tenochtitlan each year, claiming that twenty thousand were killed (Las Casas, 1552, f25v).

Las Casas was the flip side of the coin and was considered as an enemy of the encomienda. His sympathy for the indigenous peoples has earned him the status of a "conquered conqueror" (Yáñez 1942). Unlike Sepulveda, the Dominican friar was an assiduous traveler and gathered information from all over the continent to defend the natives. When he realized that human sacrifice was a central argument of those who supported the encomienda and mistreatment of the indigenous people, Las Casas dedicated a large part of his work *Apologética Historia Sumaria* to describe and analyze this ritual practice. He was the first to understand human sacrifice in the American continent from a comparative perspective. Unlike all his contemporaries, Las Casas conceptualized sacrifice in its broadest sense: as the dedication of actions, objects, plants, animals and humans to gods. This implied a destruction of the ritual offerings or a deprivation performed by the worshipper. In this sense, Las Casas considered the destruction of a vessel or fasting as the product of a profound religiosity and faith of natives to please the gods. In the origin of immolation of human victims, Las Casas concluded that it originated in the sacrifice of herbs and flowers (1967, II:47). The friar proposed a linear scheme, where the sacrifice of plants resulted in the dedication of animals and, finally, in the ritual killing of humans.

Las Casas never denied the existence of sacrifice and did not minimize its implications either, but he tried to put it into broader perspective, compiling data from South America to Florida and the Caribbean islands. He also gave an account of the ancient European and Mediterrenean societies that carried it out this practice, such as Egyptians, Phoenicians, Greeks, Romans, Celts and the ancient inhabitants of the Iberian Peninsula.

In fact, he considered that the three nations of the Old World that practiced the cruelest sacrifices were "the French" (Celts), "the Carthaginians" (Phoenicians) and "the Spaniards" who inhabited Andalucia in ancient times. Based on Strabón's Geography, written during the First Century, Las Casas documented the sacrificial practices of ancient Spaniards and condemned the brutality with which the parents themselves gave their children for sacrifice (Las Casas, II: 72, 274). I assume that these claims must have caused much discomfort to Sepulveda and his followers, who simply ignored them.

In the Valladolid debate, a war of numbers began, where the sheer quantity of immolated victims was considered as an argument sufficient to justify the conquest. In this regard, Sepulveda affirmed:

> [….] Every year more than twenty thousand people were sacrificed; this number multiplied by thirty years since we won and took this sacrifice: it would be six hundred thousand; and in conquering all: I do not believe that more people would die than those who were sacrificed in a year. And also by this war we avoid the loss of infinite souls of those who converted to faith will be saved present and future (Las Casas 1552, f25v).[20]

Las Casas' response to these claims calls into question the number of sacrificial victims as well as Sepulveda's argument that war had saved lives. The Dominican friar affirms:

> [...] it is not true to say: that in the new Spain, twenty thousand or a hundred or fifty (thousand) people were sacrificed every year: because if that were true we would not find as many people as we do. And this is nothing but the voice of tyrants: for excusing and justifying their tyrannical violence and for

[20] […] se sacrificaban cada año mas de veynte mil personas: el qual numero multiplicado por treynta años que ha que se gano y se quito este sacrificio: serian ya seys cientos mill: y en conquistarla a ella toda: no creo que murieron mas numero de los que ellos sacrificaban en un año. Y tambien por esta guerra se evita la perdicion de infinitas animas de los que convertidos a la fee se salvaran presentes y venideros (Las Casas 1552, f25v).

> having oppressors and for stripping the Indians of the harvest that they made and subtracted as slaves and were tyrannized (Las Casas 1552: 45v).[21]

The underlying rationale behind Sepulveda's position is very clear: the lives of the indigenous people were of no value to the wealthy European class he represented. They could be lost in war or sacrifice, but it was preferable in conquest, for that would bring economic benefit. Thus, by demonstrating that human sacrifice was central and characterized native populations, he argued that the encomienda system was fair. In exchange for his services, he received a considerable sum of gold from the grateful *encomenderos* of New Spain (Keen 1984:92).

Las Casas would have managed to disturb some consciences in the Old World with his arguments, setting a precedent in the ordering of laws; however, the indigenous population continued suffering countless abuses (Salas 1959:167). While there was no declared winner in the debate, eventually it would have been Sepulveda's Colonialism (Friede 1952:408; Salas 1959: 199), which, in addition to strengthening the encomienda, would have helped to spread the notion that the indigenous peoples of the Valley of Mexico, particularly the Mexica, were a barbarians defined by their sacrificial practices.

During this time the most important books on indigenous religion and ritual practices were written; from this, it has been possible to study Mexica society and sacrifice.

[21] […] no es verdad dezir: que en la nueva españa se sacrificaban veynte mil personas ni ciento ni cincuenta cada un año: porque si esso fuera no hallaramos tan infinitas gentes como hallamos. Y esto no es sino la voz de tyranos: por escusar y justificar sus violencias tyranicas y por tener opressos y por dessollar los yndios que de la vendimia que hizieron restaron por esclavos y tiranizallos (Las Casas 1552: 45v).

Many were written by Spanish friars who had had the opportunity to live very closely with natuves. Such would be the case of Friars Toribio Benavente Motolinía,[22] Bernardino de Sahagún,[23] Diego de Durán[24] and Jerónimo de Mendieta,[25] who dedicated complete sections of their books to descriptions of human sacrificial practices. In contrast, the ritual immolation of animals did not attract the attention of the chroniclers.[26]

Mestizo and indigenous chroniclers had different attitudes towards sacrifice, but they had in common the intention of dissociating themselves from this practice, in order to preserve their privileges. An interesting case is Hernando Alvarado Tezozómoc, an indigenous nobleman and chronicler who presents two different visions of sacrifice in his manuscripts: the *Crónica Mexicáyotl* and *Crónica Mexicana*. In the first sacrifice is addressed in a neutral way; in the second, he condemns the practice because it was contrary to the Catholic religion.[27] These documents were written for different audiences and had

[22] This Franciscan friar is one of the "twelve apostles", that is, one of the first evangelizers to arrive in America. He wrote his main books, *Memorials* and *Historia de los Indios de la Nueva España*, between 1536 and 1543 (Gibson and Glass 1975:348-350). Despite his defense of the Indians, Benavente (Motolinía) was against Las Casas, whom he accused of obstructing evangelization. In response, the latter friar accused him ingratiating himself with the Crown (Keen 1984).

[23] The writings of this Franciscan are, without a doubt, one of the most impressive colonial manuscripts as they correspond to approximately forty years of data collection on the most diverse aspects of the indigenous cultures. *Primeros Memoriales* would have been produced between 1559 and 1561, while the *Historia General de las Cosas de la Nueva España* was written between 1575 and 1580 (Gibson and Glass 1975:364-366).

[24] Durán wrote his most important books between 1579 and 1581. Jesús Monjarás Ruiz (1994), considers him a conquered evangelist, who was absorbed and fascinated by pre-Hispanic religion.

[25] In his Historia Eclesiástica Indiana, written in the late 16th century, Mendieta focuses on the process of evangelization and sacrifice was barely mentioned.

[26] Most chroniclers refer to animals as resources, pointing out that the Mexicas had access to exotic species. Only Bartolomé de las Casas addresses the issue of animal sacrifice when he compares this practice between the Old and New World. However, most of his references on fauna immolation refers to Europe.

[27] Regarding the *Crónica Mexicáyotl*, it is well accepted that this document is the product of a collaboration between this chronicler and Domingo Francisco de San Antón Muñón Chimalpahin (Peperstraete 2010). On the other hand, Gabriel Kenrick Kruell (2013:216-217), considers Alvarado Tezozómoc as the true author of *Chronicle X*. According to his hypothesis it must have been written in Náhuatl, and the *Crónica Mexicana* was a translation into Spanish (and Duran's *Historia de la Indias de Nueva España*, an adaptation). On the other hand, Sylvie Peperstraete (2007) considers that Alvarado Tezozómoc is the translator of this work, but not the author. Whatever the case might be, clearly the indigenous chronicler's translation is much more

dissimilar objectives. The former exalted his indigenous origins, while the latter ingratiated him to Spanish eyes by affirming that the sacrifice was "the greatest and most abominable cruelty and sin that can be committed against the immense majesty of Jesus Christ" (Alvarado Tezozómoc 1944:332).

Among the mestizo chroniclers, it is worth mentioning Juan Bautista Pomar (1941, III:6), son of a Spaniard and descendant of the Texcocan ruler Nezahualcóyotl. According to his account, the Mexica were responsible for spreading sacrifice in the cities of Texcoco, Tacuba, Chalco, Huexotzingo and Tlaxcala. He concludes that:

> As for their ceremonies and sacrifices, what we have been able to get from the root, investigating the truth, is that the sacrifice of men to these idols, was invented by the Mexicans in this way: that after the Chichimeca lords of Azcapotzalco let them settle and populate where Mexico City is now, with the title of their vassals, with time they become relatives to the main men and lords of this land, for reasons that are told in their stories, they rebelled against their masters, and in such a way that, in a short time, they took up arms against them, subdued them, and for honoring their idols more they sacrificed men to them... (Pomar 1941, III:16).[28]

According to José Espericueta (2011:50-51), these statements were part of a narrative strategy to distance Texcoco from polytheistic religion and the practice of human sacrifice, both of which were interpreted as evidence of indigenous inferiority.

reliable than the one made by the Spanish friar (López Luján, in press), an aspect that will be consider when comparing excerpts about sacrifice that were written by both chroniclers.

[28] En lo que toca á sus ceremonias y sacrificios, lo que se ha podido sacar de raíz, investigando la verdad de ello, es que el sacrificio de hombres á estos ídolos, que fue invención de los mexicanos en esta manera: que después que los señores chichimecas de Azcapotzalco los dejaron asentar y poblar adonde ahora es la ciudad de México, con título de sus vasallos, andando el tiempo y emparentándose con hombres principales y señores de la tierra, por causas que en sus historias se cuentan, se rebelaron contra sus señores, y de tal manera, que tomando las armas contra ellos, en poco tiempo los sojuzgaron, y que por honrar más á sus ídolos les hicieron sacrificios de hombres…(Pomar 1941, III:16).

Diego Muñoz de Camargo, a mestizo of Tlaxcaltec and Spanish descent who identified himself more with the colonists, sought to disassociate Tlaxcala from sacrifice, considering that this "error and cruel use came from the province of Chalco" (Muñoz de Camargo 1998:155).[29] For Espericueta (2011:111), this statement reflects his desire to differentiate allies from Spaniards, based on moral criteria. Also, Muñoz de Camargo evaluated the issue of sacrifice within the framework of other traditions, such as the Jewish, and argued that this practice was not invented by the indigenous peoples (Espericueta 2011:105).

Towards the beginning of the 17th century, Hernando de Alva Ixtlilxóchitl (1952, I:39), also a mestizo from the Texcoco noble house, made clear who was responsible for human sacrifice, exempting his ancestors from this practice. In fact, the chronicler affirms that the Toltecs did not conduct human sacrifice and suggested that the Mexica were the ones who invented this practice. Moreover, he follows Pomar's ideas and considers that Nezahualcóyotl came to know the true deity of the Christian religion even before the arrival of the Spanish. This "unknown god" inspired the ruler to prohibit human sacrifices in Texcoco, just as Cortes did in Tenochtitlan (Alva Ixtlilxóchitl 1952, I, 251-255; II: 382). Despite his efforts to bring his ancestors closer to the god of the Spanish religion and please his audience, the chronicler finally recognized that the ban on sacrifice was not effective in Texcoco:

[29] This book would have been written around A.D. 1585 (Espericueta 2011).

> And though he could not in any way take away the sacrifice of men according to the Mexican rites, he still succeeded with them in sacrificing only those who had been at war, slaves and captives, and not their children and natives as they used to be accustomed (Alva Ixtlilxóchitl 1952, II:244).[30]

Mestizo and indigenous chroniclers largely guaranteed the continuity of their privileges by separating themselves from these practices and condemning human sacrifice. In this attempt, they contributed to the growing idea that the Mexica were the inventors and creators of this annihilating practice.

Meanwhile, European authors writing about the New World who believed in European superiority were responsible for building the stereotype of a barbarian, bestial, cannibal, sodomite, insensitive and ignorant Indian, whose destruction was a deserved punishment. Among these authors Giovanni Botero stands out in particular (Keen 1984:150-151). Not everyone agreed, however; Jacques de Miggrode applauded the defense of the Indian peoples by Las Casas, and he translated and published the work of this Dominican friar. However, despite these efforts, the work of Francisco López de Gómara[31] continued to be the most popular (Keen 1984:156-157).

During this period, the power of images was decisive for Europeans to construct an image of the inhabitants of America. Towards the end of the 16th century, Theodor De Bry's publications became popular throughout Europe. According to John H. Elliot

[30] Y aunque no pudo de todo punto quitar el sacrificio de los hombres conforme a los ritos mexicanos, todavía alcanzó con ellos que tan solamente sacrificasen á los habidos en guerra, esclavos y cautivos, y no á sus hijos y naturales como solían tener de costumbre (Alva Ixtlilxóchitl 1952, II:244).

[31] Spanish historian. His most important book, *The Conquest of Mexico*, was finished in 1552 and has a clear hostility towards Las Casas. Without having been to the New World, this chronicler supports the civilizing mission of Spain (Keen 1984:97-99), estimating an annual number of victims sacrificed from 20,000 to 50,000 (López de Gómara 1987:477-482).

(2003:7), readers of this epoch came to his books discovering the customs and appearance of natives of the New World, the encounters they had had with the Spaniards and the excesses of the conquerors. De Bry, born in Liège (now Belgium) was an experienced publisher and Protestant, whose interests were not with the Spanish Crown. According to Maureen Quilligan (2011:1), his work is a gold mine for scholars seeking visual material for understanding the attitudes Europeans had towards the "foreign other". While few images of the Mexica were published by De Bry, they focus on describing ritual activities, including sacrifice, bloodletting, and funerals. Interestingly, three of his plates refers to ritual immolation, all of them in the first part of his Ninth Book (Elliott 2003).

The first (Plate 6, Book Ninth) alludes to the capture and offering of hearts from animal victims. Undoubtedly, the passage that De Bry seeks to illustrate is the one corresponding to the *quecholli* month, where the Mexica went to the hill of Zacatépec to reenact a mythical hunt that would culminate in sacrifice of the prey. The picture shows the half-naked hunters chasing the animals and beating or shooting them with blowguns. From a European perspective, this passage explains the strange way the natives hunt; the author did not explicitly interpret it as a sacrificial act, possibly because of his own affinity with hunting (Figure 2).

Figure 2. Plate 6, "On how Indians Hunt," De Bry, Book Ninth (Elliott 2003:291).

On Plate 8 of Book Ninth, De Bry illustrates a heart extraction sacrifice scene performed on the Templo Mayor sacrificial stone; this building can be identified by the two shrines at the summit. The way in which the temple was shaped reflects how difficult it was for Europeans to imagine a different world. This building was represented as a circular tower, crowned by a platform decorated with skulls. On top, there are two small rooms with vaulted ceilings, representing the chapels dedicated to Tlaloc and Huitzilopochtli. Slaughter is performed with a knife of clearly European design and the incision made to the victim is longitudinal, ranging from the lower abdomen to the sternum (Figure 3). The

text accompanying this image describes the scene, warning the reader that the fate of this individual was anthropophagy.

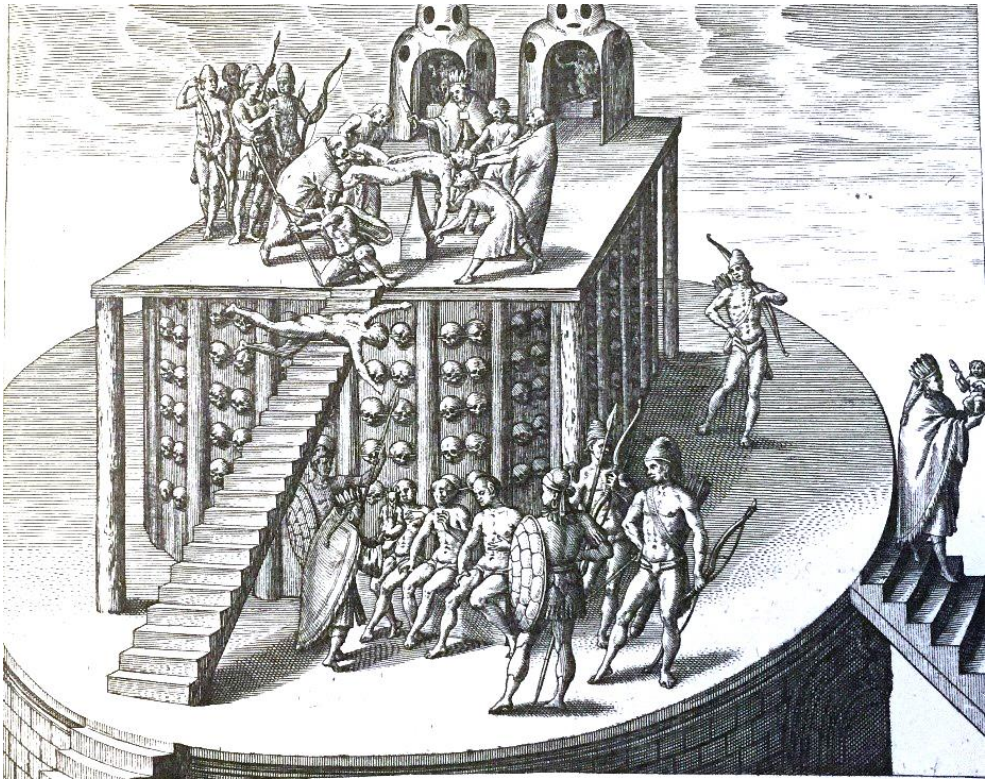


Figure 3. Plate 8, "On human sacrifices of the Indians of Mexico", De Bry, Book Ninth (Elliott 2003:293).

Finally, in plate 9 of the same book, is depicted the Mexica gladiatorial sacrifice in a European fashion. In this engraving there are several scenes that allude to different moments of the ceremony and the main actor: the sacrificial victim, "a prisoner or servant", acting as the impersonator of a deity. In the lower right corner, this individual has been offered food; above this scene is the cage in which the captive was kept during the night, preventing him from escaping. At the center of this engraving, the prisoner is walking down the street, while he receives reverences from those who find him in his path. The lower left

corner shows the moment of the fight with the captive half-naked and with his legs tied. Finally, the central lower part of the plate depicts the flaying of the sacrificial victim, who according to the text was "flayed alive"[32] (Figure 4).

Figure 4. Plate 9, "Another Way to Sacrifice Humans," De Bry, Book Ninth Elliott 2003:294).

In sum, through written chronicles and the unquestionable power of images created during the first century after the conquest, the foundations were laid for a negative stereotype in which the Mexica were synonymous with human sacrifice.

[32] As I will discuss, flaying is a posthumous treatment.

Towards the Creation of a National Identity

During the 17th century, Spain's economic problems led to a greater need for natural resources from the New World, intensifying the exploitation of indigenous population. The stereotype of natives as barbarian sacrificers made it to justify the looting of New Spain and the abuses against its inhabitants. Writers such as Antonio de Solís (1771), were very useful for the Spanish cause, while others such as Juan de Palafox (2006:39-41) defended the natives, considering them to be full of virtues such as cleanliness, humility, courage, justice and innocence.

During the second half of this century, an emblematic figure emerged in the American continent: Carlos Sigüenza y Góngora, a Creole intellectual interested in Mexico's past. According to Rolena Adorno (2014:12, 14), he would begin the academic study of Mexican antiquities from a perspective that was intended to dignify the past as something historical. In this sense, this scholar compared the Greco-Roman mythology with that of the Mexica, rejecting the belief that their ritual practices were idolatries and superstitions (Adorno 2014:13).

In the early days of the European Enlightenment on the 18th century, Spanish intellectuals Benito Jerónimo Feijóo and José del Campillo accused the Spanish conquerors of war crimes and the exploitation of indigenous peoples. Despite this, there was still a widespread notion that natives were inferior (Keen 1984:234). However, such attacks by Europeans on indigenous and Creole people would help to strengthen a national identity in the New World. The controversy over human sacrifice gradually began to fade away, ceasing to be a central topic of debate.

For example, the Creole Juan José de Eguiara y Eguren dedicated several pages to refute the idea that all the inhabitants of the American continent were inferior beings. He defended the indigenous people, arguing for the greatness of the Mexica Empire (Comes Peña 1999:188). From this moment on, at least in New Spain, the stereotype of indigenous peoples as "sacrificers" was set aside in favor of a more romantic vision of the past. This would be extremely useful in forging the identity of an independent nation.

In Europe, this was not the case: the bitter debate over indigenous capabilities continued. Georges-Louis Leclerc Comte de Buffon, Oliver Goldsmith and Cornelius de Pauw, were known for their opinions critical of America: its flora, fauna and of course its inhabitants. (Browning 1978:290-292). De Pauw (1771: 254-255) brought the issue of human sacrifice and cannibalism to the debate, accepting as a fact that the Mexica sacrificed twenty thousand children per year and that sixty-four thousand were slaughtered during the inauguration of the Templo Mayor under the command of Ahuítzotl. Although the Pauw's claims had detractors among the Europeans themselves,[33] the most forceful response was given by the creoles, especially those Jesuits who had been expelled from the New World. Among them is Francisco Javier Clavijero; in his *Historia Antigua de México* deals with various aspects of religion, political, economic and social organization of the Mexica. Although he mentions the practice of sacrifice on several occasions, he does not consider it central or definitory for the Mexica. Very much in the style of Las Casas, he reminds readers that the Spaniards also performed sacrifice in ancient times (Browning

[33] For example, scholars such as Voltaire joined the debate. For this philosopher, the fact that the Mexica could combine greatness with barbarism was explained by the fact that human nature combines the best and the worst. In addition, he was skeptical of the numbers of sacrifices, but also of the number of atrocities that Las Casas attributed to the Spanish conquerors (Keen 1984:267).

1978:301). Clavijero represents a generation of *criollos* who were not satisfied with the Crown of Spain and, in the search for a national identity, glorified the pre-Hispanic past.

After Mexican Independence, references to sacrifice as an indicator of the "degree of civilization" of natives began to fade away in the academic world. With the emergence of anthropology in the 19th century, came the first formal attempts for understanding this phenomenon from a scientific perspective.

Sacrifice in Popular Imagination of the 20th and 21st Centuries

In a nationalist atmosphere that exalted the greatness of the past, a series of books for children were published under the title of *Biblioteca del Niño Mexicano*, written by Heriberto Frías between 1899 and 1901, with covers by José Guadalupe Posada. This series deals with the history of Mexico and consists of 110 fascicles. Although these were not official books, they were an opportunity to learn history, generating a deep sense of nationalism at an early age. The publication was a great success. According to Roberto Quevedo (2004: v) "almost all the texts are pseudo-moral articles, pamphlets that try to glorify the nineteenth-century nationalism of the Porfiriato", glorifying war and legitimizing xenophobia, racism and classism (Quevedo 2004: v). In addition to the content written by Frías, most of Posada's illustrations depict violence, whether through war, sacrifice or inquisition. Four of its covers depict scenes of sacrifice by heart extraction and decapitation.[34]

[34] *The dream of Tenochtitlan or the origin of bloodthirsty fanaticism* (1899), *The mountain of skulls or the cruelties of Ahuítzotl* (1900), *The story of King Acamapitzin* (1900) and *The dreadful punishment or the rain of blood* (1900).

One of these publications, *La montaña de cráneos o las crueldades de Ahuítzotl* (Frías 1900), has a cover where dozens of human heads were severed before the sinister gaze of the ruler (Figure 5). The book narrates how the older priest gives a speech to Ahuítzotl:

> This means, oh great king, that you must cover your empire with the corpses of your enemies and that the god of war, who has protected you so much in battle, wants you to give him offerings of death and extermination (Frías 1900:4).

Figure 5. Cover of *La montaña de cráneos o las crueldades de Ahuítzot*l, by José Guadalupe Posada, published in 1900 by Maucci Hermanos.

The stereotype of the sacrificial Mexica was deeply rooted in the popular culture of the early 20th century, but with a very different emphasis than previously observed. With the appearance of film and TV, movies such as *El signo de la muerte* (1939)[35] and *La cabeza viviente* (1963)[36] were produced, in which sacrifice was the central topic. In the first, a sect seeks to murder maidens by heart extraction using obsidian knives, all under the instructions of the most distinguished archaeologist of the time. Interestingly, ritual murder is handled with great spontaneity and humor, as can be seen in the conversation between a woman and a journalist, while they listen the lecture given by the archaeologist:

> Woman: "What an admirable civilization, isn't it?"
> Journalist: "Do you think so?"
> Woman: "Of course. What better destiny than to offer your heart to the deity, to calm her anger with your own blood, to die for the sake of a sacred rite, naked and held by four priests.

In *La cabeza viviente*, a mummy and the severed head of a priest have come to life to commit crimes, in an atmosphere of "idolatry and superstition; blood and death". Not surprisingly, the victims were killed in the old-fashioned way: heart extraction with the "classic obsidian knife".

With the introduction of Internet it is possible to confirm that this stereotype remains deeply rooted worldwide. For example, the most recurrent images associated with

[35] Directed by Chano Urueta, with the performances of Mario Moreno Cantinflas, Manuel Medel, Elena D'Orgaz, Carlos Arellano, among others.
[36] Also directed by Chano Urueta for Alameda Films. With performances by Germán Robles, Ana Luis Pelufo, Abel Salazar and Mauricio Garcés.

the keyword "Aztecs" are the emblematic Calendar Stone or Sunstone and scenes of sacrifices from codices.[37] In a web search on "human sacrifice" (worldwide), a vast number of images corresponded to the Mexica.[38] In contrast, a web search with "Mexica" as a keyword resulted in diverse images ranging from archaeological objects to contemporary dancers.

Social networks can be used to assess the perception of non-specialist audiences and their interaction with academia. For example, *Arqueología Mexicana* magazine has more than 1,300,000 followers on Facebook. Without any doubt, the articles receiving more comments on this page are those on human sacrifice. An example of this is its publication on January 4th, 2017, when the magazine shared the report in which the minimum number of individuals who have been sacrificed in the sacred site of Tenochtitlan was published (Chávez Balderas, Barrera y García 2017).[39]

The headline of this note encourages controversy (Figure 6): "519 slaughtered in Tenochtitlan! Are they many or few?" This publication received 162 comments, most of them expressing one of two positions: one denying the existence of sacrifice and the other admitting this practice, believing that it should be studied by specialists. On one side, several users attacked Spain, the Catholic religion and archaeologists, claiming that sacrifices did not exist and were an invention to justify the genocide. A couple of comments claim that the magazine and the archaeologists are Spanish and that they were paid for by

[37] An Google search with the keyword "Aztecs" produced the following results: 24% corresponded to the Calendar or Sun Stone; 23% to warfare and sacrifice; 15% to historical scenes depicted in codices and contemporary artwork; 10% to maps; 10% to photos of the Maya site Chichén Itzá and the rest to archaeological objects, cotemporary dancers, archaeological sites, among others (N=70).
[38] A Google search on "human sacrifice" produced the following results: 44% corresponded to sacrificial scenes from different cultures worldwide and all temporalities; 39% to Mexica sacrifice; 12% were contemporary references to violence; 4% were related to Mayan culture and 1% to Peru (N=80).
[39] https://www.facebook.com/arqueomex/posts/1291326494238959?pnref=story.

the church or by the "Creole bourgeoisie", statements that triggered a discussion on the mestizo culture of Mexicans. Those who deny the existence of sacrifice have a radical view of a perfect past and tend to engage in discussions defending Mexica greatness by using insults and threats. Some comments pointed out that human sacrifice was common throughout the history of humanity; others argued that the Mexica were cruel to the societies they conquered; others claimed that the oral tradition of their people corroborated the existence of sacrifices. Several writers, including some anthropologists, defend the scientific method and the interpretation of evidence. Based on the comments on this news story, I conclude that a considerable number of participants think of sacrifice as an indicator of the "degree of civilization", rather than as an anthropological phenomenon that must be studied.

Figure 6. *Arqueología Mexicana*'s post on the social network Facebook.

The internet is a vehicle for exploring the vast spectrum of ideas on sacrifice as well as a major medium of communication. Of course, it is not the only one. In fact, literature has been a fundamental tool in spreading Mexica history, intertwined with fiction. One example is the book *Aztec* by Gary Jennings, written in 1980. While the author relied on historical sources, in Michael E. Smith's view (2001:97) this is a novel "full of violence, blood and gore, and frequent sex".

This glorification of sacrifice is not only present in adult literature. All kinds of audiences are exposed to stereotypes created by prejudice, sensationalism, sometimes with racist overtones. For example, like the *Biblioteca del Niño Mexicano* written more than a century ago, children are exposed to stereotypes. To prove this point, I will mention two books written for this specific audience. The first is Fiona McDonald's *You Wouldn't Want to Be an Aztec Sacrifice* (2013), a book that promises "gruesome" details. On the cover, an unarmed victim is defeated by a fierce warrior dressed like an eagle (Figure 7). Although the manuscript offers interesting information on the daily life of the Mexica, the author considers human sacrifice as a central feature of this ancient society. The second book, Terry Deary's *The Angry Aztecs* (1997), is one in a series that supposedly seek to educate young audiences on world history. This paperback edition was announced as a source of information on "…Cuahtemoc (sic) and people with unpronounceable names, whose idea of fun was ripping out human hearts".[40] The cover depicts a captive and a warrior, standing at the foot of the Great Temple which was covered with blood and human bodies (Figure 8). These types of books are a reminder to all scholars of the need to promote education to broad audiences, in addition to conducting research projects.

[40] The back cover suggests young readers: "Read on for human sacrifices, Mayan mysteries, sacrifices, a suffering slave's diary, and more sacrifices." In addition, the author promises to answer, "why the Aztecs liked to eat scum, when the world is going to end and how to play a *really* violent ball game" (Deary 1997).

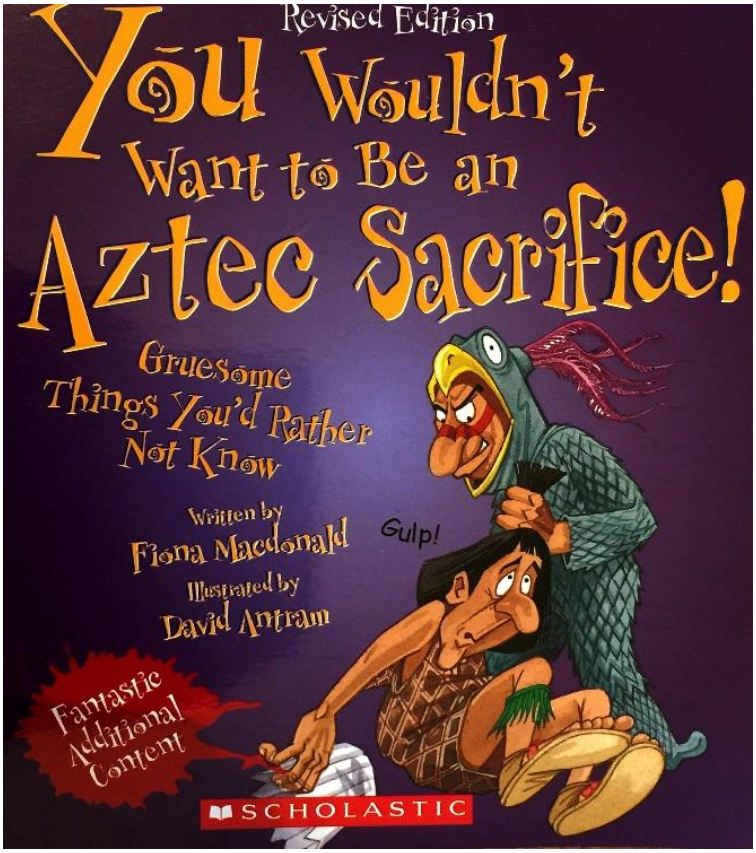


Figure 7. *You Wouldn't Want to Be an Aztec Sacrifice* by Fiona McDonald (2013).

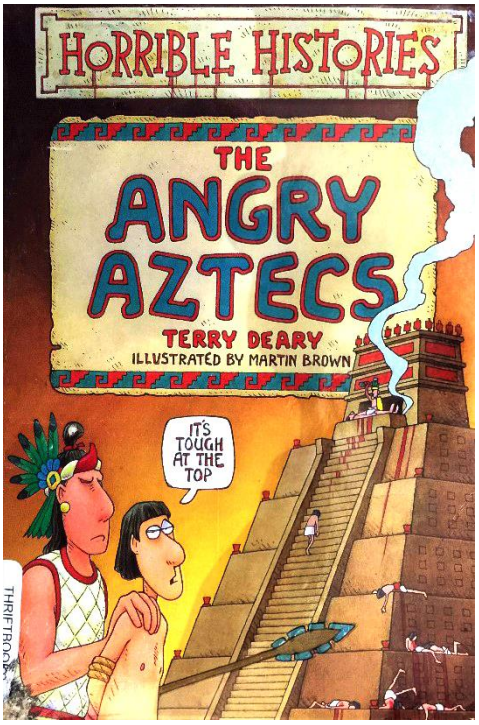


Figure 8. *The Angry Aztecs (Horrible Histories)*, by Terry Deary (1997).

In sum, the identification of the Mexica with human sacrifice began before the arrival of the Spaniards during the expansionist period, when public display of state sponsored violence was common. The decisive period in which this stereotype was developed and strengthened was during 16th and 17th centuries, particularly through the voice of Spaniards who, like Sepulveda, were seeking economic or political benefits regardless of the consequences for the native population. Over the years, attitudes towards this phenomenon have diversified, but the stereotype of the "Aztec sacrificer" is deeply rooted worldwide. On the other hand, animal slaughter has remained secondary to the discussion and has been minimized. But… in academia, how are human and animal sacrifice conceptualized and distinguished? I shall now explore this topic.

Theories on the Origin and Function of Sacrifice

Etymologically speaking, *sacrificium* is composed of two Latin words, *sacer* (holy) and *facere* (to make); it literally means to make or to transform something into a sacred object or being. In the words of Edwin Oliver James (1962: 13), it implies "destruction of a victim with the purpose of maintaining or restoring a right relationship of man to the sacred order". For this research, I consider that the destruction of ritual goods (artifacts or organisms) is key to distinguishing between sacrifice and other oblatory practices. I regard this practice as the offering of life, where humans, animals, plants and objects were destroyed to communicate with the sacred. Objects can be included on this category as sometimes they were thought to be charged with supernatural forces or to be recipients of life.

Human and animal sacrifice have been practiced worldwide since ancient times. However, it is difficult to trace their origins, since to consider the murder of a living being

as sacrifice, it must be performed in a ritual setting. In this sense, it is practically impossible to discern when the hunting of an animal ceased to be an act of subsistence and acquired sacred connotations. Likewise, although cannibalism and sacrifice can be linked, they are not always related. Cannibalism has existed for hundreds of thousands of years among members of the genus *Homo*,[41] but it is hard to tell whether it was for food purposes or had any symbolic connotations. Moreover, in case of ritual cannibalism the context could be funerary and not necessarily sacrificial.

There is evidence of cannibalism since at least the Neolithic times. It has also been documented in all continents, including cultures traditionally considered classical or emblematic: Egyptians, Phoenicians, Greeks and Romans (Las Casas 1967, II; López Austin and López Luján 2009; Graulich 2016). Ritual killings of animals continues to be practiced in various cultures. In contemporary Mexico it is performed among the Tlapanecos, Tzeltales and Huicholes (Dehouve 2010; Figuerola Pujol 2010; Neurath 2010). Human sacrifice is prohibited by law, although there is evidence of such sacrifice in religious sects around the world. For example, it is estimated that some 5,000 people are part of these sects and some perform animal and sometimes human sacrifices; only the latter are punished as criminal cases (Birkhoff et al. 2014). In Mexico, this practice was documented in the 1980s associated with the construction of buildings in which the victims were usually outsiders and marginalized. Although these stories appear to be reliable, there is no physical evidence to corroborate these claims (Figuerola Pujol 2010:536-541).

[41] The most convincing early cases have been documented for the species *Homo antecessor* and *Homo neanderthalensis*, dating back 780,000 years for *H. antecessor* (Defleur, et al. 1999; Fernández Jalvó, et al. 1999).

Given the nature of sacrificial practices, numerous attempts have been made to explain it. From a scientific perspective, the first research on this topic was carried out in in the fields of anthropology and history of religion in the late 19th century. These investigations pursued an understanding of sacrifice as a universal practice, based on a comparative study. The first book of this nature was written by Edward Burnett Tylor, who is considered the founder of cultural anthropology. In 1871 he published *Primitive Culture: Researches into the Development of Mythology*. In this manuscript he proposed that sacrifice was a gift that could calm the gods and obtain favors in return. Under this evolutionary approach, as time passed sacrifice became a homage that no longer expected reciprocity. Tylor's theoretical premises were criticized for treating sacrifice simply as a gift (Hubert and Mauss 1964: 2), arguing that it is a much more complex phenomenon. Interestingly, Tylor considered religious rites as "expressive and symbolic performances, the dramatic utterance of religious thought, the gesture-language of theology" (Tylor 1891, II:362). Similar approaches are currently under exploration by the Theory of Performance, as I will discuss.

In *The Golden Bough,* published in 1890 by James George Frazer, the author explains sacrifice as a form of rejuvenation and strengthening of the deity. In this book Frazer analyzed some aspects of Mexica festivities. He was especially interested in corn ceremonies because these cases supported his idea that sacrifice and food are related (Frazer 1900, III: 136). While this connection may be recognized in some cases, not all sacrifices can be evaluated from this perspective, as will be discussed below.

In 1894, William Robertson Smith published his emblematic book *Lectures on the Religion of the Semites. Fundamental institutions*. Smith regarded sacrifice as a basic rite

in ancient religions, and subsequently developed a controversial theory linking this practice with totemism.[42] Smith focused on fauna sacrifice, arguing that through the immolation and consumption of totemic animals, a communion was established between the social group and a deity, restoring a broken bond (Smith 1927). Under this logic, both expiatory and propitiatory sacrifices were derived from communion (Faherty 2016). Smith's ideas were criticized because he believed that totemism was a universal condition and this model certainly is not applicable to the Mexica case. His idea that all types of sacrifice originate from a primitive form was also refuted (Hubert and Mauss 1964: 5, 95).

Four years later, an important essay was published that would transform the study of sacrifice, since many of its contributions are still recognized: *Sacrifice: its nature and function*, written by Henri Hubert and Marcel Mauss in 1898. For these authors sacrifice is "a religious act which, through the consecration of a victim, modifies the condition of the moral person who accomplishes it" (Hubert and Mauss 1964:13).[43]

Among the propositions that stood the test of time, is the authors' identification of three participants in sacrifice: *sacrifier*, *sacrificer* and *victim*. Two additional categories are also defined: the places and instruments for this practice. The *sacrifier* offers the victim and receives benefits or outcomes from the ritual act: he can be an individual or a group. When the *sacrifier* gains the rewards of action, it is a personal sacrifice; when an object (real or ideal) is affected by an action, it is identified as objective sacrifice (Hubert and Mauss 1964:10, 13). On the other hand, the *sacrificer* is the one who kills the victim; he is

[42] Under this approach, a community believes to have a relationship of ancestry or kinship with a spirit, which generally takes the form of an animal, plant or object and manifests itself through a totem, an effigy that is venerated.

[43] In this regard, the authors caution that, although sacrifices are consecrations, not all consecrations are sacrifices (Hubert and Mauss 1964:9).

an intermediary to the *sacrifier*. However, it is possible that the same person assumes both roles simultaneously.[44] On the other hand, the object or living being that will be destroyed in the ritual act is the victim, and its death is an irreversible act of consecration to be reborn in the sacrament.[45] Usually, the sacrificial actors must receive ritual preparation prior to participating in the sacred act; these may consist of purifications, consecrations or lustrations, among others. Sometimes the use of intoxicating beverages can be taken as a sign of possession implying that they are prepared for the ritual (Hubert and Mauss 1964:12, 22-23, 30-35).[46]

For these authors, the occasions in which sacrifices are made are diverse, but they can be divided into regular and occasional.[47] They must be carried out in specific places and with certain instruments for this purpose. Beyond the sacred space, sacrifice can be considered simply as murder. When immolation takes place in an everyday place it is necessary to consecrate it; if it was already considered sacred this step is not necessary (Hubert and Mauss 1964: 14, 25).

It was not until the mid-20th century that sacrifice was studied extensively by Mircea Eliade, one of the most emblematic figures in the field of history of religions. According to this author, numerous cultures share the notion of a primordial sacrifice, in which the cosmos was created from the slaughter of a mythical being. Its assassination

[44] Such is the case of the Mexica rulers as I will mention on chapter 3.
[45] In the case of the Post-Classic Nahua, some victims were considered sacred even before the immolation. Such was the case of the images or impersonators of the deities. Hubert and Mauss (1964:77) considered the deity sacrifice to be "the most perfected form of the historical evolution of the sacrificial system".
[46] I will reexamine this classification on chapter 3 for understanding the role that each actor played in sacrifice. Of course, I will focus on the victims, whose skeletal remains were analyzed.
[47] In the case of Mexica rituals, the first ones are considered periodic, while the latter are considered exceptional. The first ones correspond to calendrical celebrations, while the second ones are funerals, rituals for rain petition, coronations, among others (Olmedo and González González 1986: 49; López Luján 1993: 103).

would mark the beginning of the necessity of eating, the fate of death and sexuality (Eliade 1959: 55, 101). One of the many contributions of this scholar was to highlight the diversity in ritual immolation that has been practiced throughout human history. For example, Eliade discusses consecrating sacrifices which are interpreted in terms of a transfer of the victim's life and soul to the building under construction. He also notes the existence of sacrifices for the inauguration of buildings, which would mark the beginning of a new life (Eliade 1959:56-57). Throughout his work, Eliade insists on the importance of myths, narratives reenacted in human time through rituals. Many of his ideas influenced scholars dedicated to the study of the Mexica sacrifice, as I shall discuss in chapter 2.[48]

Another important figure in this field is Edwin Oliver James who published his book *Sacrifice and Sacrament* in 1962. In this work the author considers that destruction is the essential act that defines sacrifice; paradoxically this enables the preservation of life in a broad sense. An issue highlighted is the consecration of the victim: the latter receives the divinity through consecration and it is released through immolation. From this act the victim, whether human, animal or vegetable, connects with the sacrificial agent, a bond that unites them. The author considers this to be important for fauna sacrifice, as animals represent the powers that humans lack. During immolation, blood plays a primordial role because it is the vehicle of life, having effects on the living, dead, humans and supernatural beings; for this reason, blood offerings are considered the most effective (James, 1962:15, 18-19, 27). In sum, from this perspective, the offering of life preserves life.

[48] For example, *Muerte a filo de obsidiana* by Eduardo Matos Moctezuma (1978).

Since the 1970s and 1980s, diverse theoretical approaches to sacrifice have been developed; such is the case of René Girard's *Violence and the Sacred* (1977). This author considers sacrifice as an ambivalent practice: it is both an obligation and a criminal act; therefore, it needs to be evaluated in terms of violence. The victim is neither guilty nor innocent, but indifferent and "expendable", because it is a means by which violence can be diverted. In this sense, animals or humans immolated in the ritual act are substitutes for a community that protects itself from its own violence; this will restore collective harmony. Under this view, sacrifice is an act of violence, but it does not imply the risk of revenge: it prevents conflicts within the community (Girard 1977: 1-4, 8,13).

In the same year was published Homo necans*: The Anthropology of Ancient Greek Sacrificial Ritual and Myth*, written by Walter Burkert. This author proposes that ritual sacrifice derived from hunting practices during the Paleolithic. In other words, originally it was an act to fulfill food requirements, but it was ritualized gradually. In this sense, the hunt was practically a dramatic performance intended to canalize aggression in the group. For Burkert *Homo sapiens* is a hunting ape, so he labels it as *Homo necans* ("man the killer"). Therefore, he believes that the study of chimpanzee hunting behaviors can help elucidate the evolution of this phenomenon in humans (Burkert 1983:164-166). Of course, his theoretical assumptions were criticized because other species have complex hunting strategies. In addition, although there may be a link between sacrifice and hunting, as I will discuss, these are two phenomena that can coexist and overlap, but which do not necessarily correspond to two stages in an evolutionary chain.

Towards the end of the 1980s, the trend of attributing multiple meanings to ritual murder began. For example, Joseph Henninger (1987: 8001-8002), highlights the existence

of sacrifices of praise (veneration, homage), thanksgiving, supplication (to maintain cosmic order), expiation (when a moral fault was committed or as purification) and for the reenacting mythical events. Interestingly, the author suggests that some or all forms of sacrifice can be combined in the same ceremony.[49] For the study of the sacrifice Henninger (1987: 7997) argues that it is necessary to answer the following questions: who offers the sacrifice, what is the offering, where and when are offered, who is the recipient of the sacrifice and for what reasons are the sacrifices offered.

Finally, this author emphasizes that sacrifice has been transformed over time. These changes concern the quality and quantity of the gifts offered, although they can be substituted for economic, ethical or moral reasons; an example of this is the replacement of human victims by animals. Other transformations involve time and space (which may be caused by the centralization of worship), changes in the social status of the offerings or the motivations of the ritual (Henninger 1987: 8002).

In the 1990s, Nancy Jay (1992), under a gender perspective, asked a question that had not been previously addressed: why is sacrifice often the religious institution in which the gender dichotomy is most obvious? Under a pattern of patrilineal domination, in various traditions of the world, women play a secondary role in the active realization of sacrifice, that is, they are often included as victims, but not as sacrifiers or sacrificers. [50] This dichotomy extends to most religious offices like priest, cardinals, bishops and so forth.

[49] In that same year Mexican scholar Martha Ilia Nájera (1987) developed a very similar classification, which I shall discuss on chapter 2.

[50] Such is the case of the Mexica sacrifice where scarce information is available on the active participation of women in the sacrificial act as sacrifiers (dedicating the victim) or sacrificers (performing the immolation).

In recent years there has been a proliferation of case studies, research on bloodletting, animal sacrifice, and gender roles, among others, seeking to explain the powers of ritual violence (Carrasco 2013). Among the new approaches to the function of sacrifice function is the one proposed by Joseph Watts and colleagues (2016), who argue that sacrifice promotes and sustains the evolution of stratified societies because it legitimizes political authority through the exhibition of sponsored state violence. This reveals a link between religion and hierarchical societies. Although similar hypotheses were suggested earlier, these researchers used Bayesian phylogenetic methods in a series of data from 93 Austronesian cultures, testing hypotheses by using phylogenetic language, computational models and historical data. The conclusion is that sacrifice co-evolved with social stratification. While the authors recognize that each culture can attribute a specific symbolic function to practice, sacrifice plays a central role in the construction and maintenance of such societies, strengthening their transformation from egalitarian to hierarchical (Watts et al. 2016:229-231). However, identifying early evidence of sacrifice is a challenge.

Alongside the development of general theories on the function of sacrifice in different cultures, various proposals have been formulated in an attempt to explain the meaning of ritual immolation among the Mexica; these will be discussed below.[51]

[51] On Mexica, books written by Yólotl González Torres (1985), David Carrasco (1999) and Michel Graulich (2016) are outstanding, as well as the volume coordinated by López Luján and Guilhem Olivier (2010).

Theories on the Function of Mexica Sacrifice

While most scholars of the Mexica sacrifice agree that this phenomenon was intended to ensure the functioning of the universe, there are different interpretations on this practice. Sacrifice has been explained in terms of the rejuvenation of deities, reciprocity, energy transfer, demographic pressure, economic benefit or political domination, where the trend is to consider it as a polysemic practice, involving a diversity of meanings and expressions at the same time. I shall now discuss the development of the leading theories on Mexica sacrifice, proposed over a century of studies.[52] These proposals were all formulated for human immolation, but I will demonstrate that most of these ideas also apply to animal sacrifice.

At the beginning of the 20th century Konrad Theodor Preuss considered that the function of sacrifice was the rejuvenation of deities, an approach very much like Frazer's contemporary writings. According to Preuss (2008: 88-95), the Mexica believed that the sky was the scenario in which the sacrificial struggle between the sun and the stars was carried out daily; this was reenacted in the human world through rituals. Under this logic, the gods found rejuvenation and renewal through death. It also establishes a relationship between the perforated stones of the ball court (markers) and the sacrificial *temalácatl* stone. Olivier and López Luján (2010:21) pointed out that this insightful researcher had also established a link between sacrifice and punishment.

[52] In this section, I will talk about the main hypotheses developed for Mexica sacrifice. For a discussion on academic perspectives formulated in the first half of the 20th century, the reader should refer to Graulich's work (2016:14-17).

Another function that has been attributed to sacrifice is reciprocity, as proposed by Alfonso Caso in his book *La religión de los Aztecas*, published in 1936. The author states that people sacrifice in reciprocity, that is, to reciprocate the gods because they were sacrificed to create humanity. For this reason, human beings have the obligation to feed the deities with sacrificial blood; the victim is a messenger of the Mexica's desires. Under this logic, sacrifice is food (Caso 1936:10; 1962:95-98). In his view, the Mexica ceremonies had both "bloody aspects and kind manifestations". Among the former he considers sacrificial techniques, including heart extraction, beheading, fire immolation and gladiatorial sacrifice.[53] He defines cannibalism as a ritual practice with no dietary purpose, in which the captive could be considered as a son or daughter. This scholar emphasizes that, besides anthropophagy, there was another type of communion: the consumption of the effigy of the god of war Huitzilopochtli (Caso 1936: 11, 38-39). The idea that the flowery wars -*xochiyáoyotl*- had only the function of acquiring war captives became popular thanks to this researcher. This notion has provoked several controversies in recent decades, as some have considered that its link with sacrifice has been overestimated (Hassig 1988; Cervera 2007, 2011).

Eduardo Matos Moctezuma (1978: 53-57) is another scholar who emphasizes reciprocity as a function of sacrifice. Under this view, deities were sacrificed in mythical times, making human life possible; consequently, they need sacrifice to survive. Thus, Mexica sacrificial rituals "are the base for reenacting the primeval myth"; therefore, there must be an affinity between the victim and the god (Matos Moctezuma 1978: 57, 59).

[53] From osteological information, we disagree on the identification of sacrificial techniques, as I will discuss in chapter 3.

Interpretation of the Mexica sacrifice as an "energy transfer" has been very popular among authors such as Yólotl González Torres, Christian Duverger[54] and Jill Mckeever Furst, each of them with different approaches. Research by González Torres (1985) constitutes a starting-point because it is the first publication devoted to the study of sacrifice. [55] She defines human sacrifice as:

> […] the immolation, the destruction, by various means, of a human being's life, to establish an exchange of energy with the supernatural for influencing and reproducing the natural and supernatural world (this is what some researchers call magic); this is done by providing the energy necessary for a proper balance in the cosmos, including society; this is why one of the most important functions of sacrifice, like any ritual, is to regulate (González Torres 1985:28-29). [56]

In this sense, ritual death (*tlacamictiliztli*), unlike natural death (*tlalmiquiztli*), transfers energy to the universe; blood is the vehicle (in the form of food), which carries energy. Under this logic, immolation releases forces that feed the sun, ensuring life's continuity. Although González Torres embraces the energy transfer theory, she does not focus on this and her perspective is very holistic and innovative. For example, she considers sacrifice as a means for exploiting dominated nations, involving economic implications. Moreover, sacrifice is a reciprocity for the gods, which is offered as a selfish offering (González Torres 1985:18, 26, 28).

[54] This author emphasizes the economic function of sacrifice, which is why I will mention him later.
[55] In addition, the author explores the geographical distribution of this practice in other world cultures.
[56] […] la inmolación, la destrucción, por diversos medios, de la vida de un ser humano, a fin de establecer un intercambio de energía con lo sobrenatural para influir en el mundo natural y sobrenatural y reproducirlos (es lo que algunos investigadores llaman magia); esto se realiza por medio de la aportación de la energía necesaria para que exista un equilibrio adecuado en el cosmos, lo que incluye a la sociedad; de aquí que una de las funciones más importantes del sacrificio como la de todo ritual, sea la de regular (González Torres 1985:28-29).

This energy transfer is not only an exchange between the victim and the cosmos. For McKeever Furst (1995:137), sacrifice permitted the extraction of life forces from the captive to the captor. In fact, she considers that, after immolation, the victim is like a squeezed sponge with no more *tonalli*.[57] Although this proposal is suggestive, it is not clear whether the energy was transferred to the sacrifier or sacrificer, or both.

Human sacrifice has also been interpreted as a mechanism to deal with demographic pressure. Michael Harner (1977) proposes that sacrifice originated from the need of human flesh for food consumption. Demographic growth and the supposed lack of protein caused by a diet based on corn consumption would have triggered this need. Under this logic, cannibalism was a form of subsistence and not a ritual act. As would be expected, this theory has been widely criticized, as many other cultures have been exposed to greater demographic pressures and have not adopted this solution. One of Harner's critics was Bernardo Ortiz de Montellano (1993), who demonstrated through a detailed study that the pre-Hispanic diet fulfilled all the nutritional requirements.

From the examination of decapitated victims recovered during the excavations of the Templo Mayor of Tenochtitlan, they appear to have been in good health conditions with only with a few individuals showing indicators of mild metabolic stress (Chávez Balderas 2017). On the other hand, the children from the Offering 48 (buried also in this building), had health problems associated with poor nutrition, but they were not cannibalized. This selection pattern, based on health conditions, is related to other ritual aspects associated with the cult of Tláloc, god of rain (Román Berrelleza 1990).

[57] *Tonalli* was one of the three soul entities that composed the human body, as I will discuss later.

Consequently, the children who were not dedicated to this deity tend to have better health (Chávez Balderas 2017).[58]

In the late 1970s, Christian Duverger argued that the function of sacrifice was fundamentally economic. Although he recognizes the existence of an energy transfer, he considers that ritual immolation was central to Mexica economy, even more important than agriculture and war. With a clearly reductionist approach, the author proposes that ritual calendar festivities were nothing but a scenario for sacrifice. I consider this unrealistic because these ceremonies are of great symbolic complexity (see Graulich 1999, 2016). Furthermore, sacrifice was not carried out during all festivities. Under Duverger's approach, war was made for obtaining sacrificial victims, minimizing the economic importance of tribute. The author supports his ideas by considering that the number of sacrificial victims given by the chroniclers is accurate, for example, that more than eighty thousand individuals were sacrificed for the inauguration of the Templo Mayor, during Ahuítzotl's government (Duverger 1993: 91- 97, 119, 175, 190). Archaeological evidence from the last decades refute these ideas. Although there is a connection between sacrifice and war, many sacrificial victims, including women and children, were obtained by other means. Moreover, the immolation did not appear to involve the number of people Duverger claimed.

John Ingham (1984), in contrast considers sacrifice as a means of political domination. This author proposes that massive immolations allowed subjugation of weak

[58] Diana Moreiras of Western Ontario University is currently conducting carbon and nitrogen isotope analysis from all children recovered at the Tenochtitlan Templo Mayor; this will provide a detailed understanding of their diet.

individuals to guarantee the continuity of the community and the cosmos. In this sense, the sacrifice offered to the gods was a metaphor for the tribute collected by the Empire. Under this logic, cannibalism would symbolize the political assimilation of the conquered. Moreover, it is a form of intimidation to avoid insubordination; thus, in sacrifice, relationships of domination are reproduced (Ingham 1984: 379, 393, 397). Although I agree with several of the premises proposed by this researcher, I believe he minimizes the religious function of this practice.

Some of the approaches outlined in this section were refuted in 1980 by López Austin in his book *Cuerpo humano e ideología*. In the author's view, many of the above functions, while true, are secondary. Among them is the ability to move up the social pyramid by capturing victims, the increase of fear or the establishment of a political balance. In contrast, this scholar considers other postulates to be implausible based on historical and archaeological evidence. For example, the belief that individuals were sacrificed to take posession of their land or that population pressure incited massacre and cannibalism (López Austin 1996: 435-437). On the contrary, empty lands were few and scattered and expansion demanded resources not territory.

The trend in recent decades is to study sacrifice as a polysemic practice. For example, David Carrasco (1999: 63, 73) explores various dimensions of ritual killing. The human body plays a fundamental role in sacrifice because it contains essences that must be renewed periodically, since it was perceived as a vulnerable link to vital cosmic forces. The author also sees sacrifice as a form of violence and domination, which counteracts threats of rebellion and environmental fluctuations, such as drought. In this sense, sacrifices are transformed into a social force thanks to the construction of monumental ceremonial

centers, theatrical settings for the performance. Another interesting idea by Carrasco is the link established between the sacrifier or the sacrificer and the victim, which expresses the relationship between the center and the periphery of the Mexica empire (Carrasco 1999: 63, 73, 87).

López Austin and López Luján (2008:144-146) consider it necessary to evaluate this practice within the framework of Mexica cosmovision, based on the study of the historical context, religious practices and social institutions. They argue that the Mexica were required to pay gods with gifts to calm their anger or to please them. This is inferred from the existence of two categories of sacrificial victims: the *nextlahualtin* and the *teteo imixiptlahuau*.[59] The former corresponded to payments, while the latter to images of the gods; through the possession of humans, the deities would die again as in mythical times. For these authors it is also essential not to overlook the economic and political dimension of sacrifice (López Austin and López Luján 2008:144-146).

Michael Graulich's work (2016), first published in 2005, has become a milestone in the study of sacrifice and it is an indispensable reference on this subject. In a masterly fashion, Graulich demonstrates the diverse functions of sacrificial acts. Among these are feeding the deities, obtaining benefits, conciliation, payment, consecration, expiation or to convey messages; sacrifice also reenacts the myths where the gods die. In fact, the analysis of myths is central for this author because narratives explain how human sacrifice emerged, sometimes as a substitution of animal immolation (Graulich 2016: 92). In human time, these mythical scenes were reenacted during the calendrical festivities; this permitted the

[59]In the next chapter I will discuss both categories.

overthrow of forces of darkness, guaranteeing the cosmic order. Just as sacrifice has a diversity of meanings, so does the victim, who may represent separately or simultaneously, a deity, a mythical hero, food, seed, corn, prey, or a heavenly body (Graulich 2000, 2016). I would add, that this diversity is also expressed in the way victims were obtained and in their biological profiles.

Finally, I would like to mention the research by Danièle Dehouve (2007, 2008, 2013). From the perspective of ethnography, Dehouve considers that sacrifice, victims, posthumous treatments and their ritual deposit are characterized by polysemy. Objects and individuals (animals and humans) evoke different meanings; they are signs with different contents. In this sense, the victim has two general meanings: one pertaining to the world of gods and the other to the world of humans (Dehouve 2007:251). For the study of ritual deposits, the author recommends not to concentrate only on them as gifts, forgetting sacrifice. In fact, she argues that the deposit of ceremonial objects, accompanied by prayers, usually ends with a sacrifice; these can be human, animal or vegetable; "because they are alive, they represent the life that is asked for" (Dehouve 2013:154). Finally, the author proposes that the contexts resulting from sacrificial practice should be regarded as *ritual deposits*, because this is a neutral and appropriate term. Although I fully agree with this observation, for practical reasons I will keep the official nomenclature of the Templo Mayor Project, which designates these deposits as *offerings*.

I agree with the polysemic view of sacrifice: it is a practice with different meanings that are interwoven depending on the occasion in which they are performed. Both historical sources, and the archaeological record confirm this. In the latter case, this is clear from diversity of the victims, both in their biological characteristics and the sacrificial and post-

sacrificial treatments they received. In this research I also documented that the meaning of the original immolation of some individuals, both human and animal, was transformed by reusing their remains in other ceremonies; they acquired a completely different symbolism. These aspects will be revealed throughout the next chapter.

Chapter 2

Sacrifice, the Offering of Life

Sacrifice is a religious act that consists in transforming an object or a living being, by destroying it, into a sacred entity or a means for communication with the divine. There have been numerous debates on the origin of sacrifice, and it is not possible to attribute a single origin to such a diverse practice that has changed over time. It is possible that in some cultures hunting may be the antecedent, as suggested by Burkert (1987), but this is not always the case. Its origin has also been linked to the beginning of agriculture, as Eliade (1959) argued. In Mesoamerica,[60] the practice has deep roots extending back many centuries (Chávez Balderas 2017). Of course, this implies that the Mexica did not invent human sacrifice, as Duverger (1993:190) claimed; on the contrary, they inherited an ancient tradition, which they transformed throughout their expansionist history.

The Function of Sacrifice Among the Mexica

Regarding sacrificial practices, two distinct functions can be distinguished: 1) those that are deliberately pursued by the social group and are the main reason for ritual murder (primary functions) and 2) those which are the consequence of the former (secondary

[60]In fact, the earliest evidence that could be linked to a sacrificial practice precedes the formation Mesoamerica. These are the findings of the Coxcatlan cave, in the current state of Puebla. This context is dated to 5750 B.C. ± 250 (Pijoan Aguadé and Mansilla 2007).

functions). As primary functions I identify the interactions that a community establishes with the divine realm. Among them are obtaining benefits, paying favors, consecrating, asking for forgiveness, expiation, feeding a supernatural entity, transferring energy and renewing the deity, among others.[61]

As secondary functions I define all those changes in the short, medium and long term that occur to the sacrifier - individual or social group - because of sacrifice. For example, when a warrior ascends the social pyramid through offering a victim, such promotion was not the primary reason for the ritual ceremony that resulted in the immolation of the captive.[62] However, such a reward should be an incentive for warriors for capturing enemies, as they would enjoy the symbolic and material benefits of sacrifice.

A second example of a secondary function is instilling fear in enemies by displaying violence. However, this was not always the case, since many sacrifices occurred in a private setting, such as the immolation of children in the lake or mountains. In addition, not all the victims were captive warriors, as many of them were purchased slaves, who were not connected to warfare. Besides, to assume that these ritual performances were new to the Mexica's neighbors is to forget that sacrifice was also practiced by other contemporary polities, as can be confirmed from historical sources and archaeological evidence.

Another secondary function would be societal stratification resulting from sacrifice, as identified by Watts and colleagues (2016) in a comparative study. Under this view, the greater the social stratification, the more complex the sacrificial practice, contributing to

[61] I believe that many of these functions can also be extended to animal sacrifice, as I shall discuss in this research.
[62] We should recall that many sacrificed individuals were slaves bought in markets and not war captives.

the consolidation of stratification. While one could argue that Central Highlands societies were the most stratified, this was not necessarily a consciously pursued goal. This range of secondary functions becomes even more extensive when discussing animal sacrifice, as it involved the management of exotic wildlife, as well as their maintenance in captivity and reproduction. This enormous State effort must have been recognized by the Mexica citizens, their allies and enemies. The strength of the empire was materialized in the fact that they captured and maintained animals of great symbolic importance such as jaguars, golden eagles, harpy eagles, among others.

Most certainly, given the archaeological evidence, I do not consider that sacrifice functioned as an escape valve for demographic pressure, nor as a form of economic subsistence. Pre-Hispanic populations lacked the nutritional deficiencies that Harner (1977) assumed, and the sacrifices were not as massive as Duverger (1993) argues would have been necessary to have a major economic impact.

Classifying Mexica Sacrifice

In Mexica society ritual immolation was conducted during periodic (regular) and exceptional (occasional) ceremonies. The former rituals were repeated year after year, during the festivals of the *veintenas*, Mexica months composed of 20 days. Numerous historical sources provide information on these celebrations and we also are informed by the detailed study by Graulich (1999, 2016). In contrast, exceptional celebrations

correspond mainly to funerals, coronations, consecrations, inaugurations and termination rituals, as wells as moments of environmental crisis, such as droughts (Broda 1971, 2001; Olmedo and González González 1986: 49; López Luján 1993: 103; Graulich 2016). If the historical sources are accurate, most victims were sacrificed in the context of extraordinary ceremonies, especially during the inauguration of the Templo Mayor. On these occasions, not only humans were sacrificed, but also countless living beings of the most diverse species and origins. In contrast, calendrical festivities involved fewer sacrificial victims, and I consider them to be much more diverse in terms of their biological profile and their symbolism, as I shall discuss.

In 1987 Martha Ilia Nájera proposed a classification of sacrificial practices in the Maya area that is also applicable to our case study. Based on the categories formulated by this author, I propose that sacrifices of oblation, expiation, divinity, consecration, termination, and retainers' immolation (all of which involved human and animal victims), were all performed in the Templo Mayor of Tenochtitlan. I agree with Graulich (2000: 354), who considers that a sacrificial ceremony is composed of several levels of meanings. It can pursue multiple goals at the same time, such as reenacting myths, rejuvenating or nurturing a deity, conciliating, asking for favors, transmitting messages, among others. Therefore, "sacrifice consists of superimposed layers of meanings" (Graulich 2000:371). I will now explain each category.

1) Oblation Sacrifice

The primary function of oblation sacrifice is to act as a payment or as a request (a form of advance payment), with the purpose of promoting the proper functioning of the cosmos. For Matos Moctezuma (1978), this was more than a compensation in exchange for a favor, because through immolation humans repay the gods for the sacrifice they made in mythical times. Individuals who were killed in such sacrifices were called *nextlahualtin* -the payments-, who reciprocated the resulting benefits (López Austin 1996: 433-435).

Such sacrifices were intended to ensure environmental balance, to guarantee crops, but they could also be propitiatory for war, as this was the other important form of subsistence. The former made possible the arrival of rains, and therefore agricultural fertility. These sacrifices are extensively documented in historical sources, both for the calendrical festivities and for periods of drought and famine; these could be carried out in mountains, the lake or temples. Most of the victims sacrificed in these ceremonies were children, mainly males, who were dedicated to the gods of rain and wind (Román Berrelleza 1990, López Luján 1993, Román Berrelleza and Chávez Balderas 2005). Albinos, dwarves, hunchbacks, and other individuals who judging from the descriptions suffered from congenital malformations, were also immolated (Alvarado Tezozómoc 1944:384).

According to López Luján (1993:200), child sacrifice was carried out during the dry season of the calendrical festivities and was intended for Tláloc and his assistants, to encourage the arrival of the rains. For example, in the *atlcahualo* veintena ("detention of the waters"), the celebration of Tláloc's assistants (*tlaloque*) was held. During this festival, young children were sacrificed; they were allegedly sold by their parents (Graulich

1999:49, 265-269). Folio 250 of the *Primeros Memoriales* (Sahagún 1997) describes what occurred during this festivity, explicitly stating that sacrificial victims were payments:

> "In Cuahuitl ehuea[63], 'The Raising of the Pole', a festival was celebrated in honor of Tlalocs, and the debt was paid [to them], everyone, all the commoners, [paid it] everywhere on the mountaintops […] This festival fell on the first day of February. In this festival little children, called 'human sacrificial papers,' died there on the mountaintops." (Sahagún 1997:250r)[64]

Figure 9. Offering of children during the *atlcahualo* month. *Primeros Memoriales*, f.250r (Sahagún 1997).

[63] This was another name for the festivity which is translated as "the tree is straightened out" (Graulich 1999: 268).
[64] Translation by Thelma Sullivan.

In addition, droughts and famine were moments of crisis that resulted in extraordinary sacrifices unrelated to the ritual calendar. As noted by López Luján (1993:203-204, 2018), the drought that occurred in 1454 (year 1 *tochtli*) motivated the sacrifice of children. In this regard, Benavente Motolinía affirms that:

> This cruel sacrifice had beginning in a time of four years that did not rain and any green thing hardly remained in the field, and for appeasing the demon of the water their god Tlaloc, and for raining, they offered him those four children (Benavente Motolinía 1941: 50).[65]

In his description of this drought, Chimalpahin (1965:99-100) states that the famine was so severe that the Mexica sold themselves to the Totonacs in exchange for corn. Consequently, the glosses of the *Codex Telleriano Remensis* (1995: 32r) describe that there was "so much hunger that people died".

[65] "Este cruel sacrificio tuvo principio de un tiempo que estuvo cuatro años que no llovió y apenas quedó cosa verde en el campo, y por aplacar al demonio del agua su dios Tláloc, y porque lloviese le ofrecían aquellos cuatro niños" (Benavente Motolinía 1941: 50).

Figure 10. Famine of the year 1 *tochtli* (1545), *Codex Telleriano-Remensis* (1995), f32r.

Archaeological evidence is compelling: 42 children between two and seven years old were found in Offering 48, located inside the northern half of the Templo Mayor platform. Skeletal remains were accompanied by effigies of Tlaloc, among other ritual goods. According to López Luján (1993: 201, 204-205), this context may correspond to a massive and exceptional ritual of sacrifice carried out during the year 1 *tochtli* (AD 1454) to restore environmental conditions. However, this deposit dates to AD 1469-1481. In contrast, for Roman Berrelleza (1990) this deposit was buried at the inauguration of the Templo Mayor, which seems unlikely, as it was clearly dedicated only to Tlaloc. An alternative hypothesis was proposed by Gregory Pereira (1994). According to him, the stone box containing the skeletons was reused over time, as can be inferred from the analysis of bone articulations.

This means that it was not a massive sacrifice, but rather several killing events. Whatever the case may be, the ceremony took place as a rain request, possibly after the great drought.

There were also child sacrifices to ensure warfare success. In Cholula, three-year-old children were sacrificed before a war started (Fernández de Oviedo 1945, vol. X: 46; López de Gómara 1987:133; López Luján et al 2010: 383).[66]

As López Luján and colleagues (2012:383) noted, these sacrifices could also have an oracular function. In fact, the *Relación de Coatepec y su Partido* (Acuña 1985 I, 6: 164) narrates that in Chimalhuacan Atoyac a child was sacrificed by heart extraction to honor Huitzilopochtli. At the end of the ceremony, the priests asked the deity what he wanted to know. I regard this sacrifice as a payment to the god, who in exchange would have to reveal the fate of the battle. Archaeological evidence suggests that similar practices were carried out in Templo Mayor where children were sacrificed to the god of war. Offering 111, excavated in 2005, consisted of a child who wore the attributes of this deity; [67] his ribs had cut marks on the pleural side, which was interpreted as evidence of heart extraction. However, in this case, it is difficult to confirm if the child was immolated as a payment or a petition because, judging by his attire he may also be an *ixiptla* or impersonator of the deity (López Luján et al. 2010).

Regarding animal sacrifice, there are few examples and ambiguous narratives, which makes it difficult to interpret the type of sacrifice to which they correspond. For

[66] López de Gómara's version (1987:133) describes that ten children of three years old, five females and five males, were sacrificed. In contrast, Fernández de Oviedo (1945 vol. X:46) mentions that they were five three-year-old boys and five virgin maidens.
[67] Cranial and pelvic morphology are more consistent with a male (Hernández and Peña 2010), as well as the garments. However, DNA analysis was not conclusive (López Luján et al 2010 and Chávez Balderas 2017).

example, Torquemada (1943, 2:97) mentions that the natives dedicated quails and sparrow hawks to Huitzilopochtli, while rabbits, deer and *adives*[68] were offered to Mixcóatl; "with this they celebrated their feast, made their sacrifices". Unfortunately, the religious did not state the purpose for which these immolations were carried out.

It is known from historical sources that animals were also sacrificed in both periodical and extraordinary ceremonies. On the one hand, there are references to calendrical festivities; of these, the most important was held during the *quecholli veintena*.[69] In fact, this month name alludes to a bird of rich plumage, the roseate spoonbill (*Platalea ajaja*), linked to ancestors, warriors and dead rulers (Olivier and López Luján 2017). In addition to the ceremonies that evoked the cult of the deceased, a mythical hunt on the Zacatépec hill was reenacted in this festival (Benavente Motolinía 1967:66, Sahagún 2000: 160, 244, *Codex Tudela* 1980:24). It used to be presided over by the ruler himself, who represented Mixcóatl, assisted by the *mimixcoa*; on this occasion, felines, canines, deer, hares, and other animals were hunted. I shall explore this ritual later, but for now it is enough to say that Graulich (1999: 183-184) interprets the death of these animals as a payment or food: “the sacred hunt prefigures war to feed heaven and earth. The hunters were like warriors, and the game captured were like war prisoners” (Graulich 1999:184).

The offering of birds as an oblation was documented in the *Primeros Memoriales*:

[68] With the word *adive*s, chroniclers often refer to different types of canines, mainly coyotes and foxes.
[69]Although there are references for other festivities, animal sacrifice appears to be more common in the months of *quecholli*, *izcalli*, *tóxcatl* and *tepeílhuitl*.

> The decapitation [of birds] was done in this manner: when they decapitated a bird before the devil, they also presented it as an offering: [then] they cast it there before the devil; there the body of the bird lay fluttering (Sahagún 1997:255v).[70]

Figure 11. Bird decapitation. *Primeros Memoriales* (1997), folio 225r.

Quail are the most frequently mentioned in historical sources. Their sacrifice was a pivotal component of exceptional ceremonies, particularly the coronation of the new rulers (Alvarado Tezozómoc 1944: 247, 399; Durán 1967, II: 301, 309, 487).[71] This sacrifice can be interpreted as a payment to correspond to the gods for his new commission or as a petition of prosperity for the new government. Another example of quail sacrifice is the

[70] Translation by Thelma Sullivan.
[71] Contradictorily, Duran (1967, I: 140-141) also believes that these birds were commonly offered by "low and poor" individuals.

one in which the ruler Ahuítzotl ordered the construction of the aqueduct to carry water from Coyoacán to Tenochtitlan. Numerous rituals were performed throughout the aqueduct, including the slaughter of quails, sprinkling their blood into the water (Alvarado Tezozómoc 1944:382-383). This payment was not enough: the poor planning of the aqueduct caused a terrible flood. According to some sources, the ruler died when he struck his head while trying to protect himself from the water (Torquemada 1943, I: 193, Chimalpahin 1978, 42-44).

Quail sacrifice has been extensively documented in the excavations of the Templo Mayor (López Luján 1993) and the West Plaza. The most noteworthy example is Offering 162 explored by the Urban Archaeology Program during the excavations of Plaza Gamio. It consists of hundreds of quail bones and plant fibers, corresponding to approximately a dozen individuals. [72] This context was associated with other sacrificial deposits: offerings 157 and 159 composed of human skulls, including a sacrificial stone. However, in these archaeological cases it is difficult to discern whether quail were sacrificed as a payment to the deities or if their immolation was intended to recreate the myth in which Quetzalcóatl was attacked by these small birds while stealing the bones from the underworld for creating humanity (*Leyenda de los Soles* 1945:121).

[72] Personal communication, Fabián Daniel García Almaraz, 2012.

2) Expiation Sacrifice

This type of immolation seeks to absolve a fault or to pay for a misconduct. According to Nájera (1987:42), this sacrifice reestablishes the bond with the deity and ingratiates the person, to obtain forgiveness for the offense. For Graulich (2000:355), expiation is central to the Mexica sacrifices for amending transgressions, regardless of other functions that this practice may have. According to this author, the myths that narrate the death of Mixcóatl's brothers, the 400 *mimixcoa,* are based on the general premise that the latter were sacrificed because of their transgressions. In human times, these deaths were reenacted in rituals where sacrificial victims costumed as the *mimixcoa,* covered in chalk and dressed in feathers, were killed (Graulich 2000:362). For Guilhem Olivier (2015:496) these attributes not only indicate their sacrifice, but also that they are war captives. In consequence, their sacrifier would be promoted for offering them. Similarly, slaves also had to expiate faults; ultimately such slavery may be regarded as a punishment. As for animals, they were considered condemned to sacrifice because of their failure in recognizing the superiority of creators (Graulich 2000: 363-367, 2016:119).

Figure 12. Captive of war dressed as *mimixcoa*, covered with chalk and adorned with feathers. He carries a *chimalli* alluding to war and a flag symbolizing sacrifice. *Codex Telleriano Remensis* (1995), folio 41r.

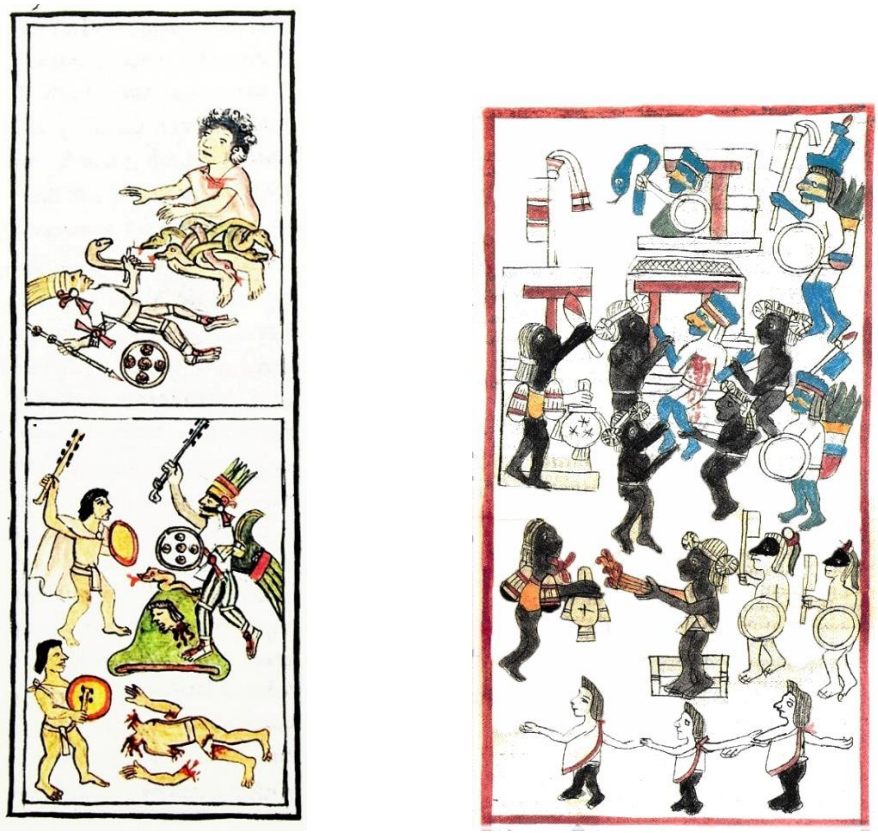
I would argue that while the notion of expiation exists in some sacrifices, it is usually combined with other purposes, such as rejuvenating the deities or obtaining favors. The study of myths is essential to understand the faults that had to be payed, but it is a challenge to understand the meaning of expiation through the sacrificial victims remains - animals or human beings - recovered in archaeological contexts. There are data on the burial or reuse of the remains, but it is difficult to fully understand the ceremony in which they were deprived of their lives.

3) Sacrifice of Gods [73]

Sacrifice of gods involves reenacting the death of a deity or mythical hero during a ritual (Nájera 1987:42). González Torres also agrees that this sacrifice does not correspond to an oblation, as it essentially seeks to repeat a mythical story where the deity dies to make possible human life. One of the best examples is in the *Leyenda de los Soles* (1975), where the gods Nanáhuatl and Tecciztécatl sacrifice themselves in a bonfire to create the sun and the moon. According to Graulich (2016:74) these gods represent the two main categories of sacrificial victims: warriors and captives.[74] The myth of Toltec origin where the 400 *mimixcoa* were sacrificed would have been the original source of the Mexica version: in this, the 400 *centzonhuiznahuas* and Coyolxauhqui were killed by their brother Huitzilopochtli (Graulich 2016:92, 96, 101).

[73]The original category proposed by Nájera (1987) corresponds to sacrifice of creation divinities. However, I consider that not all the deities that were sacrificed through the victims' bodies (human or animal), played a role in creation myths.

[74] It is worth mentioning a discovery made by Oswaldo Chinchilla et al (2015). It consists of a cremated double burial found at Tikal, in which two male individuals were exposed to fire in a pit pyre, during the perimortem interval. From an interdisciplinary analysis and evaluating various lines of evidence, the authors conclude that both individuals could have been sacrificed while reenacting the myth of the sun and the moon's birth.



a) b)

Figure 13. a) The myth of Huitzilopochtli's birth and the combat against the 400 *centzonhuiznahuas*. *Codex Florentine* (1979) Book III, f.3v; b) The myth reenacted during the *panquetzaliztli* festivity, *Primeros Memoriales* (1997), f. 252v.

Under this category were all individuals sacrificed during the calendrical festivities representing a deity. They were known as *teteo imixiptlahuan* (*ixiptla*) and were considered as images or vessels of the gods. Through Lopez Austin's research (1996: 432-433), it is possible to know that they were thought to be possessed by the deities; they had to die in the human body they had taken in order to regenerate themselves. In the words of this author, "it was not the humans who died, but the gods, within a body wrap, making their sacrifice on earth possible" (López Austin 1996:433).

These ixiptla caught the chroniclers' attention because they embodied a deity and were treated as such. One example is the individual who represented Tezcatlipoca for a year in which he learned to play the flute and to speak properly. He wore necklaces of precious stones and ankles bracelets made of golden bells. He had four women and he mingled with elite members of Mexica society. Once his cycle was completed he was sacrificed by heart extraction and his head was taken to the *tzompantli* (Sahagún 2000:143-144).

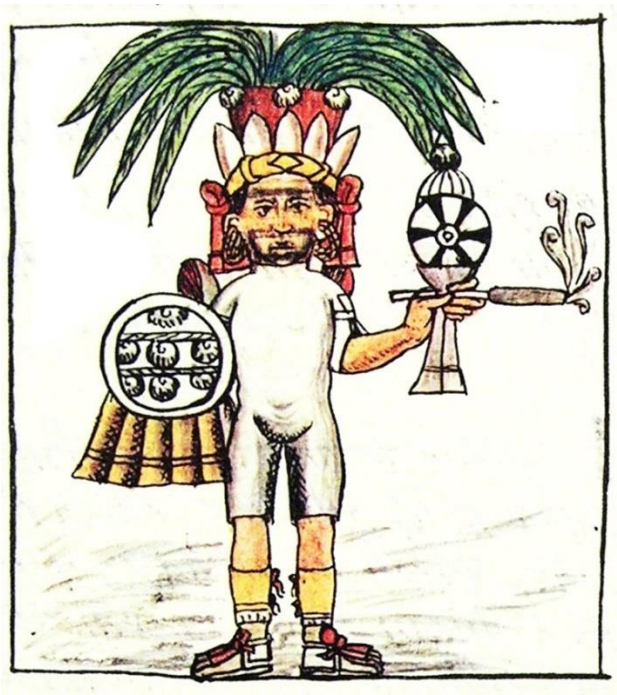


Figure 14. Tezcatlipoca's impersonator, sacrificed during the *tóxcatl* month. *Codex Florentine* (1979), Book 2, folio 30r.

Although historical sources do not make it explicit, I consider it highly possible that animals acted as deities' recipients too. As I shall discuss in the following chapters, many of them were considered as naguales or deities' avatars. Examples of this would be the

jaguar which, in the shape of Tepeyólotl, was the avatar of Tezcatlipoca; or Xólotl, who was represented as an anthropomorphic dog. Consistent with this, some of the animals that were excavated in the Templo Mayor were wearing pectorals alluding to their link with deities (Velázquez 2000: 219), an aspect that I will discuss in chapter seven.

Figure 15. Huehuecóyotl wearing a shell *oyohualli* pectoral. *Codex Borgia* (1993) page 64.

4) Consecration and Termination Sacrifices

Construction rituals allude to the history of a building or monument, including its construction, enlargement and abandonment. They are commonly regarded as consecration and termination rituals.

According to Jorge Gamboa Velásquez (2015), consecration events result from the foundation or construction of an architectonic structure.[75] These might be identified by the placement of ritual goods or human and animal remains, located below the occupational levels of the structure; subsequently, it may undergo further renovations and rituals. This action gives life and power to a space, now perceived as an animated entity. As among the Maya, the Mexica believed that their world was animated and that the power of objects, ancestors or sacred landscapes could be manipulated by social agents (Stanton et al. 2008).

According to Nájera (1987: 197-198, 201), these sacrifices sacralize and protect the construction, and therefore they have a propitiatory purpose. For González Torres (1985:240), the victim's sacrifice provides the necessary energy for the new building; with this, the construction was offered with a guardian or an existing one was revitalized. For Graulich (2016:159), these rituals strengthen the guardian spirit, while at the same time give life to the building. In the opinion of Stanton et al (2008:235), victims can also be considered the food that nourishes the construction in the process of bringing it to life. In addition, such rituals allow one to "make a statement about the connection between social leaders, divinities and ancestors" (Gamboa Velásquez 2015:88).

In addition, termination rituals indicate the conclusion of a given space. As Gamboa Velásquez (2015: 89) explains, it is possible to identify these rituals by the presence of materials on the surface of the buildings or from buried deposits associated with dismantled architectural elements. Among the Maya it is common to find fragmented artefacts that are often confused with domestic debris; thanks to the systematic recovery of these contexts it

[75] Or in the placement of a monument or sculpture, as I will mention in the discussion of Offering 126 and its relation to the monolith of the goddess Tlaltecuhtli.

has been possible to know that they correspond to termination rituals (Stanton et al. 2008). I shall discuss these problematic deposits (Tiesler 2007) in Chapter six. The destruction of buildings and sculptures, as well as their exposure to fire, are also part of these termination actions. These rituals can be carried out because the occupation of a structure[76] or the use of a sculpture[77] has concluded, but they can also result from a social conflict that requires a drastic change. An example is the destruction of images in Teotihuacan that once contributed to legitimize power, and ultimately were desecrated (López Luján et al 2003: 59).

The human body played a central role in consecration ceremonies. Blood was used during these occasions as mentioned by Muñoz Camargo (1998:211): during the enlargement of the main temple of Cholula, child sacrifices were dedicated to construction. Interestingly, their remains were not buried in the building, as only the blood of the victims was supposedly mixed with the lime.

Undoubtedly, in Mesoamerica, the head was the most important body part in these ceremonies, as studied by Christopher Moser (1973). Of course, the Mexica were not an exception and they also carried out this postsacrificial practice for the purposes of consecrating the Templo Mayor, as first proposed by López Luján (1993:262-265). Based on historical and archaeological information, this author considers that decapitation is central for these rituals. In this regard, I would emphasize that the treatment given to the

[76] Such would be the case of the destruction of the Cuauhxicalco, an aspect that I will discuss in chapters five and six (Pérez and Chávez 2016; Barrera Rodríguez in press).

[77] Such as the monolith of the goddess Coyolxauhqui from Stage IVb (AD 1469-1481) that was buried during the enlargement of the building. In the subsequent construction stages, a monolith of similar characteristics was placed for representing the myth of the birth of Huitzilopochtli, patron god of the Mexica. In fact, remains of at least two almost identical monoliths, destroyed during the conquest, were found during the excavations (Matos Moctezuma 1991).

heads is the key to understand these ceremonies. In consecration rituals heads were buried preserving soft tissues and the first cervical vertebrae articulated. This indicates that they were interred shortly after beheading. In contrast, the burial of defleshed skulls was associated to different rituals, as I shall explain on chapters five and six.

Figure 16. Severed head buried inside a temple. *Codex Borgia* (1993), page 4.

In the Templo Mayor, 48 severed heads preserving articulated cervical vertebrae have been recovered; all of them were deposited inside the building's platform corresponding to Stage

IVb (AD 1469-1481).[78] Some were buried in the construction fill while the building was enlarged; others were placed inside offerings, dug into the platform floor. This indicates that these ceremonies took place during different phases of the enlargement, from the very beginning to the inauguration.

Heads were also very important in termination rituals, acts that can be identified by the posthumous treatment of individuals. In fact, heads used in consecration ceremonies were buried in a cadaveric stage, while those in termination rituals were fragmented skulls,[79] defleshed and sometimes weathered. I have identified a clear dichotomy in the use of the heads: in ceremonies that give life to the building they were deposited complete, shortly after death and without altering the physiognomy of individuals. On the other hand, in rituals that evoked symbolic death of the construction, dry skulls were broken, scattered and mixed. As I will argue, the Mexica priests preserved even the smallest bone fragments, possibly storing them for this purpose.

Animals were also considered appropriate for consecration ceremonies. In fact, the offerings that López Luján (1993:262) associated with the inauguration of the Templo Mayor during the Axayácatl government (1469-1481 AD), contained mass numbers of faunal remains. Unlike human victims, there is no evidence of animal decapitation.[80] Whether they were deposited complete, as skins or as scattered bones, these specimens

[78]In the West Plaza an atypical case corresponding to the deposit of severed children's heads, was recovered: Offering 149. I consider this deposit a termination ritual; the results on the analysis will be discussed in chapter 6.
[79] Some were manufacture waste, while in other cases bone fragmentation was caused by their intensive use.
[80] The use of fauna in consecration sacrifices is much more obvious inside the Pyramid of the Moon, in Teotihuacan, where powerful carnivores were placed in cages and buried alive in the building as part of a consecration sacrifice. Sometimes only their heads were deposited (Sugiyama and López Luján 2006; Sugiyama 2014).

were used to symbolize some cosmical landscape; such is the case of Offering 126, discussed in chapter seven.[81]

5) Retainer Sacrifice[82]

This category includes two types of victims: those who were immolated in funerals and the ones who preceded the victims representing deities (god's containers or impersonators); both had the function of serving in the afterlife. Sacrifice in elite funerals was extensively documented in historical sources. According to Durán (1967, II:296-297), these victims were known as *tepantlacaltin*, "those who went after the dead to keep him/her company". These were purchased slaves or servants, individuals offered by those attending the funeral. In addition, dwarves, albinos and individuals with congenital diseases were sacrificed (Alvarado Tezozómoc 1944:239, 243; Duran 1967 II:393; Benavente Motolinía 1967: 245, Mendieta 1971:162). As for war prisoners, there are some disagreements: while Durán (1967, II:299) affirms that they were not immolated in the funerals as they were only dedicated to the gods, Alvarado Tezozómoc (1944: 266) narrates that in the funeral of Tízoc, captive warriors were also sacrificed.

All of them had the duty of carrying their lord's belongings, so he could use them on the way to the afterlife and at the funerary geography where the soul was supposed to inhabit. According to Sahagún (2000:330), those who served the lord on earth would do

[81] For example, crocodiles, turtles and sawfish symbolized the terrestrial level (López Luján 1993:250-251; Robles Cortés 2017).
[82] Nájera (1987) refers to this category as obsequies sacrifice. However, I decided to expand this category based on the proposals of López Austin (1996: 435).

the same in "hell". Although historical sources agree on the role of these individuals, the narratives on their sacrifice and posthumous treatments are diverse and even contradictory.

Regarding the sacrificial technique, most of the sources affirm that the retainers were killed by heart extraction. According to Duran (1967 II:300, 395), during Tízoc and Ahuítzotl's funerals individuals were sacrificed on top of a *teponaztli* drum. Alvarado Tezozómoc differs as he claims that during Tízoc's funeral their hearts were extracted on the *cuauhxicalli* stone (Alvarado Tezozómoc 1944: 266, 392). In contrast, Sahagún (2000:330) has a completely different version. He argues that for great lords' funerals, slaves were shot with arrows, "by sticking it at the edge of their throats".

There are also discordant narratives on the fate of hearts and bodies. Benavente Motolinía (1967: 245) affirms that hearts were cremated on a pyre. Alvarado Tezozómoc (1944:392) and Durán (1967 II:395), have the same version, as both chroniclers follow the same narrative from *Chronicle X*: during Ahuítzotl's funeral the hearts of his slaves were burned all day and all night along with the body of the ruler. In contrast, in describing the funerals of Axayácatl, Alvarado Tezozómoc (1944: 243) explains that bodies of the victims were buried separately.[83]

For Tízoc's funeral, Durán (1967 II:300) affirms that slaves' blood was poured on the pyre, but their hearts were buried inside the grave. Mendieta (1971:162) differs as he suggests that the bodies were also thrown into the pyre. The *Codex Magliabechiano* (1996: 65v) also follows this version: corpses were also cremated. In contrast, its cognate, the

[83] In the *Relación de Coatepeque* (1985, 6:295), a town located in the current state of Guerrero, retainers sacrifice is also mentioned. According to this source, neither their lord nor the servants were cremated; they were buried seated.

Codex Tudela (1980: 57r, 58r, 58v) follows the exact same version as the document *Costumbres, Fiestas, Enterramientos...* (1945:58), which states that retainers were buried alive (Table 2).[84]

Source	Sacrificial technique	Heart treatment	Blood treatment	Corpse treatment
Alvarado Tezozómoc (1944:243, 266,390-319)	Heart extraction	Cremation and taken to the Cuauhxicalli ("pierced stone")	Placed in a large gourd with which they sprinkled Huitzilopochtli	Buried in a different place
Codex Magliabechiano (f. 66r)	Heart extraction	--	---	Cremation and burial with their lord
Codex Tudela (f. 57r)	Heart extraction	--	--	Buried alive
Costumbres, Fiestas, Enterramientos… (1945:58)	Suffocation or starvation?	--	--	Buried alive
Durán (1967, II:296, 300, 393, 395)	Heart extraction	Cremation or burial	Thrown into the fire	--
Motolinía (1967:245)	Heart extraction	Cremation	--	--
Mendieta (162-163)	Heart extraction	Offered "to the demon"	---	Cremation
Sahagún (2000:330)	Arrow shooting (in the neck)	--	--	Buried in a different place

Table 2. Retainer sacrifice and posthumous treatments.

[84] The image on this page contradicts this statement: like in *Codex Magliabechiano* (1996), the retainer was killed by heart extraction.

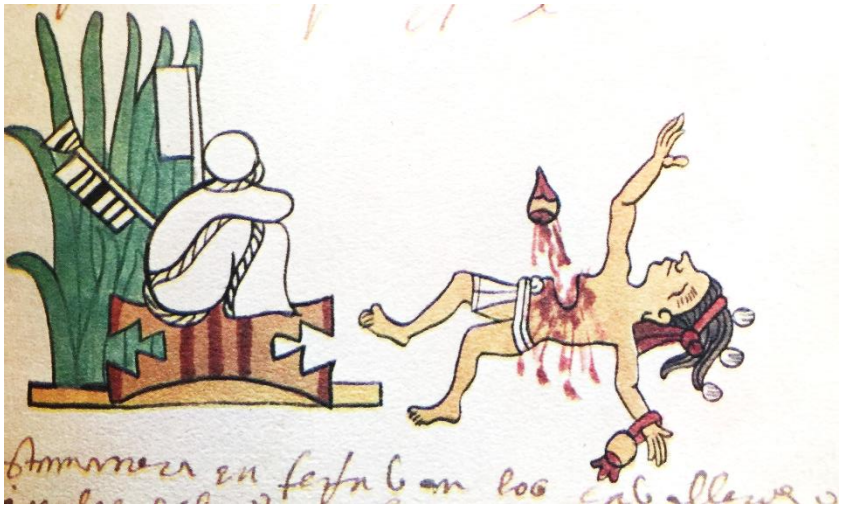


Figure 17. Retainers sacrifice by heart extraction. *Codex Tudela* (1980), folio 57r.

Following Benavente Motolinía (1967:246), retainer sacrifices continued after the funeral: individuals were killed on the fourth day when the soul was supposed to begin the journey. In addition, more sacrifices were made at twenty, forty, sixty, and eighty days to help the deceased on his/her path. At the end of this period only quail, rabbits, birds and butterflies were sacrificed each year.

While we have archaeological evidence at the Templo Mayor confirming the cremation of elite individuals and the burial of cremains in urns, there is no evidence of human retainers' sacrifice.[85] There are two possible explanations: 1) these contexts correspond to Stage II (1375-1427 AD), when such sacrifices were not yet practiced as in

[85] This practice has been documented in other archaeological sites. For example, Tiesler and Cucina (2007:58-71) studied retainer's sacrifice at Calakmul, Palenque and Becán; all the individuals were killed by heart extraction.

the imperial era; 2) considering that only hearts and blood were cremated on the pyre, their presence remained unnoticed in the archaeological record. By burning the heart, they guaranteed that the *teyolía*, the soul that was supposed to travel to the afterlife, was liberated to take its path (Chávez Balderas 2007). As for the first possibility, although the number of victims increased during the expansionist period, it is likely that sacrifices occurred from an early stage, but evidence has yet to be found (Chávez Balderas 2007). The second possibility sounds more realistic: most likely hearts and blood of these individuals were exposed to the fire with their lord's corpse, because it was an expensive funerary treatment, which requires long hours to be completed; the more bodies are added to the pyre, the more complex and expensive it becomes.

Animals were also sacrificed in funerals to serve their masters in the afterlife. The most compelling example is the dog sacrificed and cremated to help the deceased when crossing a supernatural river, the Chiconahuapan. Dogs were considered guides to the underworld, just like Xolótl, who traveled to Mictlan along with Quetzalcóatl. According to Benavente Motolinía (1967:245), these canines were sacrificed by arrow shooting:

> […] and the death they gave it was shooting arrows in the throat, and dead, they put it in front of him and said that that dog guided him and passed all the bad passages.[86]

[86] "…y la muerte que le daban eran flechándole con una saeta por el pescuezo, y muerto, poníanselo delante y decían que aquel perro le guiaba y pasaba todos los malos pasos" (Motolinía 1967:245).

Figure 18. The god Xólotl, represented as a canine, was considered a traveler to the underworld. On page 16 of the *Codex Borbonico* (1991) he is sitting in front of the dead sun that will be devoured by the earth, beginning his descent into the underworld.

Dog cremains have been found in five of the seven burials at the Templo Mayor. These canines were cremated on the same pyre as human bodies. They were burnt with soft tissue or high moisture content, as bones have fissures and fractures consistent with fire exposure of "fresh bone". The use of this animal was strictly funerary, and therefore it has not been found in other contexts. The deer is another funerary animal: its fragmented remains were found in three burials, mixed with human bones (Chávez Balderas 2007, 2018a). According to Eduard Seler (2004: 112), this animal evoked fire and the god Xiuhtecuhtli. His role in

the journey to the Underworld is unclear. Perhaps his presence enhanced the fire, transforming corpses and objects: it could be considered a symbolic fuel. After one year of the death, and until the fourth year, they sacrificed quails, rabbits, birds and butterflies. This happened in the presence of the urn containing cremains (Benavente Motolinía 1967:246). The precise role of these species is unknown, but they were meant to accompany the deceased on his/her way, as this offering was done for four years, until the *teyolía* was supposed reached the Mictlan and the journey ended.

The second type of retainers are individuals sacrificed to serve the *ixiptla* (deities' impersonators). According to Lopez Austin (1996: 434-435), these were called *pepechtin* or *teteo inpepechhuan*: "the beds of the gods". They were killed to serve gods sacrificed in a human recipient. Although both categories of sacrificial victims coexisted in the ceremonies of the ritual calendar (the beds and the impersonators), it would be difficult to identify them in an archaeological context: they received similar posthumous treatments and oftentimes their remains were reutilized in other rituals.

Clearly, the complexity of sacrifices extends beyond this classification, which I use in a heuristic way to help understand the meaning of this practice. One must bear in mind that in some ceremonies these meanings may intermingle.[87]

[87] For example, in Offering 111, a child was sacrificed wearing cooper bells and snails in the ankles, an *anáhuat*l pectoral, a shield and sparrow hawk wings. He has been identified as Huitzilopochtli's *ixiptla* (impersonator) (López Luján et al. 2010). Considering historical sources, it is possible that his sacrifice was also propitiatory, to ensure success in the war. Furthermore, his body was buried during the enlargement of the platform, so his sacrifice could have been also a consecration ritual.

Individual and Collective Sacrifices

A sacrificial ceremony, periodic or exceptional, may involve one or more victims. The number of victims depended on the type of ritual: some required more individuals and others less. Collective sacrifice is mentioned repeatedly by historical sources. For example, numerous individuals were killed in the *tlacaxipehualiztli* month. Regarding this festivity, held during the Axayácatl government (AD 1469-1481), Durán (1967, II: 277-278) narrates that all the Matlatzinca prisoners captured after war were sacrificed. Although it does not specify how many people died, he emphasizes that it was a collective sacrifice. Animal slaughter could also be massive, as historical sources confirm, especially in the case of quail (Benavente Motolinía 1967:62).

Archaeological evidence also suggests the existence of collective sacrifices. For example, if we assume that offerings from Complex A, located on the platform of the Templo Mayor, are contemporary (López Luján 1993: 238),[88] this would imply that at least 34 victims were sacrificed simultaneously. For this quantification I am only considering individuals that were deposited in a cadaveric condition, in the same ceremony and without further posthumous treatments after decapitation. There are other human remains in these contexts,[89] but they are represented by skull masks, *tzompantli* skulls and a secondary burial; these were reused and correspond to sacrificial acts that occurred previously (Chávez Balderas 2017). The 34 individuals correspond to Axayácatl's government (AD

[88] They correspond to offerings 1, 6, 11, 13, 17, 20, 23, 60 and 61. Of these, 11-20, 13-17 were paired and placed mirrored. The relation of these four deposits is currently under research by Alan Barrera, who studies the origin of these individuals through strontium and oxygen isotopes analysis.

[89] All these offerings have a total of 56 individuals, including the skulls that were reused and therefore killed in a different ceremony.

1469-1481), that is, the expansionist period, although not in its maximum grandeur. I agree with López Luján (1993:238) that these offerings were buried for the inauguration of the Templo Mayor. This is consistent with historical sources: less individuals were sacrificed during calendrical festivities, than during the inauguration of the temple.

These same deposits illustrate simultaneous sacrifice of fauna: quail remains recovered from almost all the Complex A offerings, except Offering 20 (López Luján 1993:329-330). A total of 74 individuals corresponding to the species *Callipepla squamata, Cyrtonyx montezumae* and *Colinus virginianus* were recovered in these deposits; most likely they were killed at the same time.[90] In this research I shall discuss some cases where the death of various animals occurred at the same time, as I can confirm from archaeological evidence.[91]

Individual sacrifices were less common, but they are also mentioned in historical sources, especially for children. For example, Durán (1967 I:88) narrates that during the *huei tozoztli* month, in the festivity dedicated to Tlaloc, a seven or eight-year old girl was sacrificed; she was hidden in a pavilion so no one could see her. She was dressed in blue because she represented the lake, springs and streams. First the priests took her to the place in which they planted a tree in the forest[92] and then boarded a canoe heading to Pantitlan. There, in the whirlpool of the lake, they threw the tree and slit the girl's throat with a fish spear that they used to kill ducks; her body was thrown into the water, where she disappeared.

[90] I cannot confirm this fact, as there are no detailed excavation records on their tiny skeletons.
[91] I relied on the analysis of anatomical connections to infer the state in which the specimens were deposited: complete corpses, articulated segments or skeletal remains.
[92] They called this tree as Tota, "our father".

There are archaeological deposits in which only one individual has been found. Such is the case of the skeleton of a child dedicated to the god of war (Offering 111) or the roseate spoonbill (*Platalea ajaja*) buried in the construction fill (Offering 128). However, it cannot be affirmed that these are individual sacrifices. Although it is likely, it is only possible to confirm that it was an individual burial, as we lack information on their immolation.

Massive Sacrifices?

One of the most contentious issues has been the number of victims sacrificed each year in Tenochtitlan. As discussed previously, dispute over numbers started in the 16th century and has continued to the present day. The massiveness of sacrifices has been considered as a measure of the "degree of civilization" of the Mexica and has been used in their favor and against them. For this research, I consider that counting the victims is useful only because it provides a better understanding on the nature of the sacrifice and its historical development. Likewise, it is an interesting exercise to compare data from historical sources with the archaeological evidence.

To elucidate this issue from historical documents is not an easy task, since the interests of each author must be considered. In addition, it is common to find discrepancies in the same chronicler (Table 3). For example, the numbers presented by Durán (1967 II:295-297; 393) are the most disparate. The friar estimates that twenty individuals were sacrificed at Axayácatl's funeral, while more than 200 were killed at Ahuítzotl's obsequies;

all of them donations made by attendees from other villages.[93] As for the number of victims associated to the consecration of the building, I consider these estimates quite doubtful. For example, Durán (1967 II:345) assumes that during the inauguration of the Templo Mayor under Ahuítzotl's reign, 80,400 individuals were sacrificed. The friar himself questions this number, but he mentions that it was also reproduced by other sources. *Anales de Cuauhtitlan* (1945:58), documented that this commemoration occurred in the year 8 *ácatl*, in which the Mexica sacrificed 16,000 Zapotecs, 24,000 Tlapanecas, 16,000 Huejotzincas and 24,400 Tziuhcohuacas, Cozcaquauhtenacas and Micltanquauhtlacas: a total of 80,400 individuals. Torquemada (1943, II:168) agrees that in these consecration ceremonies many victims were sacrificed and estimates that 60,000 people died during this inauguration.[94]

These numbers were taken as reliable by scholars such as Duverger (1993: 175, 199) and Harris (1977: 119). On the other hand, González Torres (1985:248) questions these calculations and argues that to make this possible, it would require the slaughter of 47 individuals per hour, for 96 consecutive hours nonstop, in 20 places simultaneously. On this ceremony, Alvarado Tezozómoc (1944:318-319) describes the participation of 19 sacrificers in 17 "slaughterhouses",[95] which makes less likely that they could meet the goal of sacrificing so many people. Furthermore, it is unlikely that a city of approximately 250,000 inhabitants would be able to control 80,400 captives; this would imply that there

[93] While Ahuítzotl's funeral was more lavish because it corresponded to the period of maximum expansionism, this difference is remarkable.

[94] In *La Conquista de México*, López de Gómara (1987:477-482) also mentions these mass sacrifices. He made an annual estimate of approximately 20,000 to 50,000 individuals.

[95] These were fifteen priests dressed as deities, in addition to Ahuítzotl, Tlacaelelel, Netzahualpilli and Totoquihuaztli; the last two were rulers of the Texcocanos and Tlapanecas, respectively. In addition, 17 slaughterhouses are mentioned, the most important were the Templo Mayor, the Cuauhxicalli, the Yopico temple and the sacrificial stone next to the Huitznahuac; in them the rulers of the Triple Alliance and the Mexica Cihuacóatl presided the ceremony.

existed approximately one sacrificial victim for every three individuals, including women and children (Chávez Balderas 2017). Alvarado Tezozómoc (1944:227) estimates that during the Axayácatl government (A.D. 1469-1481) the Mexica army had 32,200 soldiers;[96] they could hardly capture and subjugate such number of individuals.

Although Durán and Alvarado Tezozómoc (1944: 307, 330-331) based their writings in the so-called tradition of *Chronicle X*, the second one does not mention the number of sacrificed individuals. He also makes explicit that this ceremony corresponded to Ahuítzotl's coronation; it was the "feast of the Tetzahuítl[97] of Huitzilopochtli, coronation and lavatory". The chronicler states that the number of spectators for this event was unusual: he claims that between six and eight million people witnessed such an event. This is also unlikely considering the size of the city, the population of Tenochtitlan and the Basin of Mexico during the 15th century.

The conqueror Andrés de Tapia (1988:108-109) also provides a very high estimate on the number of sacrificial victims killed in Tenochtitlan. When referring to the main skull palisade known as the Huei Tzompantli he stated that:

[96] While these must have increased for the Ahuítzotl government, it is unlikely that they subjugated such many prisoners and slaves.
[97] Tetzahuitl: something extraordinary, frightening, supernatural (Karttunen 1983:237).

> This tower was surrounded by sixty or seventy very high poles, diverted from the tower like a crossbow shot distance, placed on a large theatre, made of lime and stones, and by the steps of it many heads of the dead were glued with lime and with their teeth outwards. From one end of these beams to the other were two towers made of lime and heads of the dead, without any other stone, and the teeth outward, in what might seem like, and the poles (were) apart from each a little less than a measuring stick, and from the top of them up to the bottom (there were) posts placed as thick as there was room for them, and on each pole five heads of the dead threaded in the pole. And he who writes and Gonzalo of Umbria, counted the sticks that were there, and multiplying five heads each of the sticks of which between the pole and the pole were, as I said, we found one hundred and thirty-six thousand heads, without those of the towers (Tapia 1988:108-109).[98]

Although the 136,000 skulls would correspond to different sacrificial events, this is far from the actual number of individuals that were exhibited in the tzompantli. Thanks to the exploration of the Huei Tzompantli of Tenochtitlan, by the Urban Archaeology Program it is possible to question these estimates based on archaeological data.

According to Raúl Barrera (In press), the skull palisade measured approximately 34 m north-south, and 12 m east-west. Specialists Ingrid Trejo and Lorena Vázquez (In press) reported that the posts were embedded in the platform every 60-70 cm. This coincides with Tapia's description that the posts were separated by less than one *vara*.[99] The conqueror

[98] "Estaban frontero de esta torre sesenta o setenta vigas muy altas hincadas desviadas de la torre cuanto un tiro de ballesta, puestas sobre un teatro grande, hecho de cal y piedras, y por las gradas de él muchas cabezas de muertos pegadas con cal y los dientes hacia fuera. Estaba de un cabo y de otro de estas vigas dos torres hechas con can y de cabezas de muertos, sin otras alguna piedra, y los dientes hacia afuera, en lo que se podría parecer, y las vigas apartadas una de otra poco menos que una vara de medir, y desde lo alto de ellas hasta abajo puestos palos cuan espesos cabían y en cada palo cinco cabezas de muerto ensartadas por las sienes en el dicho palo. Y quien escribe y un Gonzalo de Umbría, contaron los palos que había, y multiplicando cinco cabezas cada palo de los que entre viga y viga estaban, como dicho he, hallamos haber ciento treinta y seis mil cabezas, sin las de las torres" (Tapia 1988:108-109).

[99] According to the Dictionary of the Real Academia Española, a vara measures between 78 and 91 cm.

also stated that each pole housed five skulls, a fact that can be corroborated by the discovery of five *tzompantli* skulls that were dismantled from the palisade and placed with the wooden pole that once held them in the skull rack (Jiménez González and García Velasco, In press).[100] On the height of the Huei Tzompantli there is no precise information. According to Durán (1967, I: 23) it was as tall as "a great tree". In contrast, other skull racks located in the city were five *brazas* high, that is, approximately 8 m (Benavente Motolinía 1967:72). If the Huei Tzompantli was about 15 m high[101] and consisted of 70 posts crossed by beams of approximately 65 cm, then it housed about 15,750 skulls.[102] The number of victims calculated by Tapia would imply that the skull rack was more than 340 m long, which does not even remotely correspond to archaeological data. On the number of sacrificial victims, there are calculations by other chroniclers. Many correspond to other Central Highlands towns, proving that sacrifice was a regional phenomenon that went beyond the Mexica.

[100] Offering 159.
[101] I propose this height, because it would be difficult to handle larger poles. In addition, this measure corresponds approximately to the *ahuejotes* (*Salix bonplandiana*) and the holm oaks (*Quercus* sp.), species of great importance for the Mexica.
[102] Considering three rows of skulls for each meter height.

Source	Festivity	Sacrificial victims	Comments
			Calendar festivities
Chimalpahin (1965:229)	New Fire	> 40	Year 2 *ácatl* (1507). Moctezuma and Nezahualpilli each contributed 20 individuals.
Durán (1967,I:33)	To Quetzalcóatl	40-50	War captives
Durán (1967,I:72)	To Camaxtli	30-40	In Huexotzingo y Tlaxcala
Durán (1967,I:96)	Tlacaxipehualiztli month	60 in Tenochtitlan	Thousands counting all the cities in which the festival was held
López de Gómara (1987:470)	New Fire	400	Festivity with the highest number of sacrificial victims
Motolinía (1967:59)	Panquetzaliztli month	> 100 in Tenochtitlan	In other villages, 20, 30 or 40 were sacrificed.
Motolinía (1967:78)	To Camaxtli	800	In all the neighborhoods of Tlaxcala.
			Coronations and inaugurations
Alvarado Tezozómoc (1944:460)	Inauguration of Coatlan Temple	800	Lasted four days
Anales de Cuauhtitlan (1945: 58)	Inauguration of Templo Mayor (year 8 ácatl)	80,400	16,000 Zapotecas, 24,000 Tlapanecas, 16,000 Huejotzincas and 24,400 Tziuhcohuacas, Cozcaquauhtenacas and Micltanquauhtlacas. Ordered by Ahuítzotl.
Códice Telleriano-Remensis (F.39r)	Inauguration of Templo Mayor (AD 1487)	20,000	Ordered by Ahuítzotl.
Durán (1967,II:326)	Ahuítzotl's coronation	Almost 1000	Captives from Xilotepec and Chiapas
Durán (1967,II:345)	Inauguration of Templo Mayor (AD 1487)	80,400	Four days. Ordered by Ahuítzotl

Durán (1967,II:443)	Inauguration of Coatlan Temple	2300	Slaves from Teuctepec
			Annual calculations
Fernández de Oviedo (1945, X:54)	Annual	5,000	In honor of Mexica gods
López de Gómara (1987:482)	Annual	20,000-50,000	"In the lands that Cortés conquered"
Torquemada (1943, II:120)	Annual	20,000	Children. Estimate by Zumárraga.

Table 3. Occasions in which a higher number of individuals were sacrificed according to historical sources.

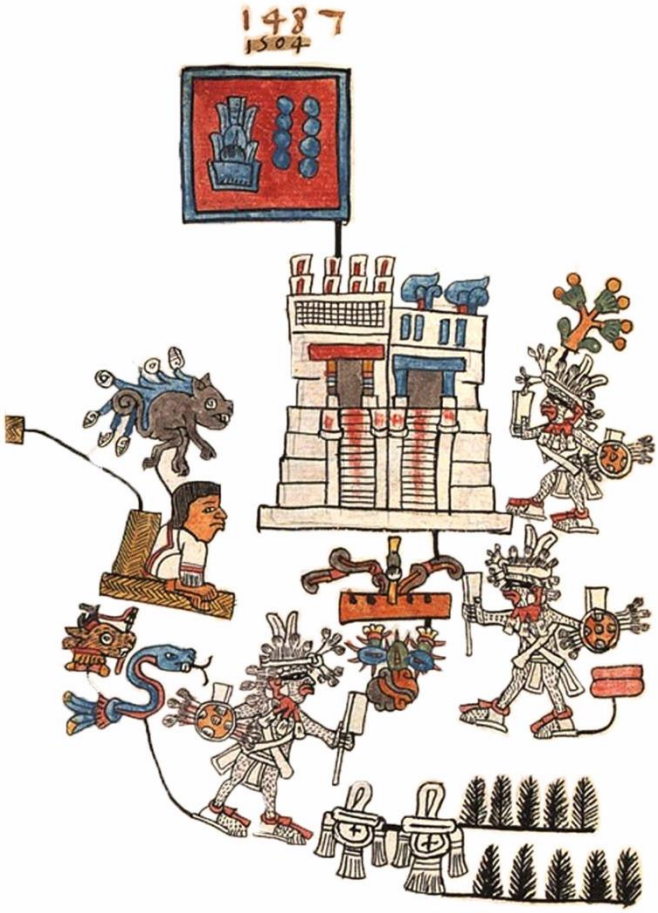


Figure 19. Inauguration of the Templo Mayor in AD 1487, in which 20,000 victims were immolated according to the *Codex Telleriano Remensis*, 1995, f.39r.

From these findings I would conclude that despite the claims made by some authors, fewer victims were sacrificed during calendrical festivities. Rituals carried out in *panquetzaliztli*, *tlacaxipehualiztli* and in the New Fire had more victims. Although the majority were sacrificed during the inauguration of the Templo Mayor, the archaeological evidence is inconsistent with that sacrifices that involved tens of thousands of victims in a single celebration.

The minimum number of individuals found in Templo Mayor and the Sacred Precinct has been calculated through bioarchaeological research. It is important to bear in mind that the Huei Teocalli[103] was a site of public immolations, but it was not conceived of as a burial place for the victims (Elizabeth Boone, personal communication, May 2014). In this building were buried only severed heads and gods effigies during very specific ceremonies (see chapters five and six). A total of 153 individuals have been documented in this building, excavated between 1948 and 2013. These correspond to primary burials of children, as well as skulls of men, women and children (Chávez Balderas 2017).

Most of the evidence, however, has been found in the West Plaza and in some other buildings. Thanks to collaborative research of the Templo Mayor Project and the Urban Archaeology Program, it has been possible to quantify the number of individuals recovered by both archaeological projects (Chávez Balderas et al. 2017).[104] At the present a total of 538 individuals[105] have been recorded corresponding to the Construction Stages IV to VII

[103] The Templo Mayor was also known as *Huei Teocalli* and *Cu de Huichilobos*.
[104]Methods used for this quantification are in Appendix 1.
[105] This quantification includes individuals found underneath the Cathedral, analyzed by Ana Solari (2008).

(AD 1440-1520), that is, a period of approximately 80 years of expansionist history (see Appendix 1). As for the Huei Tzompantli, the initial estimate is 450 skulls, making a total of 988 individuals. Although many skulls have yet to be quantified, this gives an idea of the magnitude of human sacrifice. These victims would have been sacrificed throughout this period, in diverse ceremonies and received complex posthumous treatments that were not documented by the chroniclers.[106]

Although there are few references, the tendency to exaggerate the number of sacrificial victims seems to extend to animals as well. For example, Benavente Motolinía (1967:63) claims that eight thousand quail were sacrificed for the Fire festivity in Cuauhtitlan. This seems unlikely, since in nature quail form small groups and the captivity of this number of animals seems implausible (Chávez Balderas 2017, Elizalde 2017).

As for archaeological data, there is no a global quantification of all the animal remains, as they include invertebrates and vertebrates from six phyla: Porifera, Coelenterata, Echinodermata, Arthropoda, Mollusca, Chordata. Among the chordates, six classes stand out: Chondrichtyes, Osteichthyes, Amphibia, Reptilia, Aves and Mammalia (López Luján et al. 2014:35). If these specimens were counted, the result would be hundreds of thousands of organisms that were offered in the sacred precinct of Tenochtitlan. However, thanks to the research by Israel Elizalde (2017) it is possible to know that vertebrates found inside 79 offerings correspond to approximately 700 individuals.[107] This number includes skeletal remains analyzed on chapter seven.

[106] Most of the victims' bodies would have been taken elsewhere; however, it is likely that most of the heads remained in the Sacred Precinct of Tenochtitlan, as I shall discuss.
[107] Fish were not included in this quantification: only reptiles, amphibians, mammals and birds.

Sacrifice as acts of inherent drama

Massive or individual, sacrifices can be understood as acts of inherent drama, performances, featuring choreographic secuences. These rituals are also acts of communication (Bell 1997).

According to Takeshi Inomata (2006: 805-808), a performance is a theatrical expression that, in addition to communicating ideas, defines the political reality of its participants, establishing their social relations. Monuments and buildings in which these rituals were performed maximized the communication; this was a priority for rulers who presided over the ritual. In this sense, the sacred precinct of Tenochtitlan was an ideal space for public spectacles which, if held at the top of the Templo Mayor, would be visible from the West Plaza and most of the buildings on it.

Some Mexica sacrificial ceremonies were theatrical events with direct political effects transcending ethnic boundaries. As Alfredo López Austin (1996: 435-437) states, massive sacrifices were used to intimidate enemies, establishing a political balance. The most important example of this public event is the above-mentioned inauguration of the Templo Mayor, under the rule of Ahuítzotl, where the spectators:

> [....] through the squares and rooftops, they looked like flies on honey, and the people came looking at those who had to be sacrificed from the Huitzilopochco to the hill that now belongs to our Lady of Guadalupe, and from the garden of the Marquis of the Valley to the city [...] (Alvarado Tezozómoc 1944:330). [108]

[108]"[…] por las plazas y azoteas que parecían moscas sobre la miel, y llegaban las gentes mirando a los que había de sacrificar desde el Huitzilopochco hasta el cerro que ahora es de nuestra señora de Guadalupe, y desde la huerta del Marqués del Valle hasta la ciudad […]" (Alvarado Tezozómoc 1944:330).

While it is true that most sacrifices were acts with numerous spectators, I agree with Hodder (2006:82) that performance is not always supposed to be witnessed by large audiences. In Tenochtitlan some rituals were not intended to intimidate enemies through the mass execution of war captives. In fact, the child sacrifice could be both dramatic and private, only witnessed by the priests. An example of this is the immolation of a child during the *huei tozoztli* month:

> From the day, when it was dawning, all these kings and lords, with all the other people, came out, and took a child of six or seven years old and put him in a bunk bed, covered from everywhere, so that no one could see him, and they put him on the shoulders of the principals and, all of them in order, went as if in procession to the place of the courtyard, which they called tetzacualco. And when they got there, at the image of the idol Tlaloc, they killed that child inside the bunk, which no one could see, to the sound of many horns and snails and flutes. This child was killed by the same priests of this idol (Duran 1967, I:83). [109]

As can be seen in this quote from the Dominican friar, despite being an event that sought to hide the victim and the sacrificial act, the theatricality and solemnity expected for any event of this nature is evident. Other child sacrifices were also conducted by priest with no audiences. Such is the case of those carried out in the lake or mountains, which I have previously mentioned.

[109] "De donde el día, luego en amaneciendo, salían todos estos reyes y señores, con toda la demás gente, y tomaban un niño de seis o siete años y metíanlo en una litera, por todas partes cubierto, que nadie no le viese, y poníanlo en los hombros de los principales y, puestos todos en ordenanza, iban como en procesión hasta el lugar del patio, al cual lugar llamaban tetzacualco. Y llegados allí, delante de la imagen del ídolo Tláloc mataban aquel niño, dentro de la litera, que nadie lo veía, al son de muchas bocinas y caracoles y flautillas. Mataban este niño los mesmos sacerdotes de este ídolo (Durán 1967, I:83)."

Nawa Sugiyama (2014: 10, 27) also considers animal sacrifice as a performance that facilitated the construction of a hierarchical social landscape, where animals were endowed with agency. According to this researcher, these theatrical events make possible the production of a place: the materialization of the sacred cosmic order, allowing the organization of the socio-political system. Under this logic, animals are central to the construction of a sacred place; this was also true for Tenochtitlan as discussed in chapter 7.

In sum, sacrificial performances tend to be dramatic and theathrical. This allows enemies to be intimidated, resulting in a legitimation of the imperial power. It also makes it possible to materialize the sacred order by recreating the myths. This all helped to establish social cohesion.

After outlining the great diversity of meanings and functions of Mexica sacrificial practices, I shall discuss the actors, instruments and places of sacrifice, combining historical and archaeological information available from the sacred precinct of Tenochtitlan.

Chapter 3

Actors, Places and Instruments

In 1898 Henri Hubert and Marcel Mauss[110] proposed a classification for the study of sacrifice. In these essays the authors defined the concepts of sacrifier, sacrificer and victim, as well as the places and instruments for slaughter. Research by these scholars was so important that they are still considered a reliable source for the analysis of sacrifice (González Torres 1985, Dehouve 2008, Graulich 2016, Chávez Balderas 2017). In a previous investigation (Chávez Balderas 2017) I defined the main characters of this ritual act. On this occasion I added new data, including the slaughter of animals. I will emphasize the role of victims, as I agree with John Verano (2014:292) that the identity of these individuals is crucial for understanding sacrifice.

The Sacrifier

The individual or collectivity that offers a victim in sacrifice is known as the sacrifier. In return for their offering they will receive benefits, tangible or symbolic, derived from this

[110] Translated into English and published in 1964.

act (Hubert and Mauss 1964: 10). Gods are the primeval sacrifiers who are credited for inventing this practice in mythical times.

To be a sacrifier was a privilege that not everyone could have, because it was necessary to risk one's life or to have great wealth (Graulich 2016:177). In addition, it was essential to have a preparation for the ritual act. As for collective sacrifiers, the State, guilds, clans, tribes, etc., can offer a victim in sacrifice (Hubert and Mauss 1964:10). However, despite the distinction between individual and collective sacrifiers, sometimes the same person could act in both spheres. For example, it is possible for a merchant to offer a victim, representing both an individual sacrifier and a community: the *pochteca* guild. Something similar has been documented by Dehouve (2007: 47, 2008: 325, 328) for animal sacrifice among contemporary Tlapanecas of Guerrero. The village commissioner offers the animal as a personal gift, but he also represents the local authority: the person responsible for symbolic and real welfare of the population. As I discussed previously (Chávez Balderas 2017), the donation of human victims at the sacred precinct of Tenochtitlan most likely was responsibility of the State, warriors, merchants and possibly other elite members. Depending on the case, they could act as a collectivity or as individuals.

Sahagún (2000, I: 248) refers to individual sacrifiers as "owners". For Graulich (2016:187), this relationship extended even further, as the sacrifiers died symbolically through the victim. The most important sacrifiers were warriors, merchants, wealthy artisans, lords and rulers (Graulich 2016). Of these, there are many testimonies about warriors who received privileges and benefits by offering war captives for sacrifice. Warriors were known to fight among themselves to prove who had captured a prisoner. If

they were unable to prove it, the victim was taken to the warriors' neighborhood temple; there, he was sacrificed "without captor's title" (Sahagún 2000, II: 766). If several warriors disputed his property, the prisoner would say who was his master (Benavente Motolinía 1967: 299). Apparently, warriors could also function as a collectivity dedicating prisoners when they collaborated in the capture (Sahagún 2000: II: 781).

Merchants, on the other hand, had enough wealth to buy slaves and to offer them to their patron Yacatecuhtli (Sahagún 2000, I: 103). According to Graulich (2016:197-199, 204), they were a wealthy guild, highly respected. In their incursions into distant lands they were armed and considered themselves warriors. In fact, they provided sacrificial victims for the feast of Huitzilopochtli, during the *panquetzaliztli* veintena; these victims were acquired expeditiously, simply by paying and with no need for war.

Members of other guilds also had sufficient resources to offer human victims for sacrifice. For example, pulque makers, masters of feather art (*amanteca*) (Sahagún 2000, I: 245, II: 848), lapidarians, water vendors and *titici* (doctors, healers) (Graulich 2016: 213).

Warriors, merchants, and most likely other sacrifiers, needed proper preparation to receive the symbolic benefits of sacrificial death. For example, during the *panquetzaliztli* festivity sacrifiers fasted for five days, bathed at midnight and practiced self-sacrifice (Sahagún 2000, I: 248). Owners also prepared and bathed the slaves. Sahagún (2000, I: 267) noted that they were also known as Tealtiani, "which means bathers, and it is because they bathed the slaves with hot water every day". The victims were offered to the fire, Ixcozauhqui; they were fattened and provided with a woman "to prevent them from being

sad". Sacrifiers tore the hair off victims' crowns evoking their capture, but also to extract their force (*tléyotl)*, increasing their inner fire (Graulich 2016:190, 196).

In sum, through sacrifice, a sacrifier would obtain a higher status, power, privileges, and economic benefits (González Torres 1985:187-230). If one thinks of the examples mentioned so far, these prerogatives would be achieved by both individuals and communities. In the end, while the direct beneficiary was the sacrifier, the entire society gained from having the approval of the gods.

As for the offering of animals, historical information is not explicit. Thanks to the research by Elizalde (2017), who combined historical and archaeological data, it is known that the State and the rulers maintained several *vivaria* where captive species were bred for use in sacrificial rituals at the Templo Mayor. There is no information to confirm if warriors donated animal victims, however, this was done by hunters, their symbolic equivalents. As I shall discuss in chapter four, during the *quecholli* veintena, hunters dressed as *mimixcoa*[111] captured animals to sacrifice in honor of Mixcóatl. They surrounded the Zacatépetl hill and began the hunt. Prey was brought to the idol and killed "in the same way that men were sacrificed" (Duran 1967, I: 76). Like warriors, hunters were rewarded as sacrifiers (Benavente Motolinía 1967: 66-67) and they had to prepare themselves through fasting and sexual abstinence (Olivier 2015: 321). The case of the hunters is special, since they were both sacrifiers and sacrificers, as I shall explain in the next section.

Finally, there are accounts of rituals held outside the sacred precinct of Tenochtitlan; these narratives prove that animal sacrifice was very common in domestic

[111] The northern stars. They are considered as the prototypes of the sacrificial victims (Olivier 2010).

spheres. For example, Sahagún (2000, I: 195) mentions that in the *tóxcatl* month people offered quail blood on the altars of their houses. Another example is the celebration in the *izcalli veintena*, in which parents were sacrifiers, dedicating snakes, frogs, fish, *ajolotes*[112] or birds. These animals were toasted; the children ate them, saying: "our father the fire eats toasted things" (Sahagún 2000, I: 88).

In sum, any member of Mexica society could act as a sacrifier. The identity of victims offered in sacrifice would depend on the sacrifier economic capacity, status and occupation, aspects closely related. Under this logic, elites, warriors and wealthy individuals could offer humans and most likely exotic animals.[113] It is also possible that benefits obtained by the sacrifier depended on the type of victim they offered.

The Sacrificer

The person committing the ritual murder, and therefore an intermediary between the donor (sacrifier) and the victim, is known as the sacrificer (Dehouve 2008:325). In the words of Graulich (2016:174), the sacrificer is "the armed wing of the sacrifier". Sometimes the sacrificer and the sacrifier could be the same person, an aspect noted by Graulich (2016:174-175). This is exemplified in both human and animal sacrifice. The first would correspond to victims' immolation by the ruler himself (Duran 1967, III: 193, f.70r) (figure

[112] *Ambystoma mexicanum.*
[113] These animals were important because of their biological characteristics, symbolism, accessibility, etc.

20), while the second would be the sacrifice of animals by hunters personifying Mixcóatl or the *Mimixcoa* (Duran 1967, I: 76) (figure 21). [114]

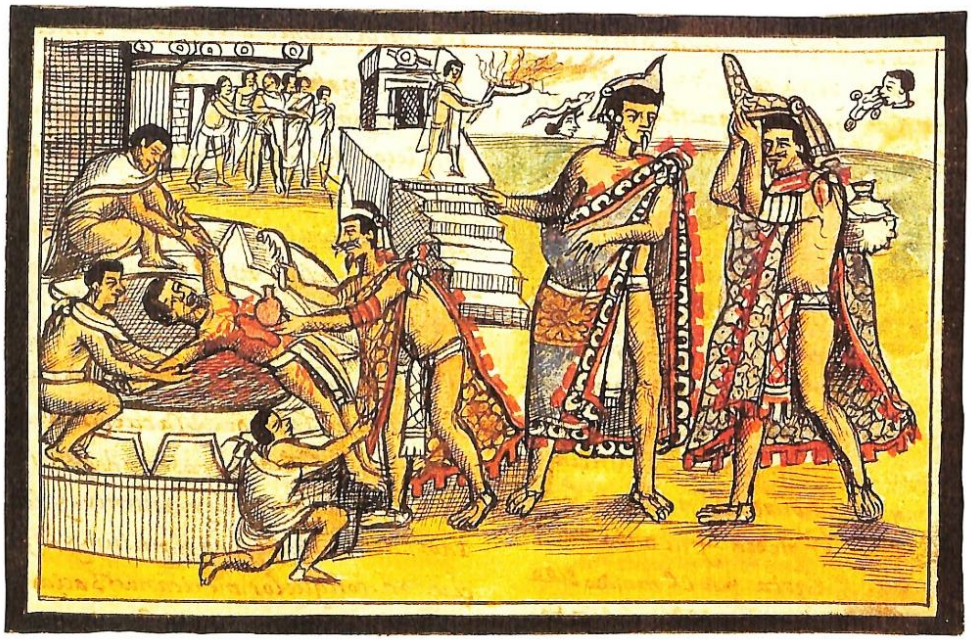


Figure 20. Inauguration of the sacrificial stone that Motecuhzoma I commissioned. The *tlatoani* himself performs heart extraction (Duran 1967: f. 70r).

[114] In households, parents acted as sacrifiers and sacrificers at the same time, as they offered and killed animals during *izcalli* and *tóxcatl* festivities.

Figure 21. Jaguar shot by Mixcóatl, god of hunting (*Codex Fejérváry Mayer*, 1994, f.42).

Sacrificers of human victims belonged to a very specialized priestly class, the *teopixcáyotl* or *tlamacazcáyot*l,[115] which symbolized the feminine, darkness and earth, commanded by the *cihuacóatl*[116] (Graulich 2016:268). They had different names and titles, depending on the functions they performed or the temple they were devoted to. According to Cecelia Klein (1984: 42), elite priests were known as the *quacuacuiltin* or *cuauhuehuetque*. Alvarado Tezozómoc (1944:137) mentions that the latter were the sacrificers ("matadores") of the Huitzilopochtli temple and were responsible for taking the bodies to the *tzompantli*.

[115] According to Graulich (2016:276, 279), they had hierarchies: the *tlamacazton* would be equivalent to the acolyte; the *tlamacazqui* to the deacon and the *tlenamacac* to the priest; the last two would be those who sacrificed the victim.
[116] The most important minister of the Mexica. He symbolized the feminine part of the government.

In Klein's (1984:42) opinion, the *chachalmeca* were part of this priestly group. They were four or five individuals entrusted with subjugating the victim during heart extraction; they were considered "ministers of the divine or sacred thing", a position inherited from father to son (Durán 1967, I:30-31) (figure 22). Of them, the most experienced, aged and prestigious was known as *tecuacuiltin* alluding to his status as an image of the god (Klein 1984: 42). Durán (1967, I:32, II:172) mentions that the name of the supreme sacrificer depended on the feast. [117] These priests were all painted black, with frizzy and curly hair, carrying a sacrificial knife. They were asked to practice on the sacrificial stone.

Figure 22. In addition to the sacrificer, five *chachalmeca* are holding the individual's limbs and neck. *Durán* (1967), f. 238 v.

[117]Their costume also depended on the occasion. For example, for gladiatorial sacrifice they dressed as Huitzilopochtli, Quetzalcóatl, Toci, Yopi Opochtzin, Tótec, Itzpapálotl, or as jaguars, pumas and eagles (Duran 1967, II:173).

Alvarado Tezozómoc (1944: 224, 286) identifies the main priest of Huitzilopochtli's temple as a *tlamacazqui*. According to Benavente Motolinía (1967:64), they were considered "butchers of the devil"; their hair was long, dirty, and black. During heart extraction, they tied their hair with a white cloth (*Codex Magliabechiano*, 1996, 69r).

The number of sacrificial priests varied according to the town. For example, the *Relación de Huaxtepeque* (Acuña 1984:203),[118] states that they had 15 or 20 sacrificers, "and one greater than all of them, who commanded the others". Although it is not known how many sacrificers Tenochtitlan had, Alvarado Tezozómoc (1944:318-319) mentions that 19 participated in the inauguration of the Great Temple, including Ahuítzotl and Tlacaelel himself. According to historical sources, this would be a male profession, although it was possible for women to participate as assistants during heart extraction (González Torres 1985: 181-184).[119].

Regardless of the number and gender of sacrificers, they had specialized education, as well as training to deal with the energetic transference resulting from this act. Some rituals were performed to help them connect with the sacred realm and, possibly, to reincorporate themselves into normal life after sacrifice. Among these were all kinds of abstinences, mortifications and penances (González Torres 1985: 181-185).

The identities of sacrificers responsible for immolating animals were not given by the chroniclers. From the *Codex Zouché Nuttall* (1992:69) I can assume that on many

[118] Oaxtepec, in the current state of Morelos.
[119]González Torres (1985: 105) mentions the women who washed faces during these rituals, as well as the ones who gave food to individuals participating in sacrificial practices.

occasions sacrificers killed animals and humans indistinctly. In fact, on page 69 of this Mixtec codex, Lord 9 Flower ("Arrow of Burning Tobacco"), in his priestly role, performs heart extraction of a man and a mammal, possibly a wolf (figure 23).[120]

Figure 23. Lord 9 Flower ("Arrow of Burning Tobacco") sacrifices human and animal victims. *Codex Zouché Nuttall*, 1992, folio 69.

The idea that a sacrificer kills different species seems logical considering that he has the technical and symbolic preparation to perform this act. As for the Templo Mayor of Tenochtitlan, it is well known that the rulers sacrificed humans and quail (Durán 1967, II: 193, 274, 285, 301, 309, 365, 400, f.70r). There is no data suggesting that they immolated other species as well, but I believe this is very likely. The fact that the technique used for

[120] I will discuss this identification on chapter seven.

heart extraction is the same in animals and humans, support this proposal.[121] Also this act is represented with the same sacrificial stones (*téchcat*l) (*Codex Zouché-Nuttall* 1992:4, 44) (figure 36). In addition, there are some similarities in posthumous treatments such as flaying, defleshing, cutting of bone and disarticulation of bone segments. Animals destined for sacrifice had a very great symbolic importance: some of them were gods' avatars. They were dressed as such before sacrifice, in a similar fashion to human impersonators.[122]

From historical sources and osteological information, I proposed in a previous study (Chávez Balderas 2017) that sacrificers were a highly specialized priestly class, possessing anatomical knowledge inherited from generation to generation. This can be inferred from the strategies they adopted to make slaughter and posthumous treatments more expeditious. For example, knowledge and constant practice simplified heart extraction and decapitation techniques. In both cases, the priests chose to cut soft tissue instead of bone, which made these processes considerably faster (see chapters four and five).

I also suggest that in addition to the sacrificer, [123] many other individuals participated in the posthumous treatments of the bodies, as they required several hours of work. Although these assistants did not take the victim's life, they had to receive some preparation - technical and symbolic - to handle the corpses. Durán (1967, I: 23) confirms that the skull rack (*tzompantli*) had its own ministers to whom the heads were delivered.

In addition, as I will demonstrate in this dissertation, human and animal bones were stored and later reused in specific rituals. Considering the symbolic importance of bones,

[121] I will address this sacrificial technique on the next chapter.
[122] Unlike humans, numerous animal corpses were buried inside the ritual deposits at the Templo Mayor and the West Plaza (see chapter seven), with no additional posthumous treatments.
[123]It is possible that the sacrificer also performed posthumous treatments, but undoubtedly, he had to be helped by other people.

these remains had to be kept under the supervision of a member of the priestly class. I the next section I will focus my discussion on the sacrificial victims: the most important actor in the sacrificial practice.

The Victim

> "The things they sacrificed were all the animated and living things, and the things with no sensitivity, and all the things they could have, without taking anything out. They sacrificed animals, namely lions, tigers, ounces,[124] which are like big cats, foxes and others who call coiotles (coyotes), which are like between wolf and fox; deer, hares, rabbits and dogs of the native people of that land that growl and do not bark; birds of all kinds, especially quails; snakes and reptiles and lizards; locusts and butterflies; roses and flowers, incense and aromatic things...but the noblest and highest sacrifice that they esteemed and more than they used and exercised and continued, was to sacrifice men and bathed everything with their own human blood and that of others, and that which they poured from themselves and with so much pain, it was a terrifying thing."[125] Las Casas 1967, II: 184.

From an archaeological point of view, victims - human or animal - provide an unimagined wealth of information. Through the study of their skeletal remains it is possible to know

[124] Small felids.

[125] Las cosas que sacrificaban eran todas las animadas y que tenían vida, y de las insensibles que carecían della, y de todas cuantas podían haber, sin sacar alguna. Sacrificaban animales, conviene a saber, leones, tigres, onzas, que son como gatos grandes, raposos y otros que llaman coiotles, que son como entre lobo y raposo; venados, liebres, conejos y perrillos de los naturales de aquella tierra que gruñen y no ladran; aves de cuanta podían tomar, en especial codornices; culebras y lagartos y lagartijas; langostas y mariposas; rosas y flores. Sahumerios de incienso y cosas aromáticas…pero el más noble y alto sacrificio que estimaban y más dellos usado y ejercitado y continuado, era el sacrificar hombres y bañallo todo con sangre humana suya propria de cada uno y de otros, y la que de sí mismos derramaban y con cuánto dolor, era cosa espantable" (Las Casas 1967, II:184)

different aspects of their biological profile, such as age, sex, height, origin, diet, health conditions, among others. In addition, it is feasible to infer how they died and how their bodies were treated; this helps elucidate some aspects of sacrifice that went unnoticed or were exaggerated by the chroniclers. Indirectly, the victims are also a vehicle for obtaining information on the sacrificers, such as the expertise with which they acted, the type of instruments they used or the anatomical knowledge they had. For Hubert and Mauss (1964:97) the victim was a means for communicating with divine entities; this bond was established through their destruction in the ritual. For the Mexica the offering of life was the supreme act to reach the supernatural world; to achieve this goal the identity of the victim must have been fundamental. Therefore, the selection criteria for both humans and animals had to be very precise, motivated by the type of ritual. Some celebrations required men, women or children, while others demanded powerful carnivores. Among the variables considered for victim's selection are age, sex, appearance, provenance, health status and physical defects, social status, occupation or even their abilities for the arts. In the case of animals, the species characteristics and symbolism, were important aspects to consider (Broda 1971, González Torres 1985: 251, Román Berrelleza and Chávez Balderas 2006, Chávez Balderas 2017, López Luján 2018).

López Austin (1996: 436-437) argued that human victims needed to be outsiders, because otherwise ritual murder would economically diminish the Tenochcas. Thanks to population genetics and strontium and oxygen isotope studies, it is possible to know that some of these individuals were from nearby communities and had close genetic affinity, while others came from distant regions. Although their birthplace may not have been Tenochtitlan, many of them lived in the city for a significant period before sacrifice (Bustos

2012, Barrera 2014, Moreiras, personal communication, September 2017). Something similar happened with animals: the most important species for slaughter were not native to the basin of México, but, many were kept in captivity in the city (Elizalde 2017).[126] While there are some parallels in the selection and immolation of human and animal victims, both categories need to be explored separately.

Human Victims

In the past, it was generally believed that most individuals were male warriors captured by the Mexica in warfare and brought to Tenochtitlan for sacrifice. However, different lines of evidence suggest that this was not the case and that the scenario is much more complex (Chávez Balderas 2014). Individuals were selected depending on the type of ceremony and the function of sacrifice: some festivities demanded slaves or prisoners of war; others required women and children. In some cases it was believed that the deity was the one who chose the origin of individuals. For example, it was thought that Quetzalcóatl needed sacrificial victims from Tepeaca, Calpan, Tecalli, Cuantlinchan, Cuauhquechollan, and Atotonilco, and not from another nation (Durán 1967 I: 32). In addition, the meat of the Michoacan and Huastecan victims was supposedly not liked by the god (Duran 1967 I: 32).

According to the *Primeros Memoriales* (Sahagún 1997: f. 255 r), victims were known as *teomicqui*, "ones sacrificed to the gods" (Sullivan in Sahagún 1997: 72). Based on their function and role in the ritual, Lopez Austin (1996:433-435) classifies these individuals into "the payments" (*nextlahualtin*), "the images" (*teteo imixiptlahuan* or

[126] In chapters six and seven of this dissertation I will discuss the results of oxygen isotope analysis.

ixiptlahuan), "the beds of the gods" (*pepechtin*) and "the skin owners" (*xipeme*).[127] The first reciprocated the benefits granted by the gods, such as the rains that provided the crops; they were also known as "dripped human papers" (*tlacatetecuhtin*). The images served as recipients for the gods and died possessed by them. "The beds" preceded impersonators in sacrifice, to serve them. Finally, skin was obtained from the *xipeme* to be used as attire for ceremonies; these victims could also be either *ixiptla* or *nextlahualtin* (López Austin 1996:433-435).[128]

Archeological information corroborates victims were males, although there were also numerous women and children; the latter are especially abundant in the contexts of the Templo Mayor (Chávez Balderas 2017). Regardless of their age and sex, the main categories of sacrificial victims are slaves, warriors, and most likely individuals obtained as tribute. According to Graulich (2016), convicted criminals, donated individuals, people with physical defects, virgins, volunteers, "marked" people and, to a lesser extent, free and noble citizens, could also be sacrificed. For this author (Graulich 2016:221), the gods Nanáhuatl and Tecciztécal, who killed themselves to create the sun and the moon, would represent one of the two main categories: warriors and slaves, as they were dressed as such. I shall now discuss how the victims were obtained.

[127] These correspond to the main categories, although other ones are mentioned in historical sources. For example, Durán (1967, I:44) suggests that every four years the Imallacualhuan ("the prisoners of their food") were sacrificed, along with the *ixiptla* of Tezcatlipoca. The Mamaltins were four prisoners of war sacrificed in *panquetzaliztli* (Benavente Motolinía 1967:57), while those killed for the Tlatoani coronations were known as *tlahuahuanaloz* (Alvarado Tezozómoc 1944:313).
[128] See chapter two.

1) Slaves

Slaves were individuals who were sold and sacrificed after purification. They were especially important because, among other things, they personified the deities (*ixiptla*) in calendrical festivities and were considered the sweet food for the gods. In contrast, those who served as "their beds" were war prisoners (Duran 1967, I: 181). The difference in roles may be explained by the fact that an enemy was not the best candidate to represent the deity, but rather his servants. Slaves were also purchased for sacrifice during rulers' coronations: this would have happened during the reign of Ahuítzotl, where the attendants from other regions had brought prisoners and slaves (Duran 1967, II: 396).

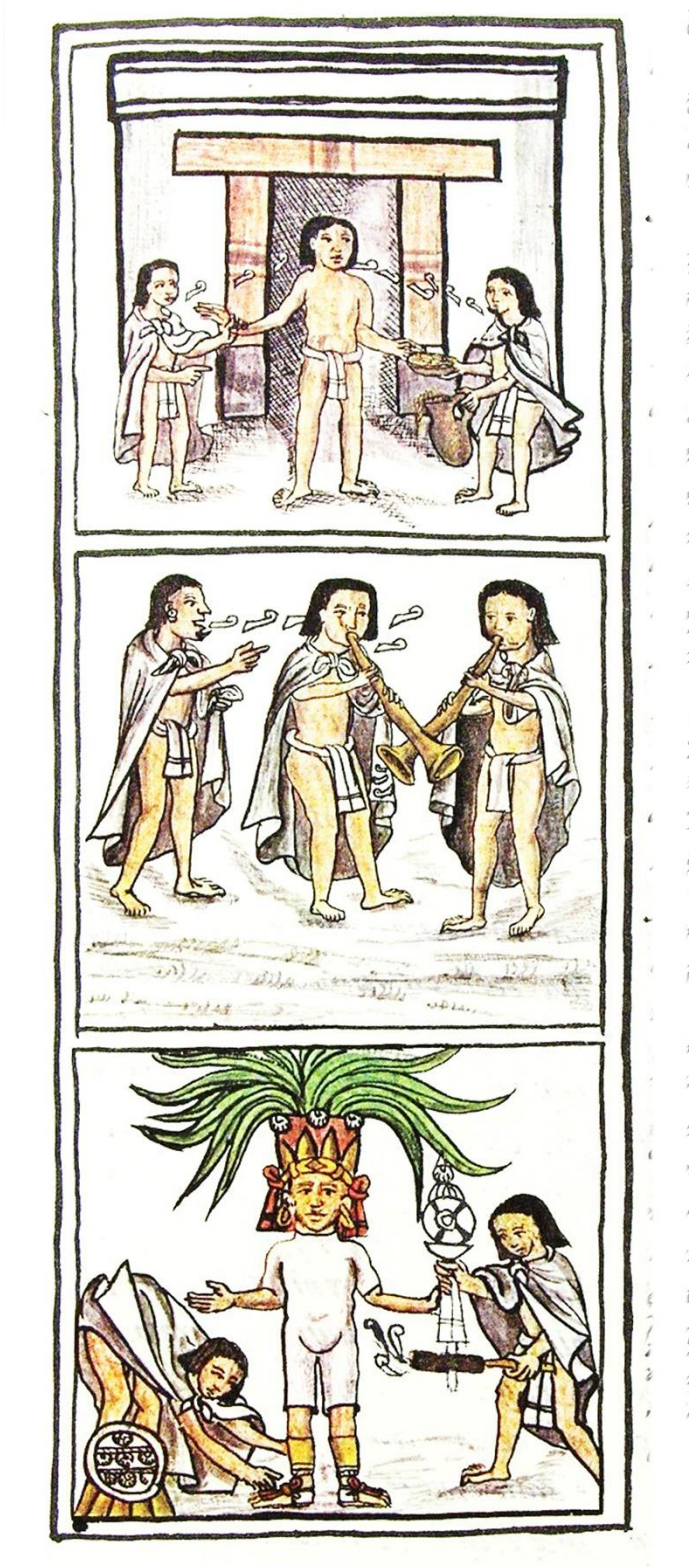


Figure 24. Tezcatlipoca's impersonator (*ixiptla*) was treated as the deity. His final destiny was to be sacrificed during the *tóxcatl* month festivities. *Codex Florentino* (1979), Book II, folio 31.

Durán (1967, I: 181-186) describes the places in which slaves were bought: specialized markets. The most important were in Azcapotzalco and Izucan, where men, women and children were sold by their owners. They were purchased for slavery and for sacrifice; in the latter case they had to be healthy and with no defects: they were undressed for inspection. The Dominican friar explains the slavery system. A person could become a slave if he or she had stolen, had gambling debts, had not paid off a loan or have committed a crime. Parents could sell their children during a time of famine or simply because they were disobedient, shameless, incorrigible and dissolute. [129] A woman could take her husband's killer as a slave. It was possible to be freed from slavery if the stolen amount was repaid, if the loan was paid, or if the master fell in love with the slave. They could also escape by running away; that is why they wore wooden collars to prevent them from escaping. However, sometimes they ran away and if they stepped on "the dirt of a person" they would be released; if they ran away and hit someone, the person would take their place. When a slave was bought the price was paid in blankets, jewelry and feathers (Durán 1967, I: 181-186).

Sahagún (2000, I: 103) also describes the Azcapotzalco market, which was “located two leagues from Mexico”.[130] According to the Franciscan, the customers made sure the slaves (men or women) had no illness or "ugliness in their bodies". According to Benavente Motolinía (1967: 66, 72), slaves were inexpensive. For this reason, they were offered by the merchants and were replaced in the *tzompantli* "because the dead were cheap and underpriced".[131] In contrast, Sahagún (2000, III: 893) argued that "the slave trader is

[129] Disasters could also motivate the selling of people for corn; this would have been the case during the famine of AD 1554. After the drought the slaves were rescued (Durán 1967, II:244).
[130] According to the Real Academia Española, one legua corresponds to 5572.7 m
[131] These accounts confirm that the tzompantli was supplied with slaves.

the greatest merchant of all, because his wealth is composed of humans themselves". In addition, the price of individuals varied according to their abilities. For example, those who did not sing would cost 30 blankets and those who did, would cost 40 (Sahagún 2000, III: 824-825).

Benavente Motolinía (1967:322) was impressed by the differences between the native and European slavery systems. In Mesoamerica individuals could sell themselves or their children as slaves, be replaced by their relatives, have a family in which their descendants were free, and even have their own slaves. The Franciscan adds that those who stole a child or knew of any betrayal to the republic and did not denounce it would become slaves.

After being bought and before becoming deities' impersonators, individuals were bathed to wash them from slavery (Duran 1967, I: 181-186). Those who would be sacrificed on the feast of Huitzilopochtli (*panquetzaliztli*), were bathed with water from Huitzilátl, from the town of Huitzilopochco (Sahagún 2000, I: 248), today Churubusco in Mexico City. These purified slaves (*tlacoti*) were literally treated like gods for several days, months, or even a year (Duran 1967, II: 273). Sahagún (2000, I: 103.104) mentions that they were raised "with much gift", dressed very well, bathed in hot water and fattened "because they were to be eaten and offered to their god"; if they were good for service, they could be freed from sacrifice. To prevent them from escaping they were put in wooden jails (*cuauhcalco*) (Alvarado Tezozómoc 1944:117).

The importance of markets was undeniable, as it allowed sacrificial victims to be available for all rituals. Durán (1967, II:232) reported that Tlacaelel said that the deities had not to wait "the opportunity of some offense to go to war, instead they (can) seek a comfortable market where, as such a market, our god and his army would come to buy

victims to eat". In this sense, the market (*tianguis*), like the *vivarium* of Tenochtitlan, ensured access to sacrificial victims all year round without depending on war campaigns or tribute.

Historical sources are emphatic about the relevance of slaves in sacrificial practices. Despite this, they seem to have been overshadowed in recent history by warriors, who were also sacrificed in various celebrations. Mendieta (1971:100) explains:

> […] that so many slaves were killed and sacrificed in a feast, as many of their gods came to fall in it (the festivity); is understood they (were) slaves for sale: and this was sacrificing men in the presence of gods, and women in front of goddesses, and sometimes children. The slaves taken in war, all those who they had, (were) sacrificed and killed, even if they were a thousand, in various feasts, where diverse ceremonies were made with them.[132]

In addition to historical sources, the biological profile obtained from the skeleton, as well as isotopes and genetics analysis, suggest that slaves - men, women and children - most likely played a leading role. They personified the gods, they were immolated in the coronations, sometimes cannibalized and placed in the *tzompantli*, where ultimately skulls were stored or reused for the Templo Mayor offerings.

[132]"[…] que tantos esclavos mataban y sacrificaban en una fiesta, cuantos de sus dioses venían á caer en ella, se entiende de los esclavos de venta: y esto era sacrificando hombres ante los dioses, y mujeres delante de las diosas, y á veces niños. Mas de los esclavos tomados en guerra, todos los que a la sazón tenían, sacrificaban y mataban, aunque fuesen mil, puesto que en diversas fiestas diversas ceremonias hacían con ellas" (Mendieta 1971:100).

2) Victims Obtained Through War

Under this category I distinguish two types of sacrificial victims. The first ones correspond to captured warriors (*cuauhteca*) and the second to civilians who were imprisoned; [133] both were destined for sacrifice. Certainly, warriors were more valuable, as they would bring privileges and recognition to their captors; the braver the defeated warrior, the more appreciated he was (*Relación de Tezcoco,* Pomar 1984:55). His captors were considered as his "owners" and established a very close relationship that prevented them from consuming the meat of his captive; "he had him as his son" (Sahagún 2000, I: 183). [134] Therefore, he would not eat him, because it was "his own flesh" (Graulich 2016:192). In sum, defeated warriors were courageous men who risked their lives in the battlefield. These warriors would represent the *mimixcoa*, the *xipeme* and possibly the *huitznahuas,* all of them sacrificed in mythical times (Graulich 2016:237).

As for the second category, Alvarado Tezozómoc (1944:343-345) describes how the Mexica attacked Oztoma, under Ahuítzotl command. Half of the men in town, all the boys, girls and children were taken to Tenochtitlan. They were civilians who were not trained for war and therefore not recognized for their courage; the region had to be repopulated. It is likely that the chronicler overestimated the number of captives taken in this raid. Whatever might be the case, he confirms the capture of civilians. Muñoz de Camargo (1998:190) suggests that these men and women, acquired as "warfare spoils", were sold.

[133] These are considered by Graulich (2016) under the slave category. However, I placed them in this group because they were obtained as direct consequence of war and not all of them were sold.
[134] In chapter five I will address anthropophagy.

The *Relación de Chichicapa* (Acuña 1984, I:77) goes further by suggesting that in Miaguatlan war captives could be transformed into slaves to be sold in the market:[135]

> …and so, those they took in wars many became slaves, who were sold and bought in the markets. And so, in that town, many from other parts and provinces, such as Mexico and Tlaxcala and Tepeaca, and from the Mixteca, were sold and bought. [136]

The *Relación de Quiotepeque* (Acuña 1984:237) notes that enemies captured in war could be sold in the fairs for 400 *cacaos* (cocoa beans).

Usually, historical sources refer to captives without specifying whether they are warriors or civilians. [137] Only a few references are explicit in mentioning apprehensions of ordinary citizens, so it is likely that most of the time they are referring to enemy warriors. These were brought to Tenochtitlan, given shelter and food to fatten them for sacrifice (Alvarado Tezozómoc 1944: 130, Duran 1967, II: 169). According to Benavente Motolinía (1967:299-300) they were kept in cages that a jailer guarded: he had to pay if the prisoner escaped. [138] In contrast, Sahagún (2000, II: 762) mentions that captives were kept in the Malcalli (a sort of jail for war prisoners), where the *mayordomos* took care of them. No war captive could be released, no matter if he was a lord; all were destined for sacrifice (Mendieta 1971: 131).

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[135] These data are extremely relevant and they will be discussed in Chapter 6 along with results on isotope analysis.

[136] "y ansi, los que tomaban en las guerras muchos se hacían esclavos, que se vendían y compraban en los mercados. Y así, en el desde d[ic]ho pu[ebl]o, se vendían y compraban muchos traídos de otras partes y provincias, como eran de hacia México y Tlaxcala y Tepeaca, y de la Mixteca." *Relación de Chichicapa* (Acuña 1984, I:77).

[137] Sometimes they are confused with slaves as well.

[138] Similarly, stealing a captive from another warrior or donating him was punishable (Mendieta 1971: 132).

War prisoners used to be sacrificed as the "beds" for the *ixiptla*, in coronations, inaugurations, the feast of the sun and during calendrical festivities such as *tóxcatl*, *títitl*, *xócotl huetzi*, *izcalli*, *huei miccaílhuitl*, and especially the gladiatorial sacrifice performed on tlacaxipehualiztli and in the feast of Huitzilopochtli, *panquetzaliztli* (Alvarado Tezozómoc 1944: 307, *Costumbres, Fiestas y Enterramientos*...1945:46, Durán 1967, I:106, II:303, Benavente Motolinía 1967:44-45, 47, 61, Mendieta 1971:100, *Codex Magliabechino* 1996: 42v).

Figure 25. Warrior taking an enemy. *Codex Mendocino* (1992, f. 65r).

3) Victims Obtained Through Tribute[139]

After conquests, subjected towns had to comply with their tributary obligations, by sending the most diverse products to the city. Although payment with individuals was not recorded in the *Matrícula de Tributos* or in the *Codex Mendocino,* it is known from other sources that some villages covered these obligations with human victims for sacrifice. Judging by the accounts, some of them were captured in other cities and others were from the same town.

For example, Durán (1967 II: 158) notes that humans were sent as tribute every eighty days; they were slaves "who had been [obtained] in war for the miserable and abominable sacrifice to idols". The Dominican friar explains that the provinces that lacked the goods that were normally taxed, delivered "young girls and boys, of which the lords distributed among themselves"; some of the female slaves had children with them (Durán, 1967, II: 209). The friar also affirms that the Mixteca and Zapoteca also paid with numerous slaves who were brought to the city, tied with ropes (Durán 1967, II: 232).

The *Anales de Cuauhtitlan* (1945: 64-65) reported that the Cuextecas (Huastecans) had 20 slaves among their tribute obligations. Finally, the *Relación de Citlaltomahua and Anenecuilco* (Acuña 1984:115) claims that the slaves delivered to Motecuhzoma were destined for anthropophagy. Although scarce information is available on this type of

[139] Graulich includes these individuals under the slave category, however, I decided to consider them separately, because they were given to the empire because of war, even though they were not captured directly by the Mexica.

sacrificial victims, it can be assumed from the accounts that, after the slaves and war captives, these victims were the third most important group.

4) Sacrificial Victims Obtained in Other Ways

Historical sources list other individuals outside the groups described above. Within this category I must mention children who were donated or sold directly by their parents. [140] According to Benavente Motolinía (1967:63), they were between three and four years when offered on Mount Tláloc: they were son and daughters of dignitaries. [141] Sahagún (2000, I: 176) mentions that during the *atlcahualo veintena* infants were bought by their mothers for sacrifice; their economic status was not specified.[142]

Criminals were also destined for sacrifice. For example, Sahagún (2000, I: 172) describes how during the festivity dedicated to Cihuapipiltin "they killed in her honor those condemned to death for some crime, who were in jails". The *Relación de Ocopetlayucan* (Acuña 1986:86) and the *Relación de Tequizistlan* (Acuña 1986:242) confirm that offenders were ritually killed. For Graulich (2016:246), convicted individuals were another important category that allowed the supply of victims. However, I must point out that some of the accounts are confusing and may involve executions rather than sacrifices.

Individuals with unusual physical characteristics or deformities were also destined for sacrifice. In fact, there is evidence that some were sheltered in the vivarium where the Tlatoani kept sacred animals he would offer in sacrifice (Tapia 1988: 106). From these,

[140] We must bear in mind that children were also purchased in the markets.
[141] The same version of events is found in Las Casas (1967, II: 188)
[142] Cervantes de Salazar mentions that both parents gave "niños de teta" (infants) for sacrifice (1971:133).

Sahagún (2000, II: 693) mentions that albinos were sacrificed to the sun; Mendieta (1971:101) states that they were offered during eclipses, along with hairless persons. In addition, dwarves, albinos and individuals with congenital malformations could also be slaughtered in funerals as companions to their masters (Durán 1967, I: 56).

Suarez de Peralta (1949: 166) notes that in Texcoco infertile individuals were also sacrificed:

> […] they sacrificed them, because they were good for nothing but to occupy the world and not to increase it, and that when there was a lack of supplies, they ate it, while these are needed by the women who gave birth and raised children and to the man who begets.[143]

Other sources provide different examples. The *Relación de Huaxtepeque* (Acuña 1986:202), states that the children of slaves caught in war were sacrificed. In contrast, the *Relación de Atlatlaucca* y *Relación de Malinaltepeque* (Acuña 1986:50) indicate that in absence of slaves, the lord selected one citizen for sacrifice. Sahagún (2000, II:714) narrates that for the New Fire celebration held during the government of Motecuhzoma II, the victim was chosen by his name: it must be named Xiuhtlamin, no matter if he was a captive or a slave. In addition, Graulich (2016) also mentions virgins, volunteers, people who were considered "marked"[144] and, to a lesser extent, free and noble citizens.

From historical sources it can be confirmed that human victims offered in sacrifice were characterized by their diversity, regarding their origin, sex, age, health conditions,

[143] "y a estos sacrificaban, porque decían que no servían sino para ocupar el mundo y no aumentarle, y que cuando había falta de bastimientos, que se los comían y la hacían falta a las mujeres que parían y criaban y a los hombres que engendraban" Suárez de Peralta (1949: 166).
[144] With some physical trait.

physical characteristics, occupation and the way in which they were acquired. Some of these aspects can be inferred from the osteological analysis, as I shall discuss in chapter 6.

Animal Victims

Animals played a central role in sacrificial rituals. This must be understood in terms of the relationship that humans establish with fauna. Ingvild Saelid Gilhus (2006:1-2) defines this link as a contradiction, involving sympathy and affection, but at the same time exploitation. Animals are equated with friends or even people, but at the same time they are food; we communicate with them and protect them, while killing them and supply ourselves with their bodies. We feel friendliness for some and fear for others; closeness and distance. Following this author, these contradictory thoughts and feelings are transformed into symbols and myths; animals are sacrificed during rituals because of the superiority attributed to gods. In this sense they are effective symbols, since it is not only good to eat them, but also to think and feel them (Gilhus 2006: 4-5). According to Timothy Insoll (2010: 234-235), animals are also bridges between ancestors and their descendants; in addition, their physical characteristics determine the place for sacrifice (household, temple, etc.).

López Austin (2013) considers that animals can be classified into four categories: *anecumenical*, [145] liminal, ecumenical[146] and narrative animals. The first ones participate

[145] The *anecumene* is "the spatial-temporal dimension of the cosmos that constitutes the exclusive realm of supernatural gods, forces and processes" (López Austin 2013: 79).
[146] The *ecumene* is "the spatial-temporal dimension of the cosmos where all creatures (stars, mountains, valleys, elements, sea, rivers, lakes, meteors, minerals, plants, animals, human beings...) inhabit; but also, gods, dead individuals and forces that come from *anecumene*" (López Austin 2013:79).

in myths and are not from this world; the second ones can travel through the anecumenical and ecumenical planes; the third ones coexist with men on earth and the fourth ones are part of legends and stories. It is possible that the same species may be classified under more than one category, as has been suggested by Elizalde (2017) and Robles Cortés (2017).

For the Mexica, animals were food, raw material, companions, insignia, mythical beings, invocations of the gods and sacrificial victims. Even at death, some human beings could be transformed into animals (González Torres 2001a:107-111, 117). According to Mercedes de la Garza (2001b:145), animals have qualities that humans lack; they are mysterious, admirable and at the same time, fearsome. The role of fauna as sacrificial victims was very complex and it is still far from being completely understood. It is known that the type of ritual and the god to whom it was addressed determined, to a certain extent, the type of animal that would be sacrificed and the treatment given to its body. For example, Torquemada (1943, 2:97) states that Huitzilopochtli required quails and sparrow hawks, while Mixcóatl demanded rabbits, deer, coyotes and *adives*.[147]

The most important species for sacrifice belong to both anecumene and ecumene,[148] in other words, they are a fundamental part of myths or originated from them, but humans can have access them on Earth through different strategies, and even keep them captive. And it was precisely in mythical times when these animals were linked to sacrifice over and over. For example, in *Leyenda de los Soles* (1945: 122-125) narrates that after the

[147] By *adive* the chroniclers refer to canines such as coyotes and possibly foxes. The *adives* (*Canis aureus*) inhabit Europe, Asia and Africa. These jackals were widely known by the Spanish, so they became a reference for describing coyotes, which only existed in America.
[148]Here "the perceptible and the imperceptible coexist, and do so in an indissoluble relationship" (López Austin 2013:36).

creation of the sun and the moon, where Nanáhuatl and Tecciztécal killed themselves, the moon fell in the ashes and the eagle was the only one who could grasp it. The jaguar[149] also jumped into the bonfire and burned itself, which would explain the origin of its spotted fur. The sparrow hawk became smoked and the wolf was also charred by the fire. In the myth these animals were not sacrificed, even though they jump into the sacrificial bonfire. Later, Ce Ácatl looked for the bones of his father, Mixcóatl. When he got them back, he took the remains to a temple, the Mixcoatépetl. There his uncles - Panécatl, Zolton and Cuilton - asked him about the dedication of the temple, telling him that sacrifice of snakes and rabbits would make them angry. In contrast they suggested to sacrifice jaguars, eagles and wolves. Ce Ácatl called these animals and, instead of killing them, he asked them to eat his uncles. Although the animals did not die in this myth, it is interesting to note that the three species that the gods ask for sacrifice are the most abundant carnivores in the Templo Mayor offerings, as I shall discuss in chapter 7.[150]

Sahagún (2002, II: 696) writes a similar version, but he omits the wolf and only mentions that the eagle was burned, which explains the color of the feathers. Then, the jaguar was charred, leaving its coat stained. In the friar's narrative, both animals seem to allude more to warrior orders. In contrast, for Elizabeth Benson (1988) they represent the sun by day and the sun by night. In any case, these animals continued to be preferred for sacrifice in human time.

[149] The original source refers to it as tiger, as the Spanish did not know jaguars and used this animal as an analogy.
[150] Most of the felines recovered in this context are pumas, which I consider symbolic equivalents of jaguars, as I will argue in chapter 7.

In addition to their role in myths, other aspects had to be important for their selection. For example, their size, color, age, sex, type of locomotion, the environment where they lived and the difficulty in obtaining them. Many animals found in the offerings of the Templo Mayor were sacrificed specifically for these celebrations. It is likely that others would have already arrived transformed into luxury goods, in which case their death likely involved some ritual, considering that these species had great symbolic importance. In addition to the burial of complete specimens, animals could be used for the feather industry, fur manufacturing, medicinal purposes, as food or to make bone artifacts (Elizalde 2017). I will now describe the ways in which these animals could have been obtained for sacrifice.

1) Hunting

I distinguish three categories: 1) the capture of living animals, 2) ritualized hunting, and 3) non-sacrificial hunting. The first refers to animals that were captured by experienced hunters and brought to the heart of Mexica empire, either to be sacrificed immediately or to be incorporated into the *vivarium* maintained by the ruler.[151] Undoubtedly, the most informative description on capture techniques is provided by Sahagún (2000, III: 1019), who narrates how hunters used camouflage to distract eagles and steal their offspring (figure 26):

[151] See Elizalde, 2017.

...all kinds of eagles breed and nest in the high mountains, in the cliffs that cannot be climbed and to hunt them, they use this practice, they take a large *chiquihuite* cane or palm trees, put it in their heads and the hunter start to climb the cliff with his *chiquihuite* stuck in his head: and as soon as he comes near where the eagle is, the eagle grabs the *chiquihuite* with his claws and holds it by the air, thinking that it carries the man, (the eagle) climbs very high and drops it and descends on it, meanwhile the hunter takes his offspring and runaway with them.[152]

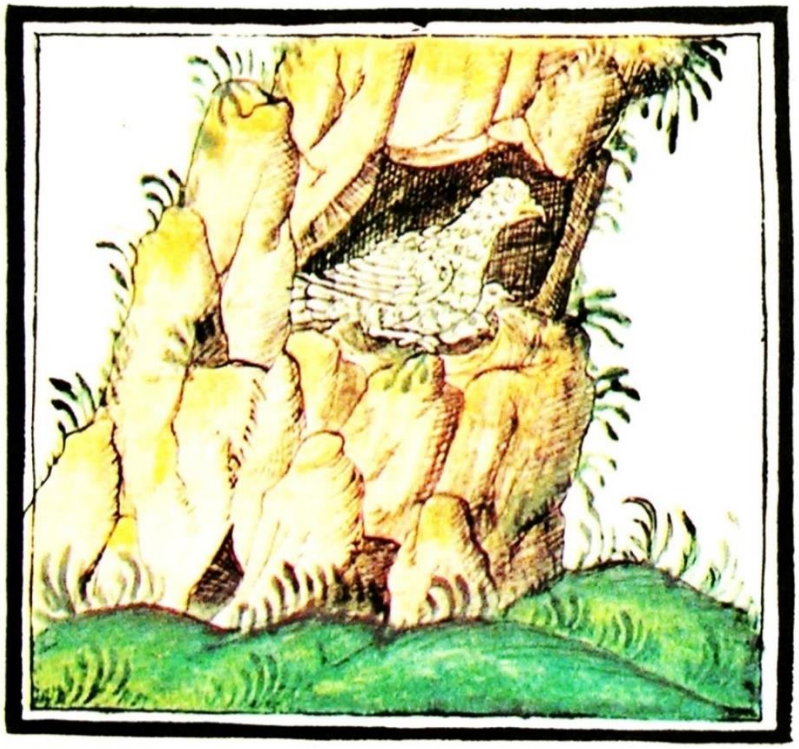


Figure 26. An eagle's nest located on the cliffs. *Codex Florentine* (1979, book XI, f. 47v).

[152] …todo género de águila cría y hace nido en las sierras muy altas, en los riscos que no se pueden subir y para cazarlas, usan deste ensayo, que toman un chiquihuite grande de cañas o palmeras, métenselo en la cabeza y comienza de subir el cazador por el risco arriba con su chiquihuite metido en la cabeza: y desque llega acerca a donde está el águila, el águila abadese el cazador, y ase el chiquihuite con las uñas y llévale asido por el aire y pensando que lleva al hombre, súbese muy alta y dexale caer y desciende sobre él, entre tanto el cazador tómale los hijos y base con ellos Sahagún (2000, III:1019).

The second category corresponds to ritualized hunting. The most compelling example corresponds to the *quecholli* month, which was intended for sacrificing animals to Mixcóatl, rewarding hunters (Durán 1967, I: 76, Benavente Motolinía 1967: 66-67). I shall discuss this celebration in more detail in the next chapter. Ritualizing the hunt goes beyond calendrical festivities and appears to be a practice shared by Late Postclassic societies, involving sacrifice. For example, the *Relación de Chichicapa* (Acuña 1986:67) describes that "it was the custom that, [of] whatever they hunted, killed or captured, they would sacrifice their hearts to the idols, and the rest (of the corpses) were eaten.

However, sometimes it is not explicit whether these animals were killed immediately in the fields or taken alive to the cities to be sacrificed in the temples. For example, the *Relación de Atlatlauhcan* (Acuña 1986:48) affirms that the gods were offered with thrushes, owls, sparrow hawks, turtle doves, quails and deer that they caught in nets; they were killed by using bows and arrows, but it is not clear where the immolation took place. The same is true in the *Relación de Chichicapa* (Acuña 1986:89), where it is reported that in the town of Ocelotepeque they sacrificed quails, deer and "other things they hunted in the mountains".

Finally, the last category refers to those specimens that were killed to be used as raw material or for subsistence purposes. Their death was not intended to establish a communication with the sacred realm, and therefore is not considered sacrificial; I will not deal with this category in my research.[153]

[153] However, it is likely that rituals or at least prayers were conducted when killing an animal, even with no sacrificial purposes.

2) Tribute

The Mexica received numerous goods as tribute, including products manufactured with animal parts, as well as live specimens; both categories were used in the offerings of the Templo Mayor. During the reign of Motecuhzoma I, the provinces of Xochimilco, Cuitláhuac, Colhuacan, Chalco, Cuetlaxtlan, Oaxaca, Tehuantepec and Chiapas gave as tribute colorful live birds, eagles, owls, sparrow hawks, hawks, crows, herons, snails, turtles, snakes, centipedes, scorpions and spiders, among others. In addition, "they tributed lions, live tigers,[154] and wild cats of all kinds of wild animals; they were brought in cages" (Durán 1967, II: 206-207).

In the *Codex Mendocino* (1992, f.31r, f.55r) and the *Matrícula de Tributos* (1980, page 11) it was documented the tribute that provinces of Xilotepec and Oxitipan paid to Tenochtitlan: live eagles (figure 27). According to Elizalde (2017:110), it is very likely that the animals that arrived alive were taken to the Tenochtitlan *vivarium*, where they received all the care they needed.

[154] Pumas (*Puma concolor*) and jaguars (*Panthera onca*).

Figure 27. The province of Xilotepec was taxed with living eagles ("sometimes three/other times four/other times about 6"). *Codex Mendocino* (1992, f. 31r).

Most of the references correspond to the taxation of products manufactured with animal remains. For example, some towns in the current state of Veracruz, such as Orizaba, Cuetlaxtlan and Zempoala, used to pay taxes with "feathers and skins" of tlauquéchol (*Platalea ajaja*), xiuhtótotl (*Cotinga nattereii*), eagle (*Aquila chrysaetos*), as well as jaguar skins (*Panthera onca*), pumas (*Puma concolor*), *onzas*[155] and wolves (*Canis lupus*) (Alvarado Tezozómoc 1941:130, 142, 1949:308-309). Numerous examples were reported in the *Matricula de Tributos* (1980) and the *Codex Mendocino* (1992), most of them

[155]Most likely term *onza* usually refers to smaller felines, such as the ocelot (*Leopardus pardalis*), the jaguarundí (*Puma yagouaroundi*) or the margay (*Leopardus wieddi*), which did not exist in Spain. They probably used the term *onza*, to compare these felines with the leopards from the old continent. The snow leopard (*Panthera uncia*) is now known as *onza*; however, it is difficult to believe that they were familiar with this animal, since it inhabits very remote regions (Roberto Rojo, personal communication, January 2018). Alvarado Tezozómoc (1941: 211) identifies *onza* as ocotochtli, an animal that according to Molina (2001) corresponds to the bobcat or marten. However, in numerous mentions of the Relaciones Geográficas, *onzas* are cited alongside bobcats as different animals. The latter was a species known to the Spanish, who had the Iberian lynx (*Lynx pardinus*), similar to a local species (*Lynx rufus*).

corresponding to feathers or delicate works of feather art, as well as jaguar or deer skins (figure 28). [156]

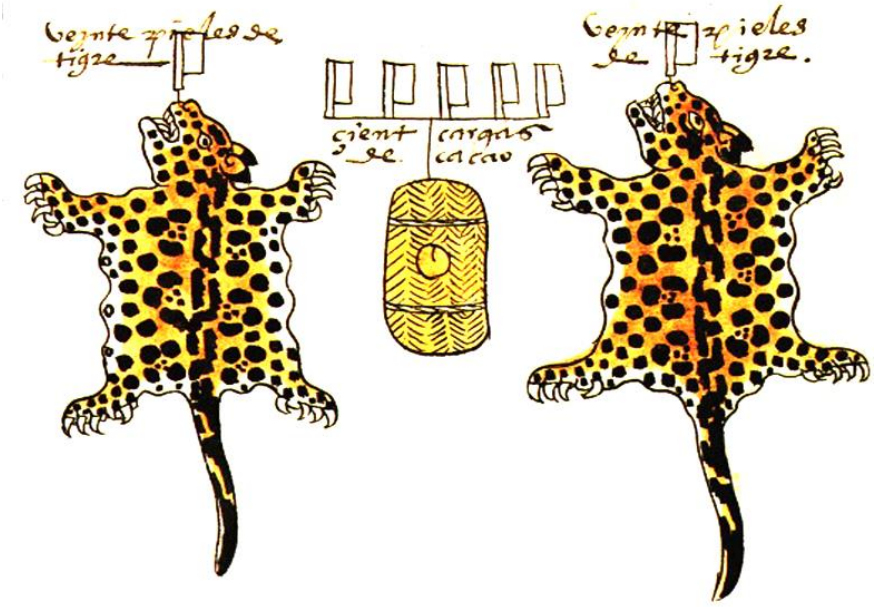


Figure 28. The Soconusco province paid 40 jaguar skins. *Codex Mendocino* (1992: f.47r).

I would like to highlight an interesting reference painted in the *Codex Selden* (1964), a Mixtec document that recorded the genealogy of Jaltepec, in the current state of Oaxaca. On page three Lord Ten Reed Eagle and Lord Nine Rain, were depicted paying taxes. Caso (*Codex Selden* 1964:29) interprets this scene as a pilgrimage led by Lord Ten Reed Eagle, who brings offerings and not tribute. Whatever the case might be, it is important to note that among the goods offered are two birds of prey, a jaguar and what appears to be a wolf.

[156] Numerous skins used in rituals were manufactured in Tenochtitlan as I shall explain in chapter 7.

[157] These animals are in cages, showing that they were offered alive; this implies the existence of specialists in their capture, handling and transport.

Figure 29. Lord Ten Reed Eagle, Lord Nine Rain and the offering of live animals. In the upper right corner are two birds of prey and below them a jaguar and, possibly, a wolf. *Codex Selden* (1964: 3).

3) Trade

In some markets animals were sold for different purposes. Apparently, the majority were intended as food. For example, the conqueror Bernal Diaz del Castillo (1942: 322) suggests that domesticated specimens had culinary purposes. Durán (1967, I: 180-181) pointed out that in the market of Acolman, which survived into the Colonial Period, dogs of all kinds were purchased; according to this Dominican friar, they were used for food.

[157] In chapter 7 I shall discuss these canines, including their depiction in the codices.

In other markets, such as Tepeaca, they sold puma, jaguar and bobcat skins (Durán 1967, II: 162), however, the circumstances in which these animals were killed before being transformed into luxury goods are not clear. In addition, they sold birds, snakes, worms, guinea pigs, dogs, rabbits, rodents and ants (Torquemada 1943, 2:557). Cortés (1985:132), who visited the Tlatelolco market, describes the trade in birds of different species, including owls, eagles, falcons, hawks, sparrow hawks and kestrels, as well as pelts preserving feathers, heads, beaks or claws. The conqueror does not mention what was done with live birds, but I consider feasible that some were offered in sacrifice, since they are abundant in the Templo Mayor offerings. Considering the existence of markets specialized in human victims, it is reasonable to suggest that similar spaces existed to provide the Mexica with animals for sacrifice.

4) Gifts Donated by Lords

Some animals may have been brought to Tenochtitlan as gifts. For example, after the war against the Matlatzicas, Axayácatl returned to the city where the lords of Tzaucyucan, Chichicuauhtla and Huitzilpapan "were like mountain people and natives of the mountains, brought their gifts of tigers, lions, wolves, *ocotochtli*, brown wolves, *cuetlachcoyotl*, fox called coyotes, deer, hares, rabbits, all alive and caged" (Alvarado Tezozómoc 1941:211). The fate of these specimens is unknown; most likely they were taken to the Tenochtitlan *vivarium*. At the funerals of the lords, their corpses were provided with gifts, including

ornaments made with feathers (Chávez Balderas 2007). There is no information on whether these goods included live animals to be offered in sacrifice.

5) Captivity at the Tenochtitlan *Vivarium*

Sahagún (2001, II:745) states that the great lords had as their hobby to breed "wild beasts, eagles, tigers, bears, and serval cats, and birds of all kinds". These animals were kept captive under the strictest care, in spaces designed for this purpose. The most famous of these places is the so-called Moctezuma Zoo, however, thanks to Elizalde's research (2017:135) it is known that it was not properly a zoo, because it was not intender for the visual and did not welcome visitors. In addition, archaeological information suggests that this space existed, at least, since the Axayácatl government (1469-1481 AD). For this reason, Elizalde (2017:136, 292) proposes the term *vivarium*, a much more neutral word; in this place, located next to the sacred precinct, large mammals and birds of prey were housed. In addition, there was an aviary, located on the city shores; inside this place were located the ponds for aquatic birds.

The *vivarium* and *aviary* of Tenochtitlan were used to confine exotic animals of great ritual importance. They were not spaces that housed domestic species for consumption, but rather animals that were used as raw materials to make sumptuous goods, for sacrifice and other rituals; at the same time these places enabled the ruler to show off his power. In this respect, Torquemada (1943, I:297) states that:

> […] no animal of any kind, or species, was known in more than three hundred leagues around Mexico, that was not brought to the cages, and animal house, of this powerful emperor, who apart from the pleasure he had in seeing them, wanted to show in this his power.[158]

The *vivarium* was an enclosure where numerous amphibians, reptiles, birds and mammals were kept. [159] The diversity of animals must have been astonishing, implying a great investment of resources to maintain it properly. According to Sahagún (2000, I: 762), in the *totocalli*[160] existed:

> [...] all kinds of birds, such as eagles and other avian, which are called *tlauquéchol* and *zacuan* and parrots and *alome* and *coxoliti* [...] and also in this place resided some caretakers who were responsible for keeping tigers and lions, and ounces and cervical cats.[161]

[158] "[…] no se conoció animal de ningún género, o especie, en más de trescientas leguas a la redonda de México, que no se traxese a las jaulas, y casa de animales, de este poderoso emperador, que demás de el gusto, que en verlos tenía, quiso mostrar en esto su poder". Torquemada (1943, I:297)
[159] For a detailed inventory of animal species reported by the chroniclers, see Elizalde 2017:108.
[160] Another of the names by which the *vivarium* was known.
[161] "[…]todo género de aves, como águilas y otros paxarotes, que se llaman tlauquéchol y zacuan y papagayos y alome y coxoliti…y también en este lugar residían unos mayordomos que tenían cargo de guardar tigres y leones, y onzas y gatos cervales." Sahagún (2000, I:762).

Figure 30. Tenochtitlan *vivarium*. Among the animals depicted in this picture are the roseate spoonbill, jaguar, eagle and most likely a wolf, all of which are abundant in the Templo Mayor offerings. *Codex Florentine* (1979), Book VIII, f.30v).

Each of these animals was intended to be in an appropriate space receiving a diet like the one they had in the wild. They had very thick, "very well carved and fitted" wooden cages, to house pumas, jaguars, foxes, wolves and small felines; birds of prey had two spaces: one for the day and one for the night (Cortés 1985: 139). Díaz del Castillo (1942: 316-317) narrates that each species of bird was fed with their wildlife food. In addition, the great carnivores were supplied with birds, deer and other prey; these powerful animals could even be fed with flesh of sacrificed humans. The animals received health care, which allowed the Mexica to breed several species in captivity (Elizalde 2017:110-111). This space was also inhabited by dwarves, hunchbacks, and individuals with other congenital diseases (Tapia 1988:106); they were destined for sacrifice.

Archaeological evidence has made it possible to infer the captivity of fauna from the study of disabling diseases, diet and reproduction. Captivity allowed the Mexica to obtain, in an expeditious way, specimens for sacrificial rituals at the Templo Mayor de Tenochtitlan (Elizalde 2017, Chávez Balderas and Elizalde 2018).

Places and Instruments for Sacrifice

Hubert and Mauss (1964) mention two fundamental categories for analyzing sacrificial practices: the place where the victims were immolated and the instruments with which the ritual act was perpetrated. For murder to be considered a sacrifice and not a crime, places and instruments had to be sacred or consecrated before the act.

The space where sacrifice is performed can be natural or constructed. Its location can be revealed by supernatural forces or it must be built in an important place, symbolically speaking (Eliade 1959). As for the places where the Mexica carried out the ritual killing, there are temples, altars, plazas, household units, as well as various natural spaces; among the latter were the lake, mountains, caves and the whirlpool in the lake at Pantitlán (González Torres 1985:171, Nájera 1987:130, Chávez Balderas 2017). These places, natural or built, are called by Carrasco (1999: 150-152) “ceremonial landscapes". Graulich (2016: 313-314) recognizes two categories: those of the mountain countryside and those of the city. However, potentially all places could be for worship because gods, spirits and other supernatural forces inhabited them.

Regardless of the type of space, it needs to be sacralized; otherwise it would change the act’s connotation: in a profane place, sacrifice would be considered murder (Dehouve

2008:325). Considering various factors, I propose that most of sacrificial victims analyzed in this research would have been immolated in the Templo Mayor or in some space near this building. In addition to the sacred spaces where sacrifice was performed, the Mexica had specific areas for the treatment of corpses and skeletal remains; although these were not mentioned by Hubert and Mauss (1964), I consider them central to the practice of sacrifice. For example, the skull rack was a true center of *death gravity*, where the heads of most of the human sacrificial victims ended up: they were exhibited, stored and redistributed to be used for other ritual purposes (Chávez Balderas and Vázquez Vallin 2017). Archaeological information suggests the existence of places in which human and animal bones were stored, as I will demonstrate in the following chapters. Finally, I must mention the spaces where skeletal remains were buried, such as the offerings of the Templo Mayor and the construction fills to consecrate buildings of the sacred precinct. All these places were sacralized by depositing remains of sacrificial victims, among other goods.

The instruments for sacrifice are divided by González Torres (1985: 176-180) into two categories: those that kill the victims and those with another ritual function. The first ones correspond to knives, axes, bows, arrows, prismatic blades, mallets, slingshots and any other instrument used to commit ritual killing (figure 31). Alvarado Tezozómoc (1944:309, 323) mentions that some of these instruments, such as "sharp blades for slitting throats", were obtained through tribute; these blades were known as *nixcuahuac ytzmatl*.[162]

[162] This was paid by Cuetlaxtlan, in addition to "white paper" for the sacrifice (Alvarado Tezozómoc 1944:309).

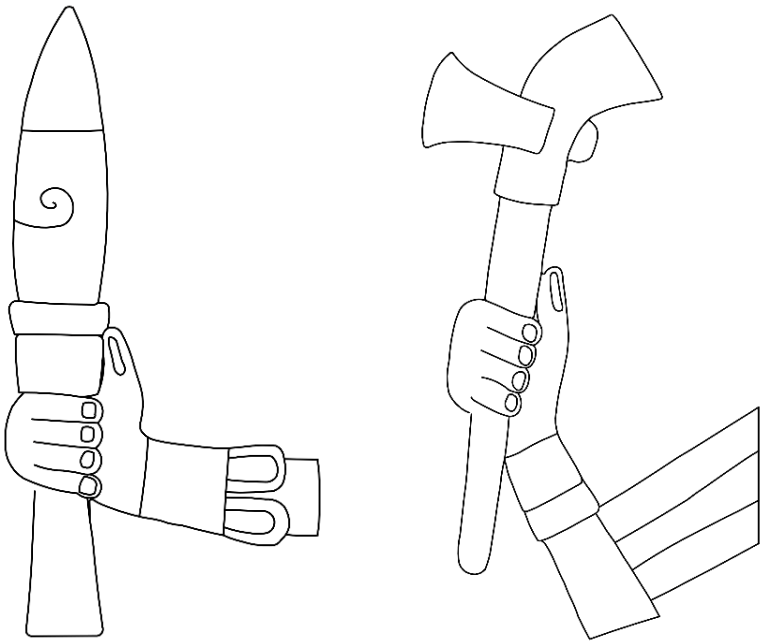


Figure 31. Flint knife and axe used for sacrifice. *Codex Laud* (1994: f. 24r). Drawing by Israel Elizalde.

Osteological data suggest that some of these instruments were used both for sacrifice and for posthumous treatments. Flint knives depicted in heart extraction pictographs may have been used to open the abdomen; however, smaller instruments such as prismatic blades or even flakes were used to detach the heart (López Luján et al. 2010, Chávez Balderas 2017). This was also common to animal sacrifice as I shall discuss on the next chapter.

Instruments that have another ritual function correspond to the sculptures that were used to perform the sacrifice, tools that were used to hold the victim, as well as the containers for human remains. Among the former we have four sacrificial stones par excellence: *téchcatl*, *chacmool*, *temalácatl* and *cuauhxicalli*.

The *téchcatl* corresponds to the emblematic stone that the Spaniards witnessed at the top of the Templo Mayor (figure 32). Of these, there are two examples recovered from excavations. The first was discovered in 1978, embedded in the floor of Stage II of this building, outside the Huitzilopochtli shrine. Another was found by the Urban Archaeology Program at the foot of the temple: it is a polyhedral rock that was removed from its original place to be deposited as part of an offering (Jiménez y García, in press).

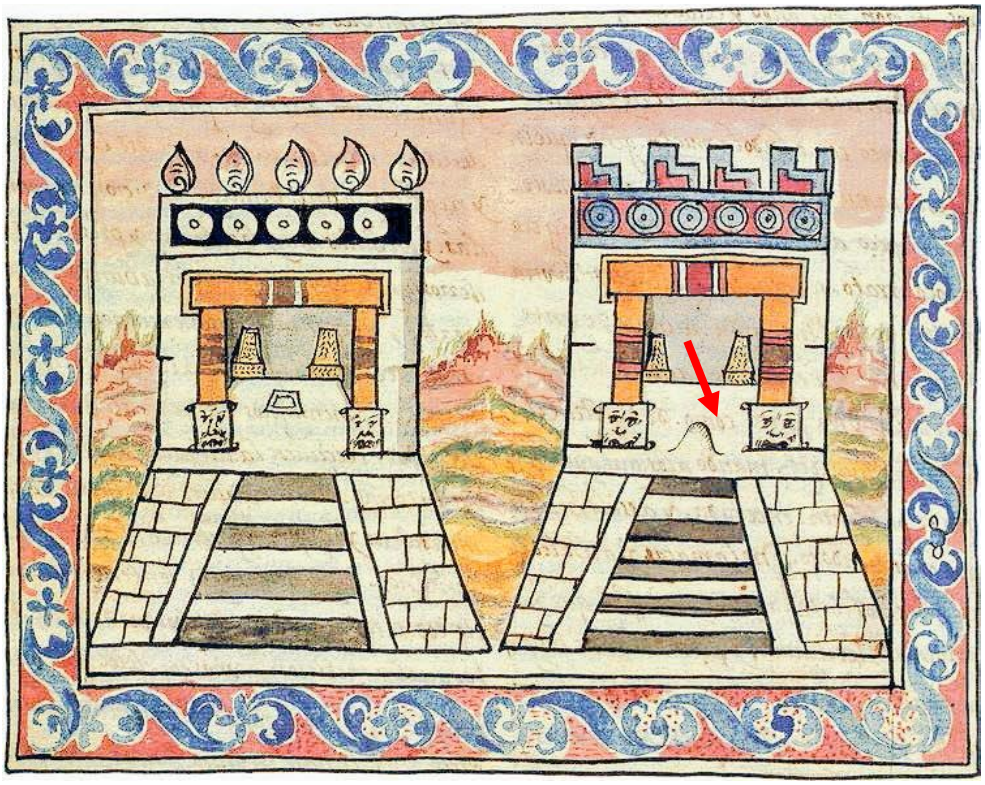


Figure 32. Templo Mayor of Tenochtitlan, where the sacrificial stone, *téchcatl*, is represented in a very schematic way (Durán, 1967: 333).

There are numerous references to these sacrificial stones in historical sources. In this regard Benavente Motolinía (1967:58) explains that "most of this stone or half of it was buried in the ground, high above the steps in front of the altar of idols."

Moctezuma wanted the stone to be carved by those from Azcapotzalco and Coyoacán, who were the best for this task (Alvarado Tezozómoc 1944:115). Durán (1967, I: 20) mentions that the stone outside the Huitzilopochtli shrine was a "somewhat pointed, green, waist-high stone, in which a man was bent on his back". The shape of the stone allowed the placement of the victim in supine position, pushing the abdomen upward, which facilitated heart extraction (figure 33). In fact, Durán (1967, I:32) assures that by bending the victim in such way and slashing him/her with the knife "it was very easy to open a man in the middle, like a grenade". This description is compatible with the heart extraction technique documented in the Templo Mayor, which involved an incision below the ribs. I shall discuss this on next chapter.

Figure 33. The *téchcatl* exposed the area below the ribs, which would facilitate the removal of the heart through the abdomen. *Codex Laud* (1992), page 8.

Analysis of historical sources and archaeological contexts carried out by López Austin and López Luján (2001: 61, 71-72) reveals that the Chacmool functioned as a sacrificial stone

in Late Postclassic Central Highlands. This conclusion is supported by López Luján and Urcid's (2002:40) study of an outstanding sculpture found in Mixquic: a chacmool that holds a sacrificial slab, confirming its function as a stone for heart extraction.

According to López Austin and López Luján (2010:61), the *temalácatl* and the *cuauhxicalli* were a "liturgical pair" used in the gladiatorial sacrifice at the Yopico temple; the former was used to tie the victims and the latter to sacrifice them, and to contain their blood and hearts.[163] In addition, scenes carved on these stones made them "memorials that glorified the achievements of each sovereign" (López Austin and López Luján 2010).

Thanks to the meticulous study by López Austin and López Luján (2009: 463-466) it is known that the chroniclers named the *temalácatl* in seven different ways, while they referred to the *cuauhxicalli* with 23 different names; sometimes they use both terms as synonyms. This reflects the confusion they had regarding both stones. In the view of these authors, the first one only had the function of tying the captive (figure 34), while the second one could be used as a sacrificial base, brazier and container. Thus, the *temalácatl* was exclusive to the Yopico temple, while numerous buildings had a *cuauhxicalli*; some were even called Cuauhxicalco, in allusion to the existence of one of these stones.

Under this logic, the *temalácatl* is not directly related to the victim's death; this was the *cuauhxicalli* function.[164] Examples of the latter are the Ex-Arzobispado stone and the stone of Tízoc; both have a hole in the center to place the hearts and the second has a canal

[163] Graulich (2016:329) believes that *temalácatl* could be used as sacrificial stone. However, I agree with the proposal of López Austin and López Luján, as in pre-Hispanic and some colonial pictographs these stones are smaller and only had the purpose of restraining sacrificial victims. In addition, the stone of Tízoc, the Ex Arzobispado stone and even the Stone of the Sun, does not have a hole to tie individuals. For these reasons they must not be considered as *temalácatl*, but as *cuahxicalli*.

[164] Small receptacles containing hearts were also known as *cuauhxicalli*, but did not function as sacrificial stones.

that could also serve to drain the blood. Of these, the stone of the Ex-Arzobispado was identified by Emily Umberger (1998) (figure 35) as the *cuauhxicalli* represented in folio 70r of the Durán (1967) (figure 20); it is decorated with solar rays and seems to have a hole in the center. In this pictograph the tlatoani performs heart extraction.

Figure 34. Captive tied to the *temalácatl* during gladiatorial sacrifice, *Codex Magliabechino* (1996), f. 30r.

Figure 35. Ex-Arzobispado *cuauhxicalli* with a cavity in the center that function as a heart container. Image by Boris de Swan, courtesy of Editorial Raíces.

In addition to sacrificial stones, Durán (1967 II:300, 395) affirms that in the funerals of the rulers (Tízoc and Ahuítzotl), retainers were sacrificed on top of a *teponaztli* drum, which would seem to be reserved for this type of ritual.

From Mixtec pictographs, it can be assumed that animals were also killed in sacrificial stones, possibly in a *téchcatl*. This was depicted on page 44 of the *Codex Zouché Nuttall* (1992) in which a canine appears with its back resting on a stone, while one individual is holding its forelimbs and a priest is removing the heart (figure 36). In addition, the osteological information confirms that the technique used for animal's heart extraction was very similar to the one used for humans, which implies that both victims were placed in the same position.

Figure 36. Heart extraction of a deer and a canine. The latter is on top of a sacrificial stone (*téchcatl*). Codex *Zouché Nuttall* (1992), page 44.

Other instruments used for sacrifice were a wooden collar and a sawfish cartilage. These were not used directly to kill the victim, but to restrain individuals while their hearts were removed. The collars are known only from historical sources, [165] while the sawfish cartilages have been recovered in the offerings of the Templo Mayor, symbolizing the land above the sea. It is possible that some would have been used in sacrificial rituals, but we lack evidence to confirm this. There is no information to support the use of these

[165] Although for other Mesoamerican sites, Graulich (2016:235) considers that the so-called "yokes" would have this function.

instruments for animal slaughter. However, it is obvious that these or other instruments had to be used to immobilize individuals, especially larger carnivores.[166]

Following González Torres' classification (1985: 176-180), I must mention the recipients used to collect the blood, heart and heads. The containers could be ceramic vessels or sculpture masterpieces, such as the famous *cuauhxicalli* in the shape of eagles and jaguars, recovered in archaeological excavations. As mentioned above, these would not serve as sacrificial stones, but only as containers. In addition, the author mentions other artifacts that were used in sacrificial rituals, although they were not connected to the death. Among these are copal resin, incense burners, musical instruments and paper artifacts (González Torres 1985: 176-186). All these were also used in non-sacrificial ceremonies.

Besides these instruments, there are those used for posthumous body treatments. Among these were sharp and blunt force tools to remove skin, muscles and other soft tissues, as well as to disarticulate anatomical segments or to cut bones. For example, flint knives, axes, prismatic blades or flakes would have been used for decapitation by disarticulating the cervical region of the spine. On the other hand, for flaying and defleshing, most likely they have used obsidian blades or even flint flakes (Chávez Balderas 2017). Finally, I must add some artifacts or architectural element that served as cutting surfaces, as well as the containers to handle or store human and animal skeletal remains. Having defined the main actors of sacrifice, I will explain the most important sacrificial techniques by which human and animal victims were killed.

[166] In the case of jaguar heart extraction, most likely these felines were weakened or dead at the time of the cardiectomy, as I shall explain in the following chapter.

Chapter 4

Mexica sacrificial techniques

Much has been written on sacrificial techniques used by the Mexica; however, most studies are based on the analysis of historical sources. To a large extent, these investigations have focused on the killing of human victims, because there are very few accounts of animal sacrifice. In this chapter I evaluate historical data and archaeological evidence from various excavations at the sacred precinct of Tenochtitlan.

I will do this by using a taphonomic perspective; this was originally formulated by Ivan Efremov (1940) for paleontology. Its application in archaeology and physical anthropology was consolidated in the eighties, largely thanks to the efforts of Diane Gifford, who defines it as the "area of paleontological research that defines, describes, and systematizes the nature and effects of processes that act on organic remains after death" (Gifford 1982:366). Carmen Pijoan Aguadé and Xabier Lizarraga (2004:13) expand this definition by adding that these transformations continue until the destruction of bone.

To understand the complexity of processes that occur in an organism after its death, taphonomy has been divided into three phases: necrology, biostratinomy and diagenesis (Grupe 2007: 242-247). The first deals with the moment of death, for example, whether it was caused by catastrophic events, illness, old age or predation. Biostratinomy refers to the period between death and burial (Grupe 2007:242). Finally, diagenesis documents physical and chemical transformations of remains, generally associated with their burial (Smith et

al. 2007:1485). In the context of sacrifices at the Templo Mayor, the necrology phase will provide information on the sacrificial technique; the biostratinomic phase will focus on the posthumous treatments; and the diagenetic phase focus mainly on the conditions of burial.

In this research I address these three phases, focusing on biostratinomic processes, which are divided into natural and cultural (Micozzi 1991). Natural transformations are carried out without direct human intervention, but they can be a consequence of a cultural action (Chávez Balderas 2017), for example, deliberate abandonment of a corpse to outdoor conditions will lead to a series of different transformations than if it was deposited in water. Natural processes include decomposition, passive disarticulation, skeletonization, mineralization, and weathering, as well as mummification and saponification. On the other hand, cultural biostratinomic processes include skinning, defleshing, active disarticulation, fractures, cuts, thermal alterations, scraping, polishing, among others (Micozzi 1991; Botella et al. 1999; Pijoan Aguadé and Lizarraga 2004; Chávez Balderas 2017).

To analyze the transformations that the sacrificial victims, human and animal, suffered, it is necessary to know the precise moment at which they were carried out. Direct analysis of bone remains enables one to distinguish whether body modifications were carried out at the antemortem, perimortem or postmortem intervals. The first of these refers to all events that occurred before the individuals' death and are characterized by the presence of a bone healing. It is important to keep in mind that in the case of an injury, the soft tissues react first while the bones take longer. According to Norman Sauer (1998: 322-323), the way in which bones heal will depend on the location of the injury, health

conditions and genetic variations. On average, this osteoblastic and osteoclastic activity will take about thirteen days to manifest, with some cases reported at seven days.

The perimortem interval refers to all those modifications that took place shortly before or after the death, where there is no visible bone regeneration. In the case of posthumous perimortem treatments, bones fracture as living tissue, mainly because fresh tissue contains "fluid filled vessels, grease, and collagen fibers", and therefore has more tensile strength than dry bone (Sauer 1998:325). This interval has been considered flexible and of indeterminate duration (Wheatley 2008:69), as it depends on intrinsic and extrinsic factors.

The postmortem interval refers to the transformation of bone into brittle matter; the time in which bone tissue loses its organic component and its moisture content will depend mainly on the environment (Sauer 1998:325), and to a lesser extent on intrinsic factors (bone shape, thickness, health conditions, age, etc.). Generally, perimortem and postmortem modifications can be distinguished by fracture patterns, coloring of broken edges, their microscopic characteristics, and the presence of plastic deformation (Sauer 1998; Wieberg and Wescott 2008). This reflects the ability of bone to respond to trauma ("green bone vs. dry bone") (Ubelaker and Adams 1995:509). While these criteria can be used with some degree of certainty, it should be kept in mind that some of these characteristics may be present in some bones that are already in the postmortem interval (Ubelaker and Adams 1995; Wheatley 2008). For this reason, it is necessary to consider the context in which remains were found. In addition, experimental work under local conditions is needed to distinguish bones that have been in different types of environments (submerged, weathered, buried, etc.) (Jordana et al. 2013). It is important to emphasize

that in the anthropological field the term perimortem is used to refer to the alterations produced in fresh bone. This definition is different from that used by pathologists who refer to something that happened regarding the event of death (Passalacqua and Fenton 2012:402). For this reason, and especially when working on forensic cases, this definition needs to be made explicit.

Based on these differences, it is common for perimortem modifications to be correlated with the manner of death and the handling of remains, while those of a postmortem nature with natural taphonomic processes (Wieberg and Wescott 2008: 1028). However, I consider that this is not always the case, as I will demonstrate that in the sacred precinct of Tenochtitlan bones continued to be manipulated and reused long after the death, when they had already lost all plasticity and moisture content.

In this chapter I will focus on the analysis of perimortem transformations, as there is plenty of evidence of them. These correspond to three different types of practices recorded in historical sources: pre-sacrificial tortures, sacrifice and posthumous treatments; these could be carried out in the same ceremony. An example of this is the gladiator sacrifice (*rayamiento* or *tlahuahuanaliztli*), which implied a combat where an enemy warrior was seriously wounded, and then sacrificed for heart extraction. Later the victim's body was skinned, decapitated, dismembered and destined for anthropophagy (Duran I: 98, II:174-175, 278). [167] Potentially, evidence of all these actions could be recorded in the bones.

[167]This ritual was carried out during the *tlacaxipehualiztli* month, as I will explain later.

When interpreting bone transformations, it must be considered that sometimes the same procedure could be used in different scenarios. For example, depending on the ceremony, throwing victims from a high structure could be a torture, a sacrifice or a treatment applied to the body. Next, I will talk about the most important sacrificial techniques, linking historical and osteological information (Chávez Balderas 2017).

Exposure to Fire

Judging from historical sources, this was a torture that preceded sacrifice. It could be intended to bring the individual into an altered state of consciousness, to release more energy through violence (in terms of the energetic approach), while at the same time was a public demonstration of violence. According to Graulich (1999:421) it had the function of regenerating Xiuhtecuhtli, god of fire. In addition, I propose that this pre-sacrificial torture was carried out to purify the victims (Chávez Balderas 2018a). The prototype of fire exposition is found in the myth where Nanáhuatl and Tecciztécatl jump into the fire in Teotihuacan, and in the myth in which the Popol Vuh twins encounter the bonfire of the Xibalbá (Duverger 1993: 112-113, Graulich 2016:364). [168]

Historical sources report that some individuals were briefly exposed to fire (*Costumbres, Fiestas, Enterramientos*...1945: 46; Durán 1967, I: 120, 128, II: 143, 463; Benavente Motolinía 1967:61; *Codex Magliabechino* 1996:37v; Sahagún 2000:152-157). They were grabbed by the limbs and thrown into a bonfire, but prevented from dying,

[168]As previously mentioned, Chinchilla et al. (2015) found at Tikal an archaeological context that might recreate this myth.

because they were destined for sacrifice by heart extraction (Figure 37). Durán (1967, I: 128) explains the process:

> [....] burning them, the ministers of that temple, one by one, two by their hands and two by their feet, and giving four pushing in the air with him, at the fourth push in the air throw him in the great fire, and, before dying, they took him out quickly and put him thus, half roasted, on top of a stone and cut off his chest, as I have said, and took his heart out and threw it in front.[169]

The victims apparently consumed *yauhtli* (*Tagetes lucida*), to ease their pain, "so that they would lose their senses and not feel so much death" (Sahagún 2000:152). Yauhtli is a wild plant also known as *pericón*; it is yellow in color and smells like aniseed (anise). It was widely used in the ritual sphere (Sierra 2015: 415). In addition, it was credited with anaesthetic, psychotropic and medicinal powers (Aguilera 1985:103-104; Sierra 2015:419), which appear to be activated when the plant burns (Garza 2001a:98). However, the hallucinogenic properties of this plant are not accepted by all scholars (Garza 1990:82-84).

[169] […] quemándolos los ministros de aquel templo, uno a uno, dos de las manos y dos de los pies, y dando cuatro enviones en el aire con él, al cuarto envión daban con él en aquella gran brasa y, antes de que acabase de morir, sacábanle de presto y poníanle así, medio asado, encima de una piedra y cortábanle el pecho, como tengo dicho y sacábanle el corazón y echábanaselo delate (Durán 1967, I:128).

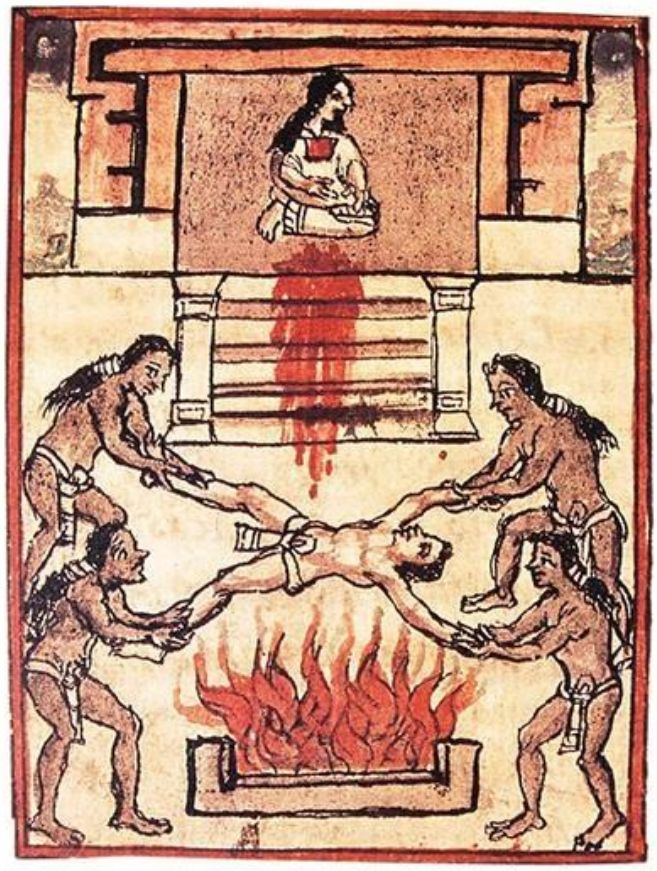


Figure 37. Sacrificial victim exposed to fire as a ritual torture preceding sacrifice, Durán (1967), f.22.

The *Codex Magliabechino* (1996: 37v, 38r) narrates that an individual was on top of a pole. After being torn down to obtain the sacred amaranth, he was thrown into the fire with his head protected; it was supposed to not be damaged because it would be flayed. The body was destined for anthropophagy.

This practice was performed during the calendrical festivities. For example, during the *xocótl huetzi* month (Durán 1967, I: 210; *Codex Magliabechiano* (1996: 37v); Sahagún 2000:152-153, 226) it was associated to the sacrifice of the deities' images (*ixiptla*). Durán describes that in Coyoacán four men and one woman represented the gods Yacatecuhtli,

Chiconquiáhuitl, Cuauhtaxayauh, Coyotl Inahual and Chachalmecacíhuatl. The ministers swept around the great brazier and at the end "took the gods, one by one, alive, and threw them into the fire" (Durán 1967, I: 120). In addition, this type of pre-sacrificial torture was carried out in other festivities such as *teutleco* (*Costumbres, Fiestas, Enterramientos*...1945:50; Sahagún 2000:156-157, 237), where slaves were burned in a large brazier located on an altar called Teccalco. Durán (1967, I:126-128) mentions that during the *huey tecuílhuitl* festivity the "beds" that preceded the *ixiptla* of the goddess Xilonen were briefly thrown into the bonfire and then sacrificed by heart extraction.

Evidence on the use of fire in animals is very scarce and does not correspond to pre-sacrificial rituals but rather to post-sacrificial treatments. Such is the case of snakes, frogs, fish, axolotl or birds that were hunted during the *izcalli* month. All these were grilled to feed "our father the fire" (Sahagún 2000:88).

Historical sources are consistent in saying that fire exposure was brief and that all individuals were alive when they were removed from the bonfire. Consequently, there is no osteological evidence of this procedure, since this type of thermal alteration would only damage the skin and possibly the muscles, but not the bones (Chávez Balderas 2017).

The damage to the victim's bodies would depend on several factors, such as the type of fire, temperature and exposure time. Depending on this, the burns they would suffer could vary in severity. In any case, these were devastating injuries currently classified in two ways: by degree and by depth. The first one divides them into first, second, third and fourth degree burns. According to Lee et al (2014:172) first degree burns are characterized by erythema (redness and irritation of the skin), due to dilated capillaries. Those of second degree correspond to blistering and superficial ulceration while those of third degree are

characterized by tissue disorganization and a marked change in color. Other authors consider the existence of fourth-degree burns, for example, for Mozafari et al (2008:406), these are often small and well-defined, involving tissue loss and even bone exposure. On the other hand, the current trend for classifying this type of injury is by its depth. They are divided into "superficial, mixed depth and full thickness" (Lee et al. 2014:172).

Therefore, considering the narratives of historical sources, it is likely that the victims suffered first, second and third degrees burns, depending on the time of exposure and their proximity to the fire. As already mentioned, in some cases the skin was to be protected from injury, as it would be used for other ritual purposes. In addition, it is likely that the time of exposure was short because the individual was held by the priests, who had to bear his weight and feel the effects of the heat. Some accounts claim that the individuals were thrown to the bonfire, which also suggests a brief exposure.

When does fire exposure leave traces on bones? This will depend on several factors, both intrinsic and extrinsic, including the characteristics of the heat source, the individual's body, his or her clothing, and the length of exposure (DeHaan 2012:1583). John DeHaan (2012:1579) considers that body tissues that serve as fuels are: skin (both epidermis and dermis), subcutaneous fat, muscles, tendons, internal organs and bone remains (in their mineral and organic content, especially long bones with a fat-rich marrow). From the experimental work of Michael Bonhert et al (1998:13) we know that the cranial vault is visible after 10 minutes of fire exposure, but without thermal alterations on bone. However,

after 20 minutes the skull and some ribs are already visible, while the jaw may be fractured.[170]

In cases where the effects are more severe and lethal, Eckert et al (1998:189) propose the following classification.

Type of bone damage	Features
Charred	Internal organs survive
Partial	Preservation of soft tissues
Incomplete	Fragmentary bones
Complete	Bone fragments and ashes[171]

Table 4. Damage to human remains caused by fire. Based on Eckert et al (1998:189).

Thermal damage to bones has been observed both in fatal fires (where individuals lost their lives) and in funeral cremations, which involves reducing the body to fragments by fire. This type of alteration is not consistent with the brief fires mentioned by historical sources. These brief exposures would certainly cause skin damage and depending on the type of fire contact, possibly of some muscles, therefore this practice passes completely unnoticed in the archaeological record.

[170] These data correspond to crematoriums with a controlled temperature between 720° and 810° C.
[171] The authors propose that in the complete cremation only ashes survive. However, I have observed the preservation of bone fragments in commercial crematoria. The complete reduction to ashes is the result of the pulverization process (Chávez Balderas 2007).

Arrow shooting

According to historical sources, this practice could be used as a torture or as a sacrificial technique. For example, during the *ochpaniztli* month, it was a form of torture that preceded the sacrifice of victims dedicated to the impersonator of the goddess Chicomecóatl. [172] Her throat was slit and she was flayed, and her skin was carried by a priest. Later, in his honor, several prisoners of war and captives were shot and placed in:

> [...] some tall wooden poles that were there for that purpose, their hands outstretched and their feet open one on a stick and the other on another, tying them all up very tightly. Those *flecheros* in the garments of these gods arrowed them all, which was a sacrifice of this goddess and was made to her honor, like the sacrifice of fire to the former goddess. Having just roasted those unfortunates, they would tear them down and cut off their chests and take out their hearts and give them to their owners, together with the flayed Indian for their banquets and feast of human flesh [....]. Durán 1967, I: 140.[173]

From this description it can be assumed that this was a ceremony prior to sacrifice by heart extraction, although it is difficult to know the state in which the victims were after arrow shooting. In this same month, the *ixiptla* of the goddess Toci was also sacrificed. In her

[172] A different version is found in *Costumbres, Fiestas, Enterramientos*... (1945:48), a document in which it is stated that the representation of Chicomecóatl was shot in the throat and flayed. Later her remains were eaten. The account is somewhat ambiguous and it is not clear whether it was shot with arrows or whether the description alludes to the woman's throat cut. Graulich (2016:370) suggests that she was forced to swallow an arrow and she suffocated.

[173] […] unos maderos altos que había para aquel efecto, las manos extendidas y los pies abiertos uno en un palo y otro en otro, atándolos a todos de aquella suerte muy fuertemente. Aquellos flecheros en hábito de estos dioses los flechaban a todos, el cual era sacrificio de esta diosa y se hacía a honra suya, como el sacrificio del fuego a la diosa pasada. Acabado de asaetear a aquellos desventurados, los derribaban abajo y les cortaban los pechos y sacaban el corazón y entregábanlos a sus dueños, juntamente con la indezuela desollada para sus banquetes y fiesta de carne humana […]. Durán 1967, I: 140.

honor prisoners of Tlaxcala were sacrificed and according to Durán (1967: II-463-464) a third of them were shot in memory of:

> [....] the many who came out arrowed and badly wounded when, fleeing the Mexicans from those of Colhuacan, they got into the tulars and reedbeds, where they hid themselves for not being killed and destroyed, in memory of those arrows, given for the sake of this goddess, offered her in sacrifice dead men with arrow shots, trussed on poles. Durán 1967, II: 463-464.[174]

According to this Dominican friar, on this occasion, the arrows were used to kill these individuals. Benavente Motolinía (1967:62) describes this practice for the *izcalli veintena* and suggests that it was a form of torture prior to throwing them from heights and extracting their hearts. During that day, six poles were erected where they tied up the same number of individuals. They were shot with arrows "by more than two thousand men and adolescents with bows and arrows". The friar affirms that "and thus wounded and half dead", they would throw them down from that height and then extract their hearts. Interestingly, he affirms that the heads were left to the priests and the bodies were distributed among the lords.[175]

The *Historia Tolteca Chichimeca* (1976:185) considers arrow shooting as a form of public sacrifice in which the Chichimecas took prisoners and transported them to Cholula: there, the Tlatoque "sacrificed Quauhtzitzimitl by arrows" (figure 38). It is

[174] […] los muchos que salieron flechados y mal heridos cuando, huyendo los mexicanos de los de Colhuacan, se metieron por los tulares y carrizales, donde se escondieron por no ser muertos y destruidos, en memoria de los cuales flechazos, dados por causa de esta diosa, le ofrecían en sacrificio hombres muertos a flechazos o asaetados, aspados en palos (Durán 1967, II: 463-464).
[175] This same version was copied by Las Casas (1967, II: 192).

interesting to note that the manuscript emphasizes that this was a sacrifice in the context of a feast and not a war execution.

Figure 38. Sacrifice of Quauhtzitzimitl by arrow shooting. *Historia Tolteca Chichimeca*, 1976: f.28r.

The *Codex Tellerianus Remensis*, on the other hand, links this practice with an extraordinary occasion. In A.D. 1506 Motecuhzoma ordered the shooting of a man to pacify the gods, because there had been a famine for two hundred years (in the years of 1 rabbit). Although the source is not explicit his sacrifice was done to request crop abundance, it can be interpreted as a sacrifice (Quiñones in *Codex Telleriano Remensis* 1995: 228).

Figure 39. Arrow shooting of a man during the year 1 rabbit, as an extraordinary petition to eradicate famine. *Codex Tellerianus Remensis*, 1995: f.41v. [176]

Arrow shooting was known to be used as a form of sacrifice in another type of exceptional festivity: the inauguration of the Templo Mayor. According to Durán (1967, II: 466), Motecuhzoma II ordered the capture of prisoners from Huexotzingo, for the inauguration of the building; some were "shot alive, in sacrifice and honor of the inauguration of the temple". The Huexotzincas responded by sacrificing their Mexica prisoners as well.

[176] This scene was also depicted on plate 84v of its cognate Vatican Codex 3738.

This practice spread beyond the Central Highlands, as evidenced by the Mixtec manuscripts. On pages 89 and 90 of the *Codex Zouché Nuttall* (1992) the Lord "6 House" carrying attributes of the god Xipe Totec is tied to a wooden structure; he has been shot by a warrior devoted to death (Anders et al. in *Codex Zouché Nuttall* 1992) (figure 40). In the upper part of this scene, Lord "10 dog" is tied to a circular sacrificial stone (*temalácatl*). According to John Pohl (1998:60), in *Codex Becker 1* this scene was depicted with inverted characters; in it Lord "6 House" is tied to the *temalácatl*, while Lord "10 Dog" was shot. This could imply that both were subjected to gladiator sacrifice[177] and arrow shooting. Although this painting is very damaged, it is illustrative of the wooden structure where the victim was tied up (figure 41).

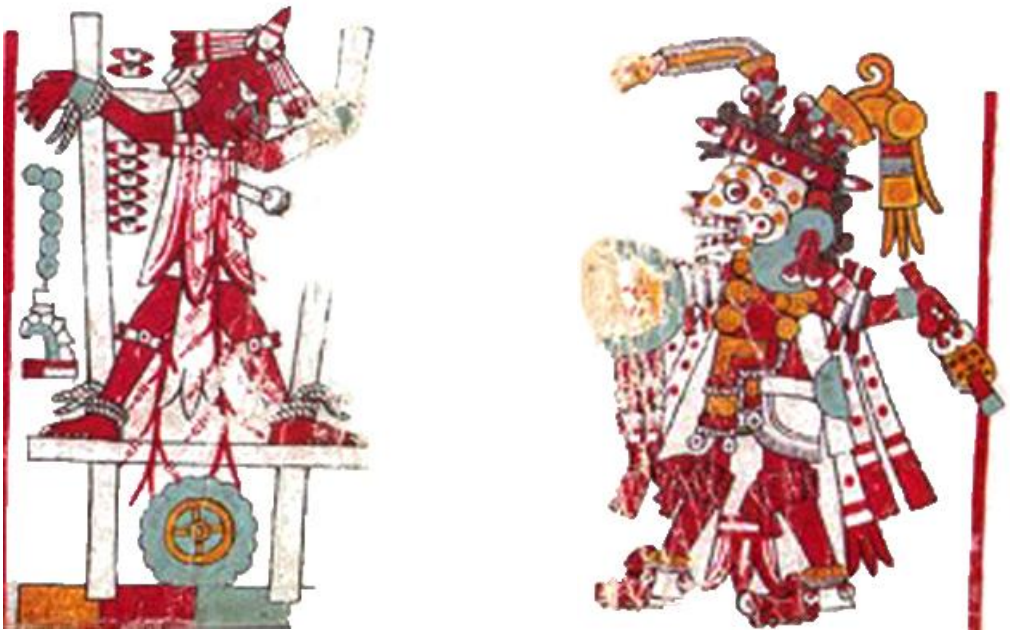


Figure 40. Arrow shooting of Lord "6 House" in the hands of a warrior dressed as the god of death. *Codex Zouché Nutall* (1992), pages 89 and 90.

[177] This practice was carried during the tlacaxipehualiztli month. It consisted of forcing war prisoners to a combat in which they were tied to a circular stone (*temalácatl*). They were provided with fake weapons, ending severely wounded. They were then sacrificed for heart extraction and flayed.

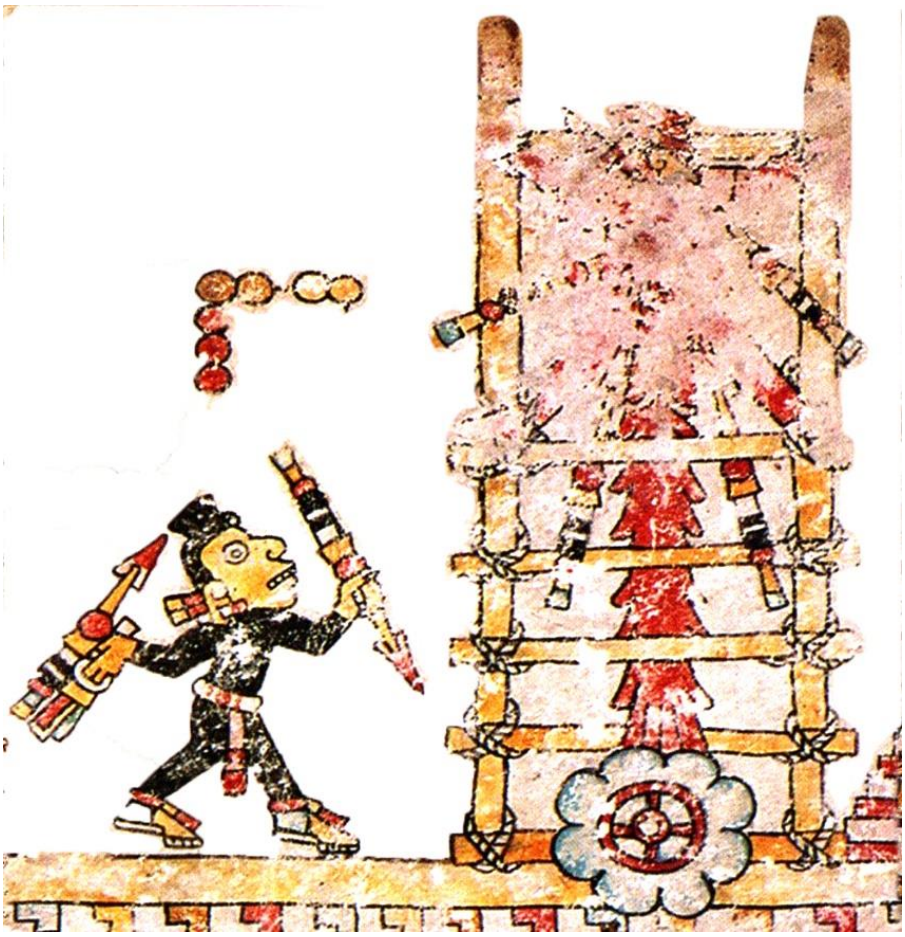


Figure 41. Scaffold where Lord "10 Dog" was shot with arrows. *Codex Becker 1*, 1996, page 36.

Source	Celebration	Pre-sacrificial torture	Sacrificial technique	Posthumous treatment
Codex Tellerianus Remensis (f.41v)/ *Codex Vaticanus 3738 (f.*84v)	Exceptional: year 1 Rabbit. Famine	---	¿Arrow shooting?	---
Codex Zouché-Nuttall (1992, p. 89-90)/ *Codex Becker 1* (p. 36).	Executions within the framework of a gladiatorial ritual?	Individual tied to a stone and injured	¿Arrow shooting?	
Durán (1967 I:140)	Ochpaniztli (in Chicomecóatl's honor)	Arrow shooting	Heart extraction	Anthropophagy
Durán (1967 II:463)	Ochpaniztli (in Toci´s honor)	---	Arrow shooting	---
Durán (1967 II:466)	Templo Mayor inauguration	---	Arrow shooting	---
Historia Tolteca Chichimeca (f. 28r)	"Festival" after capturing enemies	---	Arrow shooting	---
Motolinía (1967:62)	Izcalli month	Arrow shooting and thrown from high altitudes	Heart extraction	Anthropophagy

Table 5. Occasions in which arrow shooting of humans was carried out according to historical sources.

In the case of animal sacrifices, there are numerous references in historical sources, especially in pre-Hispanic codices. These allude to mythical events, rituals and hunting, all of which are closely related, as I shall explain later.

Undoubtedly, the festivity on the *quecholli* month provides the most information on animal sacrifice by arrow shooting. It is the celebration of Mixcóatl, god of hunting,

venerated mainly in Huexotzinco, Tlaxcala and Coatepéc; he was also known as Camaxtli. During this festivity there were several ceremonies connected with the veneration of the deceased (lords and warriors), bloodletting, the production of bows and arrows, the hunting of animals and human sacrifice. According to Durán (1967, I: 75), for the feast celebrated in Huexotzinco and Tlaxcala, the attendees dressed like *mimixcoas*, decorated with white plaster bands. They surrounded the mountain and began the hunt, shooting and catching by hand as many animals as possible and "when they had done the hunt, they brought it all to the idol and there they sacrificed and killed it, just as they sacrificed men" (Durán 1967, I:76).

Benavente Motolinía (1967: 66-67) also agrees that the objective of this hunt was to sacrifice animals; according to what each hunter brought, he would receive a reward. The Mexica and other local people celebrated this ritual on the hill of Zacatépec. They surrounded the animals and captured them to receive blankets and food in return. They killed their prey and took the heads and hung them in their homes (Sahagún 2000:244). *Costumbres, Fiestas, Enterramientos*... (1945:50) explains that Motecuhzoma himself went to this hill and when he arrived they made human sacrifices at the temple located there. The hunt began and:

> [...] all the kinds of animals they took were brought to Moctezuma even if it was a lizard, and they took lions, and tigers, and wolves, and foxes, and rabbits, hares, deer, and many other kinds of snakes, lizards. [178]

[178] […] todos los géneros de animales que tomaban traían ante Moctezuma aunque fuese una lagartija, y tomaban aquí leones, y tigres, y lobos, zorras, y conejos, liebres, venados y otros muchos géneros de culebras, lagartos (*Costumbres, Fiestas, Enterramientos*... 1945:50).

Arrow shooting of animals was also carried out during exceptional ceremonies, particularly funerals. Motolinía (1967:245) states that dogs were sacrificed to accompany their masters on the way to the underworld; canines were shot "with an arrow by the throat". Codices have abundant depictions of animals shot with arrows. In most cases, this type of representations allude to mythical events in which deer, jaguars, crocodiles and birds are killed. Sometimes it is difficult to discern if, besides alluding to a mythical scene, the scene illustrates the immolation of these species.

Undoubtedly, jaguars are the most common animals depicted for this practice. In most cases are associated with Mixcóatl or Tlalhuizcalpantecuhtli, deities with bows and arrows. The relationship of jaguars and Mixcóatl is particularly important, as it reveals the close connection between hunting, war and sacrifice. In equivalent plates of *Codex Borgia* (1993: 50), *Codex Fejérváry-Mayer* (1994: 41) and *Codex Vaticanus* 3773 (1993: 25), these felines are shot by Mixcóatl, who was represented with body painting, consisting of longitudinal white and red stripes (figure 42a-c). This type of attire also characterized the *mimixcoas,* prototypes of sacrificed warriors, food of the gods that can be equated with hunted animals (Olivier 2010:461).

In equivalent plates of *Codex Cospi* (1994: 11) and *Codex Vaticanus* 3773 (1993: 84), this animal is sacrificed by Venus -Tlalhuizcalpantecuhtli-, the arrow-shooting deity par excellence (figure 43 a-b). Ferdinand Anders et al (*Codex Cospi* 1994:255) interpreted this scene as metaphor of the sun's rays affecting warriors. In contrast, for Eduard Seler (2004:37), the jaguar attacked by Venus represents the god Tezcatlipoca in his Tepeyólotl form. This feline represents the land, the night and the night power (González Torres

2001b:123, Seler 2004:37). Stars are arrows equated to comets (Olivier 2015:92), and when they shot the earth they make it fertile (Graulich 1999:117).

a) b)

c)

Figure 42. Arrow shooting of a jaguar by a character dressed as Mixcóatl. a) *Codex Borgia* (1993), plate 50; b*) Codex Vaticanus 3773* (1993), plate 25 and c) *Codex Fejérváry-Mayer* (1994), plate 41.

Figure 43. Jaguars shot by Venus. a) *Codex Cospi* (1994), plate 11; b) *Codex Vaticanus* 3773 (1993), plate 84.

In addition to jaguars, it is common to find scenes of other animals shot by arrows. Such is the case of the deer on plate 22 of the *Codex Borgia* (1993) and that has been injured on its

left side, with an arrow depicted with eyes and mouth (figure 44). This animal, according to Olivier (2010:455) symbolizes war captives who were tied by their feet like hunted animals. Interestingly, deer is almost absent at the Templo Mayor archaeological explorations, as it seems to be more related to funerary rituals which are scarce in the excavations.

Figure 44. Deer killed by an arrow. *Codex Borgia* (1993), page 22.

Finally, on page 14 of the *Codex Bodley* (2005), the Lord 8- deer points with his bow to a bird perched on a tree (figure 45). Although it is not possible to discern whether this is a form of capture, a hunting act for subsistence or ritual purposes, it is worth mentioning that

in the archaeological collection one of the eagles was shot on the keel as I shall discuss in chapter 7.

Figure 45. Lord “8 Deer”, points his bow and arrow to a bird. *Codex Bodley* (2005), page 14.

In sum, I consider that arrow shooting to be one of the most important sacrificial techniques. Although it was not performed as frequently as heart extraction, it is an ancestral practice whose origin is explained in numerous myths regarding the Mexica migration to the Central Highlands. These myths confirm a close link between hunting and

sacrifice, and between prey and sacrificial victim. [179] In this way, animal and human sacrifice[180] by arrow shooting are closely linked.[181]

This equivalence was very clear during *quecholli* month, in which animals were compared to the war captives. They were given to the lords, and the sacrifier was rewarded. Similarly, animals are hunted or preferably kept alive for ritual killing; in any case, the meaning of the ceremony is sacrificial. Interestingly, during this celebration, the Tlatoani dressed as an enemy while the hunted animal was equated with the dead captive (Oliver 2015:17-18, 349). For Olivier (2015:642), there is also an equivalence between humans and animals in terms of post-sacrificial treatments, since flaying is an ancestral knowledge of hunters.

The connection between human and animal sacrifice by means of arrow shooting is also found in myths, [182] where the immolation of fauna is considered to precede sacrifice of humans. For example, after leaving Chicomoztoc and initiating the migration, those of Cholula and Tlaxcala worshipped the sun to whom only animals were offered:

> They made a sacrifice to him, and it was that, in killing any kind of game, they took out the bloody arrow and showed it to the sun, as a sign of sacrifice and recognition by God (Durán 1967, II: 26).[183]

[179]It is not my intention to make an exhaustive analysis on this subject, but rather to briefly contextualize this ritual practice. For a detailed study, I recommend Guilhem Olivier's scholarly work, *Cacería, sacrificio y poder en Mesoamérica. Tras las huellas de Mixcóatl, "Serpiente de Nube"* (2015).

[180] As for humans, it was believed that they could be shot after death. According to the *Codex Vaticanus 3738* (1996, page 6), the *teyolía*, a soul entity that traveled to the afterlife, could be shot during the journey to the underworld.

[181]Not only humans and animals were killed in this way. The stars shoot among themselves (*Leyenda de los Soles* 1945:122). The sun was supposed to be shot everyday with an arrow to be devoured by the earth, starting its journey to the underworld, leaving the earth darkness (*Codex Borbonico*, 1991, page 16).

[182] For a detailed study of these and other myths, the reader should refer to Olivier 2015.

[183] "A éste hacían un sacrificio, y era que, en matando cualquier género de caza, sacaban la flecha, así ensangrentada, y mostrábansela al sol, en señal de sacrificio y reconocimiento por dios" (Durán 1967, II: 26).

The substitution of animal sacrifice for human killing can be traced in two myths. The first of them corresponds to the *Anales de Cuauhtitlan* (1945:13), where it is mentioned that arrow shooting began in the hands of the Ixcuinames, who shot their husbands, the Huaxtec captives: "until now there has never been arrow shooting and we are going to initiate it; we will arrow you". This is how the tradition began, and was reenacted during the *izcalli* month. For Graulich (2016: 369) this has a connotation of fertilization.

The second myth is even more significant because it refers to the creation of sacred war. In the *Leyenda de los Soles* (19445: 123-124) it is narrated that the sun gave the arrows to the 400 mimixcoas saying: "you will serve me to eat and give me to drink". However, they did not comply with the order because they only hunted birds, have fun, sleep with women and drink; they also caught jaguars, but kept them for themselves. Then the sun called the five brothers who had been born later (Quauhtliicohuauh, Mixcóahuatl, Tlotópetl, Apanecutli and Cuetlachcíhuatl), to make war with the mimixcoas; with them they fed the sun. In doing so, they become prototypes of warriors who will be sacrificed: the food that will be offered to the gods, along with deer (Olivier 2015:461). In my opinion, they should be equated not only with deer but also with other types of game such as those sacrificed during the *quecholli* month.

According to Graulich (2016: 94) the significance of this myth is that prisoners of war would be dressed as *mimixcoas,* becoming a symbol of sacrificial victims. The myth of the primeval war was reenacted during the tlacaxipehualiztli month. Also, this author suggests that the myth explains the transition from animal sacrifice to human sacrifice

because "it speaks at the beginning of a sacred war, but of a war that is in fact an enormous hunting mission" (Graulich 2016: 94). Therefore, sacrificial victims died assimilated to game and to *mimixcoas*, that is, as food and beverages for the Sun (Graulich 2002). The ritual of arrow shooting thus symbolized the fertilization of the earth[184] and was linked to ceremonies that alluded to birth and death (Olivier 2015: 138-140).

How can bioarchaeology contribute to the knowledge of this practice? Finding evidence of this type of lesions will depend on whether the projectile reached bone tissue and on detailed documentation of the context. Obviously, another of the challenges of this analysis will be to interpret whether the wound was caused in the context of war or ritual. An example of this type of analysis is Burial 6 found inside the Pyramid of the Moon, in Teotihuacan. One individual with a wound to the left arm, consistent with a penetrating injury, was recovered inside this deposit. In a second skeleton, a projectile point, possibly associated with an injury, was recovered. Although the latter did not damage bone, the characteristics of the context and its location suggest that it could be an injury of soft tissues (Pereira and Chávez Balderas 2006: 59). Ten beheaded individuals were found inside this depot with their hands tied behind their backs and buried without any attire, as a sign that they were war captives (Pereira and Chávez Balderas 2006).

Arrow shooting falls into the category of penetrating trauma, characterized by a breakdown of the skin and other tissues causing the projectile to enter the body. According to Christina A. Alexandropoulou and Elias Panagiotopoulos (2010) there are two types of mechanisms in which the tissue is broken down: crush and stretch. The damage to the victim will be determined by the combination of two factors: the type of projectile and the

[184] The sun shot an arrow into the earth, making a hole; from this came the first man (Mendieta1971: 81).

affected tissue. The arrow will modify tissues depending on its mass, diameter, shape and material. In turn, the tissue will react according to its intrinsic characteristics such as elasticity and density, as well as its function in the body. Naturally, the speed of the projectile will also be decisive. If the lesion is visible on the bone, it will be necessary to establish the trajectory of the projectile and correlate it with affected organs and soft tissues.

In conclusion, arrow shooting could act as a form of torture or as a sacrificial technique, depending on severity and number of injuries. These may affect the skin, muscles, and some organs, and may even reach bones. If these marks are present, it is possible to document the action of shooting, however, it is a challenge to determine whether they correspond to wounds suffered in warfare, to another type of peri mortem violence or to a ritual practice; for this interpretation it is necessary to rely on other sources of information. At the Templo Mayor of Tenochtitlan there is evidence of animal arrow shooting, which I shall examine in detail in chapter 7.

Throwing victims from heights

The victims who were thrown from the top of the temples were equated with a falling fruit; however, this practice undoubtedly had a complex connotation (Graulich 2016: 370). Historical sources are sometimes ambiguous in their narratives and it can be interpreted that this practice was used as torture, as sacrifice or as a posthumous treatment. [185] For example, Benavente Motolinía (1967:62) mentions that throwing victims was practiced in

[185] González Torres (1985: 111) mentions these practices associated to the hills and as a form of suicide. It could also be the result of non-ritual acts, linked to war and even accidents (Chávez Balderas 2017).

Cuauhtitlan during the izcalli festivity. Ambiguously, the friar considers it "a second form of death", since they were shot with arrows first. Later their hearts were ripped out and then their heads were disarticulated: these were taken by priests, while the body was given to lords. In a scenario of this nature, throwing from high altitude could be a posthumous treatment if the individual did not survive arrow shooting, or as a form of sacrifice if he died as result of the blow or even a form of torture if he survived the fall.

Durán (1967 I: 47) describes this practice as torture or a form of sacrifice. In fact, the friar mentions that during the *ochpaniztli* feast, a wooden structure was built with four poles, with crossbeams, like steps. [186] From the upper part the victim was thrown and, as a result, the body was "torn to pieces". It is not clear whether this implies the death or the fractures resulting from his fall. In any case, after falling the individual's throat was slit and his blood was collected in a vessel.

Historical sources agree that most of the time this was a treatment given to the corpses after heart extraction. For example, during the inauguration of the Coatlán temple, Alvarado Tezozómoc (1944:460) mentions the sacrifice by cardiectomy. Afterwards, their bodies were thrown down the stairs, "three hundred and sixty steps". By this practice, the victims reenacted the myth of Huitzilopochtli´s birth, in which his sister Coyolxauhqui fell from the top of the Coatepéc hill, dismembered. There is no information on historical sources to corroborate if this practice was applied to animals.

Depending on the height of the fall and the circumstances surrounding it, an individual might sustain fractures, dislocate joints or suffer excoriations, ecchymosis and

[186] The friar estimates that it was about 30 *brazas* high, that is, about fifty meters, a length that I consider exaggerated and would make it difficult to manage a structure of this nature.

bruising, resulting in severe injuries or even death. Interpreting the resulting bone fractures is a challenge that must consider several lines of evidence, including the biomechanics of fracture production. According to Zephro and Galloway (1999:35) it is necessary to consider bone characteristics, the nature of the force applied, the morphology of the fracture, if it is a direct or indirect trauma, and the type of object or surface on which the impact occurred.[187]

In a similar scenario to the one posed by chroniclers, the body is in motion, falling to a height below the substrate in which a person is standing. Similarly, the type of injury will depend on the characteristics of the surface to be struck (Di Maio and Di Maio 2001) and if it is a free fall (as we can interpret from the stories of Motolinía and Durán), or if the body encountered obstacles that slowed down its fall, for example, when it was thrown down the stairs. The evidence recovered from the sacred site of Tenochtitlan is controversial. There is only one case represented by a Mexican wolf (*Canis lupus baileyi*) found in Offering 125. This female has peri mortem rib fractures that may be consistent with a fall. However, these could correspond to ritual violence, to posthumous treatment or even to the moment when the wolf was buried, as the offering was located inside the stepped monument to the west of the monolith of the goddess Tlaltecuhtli (Entrance 4). Bone fractured edges are homogeneously colored and there are no signs of bone healing and therefore they are connected somehow to the death of the canine.

[187] Direct trauma implies an object in motion striking a non-moving body or a moving body hitting a static object; the fracture is related to the point of impact. Indirect trauma consists in a force transmitted from other parts of the body, in other words, the point of impact is found in a place other than the fracture (Galloway 1999).

Cat. Number	Bone	Type of fracture	Comments
1462-55	7th left rib	Transverse	*Peri mortem.* Plastic deformation. In two fragments.
1462-56	8th left rib	"Green stick" fracture	*Peri mortem.* Incomplete fracture
1462-58	9th left rib	"Green stick" fracture	*Peri mortem.* Incomplete fracture

Table 6. Features of rib fractures on the Offering 125 wolf (*Canis lupus baileyi*). Taken from Chávez Balderas and Elizalde (2015).

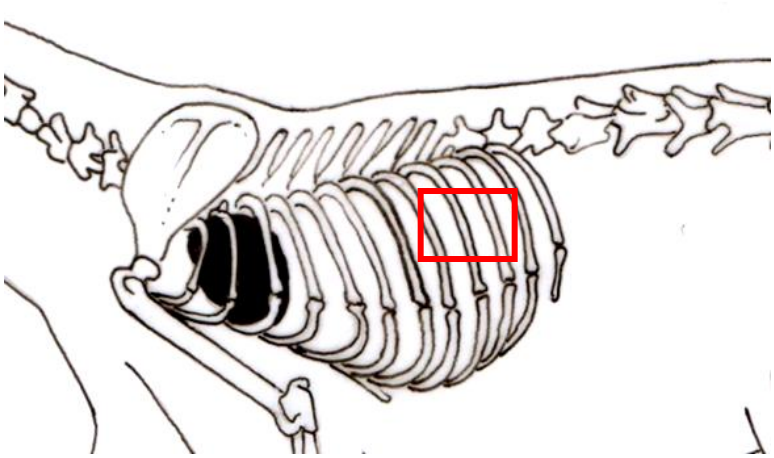


Figure 46. Anatomical position of the fractured area. Wolf (*Canis lupus baileyi*), Offering 125. Drawing by Julio Emilio Romero.

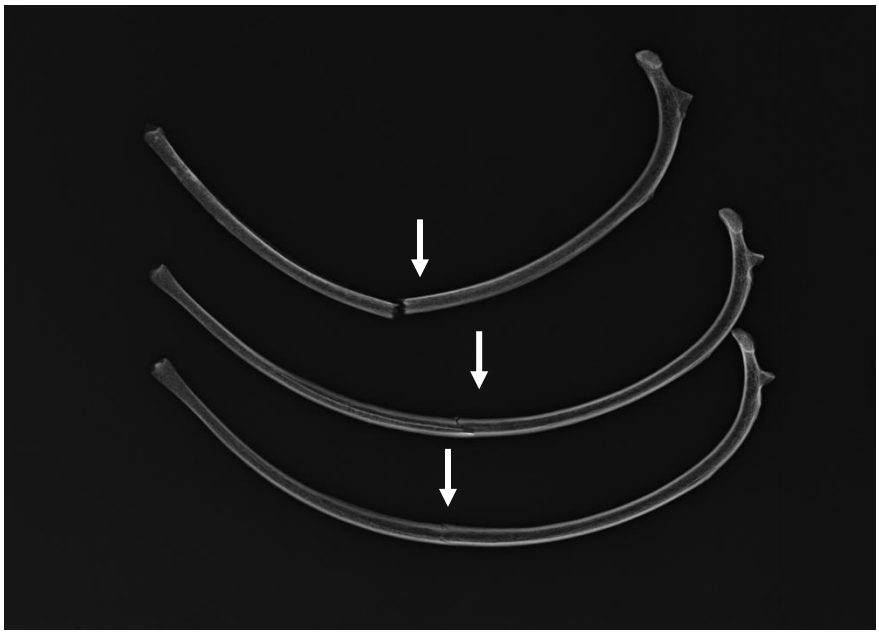


Figure 47. X-ray of fractured left ribs. Wolf of the Offering 125 (*Canis lupus baileyi*). Image by CT Scanner de México and José Luis Criales.

In the case of human victims, there is no evidence of this practice, largely because the bodies were taken elsewhere and only their heads remained in the sacred precinct. Fractures on human bones correspond to another type of ritual practice as I will now mention.

Blunt force trauma to the head

Historical sources briefly mention that sacrificial victims, both women and men, could be killed by blunt force trauma. According to Graulich (2016: 372), this practice seems to have a Toltec origin. Regarding the former, Durán mentions that during the *quecholli* festivity Yoztlamiyahual's impersonator was sacrificed:

> So, then they took the Indian woman, struck her four times on a large rock in the temple, which had the name tecomitl, meaning "divine pot", and before she had just died, so dazed by the blows, they cut her throat[...] (Durán 1967 I: 76).[188]

Another example is on folio 38v of the *Codex Tellerianus Remensis*, in which a woman is hit with a mace. This happened during the renovation of the Templo Mayor in 1484, under Tízoc's rule. The glosses on this image affirm that human slaughter began this year, as in the past only "animals and birds" were sacrificed. [189] Although the source does not give more details on this scene, the victim was depicted as an elderly woman, with abdominal folds, a convention used to denote that she had been a mother. In this scene she is struck on the head by a warrior richly dressed and her blood drips down her face.

Another scenario in which such injuries can occur to men is the gladiatorial sacrifice performed during *tlacaxipehualiztli* month. The captives were tied to a stone with a hole in the center (*temalácatl*) and given false weapons and shields. They had to face well-armed warriors, and then be sacrificed by heart extraction. It is possible that the captives could end up with severe injuries, including blunt force trauma to the head. In addition to ritual practices, skull fractures antemortem and perimortem may be related to war activity, medical treatments or accidents. In the case of the archaeological remains recovered in the Templo Mayor, there is no clear evidence to associate the victims' injuries with recurrent occupational violence or with trauma linked to a warlike confrontation. In fact, it is very

[188] Así luego tomaban la india, daban cuatro golpes con ella en una peña grande que había en el templo, la cual tenía por nombre tecómitl, que quiere decir "olla divina", y antes que acabase de morir, así aturdida por los golpes, cortábanle la garganta […] Durán 1967 I:76

[189] Contrary to these claims, archaeological evidence proves that human sacrifice was carried out at least since the government of Moctezuma I, around 1440 A.D. (López Luján et al. 2010).

difficult to link the osteological evidence with these practices and in many cases, it is only possible to explore the likely causes (Chávez Balderas 2017).

This type of injury is caused by a direct trauma in which the body is struck by a blunt instrument. The severity of the lesion will depend on the impact speed, weight, shape and raw material of the weapon, as well as the characteristics of the victim and the thickness of bone at the point of impact [190] (Di Maio and Di Maio 2001; Di Maio and Dana 2003:67-68). This can cause damage to soft tissues, skull and brain, including excoriations, contusions, lacerations, fractures, bleeding, and even infection (Gisbert and Villanueva 2004:437). According to Alison Galloway (1999: 137) skull fractures can be classified as linear, diastatic, depressed, comminuted and stellate. It is important to document these patterns as they make it possible to infer the type of trauma and sometimes the instrument used. In addition, when registering skull fractures it is necessary to describe whether they are monotonic or polytonic, that is, whether they correspond to one event or more than one (Komar and Buikstra 2008:16).

Archaeological evidence of blunt force trauma recovered in the sacred precinct corresponds to only four cases: three humans and a wolf. These are skull fractures that would have occurred at some point at or around the time of death and not to posthumous treatments. Two of them were thoroughly documented, while the other two are ambiguous due to bone preservation.

The first one corresponds to a tzompantli skull recovered in the construction fill. It is a male with a depressed fracture on the right frontal bone. It is characterized by failure

[190] For example, the temporal fossa and the facial skull are least resistant to trauma (Galloway 1999).

of the outer table, adherent fragments and radiating fractures from the point of impact. The weapon may have been a mace (*quauhololollli*) or an equivalent instrument, with a blunt surface and limited dimensions. It is a frontal impact in a very vascularized area and with little musculature; it could be the cause of death considering that there was no bone healing (Chávez Balderas 2017). This type of fracture usually causes brain damage and is commonly associated with infection, post-confusional syndrome, coma, and death (Gisbert Calabuig and Villanueva 2005: 440). However, the absence of the post-cranial skeleton does not provide a better understanding of the circumstances under which the individual died. Such an injury could have occurred in the context of war, ritual combat or sacrificial practice.

Figure 48. Depressed fracture caused by a blunt force to the frontal. Tzompantli skull from the construction fill. Photograph by Jesús López. Taken from Chávez Balderas (2017).

The second individual corresponds to a woman's severed skull found inside Offering 98. She has a fracture on the left parietal characterized by an impact point with radiating fractures. Unfortunately, there are postmortem fractures on the edges caused during interment, which prevent a full assessment of the lesion. Despite this, the fact that it has plastic deformation in one of the fracture lines reveals the peri mortem nature of this trauma (Chávez Balderas 2017). Plastic deformation occurs when bone deforms to resist impact but reaches a failure point, and bone is permanently deformed such that broken edges do not articulate without leaving gaps.

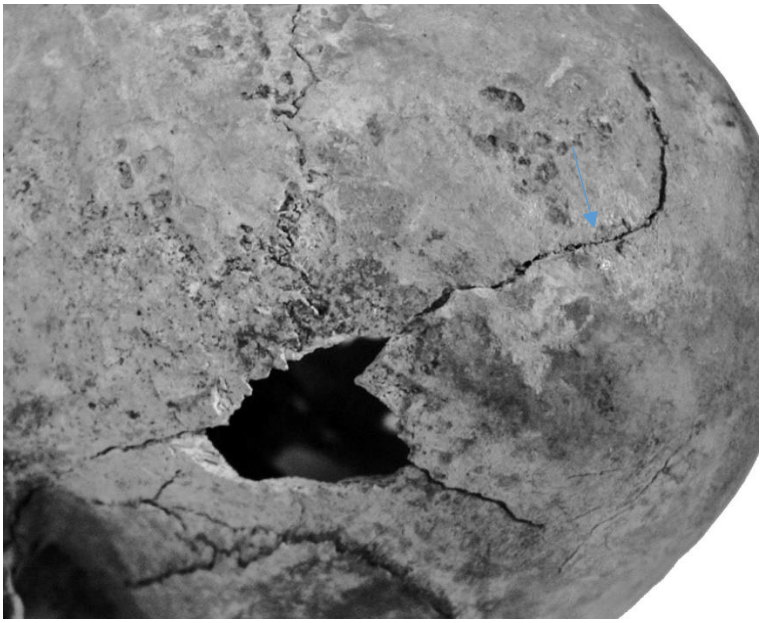


Figure 49. Radiated fracture, with plastic deformation. Female individual located inside Offering 98. Photograph by Ximena Chávez Balderas (from Chávez Balderas 2017).

A second example is the skull of a woman, deposited inside Offering 17. Unfortunately, there are serious conservation problems and numerous postmortem fractures which make it impossible to determine the nature of the fractures. However, it has two radiating

fractures, in which edges has homogeneous coloration, adherent fragments and a diastatic fracture of the lambdoid suture (Galloway 1999).[191]

Despite the large number of skulls recovered so far, I would like to emphasize the relatively rare occurrence of blunt force trauma, which tends to be more common among sacrificial victims connected to warfare. Interestingly, in the case of the Templo Mayor, two out of three cases are women, which may suggest a type of ritual perimortem violence.

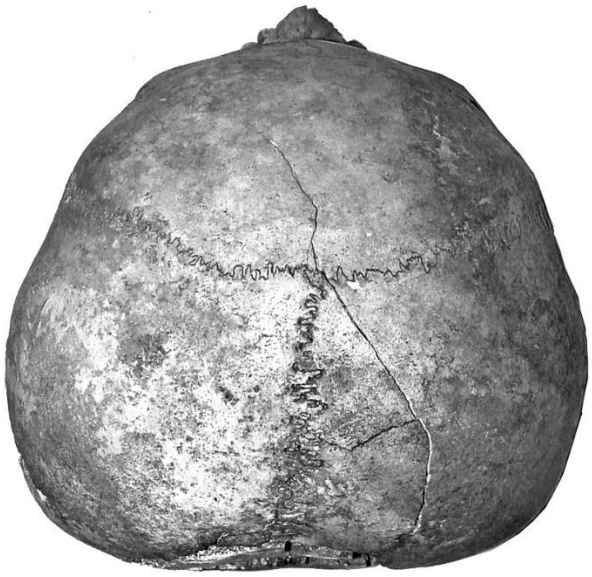


Figure 50. Fracture in right and front parietals. Female individual recovered in Offering 17. Photograph by Ximena Chávez Balderas (from Chávez Balderas 2017).

As for fauna, one case corresponds to a blunt trauma to the skull. It is a Mexican wolf (*Canis lupus baileyi*) recovered inside the Offering H, on Building B, north of the Templo Mayor. Inside a box made of tezontle stone slabs, numerous ritual goods were found,

[191]It could be an injury caused by a blunt object, but I do not rule out that it could also be the result of a fall, considering the poor preservation of the entire left side of the skull.

including the skeletons of a puma and a wolf, both in an anatomical connection (López Luján 1993: 419); both animals were adorned with shell pectorals (Velázquez 2000: 219). The canine has a skull fracture, which according to Alicia Blanco et al (2009:187), could correspond to a case of osteogenesis imperfecta or meningoencephalocele. Considering the above, I decided to submit this specimen to a CT scan. The scan revealed that the broken edges have normal density, equal to the rest of the skull, and consistent with a fracture and not with congenital disease. Therefore, it is possible to rule out osteogenesis imperfecta. This hereditary condition corresponds to a disorder in bone formation that results in a loss of bone density and a propensity for fractures, popularly known as brittle bone disease (Roughley et al. 2003). The wolf of the H Offering exhibits normal bone density throughout the skeleton. If the specimen were to suffer from it, it would present deformation, fractures, angulations, calluses and low bone density, which is not the case.

The term meningoencephalocele refers to a herniation of cerebrospinal fluid, brain tissue and meninges through a defect in the skull (Cevik et al. 2012:10). From CT scan it was also possible to rule out this condition because in the cases of meningoencephalocele, the edges are beveled and sclerotic. In this case they are dense and, rather than affecting the cranial cavity, the fracture affects the right frontal sinus which is not anatomically related to the meninges (José Luis Criales, personal communication, 2014).

In my opinion, this case is a perimortem fracture that could relate to the cause of death, corpse treatment or with some taphonomic process. It is interesting to note that in field reports there is no mention of stone collapse inside the offering, as the deposit was covered with stone slabs. In addition, according to the detailed report of López Luján (1981), very little sediment was found inside the offering, allowing it to be cleaned easily.

In the photographs taken during the excavation it is possible to see the fracture and there are no elements in the context suggesting that it is a natural taphonomic alteration. This implies that when the animal's body was deposited, its skull was already fractured. While the fracture could have resulted from some posthumous treatment, it is more likely a case of peri mortem violence. In any case, it is a blunt trauma to the skull, although detailed observations are hampered by the presence of a significant amount of glue in the affected area.

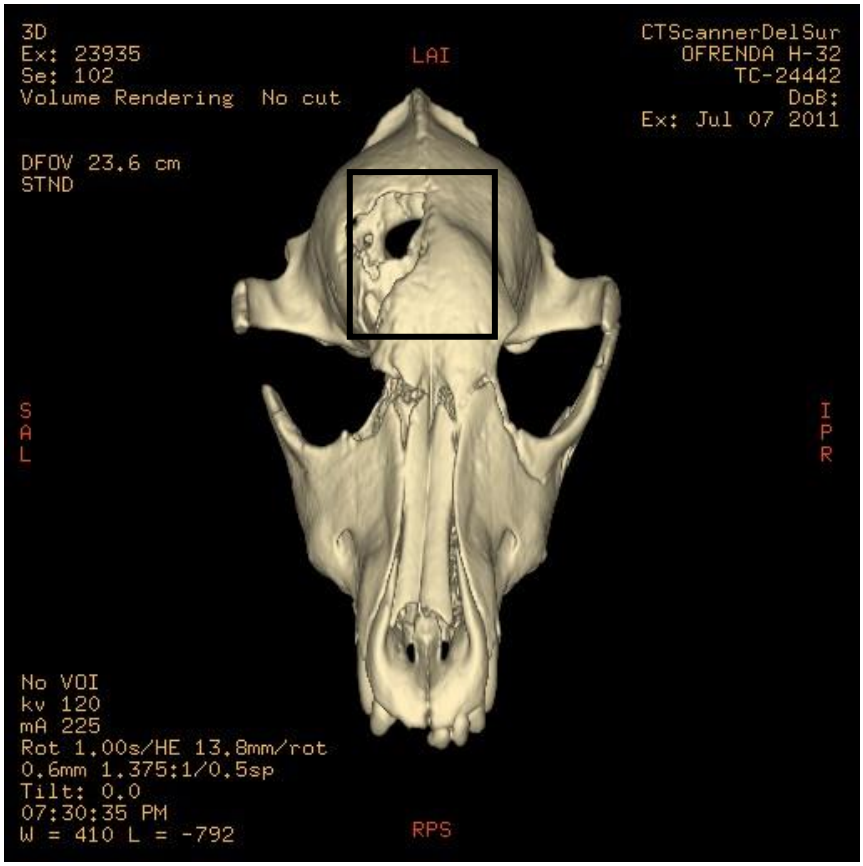


Figure 51. Fracture on the skull of a Mexican wolf. Offering H. Image by CT Scanner de México and José Luis Criales.

Figure 52. Excavation of the skeletal remains of a Mexican wolf found inside Offering H. The skull fracture is visible. Image courtesy by Templo Mayor Project Archive.

Starvation

The document *Costumbres, Fiestas, Enterramientos...* (1945:45) mentions this unusual form of sacrifice. It consisted of confining an individual in an enclosure without food and water. The source mentions that during the *miccaílhuitl* festivity (*tlaxochimaco*) the impersonator of the god Mictlantecuhtli was sacrificed:

> [...] and they put him in a cave that was in the temple for the purpose and they put him inside with a lot of food and closed the door with mud and stone, and he died there after the food was finished (Customs, Festivities, Burials...1945: 45). [192]

[192] […] y poníanlo en una cueva que estaba en el templo para el efecto y poníanle dentro con mucha comida y cerrábanle a piedra lodo la puerta el qual allí moría acbada la comida (*Costumbres, Fiestas, Enterramientos…*1945: 45).

A second example is the sacrifice of children in honor of Tlaloc during the *tozoztli* veintena, when four children between the ages of five and seven were locked up in a cave, later opened again the following year (Benavente Motolinía 1967: 64).

Identification of this practice in archaeological contexts would require a thorough field recovery. In the case of Templo Mayor, there is no evidence of this form of sacrifice of either humans or animals. However, it is possible that this custom was widespread in Mesoamerica because as it was practiced in Teotihuacan. In fact, according to Sugiyama (2014:124-128), in Burial 2 of the Moon Pyramid, two felines and a wolf were buried alive in cages; they died of suffocation or starvation.

Slitting of the throat

This sacrificial technique consists on cutting veins and arteries of the neck to obtain the victim's blood. It is important to distinguish throat-cutting from decapitation: these are different procedures often confused in historical sources[193] and in scientific literature (Chávez Balderas 2017). The first involves the severing of vascular structures while the second, the disarticulation of the head. [194] To a large extent this confusion may exist

[193] From the chroniclers, Durán makes this distinction. On the other hand, Alvarado Tezozómoc (1944: 266, 309) does not distinguish between the two processes and, on the contrary, uses slitting of the throat as a synonym for sacrifice. In addition, he refers to the sacrificial stones as places for slitting throats (degolladeros), even though this were used for heart extraction.

[194] Any decapitation that occurs near death may involve obtaining large amounts of blood. The slitting of the throat, in turn, can be done without disarticulating the head (Chávez Balderas 2017).

because in Nahuatl there is no distinction between the two words, perhaps because the two procedures are somehow linked (Graulich 2016: 362).

Slitting of the throat is generally associated with fertility rituals, where the blood is obtained to nourish the crops or to propitiate the arrival of the rains. Examples of this are the sacrifice of Goddesses Xilonen, Chicomecóatl and Toci impersonators, as well as children sacrificed to Tlaloc. In addition, it was performed in the festival held in honor of the Sun and as a war execution. Now I will review these cases relying mainly on the narratives of Diego de Durán, since this friar distinguished between slitting of the throat and decapitation.

In the *huei tecuílhuitl* festivity the priests purified a purchased slave who represented the goddess Xilonen. This woman was placed on top of the corpses of four prisoners that preceded her in sacrifice. Her throat was slit and her blood deposited in a vessel; afterwards her heart was removed (Durán, 1967 I: 127).

Durán also mentions that the woman who represented the goddess Chicomecóatl was placed on top of some platforms with corn and seeds; this happened during the *ochpaniztli* month. Her throat was slit and her blood was collected in a vessel. The image of the goddess and all the corn, seeds, squashes, chili peppers and other vegetables were sprinkled with it. This woman was then flayed and her skin worn by one of the priests (Duran 1967 I: 139-140).

The friar describes a third sacrifice by slitting the throat, connected with females linked to fertility. It was a woman between 40 and 50 years of age who personified the goddess Toci; she was sacrificed during the same festivity. She was taken by a priest on

his back and placed facing upwards, "the sacrificer came and put his hand on her hair and slit her throat, so that he who had her bathed himself in blood". Her body was flayed from her thighs to the elbows and her skin was carried by a priest dressed in the clothes that the woman had knitted (Durán 1967: I 146).

Another woman who had her throat slit during calendrical festivities was Yoztlamiyahual's impersonator. During the *quecholli* festival this woman was beaten on the head and then her throat was slashed. Durán makes it explicit that this practice consisted of slitting her throat "as if slitting the throat of a sheep", to obtain her blood. After her death, the victim was decapitated and her head was carried in procession by a priest (Durán 1967 I: 77).

Describing this practice Benavente Motolinía (1967: 62) mentions that during the *izcalli* festivity held in Cuauhtitlan two female slaves had their throats slit on the stairs "in front of the altar of the demons"; then, they were flayed and the next day their skins were worn by two lords.

Apparently slitting the throat would have been a common way of sacrificing children. For example, during the *huey tozoztli* month, a child was slaughtered for Tláloc. His blood was sprinkled on the effigy of the god and "all those idols his companions". Later, in this same celebration, the priests slit the throats of a little girl with an instrument for killing ducks. Her body was then thrown into the water in the Pantitlan whirlpool (Durán 1967, I: 84-85, 88).

The *Relación de Tezcoco* also mentions this practice to honor Tlaloc. Between 10 and 15 child slaves between the ages of 7 and 8 were taken away:

> […] to the mountain where the stone idol was, and there, with a sharp flint, their throats were slit by a priest or butcher, so to speak, that he was chosen for the service of this Demon. And with their throats cut, they were thrown into a cavern and natural opening that was in some rocks next to the idol, very dark and deep, without having another feast or ceremony (Pomar 1986:63).[195]

Males were also killed by slitting of the throat as mentioned by Duran: during the feast that was celebrated in honor to the Sun and in the *ochpaniztli* month. The first was held in the temple dedicated to this star. It consisted of the sacrifice of a war prisoner who was given a scepter and a shield that he was supposed to give to the Sun. The throat of this messenger was slit in the *cuauhxicalli* and his blood drained through the channel of this sacrificial stone. After losing all the blood, they took the heart and presented it to the Sun (Durán 1967 I: 107). On the other hand, in the *ochpaniztli* festivity, other individuals were sacrificed by throwing them off of a wooden scaffold. After they fell their throats were slit and blood was collected in a vessel decorated with feathers (Durán 1967 I: 147).

Slitting the throat was not frequently depicted in the codices and sometimes it is not clear whether the scenes refer to the cutting of arteries and veins or to the initial decapitation process. For example, in page 58 of the *Codex Borgia* (1993) there is a child sacrifice presided over by Mictlantecuhtli, who devours a human body (figure 53). A woman holds a child by the hair as she places a flint knife at his neck. The child's eyes are closed, which signifies that he is dead. The scene suggests two possibilities: that he will

[195] […] al monte a donde el ídolo de piedra estaba, y allí, con un pedernal agudo, los degollaba un sacerdote o carnicero, por mejor decir, que estaba elegido para el servicio deste Demonio. Y degollados por la garganta, los echaban en una caverna y abertura natural que había en unas peñas junto al ídolo, muy oscura y profunda, sin hacer otra fiesta o ceremonia (Pomar 1986:63).

be decapitated as part of his posthumous treatment, or that he was killed by slitting of the throat.

Figure 53. Sacrifice of a child performed by a female armed with a flint knife. *Codex Borgia* (1993), page 58.

Another example is on page 41 of the *Codex Fejérváry-Mayer* where an anthropomorphic bat holds a sacrificial victim by his hair and holds a heart on his left hand. The neck of the individual is cut, but the head remains articulated to the body; the victim is dead. It is possible that this scene alludes to the slitting of the throat, because the bat does not carry any instrument for decapitation, and the head is still attached to the body. Interestingly, in the Popol Vuh (1968: 89) this animal is associated with decapitation, so this image could allude to the sacrifice by heart extraction and the posthumous treatment of decapitation, the most common practices at the Templo Mayor in Tenochtitlan.

Figure 54. Bat holding the head of a sacrificial victim. *Codex Fejérváry-Mayer* (1994), page 41.

On page 23 of the *Codex Borgia* (1993)[196] is a singular scene: an individual is slitting his own throat with a flint knife (figure 55). [197] There is no more information on this practice and it is difficult to discern if it was real or a mythical passage. Depictions of self-decapitation by supernatural beings are common. After cutting off their heads, they continue walking while blood flows from their bodies. I shall discuss this on the next chapter.

[196] An equivalent image can be found on page 1 of the *Codex Cospi* (1994).
[197] According to Anders et al (*Codex Cospi* 1994: 173) this personage is opening his own chest. However, it is clear from the image that the wound is in the neck and results in a large amount of blood.

Figure 55. An individual slit his own throat. *Codex Borgia* (1993), page 23.

In sum, from historical sources, the slitting of the throats of human victims seems to be a practice mainly intended for women and children to nurture crops or to provide rainfall. As mentioned in these narratives, it could be used after the individual was thrown from high altitudes or before heart extraction.

As for animals, historical sources do not describe this procedure in detail. There are only few references to throat slitting and decapitation of quails, but it would appear from the accounts that most of the time these birds were beheaded, so I shall discuss this procedure on the next chapter. The blood of these birds was spilled or smeared on images or sacrificial stones (Alvarado Tezozómoc 1944:247, 382, 495; Duran 1967, II: 274, 301, 309; Benavente Motolinía 1967:62).

Is there archeological evidence for this practice? To discuss this, I must first make some anatomical considerations about this procedure, based on previous work (Chávez Balderas 2017:158-165). Because of its etymological origin, slitting the throat (in Spanish *degollar* from the Latin *decollare*) refers to the cutting of the neck, not to the separation of the head. In the medico-legal field, this term identifies the process that results in a wound to the neck, perpetrated by a sharp agent (Gisbert and Villanueva 2005:389). Depending on its location and depth, it may correspond to a lethal wound. The death of individuals may be caused by acute bleeding, embolism, or asphyxiation, if the wound reaches the respiratory tract (Martínez García et al. 2005). This injury involves cutting of tissues by pressure and sliding.

Such wounds inflicted with stone tools may not leave traces on bones, but this will depend on the force applied, the instrument used and the anatomical region in which the cut was done. Mexica priests possessed great anatomical knowledge, so they knew that by cutting the main vascular structures of the neck (the common carotid arteries and jugular veins), they would quickly obtain large amounts of blood, precious liquid par excellence. They surely knew that arterial blood had a higher pressure than venous blood, which allowed them to obtain the effect that it came out in spurts, as represented in the codices and sculptures, where mythical characters have been beheaded and the blood continues flowing from their necks with intensity. [198] These large blood vessels are located on the sides of the neck, protected mainly by the sternocleidomastoid muscle. [199] The cervical

[198] In these cases, the images do not reflect an anatomical reality, since decapitation was a relatively slow procedure and more likely it was a posthumous treatment, as I shall discuss in the following chapter.

[199] For example, depending on its depth, a cut at the level of the sixth cervical vertebra can damage the following anatomical structures: skin, adipose tissue, anterior jugular veins, sternocleidomastoid, sternohyoid, superior belly of the omohyoid, thyrohyoid muscle, thyroid cartilage, larynx, vocal ligament,

vertebrae are on a deeper plane and are difficult to damage when using stone tools; therefore, it is common to overlook this practice in the archaeological record.[200] Cut marks must be carefully analyzed by establishing their correspondence with soft tissue (Chávez Balderas 2017: 158-165).[201] Consequently, there is no evidence of this procedure in the skeletal remains recovered from the sacred precinct of Tenochtitlan, neither for human victims nor for animals. If the slitting was carried out on the children dedicated to Tlaloc or on any of the decapitated individuals,[202] there are no cut marks to corroborate it or to discern the technique used.

Heart extraction

Judging from historical sources, cardiectomy[203] was the most frequent sacrificial technique used for human victims in the sacred precinct of Tenochtitlan. It was practiced in almost every calendrical festivity [204](González Torres 1985: 124-147), and during various exceptional rituals, including funerals, the inauguration of Templo Mayor and propitiatory and divinatory rituals associated with warfare. Heart extraction was usually a primary sacrificial technique, although there are some examples where its use was a posthumous

vocal muscle, thyroarytenoid muscle, cricothyroid, sternothyroid and thyroid gland (Clascá et al., 2002: 30-32).

[200] On the anterior side, vertebrae are also protected by cartilage, esophagus, larynx or trachea, depending on the level at which the cut is made.

[201] Despite this, there have been convincing cases documented in Peru (Verano 2007, 2008), where the slitting of the throat was apparently carried out with metal instruments; these individuals were not beheaded, so it can be ruled out that the cut marks correspond to this procedure. It is feasible to leave traces when using stone edges, but this will depend on the reiteration of the cut, its strength and the anatomical location of the lesion.

[202]Cut marks recorded on the Templo Mayor collection are associated with decapitation, a posthumous treatment discussed on next chapter.

[203]Etymologically this term means the excision of the heart, so we will use it to describe this sacrificial technique.

[204]According to González Torres (1985: 124-147), the only *veintenas* in which it was not practiced were huey *tozoztli*, *atemoztli* and *tlaxochimaco*.

treatment.[205] It could be preceded by ritual mortifications such as fire exposure and was usually followed by decapitation. This sacrificial technique was used on men, women and children; the latter were sacrificed in honor of both Tláloc and Huitzilopochtli (Chávez Balderas 2017: 108). Animals could also be sacrificed by heart extraction.

The majority of historical sources agree that the heart was extracted from a victim placed on a sacrificial stone (*téchcatl*). Four priests held the individual by the extremities, while a fifth placed a wooden ring or a sawfish cartilage on the neck. Once he/she was subjugated, the sacrificer held a flint knife and sunk it in the victim to extract the heart (figure 56). The body then was thrown down the temple stairs (Durán 1967 I: 31-33). Subsequently, most of the victims were decapitated (Chávez Balderas 2017:165).

Figure 56. Sacrifice by heart extraction. Durán, 1967 I: f. 238 r.

[205] For example, Sahagún (2000: 149) mentions that during the *huei tecuílhuitl* month, the heart of Xilonen's impersonator was ripped out after she was beheaded.

Figure 57. After heart extraction, the victims were thrown from the stairs of the building. *Codex Magliabechiano* (1996), page 70r.

The two most important body parts for the sacrificial act were the head and heart. The first one housed the *tonalli*, a soul entity that provided warmth, vigor and courage to humans. In contrast, the *teyolía* was believed to reside in the heart. This soul was linked to vitality, vocational ability, cognition, personality and determination. At death it was believed to travel to the realm of dead (López Austin 1996: 179, 216-218, 253-256). The heart would feed the sun, while the head would feed the earth (Graulich 2016: 362).

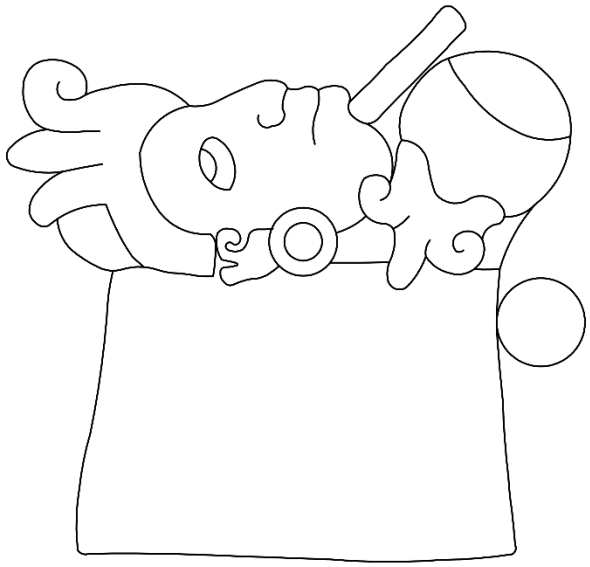


Figure 58. Head and heart were the two most important body parts in sacrificial rituals. Typically, decapitation was the posthumous treatment given to victims immolated by heart extraction. *Codex Borbonico* (1991), page 13. Drawing by Israel Elizalde.

Headless bodies could be abandoned in the lake or were destined for ritual anthropophagy:

> [...] the bodies and the guts would then take them out into the middle of the Mexican lagoon, behind a rock called Tepetzinco, and they threw them into a spring that runs under the veins and bowels of the earth, called Pantitlan [...] (Alvarado Tezozómoc 1944:333). [206]

[206] "[…] los cuerpos y las tripas los llevaban luego a echar en medio de la laguna mexicana, detrás de un peñón que llaman Tepetzinco, y echábanlos en un ojo de agua que correo por debajo de las venas y entrañas de la tierra, que llaman Pantitlán […]" (Alvarado Tezozómoc 1944:333).

In contrast, war prisoners' corpses were given to their captors for ritual consumption (Durán 1967 II: 278). Their skulls could be displayed in the tzompantli while their bones remained in the domestic environment, in the *calpulli*.

> I also asked what was done with the other bones: to which I was told that the master of the Indian who was sacrificed put the bones in the courtyard of his house, on long sticks, as trophies of his greatness and achievements, and to make it known that the victim was his war prisoner: which they had in great honor and vainglory (Durán, 1967 I: 23). [207]

Apparently, individuals sacrificed by heart extraction could also be buried and not decapitated. This is what Durán (1967 I: 137, 155) states when he refers to the ixiptla of Atlantonan who was buried in a "well or subterranean pit in the temple" or to two young women who were sacrificed in the feast of Xochiquetzal; their corpses were buried in a "basement" of the Ayauhcalli. [208] The retainers of important deceased individuals were also sacrificed by heart extraction and they were not beheaded (figure 59). There are different versions on the fate of their bodies; it seems that most of them were buried, although cremation is also mentioned (Chávez Balderas 2007).

[207] "También pregunté qué se hacía de los demás huesos: a lo cual me dijeron que el amo del indio que se había sacrificado los ponía en el patio de su casa, en unas varas largas, por trofeos de su grandeza y hazaña, y para que se supiese que aquel había sido su prisionero habido en la guerra: lo cual tenían en gran honra y vanagloria" (Durán 1967 I: 23).

[208] Archaeological evidence confirms the burial of a child's corpse, as I will discuss below.

Figure 59. Retainers were sacrificed by cardiectomy. The heart could be buried in the grave or thrown into the pyre along with the body of the dignitary they would serve in the afterlife. *Codex Magliabechiano* (1996), page 66.

Hearts could be offered to the Sun, deposited in a container (*cuauhxicalli*), buried, placed on thatch, thrown into the lake, burned or eaten, depending on the ceremony (Costumbres, Fiestas, Enterramientos...1945: 46, 48; Durán 1967 I: 97, II:300, 395; Motolinía 1967: 59, González Torres 1985:120; Sahagún 2000:146, 207, Chávez Balderas 2017:112) (figure 60).

Figure 60. A heart buried inside a temple. *Codex Borgia* (1993), page 5.

Animals were also sacrificed by heart extraction; this is confirmed by codices and archaeological evidence. For example, on page 24 of the *Codex Borgia* (1993) a jaguar holds nocturnal symbols; its chest has been cut by a flint knife (figure 61). Note that the heart of a jaguar is also shot by Tlalhuizcalpantecuhtli on page 11 of *Codex Cospi* (1994) (figure 43).

Figure 61. Jaguar with a flint knife incision to the chest. *Codex Borgia* (1993), page 24.

Codex Zouché Nuttall (1992) contains several animal sacrifice scenes. For example, on page 4 an eagle is killed by heart extraction from an abdominal incision, [209] more likely below the keel (figure 62). On page 44 a deer and a canine have been sacrificed. [210] The first lies on the ground with an injury to his chest, while the second is on a sacrificial stone. Lord 8 Deer holds its limbs, while Lord 12 Movement carries a flint knife which has opened the chest cavity to remove the heart (figure 63). Finally, on page 69 we a human and a canine were killed by cardiectomy.[211] The first was sacrificed by the Lord 9 Flower,

[209] According to Andersen and colleagues (1992:93) this scene alludes to the sacrifice of Lord Eagle 1 Jaguar at the top of his hill, at the hands of Lord 4 Snake. However, the image is not about a human wearing an eagle's suit, but rather depicts this powerful raptor.
[210] Andersen et al (1992: 186) identify this animal as a dog. However, there are no physical attributes to corroborate this identification. Judging by the size and fur, it could be a wolf.
[211] This canine is identified as a coyote by Anders et al (1992: 222).

Tobacco Arrow. From the canine chest a stream of blood flows, while a *xiuhcóatl* serpent carries the heart in one of his hands. In this scene an eagle and a jaguar have a combat attitude, possibly evoking the two warrior orders (figure 64). It is interesting to note that in this page were represented the most important species of carnivores sacrificed at the Templo Mayor of Tenochtitlan: jaguars, eagles and wolves. Although these depictions have a mythical component, archaeological evidence confirms animals sacrifice by heart extraction.

Figure 62. The Lord 4 Serpent extracts the heart of an eagle identified as Lord 1 jaguar. *Codex Zouché-Nutall* (1992), page 4.

Figure 63. Lord 12 Movement extracts a canine heart on a sacrificial stone. Next to it lies a deer whose heart was also removed. *Codex Zouché Nuttall* (1992), page 44.

Figure 64. A human and a canine sacrificed by heart extraction. *Codex Zouché Nuttall* (1992), page 69.

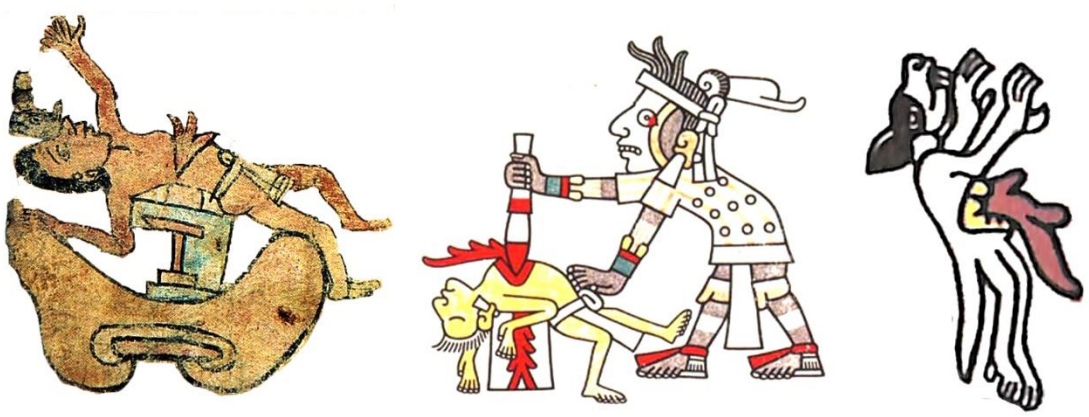
Archaeologically speaking there is heart extraction evidence for the Templo Mayor of Tenochtitlan. To date, five cases have been documented: two felines, two humans and possibly an eagle. [212] As most of the individuals recovered from the offerings and construction fills are only represented by skulls, it is not possible to estimate the magnitude of this practice. Whether the bodies were thrown into the lake or taken to the *calpulli* to be consumed, only the heads remained at the sacred precinct of Tenochtitlan. Although it appears that animal heart extraction was not a frequent practice, it has been documented in jaguars and an eagle, cases that I will discuss on chapter seven.

Historical sources do not provide detailed information on the heart extraction technique in animals and descriptions are often ambiguous or even confusing. For example, Sahagún affirms that once the thorax was opened, the priest inserted his hand and pulled out the heart (Sahagún 2000: 178). This friar also states that the chest was opened "from nipple to nipple or a little lower"[213] (Sahagún 2000:226). When reading these testimonies, it should be noted that the friars did not witness sacrifice and that it was not their purpose to make a detailed anatomical description of this procedure. As for pictographs, it must bear in mind that they are not intended as anatomical studies: in some cases, the incision was abdominal (for example, page 17 of the *Codex Azoyú 1*), in others it appears on the thorax (as in page 8 of the *Codex Laud*) and in others the location extends to both areas (for example, page 17 of the *Codex Zouché-Nuttall*). These differences may represent the

[212] In addition to the findings of Templo Mayor (Chávez Balderas 2017), heart extraction cases have been published for Michoacán, the Maya area and Tlatelolco (Pereira 1996; Pijoan and Mansilla 2004; Tiesler and Cucina 2007).

[213] Esta afirmación podría implicar que había dos técnicas diferentes para extraer el corazón, las cuales serán discutidas más adelante.

use of diverse techniques. Despite of this, they have in common the depiction of a large, V-shaped wound (Figure 65).



a) b) c)

Figure 65. (a) Abdominal incision, *Codex Azoyú 1* (1991), page 17); (b) Thoracic incision, *Codex Laud* (1994), page 8); (c) Incision comprising both anatomical regions, *Codex Zouché-Nuttall* (1992), page 17.

Beyond historical sources, the first investigation attempting to compare artistic representations with anatomy was done by Francis Robicsek and Donald Hales (1984). These authors propose four potential techniques for removing the heart: axial sternotomy, left anterior thoracotomy, transverse bilateral thoracotomy and transabdominal approach. To these, Tiesler and Cucina (2006:59) added two more: subthoracic transdiaphragmatic approach and parasternal access. I will now briefly explain each procedure (Figure 66).

Axial sternotomy implies a longitudinal cut of the sternum, while the left anterior thoracotomy corresponds to a cut of the left intercostal space. The first procedure would fracture the ribs; the second would result in only a small space preventing the heart from

being removed. Evidence of this processes has yet to be discovered. Transverse bilateral thoracotomy cuts the sternum and intercostal muscles on both sides, transversally. It is hard to assess how much the thorax would open, since the costovertebral joints are very resistant. According to Pijoan Aguadé and Mansilla (2004a, 2010) the cuts located in a series of sterna recovered in Tlatelolco correspond to this procedure.

The fourth technique proposed by Robicsek and Hales (1984) corresponds to transabdominal approach, which consists of a longitudinal section from the xiphoid appendix to the abdomen. A variant of this procedure is the subthoracic transdiaphragmatic approach, which consists of an incision below the sternum, but following the costal edge (Tiesler and Cucina 2006:59). With this technique the priests would avoid organ exposure out of the cavity. There are archaeological examples of this technique in Calakmul, Palenque and Becán (Tiesler and Cucina 2006), as well as for the sacred precinct of Tenochtitlan. Finally, para-sternal access cuts the cartilage between the ribs and the sternum. If done with great care it may go unnoticed in the archaeological record as it leaves traces on the cartilage, but not on the bone.

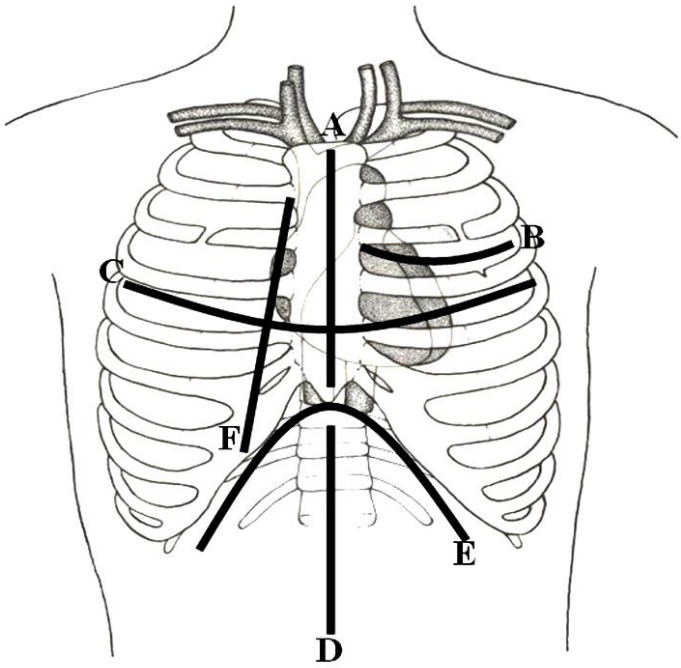


Figure 66. Heart extraction techniques. a) Axial sternotomy; b) left anterior thoracotomy; c) transverse bilateral thoracotomy; d) transabdominal approach; e) subthoracic transdiaphragmatic approach and f) parasternal approach. Based in Robicsek and Hales (1984) and Tiesler and Cucina (2006). Drawing by Julio Emilio Romero (Chávez Balderas 2017).

Templo Mayor findings in both humans and animals suggest that the priests made an abdominal incision that allowed their hands to be inserted into the thoracic cavity. The priest carried a sharp instrument, with which he severed the connective tissue, veins and arteries, to remove the heart. Possibly the abdomen was cut with a flint knife, which made the performance more dramatic. The instrument used inside the rib cage was small and may have gone unnoticed, so it appeared that the heart was ripped out with the hands. By following this procedure, the cut marks are left on the inside of the thorax, that is, on the pleural face of the ribs (López Luján et al 2010; Chávez Balderas 2017).

Archaeological evidence of this procedure is scarce, mainly because the victims' bodies did not remain in the sacred precinct. [214] Consequently, most of the remains recovered correspond to skulls and cervical vertebrae. However, there are five possible cases (Chávez Balderas 2017): two human victims, two jaguars and one golden eagle.[215]

The first corresponds to an infant recovered inside Offering 111, at the foot of the platform staircase of the Templo Mayor, corresponding to Motecuhzoma I (around AD 1440). It was deposited in the southern half dedicated to Huitzilopochtli, during the enlargement of the building. It is a boy of approximately five years of age, dressed in a wooden *anáhuatl* pectoral, sparrow hawk wings, a shield, and anklets made of copper bells and snails (*Polinices lacteus*). On his left elbow were found three aerophones, copal and an obsidian prismatic blade, which could have been contained inside a ritual bag (figure 67).

[214] Most of the primary burials located in the sacred precinct correspond to children sacrificed to Tláloc (Román Berrelleza 1990; López Luján 1993). The sacrificial technique employed left no traces on their bones. In addition, we have three burials located in the construction fills and in Building I (AD 1486-1502), which lack contextual information; thus, it was not possible do discern if they are funerary or sacrificial contexts (Chávez Balderas 2007; Chávez Balderas 2017:121).

[215] Four have been published (López Luján et al. 2010, Chávez Balderas 2017).

Figure 67. Offering 111. Child deposited in the construction fill around AD 1440. Photograph by Leonardo López Luján. Taken from Chávez Balderas (2017).

While the skeleton was being cleaned, it was found to have cut marks on the pleural side of ribs, particularly on the right side. From its anatomical location, the direction of the force and its correlation with the surrounding soft tissues it was proposed that the technique used was precisely the subthoracic transdiaphragmatic approach. Cut marks were caused by sharp force affecting the third, fourth and fifth ribs. All of them originate from the upper inner edge of the ribs, heading downwards, which is consistent with the position that historical sources described: the individual hyperextended on the sacrificial stone, with the legs and head downwards. Cut marks are heterogeneous as there are gentle, deep and repetitive cuts. In addition, there are fractures and missing parts caused by trauma. All these

modifications are peri mortem and correspond to a primary burial, so it can be ruled out that these are posthumous alterations. [216]

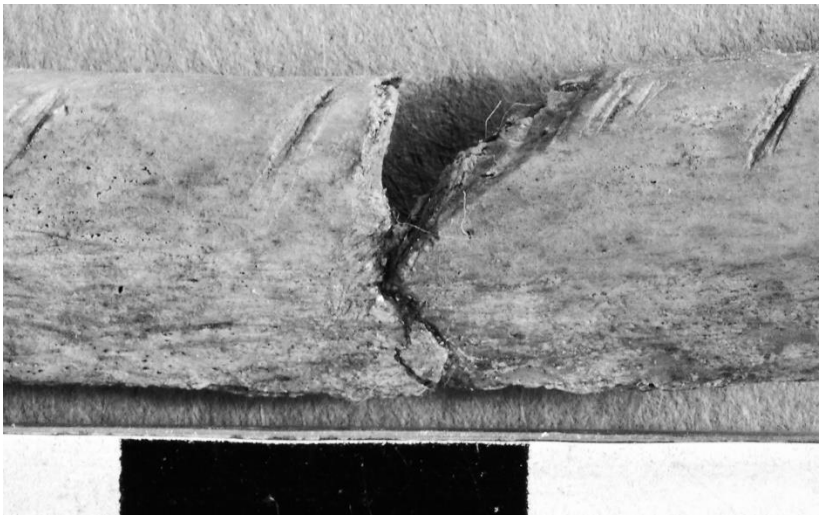


Figure 68. Offering 111. Cut marks and missing fragment in the pleural side of the fourth left rib. Photograph by Leonardo López Luján. Taken from Chávez Balderas (2017).

From the description and distribution analysis of cut marks, it was concluded that this trauma resulted from sectioning anatomical structures surrounding the heart, inside the thoracic cavity. The absence of external marks implies that the priest would have slipped his hand into the child's chest, taking the heart from behind and severing soft tissues by using the ribs as a cutting surface, which would explain the repetitive marks (López Luján et al. 2010; Chávez Balderas 2017). The quantity, distribution and irregularity of cut marks suggest that the priest had no visibility when performing this action; he had to do it quickly to obtain the heart in a reasonable time required for this type of ritual. While it is possible that the sacrificer used a flint knife to open the child's abdomen, as suggested by historical

[216] For a detailed description of the cut marks, see López Luján et al. 2010 and Chávez Balderas 2017.

sources, he used a small, sharp instrument to sever the internal structures: this was very thin or pointed, as it slid through the intercostal space to the outside. In sum, this child would have been sacrificed by cardiectomy, in honor of the god of war, whether he was an impersonator or sacrificed for propitiatory or divinatory purposes (López Luján et al. 2010).

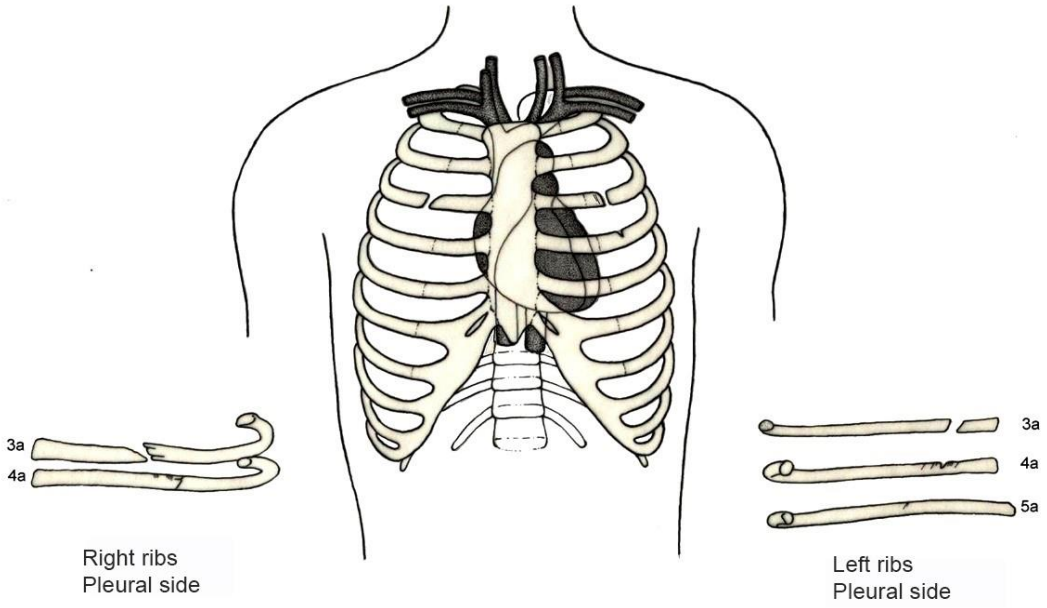


Figure 69. Anatomical location of the cuts on the pleural side of ribs. Child recovered in Offering 111. Drawing by Julio Emilio Romero. Taken from Chávez Balderas (2017).

A second case corresponds to a human sternum recovered in the construction fill of a monument in the shape of a stepped and inverted pyramid, located west to the monolith of the goddess Tlaltecuhtli. It was excavated during the seventh field season of the Templo Mayor Project. It symbolizes the entrance to an infraterrestrial realm, through the jaws of the earth (Chávez Balderas 2008; Aguirre and Chávez Balderas 2010). This space would

have been hidden from the Spanish, by placing a flimsy stucco floor, which location was marked by stones. The presence of a metal artifact and sherds from a Sevillian Olivera on the construction fill suggest that this space was not used after the conquest.

Inside this monument, some fragmented ritual artifacts were placed, which tend to cluster on a pre-Hispanic stucco seal. These were recovered as Offering 166 (Chávez Balderas et al. 2016). [217] Above this concentration of materials, a human sternum was recovered; it was not possible to estimate age or sex. It has very fine cut marks, both on the anterior and posterior views. Those on the internal surface are in the middle of the sternum body between the second and third costal facets, an area with no muscles (figure 70). Cutmarks are smooth, short and repetitive. They correspond to the location of the ascending aorta and the superior vena cava, structures that must be severed to excise the heart. In contrast, the external marks could correspond to the resection of the pectoralis major muscle (Chávez Balderas 2017). Although it cannot be proven, given that this is a secondary burial and that the rest of the bones are missing, I consider that this could be another case of heart extraction by means of the subthoracic transdiaphragmatic approach.

[217] This is a clear example of the continuity of indigenous rituals in times of the Conquest, encouraged by the need to protect sacred spaces. I shall discuss Offering 166 on Chapter 6.

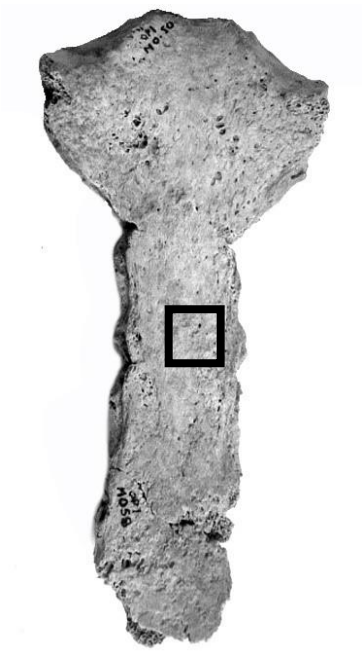


Figure 70. Human sternum recovered in Operation 1. Location of cut marks on the internal side. Taken from Chávez Balderas (2017).

The third case is a jaguar primary burial: Offering 9, explored in 1978, near the monolith of the goddess Coyolxauhqui (1469-1481 AD). This ritual deposit was found inside the construction fill and consisted of a main chamber and an "extension" to the north, where the articulated skeleton of a jaguar (*Panthera onca*) was found (López Luján 1993: 431-432). Although many bones were displaced because of hyper-flexion and reduced space, most were found in an anatomical connection (especially those of the extremities), so we can conclude that the decomposition occurred in situ (figure 71). [218]

[218] This feline presents thermal alterations, possibly by contact with incandescent material or a brief combustion, which would have happened in the cavity, as the damage to the bones corresponds to the animal's position in the context.

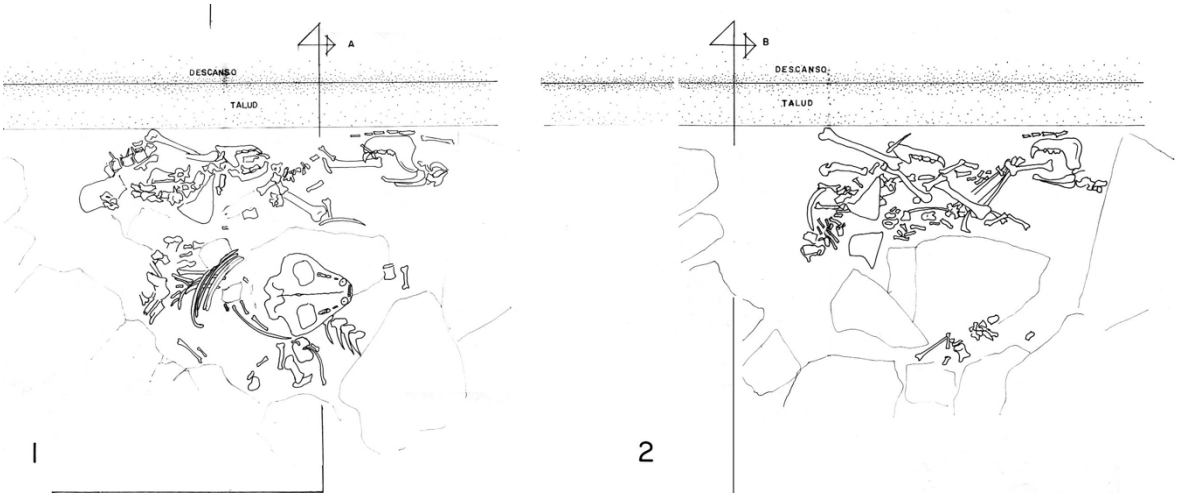


Figure 71. Jaguar skeleton, Offering 9. The hyperflexed position in which it was deposited caused displacement of numerous bones. Drawing courtesy of the Templo Mayor Project Archive.

Bone analysis revealed abundant cut marks on the pleural surface of the ribs, which originate at the cranial edges and are concentrated in intermediate and vertebral portions. The location, number and direction of cut marks suggest that the heart of this powerful feline also was removed by the subthoracic transdiaphragmatic approach. The marks are located on the second and fifth ribs, with emphasis on the right side and were made in caudal-cranial direction (figure 72).[219]

[219] Approximately 70 cut marks were recorded. A detailed description can be found in López Luján et al. (2010) and Chávez Balderas (2017).

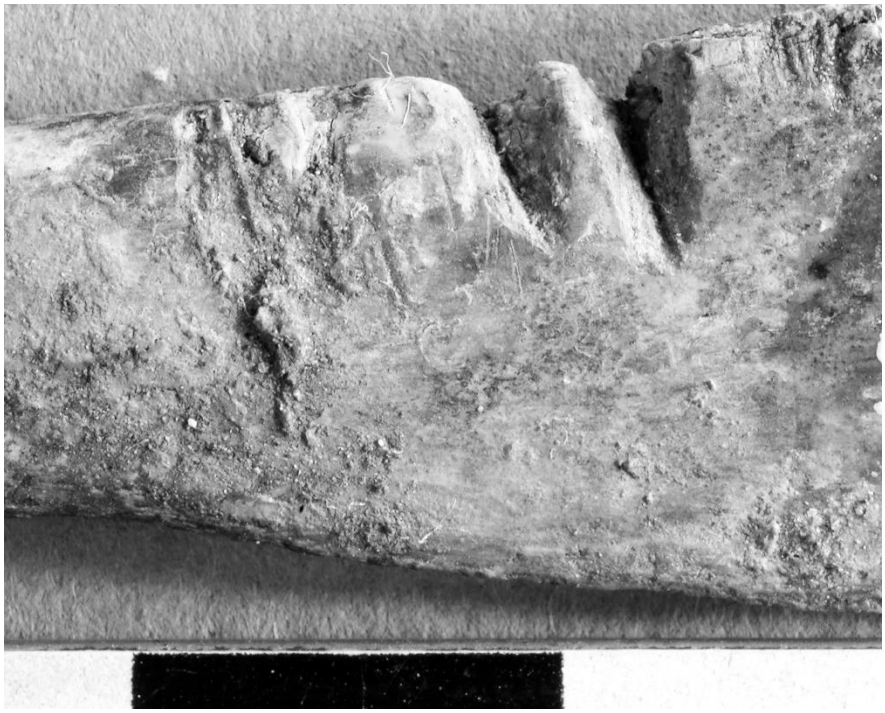


Figure 72. Cut marks on the pleural surface of the second right rib. Jaguar, Offering 9. Photograph by Leonardo López Luján. Taken from Chávez Balderas (2017).

Analysis of the cut marks suggest that the technique used for heart extraction was very similar in humans and jaguars. However, due to the difficulties involved in handling a feline, it is possible that the animal was sedated, weakened or even dead at the time of heart extraction (Chávez Balderas 2017).

The fourth case is a secondary burial recovered inside Offering 126. It is a jaguar with cut marks on the pleural side of the ribs. Although this case has been already published (Chávez Balderas 2017), I will present new data on it in chapter 7, along with the fifth case, corresponding to a golden eagle (*Aquila chrysaetos*). At this point I will only mention the technique used for heart extraction was the same: subthoracic transdiaphragmatic approach.

Other Sacrificial Techniques

In addition to the sacrificial techniques reviewed on this chapter, historical sources mention others that would seem less common or unlikely to be recognized based on osteological evidence alone. First, I will mention drowning, which was linked to children, albinos and possibly to individuals with congenital malformations. In the case of children, *Codex Magliabechiano* (1996: 28v) states that they were drowned in the lake in atlcahualo month. Benavente Motolinía (1967:64) also speaks of this practice. According to the friar, during the *atemoztli* month, the priests drowned a girl and a boy in the lake, "submerging them with the boat".[220] Of course, in the event of finding such a context it would be impossible to prove, from the skeletal remains, that individuals were drowned intentionally and that it was not an accident or a posthumous treatment.

According to Nájera (1987:193-194), lapidation (stoning) among the Maya may have been a sacrificial technique. However, among the Mexica, it more likely was a form of execution punishing thieves and adulterers, as illustrated on folio 71r of the *Codex Mendocino* (1979). In other words, it was not performed within a ritual setting, so it was a death penalty and not a sacrifice.

As for ritual suicide, González Torres (1985: 110-111) considers that since it was narrated in myths it could be represented in rituals. In codices it is common to find characters who slit their own throats or decapitate themselves. Obviously, these representations do not correspond to rituals carried out in human time, but to a mythical

[220] Alvarado Tezozómoc (1944: 333) mentions that albinos, those with "split heads" or two heads, were also thrown into the whirlpool of Pantitlan, although he does not specify whether they were dead or alive.

practice, since these characters are still alive after having sacrificed themselves (Figure 73).

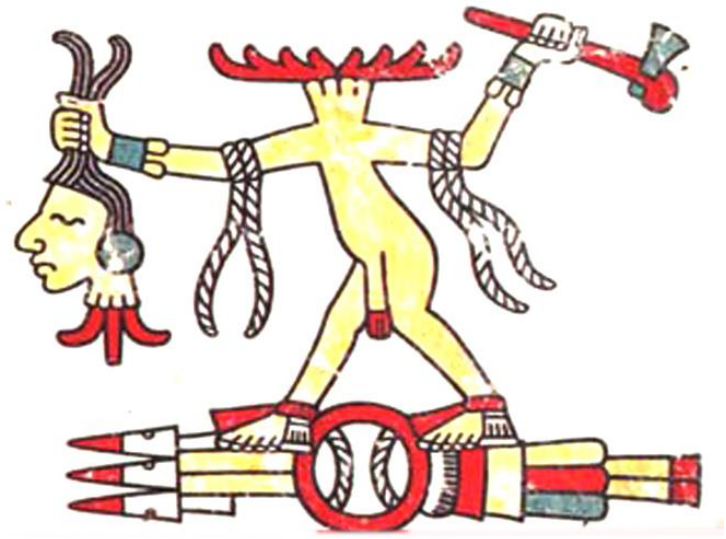


Figure 73. A naked man displays his head that he cut himself with an axe, *Codex Laud* (1994), page 24.

A historical case of suicide is mentioned by Durán (1967 II: 147) who narrates that Ezhuahuacatl, Motecuhzoma's first cousin, committed suicide during the feast of *xocótl huetzi*. This warrior was held captive by the Chalcas, who wanted to make him their king. He agreed, but asked to have a scaffold of twenty *brazas* high "to be comfortable and to have fun with his Mexican prisoners". Having built this structure, he climbed to the top and threw himself into the abyss, expecting that with his death the Mexica would attack the Chalcas in revenge. If this event actually occurred it was linked to war and not to a ritual; the fact that it occurred during one of the calendrical festivities may have been a coincidence. If ritual suicide existed, most likely it would go unnoticed in the archaeological record.

Graulich (2016: 374-376) mentions other sacrificial techniques that were not very common or that seem to be implausible. Among these were the sacrifices made by the Matlatzincas who allegedly used nets that were twisted to kill the victim, possibly by strangulation or asphyxiation; this was practiced on both humans and animals. Another case mentioned by the author is the collapse of the roof over the individuals in which case they would die from a blunt force trauma or asphyxiation. Finally, he mentions dismemberment as a possible form of execution, but considering the stone instruments available, this is more likely a form of posthumous treatment.

Independently of the sacrificial technique, most of the victims' bodies were subjected to various posthumous treatments that will be discussed in the next chapter.

Chapter 5

Postsacrificial treatments

Corpses were essential to Mexica rituals. After sacrifice, bodies of most individuals continued participating in ceremonies; for this purpose they were given the most diverse posthumous treatments. As Thomas (1989: 156-158) notes, corpses' symbolism exceed biological reality; for this reason they can be considered relics, repositories of supernatural and ancestral forces, effigies, raw materials, or debris. The Mexica believed that victims' bodies had special properties even after death. In fact, the smallest bone fragments were carefully preserved and reused in termination and consecration rituals; this will be discussed in next chapter.

For understanding posthumous body treatments it is necessary to distinguish perimortem and postmortem intervals. The first one refers to a time near the death of an individual and immediate handling of corpses, while the second focuses on taphonomic processes and posthumous manipulations carried out when bones were already dry (Wieberg and Wescott 2008:1028). Thus, from the study of cut marks, fracture patterns, and broken edges coloration, it is possible to understand the procedures carried out on sacrificial victims. In addition, reuse of bone remains was widespread at the Sacred Precinct (Figure 74).

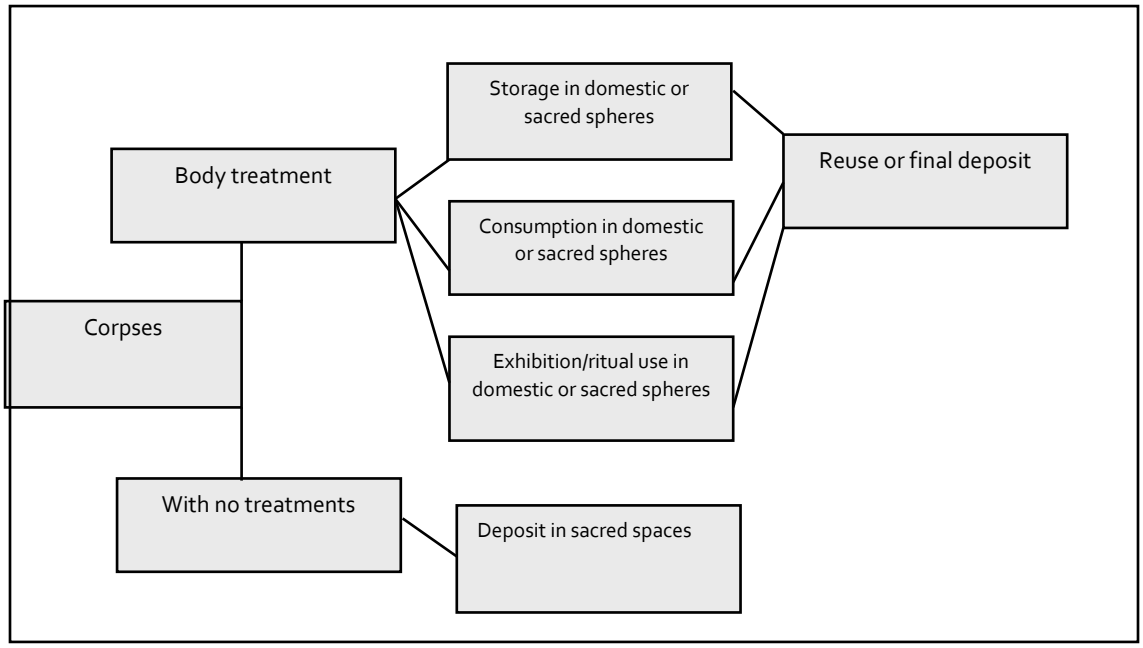


Figure 74. Posthumous treatments carried out on sacrificed victims. Modified from Chávez Balderas (2017).

Next, I will describe post-sacrificial treatments that left cut marks on bones;[221] these were applied to both human and non-human victims. These procedures will be evaluated separately, although they could have been combined in the same ceremony. This will help in understanding the posthumous manipulations described on chapters 6 and 7.

Flaying

This practice consists of removing the skin from corpses. It was done for ritual purposes or simply as part of the defleshing process to achieve a skeletal appearance. Obviously, this treatment attracted the attention of Spaniards, who wrote accounts on this topic. For example, Durán (1967, I: 97) explains that the Mexica "threw a body, and opened it from

[221] I will emphasize decapitation because there is abundant evidence for it in human remains.

the posterior part of the head to the heel, and skinned it, like a ram, removing the whole leather". In most cases sources mention the extraction of the whole skin, while others narrate the use of some anatomical segments, such as the skin of the thigh. Flaying was carried out mainly during the feasts of the *veintenas*, especially in honor of god Xipe Tótec (figure 75). It was also done in rituals dedicated to other deities, for example, Chicomecóatl, Atlatonan and Toci (Durán 1967, I: 102, Benavente Motolinía 1967:60, 62, Chávez Balderas 2017).[222]

Figure 75. Xipe Tótec wearing the skin of a sacrificial victim. *Codex Borbonico*, page 14.

[222] It is not my intention to make a detailed study on the symbolism of this practice. For this purpose I recommend research by Carlos Javier González González (2011), Michel Graulich (2016) and Víctor Cortés (2018).

To remove the skin, the corpse was struck with wooden sticks. Then it was washed and hung (Durán 1967, I: 100, González Torres 1985: 258-272). It is likely that the separation of dermal layer from the adipose tissue combined skin traction and cuts with stone instruments (Figure 76). This would give an irregular aspect to the internal surface, which may be consistent with some of the representations of god Xipe Tótec, who carries a rough, yellow or reddish skin, possibly alluding to fatty tissue and blood (Figure 77).

Figure 76. Flaying of a sacrificial victim by skin traction. *Primeros Memoriales* (1997), plate 250r.

a) b)

Figure 77. Representations of Xipe Tótec depicting rough, bloody skin. a) *Codex Borgia* (1993), page 25 and b) *Tonalámatl de Aubin* (1980), page 14.

In a recent study Víctor Cortés (2018) explores the occasions on which victims were flayed, revealing a differential use of male and female skin; for the former, adipose layer was placed outwards, while for the latter it was inwards. The reasons for this differentiation are unknown.

Apparently skins were used for the entire festival, therefore it is possible that they underwent some sort of preservative treatment. The Mexica were skilled in preparing animal skins, so these techniques were not new to them. After using the skins, they were kept in a "cave" inside the Yopico temple; this occurred during the *tlacaxipehualiztli veintena* (Durán 1967, I: 102, Sahagún 2000:139). In folio 250r of *Primeros Memoriales*

it is stated that skins were covered with dirt and there they decomposed (Sullivan in Sahagún 1997: 58).

Animal pelt production was an important industry, as they were used for ritual purposes, as rugs, as power seats, to manufacture sacred books, and garments of warriors, nobles and priests (Elizalde 2017:119) (Figure 78). From historical and archaeological data it is known that some were brought from distant regions as tribute. For example, page 42r of *Codex Mendoza* (1992) recounts that the lordship of Tepeacac paid 800 deer skins to the Mexica (Figure 79). In contrast, archaeological evidence indicates that a large part of skins used in rituals were processed locally.

Figure 78. Eagle pelt used as a ruler's mat. *Codex Florentine*, folio 71 v.

Figure 79. The lordship of Tepeacac paid an annual tax of 800 deer skins. *Codex Mendoza* (1992), plate 42r.

In the following chapters I will discuss how skins of human and animal victims were obtained by analyzing skeletal remains. For now, I would like to mention that in both cases, skin removal begins with a cut made with a very sharp lithic instrument. Then, the dermal layer was separated by traction, possibly combined with cutting, which produces transverse marks.[223] As a result, marks are usually found in sites where muscle masses are very thin, especially the skull, although they can also be found on hands, feet, and tibia. Cut marks occur accidentally, as the bone serves as a surface for cutting (Botella et al. 1999: 29, 34-41, Pijoan Aguadé and Lizarraga 2004).

[223] As I observed when skinning wolves (*Canis lupus baileyi*) to prepare our reference collections of contemporary remains.

Thermal Alteration: Cremation and In Situ *Fires*

Exposure of corpses or bones to a direct heat source was very common among the Mexica (Pijoan 1997). It was usually performed for funerary purposes, [224] although it was also used for remains of sacrificial victims. From historical sources it is known that some individuals were sacrificed during funerals of elite members. However, most accounts agree that retainer bodies were not cremated. Instead, only hearts and blood were thrown into the pyre along with the bodies of their masters (Chávez Balderas 2007).

Apparently some skulls were exposed to fire. It is not known whether they corresponded to sacrificial individuals or to ancestors. Most likely they were victims as the use of their heads was common at the Sacred Precinct. Of this treatment Alvarado Tezozómoc (1944:284) states that during the coronation of Ahuítzotl "a head or skull called Teocuahtli must be burned on the day of the great feast at midnight".

Animal sacrifice, consumption and direct exposure to fire are also described in historical sources. For example, snakes, frogs, fish, axolot salamander and birds were sacrificed Xiuhtecuhtli during *izcalli* feast; their bodies were roasted and eaten by the ritual participants (Benavente Motolinía 1967:47, Sahagún 2000:88). In the tóxcatl festival, quails were peeled, roasted and eaten (Sahagún 2000: 195).

Four cases have been documented at Templo Mayor: three human skulls and a jaguar skeleton deposited in four offerings consecrating the building. [225] All of them were exposed to incandescent materials or to a brief fire that did not reach high temperatures, so damage of bones is superficial; apparently this reflects *in situ* burning. [226] Cortical bone

[224]For a discussion on funerary cremations see Chávez Balderas, 2007.
[225] Offerings 62, 95, 82 y 9.
[226]Unfortunately there are no field records available to provide a more accurate understanding of these fires.

has colors ranging from dark brown to black; [227] and there is no warping, shrinkage or macroscopic fissures (figure 80). Most likely this burning was done as a purification or closure of each ritual deposit (Chávez Balderas 2017). Some images from *Codex Borgia* (1993) depict the deposit of heads, bodies and hearts inside a temple, linked to fire (Figure 81). These buildings are divided in two halves and the human remains are right in the center. In all three cases, flames can be seen on the walls of the temple. [228]

Figure 80. Skull mask with surface thermal alteration. Offering 62, photograph by Mirsa Islas.

[227] Temperatures associated to 250°- 600°C.

[228] These pictographs were interpreted by Anders and collaborators (*Codex Borgia* 1993) as war scenes. However, the fact that the temples have a cavity in the center, suggests a different possibility. I agree with Christopher Moser (1973: 33) and López Luján's (1993: 264) interpretation: these depictions allude to the burial of remains for consecrating temples.

a) b) c)

Figure 81. Burial of human remains inside burning temples. a) Severed head, *Codex Borgia* (1993), page 4; b) human body, *Codex Borgia* (1993), page 7 and c) heart, *Codex Borgia* (1993), page 5.

Thermal alteration: boiling and consumption of victims

Boiling and cooking of remains in a humid environment (with or without soft tissues), are regarded as indirect thermal alterations (Pijoan 1997). Depending on exposure, bones may change their texture, coloring, consistency and the sound upon friction or impact; however, these transformations are not always evident and therefore it is necessary to apply microscopic and elemental analyses (Pijoan Aguadé et al. 2007, Bosch et al. 2011, Trujillo Mederos et al. 2012, 2015, Solari et al. 2015). [229]

[229] In recent years nanometric approximations have been made to characterize remains with indirect thermal alteration. The study of components and the original composition are carried out by EDS (Energy Dispersive Spectroscopy) and XRD (X-Ray Diffraction). For morphology and bone texture studies, researchers use SEM (Scanning Electron Microscopy), TEM (Transmission Electron Microscopy), AFM (Atomic Force

There is evidence that the Mexica boiled remains of sacrificial victims for two purposes: 1) defleshing corpses to obtain a skeletal appearance and 2) to cook the meat for ritual consumption. In the first case, defleshed bones were required on specific occasions. Some heads were boiled to remove muscles and brain. It is not clear what was done with flesh, but some body parts, such as human heads or faunal caudal vertebrae, do not constitute an important meat contribution. This suggests that defleshing went beyond their ingestion (Figures 82 and 83).

Figure 82. Boiled human temporal bone. Discarded fragment from *tzompantli* skull manufacture, Operation 6. Photograph by Ximena Chávez Balderas.

Microscopy), BET (Nitrogen Adsorption) and UV-Vis (Ultraviolet Visible Spectroscopy) (Trujillo Mederos et al. 2012, 2015).

Figure 83. Jaguar vertebra. Indirect thermal alteration (boiling). Offering 126, Templo Mayor Project. Photograph by Ximena Chávez Balderas.

A second scenario is that boiling of bones corresponds to food preparation for ritual purposes. In the case of human victims Tim White (1992:9) defines cannibalism as "the conspecific consumption of human tissue". This practice has been documented in diverse cultures and circumstances, and therefore there are numerous classifications for understanding the reasons for which it was carried out. For example, Eli Sagan (1974) distinguishes between aggressive cannibalism and affectionate cannibalism: the former involves consumption of enemies and the latter of relatives. [230] On the other hand, based on its function, Flinn and collaborators (1976: 308) classify anthropophagy as ritual, revenge, gustatory and survival.

A neutral and widely accepted classification divides this phenomenon into endocannibalism and exocannibalism; the former refers to the consumption of a member

[230] This work was strongly criticized by William Arens (1976), who accuses the author of using ethnocentric and racist arguments.

of the community, while the latter involves an outsider (Morin 1979: 67, Thomas 1989: 249-256; Conklin 2001: xxv). Endocannibalism is usually linked to funerary practices and ancestor assimilation rites. For example, Beth Conklin (2001) has documented that the Warí of the Amazon consumed meat of the deceased during traditional funerals; this practice was carried out until the 1960s. Bodies were dismembered, roasted and eaten. For them, the burial of bodies was a terrifying alternative, because it implied the abandonment of a beloved in a dirty and contaminated space. According to the author, these ancestral practices are regarded as compassionate cannibalism.

As for the Mexica, *Costumbres, Fiestas, Enterramientos*... (1945:57) describes how Motecuhzoma II was cremated and his pulverized bones were drunk by the elite. If this is true, it represents an extraordinary practice of endocannibalism that occurred in troubled times of the Conquest (Chávez Balderas 2007:94). Another example is described by Chimalpahin (1978:207), who assures that the chalcas killed Tlatelolco's ambassadors and cooked them. Later they invited Moquíhuix and other tlatelolcas to the banquet, who were unaware that they were eating their own emissaries.

In contrast, exocanibalism is usually associated with war and consumption of enemies; such would be the case of anthropophagy carried out during the *tlacaxipehualiztli* month, in which the sacrificant was forbidden to consume the captive's meat, since he had acquired a sort of kinship relationship with him ("he had him for a son") (Sahagún 2000: 183).[231]

How frequent was human meat consumption? It is not known, but Durán (1967, I: 108) mentions that it was practiced by elites, and that "common people never ate it". In

[231] In contrast, Duran's version (1967, I: 278) is different, as it mentions that the "owner" ate the victim.

fact, the friar claimed that Motecuhzoma II ingested human meat every day (Durán 1967, II: 483). Not only captive warriors were cannibalized, since woman representing goddess Chicomecóatl (Durán 1967, I: 140) or children who were sacrificed during the *atlcahualo* month, were also consumed (Sahagún 2000:176). The *Conquistador Anónimo* (1941:25) also mentions anthropophagy of females, no matter how "beautiful" they were.

Historical sources also provide insights into how meat was cooked. It could be prepared with chile (Motolinía 1967:78) or simply with corn and salt (Sahagún 2000: 839). In folio 72v of Codex *Maglibechiano* (1996) it is mentioned that the meat was put in jars and that it tasted very similar to pork. Seasonings have been investigated by Aioze Trujillo Mederos and collaborators (2015), who determined that differences in bone color, besides being caused by temperature or diagenetic processes, may result from axiote (*Bixa orellana*) or chile (*Capsicum* sp.).

Another topic discussed by chroniclers is the origin of this practice. Muñoz de Camargo (1998: 155) asserts that this tradition comes from Chalco, where they ate war prisoners and slaves. Las Casas (1967, II: 211) states that the Mexica spread the practice to the Totonacas. Regardless of its origins, during Late Postclassic anthropophagy was widespread in different areas of Mesoamerica. For example, the *Relación de Santiago Atitlán* (Acuña 1982, I: 87, 106), narrates that such practices were carried out in ancient Guatemala and that war-acquired captives were eaten. In Oaxaca cannibalism is mentioned in the *Relación de Atlatlaucca y Malinaltepeque* (Acuña 1984, I, 2:50) and in the *Relación de Cuautla* (for the town of Tonatepec) (Acuña 1984, II, 1:157). In both cases, the link with war is mentioned. Regardless of the context in which anthropophagy was practiced,

Las Casas (1967, II: 221) assures that it was done for religious purposes and "for no other reason".

The existence of cannibalism has been questioned, and some have argued that it was a Spanish invention. However, there are images of this practice from pre-Hispanic times. Examples of are five pictographs depicted in codices of the *Borgia Group*. Four of them were show dismembered individuals, boiled in large pots, and in the flames at the base two human skulls were depicted. In contrast, in the last image an individual carries on his back a pot in which severed arms and feet can be seen (Figure 84).

a) b)

c) d) e)

Figure 84. Boiling of human remains. a) *Codex Borgia* (1993), page 10; b) *Codex Borgia* (1993), page 5; c) *Codex Borgia*, (1993) page 7; d) *Codex Vatican B* (1993), page 7 and e) *Codex Cospi* (1994), page 7.

Undoubtedly, bone remains are the most reliable evidence of this practice, although their analysis is a challenge. First, documenting boiling is essential for inferring human flesh consumption. However, it is not exclusive to this activity, as it may also be a technique used for manufacturing bone artifacts. Villa and collaborators (1986) propose that, in order to document cannibalism, contextual information must be analyzed. Also a comparative study of animal and human bone alterations must be made. It is expected that butchering techniques in both groups will be very similar, with equivalent fracture patterns in long bones caused by bone marrow extraction. Similarly, evidence of boiling or roasting should be very similar between animal and human remains. In some cases it is possible to observe pot polish caused by friction of bones with the container in which they were boiled (Villa et al. 1986, Pijoan Aguadé and Pastrana 1987; White 1992: 156, Pijoan Aguadé and Lizarraga 2004). Finally, a nanometric approach can be used to characterize bone remains to reveal the type of thermal alteration. The presence of seasoning residues is important as well, as it documents food preparation (Trujillo Mederos et al. 2015).

Ritual consumption of animals did not seem to capture the attention of chroniclers. There are mentions of some species that were exposed to direct fire or even eaten alive (Benavente Motolinía 1967:47, Sahagún 2000:88, 195, 271). However, references concerning their preparation by boiling are scarce. For example, Sahagún (2000:150) cites the preparation of tamales made with dog meat and "chicken", which were made one night before the *tlaxochimaco* festival.

There is evidence of boiled animal bones at the Sacred Precinct. However, they are less frequent than in human bones, because most animal corpses were buried within ritual

deposits, complete and without further posthumous treatments. In addition, they correspond to exotic species and not to domestic animals raised for consumption. These cases will be discussed in Chapter 7.

Defleshing

This procedure consists of removing superficial, medium and deep muscles and other soft tissues, in an attempt to skeletonize bodies, avoiding decomposition. [232] Although defleshing provides meat for consumption, this was not its only purpose. Skeletonization of corpses was a very important practice, reflecting bone symbolism. Bones were equivalent to seeds of life, with which humanity was created in mythical times (*Leyenda de los Soles*, 1945); in other words, bones were not just symbols of death: they also allude to the generation of life.

Some deities and supernatural beings were represented fully or partially defleshed. The most compelling example is the lord of the underworld, Mictlantecuhtli (Figure 85). In contrast, it is exceptional to find images of defleshed animals. On page 29r of *Codex Zouché-Nuttall* (1992) there is a partially skeletonized jaguar carrying a headdress: it has a scroll with a flint knife on the snout. This alludes to the name of the individual: Lord 2 Wind, Jaguar Skeleton (Anders et al., in *Codex Zouché-Nuttall* 1992) (Figure 86). There is another representation of a feline whose femur is fleshless. This beautiful carving was found in Teotenango, State of Mexico. The animal carries a pectoral hanging from its neck and is devouring what appears to be a bloody heart. The defleshed femur has been interpreted as an evocation of the lunar aspects of the feline, since náhuatl word for moon

[232] When boiling is brief, it does not alter macroscopically bone remains, and often is not recognized.

and leg is the same: meztli (Álvarez 1983:244-245; Olivier 2004:416). [233] Finally, a further example should be mentioned. This is on page 71 of *Codex Borgia* (1993), which depicts a decapitating mammal, [234] with a semidefleshed jaw; like the underworld god, it carries a flint knife in the nasal cavity (figure 87).

Figure 85. Mictlantecuhtli with a skeletal appearance and wearing earplugs made of long bones, *Codex Borbonico*, page 10.

[233] I am grateful to Guilhem Olivier who kindly drew my attention to this carving from Teotenango.
[234] Anders and colleagues (*Codex Borgia*, 1993:347) identify it as a skunk by comparing it with folio 22r of *Codex Mendoza* (1992). However, I disagree with this identification, since while in the latter it was represented with a pattern of black and white colors, in *Codex Borgia* (1993) it does not. All Mexican skunk species have this coloring, so I consider it to be another mammal. Possibly the animal in *Codex Mendoza* (1992) corresponds to *Spilogale putorius* or *Spilogale pygmaea* (Roberto Rojo, personal communication, September 2017).

Figure 86. Partially skeletonized Jaguar. *Codex Zouché-Nuttall* (1992), page 29r.

Figure 87. Detail of a decapitating mammal's face. It has an anthropomorphized defleshed mandible. It carries a flint knife in the nasal cavity and circular eyes with prominent eyebrows, attributes of the god of death. *Codex Borgia* (1993), page 71.

Through active defleshing[235] of animals and humans it was possible for bones to become visible shortly after death, evoking at the same time a deadly and regenerative aspect. When defleshing a body, cut marks tend to concentrate in muscle insertion sites, although they can be found in any other area (except joints). The bone functions as a cutting surface, where marks are usually reiterative, oriented in the same direction; it is possible to infer where the cut began, because at this point cuts are deeper (Botella et al. 1999: 52-57). In addition defleshing was also done by fracturing bone in order to suppress some muscular insertions (Chávez Balderas 2017).

In sum, defleshing was carried out for very specific ritual purposes. For example, skulls that were exhibited in the *tzompantli* were skeletonized (completely or partially), as well as those that were transformed into effigies of gods (Figure 88). The same happened with defleshed animal bones used to represent the underworld level inside ritual deposits. Even those anatomical elements of small size and minimum meat contribution were defleshed (Figure 89). I shall discuss these binary symbols of life and death in the following chapters.

[235] Made by humans.

Figure 88. Defleshing cut marks in a left zygomatic bone. Child skull mask, Offering 22. Photograph by Ximena Chávez Balderas.

Figure 89. Defleshing cut marks in the ventral portion of a caudal vertebra *(Puma concolor).* Offering 126. Photograph by Ximena Chávez Balderas.

Disarticulation (Dismemberment)

Disarticulation refers to the separation of two anatomical segments by the joint, using cut, percussion, flexion or avulsion (figures 90-92). This may involve any kind of joint, whether diarthrosis, sinarthrosis and amphitrosis (Sarmiento and Sierra 2002:71). The former are synovial joints corresponding, for example, to the separation of arms or legs. The second ones lack movement, like cranial sutures, which were separated for manufacturing child and subadult skull masks. Finally, the third ones are cartilaginous such as those between vertebral bodies: these were sectioned during decapitation, a topic that I shall discuss with great detail in the second part of this chapter, given that it was the most important posthumous treatment of the body among the Mexica.

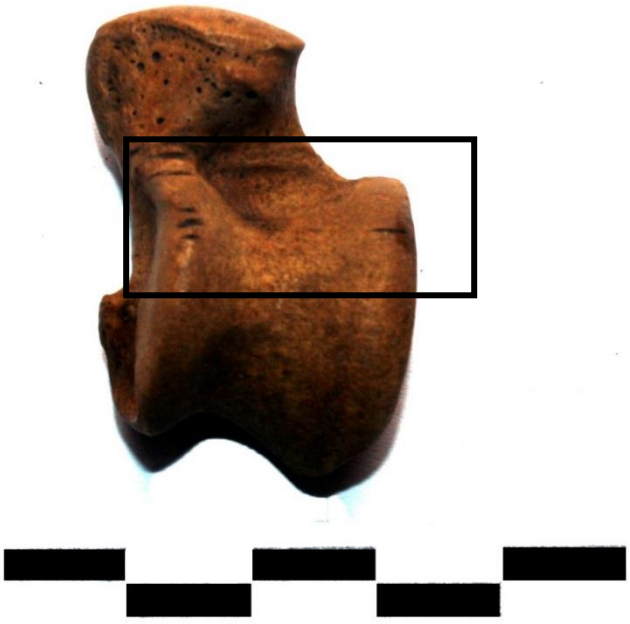


Figure 90. Diarticulation cut marks from the dismemberment of a wolf's hind leg. Right talus, *Canis lupus*, Offering 126. Photograph by Ximena Chávez Balderas.

Figure 91. Disarticulation of a right rib by fracture (torsion). Jaguar (*Panthera onca*), Offering 126. Photograph by Ximena Chávez Balderas.

Figure 92. Disarticulation of a frontal bone, child skull mask. The original intention of the priest was to cut the skull, but it was finished by disarticulating the coronal suture. Offering 64, Photograph by Jesús López, from Chávez Balderas (2017).

Considering lithic tools available at the time, the simplest way to cut a body was precisely through disarticulation, whether by sharp, blunt or sharp-blunt force; the lack of metal tools made it very difficult to sever bones. Mexica priests had deep anatomical knowledge and

knew expert techniques. Interestingly in pre-Hispanic representations - codices and sculptures - epiphyses of long bones (human and animal) are usually depicted in great detail, suggesting that they were detached by disarticulation. In these depictions it is possible to differentiate the type of bone by ephiphyseal shape: femur, humerus, ulna and radius (Figures 93 and 94). This convention is repeated in different media, indicating that these are standardized representations that reflect anatomical knowledge. In colonial pictographs dismemberment of bodies is illustrated in non-articular sites, which is not consistent with the procedures followed by priests, suggesting that post-conquest artists were not familiar with these techniques and they were habituated to metal tools (Figure 95).

a) b) c)

Figure 93. Pre-Hispanic representations of anatomical segments in which disarticulated epiphyses are visible. a) Human forearm, *Codex Fejérváry-Mayer* (1994), page 44; b) Human forearm, *Codex Laud* (1994), page 13; c) Posterior extremity of jaguar, *Codex Vatican B* (1993) page 7.

a) b)

Figure 94. Detail of disarticulated limbs of goddess Coyolxauhqui. a) Proximal epiphysis of the leg (femoral head and greater trochanter); b) Proximal epiphysis of the arm (humeral head). Photograph by Marco Antonio Pacheco, courtesy of Editorial Raíces.

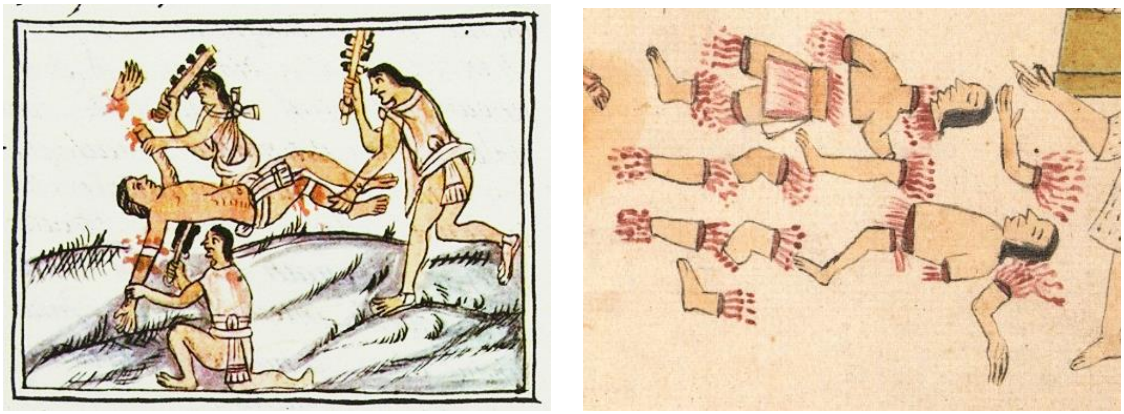


Figure 95. Human dismemberment represented in colonial codices. Bodies are segmented in non-articular areas. It was not possible to make this with available instruments in pre-Hispanic times. a) *Codex Florentine* (1979), page 110v; b) *Codex Azcatitlan* (1995), page 19v.

Historical sources mention dismemberment of human bodies on various ritual occasions. For example, Chimalpahin (1978:202) refers to it as a form of sacrifice. In fact, when describing the immolation of noble Tlamanalcas at the summit of Mount Amaqueme, he

states that "each of them was sacrificed by cutting it into five parts, cutting the neck, upper and lower extremities at the height of the elbow and knee joints". I must point out that, with lithic instruments available, it is impossible that this was the sacrificial technique; instead it was a posthumous treatment.

Another example of a post-sacrificial procedure was done on the *huei miccaílhuitl* feast. On this occasion, the sacrificial victim - a slave - was cannibalized and his lord kept the femur (*Costumbres, Fiestas, Enterramientos*...1945:47). On page 26v of *Codex Florentine* (1979) there is information on the fate of captive femurs: these were hung on the beams of the houses and were worshipped under the name of Maltéotl ("Captive God"). This deity was formed not only by the femur, but possibly by a mask (Olivier et al. in press) (Figure 96). Archaeologically speaking, few long bones have been found at the Sacred Precinct of Tenochtitlan, which is to be expected as these anatomical elements were venerated in households.

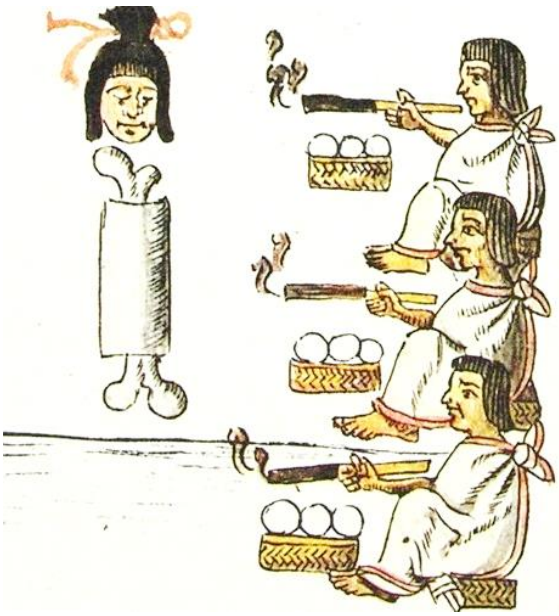


Figure 96. A victims' disarticulated femur was used as an effigy of Maltéotl, the "captive god". *Codex Florentine* (1979), folio 26v.

In other codices representations of human and animal dismemberment are common. For example, on page 73r of *Codex Magliabechiano* (1996) there is a depiction of a cannibalistic ritual, in which dismembered human remains were consumed in the presence of the god of the underworld, Mictlantecuhtli. Another example is on page 17v of Codex *Telleriano Remensis* in which goddess Ixcuina, protector of adulterers, carries a container containing a human head, a hand and a heart (Figure 97). In contrast, in *Codex Borbonico* (1991) it is common to find representations of severed animal limbs (Figure 98).

a) b)

Figure 97. Human dismemberment. a) Disarticulated limbs and a human head. Cannibalistic ritual presided by Mictlantecuhtli. *Codex Magliabechiano* (1996) page 73r; b) goddess Ixcuina carries a container with severed human remains. *Codex Telleriano Remensis* (1995), page 17v.

Figure 98. Containers with severed bird limbs. a) *Codex Borbonico* (1991) page 8; b*)* *Codex Borbonico* (1991), page 18.

Miscellaneous Bone Modifications

Human and animal remains received various posthumous treatments on which scarce information exists in historical sources. One of the most common was bone severing to fabricate ritual objects. Remains were severed by wear and, to a lesser extent, by torsion, percussion or by combining these techniques. Generally this procedure can be documented for the so-called skull masks (figure 99) or for manufacturing bloodletting instruments made from animal bone and musical instruments known as *omichicahuaztli*. For the latter there are references in historical sources. For example, Alvarado Tezozómoc (1944:241), narrates that the deceased were provided with a sawn deer bone; it was placed in their hands "as if they wanted to sing with it, as a rattle they call umichicahuaz".

Figure 99. Skull mask with frontal bone cut. It has eyes made of shell and pyrite. Photograph by Michel Zabé (from Chávez Balderas 2017).

Bone perforations were another common posthumous treatment. These had the function of suspending body parts or to maintain two bones articulated (Figure 100). Perforations were also used to attach locks of hair, as in the case of some effigies of Mictlantecuhtli (Chávez Balderas 2017) (Figure 101).

Figure 100. Unfused femur distal epiphysis (*Puma concolor*). It has a circular perforation in the anterior-distal section. This could have been used to suspend it or to keep it articulated to diaphysis. Offering 126. Photograph by Ximena Chávez Balderas.

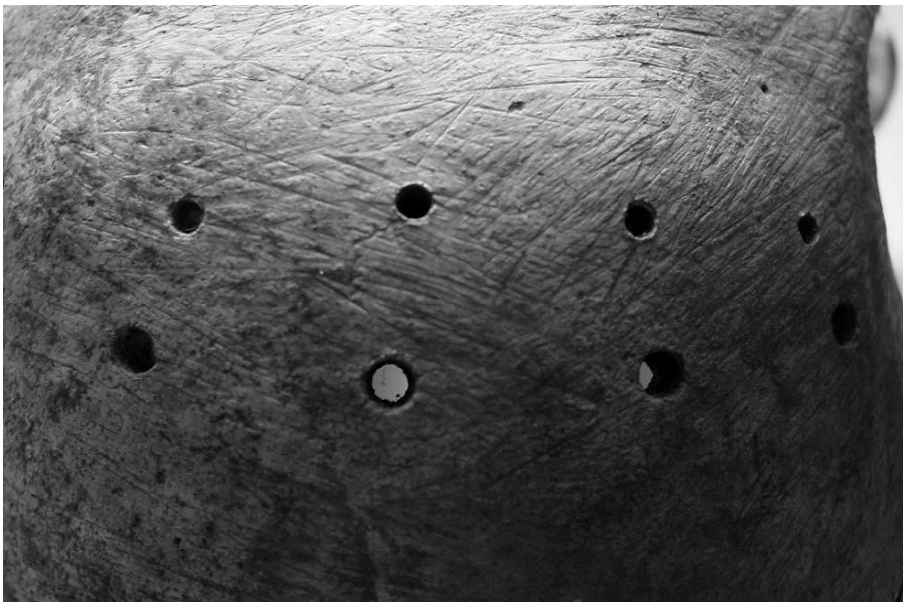


Figure 101. Perforations to attach locks of hair. Bone surface was scraped to remove periosteum. Offering 17 (taken from Chávez Balderas 2017:90).

Bone surfaces could also be modified by scraping (figure 101). This was usually done to remove the periosteum, a membrane which has the primary function of nourishing and

regenerating bones. Scraping was also used to clean bones from adhering soft tissues (muscles or ligaments). Cleaning was done with lithic instruments and cut marks are usually superficial and tend to be concentrated in specific areas (Botella et al. 2001: 62-68). After removing the periosteum, bone surfaces could be polished or burnished, which is often associated with manufacturing artefacts such as blood-letting instruments made from animal bones. Finally, bones could also be painted and appliqués made of other materials attached. Examples of this are skull masks that have eyes made with shell discs and pyrite[236] (figure 99).

The Mexica combined all these posthumous treatments for the preparation of corpses -both human and animal- in order to recover their bones; these were cleaned and transformed into ritual goods. Of all of these treatments, the most important was decapitation by disarticulation. It appears to have been restricted to humans, as it has not been documented in animals. Most of sacrificial human victims recovered in the Sacred Precinct were decapitated. In the following section I will explore this complex treatment, and the use and reuse of human skulls.

Decapitation

Preference for heads in sacrificial rituals was not a Mexica invention. It is a tradition deep-rooted long before, as confirmed by iconography and bone remains recovered in archaeological excavations (Moser 1973). This posthumous treatment was performed even before the formation of the cultural area known as Mesoamerica. Carmen Pijoan Aguadé and Josefina Mansilla (2004b), documented a very early case of decapitation in a child

[236] In Offering 120, the effigy skull eyes were made of flint and obsidian.

recovered in Coxcatlan cave, [237] dated around 5750 B.C. +/- 250. Other examples dating to the Preclassic have been documented in Kaminaljuyú (800-600 B.C.), Tlatecomila (600-400 B.C.) and Cuicatlan.[238] From the Classic period, findings from Pyramid of the Moon in Teotihuacan (200-350 A.D.),[239] demonstrated that this practice was associated with the consecration of this building. Later contexts dating from 600 to 900 A.D. have been reported at sites such as La Quemada, Altavista, Cerro Moctezuma and Xochicalco. [240] From this period I would like to highlight archeological finds in Xaltocan,[241] in which more than a hundred severed skulls were discovered in a rural setting. Undoubtedly, decapitation became more common towards the Post-classic period, as corroborated by findings in Casas Grandes, Cholula, Teopanzolco, Teotenango, Tlateloco and, of course, Tenochtitlan[242] (Lagunas and Serrano, 1972; Nájera, 1987, Ruz, 1989; Pijoan Aguadé, 1997; Pijoan Aguadé et. al, 1989; Hernández Pons and Navarrete, 1997; Botella et al., 2000; Kanjou, 2001; Xohipiltécatl, 2004; Chávez Balderas and Pereira, 2007; Morehart et al., 2012; Chávez Balderas 2017).

Why preserve only the head? There are several explanations for this ritual behavior. First, the head housed a soul entity: the *tonalli*, related to heat, vigor, courage and the celestial level of the cosmos; it also allowed growth. Children received it in their mother's womb and strengthened it during the ritual bath. *Tonalli* was attached to hair and nails, and its absence could cause illness or death. This soul entity disintegrated after death (López Austin 1996:223-251, 430). The head, particularly the face, was also a symbol of identity,

[237] Located in the Mexican State of Puebla.
[238] Sites in Guatemala, Mexico City y Oaxaca, respectively.
[239] In the State of Mexico.
[240] The first three sites in Zacatecas and the last one in Morelos.
[241] In the State of Mexico.
[242] These sites are in the Mexican States of Chihuahua, Puebla, Morelos, Mexico and Mexico City (Tlatelolco and Tenochtitlan).

gender and ethnicity. When defleshed, skulls evoked notions of annihilation and fertility at the same time. In addition, from heads it was possible to count sacrificial victims in a more expeditious way than by other body parts that are smaller or paired and had to be sided. By preserving heads at the Sacred Precinct, Mexica priests left tangible and incontrovertible evidence of human sacrifice.

It is not surprising that the most frequent posthumous treatment in the archaeological record of the Sacred Precinct is decapitation. Historical sources suggest that the majority of human victims sacrificed by heart-extraction underwent this procedure. Most of the heads remained in the Sacred Precinct, while bodies were taken to some *calpulli* (neighborhoods) or even they could be thrown into the lagoon, in the Pantitlan whirlpool (Chávez Balderas 2017). Motolinía (1967:62) mentions that in Cuauhtitlan, after sacrifice, individuals were decapitated and their heads were preserved by priests, and their bodies given to lords and principals. Las Casas (1967, II: 192) follows this version, adding that this was also done in Tlaxcala. Sahagún (2000, II: 240) narrates something similar for Tenochtitlan. According to the friar, during the *tepeilhuítl* month victims were taken to the "place where heads were embedded", referring to the tzompantli. There they hung their heads on poles that crossed the skulls. In contrast, bodies were taken to the neighborhood that had provided individuals for sacrifice.

These data are consistent with archaeological evidence at the Sacred Precinct of Tenochtitlan, where a large number of skulls have been recovered. This contrasts with a scarcity of postcranial bones, with the exception of first cervical vertebrae and some scattered remains from secondary burials. In addition, there are some primary adult burials, as well as forty-four primary child burials dedicated to gods of rain and war (Román

Berrelleza 1990; López Luján 1993; Chávez Balderas 2007; López Luján et al. 2010; Chávez Balderas et al. 2017; Chávez Balderas and Vázquez Vallin 2017; Flores in press; Ruíz Albarrán in press, Barrera, personal communication, June 2017).

In contrast, there is no evidence of animal decapitation at Tenochtitlan. There are some cases of disarticulation of first cervical vertebra and skulls in Offering 126, but this corresponds to a different posthumous treatment. All these animals were flayed, for which reason their skulls were cut or fractured. As a result, the anterior part, including the mandible and maxilla, remained attached to the skin. In contrast, the posterior part of the skull, along with vertebrae were reused in a consecration ritual with other bones. In other words, these skulls were divided into two pieces, each half having a different use as I shall discuss in chapter seven. Besides this treatment, a large number of animals were buried complete and without further posthumous processing.

Despite the absence of beheaded animals in the archaeological record, this practice was depicted in both pre-Hispanic and Colonial codices. For example, on page 71 of *Codex Borgia* (1993) a mammal with a skeletonized face beheads a quail; this bird has a white flag next to the head, as a symbol of sacrifice (figure 102). Page 80 of *Codex Borgia* (1993) also depicts the headless bodies of an eagle and a jaguar. Blood streams emerge from them, surrounding the moon and leading to two sacrificial flags. At the center of the scene is a tree with knives and painted with red and white lines, an attribute of *mimixcoas*, sacrificial victims par excellence. According to Jansen and collaborators (*Códex Borgia*, 1993), this scene would allude to the death of Eagle and Jaguar warriors. However, it is striking that they are illustrated decapitated and not during heart extraction or piercing with arrows (figure 103).

Figure 102. Quail decapitated by a mammal with a skeletal jaw. *Codex Borgia* (1993), page 71.

Figure 103. Jaguar and eagle decapitated in the vicinity of a knife tree decorated as a sacrificial victim. *Codex Borgia* (1993), page 80.

Later documents such as *Codex Borbonico* (1991) illustrate decapitation of snakes and birds; the latter also carry flags as symbols of sacrifice (figure 104).

Figure 104. Decapitation of birds and a snake. a) *Codex Borbonico* (1991), page 14; b) *Codex Borbonico* (1991), page 15; c) *Codex Borbonico* (1991), page 4.

Decapitation of Human Victims: Historical Sources

The historical record is rich in information on decapitation and the treatment of prisoners of war and bought slaves. This was one of the most popular practices during calendar festivities and inaugural ceremonies of the Templo Mayor. For example, it was carried out during the months of *tlacaxipehualiztli*, *tóxcatl*, *quecholli*, *panquetzaliztli* and *títit*l. Thus, decapitation was linked to Xipe Tótec, Tezcatlipoca, Ilamatecuhtli, Mixcóatl, Huitzilopochtli, Xiuhtecuhtli, Omácatl, Yacatecuhtli, Mayáhuel and the mountains (Chávez Balderas 2017). Although Sahagún (2000, I, 149-154, 213-220, 229-230, 240) mentions that decapitation was also performed during *ochpaniztli* and *huei tecuílhuitl* months, Durán (1967: 127, 140, 146) noted that females who were sacrificed on this occasions died by slitting of the throat: [243] they were impersonators of goddesses Xilonen,

[243] Unlike Durán, Sahagún (2000, I: 149) did not distinguish between slitting of the throat and decapitation, and therefore he believed that women impersonating Xilonen had their heads severed.

Chicomecóatl, Toci and Atlatonan. Slitting of the throat and decapitation are two different practices: while the first corresponds to a sacrificial technique, the second is most likely a posthumous treatment due to the absence of metal tools.

Most of the narratives from historical sources refer to the exhibition of heads and defleshed skulls, which was done individually or collectively. For example, the head of Ilamatecuhtli's impersonator was severed in the *títitl* feast. In contrast all the heads from captives sacrificed during *tlacaxipehualiztli* were grasped by the hair and carried in procession. Heads were held with the right hand in a ceremony called *motzontecomaitotía* (Sahagún 2000, I: 180-187, 258). Others were placed on poles raised in plazas (Mendieta 1971:133), while most would have been exhibited in the *tzompantli*, defleshed and displayed on wooden beams (Alvarado Tezozómoc 1944: 336, Tapia 1988; 108, Díaz del Castillo 1942: 33, 317, Durán 1967 I: 23, Motolinía 1967:72, Sahagún 2000:273-278). From historical sources it can be inferred that heads received a wide range of posthumous treatments. For example, some heads were defleshed, others partially defleshed and the rest were completely skeletonized; some skulls had lateral perforations, while others had it on the base. Thanks to bioarchaeological analysis it is possible to understand these treatments.

Decapitation Techniques

In a previous study conducted on the skulls recovered at the Templo Mayor I documented decapitation techniques (Chávez Balderas 2010, 2017). I define decapitation as the disarticulation of heads attached to bodies by some connective tissue. This could be done

during the perimortem or postmortem interval; the first implies the severing of all soft tissues and the second the cutting of residual tissues (ligaments or tendons that have persisted through time and decomposition).[244]

Given available lithic tools, decapitation in Tenochtitlan was carried out by disarticulation. It was a slow process done by sharp force or chopping (Chávez Balderas 2017).[245] Disarticulation by sharp force was produced by using blades, flakes or knives. Soft tissues were cut by pressure and sliding, and it is common to find accidental marks on bones; [246] these are different in appearance depending on if the edge was serrated or smooth. In contrast, disarticulation by chopping combines two types of force: sharp and blunt. This is possible when a stone tool, besides being sharp, has a considerable volume and weight; these would correspond to larger knives and axes. Damage caused in bones will depend on the edge characteristics (Gisbert and Villanueva 2004: 384-388, Chávez Balderas 2017: 168-170).

In the skull collection recovered at the Templo Mayor there are 24 individuals who have well preserved cervical vertebrae with disarticulation marks (Chávez Balderas 2017). Additionally, seven individuals have the hyoid bone, a further indicator of decapitation. This bone is suspended by soft tissues, which means that the neck was cut still fleshed and placed articulated. [247] In the remaining skulls, vertebrae were intentionally removed for manufacturing skull effigies.

[244] In the event of the removal of a skull completely disarticulated as a result of decomposition, I will consider it as a bone manipulation, but not as a decapitation. This must involve mechanical disarticulation.
[245] Beheading can also be the result of blunt trauma and avulsion. These cases are linked to falls from heights, or high-speed accidents, unrelated to this study.
[246] On the vertebral body, articular facets and in between spinous processes.
[247]The presence of this bone is low, due to three reasons: 1) when decapitation occurs closer to the head, this bone is likely to remain with the post-cranial skeleton; 2) numerous hyoid bones were not identified in the field, they were mixed with faunal remains and taken to the archaeozoology labs; 3) in some deposits, such as offering 20, the water table fluctuated, causing destruction of vertebrae and hyoids.

Mexica priests used different decapitation techniques. This might reflect different approaches to decapitation or the use of distinct lithic instruments. Some vertebrae have numerous cut marks, while on others they are scarce. This could be due to the priest's level of expertise, poor visibility when disarticulating due to soft tissues and blood, or limited time (Chávez Balderas 2017). There clearly existed a priestly class with specialized anatomical knowledge of which anatomical regions were appropriate and all necessary procedures for sacrificial techniques and posthumous treatments to be carried out expeditiously (Chávez Balderas 2010, 2017).

Through direct analysis of cervical vertebrae I documented three disarticulation techniques (Chávez Balderas 2017). The first is decapitation with a sharp instrument, in an anterior-posterior direction. [248] It consisted of placing the body in a supine position, cutting all neck soft tissues until finding intervertebral discs. The lack of visibility caused the vertebral bodies to be accidentally cut (figure 105). Later the priests severed the synovial capsules of articular facets, and cut soft tissues between the spinous processes and in the posterior part of the neck (figure 106). From the high number of cut marks, it can be assumed that this was a relatively slow process compared to cases conducted with metal tools. For this reason, if a victim was alive, it is likely that he or she would first die of asphyxia or hemorrhage.

[248] All these techniques are described in detail in Chávez Balderas 2017.

Figure 105. Cut marks produced by sharp force trauma, anterior vertebral body. Photograph by Jesús López, from Chávez Balderas (2017).

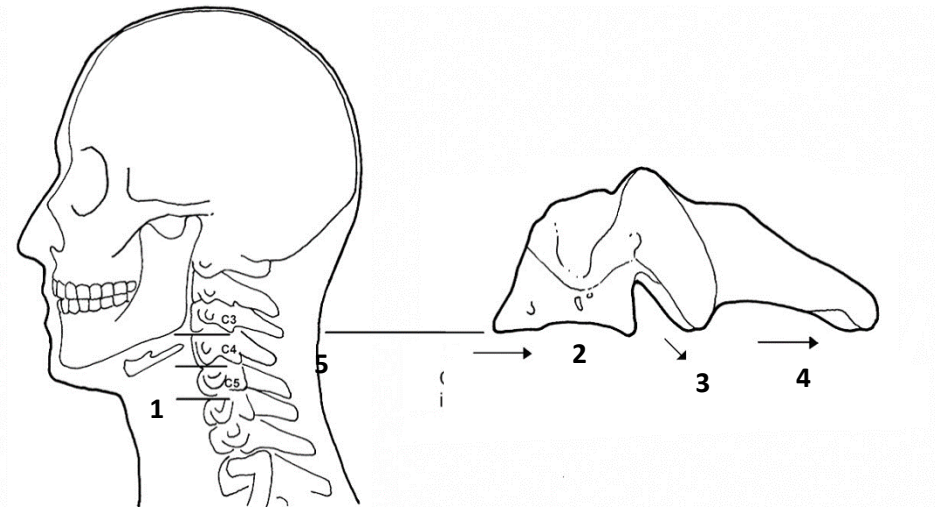
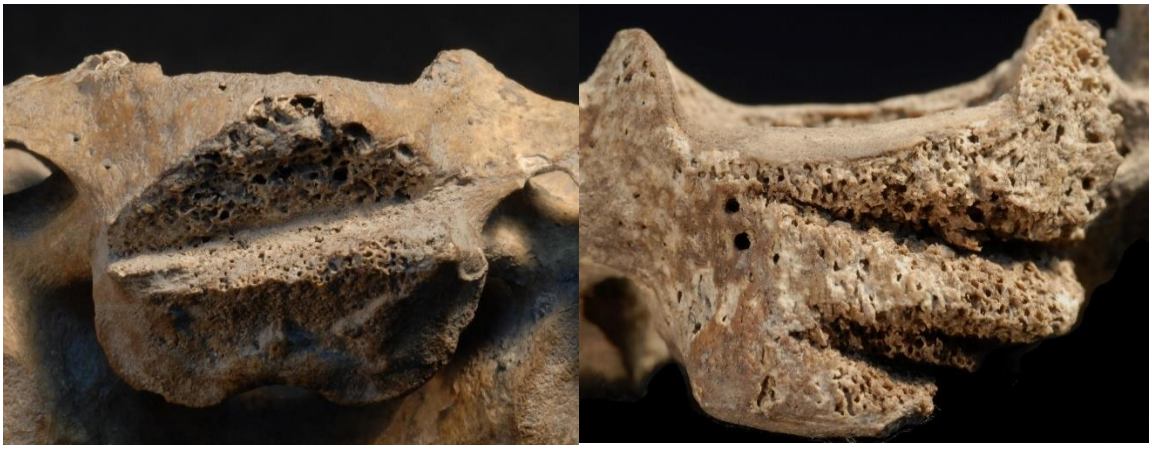


Figure 106. Anterior-posterior disarticulation. 1) Severing of anterior soft tissues; 2) cutting of intervertebral discs; 3) cutting of synovial capsules; 4) cut between spinous processes and 5) severing of posterior soft tissues. Drawing by Julio Emilio Romero, Jesús López, from Chávez Balderas (2017).

The second technique corresponds to chopping, in an anterior-posterior direction. It is a very similar procedure to the previous one, using a heavier tool that caused a contusion in

addition to the cut. Likewise, the victim was supine on a surface. The priest struck the neck with an axe or a heavy knife, inflicting between one and four frontal or slightly lateral blows, leaving "V" section fractures. [249] The purpose was the same: to find the intervertebral disc and to cut it. Later, articular facets, spinous processes and soft tissues of the back were severed (figure 107).



a) b)

Figure 107. Disarticulation by chopping with the victim in supine position. a) Fracture in the anterior part of vertebral body caused by two strokes; b) fracture at the left lateral portion of the vertebral body caused by three strokes. Photographs by Jesús López, from Chávez Balderas (2017).

The third technique corresponds to disarticulation with a sharp instrument on the lateral aspect of the neck. Individuals might also be in a supine position; however, cuts were made laterally on articular facets. Considering the anatomy of the neck, this procedure is the least effective because these joints are very small and soft tissues made difficult to locate it; this

[249] Despite the fact that in some cases cut marks are slightly lateral, it is clear that bodies were in a supine position.

resulted in numerous cuts marks (figure 108). After repeated attempts to cut, the priest proceeded to sever intervertebral disc and to separate the spinous process. [250]

Figure 108. Disarticulation by sharp force trauma in lateral direction. Severing was first attempted in the upper part of vertebra and then it was completed in the lower section. Photograph by Jesús López, from Chávez Balderas (2017).

Regardless of the technique, in most cases disarticulation took place between cervical vertebrae C5-C6, that is, in the lower part of the neck. [251] This can be explained in terms of anatomy. First, the upper cervical region of the spine is the most complex because it provides extension, flexion, rotation and inclination movements (Fernández Villacañas and Moreno Casales 2002: 93). Not all the neck is identical, since the first two cervical

[250] This technique was found only in individuals from Offering 60.
[251] Previous analysis conducted at the Templo Mayor skulls, revealed that 14% were decapitated between C6 and C7, 27% between C4 and C5, 27% between C3-C4 and 32% between C5 and C6 (Chávez Balderas 2017: 408).

vertebrae are those with greater anatomical complexity, making disarticulation much more difficult. The presence of tectorial membrane, occipitoatloid ligaments, atlantoaxoid ligaments, occipitoodontoid ligaments and cruciform ligament (Fernández Villacañas and Moreno Casales 2002:93-96), make their separation a slow process consuming considerable time. In contrast, the anatomy of third to seventh cervical vertebrae is much simpler and it can be disarticulated by severing intervertebral discs which have a nucleus pulposus and a fibrous exterior (Fernández Villacañas and Moreno Casales 2002: 93-96); these are softer and easier to cut than bone. In addition, by making the cut in an anterior-posterior direction it is easier to access synovial capsules from articular facets (Chávez Balderas 2017). These techniques are the simplest way to disarticulate the neck. However, other procedures have been documented in the archaeological record. For example, in Teotihuacan, decapitation was carried out in a posterior-anterior direction (Chávez Balderas and Pereira 2007). Both the spinous processes and the mandible[252] were obstacles that made this method more difficult, implying greater damage to bones.

Regardless of the decapitation technique, heads were used in two different ways: with soft tissues or skeletonized. The former are regarded as "severed heads", while the latter correspond to skulls with lateral or basal perforations and the so-called skull masks. These were defleshed and used for different purposes. Many were transformed into "effigy skulls" to be deposited inside the offerings of Templo Mayor and West Plaza.

[252] By chopping, when the neck is flexed.

Severed Heads[253] *and the Consecration of Temples*

Some individuals were decapitated, and their heads were not defleshed. Historical sources suggest that they might have been suspended by the hair in ritual ceremonies, as occurred in *títitl* and *tlacaxipehualiztli* feasts (Sahagún 2000: 180-187, 258). This practice was also illustrated in pre-Hispanic codices of different origins. In these documents, lords, supernatural beings and the god of death are decapitators par excellence; all of them carry the heads of their victims holding them by the hair. For example, on page 21 of *Codex Zouché-Nuttall* (1992), Lord 11 Rain holds with both hands the severed head of an individual, from whose neck sprouts blood (figure 109).

Figure 109. Lord 11 Rain holds the head of a sacrificial victim. *Codex Zouché Nuttall* (1992), page 21.

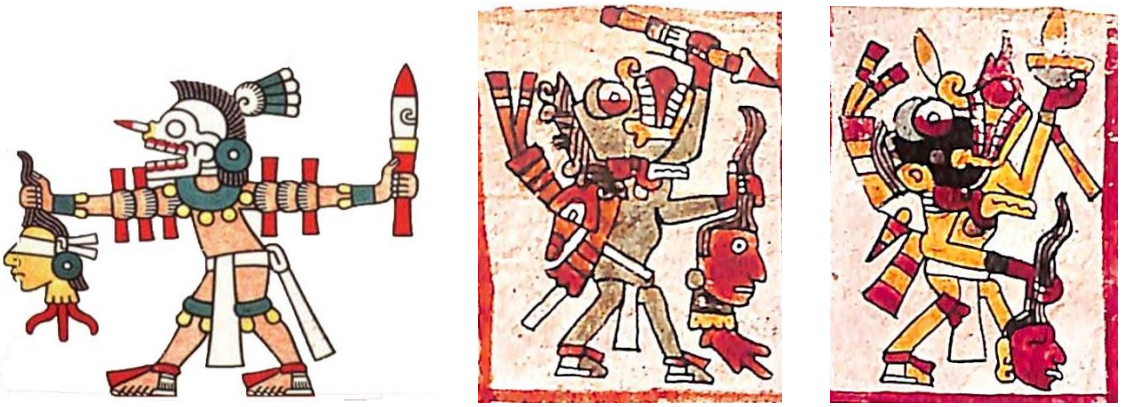
[253]In past publications I regard these skulls as "trophy heads" (Chávez Balderas 2010). However, the term "severed head" is more accurate because these individuals are not trophies or memories of war; they are not directly connected to hunting, nor are they revered ancestors. Likewise, they did not symbolize the achievements of a warrior (Mensforth 2007:222, Lozada et al. 2018). Instead, these individuals would correspond to sacrificial victims obtained from different sources, mainly through purchase of slaves, tribute and war. Isotopic studies reveal that they were foreigners, as I will discuss on chapter six.

Supernatural beings also hold their captives in this way: such is the case of an anthropomorphic opossum who is ready to decapitate a warrior with an axe (*Codex Fejérváry-Mayer* 1994; 38). Another example is a naked individual who decapitated himself with an axe; he holds his own head with his right hand while blood is sprouting from his neck (*Codex Laud* 1994: 24) (figures 110 and 111). Interestingly, the decapitating opossum depicted in *Codex Fejérvary-Mayer* (1994) would seem to sever the head in a posterior-anterior direction, by chopping; this technique is more compatible with the findings at Teotihuacan.

Figure 110. A warrior has been captured by the hair. An anthropomorphic opossum will decapitate him. *Codex Fejérváry-Mayer* (1994), page 38.

Figure 111. A supernatural being decapitates himself with an axe. He holds his head by the hair. *Codex Laud* (1994), page 24.

It is also common to find images of the god of the Underworld holding human heads by the hair. In these cases decapitation has recently occurred, as in some blood still drains from their necks (figure 112).



a) b) c)

Figure 112. Decapitating Mictlantecuhtli. a) The god carries a flint knife used for decapitation; the victim's head has his eyes covered with a cloth. *Codex Laud* (1994), page 20; b) Mictlantecuhtli carries the head of an individual recently sacrificed. His eyes are open and blood still flows from his neck. *Codex Cospi* (1994), page 7; c) The god of the underworld holds a head with eyes closed, from which blood no longer flows. Codex Cospi (1994), page 3.

It is important to point out that grabbing the heads of sacrificial victims by the hair, in addition to referring to sacrificial and posthumous techniques, is a sign of captive submission and has been considered as a sign of disdain (Berryman 2007: 378, 384).[254]

Some pictographs suggest that severed heads were placed in altars or ceramic vessels before their final deposit. Example are on pages 5 and 6 of *Codex Vatican B* (1993) and page 13 of *Codex Borbonico* (1991) (Figure 113).

a) b) c)

Figure 113. a) Head deposited inside a container along with maguey spines and bloodletting instruments. *Vatican Codex B* (1993) page 5; b) head inside a container. Eyes are arrowed and fire comes out from his mouth; *Codex Vatican B* (1993), page 6 c) heart and severed head - the most important body parts in sacrifice - rest on an altar. *Codex Borbonico* (1991), page 13.

While it cannot be assured that all severed heads were carried in procession or were deposited in altars and containers before being buried, this remains as a possibility. Whatever the case might be, they were buried in temples, as corroborated by historical data and the archaeological record. Their link with consecration ceremonies was first studied

[254] These scenes are common in Mesoamerican iconography from different periods and regions. For the Mexica, examples are vast and recurrent in sculpture and codices.

by Moser (1973) and later by López Luján (1993:263-265), who interprets the deposit of severed heads inside Templo Mayor offerings as an act to transfer energy, to expel negative forces and to assure protection and good functioning.

The deposition of severed heads in temples and mountains - symbolic equivalents - was documented in codices of the *Borgia Group*. In these, heads appear deposited on the hills, buried in the ground or associated to temples. For example, on page 6 of *Codex Borgia* (1993) and its equivalent of *Codex Cospi* (1994) and *Codex Vatican B* (1993), the severed head of Tezcatlipoca lies on a hill, surrounded by arrows, blood or a heart, in what Anders and collaborators (1993: 87) consider to be a sacrifice to the sun (figure 114).[255]

a) b) c)

Figure 114. Decapitated head of Tezcatlipoca lies on a hill. a) *Codex Borgia* (1993), page 6; b) *Codex Cospi* (1994), page 6; c) *Codex Vatican B* (1993), page 6.

The deposition of severed heads inside temples was depicted on page 4 of *Codex Borgia* (1993) and on two equivalent plates of *Vatican Codex B* (1993). Anders and colleagues (1993) consider that this building corresponds to a burning house, a symbol of execution

[255] Blood and heart do not appear on page 6 of *Codex Cospi* (1994).

and destruction. However, in an equivalent page of *Codex Cospi* it is clear that it alludes to the burial of a head, grasped by a severed arm that carries an axe: the head will be deposited in the jaws of earth. Finally, on page 48 of *Codex Borgia* (1993) a figure was beheaded next to a temple in front of the Sun from which blood gushes out on an arrow-pierced heart (figure 115).

Figure 115. Burial of severed heads inside temples and on the ground. a) *Codex Borgia* (1993), page 4; b) *Vatican Codex B* (1992), page 4; c) *Vatican Codex B* (1992), page 5; d) *Codex Cospi* (1994), page 4; e) *Codex Borgia* (1993), page 48.

Archaeological evidence corroborates such practice at the Templo Mayor of Tenochtitlan. A total of 50 severed heads with articulated cervical vertebrae have been recovered inside the offerings. Of these, 48 correspond to Stage IVb (AD 1469-1481) while two of them to Stage VI (AD 1489-1502). The former were found inside the platform of Templo Mayor[256] and the latter inside a termination deposit at the Cuauhxicalco (see Chapter 6).

In sum, after decapitation severed heads might be carried in processions or placed in altars or inside containers before being buried. Heads were the last elements to be deposited in Templo Mayor offerings, and their faces did not present a specific orientation. These individuals - males, females and children - were buried as part of the consecration rituals.

Defleshed Skulls: from Display to Burial

Most of the skulls utilized at the Sacred Precinct of Tenochtitlan were defleshed to give them a skeletal appearance. Some individuals had basal perforations, while most of them had lateral holes, to be displayed in the *tzompantli*. After a while these were removed from the skull rack and were taken to two towers adjacent to this platform or reused to manufacture skull masks, to be buried inside the offerings.

1) Skulls with basal perforation

Under this category I consider skulls that were flayed, defleshed and had a basal perforation made by percussion with a stone tool; this allowed brain removal, avoiding

[256] Most were buried on the central axis of this building.

decomposition (Chávez Balderas 2017). This perforation could also have been used to exhibit the skulls. I support this idea on historical sources and the archaeological record.

Narrations of friars, although not explicit, provide some clues on the exhibition of skulls. For example, Benavente Motolinía (1967:302) notes that a war prisoner was sacrificed by heart-extraction, then decapitated and his head was placed on a high pole or rod. [257] Mendieta (1971: 133) added: "when the stick was raised, it was placed in the courtyard of the temple", which suggests that the position of the pole was vertical.

The oldest antecedent of skulls with basal perforations have been reported for the site Cerro de Huistle, in Jalisco. A total of 22 human skulls were found in funerary complex 57. Of these, Gerardo Valenzuela Jiménez and Marco Antonio Santos Ramírez (2013: 213, 216, 220) analyzed 20: 14 males, two females and two undetermined individuals. Eleven of these had basal perforations, very similar to those found in the skulls of the Sacred Precinct. In addition, 15 had suspension holes in the superior part; this deposit is associated to the Classic period.

Vertical display of skulls is represented in Chichen Itzá's *tzompantli* altar. However, these skulls have two perforations: one basal and the other superior, which is absent in our collection (figure 116). Only the skull recovered in Offering 120 has two small holes in the parietals, which could have been used to suspend it by a small cord (Chávez Balderas 2017:353). [258]

[257] I believe that this description does not correspond to the *tzompantli*, as it suggests an individual exhibition. In addition, this friar refers explicitly to the skull rack in another passage (see Motolinía 1967:72).
[258] Basal perforation measures 78.99 mm (anterior-posterior) and 71.82 mm (transverse). The parietal holes have a diameter of 4.38-4.89 mm (Chávez Balderas 2017:353).

Figure 116. Chichén Itzá's *tzompantli* altar; skulls are crossed by vertical posts. Photograph by Jesús López.

During the excavations of Templo Mayor Stage III, eleven anthropomorphic sculptures with aquatic, stellar and *pulque* symbols were discovered, representing the brothers of Huitzilopochtli, the *centzonhuitznáhuah* (Matadamas 2016: 178). Associated with these sculptures was a staff composed by a cylinder ending with a wooden skull (Figure 117). Its presence has been interpreted as part of a termination ritual in which these sculptures were buried (López Austin and López Luján 2009:361).[259]

[259] Inventory number 10-220332. It measures 101 cm high, 7.27 cm in diameter (at the pole), while the skull is 14.37 cm high and 14.04 cm wide (Matadamas 2016:187).

Figure 117. Wooden staff depicting a human skull with basal perforation. Photograph of Mirsa Islas, from Matadamas (2016).

In the Sacred Precinct of Tenochtitlan, six skulls with basal perforation have been recovered from offerings 24, 120 and 141, corresponding to adults: one female and five males. All of them were flayed, defleshed and had a basal perforation made by percussion: Starting percussion using the foramen magnum facilitates this procedure, carried out during the perimortem interval (Figure 118).[260] After display or being used in other rituals, they were reused as gods' effigies. For this purpose, skulls were decorated with flint knives in

[260] Skull from Offering 24 was deposited with the first cervical vertebra articulated. C1 does not present cut marks, because is not the disarticulation point during decapitation. I think that this bone is preserved since it corresponds to a persistent articulation (it belongs to the region of the spine with a more complex anatomy). Absence of cut marks would imply that the second cervical vertebra was detached as a consequence of decomposition either by gravity or by a mechanical force that did not involve the use of a sharp tool. This suggests that it was not immediately deposited in the offering and that it could have been exhibited before its burial (Chávez Balderas 2017: 328). The presence of this vertebra did not interfere with the perforation, since it is located posteriorly.

the nasal and oral cavities, as well as shell and pyrite appliqués in the orbits. Five individuals present traces of pigment, making it possible to associate them iconographically with some deities (Chávez Balderas et al. 2015; Robles Cortes et al. in press). [261] I have denominated these ritual elements as "effigy skulls", which had a central place inside the offerings.

Figure 118. Skull with basal perforation. Individual 1, Offering 24. Photograph by Jesús López.

2) Tzompantli skulls

Under this category are all the skulls with two lateral perforations that were exhibited in the skull racks at the Sacred Precinct. These structures[262] were low platforms on which vertical poles were embedded; these supported horizontal beams where defleshed

[261] In a previous study I analyzed skulls from offerings 24 and 120. Results on Offering 141 will be discussed on chapter 6.

[262] Sandra Xochipiltécatl (2004:2-3, 13-38) classified these monuments and named "functional tzompantli" in which human remains were exhibited. In contrast, in "tzompantli altars" and "skull altars", skulls were carved in stone.

skulls were displayed. Durán (1967 I: 23) states that these individuals "were all those who sacrificed", in other words, it is not a funerary monument.

Skull racks were impressive to the Spaniards; this is why there are numerous narratives on the way skulls were prepared or displayed. According to Durán (1967 I: 23), after decapitation the flesh of the skulls was "eaten ". It cannot be assured if it was ritually consumed or, if this statement was a metaphor, to describe defleshing. In any event, these structures exhibited skulls and not a group of diverse human faces. This supports the idea that, in addition to having an intimidating function, the *tzompantli* had a more complex symbolism, as it was considered an equivalent of the mythical gourd tree (Miller and Taube 1993: 44, Mendoza 2007, Graulich 2016). [263] In fact, the *tzompantli* was the ultimate death symbol displaying defleshed skulls. In sum, it was a metaphor of life, death and regeneration.

Some historical accounts suggest that skulls were not completely defleshed, but rather part of the scalp was preserved. For example, Duran (1967 I: 23) mentions that "some had their scalps left and remained like this until their hair fell out". Benavente Motolinía (1967:72) also mentions that the Mexica dried the heads, and that some preserved beards. Some pictographs suggest that individuals were defleshed, retaining some hair. For example, on page 3 of *Codex Cospi* (1994), the god of death carries a defleshed skull which still preserves the ears and hair (figure 119).

[263] Later I will explore this topic when discussing the Ball Game.

Figure 119. The god of death carries a defleshed head that still preserves part of the scalp and ears. *Codex Cospi* (1994), page 3.

Another example can be found in the Map of Nuremberg (*Plano de 1524*), an engraving attributed to Hernán Cortés. In the central part of the image the Sacred Precinct of Tenochtitlan was represented in a frankly medieval style. It depicts Templo Mayor, seven structures and possibly a monolith (Fernández 1990). [264] As has been noted by other authors (Matos Moctezuma 2001, López Luján 2006, Elizalde 2017), the center of the map has an error, since it was created in at least two phases. Therefore, it is necessary to rotate it in order to have the correct orientation of the buildings. Among these structures there are two very schematic skull racks. One of them, of smaller dimensions, was depicted next to Templo Mayor. In contrast, the Huei Tzompantli was represented to the west aligned with the Huei Teocalli and with the legend "capita sacrificatorum". In both, heads have hair that,

[264] Some of these structures have been identified as the Huei Tzompantli, Building B (altar of skulls), House of the Eagles and the monolith of goddess Coyolxauhqui with the legend "Idol lapideum" (Matos Moctezuma 2001:186; López Luján 2006: 259).

according to Sandra Xochipiltécatl (2004:73), were represented as if they were moved by the wind (figure 120).

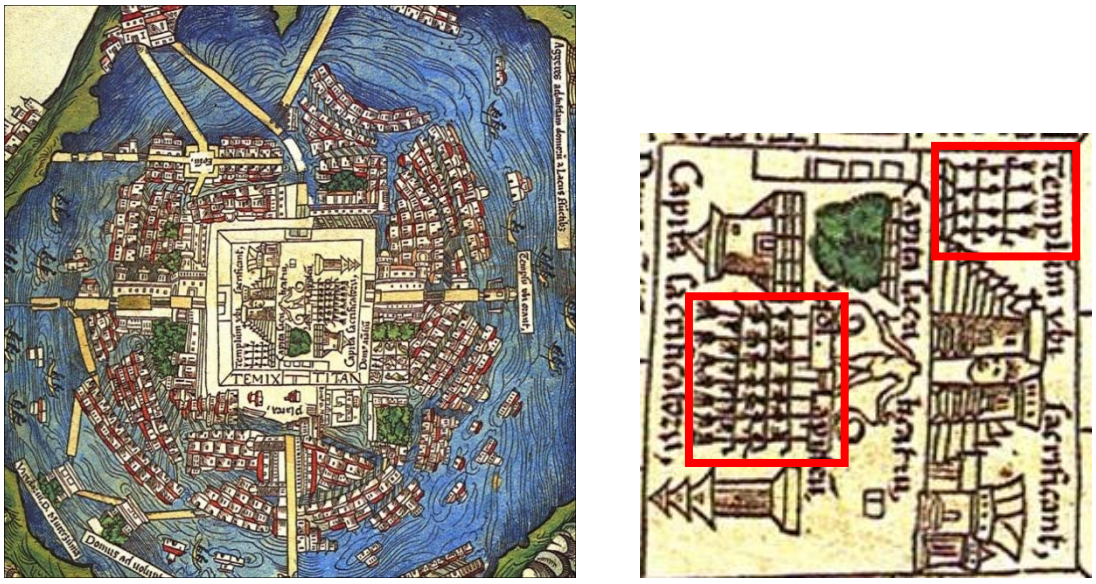


Figure 120. Map of Nuremberg. a) General view; b) detail of the map center, rotated. Two *tzompantli* were represented schematically in which skulls have hair. From Elizalde (2017).

It is possible that some skulls were exhibited with hair, since the word *tzompantli* comes from the root "tzontli" which, according to Molina's vocabulary (2001:153 v), means "hair". As already mentioned, hair plays an important role in capturing victims and also for other rituals. For example, Xochipiltécatl states that during the *tlacaxipehualiztli* feast a lock of hair of each captive was cut off before heart extraction (2004:101-102). López Austin's research (1996: 242-243) reveals that hair was considered a protective layer preventing the scape of *tonalli* (one of the body souls), which would cause illness and death. In the case of sacrificial victims, hair was considered as a receptacle of their force.

Archaeological evidence corroborates that skulls were defleshed before being placed on the skull rack and that, in some cases, they could still retain soft tissues.

Systematic documentation of cut marks from twelve *tzompantli* skulls that were reutilized in Templo Mayor offerings, inside construction fills and West Plaza, confirmed that all were defleshed. [265] Five have no marks on the parietals. Although this might indicate soft tissue preservation, in this part of the skull there are no muscles (only the epicranial aponeurosis). The skin may have been pulled out by traction without leaving marks. Remaining skulls have marks in this area which could imply that they were not exhibited preserving hair or alternatively that they were removed from the *tzompantli* while fresh and they were cleaned.

Undoubtedly, the most revealing information regarding the preservation of soft tissues is due to the Urban Archaeology Program that documented hyoid bones in an anatomical position in skulls from the *tzompantli* towers. This would indicate that some heads were placed preserving the necks without defleshing (Chávez Balderas and Vázquez Vallin 2017).

Regardless of whether they preserved remains of hair or skin, there was a consistent method to preparing skulls that would be displayed in the *tzompantli* (Chávez Balderas 2017; Chávez Balderas and Vázquez Vallin 2017). After decapitation, heads were flayed and defleshed (or at least partially) to ensure their skeletal appearance. Some individuals may have had cervical vertebrae removed, while others preserved it and were disarticulated by decomposition.

There is evidence that some skulls were boiled. This could have been done to facilitate removal of the brain and soft tissues. Some were exposed to heat for a short time, while in others thermal alteration was severe. It is not possible to determine if the flesh was

[265] In addition, skull masks that were manufactured from reutilized *tzompantli* skulls also show signs of skinning and defleshing (Chávez Balderas 2017).

consumed. Lateral perforations were made by percussion with a pointed tool. This is indicated by the presence of small circular depressed fractures.[266] Thanks to their detailed anatomical knowledge, priests were able to create these perforations without unwanted fractures that radiated to other regions of the skull. In fact, percussion with a pointed instrument on the thinnest part of the bone allowed them to break and to continue fracturing along the edge, until obtaining a cavity of a desired size. Small fragments obtained during this procedure were carefully collected to be reused in consecration and termination rituals, as I will detail on next chapter.

Once the skulls were prepared, they were taken to the *tzompantli*. It can be inferred, both from historical sources and from archaeological evidence that some individuals were on display for a long time and their skulls were damaged by weathering, finally breaking.

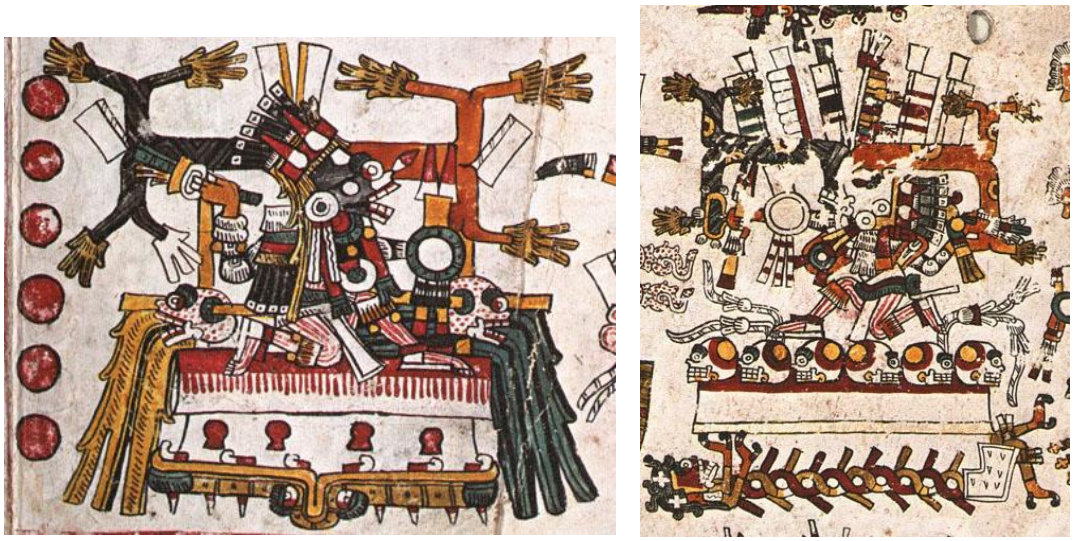
> When the palisade aged, it was renewed again and when it was removed, many [skulls] were broken and others were removed so that it would fit more and so that there would be room for those who would be kill in the future (Durán 1967, I: 23).

Some fragments analyzed in the following chapter probably correspond to cases in which skulls were fragmented as a consequence of their display and the way in which they were removed from the poles; later they were stored and reused in different rituals. Some other skulls were removed very soon from the *tzompantli*, when bone still had enough moisture and collagen content to be modified as effigy skulls.

Whether exhibited for long or short periods, these individuals were replaced with new sacrificial victims (Benavente Motolinía 1967:72, Durán 1967, I: 23). Skulls that were

[266] This type of marks were first reported by Pijoan et al (1989) when analyzing skulls from Tlatelolco's *tzompantli*.

removed from the rack had different destinations. For example, some were incorporated into the Huei Tzompantli towers; one of these structures was discovered recently by the Urban Archaeology Program. The tower was comprised of rows of skulls glued together with mortar. Some preserved the mandible articulated and even the hyoid bone which corroborates a short display period; in contrast others present weathering (Chávez Balderas and Vázquez Vallin 2017). The rest of the skulls were reused in different rituals. Based on data from codices and sculptures, I propose that they could have been exhibited elsewhere or carried by deities' impersonators or by the images. For example, on folios 19 and 45 of *Codex Borgia* (1993), Xochipiltécatl (2004: 50-52) identified two representations of the *tzompantli*. In the first one there are two skulls which are clearly pierced by a pole embedded into two trees; Tlalhuizcalpantecuhtli presides this scene. The second depicts a small platform decorated with skulls that have two lateral concentric circles, but are not on a pole; this might imply their reuse after removing from the *tzompantli* (figure 121). The same double tree decorated with sacrificial flags and the same deity can be seen in this scene. It is important to differentiate them from other representations of skulls with lateral circles which do not correspond to perforations as they have dark spots inside. This attribute is also found in long bones representations, which can be interpreted as an allusion to putrefaction and recent death (Chávez Balderas 2017). In addition, these circles have been considered by Robles and collaborators (in press) as a symbol of the *tonalli*'s exit, as I will discuss on next chapter.



a) b)

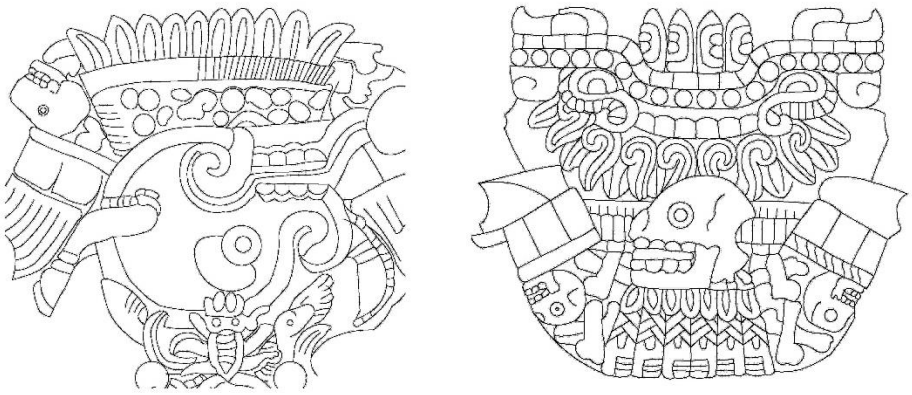
Figure 121. Tlalhuizcalpantecuhtli on an altar decorated with skulls. a) skulls crossed by a pole. *Codex Borgia* (1993), page 19; (b) skulls with concentric circles, possibly reused from the *tzompantli*. *Codex Borgia* (1993), page 45.

Other skulls taken from the tzompantli may have been used as garments by priests, elite individuals or deities' effigies, as can be inferred from some sculptures. [267] One example is the monolith of goddess Coyolxauhqui found in 1978. In this representation, the goddess carries a skull on her back, which is attached to her by a snake belt through a lateral perforation (figure 122).

[267] See Chávez Balderas 2018b.

Figure 122. Goddess Coyolxauhqui carries in her snake belt a skull perforated laterally. Templo Mayor Museum. Photograph by Marco Antonio Pacheco, Courtesy of Editorial Raíces. From Chávez Balderas (2018).

Tlaltecuhtli, in her feminine and zoomorphic advocations, was often depicted dressed with human skulls with lateral perforations. An example can be found in a sculpture from the National Anthropology Museum collection, in which she carries on her back a skull with a lateral perforation, crossed by a rope. Another example is a beautiful sculpture from the Templo Mayor Museum, in which a zoomorphic Tlaltecuhtli carries a similar skull on her back, also attached with a rope. Both preserve an articulated mandible (figure 123).



a) b)

Figure 123. a) Female Tlaltecuhtli carries a skull by a rope coming out from a lateral perforation; b) Female zoomorphic Tlaltecuhtli carries a skull with lateral perforations resembling a *tzompantli* skull. Drawing by Israel Elizalde, from Chávez Balderas (2018).

Ten skulls from the *tzompantli* were reused to be buried inside the offerings of Templo Mayor and West Plaza; two more were buried in the construction fill, possibly as part of a ritual associated with the enlargement of the building. Those that were reused in ritual deposits were decorated with flint knives or with shell appliqués simulating eyes; three of them preserved polychrome pigments. This would imply that, after display or use in other ceremonies, they were finally buried as effigies of deities.

A significant number of skulls were removed from the *tzompantli* when bone was fresh enough to be processed by priests, who removed the posterior part to manufacture the so-called skull masks, which I will address in the next section.

In sum, most individuals that were removed from the *tzompantli* were placed in the towers of the palisade. Those that were taken out of this building could have been modified

to be exhibited, used as garments or in other ritual settings.[268] The final destination of some were the offerings of Templo Mayor, in which they were deposited as effigies of gods.

3) Skull masks: from pectorals to effigies

Skull mask is the name given to the skulls whose posterior part was broken away. The facial portion was preserved and sometimes decorated with appliqués made of shell and pyrite, hair, flint knives and polychromy. As I have previously stated (Chávez Balderas 2010, 2017), these are not masks that were worn over the face, as the orbits and nasal cavity are covered. I consider that instead they may have had three main functions: 1) to be part of the garments of priests and images of gods; 2) to be displayed and 3) to serve as effigies of deities in the offerings.

Of the 32 skull masks analyzed, at least 24 of them were manufactured from *tzompantli skulls*, as suggested by the remnants of lateral perforations.[269] In addition, some had dental fractures that have been associated with weathering, as well as manufacturing defects that could be the result of collagen and moisture loss (Chávez Balderas 2017).

Regardless of whether or not they were intended for display, these individuals were decapitated, flayed and defleshed; some could have been boiled and others had their periosteum removed by scraping.[270] The posterior part of the skull was removed by percussion, cut or, in the case of children, by disarticulation. Resulting debris was not discarded, but stored. These, along with weathered fragments and those obtained from

[268] For example, the skull recovered inside Offering 23 has small suspension holes in parietals and occipital, suggesting that it may have been hung by very thin cords (Chávez Balderas 2017).
[269] The remaining masks were poorly preserved and I was not able to determine whether they had this perforation or were manufactured from skulls not displayed on the palisade. Among the first group are some child skull masks.
[270] Some of these procedures were experimentally reproduced in a previous investigation (Chávez Balderas 2017).

tzompantli skull manufacture, were collected and reused in rituals of consecration and termination.

From the skull masks recovered in Templo Mayor, 22 had holes made in the frontal bone, most likely to place locks of hair, while 14 had shell and pyrite appliqués in the orbits. Twelve were decorated with knives in the nasal and oral cavity, and it is possible that most were painted (Chávez Balderas 2017). It is not known if these modifications were made expressly to bury them in the offerings or before. In any case, I propose that after their manufacture it took some time for them to be buried, which I infer from several observations. First, some skull masks are composed of the remains from two individuals.[271] This implies that since the mandible was disarticulated, it could be lost or used in some other rituals. For this reason priests needed to replace it with a mandible that fit the mask, returning to it the appearance of anatomical unity. There are no cut marks suggesting that mandibles were intentionally disarticulated; it is more likely that the loss was the result of decomposition. In addition, some skull masks have holes to keep the mandible articulated, suggesting that they were suspended before their final deposit. Finally, many of them have teeth with longitudinal fractures, which may be the result of weathering (Chávez Balderas 2017).

How were the masks used before burial in the offerings? Written sources, codices and sculptures give some clues (Chávez Balderas 2018b). From friar and conquerors' narratives it can be proposed that skull masks were used as part of priests' garments. In this regard Alvarado Tezozómoc (1944:266) mentions that priests who sacrificed retainers during the rulers' funerals dressed as the Lord of the Underworld, carrying "faces".

[271] A total of five skull masks, corresponding to ten individuals.

> They brought war captives, and every priest for that, covered in black was titled Mictla teuctli, principal of hell, and brought his face as frightening as the demon himself who was the figure of Mictlan teuctli, that in the knees, elbows and behind the brain, they brought pestilent and frightful faces as the demon, like those who looked at him every day, and they took one by one those they sacrificed in the hole of the stone cuauhxicalli, or slaughterhouse, or butcher's stone or butcher's slab (Alvarado Tezozómoc 1944):266).

Durán (1967 II: 311-312) also reproduces this version, but his description is more detailed. When he refers to the priest who represented the god of the underworld he mentions that he was:

> [...] dressed in the manner of a very fierce demon: he brought by eyes some very shining mirrors and a mouth very big and fierce, a curled hair with some frightful horns and each shoulder brought a face with its eyes of mirrors and in the elbows two faces and in the belly another face and in the knees its eyes and faces, that seemed with the radiance of the mirrors that in these parts it brought eyes, that looked to all parts and was so ugly and abominable that they did not dare to look at it for fear (Durán 1967, II: 211-212).

As for Tapia (1988:108), who was an eyewitness, he affirms that the idols had among their adornments "faces in the 'colodrillo', like the head of a man without flesh".[272] It is possible that these narratives describe the use of skull masks, these descriptions also allude to telluric faces that deities like Tlaltecuhtli usually carry in the joints (Heyden 1997: 98). [273]

Codices and sculpture are more informative. For example, folio 80r of *Codex Magliabechiano* (1996) suggests that decorated human skulls were exhibited in other buildings such as the Ball Court. In fact, the image in Figure 124 shows seven defleshed

[272] Posterior part of the head.
[273]Mictlantecuhtli wears this type of faces only in *Codex Magliabechiano* (1996) and in its cognate *Codex Tudela* (1980).

heads with eyes and tongues that might represent flint knives. Three of them are located in the center of the court and are adorned with curls of hair and earplugs, very similar to the skull masks recovered inside the offerings.

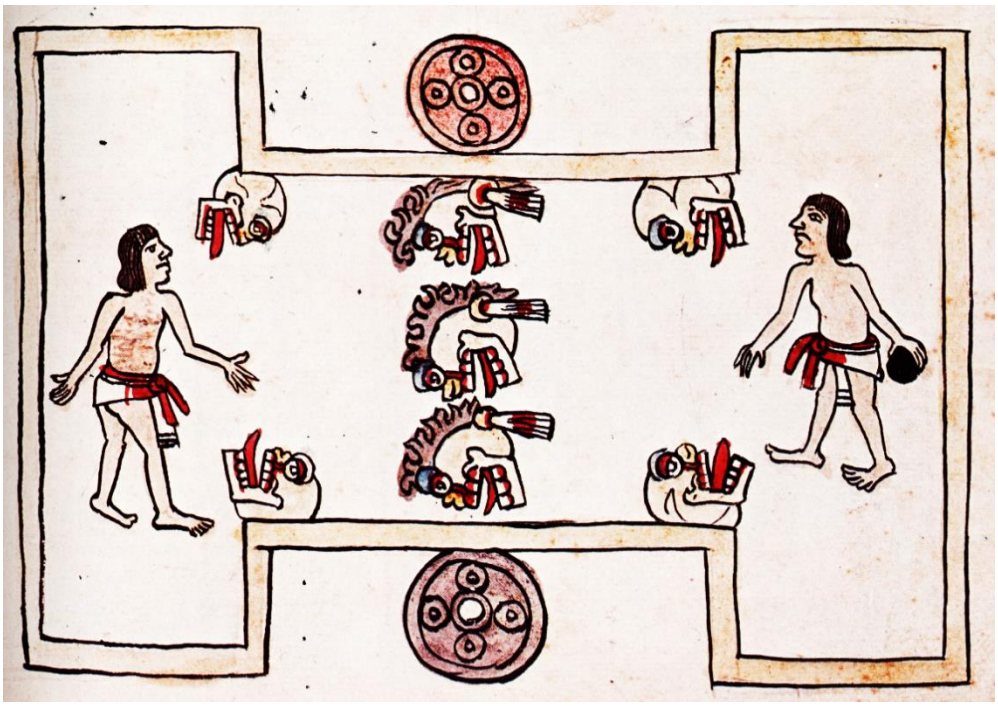


Figure 124. Seven skulls are inside the Ball game court. Three skulls placed at the center have hair, eyes, earplugs and possibly flint knife tongues. *Codex Magliabechiano* (1996), folio 80r.

It is also noteworthy that some Mixtec lords represented in *Codex Zouche-Nuttall* (1992) wear skulls as part of their attire. Lord 4 Dog of Teozacoalco and Lord 13 Eagle of Teozacoalco (Williams 2009), have these items on their backs: each one has a frame that resembles the skull mask of the British Museum collection (figure 125).[274]

[274] The presence of leather strips would confirm that it was carried out as part of the attire of some personage or sacred image; however, there is nothing similar in the skull masks deposited in Templo Mayor.

a) b)

c)

Figure 125. a) Lord 4 Dog of Teozacoalco, *Codex Zouche-Nutall* (1992), page 28; b) Lord 13 Eagle of Teozacoalco, *Codex Zouche-Nutall* (1992), page 29. Both carry skulls that could be incomplete or embedded in a frame made of another material; c) skull mask from the British Museum collection with leather straps for suspension. Photograph by the British Museum.

There are several Mexica sculptures suggesting that skull masks were used as garments. Representations of Coatlicue, Yolotlicue and Cihuateteo carry pectorals and headdresses manufactured with skulls for which the posterior part is absent. For example, the famous monolith of goddess Coatlicue was depicted with a skirt made of intertwined snakes and a necklace made of hands, hearts and two skulls; one at the front and one on the back (Boone

1999). Interestingly, both skulls lack the posterior part and also have remains of what might be an incomplete lateral perforation. In addition, their orbits are represented by two circles, possibly appliqués. These pectorals are remarkably similar to the skull masks recovered inside Templo Mayor offerings (figure 126 a).[275].

The same pectoral is found in another monolith: the goddess Yolotlicue, who wears a similar necklace but has only one skull on the front (Boone 1999) (figure 126 b). Despite of the poor preservation of this sculpture, it is remarkable that the skull has the same characteristics as the one previously described (Chávez Balderas 2018b).

a) b)

Figure 126. a) Detail of the pectoral carved in the monolith of goddess Coatlicue. It is composed of hearts, hands and a skull for which the posterior part was suppressed. National Museum of Anthropology. Photograph by Boris de Swan, Courtesy of Editorial Raíces; b) Detail of the pectoral of goddess Yolotlicue. National Museum of Anthropology. Photograph by Marco Antonio Pacheco. Courtesy of Editorial Raíces. From Chávez Balderas (2018).

[275] Most of the skull masks have no knives (Chávez Balderas 2017).

Another example is the Cihuateteo's monolith from the collection of the National Museum of Anthropology. This unique sculpture wears a necklace composed of hands and a skull whose posterior part was suppressed. It also has a circular headdress composed of skulls with the same characteristics. Interestingly, all of them are small in size (Figure 127). In fact, the shape and size of these elements are reminiscent of child skull masks recovered in offerings 22 and 24 (Chávez Balderas 2018b). It is certainly reasonable to think that these are children, considering the Cihuateteo corresponds to women who died in childbirth. They were equivalent to warriors and were believed to transport the sun from the zenith at dusk. They were also thought to be able to return to earth as *tzitzimime*, causing harm to children (Klein 2000).

Figure 127. Cihuateteo wearing skulls in headdress and necklace. National Museum of Anthropology. Photograph by Carlos Blanco, Courtesy of Editorial Raíces. From Chávez Balderas (2018).

In conclusion, iconography suggests that some skull masks may have been exhibited, portrayed, or used in other rituals, before being buried inside the platform and construction fill of Templo Mayor: in this deposit they represented some Mexica deities.

4) Effigy skulls

With this name I refer to all skulls that were deposited inside the offerings, representing deities. They have been identified as such from their attributes, associated objects and by their comparison with iconography. The first proposal in this identification was by López Luján (1997), who identified skull masks as effigies of Mictlantecuhtli from the knives they carry in nasal and oral cavities, frontal perforations to carry locks of hair and shell and pyrite appliqués that simulate eyes. All these features characterize the lord of the underworld in codices from different cultural traditions (figure 128).

Figure 128. a) Mictlantecuhtli. *Codex Borgia* (1993), page 18; (b) skull mask, Offering 11. It has a knife in nasal cavity, appliqués of shell and pyrite in the orbits and holes to place locks of hair in frontal bone. Photograph by Jesús López.

Mictlantecuhtli was represented skeletonized or partially defleshed. In the latter case, in addition to his garments, he usually wears skulls in his attire (figure 129 a). In contrast, in most representations where he is skeletonized, he carries a knife in his nose and a tongue similar to these flint artifacts (figure 129 b).

a) b)

Figure 129. Mictlantecuhtli, god of the underworld. a) Partially defleshed, wearing a skull, *Codex Telleriano Remensis* (1995), folio 15r; b) defleshed Mictlantecuhtli, carrying knives in the nasal cavity. *Codex Borgia* (1993), page 13.

Subsequent research indicates that that not only did skull masks represent effigies, but also *tzompantli* skulls and skulls with basal perforation (Chávez Balderas et al. 2015, Chávez Balderas 2017, and Robles Cortés et al. in press). While some carried appliqués, knives and possibly hair, others have adornments, for example, copper bells or earplugs made of

shell from the genus *Oliva*. It is possible also that they wore paper ornaments and fibers that did not resist the passage of time. Most likely they were all painted, as I will explain in the following chapter.

As mentioned above, there is evidence that these skulls were used before their final deposit in the offerings. In this regard, I would like to draw attention to a particular pictograph from *Codex Tlaxcala* (Muñoz Camargo 1998). Folio 13 illustrates the burning of deities, which might allude to destruction of codices and effigies. In this page it can be noticed that among burned objects there are some partially defleshed skulls preserving ears, eyes[276] and, in one case, the nose; all of them wear headdresses from god Xipe Tótec (*yopitzontli*).[277] One of the skulls has hair, while another carries what appears to be a knife in the nose. The third skull has a lateral circle, but it is not clear if this is part of the earplug or a perforation that indicates a link with the *tzompantli* (figure 130). In any case, the similarity of these skulls with those recovered inside the offerings is remarkable (Chávez Balderas 2018b).

[276] One of the skulls was represented with concentric eyes, similar to the appliqués from effigy skulls.
[277] I consider that this is Xipe Tótec's headdress, however, it could be a very schematic *cuexcochtechimalli*, viewed laterally, that the artist interpreted as a headdress. This emblem is characteristic of the Lord and Lady of the Underworld (Mateos Higuera 1993, III).

Figure 130. Friars burning the gods. *Codex Tlaxcala* (Muñoz Camargo 1998) folio 13.

In sum, from painting, appliqués and associated ornaments, it can be concluded that these skulls represented gods. I agree with the original proposal of López Luján (1997) and I suggest that although most of them correspond to effigies of Mictlantecuhtli, other deities were also represented. In previous investigations (Chávez Balderas 2017, 2018), I proposed that most likely some skulls correspond to the female counterpart of the Lord of the Underworld: Mictecacíhuatl. Like her consort, she also has a defleshed face, hair, eyes made up of concentric circles and decomposition stains. She usually wears a frontal emblem (*ixcuatechimalli*) and a neck insignia (*cuexcochtechimalli*) (Mateos Higuera 1993, III; López Luján and Ruvalcaba Sil 2015). Both gods are bloodthirsty and welcome the dead on their arrival to the underworld.

In most of the offerings, effigies come in pairs in which each individual is differentiated in some way or another. For example, in those where one skull is dressed with flint knives, the other lacks this element. In this regard I would like to point out that in most of the codices of *Borgia Group*, Mictlantecuhtli is frequently represented with knives in the nose. Mictecacíhuatl, on the other hand, usually does not carry them. However, there are some exceptions that preclude confirming this dichotomy: page 37 of *Codex Fejérváry-Mayer* (1994) and page 21 of *Codex Cospi* (1992) (figure 131), in which the goddess certainly has this attribute.

In offerings where none of the effigies carries knives, the distinction between the two individuals was made by placing a copper bell or snail necklace. Moreover, in these cases, one skull is robust and the other is more gracile or is a child. [278] In sum, there is a dichotomy expressed in pairs that are grouped as follows: 1) knife-no knife; 2) copper bell necklace-snail necklace; 3) gracile-robust. This differentiation is not reflected in the biological sex of the skulls, but it could possibly be a gender distinction, where one represents the god of the Underworld and another the goddess of this mythic landscape. As the skulls were defleshed it would have been difficult for a priest to tell whether a skull was a female or a male.

[278]Nine effigies recovered inside the offerings were manufactured with child skulls (B1, B2, 11, 15, 20, 22, 24 and 64). In offerings 11 and 15, one skull masks consists of the remains of two individuals: an adult and a child (Chávez Balderas 2017).

Figure 131. Mictecacíhuatl carrying knives in the nose. a) *Codex Fejérváry-Mayer* (1994), page 37; b) *Codex Cospi* (1992), page 21.

From garments associated to skulls, it can also be assumed that there were effigies of gods Ehécatl-Quetzalcóatl or his twin Xólotl. Both deities are closely related to the god of death. *Leyenda de los Soles* (1945) narrates that Quetzalcoatl travelled to the underworld to steal bones with which humanity was created. In codices of *Borgia Group*, the gods of Wind and Underworld were represented seated back to back, on a skeletonized earth, with

putrefaction stains, frizzy hair, and circular and concentric eyes, alluding to death. This telluric being is eager for corpses and blood (figure 132).

Figure 132. Mictlantecuhtli and Quetzalcóatl are seated on a skeletal-looking earth. *Codex Borgia* (1993), page 56.

Xólotl was considered god of duality, deformities and twins. He was represented as an anthropomorphic dog and was considered a guide to the underworld. In *Leyenda de los Soles* (1945), Xólotl appears as Quetzalcóatl's companion in his descent to Mictlan; on the other hand, in the version transcribed by Mendienta (1971) he is the one who makes the expedition. In addition, it was believed that this zoomorphic deity led the sun to the

underworld every night. Therefore, it is not surprising that dogs were considered to be companions of the deceased on their way to afterlife.

The idea that some of these deities could be embodied in the offerings, forming a pair with Mictlantecuhtli, is based on their garments. In offerings CA, 6, 11 and 98, a skull mask with attributes of the god of the underworld was found in the proximity of an effigy characterized by having shell *epcololli* earrings, snail necklaces of the genus *Oliva*, *ehecacózcatl* pectorals made of shell and obsidian *ehecatopilli* scepters; all these are attributes of both Quetzalcóatl and Xólotl (Olmo 1999; Velázquez 2000; Chávez Balderas 2017). [279]

As I previously discussed (Chávez Balderas 2018b), there is not an explanation of why Quetzalcóatl would be represented skeletonized. Instead, Xólotl was depicted defleshed on a green stone figurine from the Württemberg State Museum in Stuttgar, identified by Seler (González López 2015). Interestingly this representation is very similar to skull masks, besides being skeletonized the god wears *epcololli* earplugs and concentric eyes, similar to appliqués that carry the effigies from offerings.

In addition to these gods, Erika Robles Cortés and colleagues identified goddess Cihuacóatl (Chávez Balderas et al. 2015, Robles Cortés et al. in press). From the analysis of skull polychromy in Offering 141, these researchers determined that the goddess was represented in one of the skulls. This identification, analysis of the skulls and symbolism of the goddess will be discussed on chapter six.

[279] In offerings 11 and 6 this effigy corresponds to a skull mask. In the rest of the offerings it was represented by using green stone masks.

Although it has been suggested that Tezcatlipoca may also have been represented in a skull mask decorated with turquoise mosaics and pyrite eyes from the British Museum collection (McEwan et al. 2006), I consider that this deity is not part of the effigies recovered in Templo Mayor. Eyes of pyrite are not exclusive to this god, and blue and black colors do not characterize him.

Regardless of the deity represented, there are two placement patterns. Those skulls that were buried in Templo Mayor tend to be on the deepest levels, close to a sawfish snout or other telluric symbols. Also, some of the offerings themselves were placed in pairs, in other words, there is an equivalent offering on the opposite side of the building. In them, effigies usually have equivalent positions, but opposite orientations (Chávez Balderas 2017). In contrast, in ritual deposits explored in West Plaza, effigy skulls occupy the upper levels, and were the last elements to be buried by priests. I believe the reason for the difference is that the West Plaza symbolizes a subterranean space.

Whether severed heads, *tzompantli* skulls or effigy skulls, most of human remains were deposited west of the Templo Mayor. Now I will explain their distribution based on recent archaeological findings.

Evidence of Decapitation at the Sacred Precinct of Tenochtitlan

Archaeological excavations carried out in recent years have radically changed our view on decapitation of human victims and the ritual use of heads. In fact, numerous skulls have been recovered in different areas west of the Templo Mayor, with higher concentrations in the Ball Court, Calmécac, West Plaza, Cuauhxicalco and, of course, the Huei Tzompantli.

1) Templo Mayor

Over a century of archaeological explorations, almost a hundred human skulls have been recovered from the ruins of Huei Teocalli. In spite of this, findings in the main pyramid of the Mexica are scarce compared to those made in the last ten years of excavations west to this building. The reason appears to be that the Templo Mayor was not conceived as a burial place for sacrificial victims. On the contrary, only some individuals were interred during consecration ceremonies, either as severed heads or as gods' effigies.

The first archaeologist to report human skeletal remains in the Templo Mayor was Leopoldo Batres (1979:66-75), who by 1902 became involved in the excavation of a trench for a sewage pipe that crossed the Templo Mayor from east to west. Unfortunately, there are no detailed descriptions of the human remains, as only child skulls and long bones with polychrome paint are reported. The next discovery of human remains occurred 46 years later, when Elma Estrada Balmori (1979:183-188) and Huego Moedano recovered two child skull masks on the platform of southern façade of the building. Later, in 1966, Eduardo Contreras (1979:199-202) and Jorge Angulo excavated an offering containing skulls of eight decapitated individuals, also buried in the southern façade, but corresponding to Stage IVb (1469-1481) AD. After the discovery of the monolith of goddess Coyolxauhqui, a salvage archaeology team under the direction of Angel Garcia Cook and Raul Arana (1978) recovered another offering containing six human skulls. With the founding of the Templo Mayor Project by Eduardo Matos Moctezuma extensive exploration of the building was initiated, revealing more evidence of decapitation (76 individuals) (Figure 133). In total, 95 skulls[280] have been recovered in the Huei Teocalli:

[280] In a previous publication 99 skulls were analyzed: four of them were found in West Plaza, so I will mention them further on (Chávez Balderas 2017).

92 of them within offerings and three in the construction fill. [281] The latter had manufacturing defects, as well as perimortem fractures (Chávez Balderas 2017). [282]

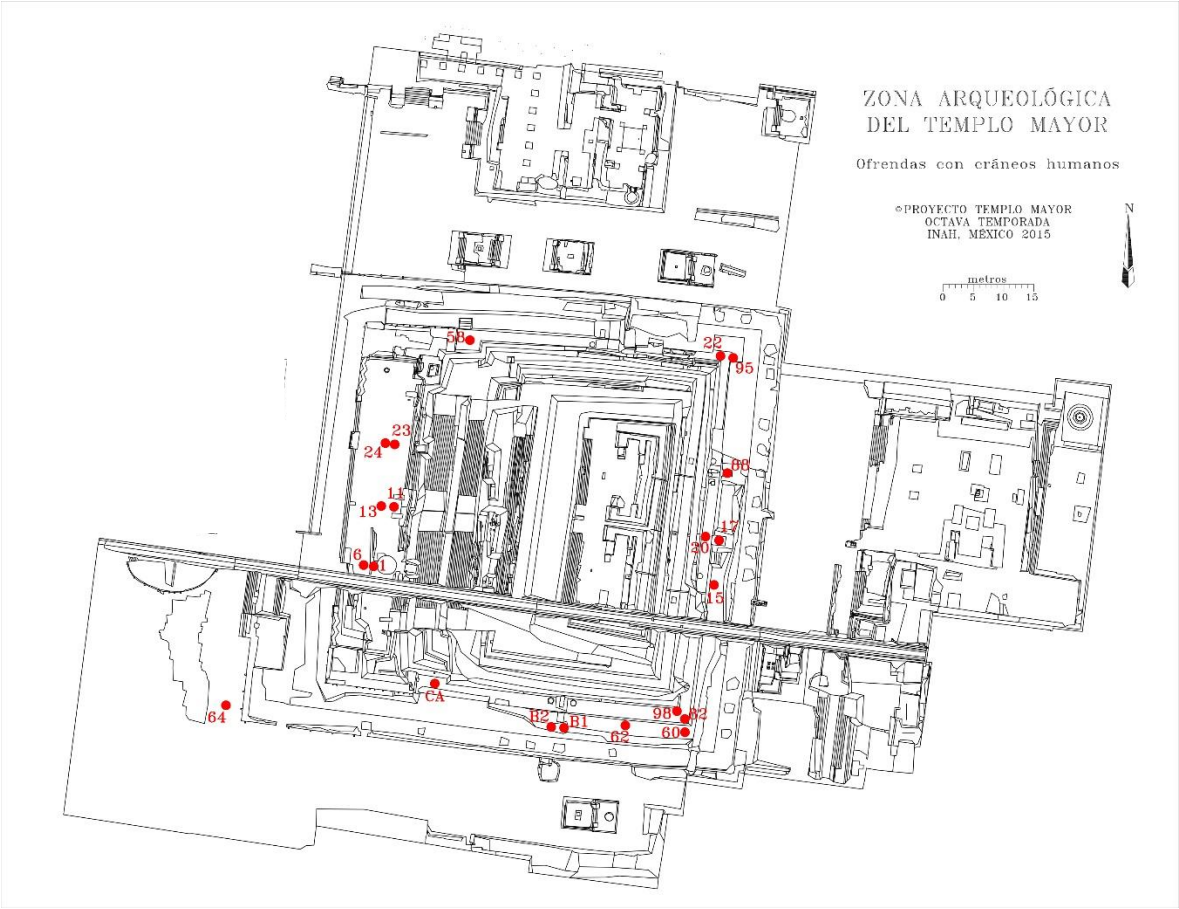


Figure 133. Offering distribution at Templo Mayor in which human skulls were recovered. Map by Michelle de Anda Rogel.

[281] There is no contextual data to determine the exact location of these three individuals.

[282] There are three more skulls, some cranial fragments, mandibles and few postcranial elements that were found in the construction fill. Unfortunately, there is no data indicating if they were in the Templo Mayor or another building. In particular, two skulls were not included in this research because they do not have evidence of cultural treatments and there is no indication that they correspond to sacrificial victims. One of them has an old skull fracture completely regenerated and the other corresponds to an old edentulous man. The third skull corresponds to a child reported by Bustos Ríos (2007).

2) West Plaza

The main square of Tenochtitlan was located west of the Templo Mayor. This space had an undisputed ritual importance in which sacrifice had a central role. The West Plaza was continuously elevated through time, leaving tangible evidence of these modifications such as floors, construction fills and ritual deposits. Explorations of the Templo Mayor Project have produced valuable information regarding its construction history, documenting a total of 14 enlargements[283] that, in López Luján's opinion (1993:70; in press), could be motivated by floods, ground subsidence, or possibly by the need of rulers to display their power. The archaeological team has explored 39 offerings on the premises of the former Mayorazgo de Nava Chávez. Together with ritual deposits previously recovered by the Urban Archaeology Program, a total of 48 ritual deposits have been excavated in this area (López Luján in press).

López Austin's and López Luján's (2009) research provide a better understanding on the symbolism of the West Plaza, particularly the area next to the base of the Templo Mayor known as *coaxalpan*. In contrast, the platform of the building was known as *apétlac*. Both places are mentioned in the myth of Coyolxauhqui's birth (on the way to Coatepec) and were reproduced in the architecture of the Templo Mayor (López Austin and López Luján 2009: 246). [284]

[283] Dating from 1440 to 1521 A.D.

[284] Interestingly, most of the sacrificial victims that were deposited in Templo Mayor were found precisely inside the platform (*apétlac*), although they are not compared numerically speaking with those buried in West Plaza. On top of *apétlac* passed the processions with sacrificial victims. Their bodies were thrown from the top of Templo Mayor to recreate the birth myth of the patron god, lying in the vicinity of the monolith of goddess Coyolxauhqui. The platform was also known as *itlacuayan Huitzilopochtli*, "the feeder of Huiztilopochtli" (López Austin and López Luján 2009:305), possibly alluding to sacrifice as food for the deity.

Coaxalpan ("on the sandy soil of the snakes") was the setting for a sacrificial ritual known as *xalaquia*, "entering the sand". According to Graulich (2016: 311) it was performed during the feasts of *quecholli*, *panquetzaliztli*, *izcalli* and *huey tecuílhuit*l; the rite involved stepping on the sand. This symbolized the access to Tlalocan, therefore war prisoners did not participate in this rite; they were destined to the Sky of the Sun. [285] In *coaxalpan* was the sand of the spring, where the wealth of the sacred mountain was found (López Austin and López Luján 2009:308).

From a correlation of historical accounts and architectonic vestiges of Templo Mayor, López Austin and López Luján (2009: 309) propose that *coaxalpan* includes the steps leading to the platform (delimited by slabs representing feathered snakes) and the floor of West Plaza adjacent to these stairs. 62 carved slabs have been recovered on this floor, carved with symbols linked to Tláloc, Huitzilopochtli and Tlaltecuhtli.(López Luján and González López 2014; López Luján in press, Vázquez Vallin in press).

During the seventh field season of the Templo Mayor Project, evidence was recovered of human sacrifice and decapitation. This corresponds to Operation 6, a test pit excavated to understand the construction sequence of the West Plaza. This assignment was entrusted to a team coordinated by Miguel García González (2010), who documented four carvings symbolically associated with *coaxalpan*: they correspond to three representations of Tláloc's face and a folded ribbon (*amacuexpalli*). Below the slabs, 2.40 m below the surface archaeologists found Offering 130, composed of 31 ceramic incense burners (Argüelles 2012). At a depth of between 3.05 m and 4.16 m, archaeologists found a layer composed

[285]According to Graulich (2016:312) “washed slaves” representing gods did not perform this rite either.

mainly of human skull fragments. These consist of manufacture debris and weathered remains, possibly fragmented as a consequence of display and extended use (Chávez Balderas and García González 2010). Results of their analysis will be discussed in chapter 6.

Two other deposits directly associated with *coaxalpan* and decapitation are offerings 105 and 107. Both were excavated by the Urban Archaeology Program in 2000, under the supervision of Álvaro Barrera Rivera. [286] Offering 105 was found associated with the northern half of the stairs from Stage VI (1486-1502 A.D.). Archaeologists found green stone beads, lip plugs, and human bones corresponding to two hands, three feet, and two skulls deposited inside the construction fill. The remains, analyzed by Juan Román Berrelleza were poorly preserved due to soil compression. Offering 107 was recovered next to the base of Templo Mayor, under the Plaza floor, also in the half dedicated to Tláloc. It consisted of three necklaces composed of more than a thousand green stone beads, bivalves, gastropods and sand dollars; on top were flint knives, rubber and copal figures, as well as the skeletons of two pumas (*Puma concolor*) and a *tzompantli* skull (with mandible) (Chávez Balderas 2017).

At the foot of Templo Mayor and behind the Cuauhxicalco, two deposits with evidence of decapitation and posthumous treatments were found. These correspond to offerings 157 and 159, excavated by Estibaliz Aguayo and Berenice Jiménez; osteological analysis was carried out by María García. The first deposit is composed of 290 individuals represented by more than 2000 fragments of skulls and mandibles, excavated in seven layers[287]. They

[286] These data was obtained from the temporary exhibition "Ofrendas a Tláloc", on display at the Templo Mayor Museum during 2001, and from http://www.templomayor.inah.gob.mx/ofrendas_tlaloc/
[287] Corresponding at least to two different construction events.

correspond to children and adults with defleshing and disarticulation cut marks; some of them were boiled (Jiménez and García, in press). Below this offering, archaeologists found a sacrificial stone covered with clay. When they removed it, they discovered Offering 159, consisting on five *tzompantli* skulls of two females and three males; all of them were boiled, flayed, defleshed and fractured laterally (Jiménez y García, in press).

Of course, West Plaza did not only comprise the *coaxalpan*. Numerous buildings were built on it as well as spaces of ritual importance. [288] Such is the case of goddess Tlaltecuhtli monolith and a monument in the form of an inverted and stepped pyramid located west to this sculpture. Evidence of decapitation was found in both sites and will be discussed on the next chapter.

The monolith of the telluric goddess is undoubtedly one of the masterpieces of Mexica art. It is a rectangular lamprobolite andesite stone measuring 4.17 x 3.62 x 0.30 m, representing the goddess of earth in her feminine advocation, evoking fertility and death at the same time (López Luján and Chávez Balderas 2010; López Luján et al. 2012). Evidence of decapitation was found directly associated with the monolith, as some fragments of human skulls were discovered inside the construction fill, corresponding to Operation 4.[289] In addition, under this offering, Israel Elizalde and Diego Matadamas (2013) explored Operation 9, finding fragments of human skulls that correspond to the same layer as those from Operation 6 (see chapter 6).

[288] As the Cuauhxicalco. Due to its importance I will talk about this building separately on the following section.
[289]Offering 126 was recovered under the monolith. This deposit will be discussed in Chapter 7.

West of the monolith a monument in the form of an inverted, stepped pyramid was explored, resembling the jaws of earth devouring human corpses, possibly symbolizing a portal to the underworld (Aguirre and Chávez Balderas 2010, 2011; López Luján et al. 2012). It is composed of seven constructive stages to which the same number of offerings were associated (Aguirre and Chávez Balderas 2010, 2011). In the construction fill (Operation 1) and inside Offering 166, human bone fragments were found, most of them corresponding to skulls with perimortem modifications. [290] To the south and southeast of this monument (Operations 11 and 12) some fragments of human bones were also recovered, which were mixed with colonial faunal remains (García González 2011).

In addition, nine offerings surrounded this monument: eight were oriented towards the cardinal and intercardinal directions, and one was found to the west, on a lower level. The latter corresponds to Offering 141 in which seven painted effigy skulls were discovered (see chapter 6)[291].

The Urban Archaeology Program has continued explorations at the Plaza, beyond *coaxalpan*.[292] West to the Cuauhxicalco they explored a pit containing the remains of a tree identified as an oak (*Quercus* sp.), which was embedded in a circular base covered with stucco (Barrera, in press). During the drainage of this excavation unit (covered by the water table), the team coordinated by Iztel Rodríguez (2015) reported some human mandibles. In

[290] In addition, in two of these offerings was found evidence of animal sacrifice (offerings 125 and 128).
[291] Inside Offering 123, located southeast to this monument, cremated human bone fragments were found, although it is not clear if they correspond to a funerary ritual and were reused, or if they are the result of some post-sacrificial treatment (see chapter 6).
[292] I would like to mention Offering 153, studied by Perla Ruiz Albarrán (in press). Although it does not correspond to a decapitation case, most likely it is an example of human sacrifice. In this deposit, more than 1,700 disarticulated bones corresponding to 12 individuals (secondary burials) covered the articulated skeleton of an adult female. A perimortem cranial fracture might have been her cause of death. Ruiz Albarrán's investigations are aimed at determining whether she is a sacrificial victim and what role was played by the other individuals in this context.

previous excavations of the same sector carried out in 2013, broken mandibles were also found (Itzel Rodríguez, personal communication, May 2016).

3) Cuauhxicalco

This building was described by chroniclers, as a location where funerals of rulers took place. Cremation of funerary bundles was carried out in this temple or in its proximity, on the Plaza. Similarly, cremated remains (or portions of them), may have been buried inside the Cuauhxicalco (Alvarado Tezozómoc 1944: 95, 233, Durán 1967 II: 395, Chávez Balderas 2007). Clearly, this building is linked to fire and funerals.

In September 2012, the Templo Mayor Project and the Urban Archaeology Program discovered the remains of this building at the intersection of Argentina and Guatemala streets. According to López Luján and Barrera Rodríguez (2011:17), it is a circular platform measuring 16.44 m in diameter and 2.37 m in height. It corresponds to Templo Mayor Stages IVb and V (1469-1486 A.D.) and it was decorated with small sculptures in the form of snake heads, which were embedded to the façade (López Luján in press).

Between 2007 and 2018 this building has been a focus of excavations that have recovered five deposits with human skulls and mandibles (complete and fragmented).[293] The first is Offering 120 which was excavated between June 2007 and November 2008 by the team coordinated by Osiris Quezada. At the time of the discovery, it was believed to have been built on an altar decorated with snakes, which later explorations would confirm to be the Cuauhxicalco. The offering was excavated on eight levels and consists of 3400

[293] Offerings 120, 149, 151, 169, and a deposit that was not labeled.

organic objects and 1700 artefacts, currently analyzed by Amaranta Argüelles.[294] In the upper level of the offering, a skull of an adult male was recovered, presenting obsidian and flint appliqués in the orbits, as well as two flint knives;[295] it was regarded as an effigy of Mictlantecuhtli. After his decapitation, this individual was flayed, defleshed and cleaned by scraping, leaving cut marks practically all over the bone surface. It presents a basal perforation and a small perforation in the sagittal suture, which could have been used to hang it (Chávez Balderas 2017) (Figure 134).

Figure 134. Skull from Offering 120, decorated with obsidian and flint appliqués. Photograph by Néstor Santiago.

[294] This offering was located at center of four containers made of stone bricks, distributed to the cardinal points; all of these were empty.
[295] Although they collapsed, one was associated to the nose and the other to the mouth.

Operation 23, located in the northeast of the Cuauhxicalco, was explored in 2012. From excavations coordinated by Julia Pérez Pérez and José María García, some fragments of human bones were recovered, as well as two deposits containing three sacrificial victims: offerings 149 and 151. In the first, skulls from two children were found, along with their cervical vertebrae with disarticulation cut marks. In addition, in the proximity of their heads were deposited the feet and hands of both children. In Offering 151, only one female skull was buried: her vault was removed. It also has suspension holes, so it could have been used as a container. All these findings will be discussed in Chapter 6.

Finally, I shall mention two deposits excavated by the Urban Archaeology Program inside the Cuauhxicalco: the first –Offering 169- was buried below staircases on the western façade and the second in the southern half of the building. Offering 169 was found by Sandra Ramírez and Ingrid Trejo during the Plaza Gamio excavations in 2015. This area was disturbed by the sewage collector built more than a century ago; and lay below the water table. In spite of this, researchers were able to document mandibles and fragments of two children's skulls, all corresponding to 23 individuals deposited in the earliest stage of the Cuauhxicalco. This deposit was interpreted as a consecration offering associated to the building enlargement (Ramírez and Trejo, personal communication, May 2016).

The second deposit was found inside the construction fill of the Cuauhxicalco where the remains of an oak tree (*Quercus* sp.) rested. During the excavation of a pit Jiménez and Aguayo (2012) located human mandibles broken in two, and some skull fragments placed on top of the tree. Both researchers consider this deposit as a consecration to the oak; this tree was symbol of the axis mundi and facilitated communication between different levels of the universe.

4) Huei Tzompantli

Thanks to Sahagún's informants (2000, I: 271-281) it is well known that Tenochtitlan had seven tzompantli where skulls were displayed; each palisade was linked to a specific deity. These include Mixcóatl, Xipe Tótec, Huitzilopochtli, Yacatecuhtli, Tezcatlipoca and the Omacame (Matos Moctezuma 1978). From all the skull racks, the main one was the Huei Tzompantli, located west to Templo Mayor, in which heads of victims sacrificed in the *panquetzaliztli* feast, in honor of god of war, were displayed. It is clear that *tzompantlis* were linked to calendrical feasts; in fact, skulls of some deities' impersonators (*ixiptla*) were on display in the palisades. For example, impersonator of Tezcatlipoca was treated as the deity for a whole month; by the end he was sacrificed and his skull ended in the *tzompantli* (Sahagún 2000, I: 142-144). The heads of the four women who personified Tepoxoch, Matlacueye, Xochitécatl, Mayahuel and the man who represented Milnáhuatl also ended displayed on a stick (Sahagún 2000 I:158). [296] By combining historical and archaeological evidence the notion that only warriors captured in battles were decapitated and taken to the *tzompantli* can be discounted.

Excavations of the Urban Archaeology Program on Guatemala Street number 24 uncovered the remains of the main Tenochtitlan skull rack. According to Barrera (in press), this is a platform 50 cm high and possibly 34 m long and 12 m wide; it was oriented from north to south. [297] It is characterized for having circular holes where the wooden posts were

[296] Most likely Sahagún refers to the *tzompantli*, although it is also possible that each skull was exhibited individually on a pole from a basal perforation.

[297] It was not possible to determine precise dimensions of the platform as part of the structure is under a modern building on the west side of this property. In addition, part of this structure would have been destroyed during the construction of Metro Line 2. It is possible that the southern limit of the platform is under the property occupied by Metropolitan Cathedral (Barrera Rodríguez, personal communication, May 2017).

inserted; these vertically implanted posts served as supports for the horizontal beams upon which defleshed heads were hung. According to conqueror Andrés de Tapia (1988: 108-109), who was an eyewitness, on each pole there were "five dead heads", which coincides with findings in Offering 159 (Jiménez and García). Also, this corresponds to the distance between the post holes, which is about 60 to 70 cm (Trejo and Vázquez Vallín, in press).

In addition, archaeologists made a striking discovery in 2015: a tower built with human skulls agglutinated with lime mortar, sand and clay, which was attached to the platform (Trejo and Vázquez Vallín, in press; Chávez Balderas and Vázquez Vallin, 2017). This correlates well with the description by the Conqueror Tapia of two towers on opposite sides of the *tzompantli*:

> [...] from one end to the other of these poles were two towers made of lime and heads of the dead, with no other stone, and the teeth facing outwards (Tapia 1988: 108-109).

The orientation of their faces was also confirmed by recent archaeological excavations. As Tapia mentions, the skulls of the façade were placed with the facial portion facing outwards; Ingrid Trejo and Lorena Vázquez Vallin (in press) discovered that those in the center look to the inside. The tower has at least two construction phases that preceded the platform that was discovered in 2015; the phase corresponding to the Spanish contact was completely destroyed (Chávez Balderas and Vázquez Vallin, 2017).

Undoubtedly, the finding of the Huei Tzompantli confirms that this structure was central to human sacrifice and decapitation. So far the Urban Archaeology Program has counted a total of 450 human skulls; however, it can be assumed that there are hundreds

more imbedded in the walls of the towers. The remains that have been recovered to date are mostly males, although there are also females and children (Chávez Balderas and Vázquez Vallin, 2017, Ramírez and Flores, in press; Trejo and Vázquez Vallin, in press). This biological profile was expected, as *tzompantli* skulls that were reused in Templo Mayor deposits show similar diversity (Chávez Balderas 2017).

In sum, the Huei Tzompantli is the most important building in the Sacred Precinct for understanding decapitation, subsequent modifications of skulls, storage and reuse.

5) Calmécac

As part of the archaeological intervention by the Urban Archaeology Program in the premises of the Cultural Center of Spain in Mexico, [298] the remains of the Calmécac, a noble school under the patronage of Quetzalcóatl, were discovered. According to Raúl Barrera (in press), the surface explored is 665.49 m^2. Numerous fragments of human skulls deposited in the construction fill were recovered; 666 were analyzed by Bertha Flores. As it have been noted in other areas of the Sacred Precinct, Flores (2011, in press) found that the skull is the most abundant body part, corresponding to 82% of the assemblage. [299] From the postcranial skeleton, the most common elements are cervical vertebrae (also associated with the practice of decapitation) and ribs. From anatomical identification, Flores estimated a minimum number of individuals of 98, of which 82 were adults and the rest were children and adolescents; they correspond to both females and males. Of these fragments, 42% had some form of cultural modification (Flores in press).

[298] Located at 97 Donceles Street, in the Historical Center of Mexico City.
[299] While most are fragments, this number includes two complete skulls (Flores, in press).

The most unusual discovery at this site is a fragmented mandible, which corresponds to an adult male. On its internal surface was carved a representation of Mixcóatl, characterized by his feathered headdress (*cuauhpilolli*), a black mask and earplugs in the shape of a deer's leg. Oliver and colleagues (in press) consider it to be a representation of the god of hunting, Mixcóatl, or a *mimixcoa*, archetypal image of sacrificed captives. On the external surface, the mandible has a depiction of two fire snakes, xiuhcóatl. Unfortunately, the one on left side is incomplete because of bone fragmentation (figure 135). The authors compared this ritual artifact with other carved mandibles located in diverse Mesoamerican sites, reaching the conclusion that it could have been used as a bracelet or pectoral, alluding to the taking of captives for sacrifice (Oliver et al. in press).

a) b)

Figure 135. Carved mandible recovered from excavations of the Calmécac. a) External surface with the representation of a xiuhcóatl; b) internal surface with the face of Mixcóatl or a mimixcoa. Photograph by Ximena Chávez Balderas.

6) Ball Game

In Mesoamerica decapitation had a very close link to the Ball Game. For example, in Popol Vuh (1968: 56-59) there are two passages in which this practice is essential. In the first Hun-Hunahpu and Vucub-Huanhpu were decapitated in the ball game of Xibalbá (underworld). The defleshed head of the first was placed on a gourd tree. There, he passed unnoticed until one day he spit saliva on Ixquic, leaving her pregnant. In the second passage, Camazotz bat decapitates Hunahpu and hangs his head on the ball court (Popol Vuh 1968:89). These mythical passages have led authors such as Mary Miller and Karl Taube (1993), Rubén Mendoza (2007) and Graulich (2016) to conclude that the gourd tree represents the *tzompantli*. Although I agree with these interpretations, I believe that this tree is not only related to *tzompantli* skulls, but also to defleshed heads and mandibles.

In this regard I agree with Xochipiltécatl (2004: 135-136) that the ball game is linked to sacrifice and decapitation. In fact, it is common to find depictions of heart extraction and head disarticulation near the court. Examples of this are page 19 of *Codex Borbonico* (1991), [300] page 80 of *Codex Magliabechiano* (1996), page 21 of *Codex Borgia* (1993) and page F of *Selden Roll* (1955) (figure 136). I consider that in addition to expressing a symbolic relationship between this space and heads, this alludes to the fact that decapitation and some sacrificial events actually took place close to the ball court.

[300] And its equivalent on page 19 *of Tonalámatl de Aubin* (1981).

a)

b)

c)

d)

Figure 136. Ball game, sacrifice and decapitation. a) Decapitation next to the ball game court. *Codex Borbonico* (1991), page 19; b) Skulls and possible effigy skulls located inside the ball game court. *Codex Magliabechiano* (1996), page 80; c) Sacrifice of a *mimixcoa* in the ball game court. *Codex Borgia* (1993), page 21; d) Heart extraction next to the ball game. *Selden Roll* (1955), page F.

Huei Tlachtli, the main ball court, has been excavated on four occasions: the first one at the beginning of 21st Century, carried out by Batres; the second one during the construction of Metro Line 2 around 1967; the third one corresponds to the Urban Archaeology Program research in the 1990s, under the supervision of Barrera Rivera. Finally, the fourth excavation was carried out during 2014 on Guatemala Street number 16, under the

direction of Barrera Rodríguez, current director of the Program (Barrera 2014; Barrera in press; García et al. in press).

A particularly important discovery at this site is a ritual deposit that, despite having few skull fragments, offers invaluable information on decapitation: an offering composed of articulated cervical vertebrae. This unusual context was analyzed in 2014 by María García Velasco, Lorena Vázquez Vallin and Fernando Orduña. According to them, these skeletal elements were not defleshed; in some cases the hyoid bone was found in anatomical position. This implies that the vertebrae were buried with soft tissues, in other words, it is an offering of necks. The vertebral segments present two disarticulation points: one close to the head and the other to the thorax (García Velasco et al., in press). This reflects the sequence in which the posthumous treatment was performed. There was an initial disarticulation to separate the head from the body, generally performed below the third cervical vertebra, as the atlas and axis have a more complex anatomy and are more difficult to reach when the body is articulated.[301]

After decapitation there was a secondary disarticulation, which was intended to separate the portion of the neck that was still attached to the head. Most likely this was done to modify skulls, either to exhibit them in the *tzompantli* or in another structure, or to manufacture pectorals or god effigies.

Thanks to García Velasco and collaborators (in press) it is known that this second disarticulation sometimes left the atlas articulated to the skull or fractured the bone. The meticulous analysis carried out by these researchers also revealed the important detail that

[301] García Velasco and collaborators (in press) mention that most of the necks were disarticulated between C6 and C7, and between C6 and C5. In the severed heads recovered in the Templo Mayor, most of them were disarticulated between C5 and C6 (32%), followed by C3-C4 (27%), C4-C5 (27%) and finally C6-C7 (14%) (Chávez Balderas, 2017).

58% of the sacrificial victims were children and adolescents. All appear to have died in a single event, judging by the state in which anatomical connections were found and stratigraphy.

Interestingly the external margins of this deposit were delimited with skull fragments[302] very similar to those recovered by the Templo Mayor Project in operations 6 and 9, which will be presented in Chapter 6.

7) Other sites within the Sacred Precinct

During the excavations at the Metropolitan Cathedral, the House of the Marquis of Apartado and the House of the Eagles, skulls or mandibles were also recovered, all with evidence of post-sacrificial treatments. On the occasion of the construction of Metro Line 2, Jordy Gussinyer (1972: 17-22) reports the discovery of 27 human skulls located near the intersection of Brazil and Guatemala streets, that is, near the western boundary of the Sacred Precinct. Remains were found in three ritual deposits; one of these is an offering composed of 11 skulls located in the proximity of a large brazier. Most of them had flint knives associated with the oral cavity, symbols of sacrifice (figure 137). In addition, some had pectorals, necklaces and earplugs. Apparently this deposit corresponds to a termination ritual dedicated to this ceremonial brazier.

A second offering consisted of 13 human skulls, 65 flint knives, and necklaces made of green stone beads and snails. It is not known if these artifacts were part of the skull garments. Finally, Gussinyer (1972: 22) describes an offering with three human skulls

[302]In the same way, these fragments might correspond to manufacture debris, with indirect thermal alterations, perimortem fractures, defleshing and scraping cut marks.

"carefully placed, turned forward". There is no detailed information in Gussinyer's report to indicate whether the 27 skulls correspond to severed heads, *tzompantli* skulls or whether or not they had basal perforations. However, due to their proximity to the Ball Court and their association with flint knives, I presume that they are sacrificial victims.

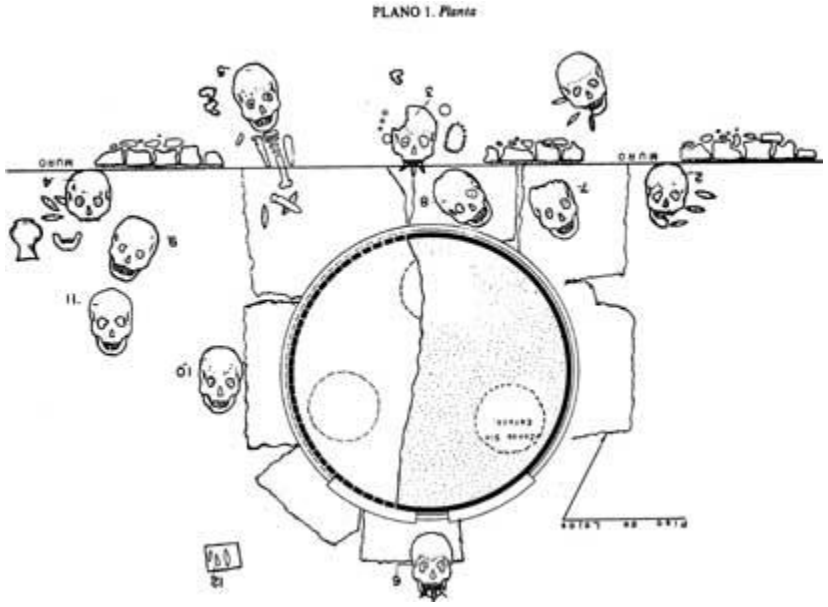


Figure 137. Base of a ceremonial brazier and 11 human skulls discovered during the construction of Metro Line 2. From Gussinyer (1972: 17-22).

During the 1990s Barrera Rivera's team recovered a total of 44 individuals associated with structures underneath the Metropolitan Cathedral. Thanks to Gabino López Arenas' (2012) research, it is known that these individuals are children, subadults and adults, including males and females. These include 30 mandibles (López Arenas 2012:87), as well as 15 tzompantli skulls. The latter were studied by Ana Solari (2008), who also noted the importance of reuse after being exhibited on the palisade.

In the neoclassical building known as the House of the Marquis of Apartado, located at the intersection of Argentina and Donceles streets, Elsa Hernández Pons and

Carlos Navarrete (1997) reported the discovery of an offering composed of a severed skull, [303] placed on a bed of flint knives (Figure 138). This deposit was found inside an altar near six lamprobolite andesite carved slabs: two of them represented severed legs, two corresponded to disarticulated arms and the rest to headdresses of god Xipe Tótec (*yopitzontli*).

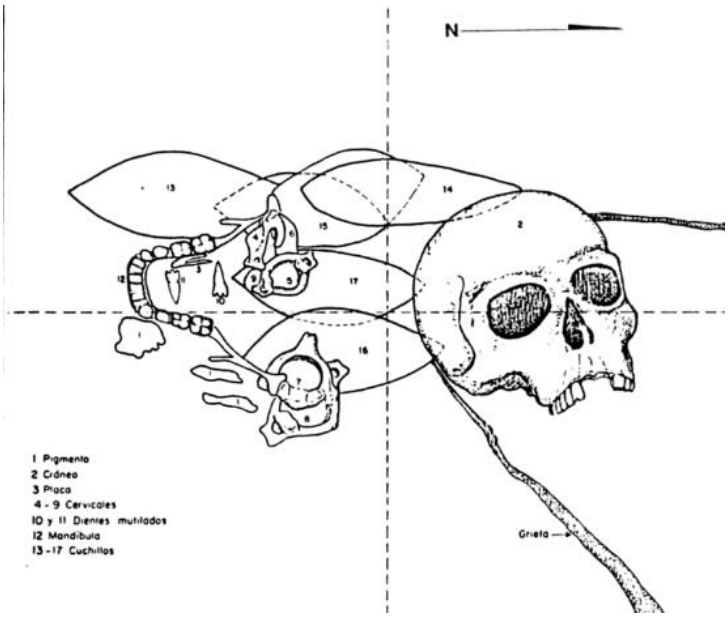


Figure 138. Severed head recovered in the excavations of the House of the Marquis of Apartado. From Hernández Pons and Navarrete (1997:88).

Finally I would like to highlight human remains found in excavations of the Eagles House. Although they are exclusively mandibles, the fact that they have been modified in the perimortem interval suggest that individuals were decapitated shortly after their death. These bones were recovered in association with life-size ceramic sculptures and were most likely placed as part of a termination ritual.

[303] With mandible and six cervical vertebrae.

The first discoveries were made between October 1981 and June 1982. During the excavations coordinated by Francisco Hinojosa in Aposento B, two incomplete sculptures were discovered: two defleshed personages, most likely representations of Mictlantecuhtli. In spite of the colonial disturbance, six perforated human mandibles were found, possibly forming a necklace. Direct analysis of these materials was carried out in 2014, with the collaboration of Jacqueline Castro Irineo and Diana Bustos Ríos. From this work it was concluded that five correspond to male individuals, while the sixth is undetermined. Four mandibles correspond to adults possibly between 20 and 30 years, while the remaining two were between 15 and 20 years when they died. The estimate was based on tooth eruption and occlusal wear. [304] The six mandibles had the same posthumous treatment: flaying, defleshing and carving of suspension holes; three have perimortem fractures (Olivier et al. in press). [305] One of the mandibles has direct thermal alteration that might correspond to a very short fire or to incandescent material exposure. There is no evidence to know if this happened as part of the termination ritual or if it corresponds to a previous practice. [306] An interesting fact is that five individuals present longitudinal fractures in their teeth; these are usually associated with weathering (Botella et al. 2000; Chávez Balderas 2017). This implies that they were not buried immediately after their preparation, but rather that they were exhibited or carried before being placed in the termination offering.

The second discovery was made in 1995 by the team under the direction of López Luján: two life-size ceramic sculptures of the underworld god Mictlantecuhtli. Three

[304] Regarding health issues, one presented an abscess and reabsorption of alveolar tissue in the second left premolar (with cavitation, loss of enamel and dentin); three had dental calculus and all have caries.
[305] Associated to defleshing and disarticulation.
[306] This type of alterations has been previously documented in other contexts in Templo Mayor (Chávez Balderas 2017).

mandibles were found associated with one of them, while the other had four. Unlike the case mentioned above, three individuals correspond to females, three males and the seventh remains undetermined. One was approximately 15 years old, five of them around 20 years old and the remaining one was more than 25 years old (López Luján 2006 I:198). The posthumous treatment was the same: flaying, defleshing and manufacture of suspension holes. Thanks to López Lujan's research (2006 I:95-96) it is known that mandibles were part of a termination ritual, in which sculptures were bathed in blood, covered with clay and later mandible necklaces were placed in their trunks. Although the ritual treatment given to these mandibles is different from those reported by the Urban Archaeology Program at the Cuauhxicalco, their central role in consecration and termination rituals should be emphasized.

Next, I will present the results of the analysis of the human and animal bone remains recovered during the seventh field season of the Templo Mayor Project and their relation with sacrifice.

Chapter 6

Human remains on the West Plaza of the Sacred Precinct

In the seventh field season of the Templo Mayor Project, numerous contexts with human skeletal remains were explored on the West Plaza. [307] These are characterized by being quite different from those from the Templo Mayor, providing a unique opportunity to expand our knowledge about sacrificial practices. Thousands of fragments of human bones were found in the construction fills, while only ten individuals were recovered inside the ritual deposits. In offerings 123, 141, 149, 151, 166, skulls, feet and severed hands were found, along with cremated remains and secondary burials. In contrast, in operations 6, 9 and 23 were found scattered bone fragments deposited in the construction fills. Each of these contexts has particular characteristics, making it necessary to develop different recovery methods and analysis strategies.

[307]Excavations were done in the premises occupied by the Mayorazgo de Nava Chávez (House of the Ajaracas), built on top of West Plaza of the Sacred Precinct.

Human remains on the West Plaza offerings

At the foot of the Templo Mayor, eight ritual deposits containing human bones have been recovered. Their preservation is exceptional, as they were found under the water table that apparently did not have important fluctuations, which prevented their lixiviation and deterioration.

Three of these deposits - offerings 105, 107 and 120 - were analyzed in a previous investigation (Chávez Balderas 2017), but I will return to them in this section for comparison. [308] The other five were aligned with the southern half of the building, dedicated to Huitzilopochtli. Three revealed some new information on the practice of decapitation and reuse of skulls (offerings 141, 149 and 151). Another one corresponds to an unknown cremation ritual (Offering 123) and the last one is key to understanding rituals carried out close to the Conquest (Offering 166). Given the diversity and complexity of these deposits, I shall discuss these separately (Figure 139).

[308] The first two were excavated by the Urban Archaeology Program and Offering 120 was explored during the seventh field season of the Templo Mayor Project. Both were discussed in Chapter 5.

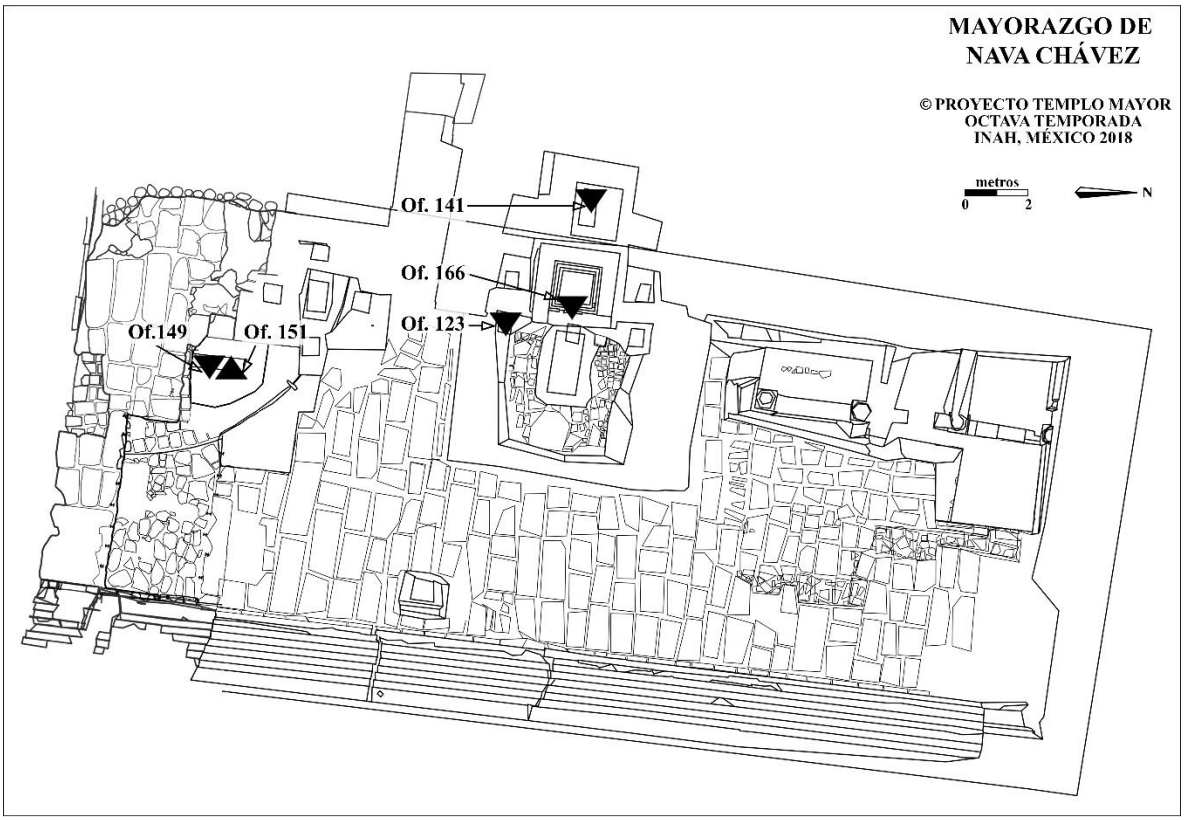


Figure 139. Offerings with human skeletal remains recovered by the Templo Mayor Project in the Mayorazgo of Nava Chávez. Drawing by Michelle de Anda Rogel.

Offering 141

The extraordinary preservation, abundance of materials and symbolic importance make Offering 141 one of the most impressive deposits of the Sacred Precinct. An offering of this nature required excavation to be done as carefully as possible, which is why this task was entrusted to archaeologists Alejandra Aguirre Molina and Erika Robles Cortés, who relied on an interdisciplinary team to face this challenge. This deposit belongs to Operation 10 and its excavation lasted almost two years, starting on February 20, 2011 and ending on February 14, 2013.

According to a report by Aguirre Molina and Robles Cortés (2013), Offering 141 was found west of the monolith of goddess Tlaltecuhtli and to the stepped monument ("Entrance") and below Offering 136. It was found at an altitude of 2242.59 masl (Figure 140). This area is characterized by the great density of ritual deposits: nine of them were placed around this monument and seven more inside. Offering 141 consists of a box of tezontle ashlars in which 18,322 elements were buried. It was excavated in 18 levels by the archaeological team. According to their interpretation, ritual goods were placed in six original symbolic layers (Aguirre Molina and Robles Cortés 2013, Chávez Balderas et al. 2015).

The meticulous excavation made it possible to reconstruct the sequence in which the goods were deposited inside the offering (Chávez Balderas et al. 2015, Robles Cortés et al. in press). After preparing the container, the priests began by depositing a layer of sea sand, a widespread practice in this type of deposit (López Luján 1993). On this level of aquatic symbolism they buried two sawfish snouts, each approximately one meter in length, evoking the terrestrial level (López Luján 1993, Robles Cortés 2017). On this telluric layer they placed bars of copal: 16 complete and 72 fragments, mixed with charcoal and vegetable fibers. Then were deposited effigies and symbols of the god Tláloc, such as miniature pots, scepters and masks preserving remains of headdresses made with heron feathers.

Afterward, the priests deposited thousands of marine organisms, mostly Atlantic bivalves and gastropods. [309] On top they placed items evoking war, water, fire and death.

[309] Identified by Belem Zúñiga Arellano.

Among these, a pot with Tlaloc's face stands out, containing pumpkin seeds (*Cucurbita pepo*), quelite (*Amaranthus hybridus*) and chia (*Salvia hispanica*). [310] Other objects deposited in this level were copal effigies adorned with garments of the rain god, made of wood, such as pots, masks and scepters that preserved blue, black and white pigments.

This level includes copal cones representing hills, basalt braziers containing masks and flint knives personifying mythical warriors and gods, as well as faunal skeletal remains. These correspond to a heron (*Egretta alba*), snake skulls, shark vertebrae and pelts of two golden eagles, one of them carrying copper bells and a wooden *anáhuatl* pectoral. In this level seven human skulls were placed; four were carefully deposited on top of tezontle sculptures in the shape of a long bone; two were placed on top of brain corals covered with puma (*Puma concolor*) and roseate spoonbill (*Platalea ajaja*) pelts. Later the priests placed four wooden scepters symbolically associated with fire, fertility and pulque. [311] Finally, the oblation ritual was completed by depositing a layer of bivalves and gastropods. The container was covered with four andesite slabs; 19 bars of copal mixed with fibers were burnt on top of it. Another deposit was placed on top: Offering 136, also excavated by Aguirre Molina and Robles Cortés.

[310] Identified by Aurora Montúfar.
[311] A deer head scepter related to fire; a *chicahuaztli* scepter linked to fertility and lightning; a god *Techálot*l scepter or possible a mallet; a *tlahuitímetl* scepter associated to pulque deities (Chávez Balderas et al 2015, Robles Cortés in press).

Figure 140. Offering 141, Level 3. Photograph by Leonardo López Luján.

Vertical placement	West Plaza
Horizontal placement	West to the stepped monument in the shape of an inverted pyramid (“Entrance”)
Stage	VI-2 (AD 1489-1502)
Symmetry	No
Container	Tezontle ashlars stone box
Dimensions	E-W: 114 cm N-S: 83 cm Depth: 81 cm

Table 7. Offering 141.

Effigy skulls recovered inside this offering are unique in the Sacred Precinct, as they are characterized by the extraordinary preservation of pigments and perishable garments, which help to interpret their symbolism. Below I shall describe each of these individuals and the results of their analysis.

Individual	Element	Description	Level	Quadrant
1	137 A (skull) and 187 B (mandible)	Skull with basal perforation	3D	NW
2	186	Skull with basal perforation	4	NW
3	370	Skull with basal perforation	5B	Center
4	187 A (skull) and 137 B (mandible)	Skull with basal perforation l	4	Between NW y NE
5	227	Tzompantli skull	5	SW
6	228	Tzompantli skull	5	SW
7	596	Tzompantli skull	7	NE

Table 8. Skull inventory, Offering 141

Individual 1 (Artefact 137 A and 187 A)

Corresponds to a skull with basal perforation and mandible, recovered in the NW quadrant of the offering.

1) Age, sex and head modifications

Adult male[312] between 25 and 35 years old, [313] with tabular-erect cranial modification.

[312] Glabella, mastoid process and occipital protuberance are prominent. Straight mentum.
[313] Composite score using Meindel and Lovejoy's technique (1985) is 1 (corresponding to the cranial vault). This implies an average of 30.5 years. Dental wear (Lovejoy 1985) corresponds to a range of 24-35 years (phases E and F).

2) Health conditions

Dental disease: dental calculus concentrated on the labial side of incisors and lower canines. “A” caries in both P^3, P^4, M^1, M^2 and in both P_3, P_4, M_1 and in the right M_2; “B” caries in left M_2 and M_3 and “C” caries in right M_3. In addition, it has horizontal wear with dentine exposure in both M_2, M_1 and in the right M_2.

Metabolic disease: healed spongy hyperostosis (type A) on the parietals and occipital. *Cribra orbitalia*, barely perceptible.

Infectious disease: infectious process at bregma and coronal suture, which consists of periosteal irritation and swelling on the left side.

Non pathological anatomical variants: Pachionian depressions on the inner table; these correspond to vascular impressions with no implication for health.

Offering 141

Individual: 1	**Sex**: male	**Head ante mortem modifications**: tabular-erect cranial modification
Elemento: A137 A and A187 B	**Edad**: adult 25-35 years	
Description: Skull with basal perforation and mandible		
Health conditions. Dental disease: caries degree A, B C. Horizontal wear with dentine exposure. Dental calculus. P_4 are impacted. Metabolic disease: healed spongy hyperostosis. Mild cribra orbitalia. Infectious disease: iInfectious process on bregma and coronal suture. Others: Pachionni depressions.		

Table 9. Biological profile. Individual 1, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Cultural biostratinomic processes

This individual provides evidence of the sequence of manufacture of effigy skulls. Shortly after his death, the individual was decapitated. It is unknown which technique was used, since the cervical vertebrae were removed to make a basal perforation by percussion, starting from the foramen magnum. [314] Two depressed fractures and bevelling of the inner table were observed at the edge of this perforation,[315] which confirms it was made during the perimortem interval. This would also imply that some kind of stone awl was used to fracture. In the posterior part of the skull (in the occipital and parietals) there is an area with possible indirect thermal alteration. [316]

This individual was flayed using a technique different from the one documented in the skulls from Stage IVb (AD 1469-1481.), which have cut marks that cross the cranium in an anterior-posterior direction. Unlike these, Offering 141 Individual 1 has two groups of cuts. The first corresponds to a series of repetitive anterior-posterior marks, located slightly to the right of sagittal suture; these begin in the frontal 25 mm from glabella and are interrupted 12.62 mm from the coronal suture (see Appendix 1). In addition, another incision was observed on the occipital, starting at 22 mm from lambda; it is 30 mm long. The second group of marks is composed of at least four repetitive transverse cuts, which are located 25 mm from the coronal suture and pass through in the sagittal plane. On the left side these marks begin 32 mm from the squamous suture; on the right side they are 12 mm from the same suture.

[314] It measures 74.06 mm in transverse direction and 58.81 mm in anterior-posterior direction.
[315] One measures 9 mm and the other 6 mm.
[316] This feature will be analyzed by Karina Lopez Hernandez.

The head was also defleshed, removing muscles and other soft tissues to obtain a skeletal appearance. This left numerous marks, especially on the zygomatics, maxillae, mastoid processes, lower nuchal line, masseteric tuberosity and mandibular ramus. Cleaning was carried out by scraping away the periosteum, leaving irregular marks in places where there are no muscles (such as the parietals). When the skull was buried in the offering the mandible was already disarticulated by decomposition. This is known because the mandible was exchanged with Individual 4 before being painted. As a result, this male skull was deposited articulated with a female mandible, showing a correspondence in designs and colors, which would imply that they were painted at the same time.

Detailed analysis of pigments was coordinated by Robles Cortés[317] and revealed that the skull has traces of a grey layer, as well as black on the mandible, maxilla and zygomatic. Due to the fact that very few traces are preserved, it was not possible to carry out a hypothetical reconstruction (Aguirre Molina and Robles Cortés 2013, Robles Cortés and Aguirre Molina 2017, Robles Cortés et al. in press).

4) Field osteoarchaeology analysis

The articulation of mandible and cranium was done by the priest as both correspond to different individuals. The skull was vertical and the face was oriented to the Southwest. No wall effects, compression or constriction were observed,[318] since the original space was

[317]Alejandra Aguirre, Michelle de Anda Rogel, Néstor Santiago, Leonardo López Luján and Giacomo Chiari collaborated in this analysis.

[318] Wall effects correspond to the preservation of bones in unstable positions as a result of the presence of sediment or other perishable elements. Constriction effects refer to the pressure to which the remains may have been exposed as result of the original architecture, the position in which they were placed or the presence of perishable items. For example, a narrow pit or a tightened shroud. Compression correspond to a constant weight that caused a change in bones (Duday 1997).

empty. It was determined that a shell *anáhuatl* and a white flint knife were part of his attire. The skull was placed on top of a brain coral that served as his seat. It was associated to copal, a dressed flint knife and wooden sticks.

Individual 2 (Artefact 186)

Skull with basal perforation, shell and pyrite appliqués, [319] and remains of what seems to be a headdress manufactured with fibers (*petatillo*). It was located in the NW quadrant of the offering.

1) Age, sex and head modifications

Corresponds to a male, [320] between 20 and 30 years.[321] No antemortem body modifications were observed.

2) Health conditions

Dental disease: "A" caries in all teeth except canines and incisors; "B" caries in right M^3 and left M_2. It presents horizontal wear with dentine exposure on M_1 and M^1. Both M_3 are impacted. Mild dental calculus is present, predominantly on the incisors and canines.

[319] It only preserves the pyrite appliqué from the right orbit.
[320] The nuchal crest and the mastoid process are prominent. The mentum is squared, and mandible ramus is straight and massive.
[321] The composite score in Meindl and Lovejoy's technique (1985) is zero, which implies an individual under the age of 30. The third molar had already erupted and phases of tooth wear (D and E) suggest an interval of 20 to 30 years (Lovejoy 1985).

Metabolic disease: healed spongy hyperostosis (A).

Offering: 141

Individual: 2	**Sex**: male	**Head ante mortem modifications:** none
Element: A186	**Age**: 20-30 years	
Description: Skull and mandible with basal perforation, shell and flint appliqués, and remains of a headdress made of fibers.		
Health conditions. Dental disease: caries (A y B). Horizontal wear. M_3 impacted. Mild dental calculus. Metabolic disease: healed spongy hyperostosis.		

Table 10. Biological profile. Individual 2, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

Soon after his death, this individual was decapitated. The technique with which the head would have been disarticulated is unknown, as the cervical vertebrae were removed

to make a basal perforation. [322] The skull presents a potential indirect thermal alteration on the right mastoid process and possibly the mandible, which consists of a change in bone texture and color. It still needs to be analyzed to determine if it was a consequence of boiling or a diagenetic process. The basal perforation was made by percussion starting from the foramen magnum in which depressed fractures[323] with bevelling can be observed on the inner table; these are characteristic of the perimortem interval. The basal perforation does not show wear on the edges.

The individual was flayed and has cut marks crossing parietals in a transverse direction, parallel to coronal suture and located 52.12 mm from it. On the left side, the cuts begin 38 mm from the squamous suture, while on the right side they end in this suture. The skull was defleshed to remove muscles and other soft tissues, to obtain a skeletal appearance. From this process, cut marks are observed especially in zygomatic, zygomatic process of the right temporal, menton and mandible ramus. The skull has a perimortem fracture near the left masseteric tuberosity, which could be linked to defleshing. [324] In addition, the bone was cleaned, removing periosteum by scraping, leaving irregular and soft marks in different directions, with emphasis on the frontal and both parietals.

It presents two linear perimortem fractures, but with no impact points. Although it cannot be ruled out that they are connected to death, most likely it is the result of handling of the corpse or preparation of the head. The first fracture starts in the coronal suture and ends in the squamous suture on the right side of the skull. [325] The second fracture also

[322] 58.91 mm in transverse direction and 56.62 mm in anterior-posterior direction.
[323] One of them of 5.9 mm evidencing the use of a pointy tool for percussion.
[324] The technique of fracturing bone to remove or suppress soft tissues had previously been reported in skulls recovered in Stage IVb of Templo Mayor (Chávez Balderas 2017).
[325] 2.48 mm from the sagittal suture.

starts in the coronal suture on the left side and ends 28 mm from the squamous suture; [326] both fractures have edges of the same color characteristics of perimortem interval. The skull has two circular shell appliqués that simulate the sclera of the eyes, manufactured with *Pincatada mazatlanica* shell and in one case with a gastropod of genus *Pleuropoca*, identified by biologist Belem Zúñiga Arellano (Robles Cortés and Aguirre Molina 2017). The one on the right side retains a pyrite appliqué. With regard to pigments applied to the skull, Robles Cortés and Aguirre Molina reported scarce traces of black pigment on left zygomatic, as well as remnants of a grey coat, although it was not possible to reconstruct the original colors.

4) Field osteoarchaeology analysis

The mandible and cranium were disarticulated. The mandible was vertical, indicating that the cranium was the displaced element; the original orientation of this individual was with the face to the East. It is possible that they were deposited when already disarticulated, considering that ritual objects often were used for other purposes before being deposited inside the offerings. This is also suggested by the postmortem loss of the upper and lower central incisors and the left lower lateral incisor. In addition, longitudinal fractures of canines and an upper lateral incisor were observed, a feature usually associated with weathering. [327] No constriction or compression effects were registered, but wall effects were noted, as the skull maintained an unstable position after moving.

[326] 49.52 mm from the coronal suture.
[327] Weathering evidence is currently being analyzed by Jaqueline Castro Irineo.

This effigy skull presented remains of petatillo fibers arranged as a spiral, which was adhered to the parietals and frontal, slightly shifted to the right side; because of its position and shape, most likely it was a headdress (Figure 141). The individual also had a wooden *anáhuatl* pectoral and was placed on top of a tezontle sculpture in the shape of a bone, a base that shares with Individual 3. Snails, coral, wooden sticks, copal and bivalves were found in its surroundings.

Figure 141. Remains of a possible headdress manufactured with vegetable fibers. Photograph by Néstor Santiago.

Individual 3 (Artefact 370)

Skull with mandible located in the center of the deposit. It has basal perforation and shell and pyrite appliqués.

1) Age, sex and head modifications

Male[328] between 25 and 35 years old.[329] There are no discernible ante mortem cultural modifications.

2) Health conditions

Dental disease: "A" caries degree right M_3 and M^2. Severe horizontal wear with dentin exposure all teeth. Mild dental calculus and loss of alveolar bone tissue. The right I^2 is rotated and has an anomalous morphology. Unfortunately it is fractured and incomplete, therefore it is not possible to know its original shape.

Metabolic disease: spongy hyperostosis predominantly on parietals (A) and occipital (B).

Infectious disease: infectious process consisting of periosteal irritation on bregma and parietals. It has swelling parallel to the sagittal suture on both sides.

Non-pathological anatomical variant: wormian bone.

[328] It is a very robust individual with prominent brow ridges, glabella, nuchal crest and mastoid process. The mandible is very robust, with a straight angle and a square chin.
[329] The composite score for the Meindel and Lovejoy (1985) technique is 1 (corresponding to the cranial vault). This implies an average of 30.5 years. The dental wear is very pronounced and does not correspond to the degree of suture closure that has just started. The diagonal wear on the incisors suggests a paramasticatory use of the teeth.

Offering: 141

Individual: 3	**Sex**: male	**Head ante mortem modifications:** none
Element: A370	**Age:** 25-35 years	
Description: skull with mandible, basal perforation, shell and pyrite appliqués.		
Health conditions. Dental disease: caries (A). Severe horizontal wear. Mild dental calculus, alveolar tissue loss. Rotated lateral incisor with an abnormal shape. Metabolic disease: spongy hyperostosis. Infectious disease: infectious process on bregma and coronal sutures. Others: wormian bone.		

Table 11. Biological profile. Individual 3, Offering 141. Photographs of Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

This individual was decapitated soon after death, however, it is impossible to determine the precise technique as the cervical vertebrae were removed to make a basal perforation.[330] On the posterior part of the skull (occipital and mastoid process), as well as on the mandible, the texture and coloration are different, most likely due to a mild indirect thermal alteration (still to be analyzed). This perforation was made by percussion from the foramen magnum, of which the posterior part is preserved. It presents bevelling on the inner table, a typical feature of perimortem interval; there is no wear on the fractured edge.

The skull was flayed using the aforementioned technique. This consists of two cuts, one longitudinal and the other transverse. The first group of marks corresponds to a series of repetitive cuts in the anterior-posterior direction, located slightly to the right of the sagittal suture. These begin at the frontal (in glabella), they are interrupted at 48.85 mm and resume at 28 mm from coronal suture, ending in the right parietal at 74.78 mm from the coronal suture. Another skinning mark in an anterior-posterior direction starts 11.3 mm from lambda and is interrupted at the highest nuchal line. The second group of cut marks are transverse: they consist of five visible cuts, which are located in the parietals, approximately 52.02 mm from the coronal suture, crossing the sagittal plane. On the left side these cuts cross the squamous suture ending 8 mm from it; on the right side they also cross this suture but end 18.94 mm from it.

The skull was defleshed to obtain a skeletal appearance. As a result cut marks were observed mainly at muscle insertion sites, with emphasis on the zygomatic, mastoid

[330] It measures 48.81 mm in transverse direction and 54.44 in anterior-posterior direction.

processes, nuchal line, zygomatic process of temporal, as well as the body and mandibular ramus. In addition, I registered perimortem fractures on the mandibular ramus and right mastoid process, also associated to defleshing. The skull also presents numerous irregular marks, located in places where there are no muscular insertions; these correspond to the scraping away of the periosteum. Later, shell and pyrite appliqués were placed in the orbits, representing the eyes.[331] The skull has black pigment on the frontal and zygomatic, as well as blue pigment on the maxilla and body of the mandible. It presents a grey coat that has been considerably diminished, but which can be seen in different parts of facial skull and parietals.

4) Field osteoarchaeology analysis

The mandible was displaced from the cranium. I consider it highly probable that they were already disarticulated by decomposition of soft tissues before burial. The skull was found slightly collapsed backwards. It was placed with the face oriented to West. No wall effects, constriction, or compression were noted. Besides the appliqués of shell and pyrite, it had a wooden *anáhuatl* pectoral, a necklace composed of five snails of the genus *Oliva* and a badly preserved palm artifact. This could have been part of his attire that collapsed on the orbits; however, its poor condition does not allow this to be confirmed. [332] Although the skull was visible from higher levels, it was not recovered until Level 5B, because it was covered by a large number of artifacts. The skull was deposited on top of a tezontle

[331] Shell discs have a diameter of 36.17 to 37.29 mm, while pyrite discs have a diameter of 19.20 to 19.60 mm.
[332] It is not a blindfold to cover the victim's eyes, but rather a thicker artifact.

sculpture in the shape of a long bone and it was also associated with a skeleton of a roseate spoonbill (*Platalea ajaja*), a miniature basalt brazier, a brain coral, dressed knives and remains of marine animals: shark vertebrae and mollusks shells of different species.

Figure 142. Remains of a palm artifact, collapsed on the orbits of Individual 3. Photographs of Néstor Santiago (taken from Aguirre Molina and Robles Cortés 2013).

Individual 4 (Artefact 187A and 137B)

Skull with mandible found between Northeast and Northwest quadrants, near the northern wall. It has basal perforation, shell and pyrite appliqués that simulate eyes, as well chromatism.

1) Age, sex and head modifications

Corresponds to a female[333] between 20-30 years old. [334] It has tabular erect head modification, slightly bilobulated.

2) Health conditions

Dental disease: "A" caries in both P^3, M^2, M^1, as well as in left M^3 and P^4. "B" caries in M_3 and in right M^3, as well as horizontal wear with dentine exposure in right M^1. Antemortem loss of both M_1.

[333] Nuchal crest, glabella, brow ridges are gracile and smooth. Mentum is triangular.
[334] The composite score in Meindl and Lovejoy's technique (1985) gave a total of zero, which implies an individual under the age of 30. The third molar had already erupted and phases of tooth wear (C and D) suggest an interval of 18 to 24 years (Lovejoy 1985).

Offering: 141

Individual: 4	**Sex**: female	**Head modifications**: tabular erect head modification, slightly bilobulated.
Element: A187 A and A137 B	**Age**: 20-30 years	
Description: skull with mandible. Presents basal perforation, shell and pyrite appliqués and chromatism		
Health conditions. Dental disease: Caries (A and B). Horizontal wear with dentine exposure. Antemortem loss of M_1. Metabolic disease: enamel hypoplasia in lower canines. Mild (healed) spongy hyperostosis. .		

Table 12. Biological profile. Individual 4, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

The individual was decapitated soon after death, although the technique is unknown as the cervical vertebrae were removed to elaborate a basal perforation; this was impacted from the foramen magnum, of which the anterior part is preserved.[335] It presents bevelling of the inner table, evidence that it was fractured on the perimortem interval; there is no wear on the perforation edges. It presents possible indirect thermal alterations (boiling) in the temporal-mandibular joints.

The skull was flayed and as a result there are two groups of cut marks: one longitudinal and the other transverse. The first consists of a series of repetitive cuts in the sagittal plane in an anterior-posterior direction initiating in the frontal, 26 mm from glabella and interrupted in the coronal suture. On the left parietal there are two cuts in this direction. The second group of cut marks correspond to two incisions in the transverse direction. They are located on the parietals 48 mm from the coronal suture. On the left side these marks are interrupted in the squamous suture, while on the right side end 40 mm from this suture. This female was defleshed, leaving cut marks on muscle insertions, especially on the zygomatic, left mastoid process, nuchal line, zygomatic process of temporal bone, as well as on the mandibular body and ramus. She presents a perimortem fracture on the left mastoid process resulting from defleshing of the sternocleidomastoid. Cleaning of bone surface was done to remove periosteum, causing irregular and soft marks, especially on the parietals and frontal.

[335] It measures 103.77 mm in transverse direction and 71.05 mm in anterior-posterior direction, including the anterior part of the foramen magnum.

The skull was adorned with shell and pyrite appliqués in the orbits, which represent the eyes. These are very small, [336] so it must have been necessary to place a support; possibly it was some organic material that did not survive the passage of time. The skull was painted and preserves traces of black pigment on the temporal bones and part of the left parietal. In addition, it has red pigment distributed over the frontal, parietal, temporal, zygomatic, maxilla and mandible, on the right side. Finally, the same gray coat found in the rest of the skulls was observed; in this individual traces were found in frontal, parietals, temporal, zygomatic, maxilla and mandible.

4) Field osteoarchaeology analysis

The mandible and skull were found displaced; the first remained in its original place, while the skull collapsed backwards (East). The articulation of this segment was simulated, as both bony elements associated belong to two different individuals: the female skull labeled as Individual 4 was deposited with a male mandible corresponding to Individual 1. The disarticulation of both anatomical elements may have occurred by decomposition, as there are no cuts on the temporomandibular joint. The mixing of both individuals suggests that they were painted simultaneously, some time after their death.

No compression or constriction effects were recorded, but wall effects were noted. In fact, the mandible preserved its original position, as it was stable on a brain coral that served as its base. In addition to the appliqués of shell and pyrite, the skull was adorned with an

[336] Shell discs have a diameter between 28.06 and 29.24 mm, while pyrite discs have a diameter between 16.77 and 16.81 mm.

anáhuatl pectoral which was placed on the parietals. In the proximity of this individual were gastropods, copal cones, wooden sticks, braziers, knives and four wooden darts.

Individual 5 (Artefact 227)

Tzompantli skull with mandible; preserves an appliqué of shell and pyrite simulating the right eye. It was buried on the Southwest quadrant.

1) Age, sex and head modifications

Male[337] between the 30 and 45 years, [338] with no discernible head modifications.

2) Health conditions

Dental disease: "A" caries in all molars. Severe horizontal wear in incisors, canines, premolars and molars, as well as diagonal wear in both I^2, which could be the result of paramasticatory use. Dentine exposure in all teeth, as well as calculus with emphasis on the buccal side of the upper arcade.

Metabolic disease: mild healed spongy hyperostosis (A).

Infectious disease: infectious process on bregma, consisting of an irritation of the periosteal bone (with less swelling than the rest of the individuals). In addition, it has

[337] It has a very robust nuchal crest and mastoid process. The mentum is squared and mandible ramus is straight and robust.
[338] The composite score on Meindl and Lovejoy's technique (1985) gave a total of five, suggesting an individual with an average age of 34.7 years. The third molar had already erupted and phases of tooth wear (G and H) indicate an interval of 35 to 45 years (Lovejoy 1985).

laminar bone deposition next to the right mental foramen, which is dense and organized (healed).

Neoplastic disease: benign frontal osteoma, characterized by regular, dense, compact, ivory-like bone tissue.

Offering: 141

Individual: 5	**Sex**: male	**Head modificaciones culturales**: none
Element: A227	**Age**: 30-45 years	
Description: tzompantli skull with mandible and shell and pyrite appliqués in the right orbit.		
Health conditions. Dental disease: caries (A). Horizontal and diagonal wear with dentine exposure in all teeth. Dental calculus. Metabolic disease: healed spongy hyperostosis. Infectious disease: infectious process on bregma. Deposition of lamellar bone next to the right mental foramen. Neoplastic disease: frontal osteoma.		

Table 13. Biological profile. Individual 5, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

The individual was decapitated in the perimortem interval, but the technique is unknown, as vertebrae were disarticulated, leaving cut marks and fractures at the occipital condyles. In addition, in the posterior and lateral part of the foramen magnum there is an area with cut marks and black stains. The skull was probably boiled, which caused in some points compaction, lighter coloration and a vitreous aspect.

It has two lateral perforations to place it on the tzompantli.[339] These were made by percussion; a pointed stone instrument was used for this purpose causing circular depressed fractures. [340] In addition, it has a radiating fracture extending from the opening. These alterations, as well as bevelling on the inner table, are typically perimortem.

The individual was flayed, resulting in two groups of cut marks. The first corresponds to a series of repetitive marks located on the sagittal plane, with anterior-posterior direction. They initiate in the frontal and are interrupted at 10.47 mm, right in the site in which there is an infectious process. The cuts are resumed at 33.36 mm from bregma and are interrupted at 54 mm from this point. On the parietal only one cut is preserved at 47.31 mm of bregma, which is 16.29 mm long. In the occipital there is another anterior-posterior incision that begins in lambda and measures 14.12 mm. The second group corresponds to a series of repetitive transverse cuts. These are located on both parietals,

[339]The one on the right side measures 96.94 mm in an anterior-posterior direction and 79.82 mm high. Perforation on the left side is smaller, measuring 66.49 mm in anterior-posterior direction and 62. 99 mm high.

[340] On the left side there is a circular mark of 3.35 mm. On the right side there are two depressed fractures, one located in the parietal (9.95 mm) and another in the temporal (6.9 mm).

approximately 55.51 mm from the coronal suture. On the left side the cuts are interrupted twice, ending 26.69 mm from the squamous suture. On the right side they are interrupted on two occasions and end 5.21 mm from the lateral perforation.

This individual was defleshed to obtain a skeletal aspect, which left cut marks in main muscle insertions, especially in the zygomatic, mastoid process, nuchal line, zygomatic processes of temporal bones, maxilla, left parietal (in the insertion of temporal muscle), as well as in mandible body and ramus. The skull has perimortem fractures of both mastoid processes, possibly resulting from the defleshing of the sternocleidomastoid. Periosteum remains were removed, leaving irregular and superficial cut marks, oriented in all directions; most were found in the parietals. The skull was adorned with shell and pyrite appliqués, of which only the right is preserved. [341] The skull was painted in blue and black, with traces of a grey coat on the frontal bone. The distribution of pigment led Aguirre Molina and Robles Cortés (2013) to propose that it was originally painted in a similar fashion as Individual 3. Finally, the skull was adorned with a white flint knife in the oral cavity.

4) Field osteoarchaeology analysis

Cranium and mandible were found articulated, but considering tzompantli skulls' reutilization most likely were already disarticulated when deposited. The face was originally oriented to West.

No compression or constriction effects were noted, but wall effects were documented. The presence of copal, shells and other materials, prevented the skull from collapsing. A

[341] Shell disc has a diameter of 32.33 mm; pyrite disc has a diameter of 20.26 mm. It is unknown if the skull was deposited with left appliqué and it was degraded and lost or if it was buried incomplete.

white flint knife was placed in the oral cavity. This individual was placed on top of a tezontle sculpture representing a long bone. It was associated to a miniature brazier, dressed flint knives, shells, copal resin and sawfish remains.

Individual 6 (Artefact 228)

Tzompantli skull with mandible and shell and pyrite appliqués in the orbits. It was deposited in the Southwest quadrant.

1) Age, sex and head modifications

Male[342] individual between 20 and 30 years old. [343] It presents a slight tabular-erect flattening in the occipital, almost imperceptible.

2) Health conditions

Dental disease: "A" caries in all premolars and molars. Horizontal wear with dentine exposure except for the right I_2, M_3, I^2 and left M^3, M_2. Antemortem loss of right M^3. Dental calculus with emphasis on the lower lingual side. The right lateral incisor has an anomalous shape.

Metabolic disease: mild (healed) spongy hyperostosis (type A), predominantly in occipital.

[342]The mastoid process and supraorbital ridge are very robust. The chin is squared, the mandible ramus is straight and massive.

[343] The composite score on Meindl and Lovejoy's technique (1985) gave a total of zero, which implies an individual under the age of 30. The third molar had already erupted and the phases of tooth wear (E and F) suggest an interval of 24 to 35 years (Lovejoy 1985). However, the state of the sutures rather suggests an individual under 30 years of age.

Offering: 141		
Individual: 6	**Sex**: male	**Head modifications**: slight tabular-erect flattening in occipital
Element: 228	**Age**: 20-30 years	
Description: tzompantli skull with mandible and shell and pyrite appliqués.		
Health conditions. Dental disease: Caries A. Horizontal wear with dentine exposure. Antemortem loss of right M^3. Dental calculus. Right lateral incisor with anomalous morphology. Metabolic disease: spongy hyperostosis type A, healed. Infectious disease: mild infectious process in bregma, parallel to sagittal suture.		

Table 14. Biological profile. Individual 6, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

The individual was decapitated shortly after death, although the technique is unknown, as the cervical vertebrae were removed, causing fractures in condyles and leaving cut marks on the posterior part of the foramen magnum. It also has a dark coloration. The skull is denser, lighter in color and vitreous, especially in the temporomandibular joints and orbit roofs, which might correspond to an indirect thermal alteration (boiling).

The individual was flayed, leaving two groups of cut marks. The first consists of a series of repetitive cuts parallel to the sagittal plane, in a longitudinal direction. It starts on the frontal bone 15.49 mm anterior to bregma. On the left parietal these cuts begin 26.4 mm from bregma and terminate on the occipital 42 mm from lambda. The second group of marks are oriented in a transverse direction and are located on the parietals 53.57 mm posterior to the coronal suture. On the left side, the cuts are interrupted on one occasion, ending in the lateral perforation, which implies that it was defleshed before making this hole. On the right side the cuts are interrupted four times ending in the lateral perforation. The marks tend to be repetitive on the lateral part of parietals.

The skull was defleshed leaving cut marks on main muscle insertions, especially the zygomatic, mastoid processes, zygomatic processes of temporal bone, maxilla, mandible body and ramus. The parietals present irregular, scarce and superficial marks, as a consequence of periosteum cleaning; these marks are smoother than in the rest of the individuals.

Two lateral perforations were made to place the skull on the tzompantli.[344] Both were done by percussion with a pointed instrument that left small circular depressed fractures.[345] These and the bevelling of inner table are characteristic of the perimortem interval. Shell and pyrite appliqués were placed in the orbits; the right is incomplete.[346] Blue and black pigment, in addition to a gray coat, revealed that it was painted similarly to individuals 3 and 5.

There is direct thermal alteration visible on the left I^1 and 1^2, possibly by contact with incandescent material, but it is unknown whether it was during its manufacture or prior to burial inside the offering, where no charcoal remains were found.

4) Field osteoarchaeology analysis

The mandible and cranium were partially articulated. As mentioned previously, there is a possibility that they had been deposited following disarticulation by decomposition. The face was oriented to West. No wall effects, constriction or compression were observed. The skull did not present decoration beyond the appliqués that simulate the eyes, but it was found associated with a Tláloc pot and a jar, three braziers, bivalves and darts. It was deposited on top of a tezontle sculpture in the shape of a long bone.

[344] The left measures 87.74 mm in the anterior-posterior direction and 73.55 mm high. The right perforation measures 84.91 mm anterior-posterior and 75. 09 mm high.
[345] On the right side there are two circular marks corresponding to this tool, measuring 5.31 and 4.21 mm in diameter.
[346] Shell discs are between 35.54 and 38.03 mm in diameter, while pyrite discs are between 18.32 and 18.86 mm in diameter.

Individual 7 (Artefact 596)

Tzompantli skull with mandible and shell and pyrite appliqués in the orbits. It was found in the Northeast quadrant.

1) Age, sex and head modifications

Male[347] between 20 and 30 years old[348] with no visible ante mortem modifications.

2) Health conditions

Dental disease: "A" caries in premolars and lower molars with the exception of right M_3 and left M^3; these have "B" caries. Horizontal dental wear with dentine exposure on all first molars. Abundant calculus on incisors lingual face, with loss of alveolar bone tissue. Left P^3 is rotated 90º and the right lateral incisor presents an anomalous morphology.

Metabolic disease: Enamel hypoplasia. Healed spongy hyperostosis (A), in occipital and parietal.

[347] Nuchal crest, mastoid process and supraorbital brow ridges are very robust. Mandible ramus and gonion are prominent; mentum is squared.

[348] The composite score on Meindl and Lovejoy's technique (1985) gave a total of zero, which implies an individual possibly under the age of 30. The third molar had already erupted and the phases of tooth wear (C and D) suggest an interval of 18 to 24 years (Lovejoy 1985).

Offering: 141

Individual: 7	**Sex**: male	**Head modifications**: none
Element: A596	**Age**: 20-30 years	
Description: tzompantli skull with mandible and shell and pyrite appliqués**.**		
Health conditions. Dental disease: Caries A and B. Horizontal dental wear with dentine exposure. Dental calculus. Left P^3 is rotated 90º. Right I^2 has an anomalous morphology. Metabolic disease: enamel hypoplasia. Healed spongy hyperostosis.		

Table 15. Biological profile. Individual 7, Offering 141. Photographs by Néstor Santiago (from Aguirre Molina and Robles Cortés 2013).

3) Analysis of cultural biostratinomic processes

The individual was decapitated in the perimortem interval by an unknown technique, as the vertebrae were removed leaving fractures on the condyles. The posterior margin of the foramen magnum has cuts and dark staining, very similar to that reported in the tzompantli skulls. It also has some areas in the base of the skull and the temporomandibular articulations, with a compact, pale and vitreous character suggesting that it could have been boiled.

This individual was flayed using the same technique noted in the other individuals, consisting of two groups of marks. The first corresponds to repetitive cuts in the sagittal plane, in longitudinal direction. In the frontal initiate on bregma and are interrupted at 22.95 mm from this point; cuts resume at 31.68 mm ending at 28.36 mm from glabella. On the left parietal these repetitive cuts start at 21.83 mm from bregma, are interrupted on three occasions, ending at the occipital, on the superior nuchal line. The second group corresponds to transverse cut marks on the parietals, approximately 73.69 mm from the coronal suture. On the left side cuts are interrupted on two occasions, ending in the lateral perforation, suggesting that it was first flayed. On the right side they are interrupted on two occasions ending 16 mm from the perforation. Cut marks tend to be more repetitive on lateral part of parietals. The skull was defleshed, which left marks in muscle insertions, especially on zygomatic, left mastoid process, superior nuchal line, mandibular body and ramus. It has a perimortem fracture on mastoid process, produced by the suppression of sternocleidomastoid.

Two lateral perforations were made to place it on the tzompantli.[349] Both were done by percussion with a pointed instrument, leaving small depressed fractures with bevelling of inner table. [350] Shell and pyrite appliqués were placed in the orbits. [351] It was painted in black and two bands of this color are preserved on mandible ramus. On right mastoid process and parietal has direct thermal alteration, possibly by contact with incandescent material, before its deposit inside the offering.

4) Field osteoarchaeology analysis

The mandible was articulated with the cranium, although it is likely that the joint was simulated. The skull rested on its right side, with the face oriented to North. No constriction or compression were reported, but wall effects were noted. A bone-shaped sculpture allowed the mandible to remain in an unstable position without collapsing. In addition, the skull was associated with copper bells,[352] copal, wooden sticks and darts, shells and flint knives.

Offering 141 and Human Sacrifice

While there is no evidence for the way in which these individuals were sacrificed, [353] this deposit has been essential for the study of post-sacrificial treatments and skulls reuse. It is considered a secondary burial because the decomposition of human remains did not

[349] The one on the left side measures 70.81 mm in anterior-posterior direction and is 71.38 mm high. The perforation on the right side measures 79.27 mm in an anterior-posterior direction and 62. 54 mm high.
[350] It has a circular shape, with a diameter between 3.65 and 8.52 mm.
[351] Shell discs are between 34.61 and 37.91 mm in diameter. The pyrite application is only preserved on the right side with a diameter of 24.89 mm; the one on the left side is degraded.
[352] Which left staining on the left mastoid area.
[353] Corpse treatments, age ranges and historical sources, among others, suggest that these are sacrificial victims. In contrast Mexica funerary rituals did not imply the mutilation of bodies, but their cremation or burial with funerary goods.

happen *in situ* (Duday 1997). Instead, the skulls were flayed and defleshed, and decomposition of remaining soft tissues had occurred during exhibition or prior use. The offering's original space was empty, in other words, the deposit was not filled with clay and wall effects are the result of the high density of goods placed inside.

Skulls, like other ritual goods, were buried in the same ceremony, so it is considered as a simultaneous or "multiple" deposit (Duday 1997). However, despite this, they may have been sacrificed on different occasions. Given different patterns of manufacture and reuse, there could be at least two decapitation events. The first would correspond to tzompantli skulls and the second to skulls with basal perforation. The first group would have been destined to the palisade and later transformed into effigies. It is not known if the latter were exhibited by inserting a vertical stake in the occipital perforation. If so, they remained immobile because they have no wear on the edges. In any case, it is clear that it took a considerable time before they were buried, since the mandibles were disarticulated as a result of decomposition and two were exchanged when painted.

Type of burial	Secondary
Original space	Empty (with sediment infiltration)
Type of deposit	Simultaneous (all bones buried in the same event)
Minimum number of decapitation events	Possibly two: a) tzompantli skulls; 2) basal perforated skulls
Natural biostratinomic processes	Passive disarticulation of mandibles (decomposition, no disarticulation marks)
Natural and diagenetic taphonomic processes associated with burial	Fractures, stains and adhering undetermined residues

Table 16. Deposit of human bone remains, Offering 141.

a) Victims' biological profiles

Who were the victims and what was the connection between them? The analysis of their biological profiles provides valuable information in this regard (table 17). First of all, there was a pattern in terms of age: six individuals were between 20 and 35 years old (85.71%) and one was between 30 and 45 years (14.29%). That is to say, this is an adult population, of productive age. Six of them correspond to males (85.71%), while one corresponds to a female (14.29%). A similar pattern can be seen in Templo Mayor deposits and has been observed also in the Huei Tzompantli (Chávez Balderas 2017, Ramírez and Flores in press), where the percentage of women is slightly higher than in this offering. [354]

Dental examination revealed that although all the individuals had caries, dental calculus, wear[355] and some impacted molars, in no case did they have severe dental disease.[356] All presented very mild spongy hyperostosis and in one case cribra orbitalia. These are lesions that involve the thickening of diploë, giving the bone a porous appearance (Roberts and Manchester 2005). Although these generally are considered as indicators of metabolic and nutritional stress, they can be produced by other conditions.[357]

Traditionally, porous cranial lesions have been considered to be signs of iron-deficiency anemia. However, as Phillip Walker and colleagues (2009:110) point out, this type of anemia is not a disease, but a symptom, in other words, while spongy hyperostosis

[354] In the remains recovered in Templo Mayor, 25% correspond to females, 19% are undetermined and 56% correspond to males (Chávez Balderas 2017).
[355] These first three are indicators of diet, oral hygiene and health conditions.
[356] This contrasts with children offered to Tláloc who had very poor dental health (Román Berrelleza 1990, Román Berrelleza and Chávez Balderas 2006).
[357] Porosity in the skull may also be associated with an inflammatory process, subperiosteal hematomas, osteoporosis, rickets and scurvy, having criteria to make a differential diagnosis. Walker and colleagues (2009:109) add that chronic scalp infections can also produce porosities on the outer table.

and *cribra orbitalia* can be found in this cases, anemia does not cause it. Instead, they suggest that the abundant presence of spongy hyperostosis in Pre-Hispanic populations may be due to megaloblastic anemia acquired by infants ingesting low vitamin B12 breast milk, gastrointestinal infections, and poor hygiene. *Cribra orbitalia* may also be caused by multiple conditions, including combined vitamin C and B12 deficiency (Walker et al. 2009:114, 119). For the purposes of this research I will consider these lesions as non-specific stress indicators, reflecting periods of nutritional deficiencies, illness or lack of hygiene. In the case of individuals in Offering 141, the lesions are mild and healed. [358] In addition to these lesions, two individuals presented linear enamel hypoplasia,[359] a condition characterized by the presence of transverse lines and grooves that correspond to defects in enamel development, the result of a metabolic insult to the organism. These non-specific indicators also may indicate stress caused by diet and disease (White et al. 2012: 456).

Undoubtedly, two aspects that drew particular attention when analyzing the biological profile were the presence of an infectious process at bregma and anomalous dental morphologies. The reason is that these observations were not frequent in bone remains of sacrificial victims previously analyzed. First, I will discuss the infectious process at bregma. It was located in four of the seven individuals (57.14%): two tzompantli skulls and two skulls with basal perforation (individuals 1, 3, 5 and 6). This lesion at bregma consists of a thickening of the outer table which, according to John Verano (personal communication, May 2014), seems to have been caused by a deposition of subperiostial bone on the cortex and not by the expansion of marrow space. In addition,

[358] In the Templo Mayor collection there were 35 cases of spongy hyperostosis (35 % of individuals) and nine cases of *cribra orbitalia* (9.09 %). Only one of these cases was severe ("hair-on-end appearance").
[359] In the Temple Major collection only four individuals showed enamel hypoplasia (4.04%).

the lesion is a localized swelling limited to a very small area, and one not typical of spongy hyperostosis. Irritation of the periosteum may be the result of localized infection or trauma. Another possibility is that they carried heavy loads on their heads, although this seems less likely in two individuals it is barely perceptible, while in two others it is more severe; in one of them a visible bump can be seen on the left side (Individual 1).

Figure 143. Lesion on bregma. General view and detail where swelling and porosity are observed. Individual 1, Offering 141.

Figure 144. Lesion on bregma. Swelling is observed parallel to the sagittal suture. Individual 3, Offering 141.

The presence of this lesion leads to wonder if they had been selected for having this feature or if they had suffered some antemortem trauma. It is unusual to find an infectious or inflammatory process of this nature and location in four individuals deposited in the same offering. For this reason, it is possible that this lesion is the result of a traumatic action taken against the sacrificial victims, which involved inflammation of the scalp.[360]

On this possibility I must mention that similar treatments have been registered in some cultures of North America and Peru. For example, Gabriel Nadeau (1941) documented numerous examples in the United States and Canada, which correspond to the practice of scalping, perpetrated against enemies. The removal of the scalp or a part of it as a trophy or as torture is not a fatal procedure and may lead to an infection if the victim survives. Complications associated with scalp avulsion include bleeding and infection or even bone necrosis if untreated (Nadeau 1941:186).[361]

Of great importance for this study is research by Marla Toyne (2011) who documented two probable scalping cases from Peru. Two individuals belonging to the Chachapoyas culture presented a periostial bone reaction on the cranial vault that coincided with an area delimited by cut marks, implying that these individuals had their scalp removed and survived long enough for the bone to react to infection. This type of osteitis could be the result of deliberate traumatic action or surgery (Toyne 2011:234-235).

[360] Cortés Meléndez (2018) reported that a Stage IVb individual recovered in Plaza Gamio excavations has an infectious process on the sagittal suture.
[361] The author does not report having carried out a direct analysis of skeletal remains.

I have cited these cases aware that my examples do not show cut marks associated with the lesions at bregma. However, it is clear that there was bone swelling and a periosteal reaction located in the same anatomical region in four individuals (pronounced in two, barely perceptible in the other two). A possible explanation for this type of lesion would be the custom of pulling the hair from the crown of victims' heads to appropriate their strength and mark their capture (Graulich 2016: 190-196). Although in numerous written accounts it is mentioned that the captives had their hair cut, Sahagún (2000, I:137-138) explains that for the sacrifice made in *tlacaxipehualiztli*, hair was torn. In addition, he adds that they were pulled by the hair to the sacrificial stone. Something similar would also happen for *panquetzaliztli* and *izcalli* months, where he also narrates that their hair was pulled out (Sahagún 2000, I: 162, 168); in all these cases locks of hair would serve as relics.

It is unlikely that this action would result in significant avulsion of the scalp unless assisted by a sharp instrument. However, it could cause an injury which, if left untreated for days or weeks, could cause infection and localized bone necrosis from avulsion of the periosteum. Although there is no way to be certain that this was the cause of the lesion suffered by the four individuals, it suggests a possible scenario in which it could have happened. Alternatively, there may have been another type of ritual practice involving this body region that was not reported by historical sources.

Another feature of note is the presence of dental morphological variants in three of the skulls (individuals 3, 6 and 7) (see Figure 145). In all three cases, these involves the right lateral incisors. In addition, Individual 5 presents paramasticatory wear on his lateral incisors, which would have given him a distinctive appearance. Given the location of these

features, they would have been visible when victims spoke, ate or smiled, so they would hardly go unnoticed. These anomalous morphologies (dental nonmetric variation), are commonly used to assess biological affinity (White et al. 2012). Although in this analysis I will not focus on this type of analysis, I would like to state the following.

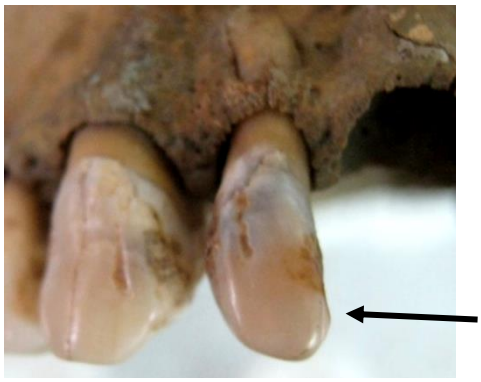
From research by Bustos (2012) and Barrera (2014), it can be concluded that analysis of genetic affinity in a collection such as Templo Mayor should be accompanied by an analysis of provenance. Clearly, this is a population with diverse origins and migratory histories, sacrificed in a cosmopolitan city. By itself the study of the genetic filiation of victims does not answer the questions of where and how they were obtained for sacrifice, but it does reflect population movements in Late Postclassic. The analysis of dental nonmetric traits as yet to be done, but I will provide the reader with isotopic data, hoping that future genetic affinity analyses will use these results to improve archaeological interpretations. [362] Based on strontium isotopic analysis, two of these individuals were born and died in the Basin of Mexico (individuals 3 and 6), while the third is of foreign origin, but spent his last 10 years in Tenochtitlan (Individual 7). Thus, dental variations should not

[362] A previous study by Corey Ragsdale and collaborators (2016) compares 30 of the 99 individuals from Templo Mayor with 127 individuals corresponding to ten samples from other Mesoamerican sites. For this study they used nonmetric multidimensional scaling (MDS). As part of their results they report genetic affinity of some of the sacrificial victims with samples from the Toluca Valley, the West, the Gulf Coast and the Central Altiplano. It is interesting to note that strontium isotopy results are available for four of the reported individuals (Barrera 2014). In one of them (Of.11-34) the origin of Perote coincides with the genetic affinity with the area of the Gulf and Cholula/Tlaxcala. For two individuals reported outside the distribution area, isotope analysis placed them in the Tula region (Of. 88-15) and in the Perote basin, Veracruz (Of. 20-39). On the other hand, the last individual (Of. 13-64) was linked by genetic affinity with the Gulf and Cholula/Tlaxcala, but its isotopic origin places it in Tula (Barrera 2014:194-198, Ragsdale et al. 2016:365). This discrepancy leads to think about the great population mobility of Late Posclassic, and that genetic affinity will not necessarily explain the origin and obtaining of sacrificial victims. In this sense, the combination of both types of data is of great importance.

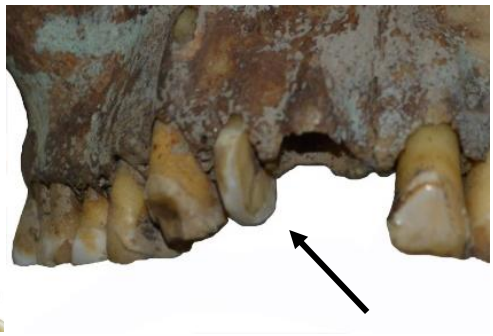
be interpreted simply as evidence of foreign origin but also as an indicator of the migratory history of Central Highland populations during the Late Postclassic.

In any case, due to the low frequency of these dental anomalies in the skeletal collection of Templo Mayor (less than 3%) and the fact that they were found in three individuals from the same offering, it raises the question of whether these individuals were chosen for sacrifice for having this feature. In Chapter 3 I explained how victims could be selected based on certain physical characteristics, such as the presence of two whirlpools of hair on the head, in the case of children sacrificed to Tlaloc. Although there are no descriptions of selection based on teeth, this remains like a possibility.

The relationship of dental modification and beliefs regarding the cosmos has been explored by Mireya Montiel and colleagues (2006). The authors compared these treatments with dental morphology of some animal species of ritual importance, concluding that fauna could be an inspiration to carry out these dental modifications. If they are correct, most likely they evoked powers attributed to animal species. Although morphological differences found in individuals from Offering 141 are not due to cultural modifications, most likely they were not unnoticed and might have been attributed to supernatural forces or even with ritual fauna. Could they have been chosen for these characteristics? It cannot be said for sure, but their presence in this offering raises it as a possibility.



a)



b) c)

Figure 145. Dental anomalies. a) right lateral superior incisor, Individual 6, b) right lateral superior incisor, Individual 7. Winging of upper central incisors; c) upper right incisor, Individual 3. Photographs by Ximena Chávez Balderas, PTM.

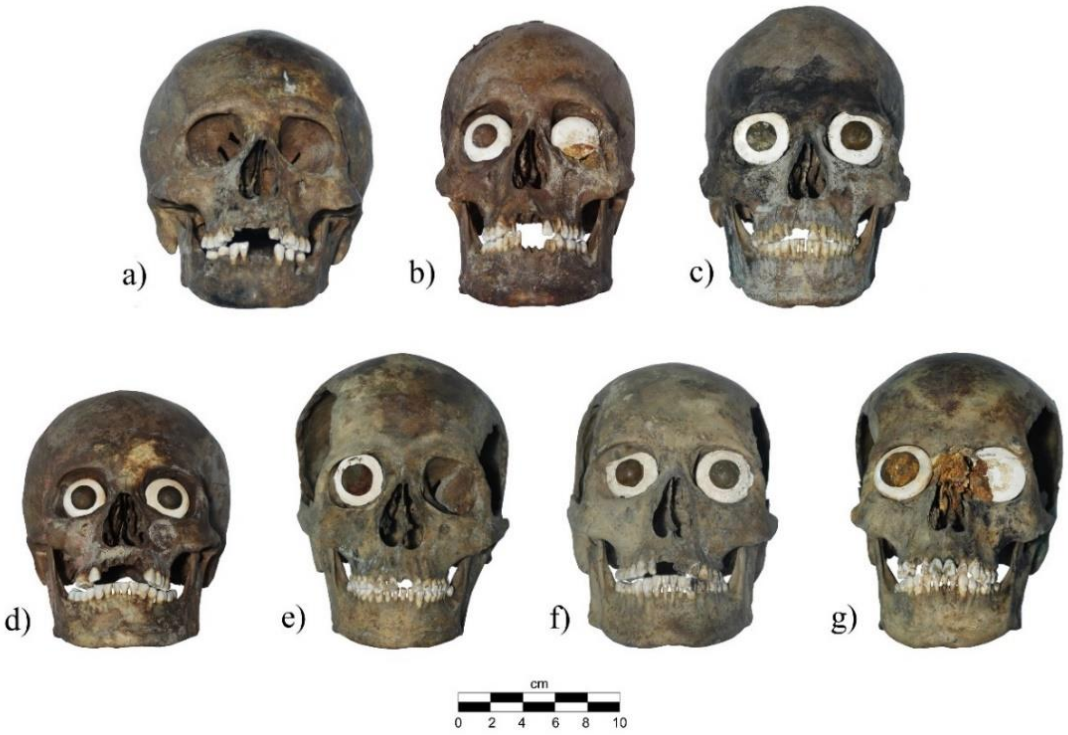


Figure 146. Skulls from Offering 141 after conservation treatments. Photograph by Jesús Néstor Santiago (from Chávez Balderas et al. 2015).

Individual	Age	Sex	Dental disease	Metabolic disease	Infectious disease
1	20-30 years	Male	Caries A, B and C. Dental calculus and horizontal wear.	Spongy Hyperostosis, *cribra orbitalia*	Infection on bregma
2	20-30 years	Male	Caries A and B. Dental calculus and horizontal wear. Impacted molars.	Spongy Hyperostosis	---
3	20-30 years	Male	Caries A. Dental calculus and horizontal wear. Right I^2 with anomalous morphology.	Spongy Hyperostosis	Infection on bregma
4	20-30 years	Female	Caries A and B. Horizontal wear. M_1 antemortem loss.	Enamel hypoplasia, Spongy Hyperostosis	---

5	30-40 years	Male	Caries A. Horizontal and diagonal wear. Dental calculus.	Spongy Hyperostosis	Infection on bregma
6	20-30 years	Male	Caries A. Horizontal wear. Antemortem loss of right M^3. Dental calculus. Right I^2 with anomalous morphology.	Spongy Hyperostosis	Infection on bregma
7	20-30 years	Male	Caries A and B. Dental calculus and horizontal wear. Left P^3 rotated 90 º. Right I^2 with anomalous morphology.	Enamel hypoplasia, Spongy Hyperostosis	---

Table 17. Biological profile and health conditions. Offering 141.

b) Provenance of sacrificial victims

Oxygen isotope studies of all sacrificial victims reported in this dissertation were conducted at the Laboratory for Stable Isotope Science of the University of Western Ontario under the direction of Fred Longstaffe and Diana K. Moreiras Reynaga.[363] The results by this team provide information on which individuals are of foreign origin, which migrated to the basin and who stayed there for a period of time (table 18).

[363] These analysis were conducted thanks to the generous support of Tulane's School of Liberal Arts, through the Summer Merit Fellowship.

Individual	Enamel	Bone	Provenience
Individual 1	δ18Op of +16.1 ‰	δ18Op of +14.4 ‰	Local to de Basin of Mexico and remained in the same location until sacrifice
Individual 2	δ18Op of +16.6 ‰	δ18Op of +14.7 ‰	Born outside of the Basin of Mexico and moved to Tenochtitlan. Long-term resident (>10 years) of the Basin before sacrifice.
Individual 3	δ18Op of +14.6 ‰	δ18Op +14.7 ‰	Local to de Basin of Mexico and remained in the same location until sacrifice
Individual 4	δ18Op of +16.1 ‰	δ18Op +13.9 ‰	Lived in the Basin of Mexico during childhood and moved outside during adulthood. She returned to the Basin soon before sacrifice.
Individual 5	δ18Op of +17.0 ‰	δ18Op of +15.1 ‰	Born outside the Basin of Mexico and moved to Tenochtitlan. Long-term resident (>10 years) of the Basin of Mexico before sacrifice.
Individual 6	δ18Op of +15.4 ‰	δ18Op of +14.4 ‰	Local to the Basin of Mexico and remained in the same location until sacrifice
Individual 7	δ18Op of +16.5 ‰	δ18Op of +15.0 ‰	Most likely he was born in Central México and moved to Tenochtitlan. Long-term resident (>10 years) of the Basin of Mexico before sacrifice.

Table 18. Results of oxygen isotope analysis. From Moreiras Reynaga and Longstaffe (2018a). [364]

Results revealed an interesting diversity regarding individuals' provenance and life histories. The sample can be divided into three different groups: 1) those who spent their childhood and adult life in the Basin of Mexico (local) (individuals 1, 3 and 6); 2) those who are of foreign origin and spent the last ten years of their life in Tenochtitlan before sacrifice (migrants to the basin of Mexico) (individuals 2, 5 and 7); and 3) those who were originally from the basin of Mexico, migrated during adult life and returned to Tenochtitlan

[364] Considering the teeth selected as sample, isotopic signatures of childhood correspond to the following ranges. Individual 1: 6 mo (+ 3 mo)- 4 yr (+12 mo); Individual 2: 2 yr (+8 mo)- 6 yr (+24 mo); Individuals 3 and 5: 9 yr (+24 mo)- 12 (+36 mo); Individuals 4, 6 and 7: 3 yr (+12 mo)- 8 yr (+24 mo) (Moreiras Reynaga and Longstaffe 2018a).

and sacrificed (migrants from the basin of Mexico to other parts of Mesoamerica) (individual 4).

Clearly these results are revealing, as they demonstrate that the idea that all sacrificial victims were foreign war captives brought to Tenochtitlan for sacrifice is far from true. The results instead support a model where there were various forms of acquisition of victims. It also should be noted that with respect to Group 1 (local individuals), their identification as being from the Basin of Mexico does not necessarily imply that they were from Tenochtitlan, although this possibility cannot be ruled out. They could have come from neighboring localities or they could be tenochcas who were sold as slaves. Group 2 represents a pattern previously detected by Barrera (2014: 191) by strontium isotope analysis, that is, individuals of foreign origin who were not brought to Tenochtitlan immediately for sacrifice (such as a warrior captured in combat); instead, these people lived in the city for at least ten years and were somehow assimilated by Tenochca society until they were sacrificed. Finally, Group 3 turns out to be the most interesting and unexpected: it is a single case of a female native to the Basin of Mexico who migrated to another part of Mesoamerica and returned to the region only to be sacrificed.

In sum, strontium isotopes suggest that sacrifices were not all warriors brought from distant regions for sacrifice. Instead, they suggest a more complex scenario involving the interaction between populations and specific migration patterns of individuals. They also suggest that a significant number of sacrificial victims were obtained through trade or tribute, and that most spent their last years in Tenochtitlan.

c) Posthumous treatments

Post-sacrificial treatments given to individuals were similar and highly standardized. Although two different categories can be distinguished—skulls with basal perforation and tzompantli skulls—all were decapitated, flayed, defleshed and perforated in a similar manner. Although the specific decapitation method is not known, it is clear that this was followed by disarticulation of the cervical vertebrae still articulated to the skull. The neck portions removed during this process were sometimes used as articulated offerings, such as those recovered by the Urban Archaeology Program in the Ball Game. Another possibility is that they were stored in some location, because there is clear evidence that the remains of sacrificial victims were reused in different rituals and were not discarded. Individuals 6 and 7 presented remains of a black colored material within the disarticulation marks left when removing vertebrae from the occipital. This material has a different consistency than pigment remnants, and therefore might be the bitumen documented by Argáez and collaborators (2011: 2987) in skeletal remains from Tlatelolco. According to these authors, this bitumen would have served to lubricate tools to facilitate disarticulation of bones.

Individuals were flayed, but the technique used was very different from that observed in Stage IVb skulls (1469-1481 AD) (Chávez Balderas 2017). These have anterior-posterior cut marks on the sagittal plane or parallel to it. In contrast, almost all the skulls of Offering 141, buried between AD 1486 and 1502, also present transverse marks

parallel to the coronal suture. These suggest that the skin of the face was obtained separately from that of the posterior part of the skull.[365]

The change in the way the skin was obtained could be interpreted as a temporary variant where new techniques of body preparation were applied, where one body treatment was imposed on another. Alternatively it could indicate that the skins were used for different ritual purposes. Those of Stage VI could have been used in ceremonies that had greater emphasis on obtaining the facial portion of the skin. This question will be addressed when analyzing the skulls of the Huei Tzompantli by the Urban Archaeology Program. The meticulous study of cut marks using scanning electron microscopy (SEM) by Cortés (2018), revealed that most of the tools used for flaying were obsidian, although he also documented cases in which this procedure was performed with flint instruments.

All the skulls were defleshed to obtain a skeletal appearance, for which muscles and other soft tissues were removed. Skulls were defleshed before making the perforations that permitted removal of the brain, as indicated by some examples where cut marks are interrupted by these perforations.[366] All seven skulls present some areas compatible with indirect thermal alteration (boiling). However, these areas are localized and do not affect the entire skull as was seen in a skull from the construction fill (Chávez Balderas 2017) or in individuals from Offering 159 (Jiménez and García, in press). Boiling of skulls is not necessarily related to meat consumption, but instead may have been done to facilitate defleshing.

[365] In his study Cortés (2018) documented this same technique in two individuals found in the Calmécac, also corresponding to Stage VI.
[366] And furthermore, these marks are visible in the manufacturing debris, of which I will address later.

For the three individuals that were destined to join the tzompantli, two lateral perforations were made by percussion[367] with a pointed instrument[368] that produced depressed fractures with adherent fragments and bevelling of the inner table. The use of such an instrument presumably served to prevent unwanted fractures beyond the perforation. It is possible that first blows were made in the region of pterion, as at this point the skull is thinner and more easily fractured. Once a fracture was done, the edge was struck with this pointed instrument until the perforation reached the desired size.

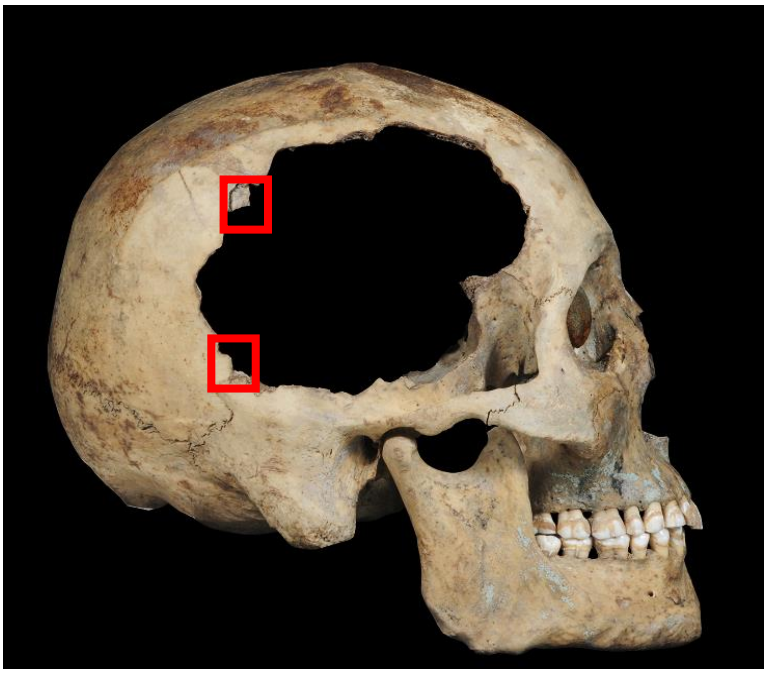


Figure 147. Tzompantli skull. Individual 5, Offering 141. Lateral perforation with an adhering fragment and areas showing the size and shape of percussion instrument.

The remaining four individuals had a basal perforation. This perforation is simpler to accomplish, as percussion begins at the foramen magnum. In none of the cases did the

[367] Perforation diameters are variable. In fact, Individual 5 has the largest and smallest perforation: the one on the right side is 96.94 mm in anterior-posterior direction and 79.82 mm high. The perforation on the left side is 66.49 mm in anterior-posterior direction and 62. 99 mm high.
[368]Leaving a mark between 3.64 and 9.95 mm.

edges of the broken-out area demonstrate wear, which implies that if the skulls were exhibited on a pole there was no friction. It is interesting to note that there is only one skull with a basal perforation corresponding to Stage IVb (1469-1481 A.D.), while the remaining five were recovered in Stage VI (1486-1502 A.D.). In the same manner that there was a change in flaying techniques from one stage to the other, it is possible that basal perforation became more popular through time.

Figure 148. Skull with basal perforation. Individual 1, Offering 141. Photograph by Néstor Santiago.

As discussed in Chapter 5, these skulls would have been exhibited, carried or utilized in other rituals before being reused to make deity effigies. For this purpose they were painted

and flint knives were placed in the oral cavity, with shell and pyrite appliqués representing the eyes. It is likely that other garments such as paper or fiber headdresses were placed on them that did not preserve. A central key to understanding their function as effigies is their surface coloration. Thanks to the meticulous study carried out by Robles Cortés and Aguirre Molina (Robles Cortés and Aguirre Molina 2017, Robles Cortés et al. in press), it was possible to reconstruct the original polychrome paint applied to these skulls.

To do this, they identified colors using DStrech and Adobe Photoshop software. DStretch allowed identification of colors that were not visible to the naked eye, while Photoshop was used to produce illustrations of color distribution. They concluded that the skulls were painted in three ways: 1) blue at the inferior part of the splanchnocranium and mandible, and black on the superior part; 2) black; and 3) red, with black areas on the parietals and temporals, as well as blue-grayish circles on the zygomatic bones. [369]

Later, the skulls were covered with a coat of grayish blue, which is interpreted as part of the inhumation ritual, evoking the passage in which Alvarado Tezozómoc (1944: 265) notes that cremated remains of the Tízoc were sprinkled with a "blue water". In another context this practice was discussed by Chávez Balderas (2007), who documented the presence of blue pigment on cremated human remains recovered in Offering 37, distributed over the bones as small stains, as if water had been splashed on them.

[369] X-ray diffraction (XRD) analysis by Giacomo Chiari at the Getty Conservation Institute showed that hematite is the main component of red pigment. Hydroxyapatite was found in black pigment: this could imply that cremated bone was used in its manufacture, although the presence of this mineral could be a contamination, as it is the inorganic component of bone. Blue pigment samples had sepiolite, vermiculite and quartz. Blue-grayish samples contained moscovite, sepiolite and glauconite (Robles Cortés and Aguirre Molina 2017).

These skulls represent deities, essentially Mictlantecuhtli, depicted with black and blue facial painting. As for the female skull, its coloration is extraordinarily similar to goddess Cihuacóatl, who is also depicted artistically with skeletal attributes (Robles Cortés and Aguirre Molina 2017, Robles Cortés et al., in press).[370]

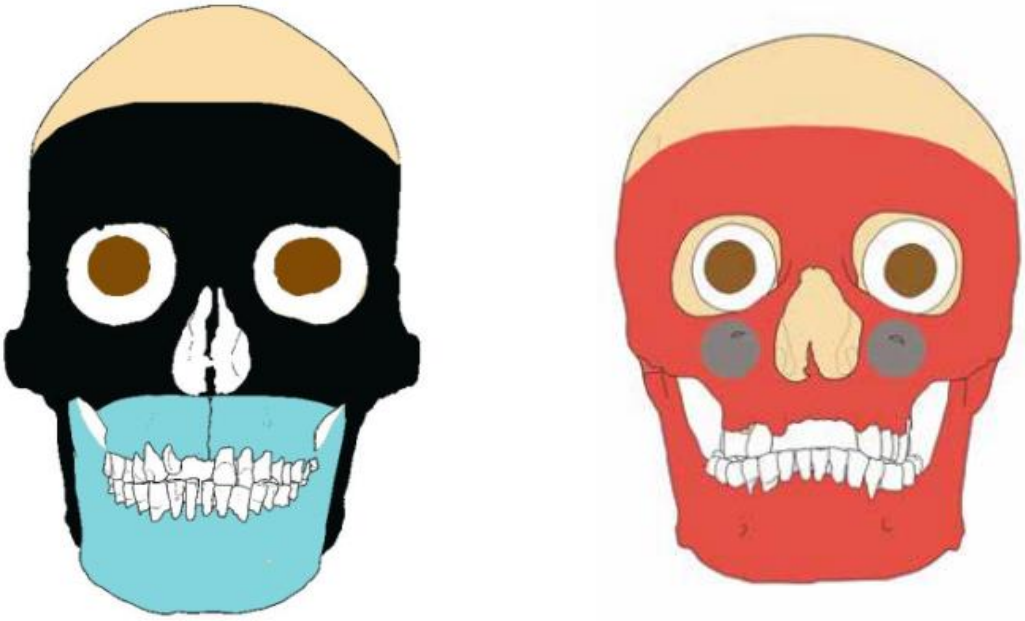


Figure 149. Chromatic reconstruction of two skulls from Offering 141. From Aguirre Molina and Robles Cortés (2013).

[370] Chromatism of skeletal remains was first reported in the early 20th century by Leopoldo Batres (1969: 66-75). Chávez Balderas (2017) also found traces of pigments in some skulls from the Templo Mayor collection, however poor conservation prevented chromatic reconstitution. .

Individual	Flaying	Defleshing	Percussion basal perforation	Percussion lateral perforation	Thermal alteration	Periosteal removal	Chromatism
1	Transversal Longitudinal	Cut marks	Yes	--	Possibly (indirect)	Yes	Black and gray
2	Longitudinal	Cut marks/ fractures	Yes	---	Possibly (indirect)	Yes	Black and gray
3	Transversal Longitudinal	Cut marks/ fractures	Yes	---	Possibly (indirect)	Yes	Blue, gray and black
4	Transversal Longitudinal	Cut marks/ fractures	Yes	---	Possibly (indirect)	Yes	Red, black and gray
5	Transversal Longitudinal	Cut marks/ fractures	---	Yes	Indirect	Yes	Blue, gray and black
6	Transversal Longitudinal	Cut marks	---	Yes	Indirect and direct	Yes	Blue, gray and black
7	Transversal Longitudinal	Cut marks/ fractures	---	Yes	Indirect and direct	Yes	Blue, gray and black

Table 19. Posthumous treatments, Offering 141.

d) Symbolism of sacrificial victims in this deposit

Similar to skulls recovered in the offerings of Templo Mayor, these individuals represented deities. Their original use is unknown, but they may have been exhibited or used as pectorals for priests and sculptures, as suggested by iconography and historical sources (Chávez Balderas 2018b). Their original symbolism changed when they were buried in this deposit, becoming effigies and recipients of gods. Considering their attire and coloration, the six males represented Mictlantecuhtli, while the female represented Cihuacóatl. The first is lord of the Underworld, who receives the dead when they arrive to this place, and is eager for sacrificial blood. Cihuacóatl, the "snake woman", is related to fertility, maternity, femininity, war, sacrifice and death; she is sometimes considered Mictlantecuhtli's wife (Johansson 1998). On page 33 of the *Codex Laud* (1994) both gods were depicted with a fleshless mandible. Both hold one individual, dead and naked,

possibly a captive judging by the way in which the goddess holds his hair. Together, they deliver the corpse to the earth's jaws (Figure 150).[371]

Figure 150. Cihuacóatl and Mictlantecuhtli deliver a captive's corpse into the earth's jaws. *Codex Laud* (1994), page 33.

In accordance with the gods they represent, six individuals were oriented to the west, a region where the Sun travels to the underworld; the remaining faced north, a cardinal point also associated with Mictlan. In the offerings of Templo Mayor, these effigies are usually paired, making this a unique case.

[371] Anders and Jansen (*Codex Laud* 1994: 173), identify them with a couple who, under the aspect of death, murder their son. However, he carries a *cuexcochtechimalli* in his head, for which Mateos Higuera (1993:43) identifies them as Mictlantecuhtli and Cihuacóatl.

In addition to their garments, other items help to understand their function in the deposit. Robles Cortés and collaborators (in press), notice that five skulls were on top of bone-shaped tezontle sculptures and two more were placed on brain corals (*Diploria strigosa*), which were covered with skin fragments from a roseate spoonbill (*Platalea ajaja*) and a puma (*Puma concolor*). Based on illustrations in codices, the authors identify these components as seats; these usually belong to deities, elite personages or warriors. These effigies were buried in their seats, in the proximity of other deities' representations as part of a complex symbolic discourse in which the telluric symbols of death, war and fertility are all abundant.

Offering 149

This deposit was excavated by archaeologists Julia Pérez Pérez and Jose María García between January and March of 2012, during the exploration of Operation 23. Offering 149 was assigned to a box made of andesite slabs,[372] placed in the Cuauhxicalco (Building O) construction fill (Figure 151).

Five hundred and forty objects were found inside this box: 429 registered as Organic Materials and 111 as Artefacts. The offering was excavated in six levels. It was initiated with the deposit of small artifacts, including five green stone beads, a miniature

[372] The stone box was built at the entrance of a tunnel leading to the center of the Cuauhxicalco; it is 46 cm wide and is flanked by two straight walls. To build this box, the West wall of the entrance was reused, reducing the space with two walls: one to the north and one to the south. In order to differentiate both spaces, the entrance was called Continent 1 and the space containing the offering was called Continent 2 (Pérez Pérez and Chávez Balderas 2016). The box was 120 cm long, 114 cm wide and 100 cm deep.

gold disc, projectile points, copal resin and six flint knives. Later the feet and hands of two children were deposited, as well as various animal remains (fish, snakes and amphibians). Two animal pelts were also included: a golden eagle (*Aquila chrysaetos*) and an unidentified bird, which were buried west of the human remains. The children's skulls were buried one in the eastern half of the offering and the other in the west; each carried a flint knife in the oral cavity. Subsequently, priests deposited two ceramic braziers and 24 shell pendants.[373] Finally a curved obsidian scepter (or some kind of sickle) and 30 flint knives were placed inside the box (Pérez Pérez and Chávez Balderas 2016).

Figure 151. Offering 149, Level 1. Photograph by Jesus Néstor Santiago.

Mapping, photographs, descriptions, sampling and soil analysis were done for each excavation level. Human and animal remains were commingled making it difficult to

[373] Twenty-three correspond to *Oliva incrassata* and one more to *Oliva scripta*. The species were identified by Belem Zúñiga Arellano (Pérez Pérez and Chávez Balderas 2016).

determine how many individuals and species were represented. Also, it was not possible to determine if the skeletons corresponded to primary or secondary burials and what caused the dispersion and comingling of skeletal elements. By good fortune, archaeologists Pérez and García conducted a systematic recovery including digitized mapping of each bone using AutoCAD. Each bone was labeled, cleaned by a conservator and marked with a field number. By doing a careful and systematic recovery, the researchers set the ideal scenario for reconstructing and understanding the nature of this deposit.

Considering bone scattering and the fact that no taphonomic observations were made in the field, I carried out the following steps: separation of human and faunal remains; anatomical identification; siding; individualization of commingled remains of both individuals;[374] inventory in a database (Filemaker) and spatial distribution analysis (AutoCAD). The results are presented below.

Vertical placement	Construction fill
Horizontal placement	Northeast side of Cuauhxicalco
Stage	VI-2 (AD 1489-1502)
Symmetry	None
Container	Andesite ashlar stone box
Dimensions	E-W: 114 cm N-S: 120 cm Depth: 100 cm

Table 20. Offering 149

[374] Luckily, there is a considerable difference in height of the two children, which facilitated separation of their bones.

Individual	Element	Description	Level	Quadrant
1	MO 336	Severed skull, four cervical vertebrae, and 48 hand and feet bones	1-4	East
2	MO 335	Severed skull, three cervical vertebrae, and 36 hand and feet bones	1-4	West

Table 21. Inventory of individuals deposited in Offering 149.[375]

Individual 1 (MO 336)[376]

Individual 1 comprised the skull, four cervical vertebrae and 48 bones corresponding to both feet and hands. It was found in the eastern half of the offering and carried a flint knife inside the oral cavity.

1) Age, sex and head modifications

Child approximately of 6 (±2) years old, age determined by dental eruption (Ubelaker 1999). Sex is undetermined and DNA analysis has yet to be conducted.

2) Health conditions

Dental disease: "A" caries in all deciduous molars. Permanent molars (M1) with dental fluorosis. Wormian bone (non-pathological anatomical variant).

[375] A lower central incisor of an adult was found in the offering fill; most likely its presence was incidental.
[376] This information was previously reported in Pérez Pérez and Chávez Balderas, 2016.

Offering 149

Individual: 1	**Sex**: undetermined	**Head modifications**: none
Element: 336	**Age**: 6 ±2 years	
Description: Skull, mandible, four cervical vertebrae and 54 bones of feet and hands. Flint knife in oral cavity.		
Health conditions. Dental disease: "A" caries in deciduous molars. Dental fluorosis in first permanent molars. Others: Wormian bone.		

Table 22. Biological profile. Individual 1, Offering 149. Photographs by Mirsa Islas.

3) Analysis of cultural biostratinomic processes

The child was dismembered in order to harvest the head, hands and feet. It was decapitated soon after death by disarticulating the neck with a sharp implement in an anterior-posterior direction. Decapitation was done between C4 and C5. The anterior part of the C4 vertebral body has three cut marks on the anterior face (one very deep and two very smooth and repetitive) and the spinal process has a perimortem fracture with plastic deformation, caused by bone fragility (figure 152 and table 23). This type of decapitation was the most common in Templo Mayor, although it is the first time it has been reported for children.[377] Feet and hands were also disarticulated with a sharp implement, leaving cut marks in the superior face of left talus (figure 153). The child was neither defleshed nor flayed and was buried with soft tissues.

a) b)

Figure 152. C4, Individual 1. a) perimortem fractures with plastic deformation in the spinous process; b) cut marks on vertebral body. Photograph by Ximena Chávez Balderas.

[377] Other children were decapitated to manufacture skull masks, for which their vertebrae were suppressed.

Offering 149	
Anatomical location of perimortem cut marks and fractures: C4 (body and spinous process).	**Individual**: 1

Table 23. Perimortem trauma in C4, Individual 1.

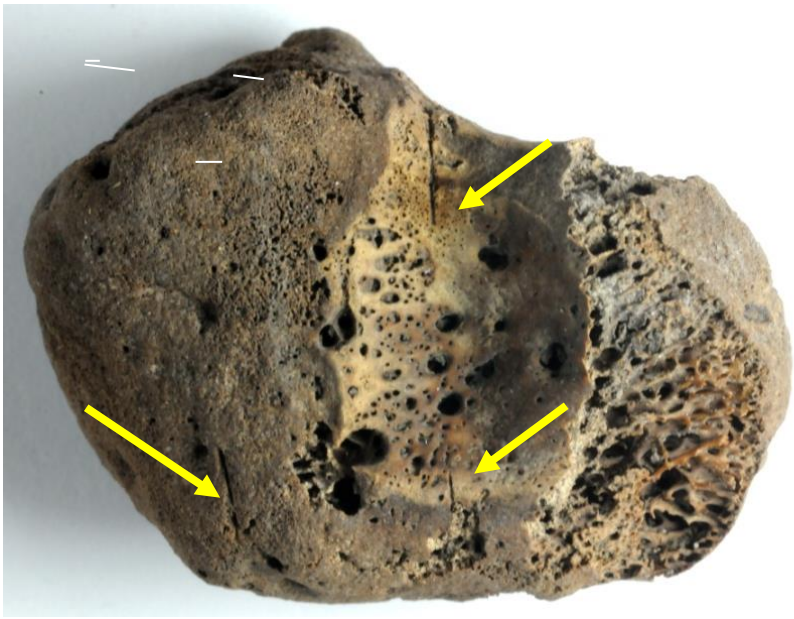


Figure 153. Left talus, Individual 1, Offering 149. Disarticulation cut marks on the articular facet with tibia. Photograph by Ximena Chávez Balderas

4) Field osteoarchaeology analysis

The remains of both children were disturbed by rodents,[378] with consumption of the epiphyses, dispersion and mixing of bones. In some areas incisor marks are seen on diaphyses (figure 154). Of the total remains attributed to Individual 1, at least eighteen presented these alterations (33.33%), and appear to have occurred on fresh bone.

Figure 154. Rodent disturbances. Incisor marks and epiphyses consumption. Individual 1, Offering 149. Photograph by Ximena Chávez Balderas.

As each bone was mapped in the field, I was able to reproduce in laboratory the position in which they were found. I discovered that despite disturbance some hand and foot bones were in strict and approximate anatomical connection. Considering that these anatomical

[378] Mouse bone remains, possibly *Peromyscus maniculatus*, were recovered during the excavation of this offering.

segments are labile joints - the first to disarticulate during decomposition (Duday 1997) - there is no doubt that they were placed shortly after death.

As for the skull and neck, the atlas was displaced: one half to the north and the other to south. C2 and C3 were in an anatomical position but C4 was displaced to the southwest. The skull separated at the coronal suture and collapsed; this demonstrates that decomposition took place in an empty space. There were no wall effects, compression or constriction. Distribution analysis of remains indicated that the skull and four cervical vertebrae were placed in the eastern half of the offering, facing slightly to the northwest[379] and resting on flint knives, symbols of sacrifice.

After anatomical identification and siding of feet and hands bones of both individuals I conducted the distribution analysis. Although dispersion by rodents disarticulated the bones, I discovered that elements of the same limb tended to concentrate in certain areas. In addition, some metacarpals, metatarsals and phalanges remained in anatomical connection or relation, which made it possible to know that fingers were oriented to the northwest and northeast. From this analysis I concluded that all feet and hands were placed around the skull of Individual 1, surrounding it, but with most of segments north of this child (figure 155). In contrast, Individual 2 was associated with two birds' pelts.

[379] Position inferred from the mandible which is a more stable element.

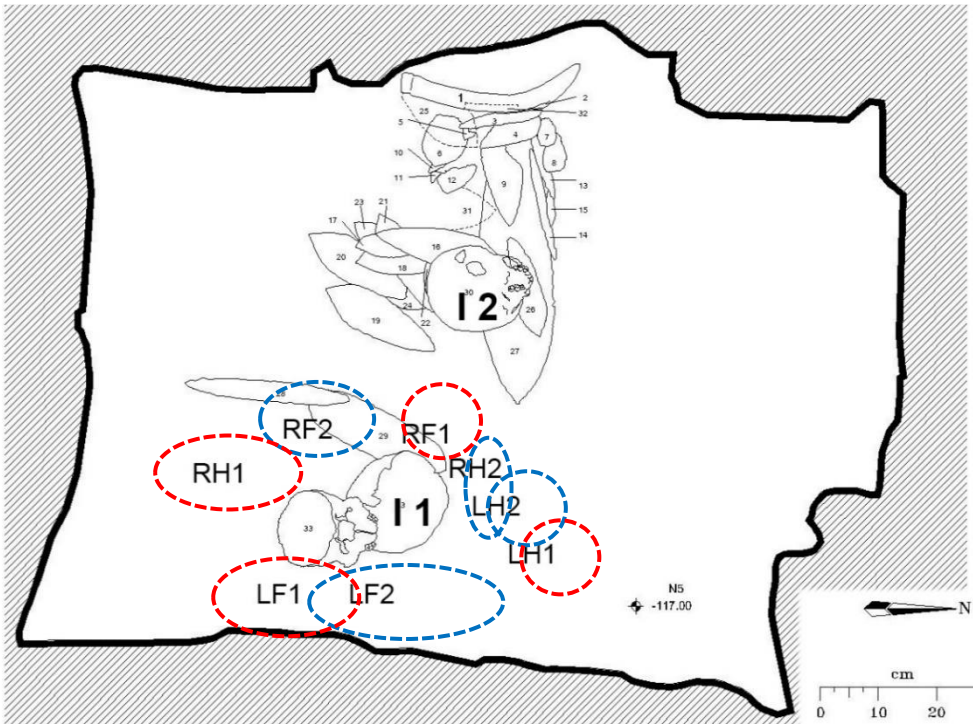


Figure 155. Skulls from individuals 1 and 2 (I1, I2). RH=Right hand; RF=Right foot; LH=Left hand; LF=Left foot. Modified from Michelle De Anda Rogel's drawing.

Individual 2 (MO 335)[380]

Individual 2 comprises a skull, three cervical vertebrae and 36 bones of both feet and hands. It was found in the eastern half of the offering and carried a flint knife in the oral cavity.

1) Age, sex and body modifications

Child of approximately 5 (+1.5) years old, age determined by dental eruption (Ubelaker 1999). Sex is undetermined and DNA analysis has yet to be done. No antemortem head modifications were made.

[380] This information was previously reported in Pérez Pérez and Chávez Balderas 2016.

3) Health conditions

Dental disease: “A” caries in all deciduous molars, with exception of first deciduous lower molars that have “B” caries. Central upper incisors also with “B” caries in lingual face.

Offering 149		
Individual: 2	**Sex**: undetermined	**Head modifications**: none
Element: 335	**Age**: 5 years ±1.5	
Description: Skull, mandible, three cervical vertebrae and 36 bones of feet and hands. Flint knife in the oral cavity.		
Health conditions. Dental disease: caries (A and B).		

Table 24. Biological profile. Individual 2, Offering 149. Photographs by Mirsa Islas.

4) Analysis of cultural biostratinomic processes

This child was treated identically to Individual 1: It was decapitated and the hands and feet were severed. The decapitation was done by disarticulation of C3 and C4 by sharp force, in an anterior-posterior direction. This left a cut mark on the inferior right articular facet of C3 (figure 156). The head was not defleshed and it was buried soon after death with a flint knife in the oral cavity.

Figure 156. Disarticulation cut marks on the inferior articular facet of C3. Individual 2, Offering 149. Photograph by Ximena Chávez Balderas.

Offering 149	
Anatomical location of the perimortem cut marks: Two cut marks (disarticulation of inferior articular facet, right side). Deformation in the area where the cut began (typical of fresh bone).	**Individual**: 2

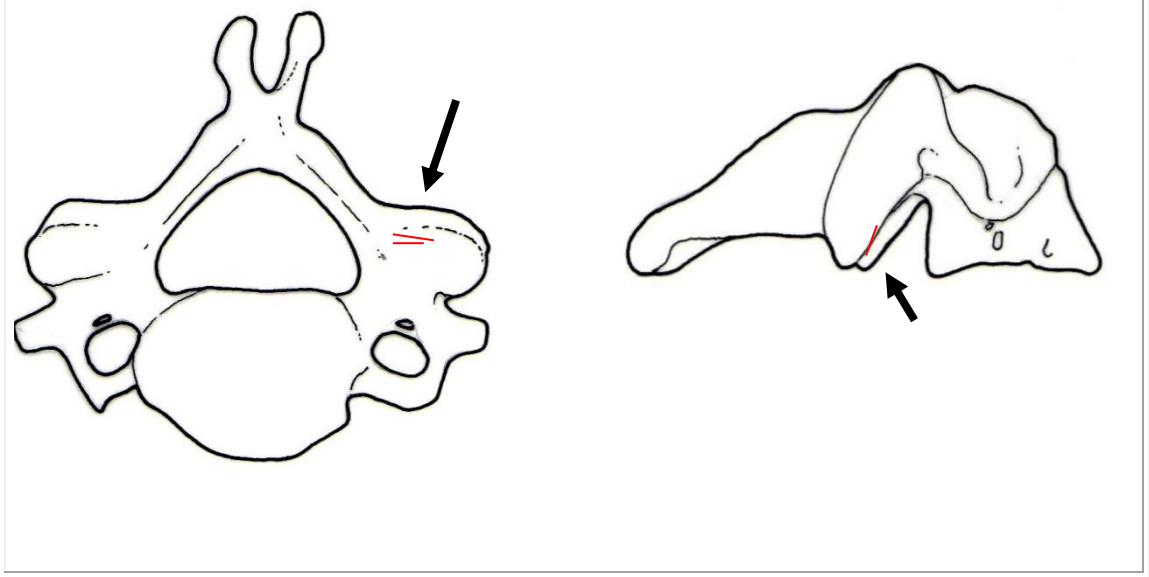


Table 25. Perimortem trauma. Individual 2, Offering 149

5) Field osteoarchaeology analysis

Body parts were disarticulated and displaced as a result of rodent activity. Of the total elements attributed to this individual, at least twenty (48.78%) showed this type of alteration. This implies that the youngest child was the most affected by rodent activity. The alterations include consumption of epiphyses and incisor marks that tend to concentrate on diaphyses, and dispersion of bones. Like Individual 1, these alterations were carried out on fresh bone shortly after deposition.

Because all bones were individually mapped, I confirmed that the skull was placed in the west half of the deposit, with the face oriented to north. The atlas seems to have

retained its original location, while C2 moved west and C3 east. The skull rotated south, so it rested on its right side. Feet and hands were buried to the east and north of Individual 1's skull, forming a circle around it (figure 155). The individual was found associated with flint knives and bird pelts.

Offering 149 and Human Sacrifice

This deposit is remarkable as it is the only example with direct evidence of child decapitation (cervical vertebrae with cut marks). Despite the fact that I had previously documented this practice in eight skull masks (Chávez Balderas 2017), disarticulation techniques were unknown, as cervical vertebrae were not present. The children recovered in Offering 149 were dismembered and their feet, hands and heads were buried with soft tissues. Although this treatment has some similarities with some adults and subadults buried in Templo Mayor, there are important differences that I will explore in this section.

Type of burial	Primary
Original space	Empty (with sediment infiltration)
Type of deposit	Simultaneous (all bones buried in the same event)
Minimum number of decapitation events	One
Natural biostratinomic processes	None, as they were buried immediately (in situ decomposition).
Natural and diagenetic taphonomic processes associated with burial	Skeletonization and passive disarticulation by decomposition. Biological disturbance (rodents). Fractures, fissures, exfoliation, stains, adhering material and degradation of mandibular ramus and axis dens, Individual 1, possibly by contact with water.

Table 26. Deposit of human bone remains, Offering 149.

1) Victims' biological profiles

Who were these children and how were they obtained for sacrifice? They were both approximately between 5 and 6 years old, the approximate age of most decapitated children found at the Templo Mayor (Chávez Balderas 2017). Their sex was undetermined.[381]

Regarding health conditions only dental disease was noted. This is an important indicator of health, as severe oral infections, usually caused by anaerobic microorganisms and streptococcus, can lead to local and systemic complications, such as sinusitis, respiratory tract infections, among others (Newman and Goodman 1989). Of the two children in Offering 149 only one had severe caries, and poor dental health may not have been the criterion for selection.[382] In contrast, children dedicated to Tláloc suffered from serious dental diseases and metabolic stress (Román Berrelleza 1990).

One child has dental fluorosis (Individual 1), as indicated by brown stains on the first permanent molars. Fluoride ions are found in drinking water and are incorporated into enamel and bones. High concentrations of fluoride (over 0.5 ppm) can cause these defects and serious bone complications (Hillson 2005).[383] In some geographic areas fluoride concentrations are higher. Consumption of this water affects tooth and bone appearance and structure, as fluorine replaces hydroxyl in hydroxyapatite, creating fluorapatite and stimulating osteoblastic activity, that is, bone growth. The first visible changes in fluorosis

[381] Most children found in the twin city of Tlatelolco were male, as confirmed by DNA analysis (Román Berrelleza and González Olivier 2017).
[382] A child dedicated to Huitzilopochtli did not present either poor health conditions as individuals dedicated to Tláloc.
[383] Ortner (2003:406) considers that above 2 ppm, fluoride brings severe health complications.

are visible in tooth enamel; skeletal changes and abnormal bone formation require long exposure periods (Ortner 2003).

In the case of Individual 1 the first permanent molars have fluorosis stains, which means that water with a high fluoride content was consumed between birth (+2 months) and 4 years of age (+12 months), period in which molar crowns are formed (Ubelaker 1999). This consumption could be direct and through nursing. Although dental fluorosis does not represent a health problem in this case, it is relevant to this study, as I consider it an indicator of foreign origin. Contemporary research has demonstrated that dental fluorosis is very common in central-northern Mexico, but not in the area once occupied by Lake Texcoco (Grimaldo et al. 1995: 25; Loyola Rodríguez et al. 2000: 194-200; Juárez-López et al. 2003: 221). This hypothesis is supported by isotopic and genetic analyses conducted on the child from Offering 111, who also suffered from this enamel defect (Bustos 2012, Barrera 2014).

Individual	**Age**	**Sex**	**Dental disease**	**Others**
1	6 years $\pm$2	Undetermined	Caries (A) Dental fluorosis	Wormian bone
2	5 year $\pm$1.5	Undetermined	Caries A and B	---

Table 27. Biological profile and health conditions, Offering 149.

2) Sacrificial victims' provenance

Four samples were collected for oxygen isotope analysis: two teeth, a phalanx and a metapodial fragment, and were analyzed by Moreiras Reynaga and Longstaffe (2018a).

Individual	Bone[384]	Procedencia
Individual 1	δ18Op of +16.3 ‰	Long term resident to Tenochtitlan before sacrifice
Individual 2	δ18Op of +15.9 ‰	Long term resident to Tenochtitlan before sacrifice

Table 28. Results of oxygen isotope analysis (Moreiras Reynaga and Longstaffe 2018).

From Moreiras Reynaga and Longstaffe's (2018a) study it is quite clear that both children had a similar life history and nearly identical diet based on their δ13C and δ15N bone collagen (Moreiras Reynaga, personal communication, May 2018). Future DNA analyses may help to understand if there was another link between them.

It is interesting to note that strontium and oxygen isotope results demonstrate that three of four children analyzed so far (offerings 111 and 149) spent their last years in the Basin of Mexico. [385] On the other hand, the child found in Offering 64 spent all his life in his homeland, coming to Tenochtitlan only for sacrifice. These results raise interesting questions on the origin of child victims.[386]

Historical sources suggest different options for child acquisition. Children could be bought in markets where slaves were sold (Durán 1967, I: 181-186, Mendieta 1971:100). Another pathway into the Basin of Mexico was as civilian prisoners taken in warfare, as mentioned by Alvarado Tezozómoc (1944: 343-345). For example, when the Mexica

[384] Two of these children's teeth are being analyzed as part of Diana Moreiras Reynaga's dissertation.
[385] Barrera (2014:188-190) places the child from Offering 64 as native to Oaxaca or the Yucatan Peninsula. On the other hand, the child buried in Offering 111 would have been born in the center-north of Mexico.
[386]Undoubtedly, research that Moreiras is currently conducting on carbon, nitrogen and oxygen isotopy will be of enormous value to understand child sacrificial victims.

attacked Oztoma, they allegedly captured the youth and children for sacrifice. They could also have been offered as tribute, although there is no explicit description of this. Finally, children could be donated or sold by their parents (Motolinía 1967:63, Cervantes de Salazar 1971: 133, Sahagún 2000, I: 176), in their homelands or by migrating to Tenochtitlan.

3) Posthumous treatments

The technique used for the sacrifice of the two children is unknown. However, it is clear that they were decapitated shortly after death using the same procedure as for adolescents and adults. Their necks were disarticulated cutting intervertebral disks in an anterior-posterior direction. Both had two flint knives placed in the oral cavity, an association that has been documented only in effigy skulls.[387] In addition to decapitation, feet and hands were also severed by sharp force. Foot disarticulation occurred between tibia and talus. No observations were possible on the manner of hand disarticulation due to poor conservation of carpal bones as a consequence of rodents.

The way in which these corpses were treated is atypical compared to children recovered in other deposits. Despite this, decapitation is consistent with treatments given to 48 adults and adolescents from other contexts (Chávez Balderas 2017). In contrast, the deposit of feet and hands had only been reported for Offering 105, but no data is available

[387] Some of the severed skulls recovered in Templo Mayor had flint knives in their proximity. In most cases these are knives dressed as effigies or supernatural beings that are not symbolically related to the skulls.

to indicate if they were disarticulated in the perimortem interval, as they were deposited directly in the construction fill and were poorly preserved.

Individual	Flaying	Defleshing	Decapitation	Feet and hands disarticulation
1	No	No	Between C4 and C5	Between tibia and talus by sharp force.
2	No	No	Between C3 and C4	Disarticulated. Unknown technique due to poor preservation.

Table 29. Posthumous treatments, Offering 149.

4) Symbolism of Sacrificial Victims

To understand the role of children it is necessary to analyze some particularities of this deposit. First I want to emphasize that this is an atypical offering, in which a large number of goods were placed in pairs, expressing a duality. Inside the offering were buried body parts of two children, two bird pelts, [388] two necklaces made of snails of the genus *Oliva* and two miniature ceramic braziers. Another striking aspect is that the deposit lacks effigies of deities and most of the goods allude to sacrifice, death and self-sacrifice. This contrasts with the rest of the offerings which are miniature models of the cosmos (Complex A), in which images of gods are abundant (López Luján 1993). In contrast, 33 flint knives, a

[388] With respect to pelts, the first corresponds to a golden eagle (*Aquila chrysaetos*), represented by 52 bones of which 14 (26.9%) show signs of disarticulation and fractures corresponding to manufacture. It was placed in prone position, with the neck flexed. The second pelt corresponds to a small bird which species has yet to been identified. It is represented by 25 bones of which nine (36 %) show manufacture marks. It was also placed in prone position and its neck was flexed towards the opposite side. They were not disturbed by rodents, as their bones were probably dry. They were found southwest of Individual 2.

sickle or curved obsidian scepter, five self-bloodletting instruments and human victims were found in this deposit. Knives, unlike those recovered in other offerings, were not adorned, neither represented deities or mythical personages, therefore they alluded to death and sacrifice.

According to González López (2015) these knives or técpatl symbolize the arid, related to Mictlampa, the north. They can produce damage but also are celestial. Also noteworthy is a piece of polished green obsidian, which was one of the last objects to be deposited in the offering. It is approximately 28.7 cm long, polished on all sides and slightly curved. Its tip is blunt and the proximal end has a peduncle suggesting that it had a handle, possibly made of wood (Pérez Pérez and Chávez Balderas 2016). Its function is unclear, but according to Alejandro Pastrana (personal communication, June 2012), this artifact is depicted on plate 11 of the *Codex Borgia* (1993) in the box corresponding to the day *miquiztli* (death).

Based on this codex, Anders and collaborators (*Codex Borgia* 1993:95) identify this object as an adze for woodcarving, but I disagree with this interpretation as it would not make sense to place such a tool in a ritual deposit. In addition, in the scene Mictlantecuhtli is wearing a human hand as earplugs; [389] he is accompanied by Metztli-Tecciztécatl, nocturnal deity, lunar, antagonistic to the sun. For this reason, I consider that this artifact is rather connected with death, night and darkness, either a scepter or some object used in sacrifice.

[389] Anders and collaborators (1993:95), identify it as the sign of death; however, it is not just a skull. His ribs are visible, he carries a tongue similar to a knife, curly hair crowned with stellar eyes and he carries a severed hand like an earplug, attributes of the lord of the Underworld.

a) b)

Figure 157. a) Adze or curved scepter. Page 1, *Codex Borgia* (1993); (b) Artefact 1, Offering 149.

In addition, this deposit included self-sacrifice symbols in the form of five bone bloodletting instruments. Four were manufactured with eagle bones corresponding to at least three specimens. The fifth corresponds to a jaguar's right femur. [390]

The burial of children's hands and feet is key to understanding the role of sacrificial victims in this context. The symbolism of hands and feet in Mesoamerica has been discussed by several authors. Hands have an important role in iconography. According to Pablo Escalante (2005) hands were commonly depicted by the Maya as symbols of prestige and power. In contrast feet are important, but because of their absence; for example, supernatural beings connected to Tezcatlipoca lack of this body part.

[390] For a detailed description on these items, see Pérez Pérez and Chávez Balderas (2016).

According to Sara Ladrón de Guevara (1990) hands had a multivalent meaning in Mesoamerica: they were symbols of death and creation. Hands were offerings, amulets, garments and power emblems when represented as scepters. Also, some deities were depicted with hands as part of their facial painting, like Xólotl, Macuilxóchitl and Macuiltochtli. Since the Preclassic period severed hands were symbols of death and sacrifice: one Olmec colossal head was decorated with hands in the headdress, alluding to power (Ladrón de Guevara 2005).

The use of hands as garments of some deities has been documented in Aztec sculpture. Necklaces combining hearts and hands were represented in goddesses of the *tzitzimime* group, supernatural females strongly connected with death. Coatlicue, Yolotlicue and the Cihuateteo, are commonly depicted with these necklaces (Boone 1999; Klein 2000, 2008). It is interesting to note that only the Coatlicue sculpture has two sets of hands in the necklace, while stone representations of Yolotlicue, Cihuateteo and pictographic depictions of *tzitzimime* only have one set. In all cases the hands are paired, with the left hands associated with the left side of the goddesses and the right hands with that side. In folio 76r of the *Codex Magliabechiano* (1996), hands are also depicted in the headdress and as part of the earplugs of a tzitzimime (Figure 158). Hands and skulls[391] of one Cihuateteo sculpture at the National Museum of Anthropology museum are strikingly small (Figure 159). Considering that these supernatural beings were women who died in childbirth, possibly along with their newborns, it is likely that they were represented carrying children's remains.

[391] These resemble child skull masks found inside Templo Mayor offerings.

The link between hands and death is reaffirmed by pictographs of codices *Borgia* (1993) and *Fejérváry Mayer* (1994), in which Mictlantecuhtli and Mictecacíhuatl carry human hands like earplugs (figure 160). However, thanks to taphonomic and spatial analysis it is known that these children's skulls were not carrying their hands like earplugs.

Figure 158. Tzitzimime wearing a necklace and a headdress of human hands and hearts. Folio 76r, *Codex Magliabechiano* (1996).

Figure 159. Cihuateteo wearing a necklace of hands and a human skull, as well as a headdress made of tiny skulls. Detail. National Museum of Anthropology, INAH. Photograph by Carlos Blanco, courtesy of Editorial Raíces.

a)

b) c)

Figure 161. Mictlantecuhtli and Mictecacíhuatl wearing human hands as earplugs. A) *Codex Fejérváry Mayer* (1994), page 18; b) *Codex Borgia* (1993), page 16; c) *Codex Borgia* (1993), page 11.

It is known that special powers were also attributed to these body parts. For example, arms and hands of women who died during childbirth were thought to be charged with powers. Sahagún (2001) documented that their corpses were guarded for four nights, preventing warriors or thieves from stealing the left upper limb. Warriors needed the central finger for being brave and powerful during battles. In contrast, thieves wanted the left arm as an

amulet, helping them with house burglary. According to Durán (1967) during the calendrical festivity of *tepeilhuitl*, some women dressed in tunics adorned with hearts and open hands to ensure good crops. The friar does not mention if the hands belonged to adults or children, males or females.

Although we cannot demonstrate that the hands and feet of the children formed necklaces, due to the absence of cords and the disturbance of the context, it is interesting to note that they were placed forming a circle around Individual 1, and therefore their appearance must have been similar to necklaces illustrated in Aztec art, except that the latter do not show feet. In any case, heart and hand necklaces are related to supernatural females connected with the death and earth.

Dismembered limbs are also represented as offerings or food for the gods and associated to warfare (i.e. *Codex Laud* 1994 folio 14 and *Codex Azcatitlan* 1995: folio 19b). However, in these cases full arms and legs are represented and not just feet and hands.

Regarding the symbolism of feet, according to Liwy Grazioso (2001) these are symbols of movement, displacement and foundation. In the Mayan area they are related to decapitation, as the word for ankle and neck is the same (*kal kuy*). Consequently, it is common to see in codices that amputated feet are replaced by animal heads. Among the Postclassic Nahua groups, during the celebration of the *pachtontli* feast, Huitzilopochtli was thought to travel to Earth. The proof of his arrival was precisely a footprint, left in the dough with which the bread for the celebration was cooked. Also, during the

panquetzaliztli month Huitzilopochtli was fed with tortillas with the shape of feet and hands (1967).[392]

In addition to the symbolism of goods buried inside Offering 149, the stratigraphy, its location and the posthumous treatment of children suggest that this is a termination deposit of the Cuauhxicalco. In fact, the container of this offering seals a tunnel that led to the center of the building. This space was modified by placing andesite ashlars to bury the ritual goods, which gives the appearance of two containers. However, the largest one might have functioned as an entrance to the tunnel. After the burial of the offering, including human remains, the building was closed by the placement of a monumental lamprobolite andesite slab measuring 3.63 m long, 2.72 m wide and 15 cm thick. This Cuauhxicalco may have been constructed during the reign of Motecuhzoma I (1440-1469 A.D.) and closed in the reign of Ahuítzotl (1486-1502 A.D.). It was buried, and therefore went unnoticed by the Spaniards (Pérez Pérez and Chávez Balderas 2016).[393]

Although severed heads are usually associated with the consecration of Templo Mayor (Chávez Balderas 2017), in this case they would correspond to a termination ritual. An important observation is that in none of the offerings associated with the consecration or inauguration of the temple were feet and hands deposited. In addition, none of the severed heads had flint knives in the oral cavity. These elements symbolize sacrifice and are also one of the attributes of Mictlantecuhtli, who carries them in his mouth to symbolize his need for sacrificial blood. Therefore, I consider it possible that these elements allude to the

[392] Deposits combining severed heads, hands and feet have been found in the huacas of Moche, Peru, (Plazas 3a, 3c and in the western part of the Huaca de la Luna). They correspond to sacrificed captives and cut marks suggest that they were severed from fresh bodies (Verano 2014:295).
[393] The Cuauhxicalco that Spaniards encountered during the Conquest was destroyed.

"death" of the building and its burial. In any case, this deposit would confirm the relationship of severed heads and construction rituals.

Offering 151

This deposit was excavated by Julia Pérez Pérez and José María García in April of 2012. It was found just below Offering 149, at the entrance to the Cuauhxicalco tunnel. It was excavated in two levels and consists of a skull with a circular perforation in the vault, two prismatic green obsidian blades and a fragment of a child's mandible that preserves a single deciduous molar. [394] The skull was covered with a basalt rock placed directly on its perforation, causing a compression fracture. The priests then proceeded to bury it, placing a clay fill in which archaeologists recovered a ceramic pot sherd, a projectile point, bird, snake, fish and amphibian bones, as well as freshwater shells and charcoal. It is possible that some of these materials belong to Offering 149 and were removed by bioturbation caused by rodents (Pérez Pérez and Chávez Balderas 2016).

[394] Most likely its presence was incidental, as it is common to find bone fragments in the construction fill.

a)

b)

Figure 162. Offering 151, level 1. a) General view and b) detail of human skull.

Vertical placement	Cuauhxicalco construction fill
Horizontal placement	Northeast of Cuauhxicalco
Stage	VI-2 (AD 1489-1502)
Symmetry	None
Container	Construction fill
Dimensions	E-W: 18 cm N-S: 13 cm Depth: 15 cm

Table 30. Offering 151.

Individual	Element	Description	Level	Quadrant
1	A1	Skull with vault perforation and 15 holes, possibly to hang it.	R1-R2	Center

Table 31. Individuals deposited in Offering 151.

Individual 1 (A1) [395]

Skull with vault perforation and 15 small holes distributed in the frontal, parietal, temporal, zygomatic and occipital. It was deposited without a mandible.

[395] This data was first reported on Pérez Pérez and Chávez Balderas 2016.

1) Age, sex and head modifications

Female[396] between 20 and 30 years old. [397] There is a slight flattening in the posterior part of the skull (tabular erect).

2) Health conditions

Dental disease: "A" caries in P^3 and P^4. Horizontal wear with dentine exposure in M^1. Dental calculus, with loss of alveolar bone tissue. Most of the teeth were lost in the postmortem interval.

Metabolic disease: mild spongy hyperostosis in occipital and parietals.

Infectious disease: irregular bone growth in the palate, which might correspond to a healed infectious process.

[396] Although brow ridges and glabella are prominent, the mastoid process, shape of the orbits and the forehead are feminine.

[397] Because the skull is incomplete, it was not possible to evaluate all Meindl and Lovejoy points (1985). However, those which were visible have a composite score of zero; this would imply that she was less than 30 years old. Tooth are incomplete, thus it was not possible to observe wear patterns.

Offering 151		
Individual: 1	**Sex**: female	**Head modifications**: slight flattening of the posterior part of the skull (tabular erect).
Element: 1	**Age**: 20-30 years	
Description: skull with vault perforation and 15 holes, possibly to hang it		
Health conditions: Dental disease: caries A. Horizontal wear. Dental calculus and loss of alveolar bone tissue. Metabolic disease: spongy hyperostosis. Infectious disease: irregular bone growth in palate.		

Table 32. Biological profile. Individual 1, Offering 151. Photographs by Néstor Santiago

3) Analysis of cultural biostratinomic processes

This skull is unique in the assemblage as it had a distinct preparation sequence and use. Shortly after death this individual was decapitated, but the technique used is unknown

as the cervical vertebrae were not present. However, the occipital condyles have very fine disarticulation marks, produced during a secondary disarticulation of neck. Some areas of the skull have greater density, lighter coloration and a vitreous appearance, especially at the base and in temporal bones; most likely it was boiled. It does not present flaying marks as the skulls from Offering 141, but it has defleshing marks especially on left zygomatic, zygomatic processes of temporal bone and nuchal lines. It also presents scraping marks for periosteal removal, which are abundant and were made in three different directions. I also documented marks on the left orbit, between maxilla and sphenoid, possibly caused by removal of eyeballs. A perimortem fracture was observed on the right mastoid process, which corresponds to defleshing of the sternocleidomastoid muscle.

The skull has cut marks on the temporomandibular joint, which implies that the mandible was deliberately removed, a treatment not documented on other skulls, where the mandible was disarticulated by decomposition. The superior part of the skull has a regular circular perforation made by sharp force that affects both parietals and frontal. It measures 75.49 mm in anterior-posterior direction and 74.25 mm in transverse direction. In addition, it has 15 small perforations that could have been used to hang it or to place garments on the skull (figure 163). These are distributed over the frontal, parietal, temporal, zygomatic and occipital. The perforations are conical and measure between 4.22 mm and 8.42 mm in diameter.[398]

[398] These are wider on the outer table, which differentiates it from other perforations seen in the skull collection.

Figure 163. Circular perforation on vertex, made by sharp force. Individual 1, Offering 151. Photograph by Néstor Santiago.

I assume it was quite a while before this skull was buried. Most of her teeth were lost postmortem, and the ones that remain have numerous fractures that might be connected to weathering. In addition, a left P^3 was intentionally placed on the alveolus of left canine.

4) Field osteoarchaeology analysis

The cranium was deposited at the center of the entry to the Cuauhxicalco tunnel. Its face was oriented to the east, an uncommon orientation for human skulls. This space was filled with clay and stones, which caused sagittal compression, resulting in numerous

fractures at the base and frontal bone. It was associated with two prismatic green obsidian blades. Numerous seeds were recovered in sediment associated with the cranium. They have been identified as *Amaranthus* sp (amaranth), *Jaltomata* sp. (tomatillo), *Physalis* sp. (groundcherries), *Scirpus* sp. (grassweed), *Solanum rostratum* (Mexican thistle), *Eleocharis* sp. (spikerushes), *Hydrocotyle* sp. (water pennywort), *Potamogeton* sp. (pondweed), *Prunus serotina* (wild blackcherry), *Ruppia* sp. (widgeonweeds), *Sesuvium* sp (purslane) and *Trianthema* sp (giant pigweed) (Pérez Pérez and Chávez Balderas 2016). Some of these correspond to cultivated crops, while others are part of the lake environment (Montúfar 2014, Pérez Pérez and Chávez Balderas 2016).

Offering 151 and human sacrifice

The use of bone remains in termination rituals is quite common, as discussed in the previous chapter. However, the posthumous treatment given to this woman is quite unusual for the Sacred Precinct of Tenochtitlan. I will now analyze the data obtained to understand the possible function of this skull before and during its deposit in Offering 151.

Type of burial	Secondary
Original space	Fill with rock and clay
Type of deposit	Individual
Minimum number of decapitation events	One
Natural biostratinomic processes	Possibly weathering
Natural and diagenetic taphonomic processes associated with burial	Sagittal compression, fractures and adhere material

Table 33. Deposit of human bone remains, Offering 151.

a) The biological profile of the victim

This woman is in the age range in which most of the sacrificial victims were killed: between 20 and 30 years old. She presents evidence of some mild dental problems, although it is difficult to evaluate these due to postmortem loss of teeth. She has healed spongy hyperostosis that would reflect some type of physical stress, either nutritional or due to illness. Before her death she suffered an infectious process in the palate, but it healed. In sum, no severe disease involving bone remains was noted.

b) The provenance of the sacrificial victim

The isotopic signatures obtained at the Laboratory for Stable Isotope Science indicate that this woman was of local origin.

Individual	Enamel[399]	Bone	Procedencia
Individual 1	δ18Op of +16.0 ‰	δ18Op of +14.1 ‰	Most likely, local to de Basin of Mexico and remained in the same location until sacrifice

Table 34. Results on oxygen isotope analysis (Moreiras Reynaga and Longstaffe 2018a).

[399] These values were obtained from the left P^3, which implies that they correspond to an age of 2 years +8 months, to 6 years +2 years (Ubelaker 1999).

Moreiras Reynaga and Longstaffe consider that she was native to the Basin of Mexico. In contrast, results obtained from bone fall outside the Basin range. However, the difference falls within the range of analytical precision (± 0.4 ‰) and due to the difference between tooth and bone samples may indicate that she might have imbibed water from different sources within the Mexico Basin, contributing to the ± 1.9 ‰ of difference (Moreiras Reynaga and Longstaffe 2018a :7). This might imply that her occupation forced her to move within Central Mexico. Most likely her presence at the foot of the Templo Mayor could be explained by means of trade or tribute.

c) Posthumous treatments

So far no other skull has been found in the Sacred Precinct with a circular perforation on its vertex, and delimited by six equidistant holes that could have been used to suspend it (table 35).[400]

Similar forms of skull modification have been reported from other archaeological sites, although it is not common. For example, Marie-Areti Hers (1989:90, 94-95) documented a skull that she identifies as a bowl corresponding to the Classic period. Tiesler (2018:48-49) reports a skull vessel recovered from the Sacred Cenote of Chichén Itzá. Unlike the one under analysis, it had a lid and natural orifices were sealed with a dark resin,

[400] Another possibility is that they were used to place locks of hair or some garments, but their arrangement and placement close to the vertex perforation makes them more likely to be suspension holes.

therefore it could be used as a container; the mandible was attached by perforations and ties.

Beyond Mesoamerica, these types of vessels have been reported at the Huacas de Moche: two in the urban sector and one on the Uhle platform. In addition to the superior perforation, they also had holes to keep the mandible articulated. (Verano et al. 1999, Verano 2014).

Judging by the existence of vertex perforation, I consider it possible that this skull was used as a vessel or receptacle, but not to contain liquids, as the anatomical orifices are not sealed and there are no traces of adhering materials or marks left by liquids.

Individual	**Flaying**	**Defleshing**	**Vertex perforation**	**Thermal exposure**	**Periosteum removal**	**Perforations**
1	None	Cut marks	Sharp force	Possibly indirect	Yes	15 circular

Table 35. Posthumous treatments, individual from Offering 151.

d) The symbolism of the skull in this deposit

Although I have noted that the posthumous treatment received by this individual is unusual, placement of skulls and other osseous material in construction fill is quite common, especially for the Cuauhxicalco. As I described in Chapter Five, reused mandibles or skull fragments were commonly utilized for consecration and termination rituals. Most likely, after being used in other rituals, these human remains were destined

for construction ceremonies. Offering 151 would correspond precisely to a termination ritual, as it was deposited in the construction fill, after a tunnel was closed. After placing the skull in this space it was covered with mud and stones; on top of it, Offering 149 was buried sealing the entrance.

Offering 166-Operation 1 [401]

During the exploration of Operation 1 in 2007, a monument in the form of an inverted and stepped pyramid was found west to the monolith of goddess Tlaltecuhtli: this monument ("Entrance") was composed of 16 andesite slabs of approximately 500 kg each (Aguirre Molina and Chávez Balderas 2010, López Luján et al. 2012) (figure 164). [402] This singular structure symbolized the jaws of earth: the entrance to the underworld. It consists of seven construction stages and eight offerings possibly associated with enlargement rituals (Aguirre Molina and Chávez Balderas 2010, Chávez Balderas et al. 2016). This monument would have been in operation from Stage IV (around AD 1440) until the Conquest. The penultimate stage was dismantled, while the last corresponds only to a stucco patch that concealed this space.

[401] Some of the skeletal remains recovered in Operation 1 would correspond to the same ritual in which Offering 166 was deposited, so I decided to combine their analysis in this section.
[402] Operation 1 covered an area of 3 m (north-south), 2.95 m (east-west) and 3.12 m deep (Chávez Balderas 2008). It was excavated between March and September 2007.

Figure 164. Monument symbolizing the jaws of earth. It is located west to the monolith of goddess Tlaltecuhtli. Photograph by Leonardo López Luján.

Offering 166 was found in fills 14 and 15. Due to the scattering of materials, it was not initially considered as an offering. However, from its analysis it was decided to give it this nomenclature, a task that was entrusted to archaeologists Diego Matadamas, Israel Elizalde and Erika Robles. This is a very peculiar offering, because there is evidence that it was deposited after the arrival of the Spaniards. The space between the monument corresponding to Stage VII (Entrance 2) and Seal 2 (Entrance 3), was filled with stone, clay and numerous artifacts among which are some of European manufacture.

This ritual began with the deposit of marine sand, starfish (*Nidorellia armata*), a pendant of snail *Columbella rusticoides*, copal resin, circular shell appliqués, a wooden awl, copper bells, and eagle and fish fragments. All were dispersed or fragmented. In

addition, three fragments of early colonial jars of the Transitional Monochrome Orange and some sherds from Seville olive oil containers were buried here. More stone and clay were later placed, in which fragments of bifacial knives and a flint point were found, plus copper bells, two obsidian blades, scattered remains of golden eagle, roseate spoonbill, turtle, chiton plaques (*Chiton articulatus*), feline claws and beads manufactured with green stone and marine snails. Fragmented human remains also were recovered (Chávez Balderas 2008). A stucco floor (Seal 1) and some stones were used to mark this location, which went unnoticed by the Spaniards who inhabited the site. With time, the floor above the entrance collapsed due to compaction of the fill.

Vertical placement	Construction fill on the entrance west to the monolith of Tlaltecuhtli
Horizontal placement	West Plaza
Stage	Conquest (After AD 1521)
Symmetry	None
Container	Construction fill between Entrance 1 and Entrance 3
Dimensions	North-south: 180 cm[403] Depth: 219 cm

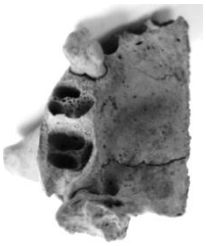
Table 36. Offering 166-Operation 1.

Considering that these are fragmentary remains in the context of a ritual deposit, I will now describe all skeletal material recovered both in Offering 166 and in the fills from Operation

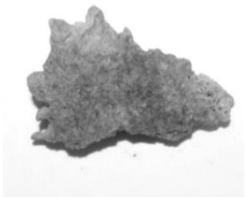
[403] These are the maximum dimensions corresponding to Seal 1. The original east-west dimension is unknown, as this area was previously excavated by the Urban Archaeology Program.

1, above this offering. A total of 26 human bone remains, including teeth, were recovered and analyzed. [404] All these were buried between Seal 1 and Seal 2, that is, in the fill that hides the monument.[405]

1. MO 37

Description	Child's maxilla (right side). Maximum height (with premolar): 4.2 cm; width (transverse): 4.2 cm; depth (anteroposterior): 4.3 cm.
Provenance	Operation 1, Entrance, R10 (Fill 10)
Photograph	 Maxilla frontal view  Maxilla inferior view

2. MO 39

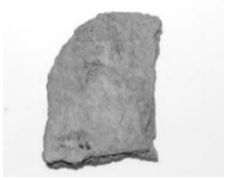
Description	Temporal fragment (articular portion with occipital and parietal). Length: 2.7 cm; width: 1.9 cm; thickness: 0.9 cm.
Provenance	Operation 1, Entrance, R11 (Fill 11, screen)
Photograph	 External view  Internal view

[404] Six fragments were glued together for a total of 23 entries.
[405] Initially this monument was denominated "Entrance" and progressive numbers were given to each one of its stages.

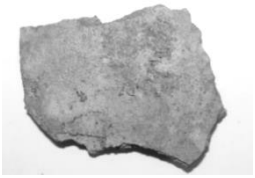
3. MO 51

Description	Parietal fragment Length: 2.4 cm; width 2.1 cm; thickness: 0.5 cm
Provenance	Operation 1, Entrance, R12 (SE quadrant)
Photograph	  External view Internal view

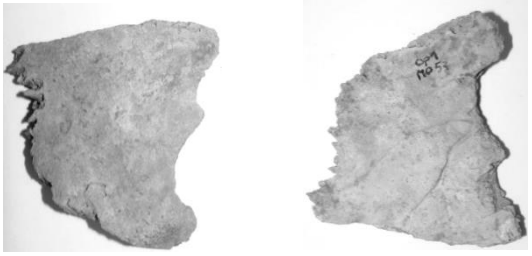
4. MO 75

Description	Frontal fragment Length: 4.1 cm; width: 3.1 cm; thickness: 0.5 cm
Provenance	Operation 1, Entrance, R14 (SW quadrant)
Photograph	  Internal view External view

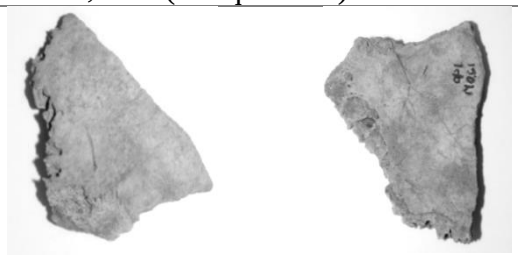
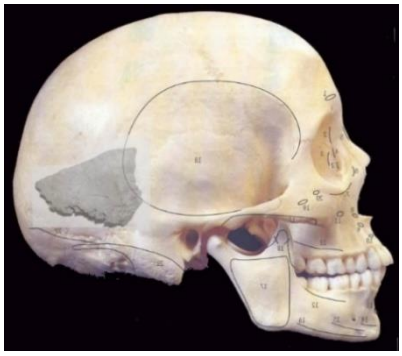
5. MO 49

Description	Occipital fragment Length: 5.9 cm; width: 4.8 cm; thickness: 1 cm
Provenance	Operation 1, Entrance, R12
Photograph	  External view Internal view

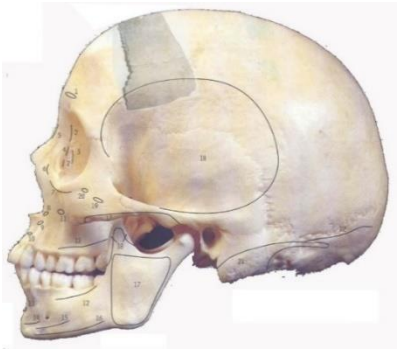
6. MO 53

Description	Right parietal fragment (reused tzompantli skull) Length: 5.4 cm; width: 5 cm; thickness: 0.8 cm
Provenance	Operation 1, Entrance, R12 (SW quadrant)
Photograph	 External view Internal view  Anatomical placement of the fragment

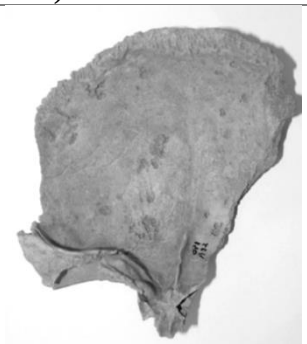
7. MO 61

Description	Right parietal fragment (reutilized tzompantli skull) Length: 4.9 cm; width: 3.4 cm; thickness: 0.7 cm
Provenance	Operation 1, Entrance, R12 (NE quadrant)
Photograph	 External view Internal view  Anatomical placement of the fragment

8. MO 36-21

Description	Right parietal fragment (reutilized tzompantli skull). Length: 5cm; width: 4.6 cm; thickness: 0.4 cm
Provenance	Operation 1, Entrance
Photograph	  External view Internal view  Anatomical placement of the fragment

9. A 92

Description	Frontal (discarded skull mask?) Length: 12.1 cm; width (transverse): 11 cm; depth (anterior-posterior): 5 cm
Provenance	Operation 1, Entrance, R14 (NE quadrant)
Photograph	  External view Internal view

10. MO 56

Description	Mandible fragment (right half) Length (anteroposterior): 10.3 cm; height: 5.4 cm; thickness (on second molar): 1.8 cm
Provenience	Operation 1, Entrance, R12
Photograph	 External view Internal view

11. MO 57

Description	Left P^3 1.6 cm x 0.7 cm x.9 cm (buccal-lingual direction)
Provenance	Operation 1, Entrance, R12 (screen)
Photograph	 Lateral view Occlusal view

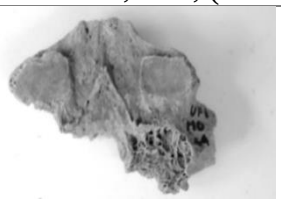
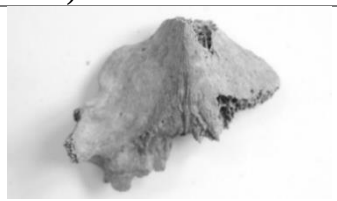
12. MO 35

Description	Left M_1 2 cm x 1.1 cm x 1 cm (buccal lingual direction)
Provenance	Operation 1, Entrance, R10 (screen)
Photograph	 Buccal view Occlusal view

13. MO 54

Description	Right I^2 1.9 cm x 0.7 cm x 0.6 cm
Provenance	Operation 1, Entrance, R12 (SW quadrant)
Photograph	  Buccal view Lingual view

14. MO 64

Description	Thoracic spinous process fragment (between T9 and T12) 3.4 cm x 3.9 cm x 1.5 cm
Provenance	Operation 1, Entrance, R13, (NW quadrant)
Photograph	  Anterior view Posterior view

15. MO 65

Description	Lumbar vertebra (between L3 and L5) 4 cm x 5.1 cm x 7.1 cm
Provenance	Operation 1, Entrance, R13
Photograph	  Superior view Right lateral view

16. MO 55-59

Description	3rd right rib 13.1 cm x 1.5 cm x 1.6 cm
Provenance	Operation 1, Entrance, R12
Photograph	 Superior view Inferior view

17. MO 63

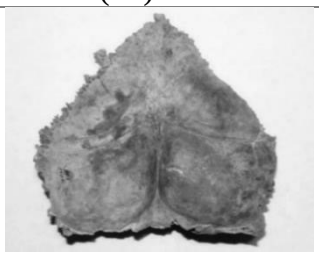
Description	Right rib (6^{th} or 7^{th}) 18 cm x 1.6 cm x 1 cm
Provenance	Operation 1, Entrance, R13 (SE quadrant)
Photograph	 Internal view External view

18. MO 50-58

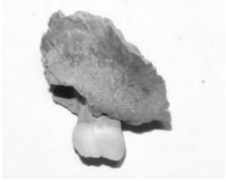
Description	Sternum (fused manubrium and body) Length: 13.5 cm; width: 6 cm (manubrium), 3 cm (body); thickness: 1.6 cm (manubrium), 1 cm (body)
Provenance	Operation 1, Entrance, R12

Photograph	  Anterior view Posterior view

19. MO 22a

Description	Occipital fragment 9.1 cm x 9.9 cm x 0.8 cm
Provenance	Operation 1, Entrance 2; 6 cm above Floor 7 (P7).
Photograph	  External view Internal view

20. MO 22b

Description	Right maxilla fragment 2.7 cm x 2.8 cm x 2 cm
Provenance	Operation 1, Entrance 2; 6 cm above Floor 7 (P7).
Photograph	  External view Internal view

21. MO 23a

Description	Left zygomatic process of temporal bone 2.1 cm x 0.9 cm x 0.4 cm

Provenance	Operation 1, Entrance, Floor 6 (P6, screen)
Photograph	 External view  Internal view

22. MO 23b

Description	Left I_2 2.3 cm x 0.5 cm x 0.6 cm
Provenance	Operation 1, Entrance, Floor 6 (P6, screen)
Photograph	 Buccal view

23. MO 23c

Description	Hand distal phalanx 1.5 cm x 0.9 cm x 0.6 cm
Provenance	Operation 1, Entrance, Floor 6 (P6, screen)
Photograph	 Palmar view  Dorsal view

1) Results

From fragment repetition and differences in age, I estimated a MNI of six, mostly represented by skull remains (Figure 165). Twenty-two percent of the bones were found in the fills from Offering 166 (R13-R14); the rest were recovered above this concentration of materials, until reaching Floor 6/Seal 1, with which this ritual space was closed (Figure 166).

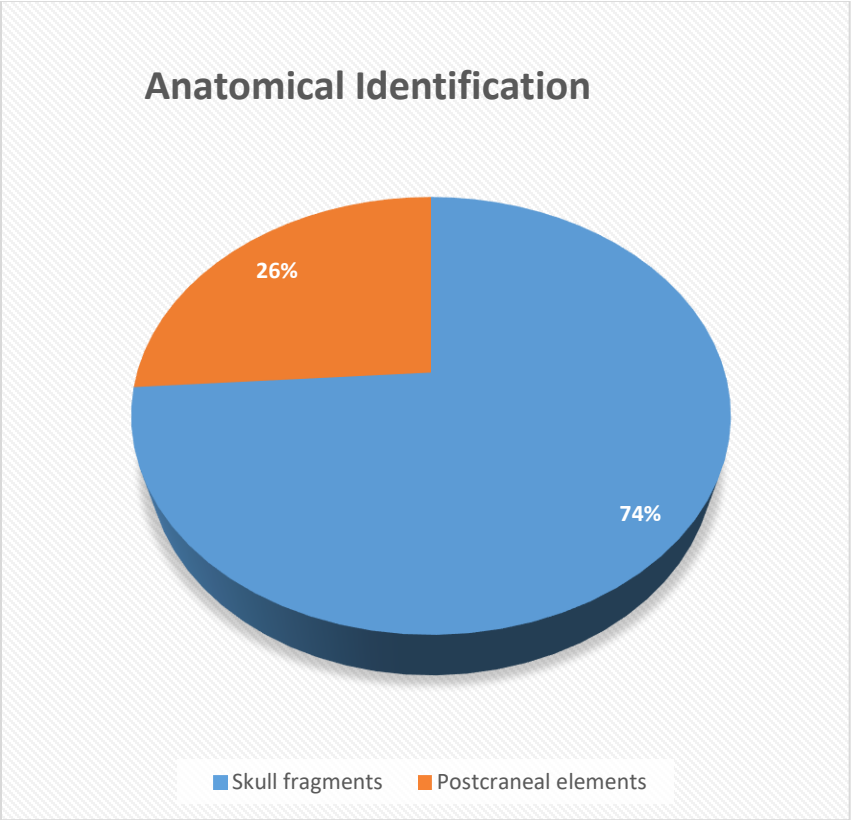


Figure 165. Anatomical identification, Offering166-Operation 1.

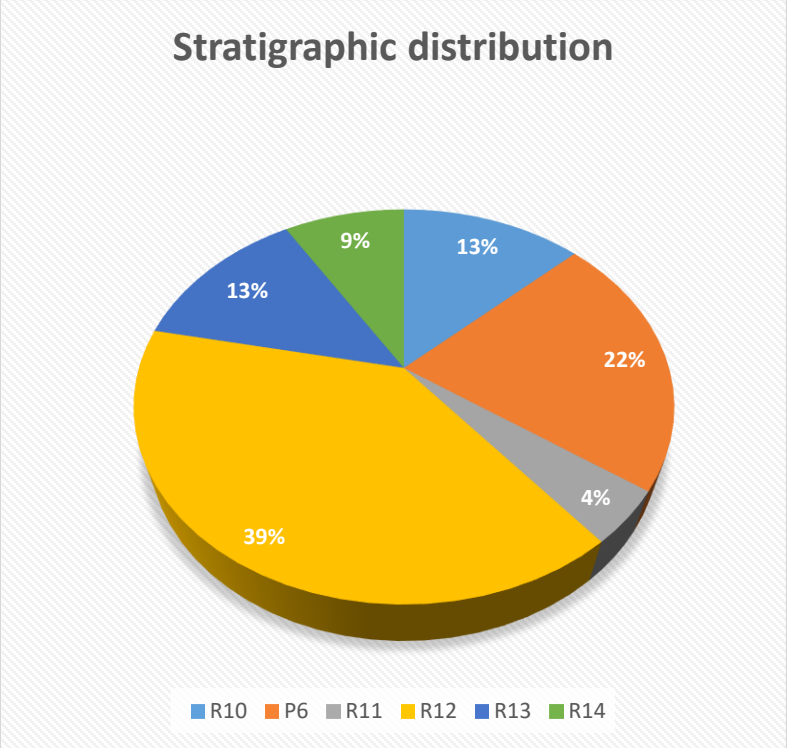


Figure 166. Stratigraphic distribution, Offering166-Operation 1.

Due to bone fragmentation it was not possible to make reliable sex determinations. Remains pertaining to a child 6 +/- 2 years old, a subadult 15 +/- 3 years old and an adult over 40 years old were identified; the rest of the fragments were classified as undetermined.[406] Regarding health conditions, only one case of spongy hyperostosis, two teeth with "A" caries and dental calculus were observed, as well as a molar with fluorosis which I consider to be an indicator of foreign origin.

[406] Although ranges cannot be determined in other fragments, it is clear that most would correspond to individuals between 15 and 40 years old, judging by bone thickness and suture closure; this is consistent with age ranges reported in Templo Mayor offerings (Chávez Balderas 2017). Three more fragments are compatible with children or subadults under the age of 15, but might correspond to the same individual.

The analysis of bone modifications is important here, as it provides insight into where these remains came from and why they were deposited in this space. Only one case might be informative on the sacrificial technique: a sternum with superficial cut marks on both sides, which can be considered evidence of heart extraction (Chavez Balderas 2017). The ventral aspect presents small marks in longitudinal direction: ten superficial cuts that could have been used to remove the pectoralis major. On the dorsal (inner) aspect there are four diagonal marks: thin, short and repetitive in an area of 0.5 x 0.3 cm. They are located in the center, between the 2nd and 3rd sternal articulation. At this point there are no muscles or joints, so it was not intended to dismember or deflesh. These cuts might correspond to the severing of veins and arteries inside the thoracic cavity. These marks approximate the location of the ascending aorta and superior vena cava. This implies that it could be an example of heart extraction via access to mediastinum above the diaphragm, as has been documented in primary burials of sacrificial victims (López Luján et al. 2010, Chávez Balderas 2017). Although suggestive of heart extraction, the lack of associated ribs the fact that this is a secondary deposit with significant human disturbance and posthumous treatment, does not provide enough evidence to confirm this hypothesis.

Twelve fragments present evidence of cultural biostratinomic processes occurring between the time of death and burial. These include defleshing, periosteum removal, boiling, perimortem fractures, bevelling and plastic deformation—the latter two a consequence of perimortem fractures (Figure 167). These treatments identify these as reutilized skull fragments, including three from the tzompantli (with evidence of a lateral

perforation). Using fragment classification in groups[407] (see Operation 6 and 9 section as well as Appendix 1 for group detailed description), I documented remains corresponding to groups 1, 3, 5 and 6 (figure 168).

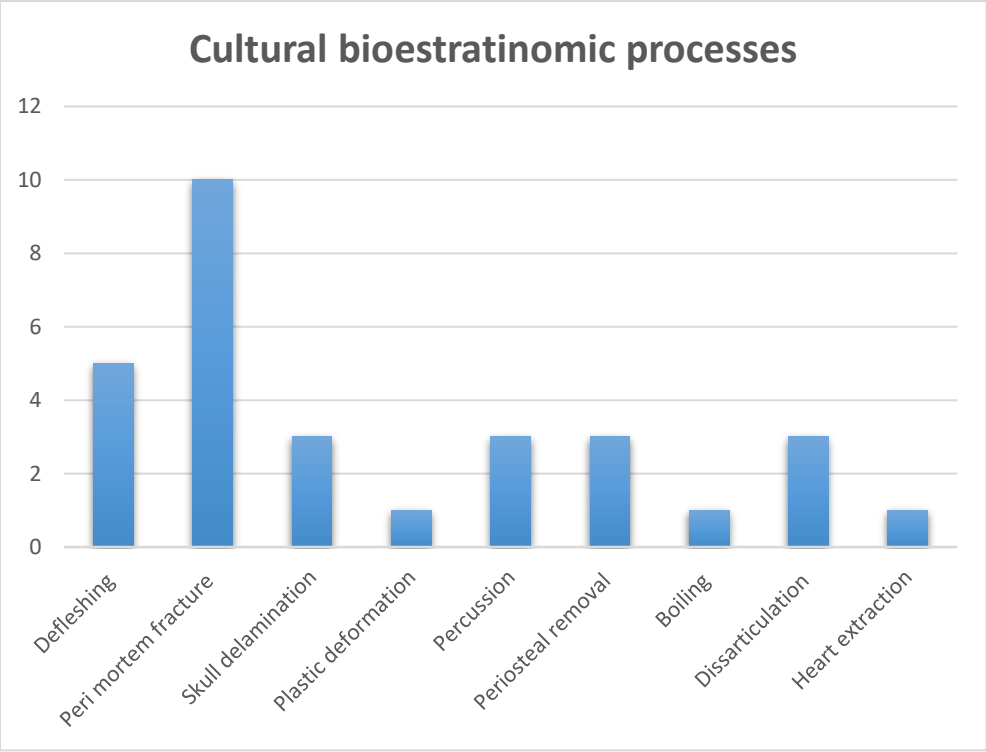


Figure 167. Cultural biostratinomic processes, Offering 166-Operation 1.

[407] Group 1 corresponds to scattered teeth; Group 3 to skull mask manufacture debris; Group 5a to broken and weathered skulls; Group 5b to post-cranial skeletal bones.

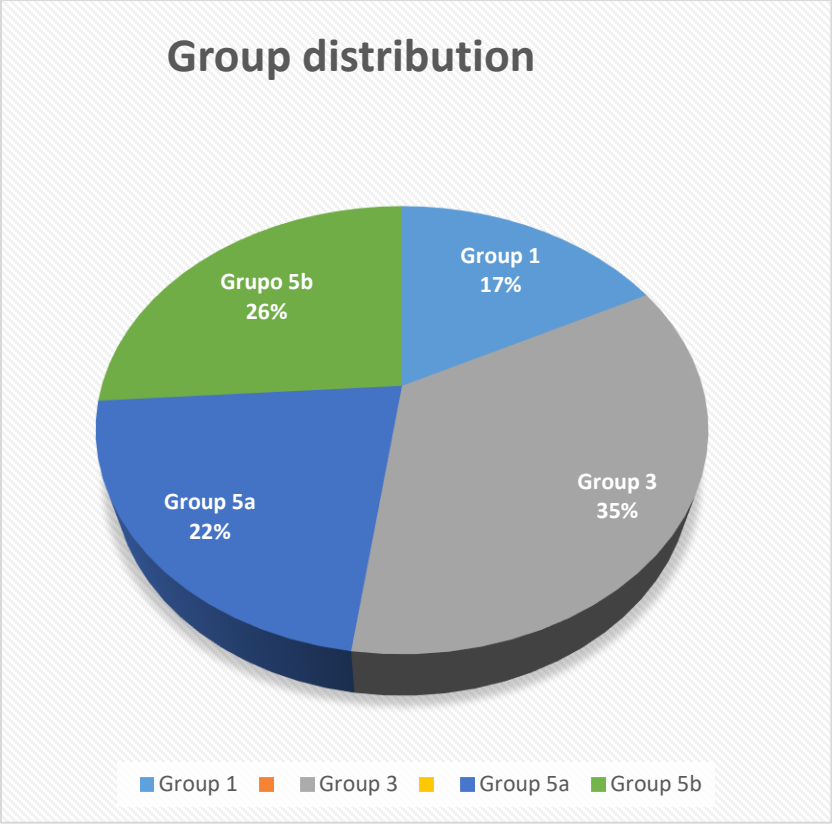


Figure 168. Fragment distribution by groups. Offering 166-Operation 1.

From the results obtained it can be assumed that most of the bones correspond to skull mask manufacture debris (Group 3), post-cranial bones (Group 5b), and skull fragments that were fractured intentionally or as a consequence of use (Group 5a). It is interesting to note that 18 of these fragments show surface weathering. [408] This would imply that they were exposed to the elements.

Fragments of the post-cranial skeleton are much less frequent in the Sacred Precinct (Flores, in press). These might correspond to funerary deposits that were disturbed or to parts of sacrificial victims' bodies that remained in the ceremonial center of Tenochtitlan.

[408] Stage 2 (peeling), in the classification of Anna K. Behrensmeyer (1978:151).

With regards to the sternum with cut marks, I suggest the second possibility. Although bone fragments deposited in this context are relatively few in number, it is interesting to note that they represent the most important sacrificial and post-sacrificial practices of the Sacred Precinct: heart extraction, decapitation, tzompantli skulls and skull mask manufacture, as well as bone reuse.

2) The presence of human remains in the monument west to the Tlaltecuhtli monolith

Although the concentration of materials above Seal 2 was referred to as Offering 166, the whole context meets the definition of a "problematic deposit"; these are composed of fragmentary remains scattered on construction fills (Tiesler 2007:15). It corresponds to a termination ritual, a very peculiar one, as it was carried out in turbulent times of Conquest. The presence of early colonial and European materials in the different fills, inside a sealed space, suggests that these are not intrusive artifacts. After the Conquest, the Spaniards abandoned Tenochtitlan for a while. It is likely that during this time the Mexica tried to hide this monument and associated deposits. In this case they filled it by placing regular layers composed of stones and dirt, in which they purposely placed fragmented ritual materials that might have been extracted from disturbed contexts. These objects were distributed throughout the fill, but tend to be concentrated near Seal 2. They were placed at the beginning of the ritual, after a layer of sea sand and starfish. This could be considered ceremonial refuse—fragments of what were once ceremonial objects that were not recycled or added back to the manufacturing chain (Walker 1995). However, it is not simply a dump,

as the act of discarding was highly ritualized. Importantly, among these goods were fragmentary remains of sacrificial victims.

Type of burial	Problematic deposit (secondary)
Original space	Filled (R10-R15 between S1-S2)
Type of deposit	Simultaneous (all bones buried in the same event)
Minimum number of decapitation events	Undetermined (most likely more than one)
Natural biostratinomic processes	Weathering
Natural and diagenetic taphonomic processes associated with burial	Compression and fractures. Adhered material

Table 37. Human remains inside Offering 166-Operación 1.

Offering 123: a funerary or non-funerary ritual?

After moving the Tlaltecuhtli monolith, three ritual deposits were discovered under the west limit of the sculpture. These are part of a set composed by eight offerings placed around the monument in the shape of an inverted stepped pyramid. Offering 123 was one of these deposits, placed under the southwest corner of the monolith. It was excavated between June 10th and August 5th of 2008, under the direction of Camila Pascal García. Inside the offering were found 228 artefacts and 72 organic materials, recovered in four levels. At the beginning of the ritual, Mexica priests deposited a layer of marine sand. Then, they buried 19 cremated bone fragments and 14 flint knives dressed with maces, darts, bells, and shell and gold ornaments. From these knives, Pascal García and González López (2012) identified the main character on this tridimensional mythical narrative: a knife

placed in the center, with eyes in the shape of a Maltese cross and one gold *ixcuatechimalli* headdress. Along with the knives were found bird remains (figure 169). Finally, the priests sealed this deposit with two pyroxene slabs.

Figure 169. Offering 123. Photograph by Tenoch Medina.

Vertical placement	West Plaza
Horizontal placement	West to the Tlaltecuhtli monolith
Stage	VI-5 (AD 1489-1502)
Symmetry	It is part of a set of 8 offerings
Container	Box made of tezontle ashlars
Dimensions	E-W: 58 cm N-S: 41 cm Depth: 72 cm

Table 38. Offering 123.

1) Cremains analysis

Bone fragments recovered inside this offering were exposed to direct fire. Judging by their aspect, bones lost their organic content by combustion; they also might present fusion of mineral crystals (Hermann 1977, Mayne 1997).

Considering the extensive fragmentation, no diagnostic bones were preserved; for this reason it was not possible to determine MNI. From the analysis, 11 fragments correspond to long bone diaphyses, three to flat bones and five remain undetermined (figures 170 and 171). It was not possible to obtain biological profiles, but as for texture and dimensions most of fragments are clearly of human origin and one might belong to a femur. Although cremation implied loss of biological information, it was possible to obtain some taphonomic data.

By analyzing fissures, fractures, deformation and shrinking it is possible to know whether bones were cremated fresh or dry; in other words, if death happened a long time ago or not (Buikstra y Swegle 1989, Grévin et al. 1990, Maples y Browning 1994, McKinley 1997, Chávez Balderas et al. 2003, Chávez Balderas 2007, Fairgrieve 2008). Bones from Offering 123 did not have curved fractures, deformation or shrinking, characteristic of bones cremated with soft tissue or defleshed but fresh (perimortem interval). Transverse fissures were documented on only one fragment, which implies that it had enough humidity when cremated (figure 172). This implies that most bones were dry when burned. They could belong to different individuals or to a skeleton in which for some reason some segments preserved more humidity. In sum, 94 % of the fragments are consistent with dry bone cremation.

Figure 170. Cremains from Offering 123. Photograph by Mirsa Islas.

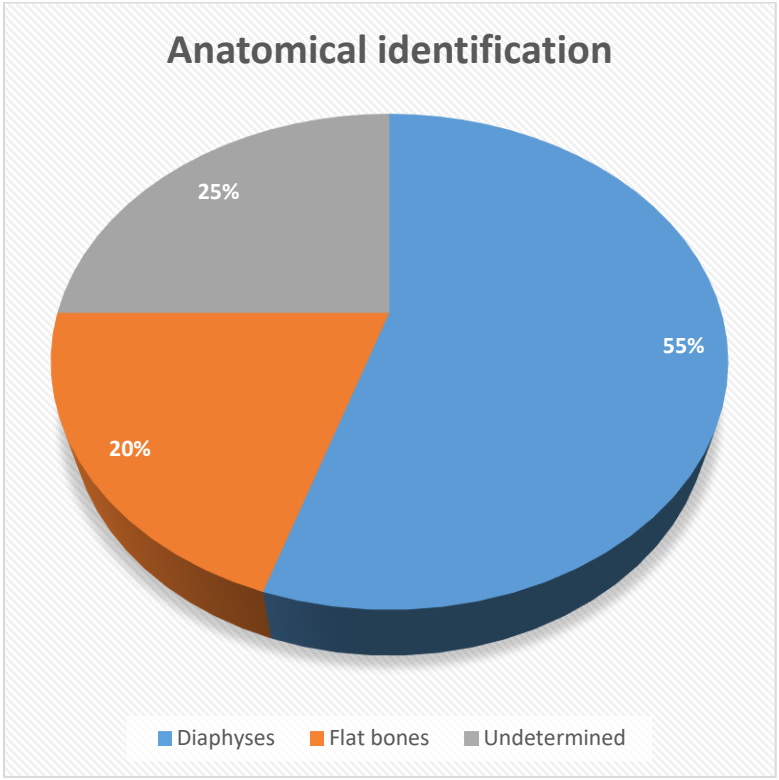


Figure 171. Anatomical identification, cremated remains, Offering 123.

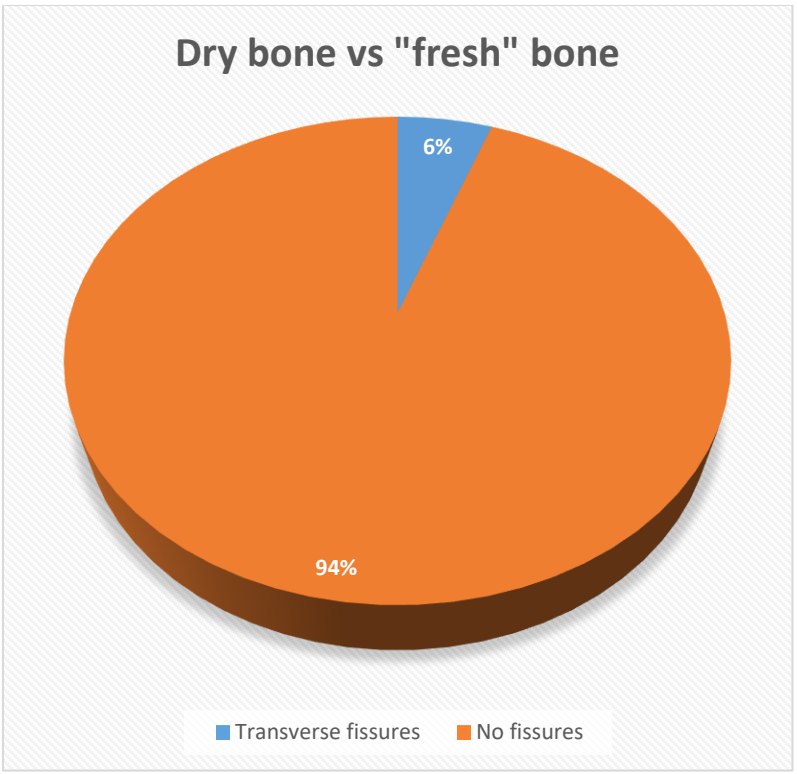


Figure 172. Dry bones and fresh bones cremation, Offering 123.

Temperature to which were exposed was inferred from bone color. From numerous experimental studies it is known that there is a correlation between the two (Barba and Rodriguez 1990, Exteberria 1994, Holden et al. 1995, Hanson and Cain 2007). It is common that the same bone can present different colors and this case is no exception. The predominant color in this sample was white, followed by gray and black (Figure 173). This implies that the temperatures were irregular and oscillated in the brazier or pyre between 300° and 900° C, although most of the bones were affected by temperatures between 500° and 900°.

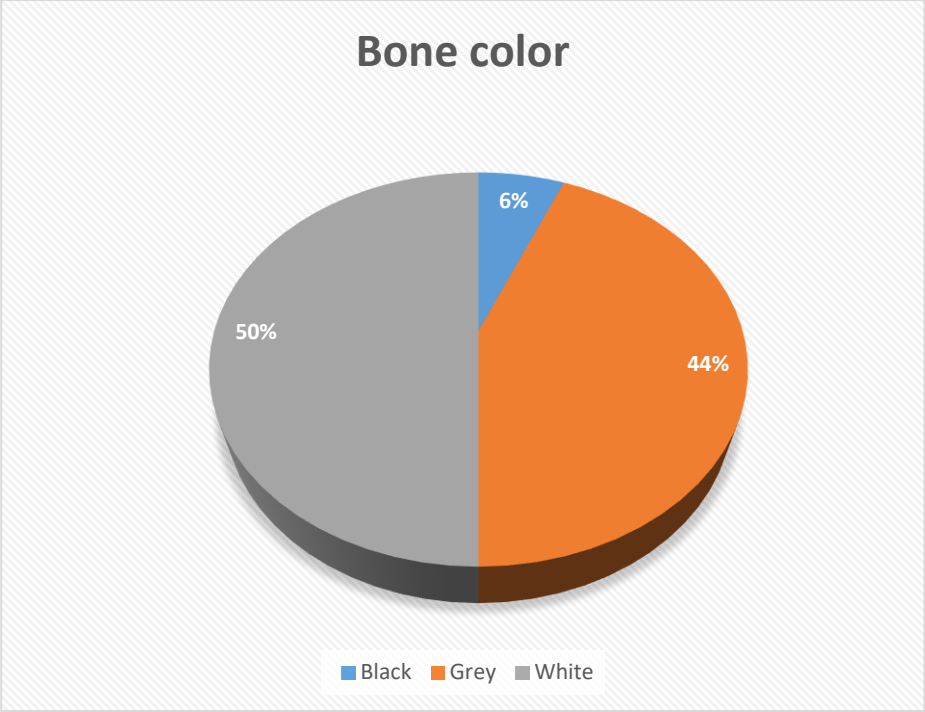


Figure 173. Colors observed in cremated bone fragments. Offering 123.

As part of this study, the weight of cremains was evaluated to estimate how much bone was deposited compared to a complete skeleton. While this calculation should not be used to estimate the Minimum Number of Individuals, it can be useful to provide an understanding of the ritual nature. William Bass and Richard Janz (2004) developed a systematic study on the weight of cremated bodies taking into account the age and sex of individuals. From a sample of 307 individuals they obtained an average of 2801.38 gr to 3379.77 gr for males. For females, they report an average ranging from 1874.87 gr to 2350.17 gr. Since in this case it is impossible to determine the sex of individuals, I considered the highest and lowest values of both categories. The total weight of the

fragments recovered in Offering 123 is 4.69 gr. This would imply that remains buried correspond between 0.13% and 0.25% of a complete skeleton.[409]

Type of burial	Secondary
Original space	Filled
Type of deposit	Individual
Natural biostratinomic processes	Dry bone cremation
Natural and diagenetic taphonomic processes associated with burial	None

Table 39. Deposit of human bone remains, Offering 123.

2) The function of skeletal remains in this context

The first question to address is whether or not this is a funerary deposit. To answer this I must rely on osteological analysis. Because of their thickness, most bones would appear to be of human origin; however, some fragments are very small, so it cannot be confirmed in all cases. The cremains have similar characteristics to those found in funerary cremation deposits, such as their fragmentation and the temperature to which they were exposed (inferred through colorimetric scales). However, eighteen fragments have characteristics consistent with the cremation of dry bones; this contrasts with what was previously documented in funerary contexts (Chávez Balderas 2007).

I propose two possible interpretations for this observation (Chávez Balderas 2018a). The first is that this is a combined ritual performed in two phases where dry bones were

[409] This estimate is an approximation, since these calculations are not available for Mexican populations.

extracted from a funerary context to be reused in the offering, giving them a new meaning. If correct, the bones could correspond to an elite member or a warrior, judging by the war symbols found in the deposit. However, from historical sources it is known that warriors were cremated in a cadaveric state and not skeletonized. Nor would this offering be a cenotaph, as such monuments are erected in honor of the deceased.

The second possibility is that this corresponds to a non-funerary ritual that involved sacrificial victims whose bones had dried as a result of time. Bone remains were not discarded, as even the smallest fragments were reused for construction rituals. Under this logic, some fragments could be recovered and cremated to be deposited in the offering. Due to the fact that these are very small fragments, with no evidence of post-sacrificial treatments or biological data it is not possible to choose between the two possibilities. In any case, it is known that cremated bones were considered to be recipients of some of the deceased's qualities, which could be transmitted to a particular space.

To understand the function of cremated bones in Offering 123, I must address the objects associated to the remains. Thanks to research carried out by Aguirre Molina (in Press), contextual associations can be examined: knives deposited near the bones were dressed with symbols of war, death and fire. In addition, bones from tecolote (*Otus* sp.), a genus reported for the first time in the excavations of Templo Mayor, were recovered. Only bones from wings and legs were found; most likely it was a pelt (Valentín and Ocaña 2011). This nocturnal bird was considered as a messenger of Mictlantecuhtli.

The knives have a distinctive characteristic that makes it possible to identify them: they carry Maltese crosses instead of eyes. Cecelia Klein (1984) was the first researcher to

identify the deity they represent. González López and collaborators (2018), agree that the name of this supernatural being was not mentioned in historical sources, therefore it is unknown. It is not Venus or the god of the underworld. Instead, it has the same garments as funerary bundles destined for cremation. In Mexica iconography these attributes are present in both funerary bundles containing human corpses and in bundles made of branches manufactured to symbolically represent bodies that were not recovered from the battlefield.

Aguirre Molina (in press) agrees that knives are symbolically related to funerary bundles, and therefore considers that their association with cremated bone remains could allude to "the representation of a funerary ritual of high-ranking warriors", since knives also have clubs and darts. As for Gonzalez Lopez and collaborators (2018), they interpret these supernatural beings as bundles that allude to the symbolic death of the 52-year cycle; that is why they are manifestations of fire and its transforming qualities. Concurring with this interpretation, bone fragments in the proximity of the knives would reaffirm their identity and the importance of pyrolatry among the Mexica. Fire was a transforming and transporting element that allowed the traveling soul *teyolía* to undertake the journey to the underworld in an expeditious way (Chávez Balderas 2007). In sum, this is not a primary funerary context, since it was not motivated by the death of an individual. Instead, it is a much more complex issue, since it materializes a mythical discourse on a being that embodies a bundle that will be cremated, in which the cremains function as an important part of the message.

Human remains recovered in the construction fills of West Plaza

Historical sources suggest that Templo Mayor was a pivotal site for sacrificial practices. However, it was not the place where the remains of the victims were buried. Indeed, most of these have been recovered on West Plaza and in buildings aligned with the Huitzilopochtli shrine. When speaking of these remains, it is inevitable to think of the skulls that were exhibited in the Huei Tzompantli and its adjoining towers. However, a large quantity of bones recovered in West Plaza correspond to tiny fragments that prove that sacrificial victims' remains were not discarded, but reused in construction rituals. Although the use of these types of fragments has been documented for the Ball Game and the Tzompantli, most of them have been recovered at the foot of Templo Mayor, in the construction fill of the plaza. In this section I will present results of the analysis of bone fragments from Operations 6, 9 and 23. The first two correspond to the same deposition event that occurred during the enlargement of the Plaza, so I will examine them together, while Operation 23 corresponds to the construction fill of the Cuauhxicalco (figure 174).[410]

[410] Remains recovered as part of Operation 1 were analyzed together with Offering 166, since they correspond to the same depositional event.

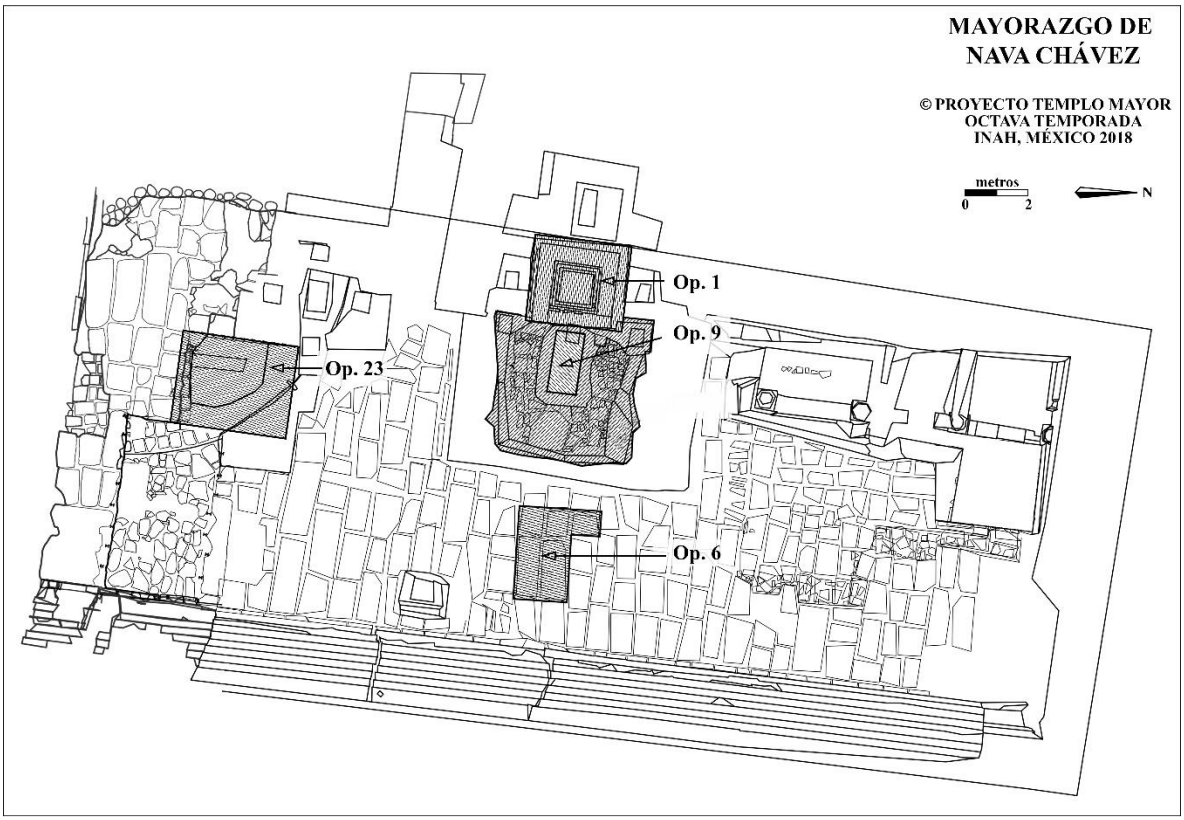


Figure 174. Operations 1, 6, 9 and 23, where most of the bone fragments were recovered.

Operations 6 and 9

These operations should be considered together because although they were explored at different times, they correspond to same event and stratigraphic layer. Operation 6 was undertaken between March and May 2010 by archaeologist Miguel García González team. It consisted in the excavation of a pit at the foot of Templo Mayor, east to the Tlaltecuhtli monolith (figure 174). In this operation was found Offering 130, composed of 31 ceramic incense burners (Argüelles 2012).

At 65 cm from this deposit, at a depth of 3.05 to 4.16 m below the floor of Stage VI-2 (AD 1486-1502), the team coordinated by García González found six fills (R11-R15) and a layer that functioned as a base for a floor that was removed (F4); these contained a high concentration of human bone fragments (Chávez Balderas and García González 2010). The existence of this floor base suggests that this wasn not a single event;[411] most likely the bones were deposited in the construction fill at leas in two different occasions.

Considering the amount of fragments and that this is a secondary deposit, bones were recovered by excavation square and fill, taking photographs of each level and mapping the most important concentrations. Most of fragments correspond to the skull, with evidence of cultural modifications.

Operation 9 was excavated by Israel Elizalde and Diego Matadamas (2013) between October 10th, 2010 and November 9th, 2012. The exploration area comprises the fills below Offering 126, that is, approximately 2.20 m below the monolith of goddess Tlaltecuhtli. Archaeologists reported bones from Fill 9 to Fill 11, although they tend to concentrate on Fill 10. [412] From research done by both excavation teams it is known that Fill 13 from Operation 6 corresponds to the same stratum recorded as Fill 10 in Operation 9 (figure 175).

[411] Diego Matadamas, personal communication, september of 2019.
[412] In Fill 9, a fragment of cremated bone and two human teeth were recovered. In Fill 12, on the other hand, only one patella was found.

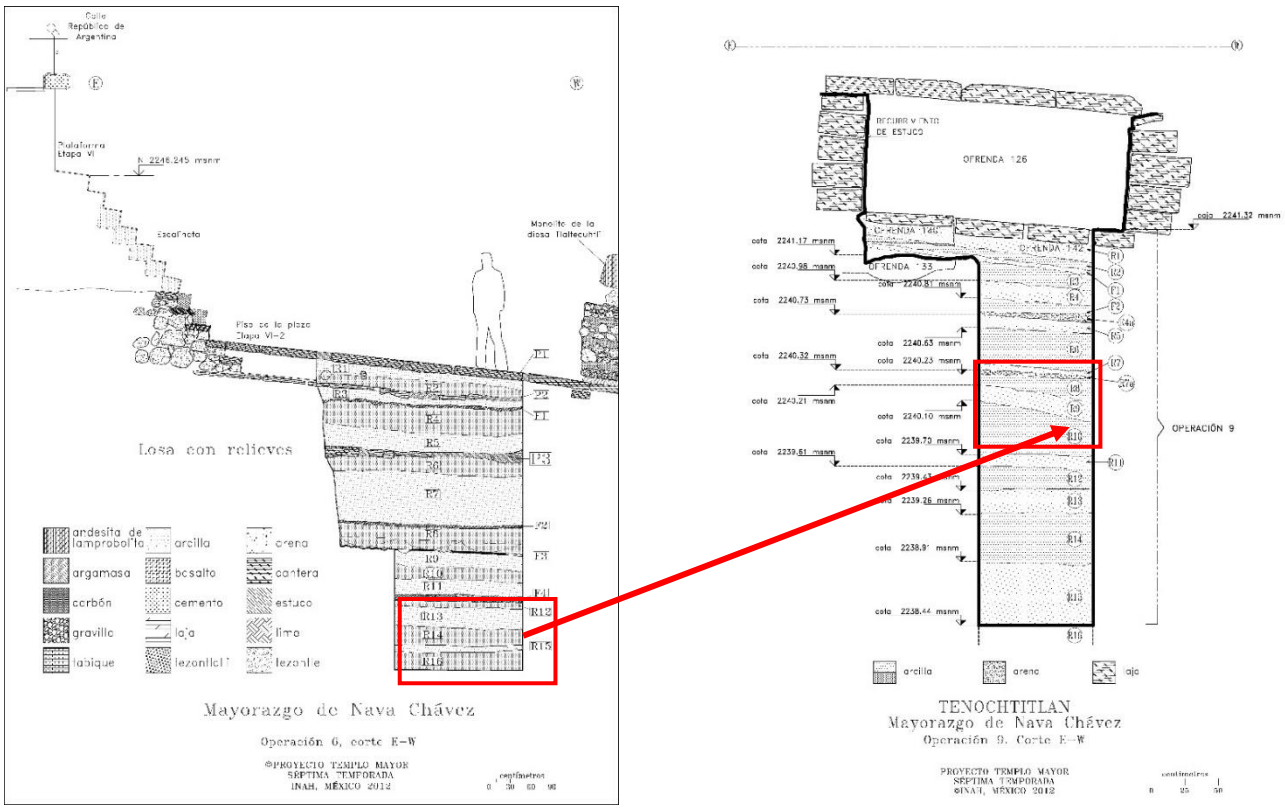


Figure 175. Operations 6 and 9. Equivalent fills (13 and 10).

Vertical placement	Construction fills, West Plaza
Horizontal placement	Aligned with the central axis of Templo Mayor
Stage	Stage IV-2 (AD 1440-1469).
Symmetry	None
Container	Construction fill
Dimensions	Operation 6: 206 cm E-W; 170 cm N-S; 111 cm depth. Operation 9: 195 cm E-W; 97 cm N-S; 88 cm depth

Table 40. Operations 6 and 9.

Analysis of Skeletal Remains

This type of assemblage required a specific laboratory methodology. This consisted of anatomical identification, classification according to posthumous treatment, quantification by group and fill, estimation of Minimum Number of Individuals (NMI), documentation of cultural treatments and natural taphonomic alterations, as well as biological characteristics. [413] This work was carried out in two phases: the first jointly with archaeologist García González and the second with researchers Jacqueline Castro Irineo, Karina López Hernández and Linda Potter.

Fragment identification was done by using specialized literature (White et al. 2012) and a reference collection. The preliminary sorting carried out during 2010 (Chávez Balderas and García González 2010) was refined in 2016. Fragments were quantified by fill in order to conduct a distribution analysis and to understand if this corresponded to a single event or if fragments were deposited on different occasions.

In the second analysis phase the Minimum Number of Individuals was estimated by documenting landmarks and taking into account individuals' age (Appendix 1). Fragments were described, documenting biostratinomic processes on each bone. This helped to refine a previous classification on posthumous treatments. For the analysis I defined six groups: 1) teeth; 2) tzompantli skulls manufacture debris; 3) skull masks manufacture debris; 4) cremated bones; 5) fragmentary skulls (5a) and post-cranial bones (5b); and 6) undetermined fragments (figures 176-181).

[413]Due to bone fragmentation no significant biological data was recovered. In contrast information on cultural biostratinomic processes was abundant.

Figure 176. Group 1 (teeth), Operation 6, R13. Photograph by Mirsa Islas.
Figure 177. Group 2, skull fragments (tzompantli skull manufacture debris), Operation 6, R13. Photograph by Mirsa Islas.

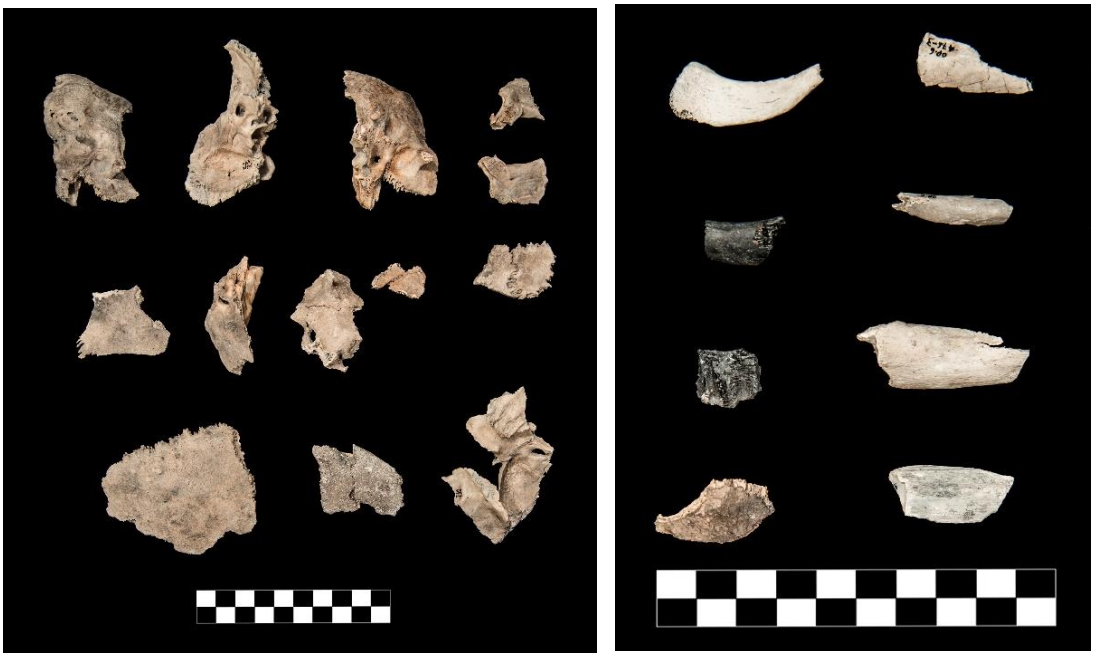


Figure 178. Group 3, skull fragments (skull mask manufacture debris), Operation 6, R13. Photograph by Mirsa Islas.
Figure 179. Group 4, cremated remains, Operation 6, R13. Photograph by Mirsa Islas

Figure 180. Group 5a, skull fragments (not manufacture debris), Operation 6, R13. Photograph by Mirsa Islas
Figure 181. Group 6, undetermined skull fragments, Operation 6, R13. Photograph by Mirsa Islas.

I documented natural taphonomic alterations, especially peeling caused by weathering and postmortem fractures, as these provide information on bone display and reutilization. Finally I obtained biological data (sex, age, paleopathology) to the degree possible, given that these are fragmentary remains.

1) Anatomical identification, quantification and MNI estimation

In Operation 6 a total of 2071 bone fragments were identified and quantified, while in Operation 9 only 145, for a total of 2,216 bone fragments. In addition, 19 animal bones were recovered.[414]This deposit is mainly composed of skull fragments (97% of all fragments analyzed). In contrast 2% are post-cranial bones and 1% are of undetermined

[414] This means that 99.15 % of bones were of human origin and 0.85% were faunal remains.

origin. This confirms that most posthumous treatments of human remains in this part of the Sacred Precinct were focused in human heads (figure 182).

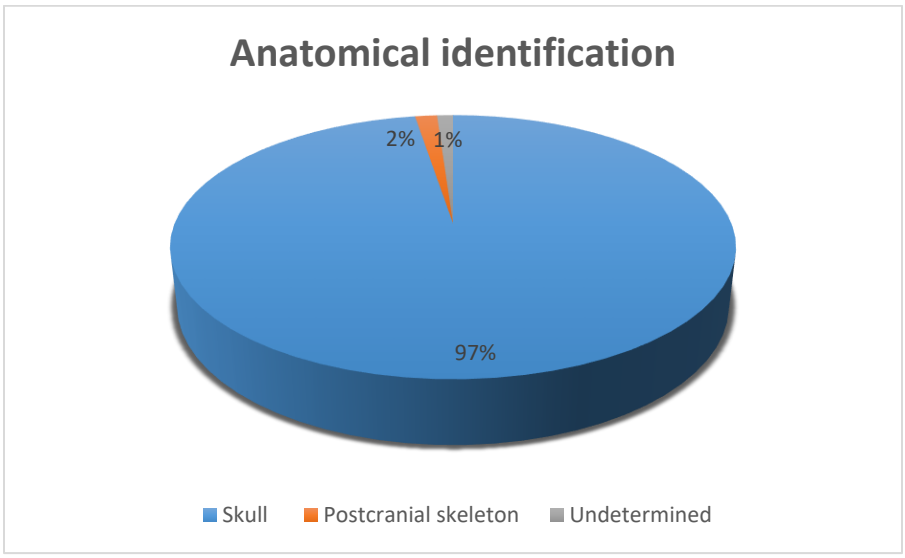


Figure 182. Anatomical identification of bone fragments from Operations 6 y 9.

To estimate MNI I quantified repetition of bony landmarks. This was done separately for adults and children. From this analysis I determined a MNI of 19, based on repetition of right mastoid processes (figure 183). Sixteen of these correspond to adults and three to children.

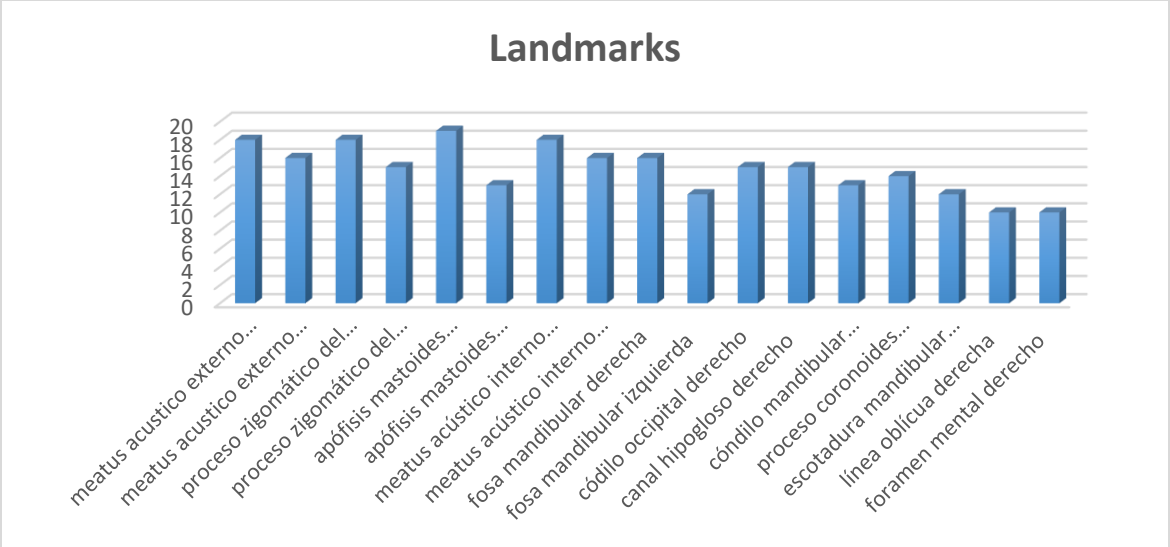


Figure 183. Landmarks used to calculate MNI, Operations 6 and 9.

2) Group classification and stratigraphic distribution

To understand this assemblage, it was necessary to classify fragments into the various groups previously defined. I determined that most of the fragments correspond to tzompantli skull manufacturing debris (48%), followed by undetermined fragments (18%) and those corresponding to skull mask manufacturing debris (13%). The first ones were produced by fractures done to make a lateral perforation, and which are more fragmented and in consequence more abundant.

In contrast, skull mask manufacturing waste was less fragmented and were more useful for calculating the MNI. Teeth correspond to 11% of the sample[415] and cremated bone 5%. Finally, 5% are skull fragments, mostly weathered and fractured that do not represent manufacturing debris, but most likely represent breakage from exposure and sustained use

[415] These might correspond to tzompantli skulls, skull masks or skulls with basal perforation.

(figure 184). All these fragments were incorporated intentionally in the construction fill as these are not workshop areas.

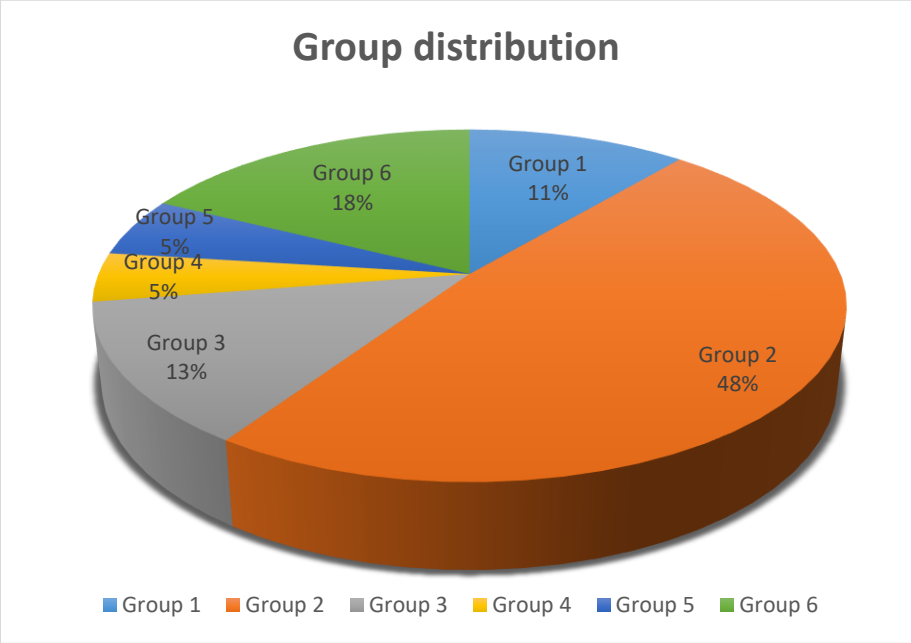


Figure 184. Fragment distribution by group, Operations 6 and 9.

Most of fragments were founds in Fill 13 (Operation 6) and Fill 10 (Operation 9), supporting the proposal of Elizalde and Matadamas (2013), who considered that both fills correspond to the same stratigraphic layer (figures 185 and 186). It is interesting to note that in Operation 6 bone fragments are abundant: it is likely that this dense concentration of bone becomes less dense to the west and it is only associated with the Coaxalpan.

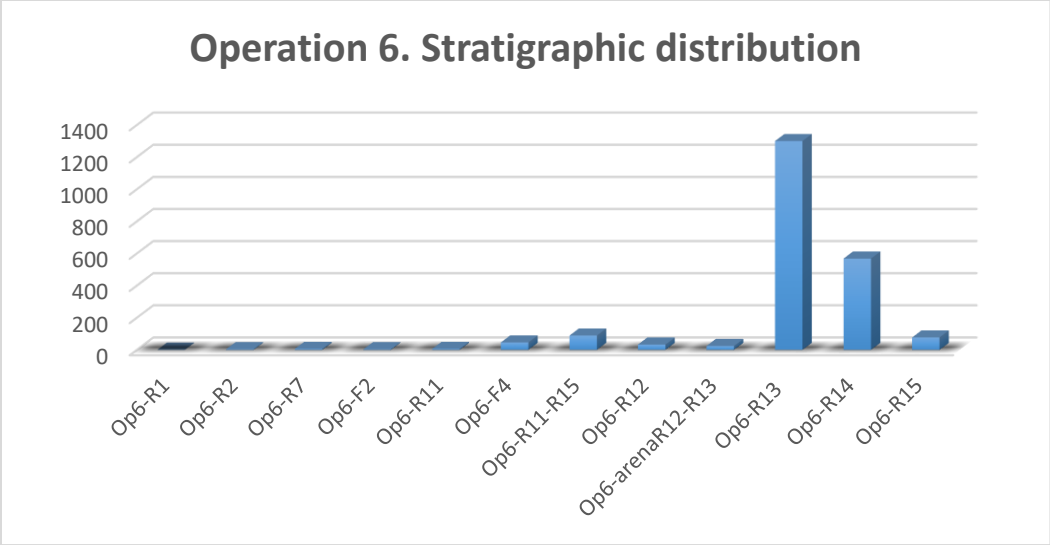


Figure 185.Bone fragments stratigraphic distribution, Operation 6.[416]

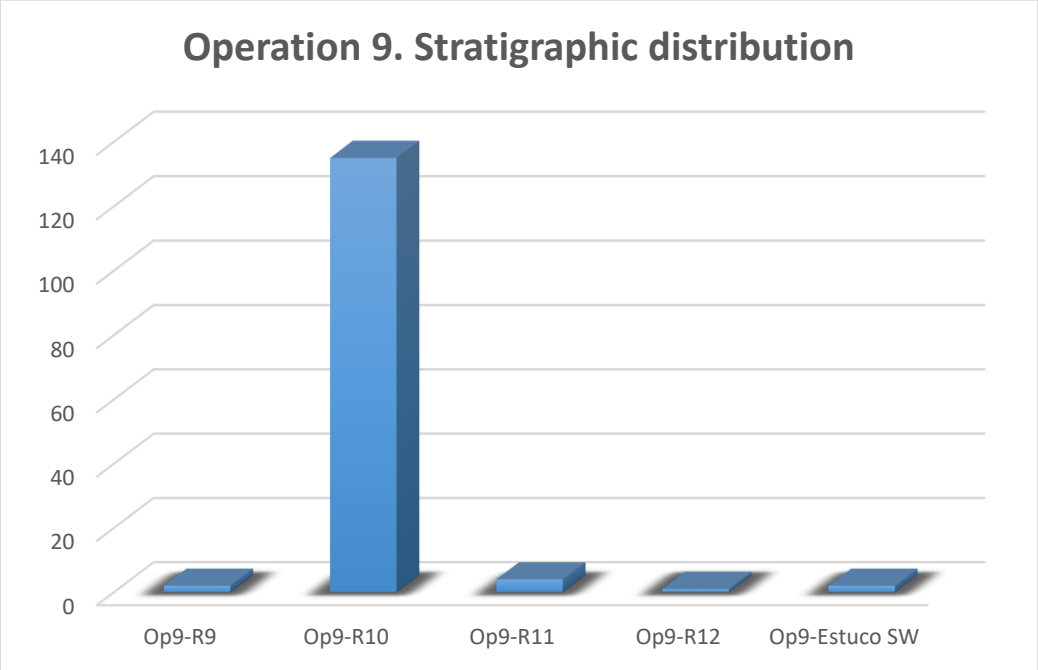


Figure 186. Bone fragments stratigraphic distribution, Operation 9.

[416] F4 corresponds to "Firme 4" (floor base).

Although most of the fragments were found in fills 13 and 14, I observed that some groups are more abundant in particular strata. For example, in Operation 6 F4 and in Fill 12, most of the fragments correspond to teeth and to tzompantli skull manufacture waste. However, the total is only 68 fragments. Instead, Fill 13 contained 1324 fragments (including those recorded as R13-R14). Below I present distribution graphs by group and construction fill (figures 187-192).

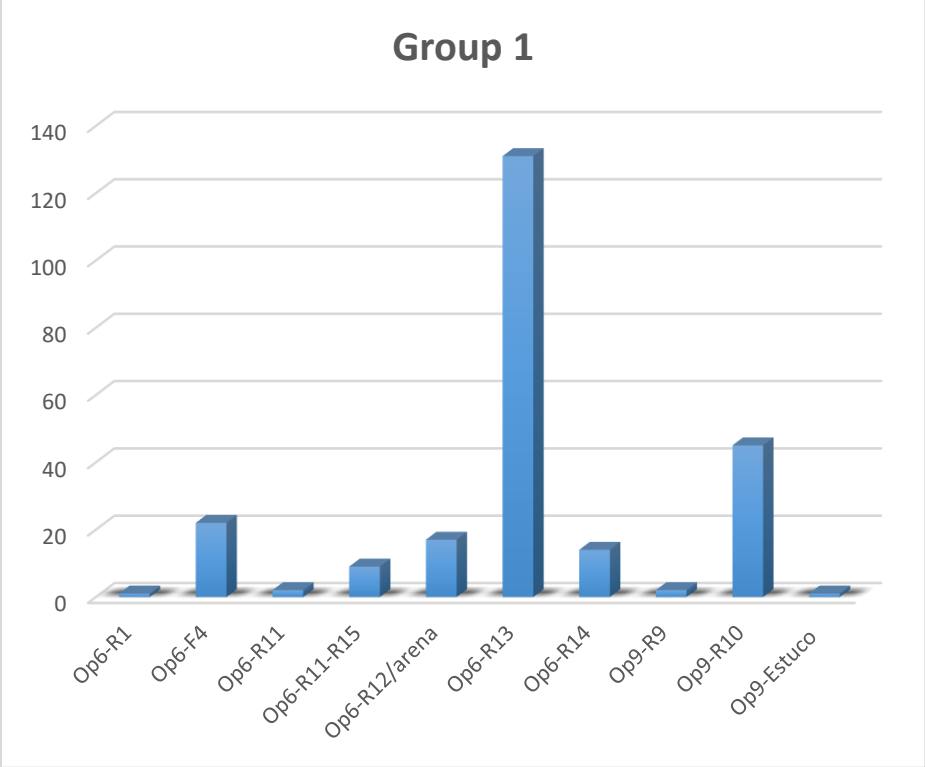


Figure 187. Stratigraphic distribution of Group 1 (N=247). Most teeth are usually in Fill 13 of Operation 6 and Fill 10 of Operation 9.

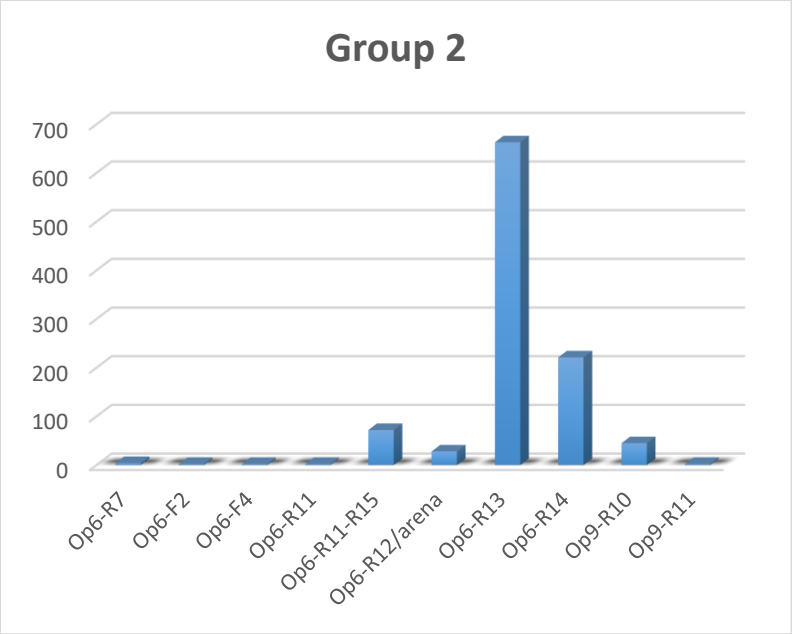


Figure 188. Stratigraphic distribution of Group 2 bones (N=1041) (tzompantli skulls manufacture debris). Most of the fragments are distributed in fills 13 and 14 of Operation 6.

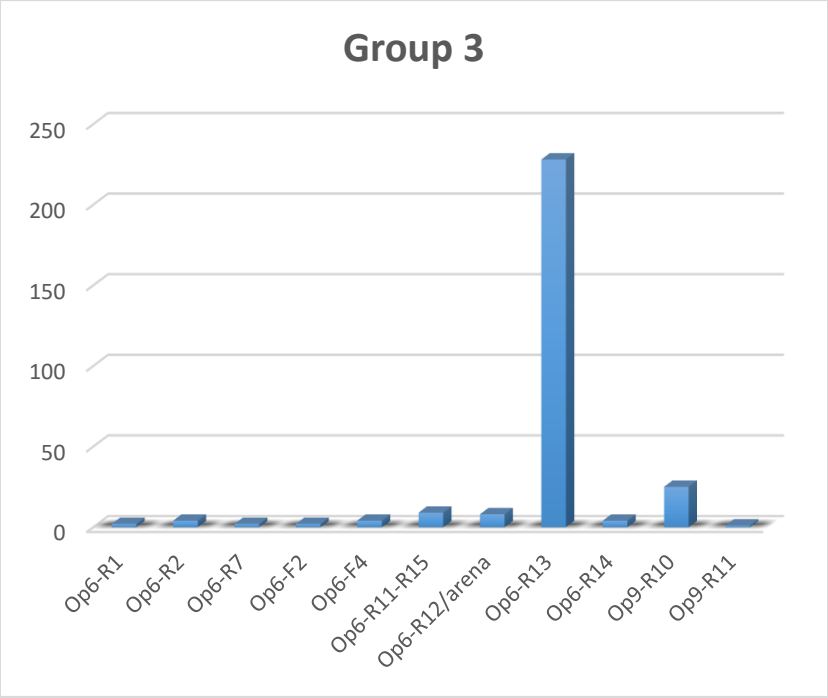


Figure 189. Stratigraphic distribution of Group 3 bones (N=289) (skull masks manufacture debris). Nearly all of the bones were found in Fill 13 of Operation 6.

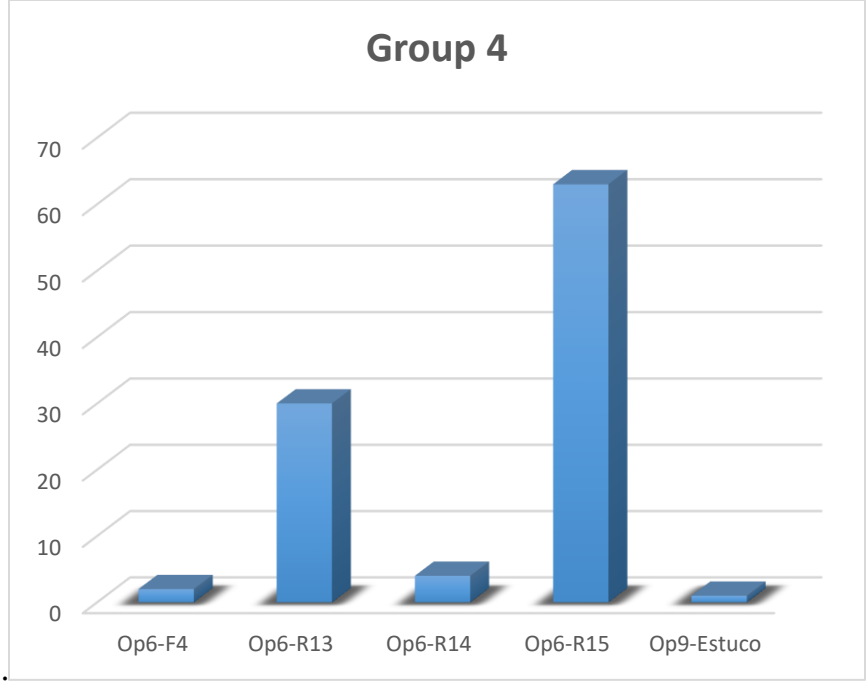


Figure 190. Stratigraphic distribution of Group 4 bones (N=100) (cremains). Most fragments were found in Fill 15 of Operation 6, which implies that they were deposited first than the rest of the fragments.

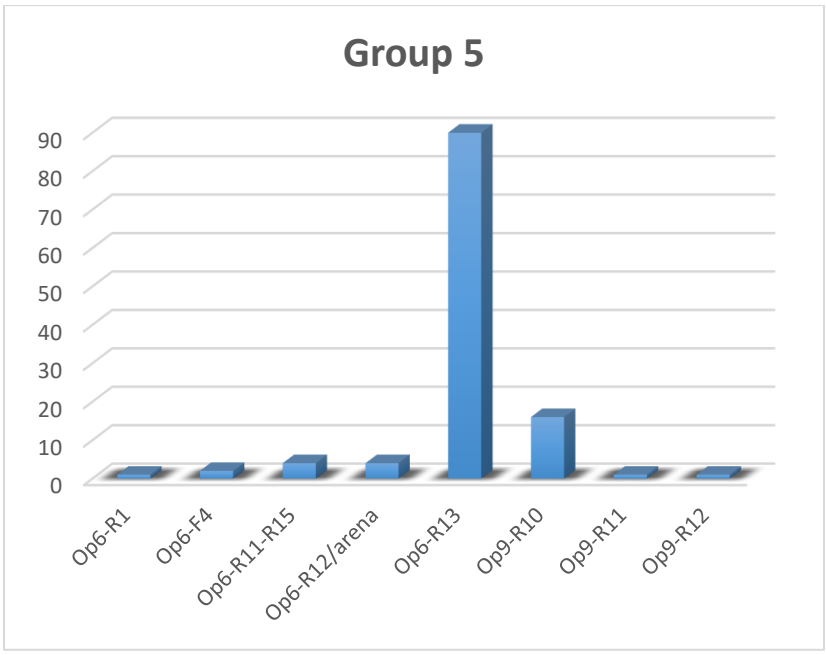


Figure 191. Stratigraphic distribution of Group 5 bones (N=119, of which 5 correspond to the post-cranial skeleton and 114 to fragmentary skulls). Most were found in Fill 13 of Operation 6 and Fill 10 of Operation 9.

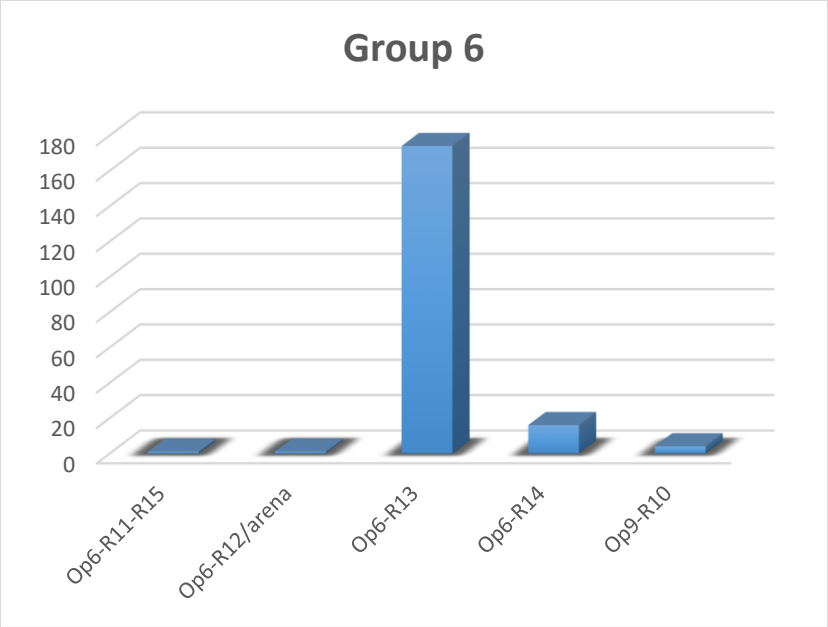


Figure 192. Stratigraphic distribution of Group 6 bones (N=198) (undetermined skull fragments). Most were found in fills 13 and 14, Operation 6.

Fills 13 and 10 from operations 6 and 9, respectively, are a single depositional event, as demonstrated by stratigraphic analysis. Despite being recovered in different excavation units, they were deposited simultaneously when raising the level of the Plaza. It is therefore not surprising that both strata have a similar distribution with regard to bone fragments, where tzompantli skull manufacture waste is the most abundant (figures 193 and 194). However, this is not a homogeneous stratum because in the fills of Operation 6 proportionally fewer teeth and more unidentifiable fragments were found. The amount of skull mask manufacture waste is similar in both fills and cremated remains were not reported in Operation 9.

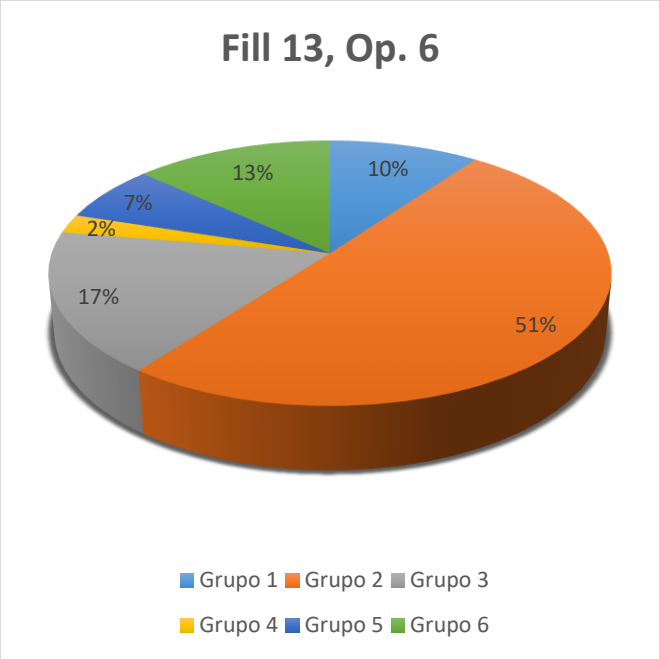


Figure 193. Distribution by groups in Fill 13, Operation 6.

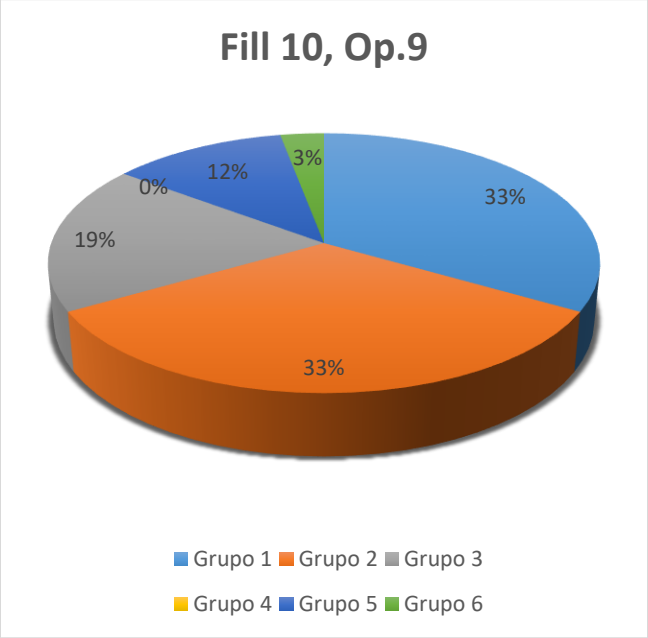


Figure 194. Distribution by groups in Filler 10, Operation 9.

3) Natural and cultural taphonomic alterations

For documenting these processes, I used a set of codes (see Appendix 1). In terms of natural taphonomic alterations, 28% of the fragments presented postmortem fractures; of these, a large percentage were recorded on teeth (10.83%). A total of 216 teeth presented longitudinal fissures and fractures that may be the result of environment exposure. In addition, in 451 bone fragments severe peeling compatible with weathering was observed; most correspond to groups 3 and 5, that is, skull mask manufacture debris and fragmentary skulls with fractures from possible use and display.

Analysis of cultural biostratinomic processes revealed that most of the bone fragments were manipulated in one way or another. For example, 75.8% (n=1571) suffered some type of blunt trauma, 29.2% sharp force trauma (n=605), and 45% (n=943) presented evidence of some type of indirect thermal alteration, although this has yet to be confirmed by microscopic analysis. Most of these fragments correspond to tzompantli skull manufacture waste. Only 4.8% (n=100) presented evidence of direct thermal alteration.

Most blunt force damage was seen in tzompantli skull manufacture debris (Group 2), followed by skull mask waste (Group 3) and fragments of facial skulls and mandibles (Group 5). Blunt force damage includes linear, radiating, and concentric fractures, as well as adhered fragments, bevelling, plastic deformation, percussion, puncture and disarticulation fractures. Of these, the most common pattern was percussion fracture in tzompantli skull manufacture waste (Figures 195 and 197).

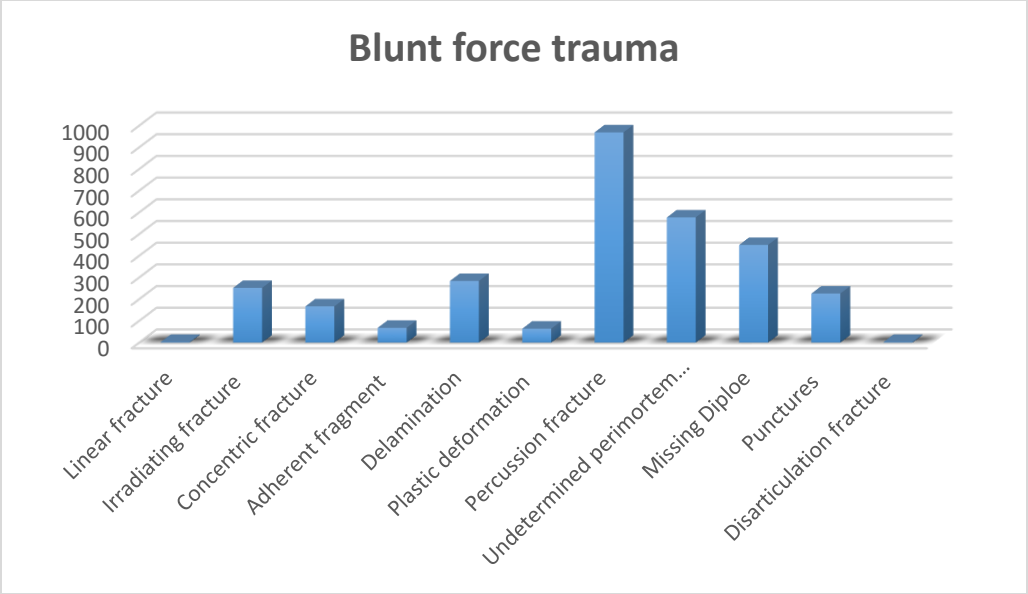


Figure 195. Types of alterations produced by blunt force. Punctures and disarticulation fractures were grouped in this category, but also imply the use of sharp force.

In addition, I observed alterations made by sharp force. Although I documented some cases of flaying, disarticulation or bone cut, most correspond to defleshing or periosteum removal. The latter were grouped into one category, as the small size of some fragments did not permit distinguishing between them. Regardless of the nature of the cuts and scrape marks, all were done with the objective of flaying and defleshing the head (figures 196 and 198).

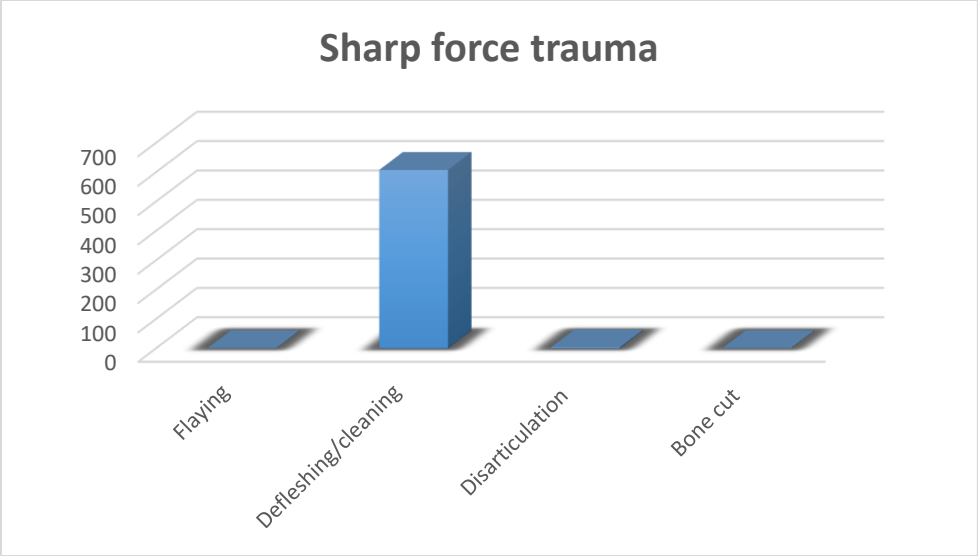


Figure 196. Sharp force alterations. Defleshing and periosteal removal were grouped.

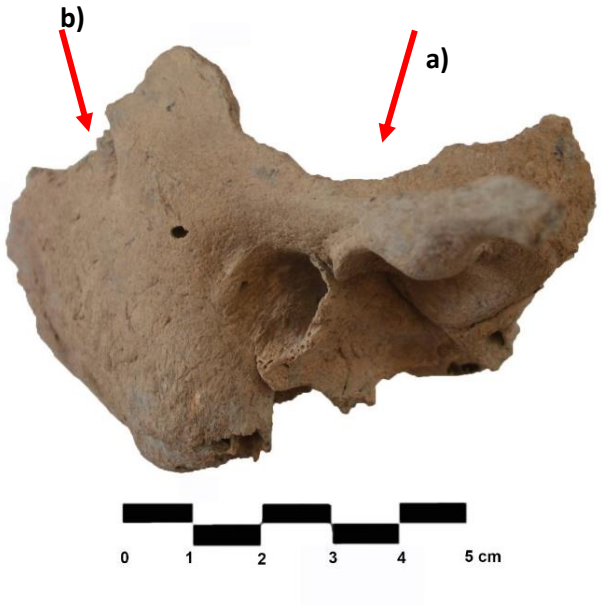


Figure 197. Temporal bone a) evidence of lateral perforation (tzompantli skull); b) secondary percussion, possible for manufacturing a skull mask. Group 3, Operation 6. Photograph by Ximena Chávez Balderas.

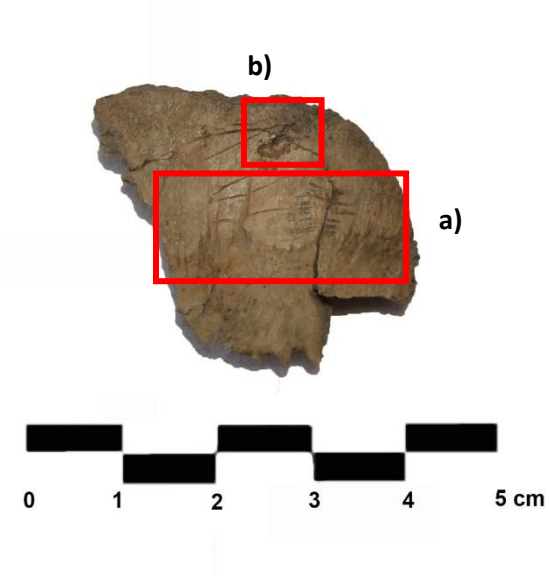


Figure 198. Parietal fragment a) cut marks; b) punctures. Group 2, Operation 6. Photograph by Ximena Chávez Balderas.

Cremated remains represent a completely different category. In Fill 15 from Operation 6 these were the first bones to be deposited, and they also were found in four more fills. Most correspond to skull fragments (64%), and post-cranial bones (28%) and to unidentified fragments (8%). Unlike to Offering 123, numerous fragments have transverse fissures and deformation, characteristic of fresh bone cremation. However this does not imply that bone came from funerary contexts, as most of the fragments present perimortem fractures (55%) or defleshing marks (6%), compatible with treatments given to sacrificial victims. Most of fragments seem to be manufacture waste exposed to fire in both perimortem and postmortem intervals.

Bones were exposed to diverse temperatures as inferred through coloration. Gray is the most abundant followed by white and black, although some Brown fragments were documented. In fact each bone presents more than one color, as pyre or brazier

temperatures are irregular, ranging from 200° to 900°, although most were affected by temperatures from 500° to 700° (figure 199) (Barba y Rodríguez 1990, Exteberría 1994, Holden et al. 1995, Hanson y Cain 2007).

Total weight of the bone fragments is 496.6 gr, and they corresponding to several individuals. Bone repetition corresponding to the right side of mandible suggest a MNI of 4 that were exposed to direct fire. However, perimortem fractures suggest that most of fragments originally corresponded to Groups 2, 3 and 5 that were ultimately burned.

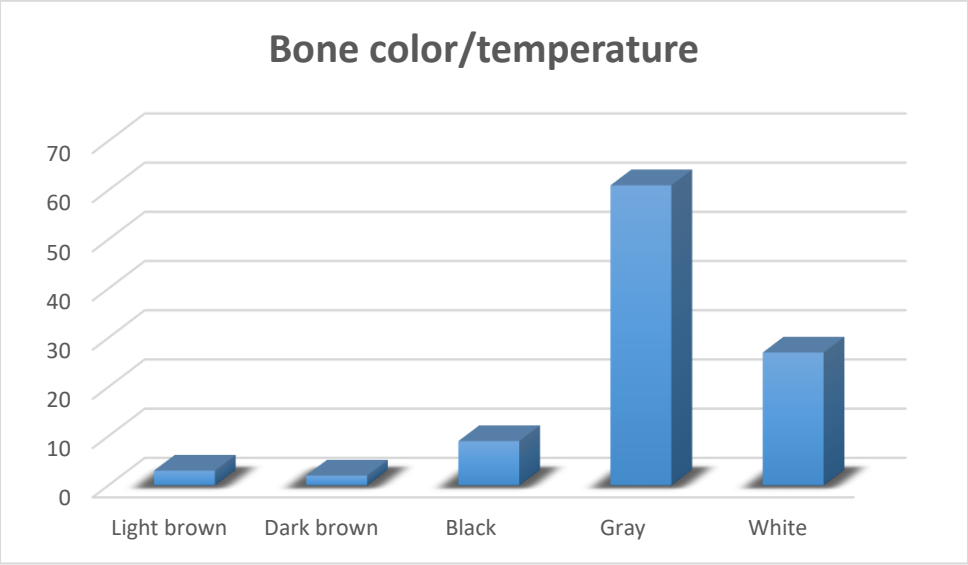


Figure 199. Cremated bone colors. Operations 6 and 9.

4) Biological profile

Bone fragmentation does not permit a complete biological profile analysis, for this reason I will only include some specific observations. From landmark quantification it was determined that at least three children are present. Mandible analysis suggest they were 5 ±1.5 years, 10 ± 2.5 years, and 9 ± 3 years. In contrast 16 correspond to subadults and

adults represented by the same number of right mastoid processes; no age estimation was conducted as this bone is not diagnostic for this purpose. However, from mandibles, at least three individuals are subadults. As for sex determination most of diagnostic fragments (temporal bone) likely correspond to males, although some are compatible with females or gracile male subadults. Other diagnostic fragments were observed such as mandibles. However, it is unknown if these correspond to any of the temporal bones, thus no attempt was made to estimate the total number of males and females from this assemblage, as this has to be based on individualization.

In any case, fragmentary bone from construction fills reflects the same biological diversity found in Templo Mayor offerings and in the Huei Tzompantli, where children, subadults, adults, females and especially males have been found. In terms of health indicators I observed some caries (A-C), abscesses, dental calculus, enamel hypoplasia and spongy hyperostosis, conditions found in other skulls from the Sacred Precinct.

5) Function of human remains in construction fills, operations 6 and 9

The osteological materials described above can be considered so far the most important collection of fragmentary remains deposited during construction rituals. Correspondence between the two operations suggests that this assemblage extends over a considerable area of the West Plaza. Although it is not possible to calculate its dimensions, it clearly included some part of the Coaxalpan, from the stairs to the monolith, and this ritual space was of central importance.

From the bone analysis it can be confirmed that Mexica priests kept even the smallest fragments of a sacrificial victim's body, preserving them for a particular occasion to be deposited and buried. These deposits do not represent one sacrificial event, but form a part of a series of activities involving posthumous treatments, skull reuse and exposure to the elements, indicating that these individuals were sacrificed and their remains manipulated on multiple occasions and their remains stored until such time that they were given final burial in ritual contexts.

Cultural taphonomic processes prove that most of bone fragments correspond to sacrificial victims that had undergone diverse body treatments. Most of the fragments correspond to skulls (97%); post-cranial bones include primarily cervical vertebrae linking this assemblage to decapitation and a local industry of tzompantli skulls, effigies and possibly garments. From stratigraphic analysis it is possible to know that most fragments correlate to Stage IV-2, that is, AD 1440-1469, during the reign of Moctecuhzoma I.

Some were buried on a single event, but the fact that some floors were dismantled suggest that this practice continued over time. Bone fragments from Offering 166-Operation 1, are a problematic deposit, where some remains might correspond to ceremonial refuse, including fragments of ritual objects that cannot be reutilized or included in manufacture chains as result of wear and tear (Walker 1995). This definition fits best with Group 5, mostly skull fragments broken by use and weathering. However, most bones correspond to manufacture debris, such as 1,330 fragments from groups 2 and 3, and reflect skull modifications conducted in other areas of the Sacred Precinct. These fills are not a workshops, however, as fragments cannot be fitted back together. Instead, they represent commingled fragments most likely from different times and places.

Obviously these ritual objects were not manufactured in construction fills during the enlargement of the Plaza; they were likely created and manipulated in some building or in a part of the square devoted to this activity. I might speculate that this hypothetical place was close to the Huei Tzompantli, but evidence has yet to be recovered.

In sum, manufacture debris, fragmented skulls resulting from wear and tear, some post-cranial bones, teeth that fell during the postmortem interval, and cremated bones were recovered by the priests and stored in some location until the enlargement of the West Plaza. These fragments were deposited in the area between the Tlaltecuhtli monolith and the Templo Mayor platform's western limit –the Coaxalpan-, as part of a construction ritual. This may have been done to provide the Plaza with special qualities extracted from the victims. New sacrificial victims walked over these construction fills on the path to their immolation; their skulls were destined also to be exhibited, buried or kept in storage inside the Sacred Precinct.

How do we know these fragments were not deposited incidentally as secondary trash inside de dirt? First the dirt utilized as fill for the plaza is unusually clean, lacking from obsidian and ceramic fragments. Bones cannot be glued back together, and the assemblage is not consistent with a workshop. These bones fragments are only placed in the Coaxalpan area and, by the existence of a base for a floor that was dismantled (F4), this was not a single event. Instead the deposit of this fragments corresponds to different to at least two construction rituals. In addition the deposit of bone fragments with the same characteristics has been documented for construction rituals in different buildings (Huei Tzompantli, Ballgame and Cuauhxicalco). Finally, bones have different preservation stages which means they were obtained during different sacrificial events. For example, some

correspond to bone fragments resulting from the manufacture of tzompantli skulls, while others where exhibited for long periods as these are heavily weathered. For this reason and by comparison with animal bones (see chapter 7), it is likely that priests collected bone fragments over time to be reused in construction rituals.

The study of "problematic" deposits has gained some importance in recent decades (Walker 1995, Tiesler 2007), and several examples have been documented (Chávez Balderas 2017, Tiesler 2018, García et al. in press). I would like to highlight a case from the Maya area found in the Main Plaza of Chichén Itzá close to El Castillo. There a team under the direction of Rafael Cobos recovered reutilized human bone fragments with perimortem modifications. In contrast with the West Plaza assemblage, however, these were commingled with numerous animal remains (Tiesler 2018: 47).

There are countless places still to be explored at the Sacred Precinct. By using proper recovery methods it will be possible to gain new insights into problematic deposits and their link to construction rituals and the use and symbolism of victims' remains, no matter how small the size of bone fragments.

Type of burial	Problematic deposit (secondary)
Original space	Filled
Type of deposit	Collective (on different occasions) (Duday 1997).
Decapitation events	Undetermined (possibly numerous)
Natural biostratinomic processes	Weathering, postmortem fractures
Natural and diagenetic taphonomic processes associated with burial	Fractures, fissures, stains, adhered material.

Table 41. Burial of human remains, operations 6 and 9.

Operation 23

This context was excavated inside the Cuauhxicalco by archaeologist José María García Guerrero, Julia Pérez Pérez and specialist Tomás Cruz, between January 31st and February 17thof 2012. The excavation area is located in the southern corner of Mayorazgo de Nava Chávez and its dimensions are the same as a gigantic andesite slab of 3.60 m x 2.70 m, which was part of the Stage VI-2 floor (AD 1486-1502). Archaeologists found the Cuauhxicalco walls in Fill 2, where they recovered offerings 149 and 151. This building corresponds to the reigns of Axayácatl (AD 1469-1481) and Tízoc (AD 1481-1486). Under the reign of Ahuítzotl (AD 1486-1502) the superior part of this structure was demolished and buried under the West Plaza (Pérez Pérez y Chávez Balderas 2016).

Tomás Cruz found a 46 cm wide tunnel, oriented towards the South.[417] Inside were five bone fragments that I decided to include in my study, as this building had a link to fire and death.

Vertical placement	Construction fills
Horizontal placement	Cuauhxicalco
Stage	Stage VI-2 (AD 1486-1502).
Symmetry	None
Container	Construction fill
Dimensions	3.60 m N-S 2.70 m E-W

Table 42. Operation 23.

[417] This was closed with offerings 149 and 151. It might correspond to a tunnel or two adjacent walls, suggesting that previous to this circular platform were build squared structures. Future excavation will reveal this mystery.

1) Human remains from Operation 23

Five cremated bones were found in the excavation of the tunnel: four long bone fragments and a rib. Fragmentation prevented sex determination, age estimation and even a reliable calculation of MNI. However, some important data were obtained. Most fragments present transverse fissures, corresponding to fresh bone cremation, that is, with enough humidity and collagen, possibly preserving soft tissues. In contrast some other bones were clearly cremated when dry (Figure 200). One is a femur fragment with defleshing cut marks on the posterior side.

Figure 200. Diaphysis fragment compatible with dry bone cremation. Photograph by Mirsa Islas.

Similar to assemblages previously analyzed, predominant colors of the bone fragments were black, gray and white, corresponding to pyres or brazier with temperatures ranging from 300° to 900° C (Barba y Rodríguez 1990, Exteberría 1994, Holden et al. 1995, Hanson y Cain 2007).

2) The role of bones in the construction fill

This is another example of a problematic deposit, characterized by the presence of cremated remains in the construction fill. The bone material might correspond to funerary pyre residues or to sacrificial victims exposed to fire soon after death or when they were skeletonized. Despite of the fact that few fragments were found in this fill, they are important as this building was linked to funerary cremation rituals and to other ceremonies in which fire had a pivotal role. In the Cuauhxicalco or close to this building were cremated elite funerary bundles, and the resulting cremains reportedly were buried inside this platform (Alvarado Tezozómoc 1944: 95, 233, Durán 1967 II: 395, Chávez Balderas 2007). Acording to López Luján (in press), in this area of West Plaza rituals were performed that focused on the transforming power of fire. This happened during the months of *quecholli*, *panquetzaliztl*i y *títitl*, and in elite funerals.

Are these fragments part of the remains of some cremated dignitary cremated or do they belong to a sacrificial victim? The bones are not informative, and both hypotheses remain as a possibility considering the presence of cut marks on a femoral shaft fragment. Regardless of its source, this fragment is consistent with the practice of saving small bone

fragments and later adding them to construction fill, in this case as a termination ritual of the Cuauhxicalco.

In this chapter I exposed the extraordinary diversity with which human victims' bodies were treated in the sacred precinct of Tenochtitilan. Following their sacrifice, victims' corpses were extensively manipulated and most were decapitated. Their heads could be buried immediately with no further treatments or they were skeletonized to be carried, exhibited, or utilized in different rituals. A skull might be reused, transforming its original symbolism, or it could end up fragmented as a consequence of use and display. In any event some skulls were later placed inside offerings, in the construction fill or on the Tzompantli towers. Manufacture waste and bone fragments resulting from various treatments were stored and later reutilized in construction rituals. In the following chapter I will discuss what happened to animal sacrificial victims that were buried on the West Plaza.

Chapter 7

Faunal remains from the West Plaza of the Sacred Precinct

Animal remains found in the ritual deposits of Templo Mayor correspond to 700 specimens (Elizalde 2017:180).[418] They have been studied from biological, ecological, economic, religious, political and artistic perspectives (López Luján et al. 2012: 13; Elizalde 2017:180). For my dissertation I will focus on the findings of the West Plaza,[419] particularly in Offering 126 in which the greatest number and diversity of exotic animals was recovered. This deposit is different from those previously explored in Templo Mayor and in the West Plaza itself, as all the animals were buried incomplete, commingled, disarticulated or partially articulated. This ritual deposit is a unique opportunity to understand animal sacrificial and post-sacrificial practices in Tenochtitlan.

[418] This includes amphibians, reptiles, birds and mammals (Elizalde 2017:180). Fish were studied by specialist Ana Fabiola Guzmán (2017). Animals found in 2018 and 2019 are not considered in this dissertation as they are under study.

[419] Between 1992 and 2016, a total of 26 offerings with animal skeletal remains have been recovered at the foot of the Templo Mayor. According to Elizalde (2017:350-352) these correspond to a total of 97 vertebrate specimens (not counting fish), distributed as follows: a toad (*Bufo* sp.), two indeterminate anurans, a red-eared slider turtle (*Trachemys scripta*), a mud turtle (*Kinosternon* sp.), 12 rattlesnakes (*Crotalus* sp.), a harpy eagle (*Harpia harpyja*), 22 golden eagles (*Aquila chrysaetos*), two barn owls (*Tyto alba*), two blue herons (*Egretta caerulea*), a kingfisher (*Alcedo atthis*), three quail (*Cyrtonyx montezumae*), a white heron (*Casmerodius albus*), two roseate spoonbills (*Platalea ajaja*), nine Rivoli's hummingbirds (*Eugenes cf. fulgens*), two amethyst-throated hummingbirds (*Lampornis cf. Amethystinus*), two white-eared hummingbirds (*Hylocharis cf. leucotis*), a violet crowned hummingbird (*Amazilia violiceps*), two birds of the Tyrannidae family, nine unidentified birds, seven pumas (*Puma concolor*), three wolves (*canis lupus*), a jaguar (*Panthera onca*) and a deer mouse (*Peromyscus maniculatus*) (Elizalde 2017:350-352). To these specimens I must add 95 recovered in Offering 126, which I will discuss in this chapter.

Offering 126[420]

Operation 4 of the seventh season of the Templo Mayor Project focused on the exploration of the area under the monolith of goddess Tlaltecuhtli. After moving this sculpture and excavating seven construction fills (R1-R7), the team coordinated by Angel Gonzalez Lopez found this ritual deposit (Figure 201).

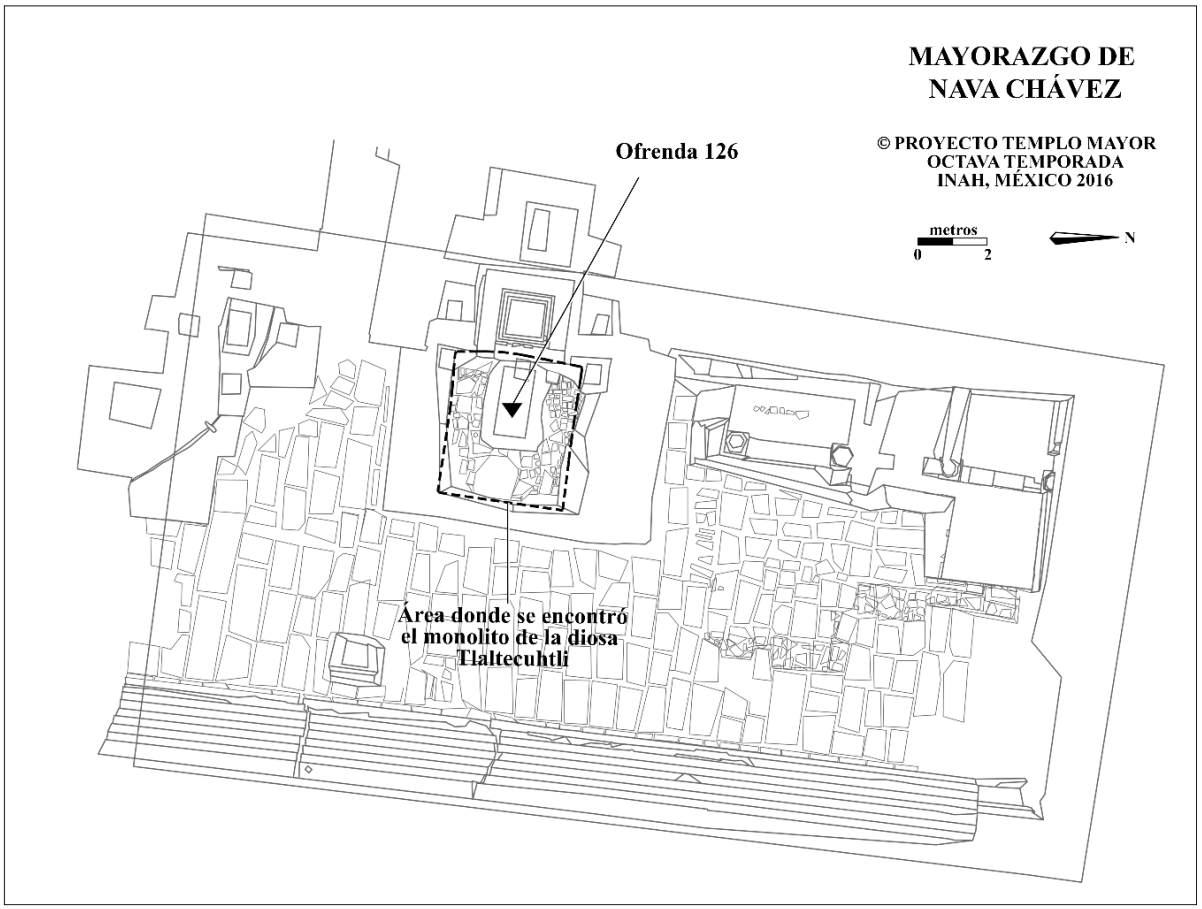


Figure 201. Offering 126. Drawing by Michelle de Anda Rogel.

[420] Data contained in this chapter are based on the report submitted to the Archaeological Council of INAH (Chávez Balderas 2016).

Offering 126 was excavated between May 16th, 2008 and June 30th, 2010. It consists of more than 12,000 ritual goods dedicated to the consecration of the monolith, arranged in four levels. The following is a brief description of each level based on González López and collaborators (2012), Chávez Balderas and collaborators (2011) and Chávez Balderas (2016).

The ritual began with the deposit of a dense layer composed of 9036 animal bones of various species (Level 4 of excavation).[421] They were buried in different states of decomposition and most were already skeletonized when placed in the offering (Figure 202).

Figure 202. Offering 126, Level 4, composed of 9036 bones. Photomosaic by Tenoch Medina and Sergio Gaytán.

[421] For a proper recovery it was subdivided into five sublevels.

Then the priests covered the bones with a layer of marine and freshwater organisms, including cnidarians (corals), echinoderms (urchins, sand dollars and starfish), mollusks (gastropods, bivalves and polyplacophores) [422] and chordates (cartilaginous and bony fish) (Level 3). [423] They also buried the remains of one snake.[424]

A sawfish snout was deposited on top of these organisms, oriented east-west. Four flint knives and five maguey apical spines were placed in their proximity, possibly used as bloodletting instruments. Finally, they buried an ornament with the effigy of Quetzalcóatl, manufactured with jadeite from the Motagua Valley, Guatemala (López Luján et al. 2015).

Shortly before the end of the ceremony the priests buried 15 dressed flint knives. From the masks that these knives carried, González López and collaborators (2012) interpreted that they are representations of god Tláloc and dead beings.[425] Their outfits include anthropomorphic masks, scepters, weapons, shields, earplugs, pectorals and votive jars. The knives have pedestals manufactured with copal, an aromatic resin obtained from the tree of the species *Bursera bipinnata*.[426]

Finally, the priests buried seven sculptures of Xiuhtecuhtli, god of fire: four of them associated to a cardinal point and three placed in the center, alluding to sky, earth and underworld. Along with these effigies copal bars and spheres were buried, as well as a blue

[422] Corresponding to a total of 2351 elements (González López et al. 2012), analyzed by specialist Belem Zúñiga Arellano (2013).
[423] Divided into five sublevels.
[424] These specimens were analyzed by biologists Belem Zúñiga Arellano, Francisco Solís Marín, Ana Fabiola Guzmán and Norma Valentín.
[425] Their garments collapsed and were recovered in a different excavation level (Level 2, divided into five sub-levels).
[426] Identified by biologist Aurora Montúfar.

ceramic pot covered with a bowl and two green obsidian artifacts: a prismatic blade and a curved scepter (*ehecatopilli*) (figure 203).

Figure 203. Level 1, Offering 126. Photomosaic by Tenoch Medina and Sergio Gaytán.

The offering was sealed with four lamprobolite andesite slabs; only two were glued with mortar. The two in the eastern half had two parallel painted vertical black bands. The container walls were also decorated with black lines, a design associated with fertility deities (Figure 204).

Figure 204. Stone slabs sealing Offering 126. Photograph by Tenoch Medina.

Vertical placement	Construction fill, West Plaza (under the Tlaltecuhtli monolith).
Horizontal placement	East of the monument in the shape of an inverted stepped pyramid. West of Templo Mayor.
Stage	VI-5 (AD 1489-1502)
Symmetry	None
Container	Tezontle ashlars box
Dimensions	E-W: 195 cm N-S: 100 cm Depth: 73 cm

Table 43. Offering 126.

To date, no other deposit has been found that compares to Offering 126 in terms of biological diversity and complexity with which animals were treated and disposed. For this reason, I utilized specific analytical methods divided into the following six stages: 1) field osteoarcheology; 2) anatomical identification, taxonomy and minimum number of individuals; 3) biological profile; 4) palaeopathology; 5) cultural taphonomy (sacrificial

techniques and posthumous treatments) and 6) natural taphonomy. [427] All data were captured in a FileMaker database with 9036 entries. Below I discuss results of this analysis, divided by species.

Taxonomic Identification and Minimum Number of Individuals

Taxonomic identification was done by direct comparison with a reference collection, specialized manuals and genetic analysis of some individuals (Evans and DeLahunta 1991; Baumel 1993; Getty 2002; Serjeantson 2009; Morales Mejía et al. 2010; Fain 2012; Chávez Balderas and Elizalde 2015; Hendricks and Wayne 2016). In addition, metric analysis was conducted on small felids (Driesch 1976). Thanks to the support of the National Mammal Collection and the Veterinary School of the National Autonomous University of Mexico (UNAM), as well as the Laboratory of Terrestrial Chordates of the National Polytechnic Institute (IPN), I was able to examine contemporary specimens of bobcats (*Lynx rufus*), puma (*Puma concolor*), jaguar (*Panthera onca*), wolf (*Canis lupus*), ocelot (*Leopardus pardalis*) and golden eagle (*Aquila chrysaetos*). In addition, thanks to specialists Jorge Servín from the Autonomous Metropolitan University (UAM) and Xóchitl Ramos Magaña from the Chapultepec Zoo, I obtained the skeletons and preserverd bodies of six Mexican wolf pups of different ages on temporary loan. Thanks to the support of the General Direction of Wildlife of the Ministry of Environment and Natural Resources (SEMARNAT) and Mónica de la Fuente, the Templo Mayor Project began a reference collection, which currently has five specimens of Mexican wolf (*Canis lupus baileyi*) and one jaguar (*Panthera onca*). Individuals from other species were identified by biologist

[427] For more details on these methods, refer to the introduction and Appendix of this dissertation.

Montserrat Morales Mejía, a specialist from INAH's Laboratories. Jacqueline Castro Irineo, Diana Bustos Ríos, Karina López Hernández, Linda Potter, Tomás Cruz, Israel Elizalde, Oscar Ruiz, Omar Mendoza and Alejandro Ramírez participated in this analysis.

I identified three jaguars (*Panthera onca*=3.52%), 15 pumas (*Puma concolor*= 17.64%), 19 bobcats (*Lynx rufus*= 22.35%), an ocelot (*Leopardus pardalis*= 1.17%), 28 wolves (*Canis lupus baileyi*=33.01%), a cottontail rabbit (*Sylvilagus floridanus*= 1.17%), two deer mice (*Peromyscus maniculatus*= 2.35%), five golden eagles (*Aquila chrysaetos*= 5.88%), four great horned owls (*Bubo virginianus*= 4.70%), one red-tailed hawk (*Buteo jamaicensis*=1.17%), a roadside hawk (*Rupornis magnirostris*= 1.17%), two sparrowhawks (*Falco sparverius* = 2.35%), two quail (*Calliplepla squamata*= 2.35%) and a snake of the genus *Crotalus* sp (1.17%). This implies that a minimum number of 85 individuals (MNI) corresponding to birds, mammals and reptiles were buried inside the offering (figures 205 and 206).

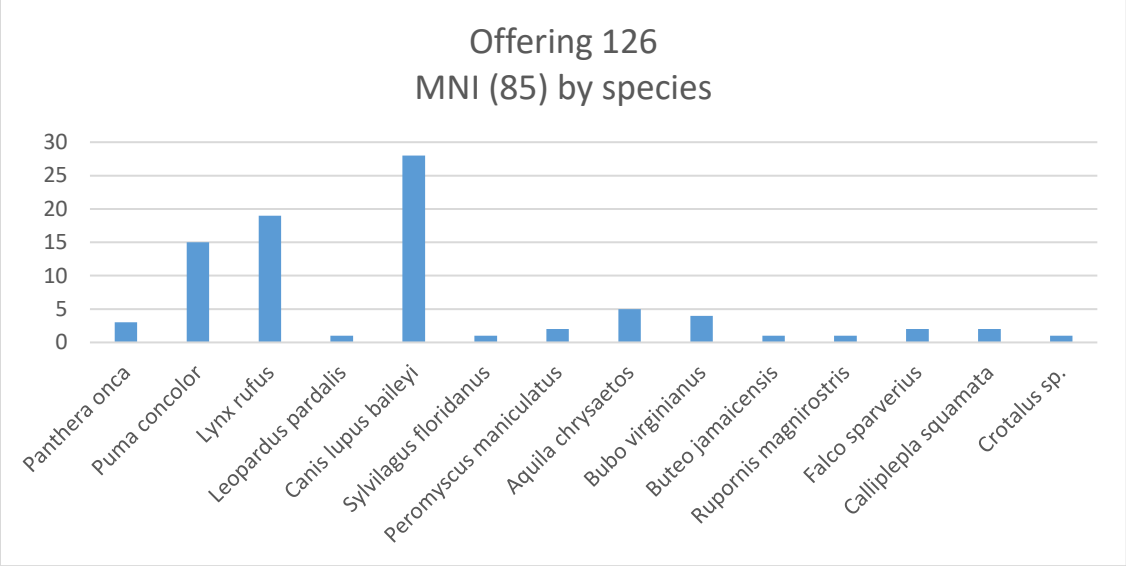


Figure 205. Taxonomic identification and minimum number of individuals by species. Birds, mammals and reptiles (n=85)

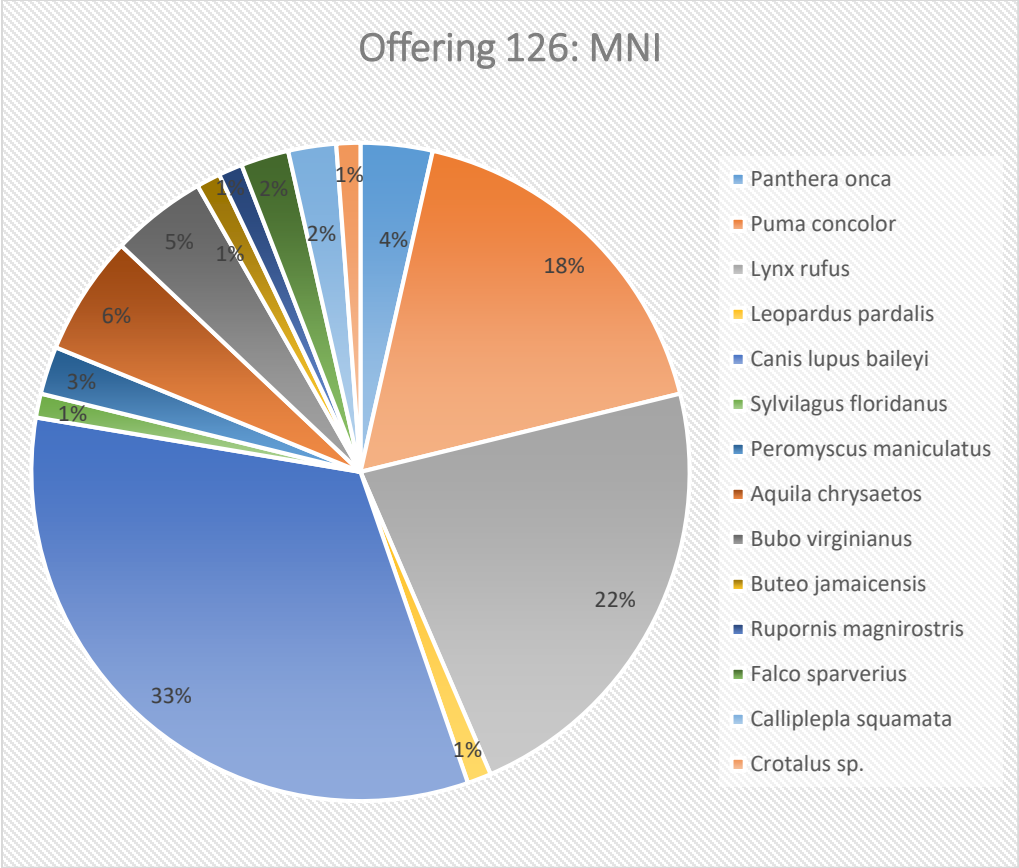


Figure 206. Minimum Number of Individuals, Offering 126 (birds, mammals and reptiles).

Thanks to ichthyofauna specialist Ana Fabiola Guzmán Camacho (2017) it is known that ten fish were placed in the offering: a sawfish (*Pristis pectinata*), two needlefish (*Strongylura marina* and *Strongylura* sp.), a grouper (*Epinephelus cf. E. adscencionus*), a remora (*Echeneidae cf. Echeneis naucrates*), two leatherjackets (*Oligoplites cf. O. Saurus*), a lookdown (*Selene cf. S. vomer*) and two burrfish (*Chilomycterus schoepfii*). The last two were deposited complete while the others correspond to five pelts and three heads (Guzmán Camacho 2017). This gives a total 95 chordates deposited in this offering.

The calculation of the Number of Identified Specimens (NISP) reflects an important discrepancy when compared to the Minimum Number of Individuals, due to the different

posthumous treatments. For example, although lynxes are the second most common species (N=19), only 174 bones of these felids were identified. This reflects the complexity and diversity of posthumous treatments given to each species (Table 44, figures 207 and 208).

Species	**NISP**	**MNI**
Lynx Rufus	174	19
Puma concolor	2358	15
Panthera onca	239	3
Leopardus pardalis	40	1
Canis lupus	4516	28
Callipepla squamata	87	2
Bubo virginianus	307	4
Aquila chrysaetos	213	5
Buteo jamaicensis	2	1
Rupornis magnirostris	1	1
Falco sparverius	17	2
Sylvilagus floridanus	1	1
Peromyscus maniculatus	11	2
Undetermined	264	
*Puma or Canis** [428]	806	---
TOTAL	**9036**	**84** [429]

Table 44. Number of Specimens Identified (NISP) and Minimum Number of Individuals (MNI).

[428] The bones grouped under the genus *Puma* or *Canis*, correspond to secondary ossification centers of vertebrae, which could not be identified.
[429] Snake bones were not analyzed for this dissertation.

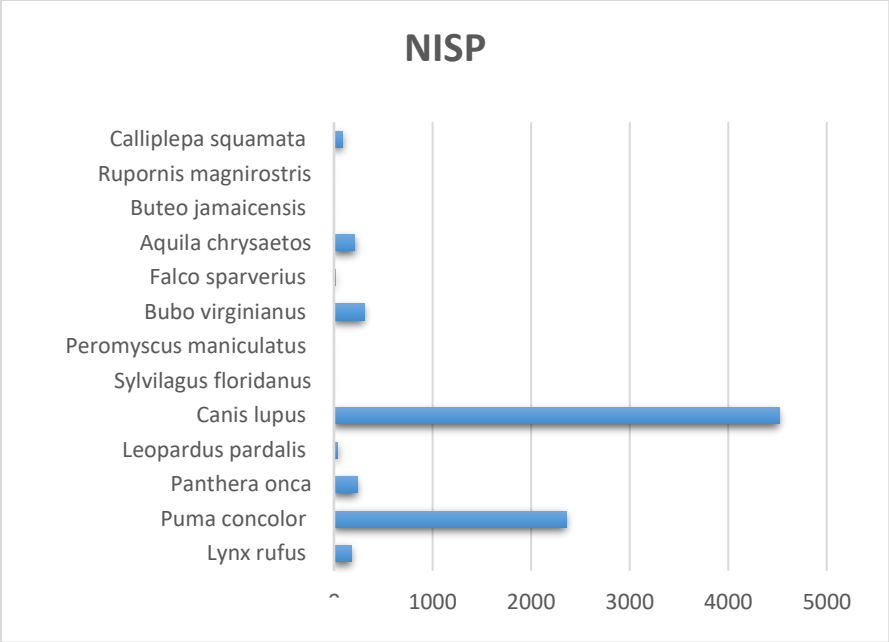


Figure 207. NISP by species. Offering 126.

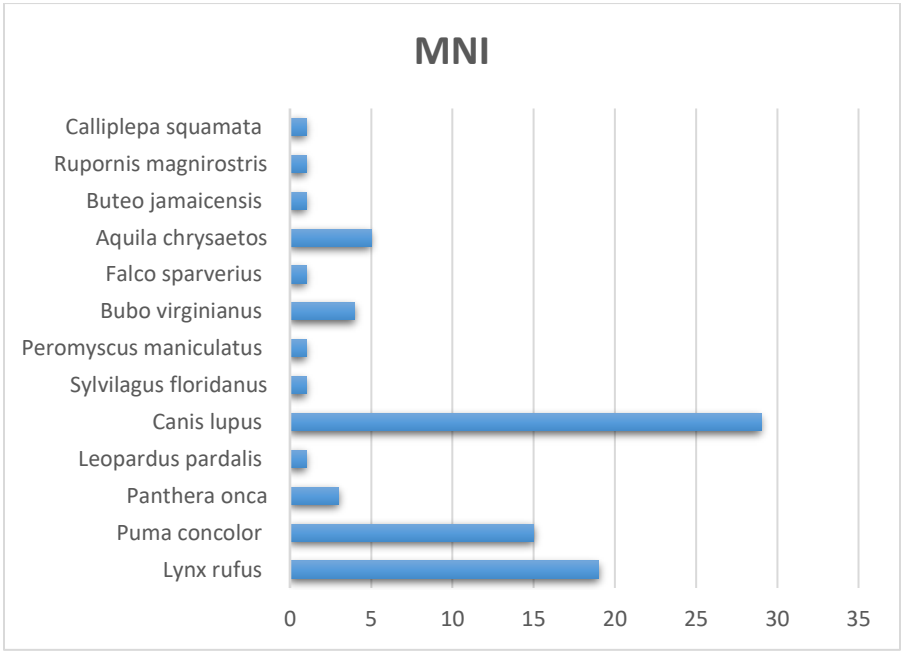


Figure 208. NMI by species. Offering 126.[430]

[430] Note the discrepancies between the two quantifications.

In addition to anatomical and taxonomic identification, I individualized some specimens. Unfortunately, this task could not be achieved for all animals, since in most cases the remains of an individual were distributed in different quadrants and levels. [431] In addition, there are numerous specimens that share the same biological characteristics. [432] For these reasons, only 26 specimens were individualized: three jaguars (*Panthera onca*), four owls (*Bubo virginianus*), five wolf cubs (*Canis lupus*), one ocelot (*Leopardus pardalis*), four golden eagles (*Aquila chrysaetos*), two quail (*Callipepla squamata*), a red-tailed hawk (*Buteo jamaicensis*), a roadside hawks (*Rupornis magnirostris*), two sparrowhawk (*Falco Sparverius*), a cottontail rabbit (*Sylvilagus floridanus*) and two deer mice (*Peromyscus maniculatus*). I shall now present the results of this analysis divided by species.[433]

Jaguars (Panthera onca)

Jaguars are the largest and most powerful felid on the American continent, standing at the top of the food chain (Ceballos et al. 2002). According to CONABIO (2011), there are five subspecies of *Panthera onca* in Mexico: *P. o. hernandesii, P.o. arizonensis, P. o. centralis, P. o. goldmani* and *P.o. veraecrucis*. They are corpulent felines showing pronounced sexual dimorphism, ranging from 157 cm to 200 cm in length, including the tail, with a weight between 45 and 114 kg for adults; in the wild they live between 10 and 12 years, although in captivity specimens can reach 22 years. This carnivore has a varied diet, is nocturnal, solitary, agile and strong, occupying activity areas ranging from 10 to 150 km2. They can

[431] The priests buried bones by types. They were grouped in short, long, flat bones, vertebrae, ribs, etc., as I will detail in each case.
[432]For example, a large number of wolves are similar in age and size, making it impossible to individualize them.
[433] I decided to follow this order as the posthumous and sacrificial treatments may vary among species.

climb trees and are often found in the vicinity of water sources. Females reach sexual maturity between two and three years. They can mate all year round and gestation lasts between 90 and 110 days. Jaguars give birth to one to four offspring that will accompany their mothers until they reach two years of age. Females then resume their reproductive cycle (Sánchez Palomino 2007, CONABIO 2011).

Jaguars are currently distributed in Mexico in a diversity of environments, ranging from jungles to semi-desert zones and from sea level to 2000 meters asl. They need large areas to ensure an adequate diet (Chávez et al. 2016). In Mexico, this species is considered endangered by Official Norm 059. Historically, its distribution was much wider than today. According to Chávez and colleagues (2016: 47, 53-55) jaguars traditionally were found along the Pacific and Atlantic coastlines, as well as throughout the southeast, with some sporadic sightings for Central Mexico. Indeed, Monroy Vilchis and colleagues (2008) report their presence at the Sierra de Nanchititla, in the State of Mexico, adjacent to Michoacán and Guerrero. Guadalupe Téllez Girón and William López Forment (1995) report sightings in the state of Querétaro, in the municipality of Arroyo Seco.

Historical distribution of jaguars proposed by Girón and López Forment and the ecosystems they inhabit coincide to some degree with reports collected during the 16th century in the *Relaciones Geográficas.*[434] It is possible that some informants exaggerated or reported a species that was not in a certain locality. For example, it is difficult to think that this species reached Ixtapaluca or Texcoco, currently in the State of Mexico, because it does not have optimal environmental characteristics for these animals as these areas are located at 2260 meters asl. In spite of this, I consider that these testimonies likely reflect

[434] Written between 1579 and 1585. It is a questionnaire by the Spanish Crown, composed of 50 questions to know the indigenous territorial organization, politics, taxes, customs, environment, etc.

the general distribution of these felids.[435] In historical records jaguars were incorrectly referred to as tigers, because jaguars were unknown to the Spaniards who used this name to compare them with the old world animals they knew.

a) Individualization, anatomical and taxonomic identification

The first step in the analysis was the anatomical identification of each bone and siding. Then I identified the species by using a reference specimen from the National Collection of Mammals of the Biology Institute, UNAM. [436] For comparative purposes, I also used a puma skeleton recovered from Offering H. I consulted specialized bibliography on the subject (Getty 2002; Arce Chávez 2009, Morales Mejía et al. 2010) and I collaborated with biologist Montserrat Morales Mejía, from INAH's Laboratories, who corroborated my identifications.

To individualize jaguar remains, it was necessary to complete the analysis of the 9036 bones contained in this offering. During this process I realized that the remains of this species were found in all quadrants and levels. The individualization was based on the size of the specimen, bone repetition, cultural treatments and association (Brothwell 1987, Chávez Balderas 2007, Adams and Bird 2008, White et al 2012). I individualized three adult jaguars: one of them is very robust (possibly a male), the other is of intermediate size and the third is a very gracile (probably a female) individual that apparently was boiled.

[435] According to the *Relaciones Geográficas*, these animals were distributed in the states of Mexico, Michoacán, Guerrero, Hidalgo, Oaxaca, Puebla, Tabasco, Veracruz, Yucatán as well as Guatemala and Honduras. There are no testimonies from Belize, where this species is also present. See Appendix.
[436] Specimen 34924, *Panthera onca*, male. Recovered in Kohunlich, Quintana Roo. Granted on temporary loan by Dr. Fernando Cervantes and biologist Julieta Vargas.

The three felines are incomplete as a consequence of the posthumous treatments (Figure 209).

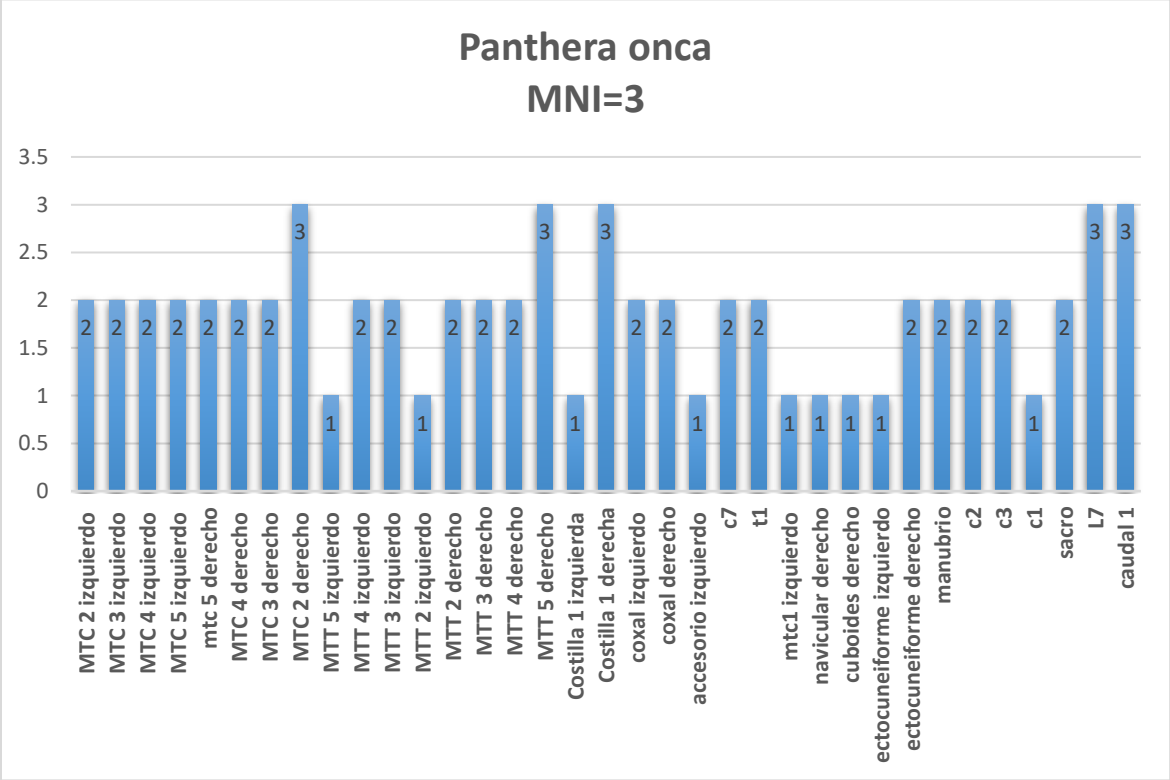


Figure 209. Minimum number of individuals (MNI), *Panthera onca* (N=3).

Jaguar 1 is composed of 31 bones corresponding to the axial skeleton (ribs, thoracic vertebrae, lumbar and caudal) (Figure 210). They were grouped in one cluster recovered at levels 4C and 4D (Figure 211).

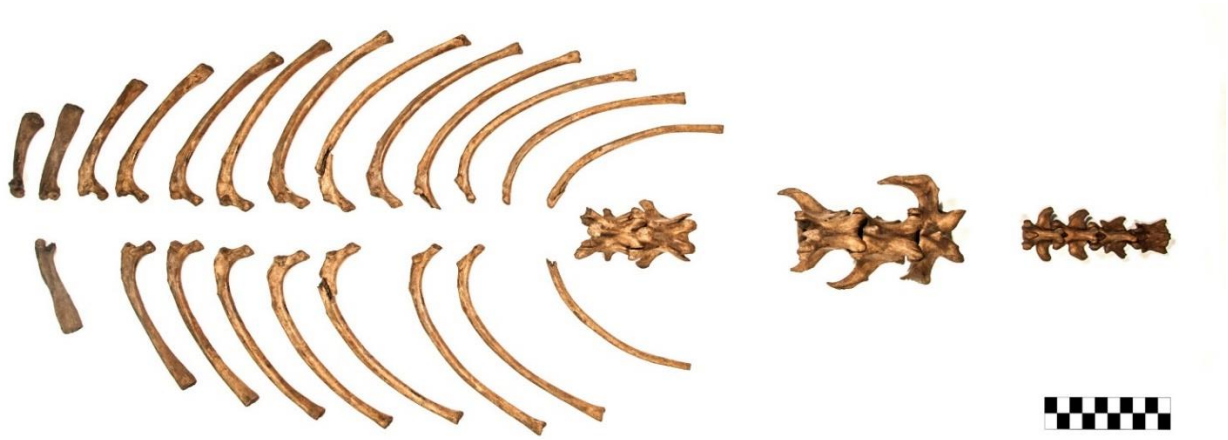


Figure 210. Jaguar 1, in anatomical position. Photograph by Mirsa Islas.

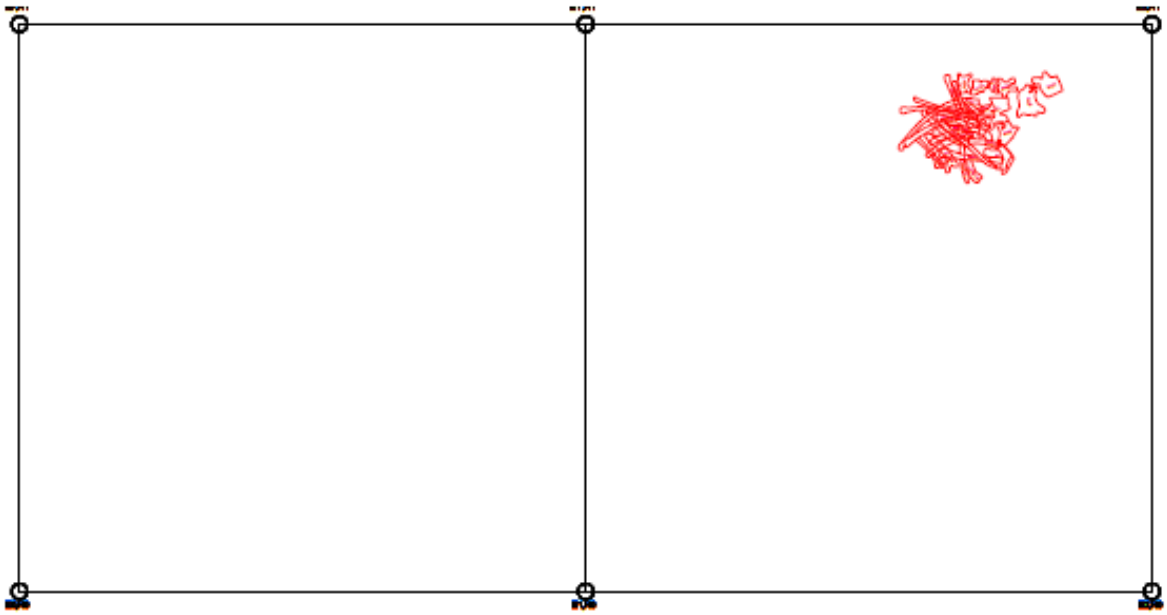


Figure 211. Distribution of Jaguar 1 remains. Drawing by Israel Elizalde.

Jaguar 2 is represented by 78 bones of both the axial and appendicular skeleton. The cervical and thoracic regions are well represented, as well as the pelvis and shoulder girdle (Figures 212 and 213).

Figure 212. Jaguar 2, in anatomical position. Photograph by Mirsa Islas.

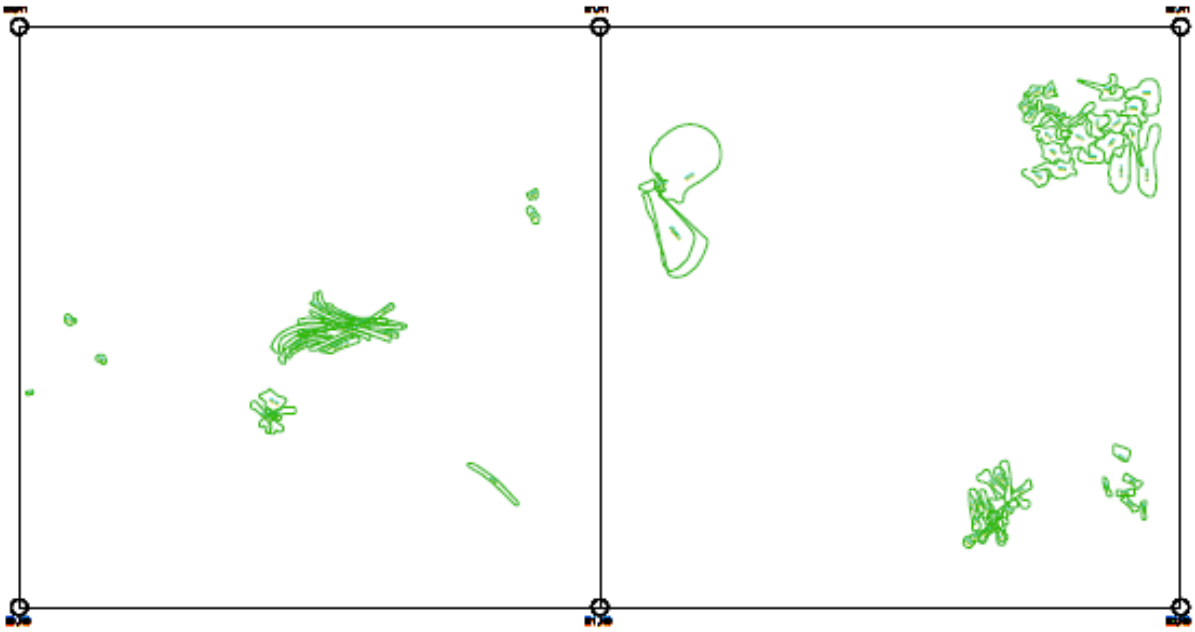


Figure 213. Distribution of Jaguar 2 remains. Drawing by Israel Elizalde.

Jaguar 3 is the best-represented specimen with 123 bones. The cervical and lumbar regions are complete, as well as posterior and right anterior limbs. Bones were scattered in levels 4, 4A, 4B, 4C and 4D, in all quadrants. The fact that it apparently presents indirect thermal alteration, in addition to articular and infectious disease, made the individualization process easier. This specimen was deposited shortly after its death, as some anatomical segments were still articulated (Figures 214 and 215).

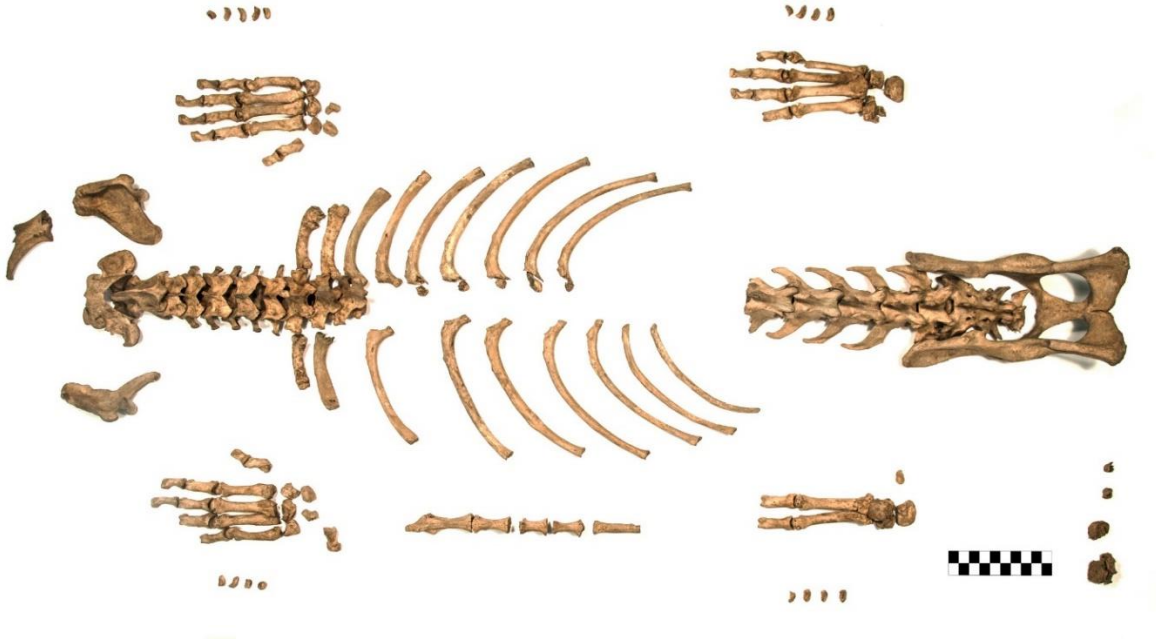


Figure 214. Jaguar 3, in anatomical position. Photograph by Mirsa Islas.

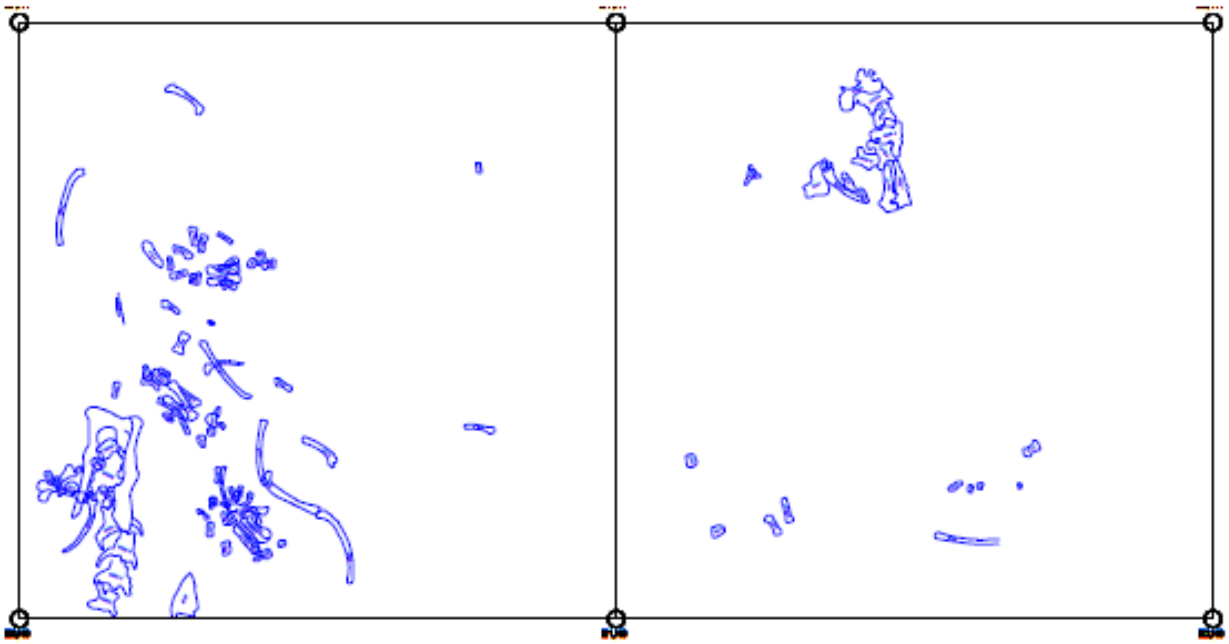


Figure 215. Distribution of Jaguar 3 remains. Drawing by Israel Elizalde.

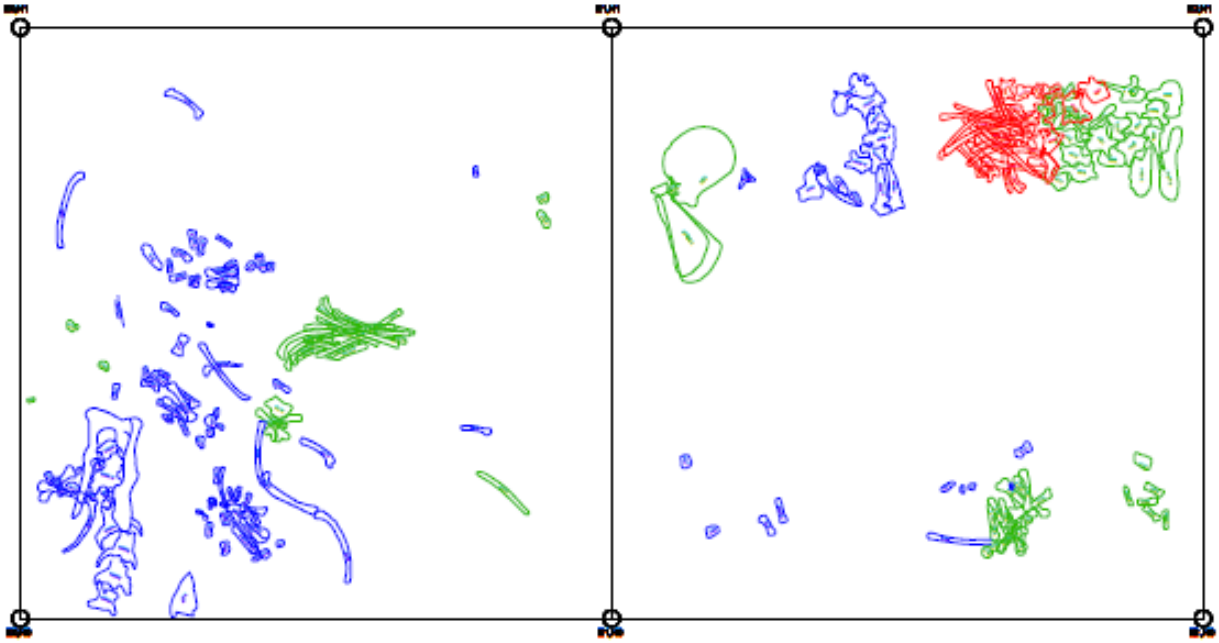


Figure 216. Distribution of the three specimens. Drawing by Israel Elizalde

b) Biological profile

Age estimation of the three jaguars was based on the observation of secondary ossification centers.[437] All distal epiphyses of metacarpals are completely fused, as well as the accessory carpus. This implies that they are individuals older than 10 months. Judging by the evidence of joint and infectious diseases,[438] I assume that they were not very young animals, although there are no diagnostic features, such as dental wear or cranial sutures.

Sex estimation was limited by the absence of skulls. However, pelvic size and morphological differences suggest the presence of one female and one male. The third individual does not have coxal bones, so it could not be sexed.

Without a doubt, the study of health conditions of the jaguars was revealing, as I documented trauma, infectious and articular disease that affected their life quality. In addition, the presence of these chronic diseases suggests that they were kept in captivity as I discuss further.

As for trauma, I observed two fractures on the same number of jaguars. These lesions occurred in the antemortem interval, as I documented bone response (figures 217 and 218; table 45).

Specimen	**Bone**	**Description**
Jaguar 3	7th left rib	The bone callus is soft. Slight deviation of the sternal part.
Jaguar 2	Sacrum	Completely healed and with no bone callus

Table 45. Antemortem fractures in jaguars (*Panthera onca*).

[437] Estimates are available for domestic cats (*Felis catus*), based on research by Balsa and Robinson (2016). In the future the Templo Mayor Project planned to expand the reference collection in order to generate data on this species.
[438] Such as lipping and eburnation, as well as periostitis and swelling.

Figure 217. Jaguar rib with healed fracture. Photograph by Ximena Chávez Balderas.

Figure 218. Jaguar sacrum with an antemortem fracture. Photograph by Ximena Chávez Balderas.

None of these injuries seems to have affected animals' life quality, unlike the articular and infectious disease they suffered (table 46).

Individual	Affected bones	Description
Jaguar 3	50 bones	Infectious and articular disease. Healed, healing and active lesions. Eburnation, lipping. Possibly secondary to infection
Jaguar 2	22 bones	Infectious disease. Healed, healing and active lesions

Table 46. Bone remains with evidence of infectious and articular disease. Jaguars 2 and 3, Offering 126.

In both felines these diseases were chronic, affecting mainly their limbs and their life quality.

Jaguar 2 has irregular bone growth in the right posterior limb, left anterior limb, sternum and ribs. In some parts lesions are active, while in the majority are healing or already healed, which indicates a chronic disease (figures 219 and 220).

Figure 219. Jaguar 2 metacarpals, left anterior limb. Dorsal view and ventral view. Abnormal bone growth can be seen in the proximal part. Photograph by Ximena Chávez Balderas.

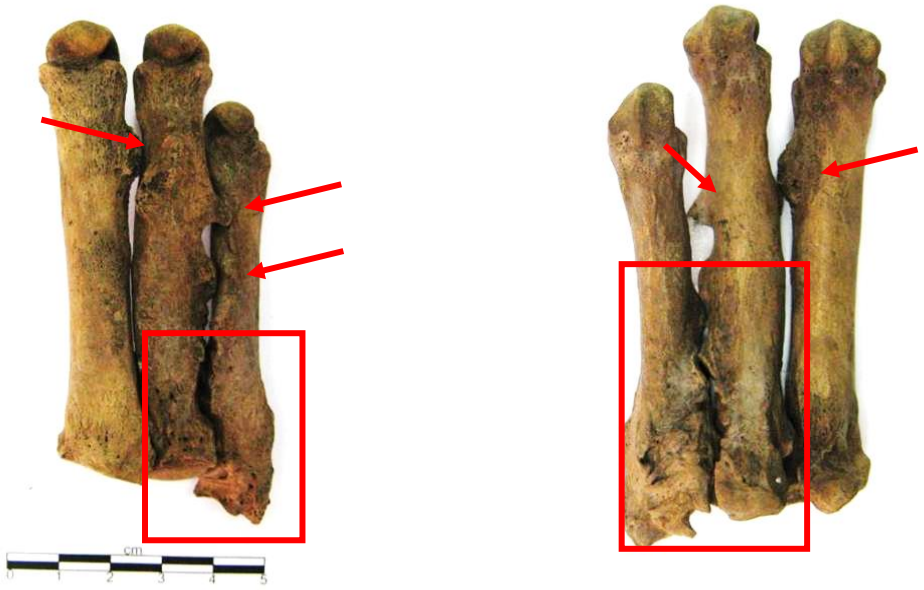


Figure 220. Jaguar 2 metatarsals, right posterior limb. Dorsal view and ventral view. Bone growth can be seen in the proximal and intermediate part. Photograph by Ximena Chávez Balderas.

Jaguar 3, in addition to being the most complete specimen, is the one that has most evidence of this condition: a total of 79 bones showed signs of illness. Four limbs, some vertebrae, the first ribs and the sternum are affected. In some points lesions are active, while in others are healing or inactive. In particular, it has evidence of infectious and joint diseases that severely affected their quality of life. Some signs of osteoarthritis might be due to aging, while others could be secondary to infection or trauma. In addition, it presented a congenital malformation in the sacrum and the seventh lumbar vertebra, which caused a compensatory asymmetry in other vertebrae (Figures 221-223). Possibly it did not cause health problems. All lesions in 79 bones are described in detail in Appendix.

Figure 221. Detail of Jaguar 3 metatarsals with bone growth in the proximal portion, Offering 126. Photograph by Mirsa Islas.

Figure 222. a) Bone growth on the dorsal aspect of the metatarsals and tarsi; b) bone growth and eburnation of tarsi. Jaguar 3. Photograph by Ximena Chávez Balderas.

Figure 223. Congenital malformation of lumbar vertebra 7, ventral view and detail. The box shows the absence of left transverse process and the arrow indicates defleshing cut marks.

Most of bones from this specimen show signs of disease. This jaguar has joint and infectious disease on the paws. Similar injuries have been observed in modern captive specimens, caused by low mobility and their confinement in spaces with hard floors that led to paw infections and sometimes osteoarthritis (Xóchitl Ramos, personal communication, July of 2019).

Infectious and arthritic diseases were chronic and I consider that the specimen survived because of human care. Certainly, the joint injuries would have prevented it from moving freely, which in the wild would have led to an early death. Future isotopy studies will help to test this hypothesis.

Individual	Age	Sex	Health conditions
Jaguar 1	Adult	Undetermined	Incomplete. No signs of bone disease.
Jaguar 2	Adult	Possibly male	Fracture, infectious and joint disease (chronic and with emphasis on limbs)
Jaguar 3	Adult	Possibly female	Fracture, infectious and joint disease (chronic).

Table 47. Biological profile and health conditions, jaguars, Offering 126.

In sum, jaguars deposited in this offering correspond to adults of both sexes. Two of them present very poor health conditions, which leads to propose that they were kept in captivity. According to Israel Elizalde (2017) Mexica rulers had a vivarium where they confined animals that were used in rituals. Keeping them captive in these spaces allowed them to have exotic fauna available for such rituals.

c) Evidence of sacrifice and posthumous treatments

As I discussed in Chapter 4, codices show numerous scenes where animals are killed by heart extraction and being shot with arrows. Interestingly, so far jaguars are the only species of mammals that show osteological evidence of cardiectomy, represented by two cases: Offering 9 and Offering 126 (Jaguar 2). [439] This specimen has evidence of heart extraction, in addition to posthumous treatments. [440] It is composed of 78 bones, of which 21 are ribs that were grouped at the intersection of squares N3-N2 and S1. Below I describe

[439] In addition, Jaguar 1 and Puma MO 4805 have similar cut marks on the pleural side of one rib. However, the fact that this evidence is only found in one bone makes it difficult to confidently identify them as evidence of heart extraction.

[440] This specimen corresponds to a secondary burial with evidence of posthumous treatment and is therefore incomplete. However, cut marks are very similar to those from Offering 9 jaguar -a primary burial-, which I used it for comparison (López Lujan et al. 2010; Chávez Balderas 2017).

cut marks documented in this animal:[441]

1) *Heart extraction:* this practice leaves cut marks on the inner or pleural side of ribs. These cuts were done from inside of the articulated thoracic cavity, as inferred by the continuity of marks from one rib to another. In addition, they are repetitive and do not correspond to the location of ligaments, joints or muscle insertions. In fact, the ribcage was used as a support for cutting vascular bundles.

2) *Disarticulation:* Jaguar 2 from Offering 126 also presents cuts on the tubercle of four ribs, corresponding to the location of the costotransverse ligament. Other marks are in the neck ligament insertion. I also documented cuts in the rib head caused by the severing of the intercapital ligament or by separating the synovial joint. This articulation is extremely resistant, as I corroborated when preparing contemporary reference specimens.

3) *Defleshing:* cuts of the dorsal side of ribs, near the tubercle correspond to the dissection of muscles, where the ilio-costal and longissimus systems cross. In addition, I documented marks corresponding to the dissection of intercostal muscles.

In sum, heart extraction marks are located on ribs 2 to 5, on the left side. They are repetitive, as the pleural side of ribs was used as a cutting surface. Some cuts have continuity from rib to rib, which implies that the specimen was articulated. They tend to concentrate in the

[441]This description is based on previous reports (Gonzalez Lopez et al. 2012) and Chavez Balderas (2017).

intermediate and vertebral parts of the ribs, a pattern also observed in the jaguar from Offering 9 (López Luján et al. 2010; Chávez Balderas 2017).[442]

Figure 224. Ribs 1 to 5, left side. Cut marks are between ribs 3 and 5, with continuity from one rib to the other. General view and detail of cut marks. Photograph by Ximena Chávez Balderas.

The heart was extracted by a technique similar to that used in humans. This consisted in making an abdominal incision, sliding the hand into the chest cavity and cutting the vascular bundles that hold the heart (López Luján et al. 2010; Chávez Balderas 2017). In quadrupeds, marks are grouped towards the vertebral end of ribs, while in humans towards the sternum, due to the heart's location. The difference between the two procedures is the

[442] This specimen was published in Chávez Balderas 2017, where I reported cut marks only on three ribs, since the entire specimen was not analyzed at that time; this task had to wait until I concluded the identification of the 9036 bones from the offering.

handling of the victim, as these powerful felines had to be sedated, weakened or even dead. This last possibility would imply that it was a posthumous treatment and not a sacrificial technique.

Regarding posthumous treatments, I documented flaying, defleshing and disarticulation marks in the three jaguars. In all cases the distal phalanges (claws) and the anterior part of the skull are absent. These modifications are consistent with pelt manufacture. Out of a total of 239 jaguar bones (*Panthera onca*), 174 presented some type of cultural alteration (sharp force, blunt force or a combination of both as well as indirect thermal exposure), in 72.80% of the remains from the three felines. It is important to point out, however, that a single bone usually exhibits more than one type of cultural alteration (Figures 225 and 226).

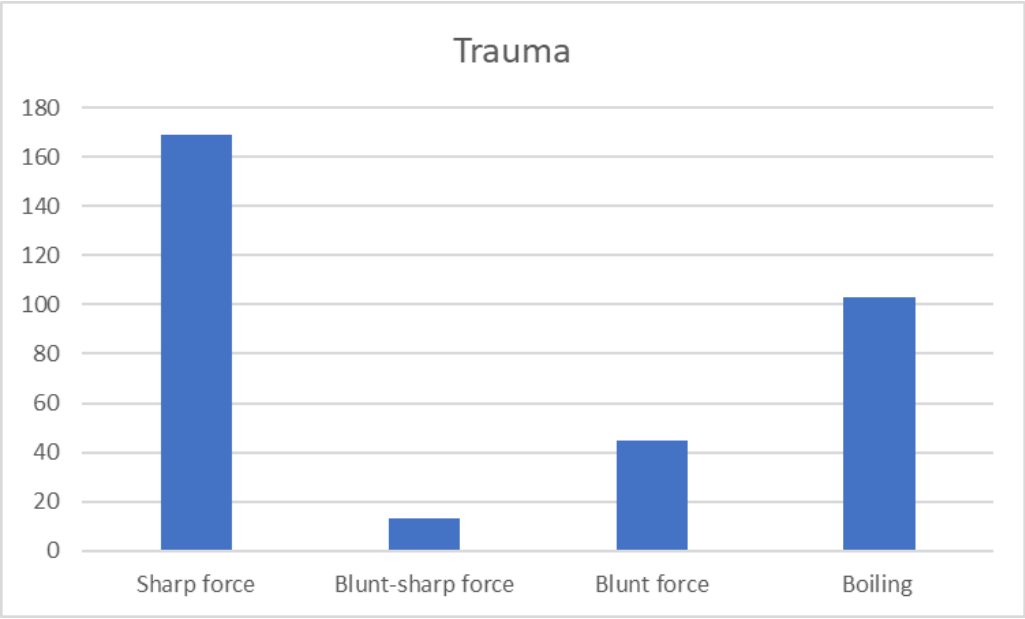


Figure 225. Perimortem trauma on jaguar bones, Offering 126.

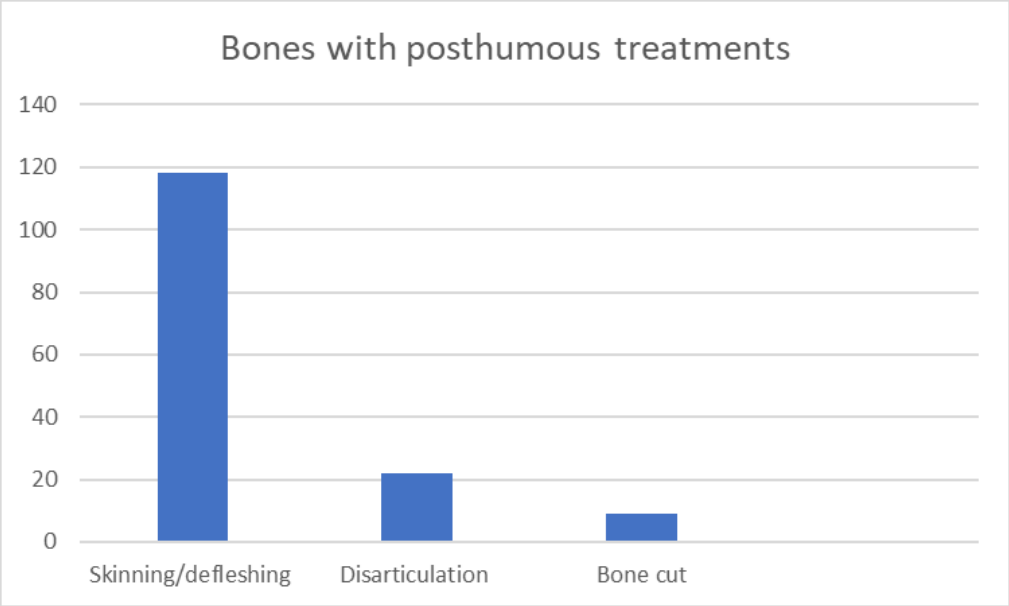


Figure 226. Bones with posthumous treatments (flaying, defleshing, disarticulation and cutting).

The three jaguars were flayed, as their skins were of great value. All were defleshed which could be done to skeletonize them or for consumption (whether by humans or other animals) as the Mexica would not be expected to simply discard the flesh of these sacred animals. In addition, 91 bones of Jaguar 3 present color and a texture consistent with indirect thermal alteration (boiling).[443]

The corpses of these jaguars were disarticulated with two main objectives: to separate bones that would remain in pelts (claws and anterior part of the skull) and to obtain body parts, and to facilitate their handling (Figure 227). It is important to bear in mind that disarticulation of body parts can go unnoticed if carried out with great care.[444]

[443] These will be analyzed by Karina López Hernández
[444] During the preparation of the reference collections I was able to confirm that it is possible to separate the claws of large carnivores without leaving marks.

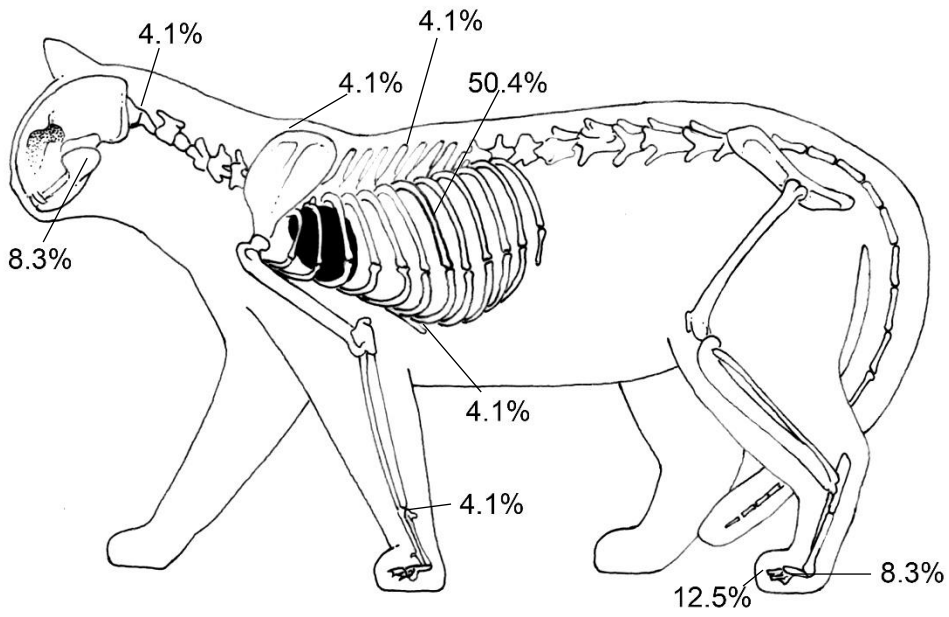


Figure 227. Percentage of marks documented at main disarticulation sites.

Some bones were deposited shortly after sacrifice, while others would have been previously stored. Jaguars were buried as: a) articulated and defleshed anatomical segments; b) clusters of defleshed and disarticulated bones, belonging to one individual; c) clusters of bones with similar morphology but from different individuals and d) scattered disarticulated bones.

Six body segments of Jaguar 3 were deposited articulated or partially articulated: the four limbs (metapodials and phalanges), one section of the cervical spine and one section of the lumbar and pelvic girdle (figure 228); this implies that its death was relatively recent. The rest of bones were scattered in different quadrants and levels.

Figure 228. a) Jaguar 3 articulated pelvic girdle; b) same anatomical segment during cleaning. Photographs by Néstor Santiago and Ximena Chávez Balderas

The paws of this specimen collapsed as they were buried on top of other bones. Despite this, the anatomical identification, position and orientation of each bone indicated that they were deposited articulated. Of these body parts, the right posterior paw was placed in a ventral position and only lacked some phalanges, although it preserved three sesamoids, all of them indicating that it was deposited with soft tissues (Figure 229).

a)

b)

Figure 229. a) Right posterior limb, Jaguar 3, in situ; b) Same limb after cleaning. Photograph by Néstor Santiago.

The defleshed and disarticulated bones that were clustered correspond to three groups of ribs of each of the individuals. The first was composed of 19 elements, the second by 16 and the third by 6. In addition, several vertebrae were found associated with ribs, despite being disarticulated. This distribution helped individualization of these specimens.

d) Sacrifice and the role of jaguars

Jaguars were the most powerful felids known to the ancient inhabitants of Mesoamerica, and they had great symbolic, religious and economic importance. In spite of being one of the most emblematic animals, few examples have been recovered inside the offerings of the Sacred Precinct of Tenochtitlan, [445] possibly because they were not easy to capture and transport. Also, it must have been difficult to keep them in captivity. Another reason could be that pumas, which were much easier to obtain, were to some extent considered their symbolic equivalents as I will discuss in the next section.

Considering their poor health conditions, I concluded that at least two jaguars were held in captivity before being sacrificed. Both had signs of chronic and severe joint and infectious disease, which would have kept them immobilized. These are predators at the top of the trophic chain that must be healthy to hunt and not become prey. In both cases it is evident that they received human care, as they obtained necessary food to survive without hunting; therefore the disease they suffered did not kill them, but became chronic. One of these sick animals showed cut marks from heart extraction through an abdominal incision (Jaguar 2). There is no evidence on how the other two have died, but must likely they also

[445] Six specimens so far.

were sacrificed, particularly Jaguar 3 that was partially articulated during the consecration of the monolith.

Regardless of how they were killed, their bodies received complex posthumous treatments. Their skins were removed because they were of high value. The anterior part of their skulls and claws remained adhered to the skins, preserving to some degree the morphology of these animals. Jaguar skins were used as seats, suits, caps and other precious objects by the Mexica (Aguilera 1985). Muscles were removed carefully, but this processing of the bodies left numerous cut marks on almost all bones. Jaguar 3 seems to have been boiled, which could have been done to consume the meat or to facilitate muscle detachment. In any case, it is unlikely that their meat was discarded. In fact, it was reported that the ruler used to eat jaguar soup to become brave and to gain honors (Oliver 2014:159.), although Sahagún's informants (2000, III: 988) claimed that the meat had a "bad taste".

Why were jaguars highly valued sacrificial victims? Undoubtedly the answer lies in their symbolism and in their close relationship with Tezcatlipoca and rulers. Jaguars are nocturnal predators, emblems of courage and power: the roar of the mountains. A jaguar was the fourteenth day sign and was considered as a man devourer: the demon of the north. In addition, warriors and sorcerers identified themselves with this wildcat for its bravery and nocturnal cleverness (Aguilera 1985: 16, González Torres 2001:123, Olivier 2014: 11-12, Quiñones 1995: 161, 167, 177, Seler 2008:37).

In the shape of Tepeyólotl, the heart of the mountain, it was regent of the third trecena (month) of the tonalpohualli calendar. Tepeyólotl was Tezcatlipoca's avatar, therefore it is represented with two smoking mirrors (Aguilera 1985: 16-17). These mirrors

have been compared to the *tapetum lucidum* of his eyes. Tezcatlipoca was transformed into a jaguar at the end of the first Sun, to devour the giants that inhabited the world (Olivier 2014: 12). In addition, this felid is central to the myths on the origin of sacrifice, as in *Leyenda de los Soles* (1945: 122-125) where a jaguar threw itself into the sacrificial bonfire along with other animals. For this reason, there are numerous references to jaguar sacrifice in pre-Hispanic iconography, as discussed in Chapter 3.

Rulers identified themselves with this animal; in fact, they continue to do so in some communities (Dehouve 2008, Olivier 2014: 13-14). In addition, Tezcatlipoca was a protector of the Tlatoani. In Oliver's view (2014: 15) the Mexica ruler reigned not only over humans but also over animals. This is very interesting since Aztec rulers kept a vivarium where jaguars were sheltered. Most likely, the three jaguars buried for the consecration of the monolith were housed in the Tenochtitlan vivarium, where the ruler visited them. In Olivier's words (2014: 11) jaguars are metaphors of power, divinity and nature.

Pumas (Puma concolor)

Pumas are the second largest wildcat in the American continent with a wider distribution than the jaguar. Pumas have been reported from nearly the entire continent, but in low numbers, and sightings are not very common. Their distribution has been fragmented by habitat deterioration and in pre-Hispanic times their range covered larger territories. Pumas live in regions from sea level to altitudes above 3500 meters and they can travel between 5 and 40 km in 24 hours. They live in a variety of ecosystems, although they tend to prefer coniferous forests. Pumas have also been reported in central Mexico, in Nanchititla and in

the Sierra de San Pedro Mártir (State of Mexico). Their activity area is larger than the jaguars: ranging from 66 km^2 to 826 km^2. Pumas are solitary animals who only get together in pairs for reproduction. Pumas are habituated to humans and can live in the vicinity of urban sites. Like jaguars they are nocturnal and eat a wide variety of prey, although they prefer small mammals (Chávez Tovar 2005, Duarte Méndez 2007, Minjarez 2013, Monroy Vilchis et al 2009, Torre and Torres Knoop 2014: 46).

Their extensive distribution coincides with reports in the 16th century *Relaciones Geográficas* (Acuña 1984, 1984-1985, 1985-1986, 1987), where they were reported in the states of México, Hidalgo, Veracruz, Puebla, Tlaxcala, Morelos, Michoacán, Guerrero, Yucatán as well as for Guatemala (see Appendix).

a) Individualization, anatomical and taxonomic identification

In the laboratory each bone was carefully identified and sided. For this purpose, I utilized reference collections and specialized bibliography (Getty 2002; Arce Chávez 2009, Morales Mejía et al. 2010). In addition, biologist Montserrat Mejía Morales corroborated some of my identifications. Unlike the work done with jaguars, I was not able to individualize complete specimens, but only anatomical segments. This is due to the fact that they are very incomplete and that most of them correspond to same age range. To determine the Minimum Number of Individuals I documented bone repetition. [446] The seventh cervical vertebra helped to establish that there are at least 15 pumas (Figure 230).

[446] Most of the long bones are represented by non-fused epiphyses of young animals. Diaphyses would have been used as raw material to make bloodletting instruments.

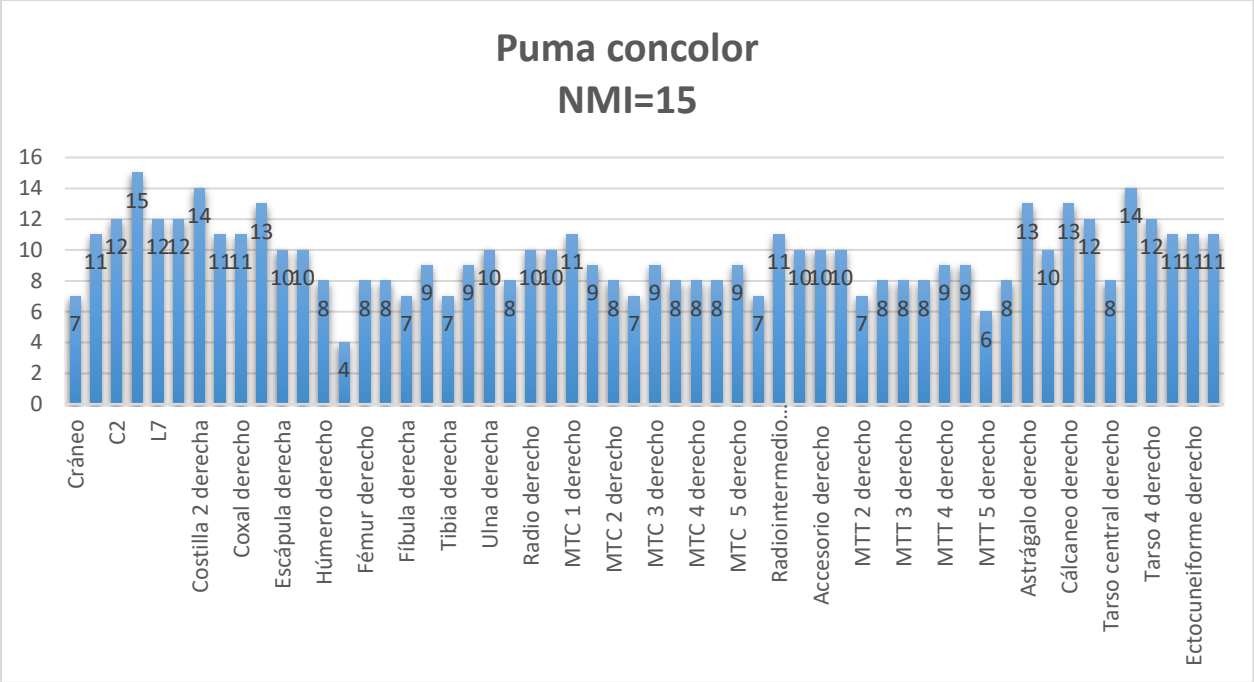


Figure 230. Minimum number of individuals (MNI), *Puma concolor* (N=15).

b) Biological profile

Pumas found in the offering were all young specimens. Of 15 individuals, 13 were younger than 14 months (young adults, sub-adults and juveniles); of these, five were below eight months (juveniles) and two were around four months (cubs) (see Appendix).

The sex of the specimens could not be determined in most cases, as they are very young. In addition, their skulls were fractured. Judging from the incomplete skulls one is compatible with female sex, another with male and the remaining five are indeterminate. It is clear, however that individuals of both sexes were sacrificed. Pumas appear to have been in much better health than the jaguars, although this is to be expected as they are very young individuals. I documented antemortem fractures in four bones, three of them clearly from the same specimen (Table 48). None of these fractures would have affected their

quality of life.

Specimen	Bone	Description
1	T3, T4 y T5 (spinous processes)	Fracture completely healed. It can be seen as a groove with a deformation of the distal part of the process.
Undetermined	Pelvis (right ilium)	Healed, on the iliac crest. Deformed towards lateral side.

Table 48. Fractures on puma bones.

Figure 231. Healed fracture on iliac crest. Puma pelvis. Photograph by Ximena Chávez Balderas.

Of the 2358 puma bones recovered in this offering, 41 have evidence of articular, infectious disease or trauma, in no case severe. Regarding articular disease I documented this condition only in one individual. This corresponds to bone growth on the anterior face of vertebral bodies, which could correspond to ossification of the anterior ligament and incipient formation of bone bridges (T4-L2) (osteophytosis).

In addition, I documented periosteal bone growth on some elements. In most cases these lesions were not active and apparently did not have implications for quality of life. Since these are scattered bones, I determined that they correspond to at least two specimens (Table 49).

Location	Description
Both femurs	Active
Both MTT 3	Healed
T9-10	Healed and healing
Right ribs (8-11)	Healed, healing and active
Right 1st rib and 2nd left rib	Healed and active
2 sternebrae	Healing
Both Ulna	Healed
Right 11th and 12th rib	Healed and healing
Right 4th-5th, 7th-9th ribs	Healed

Table 49. Puma bones with periosteal bone growth.

In sum, pumas from Offering 126 correspond to young individuals of both sexes who appeared to be in good health.

c) Sacrifice and posthumous treatments

No convincing evidence of sacrificial techniques was found in bones. However, the offering contexts in which they were found, number of individuals, age patterns, the presence of multiple species and the fact that all are wild animals suggests that they were ritually killed.

What is present, however, are numerous marks caused by posthumous treatments corresponding to flaying, disarticulation of body parts and defleshing. Claws are also

absent as well as the anterior part of the skulls, as their pelts were removed. A total of 1532 puma bones (65.9%) had cultural alterations done by sharp force, blunt force and a combination of both; indirect thermal alterations were also observed. Commonly single bones show different types of modifications (Figures 232 and 233).

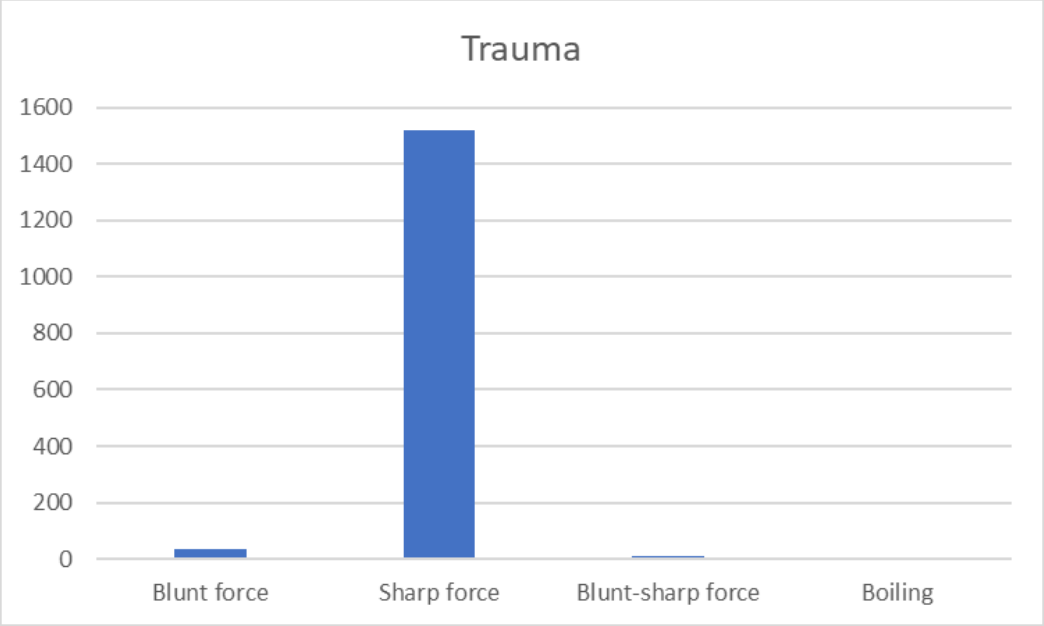


Figure 232. Perimortem trauma, Puma, Offering 126.

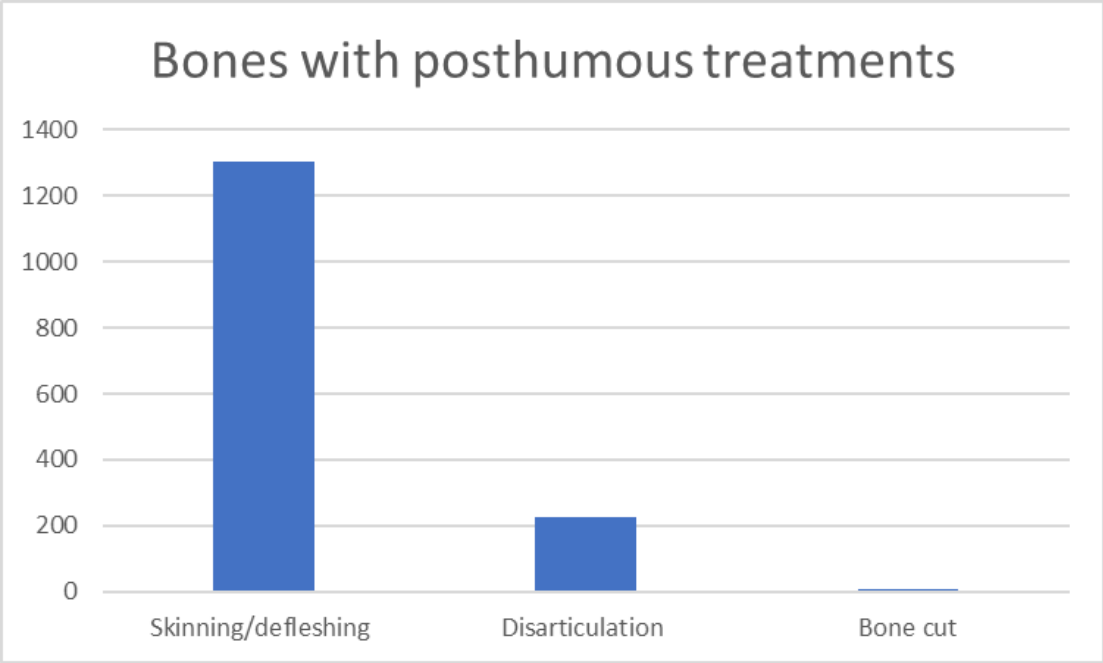


Figure 233. Posthumous treatments (skinning, defleshing, disarticulation and cutting). Pumas, Offering 126.

Evidence indicates that the corpses of these animals were disarticulated both to separate the bones that would remain on the pelts (claws and anterior part of the skull), and to divide them into body parts that would facilitate their manipulation.

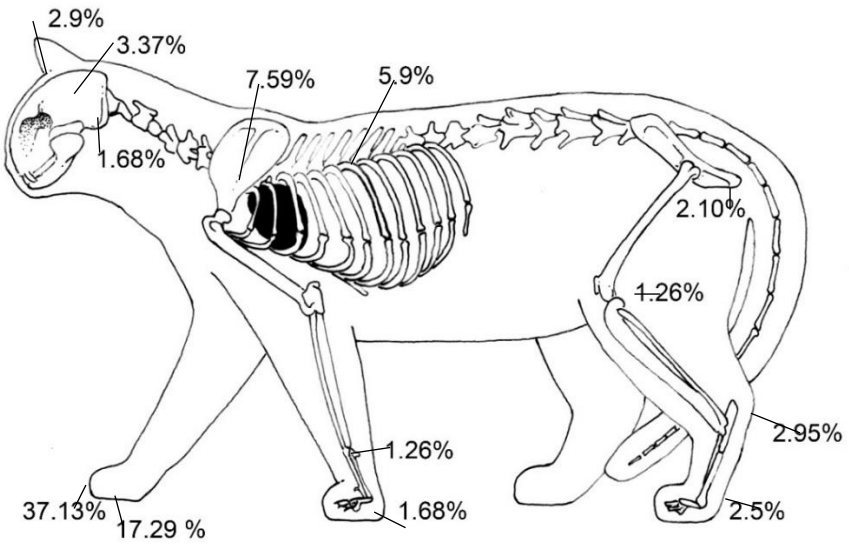


Figure 234. Percentage of cut marks at main disarticulation points[447] to detach their skins[448] and to facilitate manipulation of body parts.

Pumas received a posthumous treatment that was not seen in other specimens. Perforations are found on a large number of unfused long bone epiphyses. Although it is possible that they were made to keep the epiphyses attached to diaphyses, it seems unlikely as most diaphyses were utilized to make bloodletting instruments. Most likely these are suspension holes only for epiphyses, made by wear; the largest is 4.16 mm in diameter.

[447] In the graph I only listed anatomical regions represented by more than three bones. Other bones are described in the Appendix.
[448] The percentages of 37.13 % and 17.29% correspond to the disarticulation of phalanges for pelt preparation.

Figure 235. Tibia distal epiphysis. It has a circular perforation on the articular face with the talus. Photograph by Ximena Chávez Balderas.

Pumas were buried in three distinct conditions: a) articulated and defleshed anatomical segments; b) clusters of defleshed and disarticulated bones, belonging to one individual; c) clusters of defleshed and disarticulated bones, belonging to one individual, and d) scattered disarticulated bones. Of these I would like to highlight the first two categories. For the first one I documented nine articulated segments, all of them corresponding to the spine (cervical, thoracic, lumbar and caudal regions) belonging to at least three individuals. All correspond to elements that tend to resist disarticulation during decomposition, so it is not clear whether death occurred shortly before the monolith consecration or even perhaps months before.

With reference to the second category, puma long bones were placed in pairs and in clusters of three, four, and six bones. All correspond to juvenile animals (with no epiphyses) and are porous bones that were not used to manufacture bloodletting instruments. Puma ribs were grouped into clusters of 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 20 and 38 bone elements. All are composed of bones from the same specimen with the exception of the cluster of 38 ribs, belonging to two individuals.

Undoubtedly, one of the most important elements within this category of clustered bones are phalanges, which tend to be concentrated near the southern and northern walls of the offering. They are composed of proximal and middle phalanges, possibly from two or three specimens, and were carefully arranged with different orientations, indicating that they were deposited disarticulated. Occasionally, they are associated with distal caudal vertebrae, which have a similar shape and size, as well as to small metacarpals. Most of the phalanges' clusters are puma bones.

Figure 236. Cluster of aligned phalanges, corresponding to pumas. Drawing by José María García.

d) Pumas and sacrifice

Pumas are the most abundant felids in the ritual deposits of Templo Mayor and West Plaza. Their use as ritual offerings extends back many centuries before the Mexica as they were buried in consecration ceremonies at the Pyramid of the Moon, at Teotihuacan (Sugiyama 2014). Interestingly, despite their widespread use in rituals, pumas are not represented in codices and iconography with the same frequency as jaguars. Why this discrepancy? Eduard Seler (2004: 33) suggests that these two felids "go together in the images, although not in language", that is, there were two words that distinguished them

(meztli and océlotl), but in some codex images they seem to be equivalent. I agree with Seler about the symbolic equivalence of these felids, but note that pumas were easier to obtain than jaguars because of their wide distribution throughout central Mexico. I believe that the reason for this symbolic equivalence may have its basis in the species biology. Newborn pumas have fur with spots and stripes that resemble a those of jaguars. These coat patterns disappear when pumas reach adult age (Botero et al 2016). With all certainty the Mexica were aware of this feature, as most of the animals deposited in this offering were below one year in age and many of them could have been kept in captivity. When sacrificed they would have resembled jaguars, although it is unknown if this was the reason for sacrificing them at this early age.

In sum, for the Mexica immature pumas must have been animals that were very similar to jaguars that transformed with the passage of time. Their symbolic equivalence and the linguistic distinction might reflect these facts. If this is correct, possibly pumas were regarded as felids that did not enter the mythical bonfire long enough. Adrián Velázquez's research (2000) on Offering H suggests that the subadult puma buried in this deposit could have represented Tepeyólotl (a jaguar and Tezcatlipoca avatar), considering that he carried a pectoral characteristic of this deity. In any case, pumas had some of the essence of jaguars, but they were much easier to obtain and to keep in captivity.

The fifteen pumas sacrificed for the consecration of the monolith were also very young, of both sexes and, in general, in good health. Although they have no signs of disease directly associated with captivity, their age pattern suggests that they may have been confined in the Tenochtitlan vivarium, although this must be confirmed by isotope analysis. I did not find evidence of the way in which they were sacrificed, but it is clear that they

were killed for these rituals and to utilize their skins and body parts. This is confirmed by their abundance not only in Offering 126, but also for the rest of the ritual deposits of Templo Mayor.

Like the jaguars, pumas show evidence of posthumous treatments to obtain their skins and flesh. The standardized method of pelt preparation preserved the claws (and sometimes intermediate phalanges), as well as the anterior part of the skull adhered to the dermal tissue. All pumas were defleshed and, considering the symbolic equivalence between these felines and jaguars, their meat could be also consumed by the ruler.

Although some anatomical segments were deposited articulated, these are spine segments resistant to decomposition (persistent articulations), and therefore are not necessarily signs of recent death. In contrast, most of the bones were placed disarticulated; this implies that puma bones were also stored awaiting for this ritual.

Bobcats (Lynx rufus)

They are characterized by a short tail and a spotted coat with black and grey tones on the back. Bobcats have white fur on the belly and longer hair on the tips of the ears, which give them a very characteristic appearance. Unlike pumas, they are not adapted to tropical areas. They are usually found in mountains, deserts, bushes or pine forests. Currently they range from Tamaulipas and Jalisco to the south, up to the Isthmus of Tehuantepec, with several reported in the Central Highlands (Lariviere and Walton 1997, Gisbert and García Perea 1996, Villa 467-467, Romero 2005).

Regarding the historical distribution of *Lynx rufus*, informants of the 16th Century *Relaciones Geográficas* sometimes refer to variably as wild cats, "ounces" and "cerval

cats". It is likely that the last two names refer to the other three minor feline species: *Puma yagouaroundi* (jaguarundi), *Leopardus pardalis* (ocelot) and *Leopardus wiedii* (margay) (see Appendix). It is difficult to discern which species they were describing when using these names, as the Iberian bobcat (*Lynx pardinus*) was known to the Spaniards. In the *Relaciones de Yucatán*, where environmental conditions for them do not exist, chroniclers report "wild cats," most likely referring to the other three species that live in these regions. However, in some areas, such as Oaxaca, these felines may coexist.

a) Individualization, anatomical and taxonomic identification

Anatomical identification of each bone was the first step of this analysis. With the exception of a talus, a calcaneus and a caudal vertebra, the rest correspond to 170 long bones. Next, I conducted taxonomic identification. Before the discovery of Offering 126, there was only one specimen of *Lynx rufus*, recovered in Offering U (Elizalde 2017: 185), therefore no reference specimens were available and it was unclear whether they were ocelots (*Leopardus pardalis*) or bobcats. Specialized bibliography was consulted (Getty 2002; Arce Chávez 2009, Morales Mejía et al. 2010), and one specimen of each species was borrowed from the National Mammal Collection. This allowed identification of diagnostic anatomical features in the femur, tibia, ulna, radius and humerus (see Appendix) that clearly differentiate them. In addition, long bones of both felids had different lengths and proportions. For this reason, measurements were taken following Driesch's methodology (1976) as well as index calculations. To do this, I used the collections of the National Autonomous University of Mexico and the National Polytechnic Institute, where six specimens were available. Regarding long bone length, bobcats are larger in size. When indices were calculated, they formed two distinct clusters. I then measured the

archaeological bones and they clearly grouped with *Lynx rufus* (figure 237). This result was consistent with bone morphology. Mammal specialist Montserrat Morales Mejía from INAH's Zooarchaeology Laboratory identified a talus, a calcaneus and a caudal vertebra of this species.

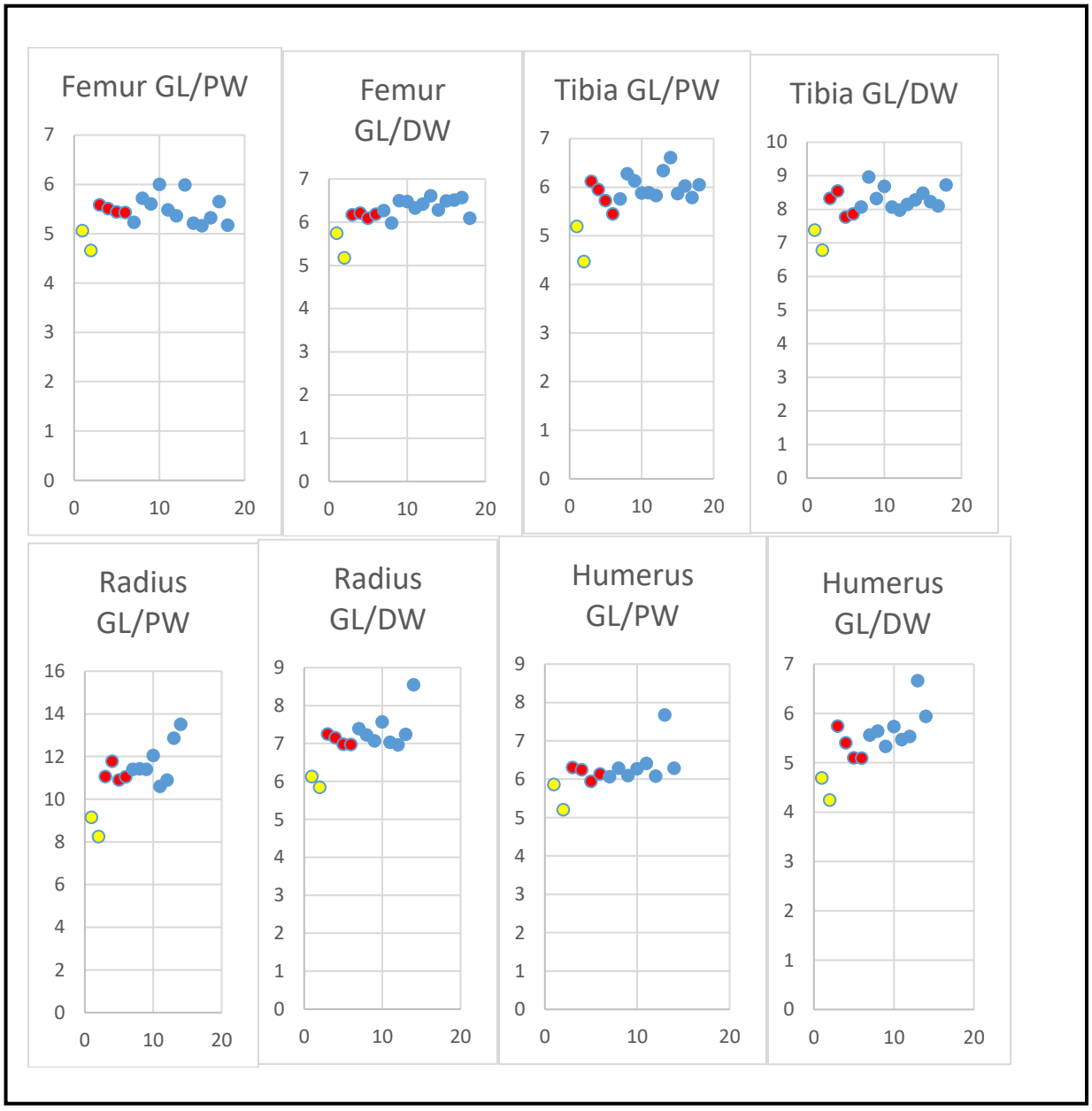


Figure 237. Dispersion diagrams. Contemporary ocelots (*Leopardus pardalis*) are in yellow and contemporary bobcats (*Lynx rufus*) are in red. Archaeological bones are in blue. GL= Greatest length; PW= Proximal width; DW= Distal width.

After identifying them as bobcats, I calculated the MNI, documenting a total of 19 individuals (Figure 238). However, it is interesting to note that they are represented only by 174 bone elements, indicating that they underwent different posthumous treatments compared to the rest of the animals buried in this offering.

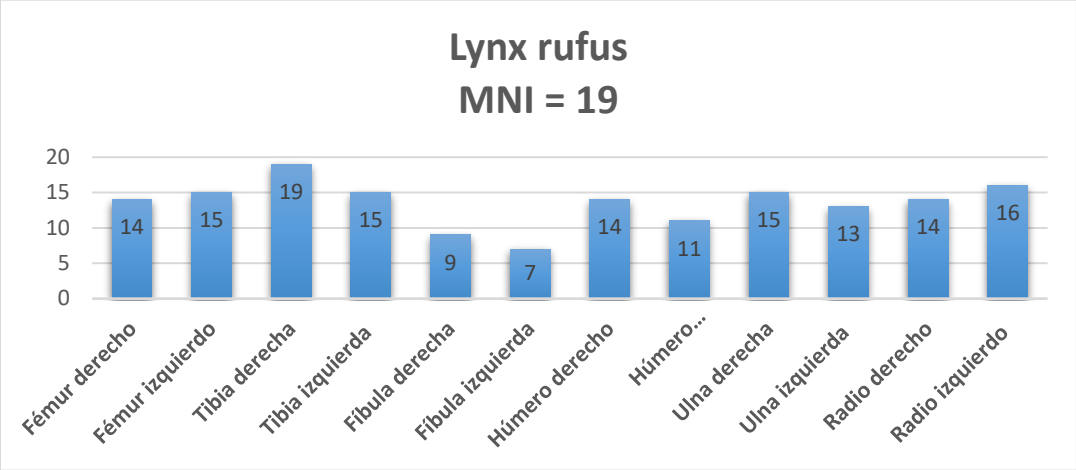


Figure 238. Minimum number of individuals (MNI), Lynx rufus (N=19).

b) Biological profile

Most of the bobcats—13 specimens—correspond to adults over 20 months old, while six of them were under 14 months. Unfortunately, it is impossible to determine their ages or sex, since only long bones are preserved. The lack of other bones also precludes observations on general health. I only documented one case of mild myositis ossificans in a long bone that had no impact on quality of life.

c) Sacrifice and posthumous treatments

Long bone selection does not allow inferences about how the bobcats were killed. Regarding posthumous treatments, the fate of the rest of their skeletons is unknown.

However, analysis of cultural modifications reveals that from 174 *Lynx rufus* bones, 161 have cut marks corresponding to defleshing and disarticulation (92.5%) (figures 239 and 240). Bones with no marks are limited to sesamoids, an epiphysis, a talus and some long bones. However, some of these were individualized and it is known that the animals to which they belonged were defleshed. It is likely that their flesh was used for a ritual feast or to feed other animals.

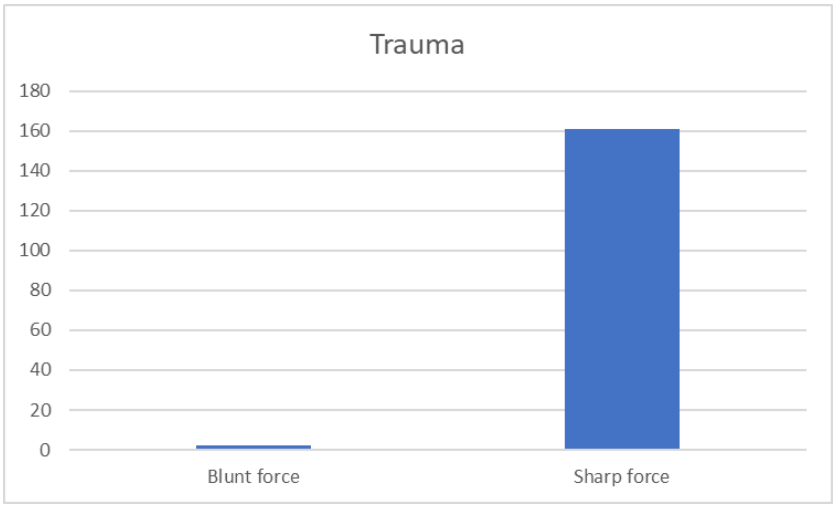


Figure 239. Types of perimortem trauma reported on *lynx rufus* bones, Offering 126.

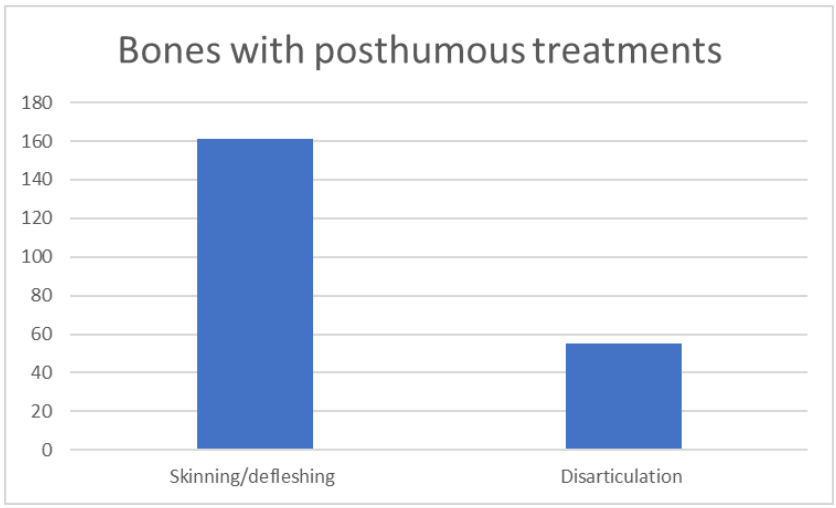


Figure 240. Posthumous treatments (skinning, defleshing and disarticulation). *Lynx rufus*, Offering 126.

It is quite possible that bobcat pelts were also prepared, but there is no evidence of this treatment (such as claw disarticulation and skull fractures). Unlike the rest of the animals, there was a clear intention to separate the long bones, as 55 of them showed signs of disarticulation.

The priests placed these bones in 16 clusters, the largest composed of 48 bones (see Appendix). Most of these were buried at the end of the ceremony (Levels 4, 4a and 4b), and include the remains of one or several individuals who were carefully accommodated, but not tied together, as some were arranged in radial patterns, while others were placed crossed and others parallel to one another.

d) Bobcats and sacrifice

Thanks to the discovery of this ritual deposit bobcats are the second most abundant felid in the Sacred Precinct of Tenochtitlan. As noted above, however, they appear to be absent or unrecognized in iconography. Most likely some link to jaguars must have been attributed to bobcats because of their spotted coat. They were more abundant in the vicinity of Tenochtitlan than other felid species and possibly easier to capture and retain in captivity because of their size.

Most of these felines were adults when they were killed and apparently in good health. Their abundance in the West Plaza and their absence in the Templo Mayor may be explained in one of two ways: either they were not animals to be buried in the main temple or their use began during the government of Ahuítzotl, whose building stage was largely destroyed in the Conquest.

In any case, these animals were defleshed. It is unknown what was done with the

rest of their bones, whether they were stored or used in another ritual. It is interesting that only their long bones were selected. Their bones are smaller than those of the larger felid species and thus they may not have been seen as optimal raw material for bloodletting instruments. All were deposited disarticulated, in clusters that vary in number and bone arrangement. Clearly they were buried with great care but with a meaning which is now unknown.

Ocelot (Leopardus pardalis)

This feline is smaller than a bobcat and spots on its dorsal fur are brighter and more contrasted, like those of a jaguar. The ocelot is distributed from southern Texas to northern Argentina, inhabiting tropical, subtropical and scrub regions (Di Bitetti et al. 2008). It is medium sized (approximately 10 kg) and feeds on mammals, birds, reptiles, fish, amphibians and insects (Martínez-Meyer 2009). Their original distribution was wider than today, although restricted to the ecosystems mentioned above.

a) Individualization, anatomical and taxonomic identification

Bones corresponding to two articulated legs, a rib and a radius that were sent for taxonomic identification to specialist Montserrat Mejía Morales at the INAH Zooarchaeology laboratory. In total, there are 40 bones, corresponding to an MNI of 1.

b) Biological profile

Considering that nearly all the bones are from the legs, only an age estimate of 10 and

14 months of age was possible, assuming that the radius corresponds to the same individual. As for health conditions, mild subperiosteal bone growth was observed on a metatarsal, which had healed, as it has a compact and organized texture.

c) Sacrifice and posthumous treatments

Given that there are few bones and that most correspond to the posterior limbs, it is not possible to know how this animal was killed. It was defleshed and the skin was removed. From the 40 available bones, 22 have cut marks; although they only correspond to 55% of the whole sample, they represent both extremities and the rib. The radius shows no cultural modifications. All marks correspond to sharp force used for disarticulation and defleshing (Figure 241).

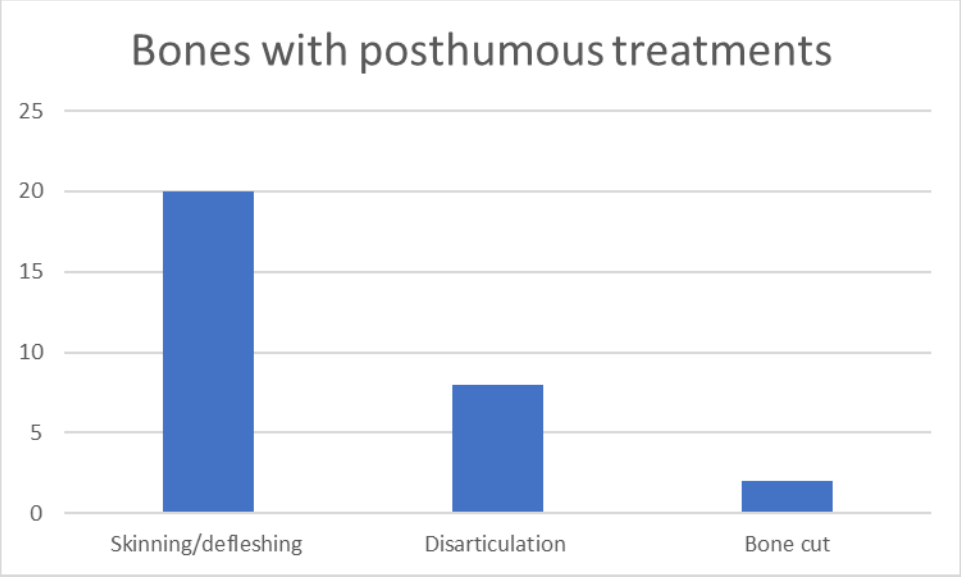


Figure 241. Bones with evidence of posthumous treatments (skinning, defleshing, disarticulation and cutting). Ocelot from Offering 126.

The right limb is represented by 20 bones and the left by 18; both were placed in dorsal position and with the distal portion towards the southwest. Thanks to the fact that they were placed on the floor of the stone box they were found in strict and loose connection (Figure 242). They were excavated in two levels, and twelve sesamoids were recovered.

Figure 242. Articulated posterior limbs, ocelot. a) right; b) left.

The fact that the paws are defleshed, lacking of middle and distal phalanges, suggest that the skin was removed. Likewise, articulation of both limbs implies that the ocelot died shortly before being placed in the offering. The fate of the rest of the skeleton is unknown.

d) Ocelot and sacrifice

This is the first reported occurrence of *Leopardus pardalis* in the ritual deposits of Templo Mayor. It is possible that the absence of this species is due to the fact that bobcats were much more abundant in the Central Highlands and therefore easier to keep in captivity. In any case, I believe that the four felid species should have a closely related symbolism, where the jaguar was the central component.

Wolves (Canis lupus)

Wolves belong to the family Canidae, which includes of 16 genera and 36 species distributed throughout the world (Wayne et al 1993; Nowak 1999). This family diverged from other carnivores approximately 60 million years ago. Genetic studies suggest the existence of four monophyletic groups within this family, which separated between 7 and 12 million years ago. The first of these groups is the wolf type canids: it includes grey wolves, coyotes, jackals and domestic dogs (Wayne 1993, Villa and Wayne 1999, Bardeleben et al 2005, Wayne and Ostrander 2007).

In Mesoamerica canids of this group include domestic dogs, wolves and coyotes. The first are distinct from the latter two in regards to ecology and behavior due to their close relationship with humans. In contrast, wolves and coyotes are predators that are capable of chasing prey for extended periods. Their diet is primarily based on mammals, but they can eat fish, birds, reptiles, crustaceans, insects and plants or even corpses (Clark 2006: 386-387). Coyotes are at a disadvantage when competing with wolves and are displaced from territories where wolves are abundant. Wolves need between 3 and 5 kg of meat per day, although they may pass several days without eating. They easily adapt to extreme conditions, but their habitat is reduced by human presence. They prefer mountain forests where they have shelter, water and abundant food, although they can adapt to other environments (Boitani 2000, Mexican Gray Wolf Husbandry Manual 2009).

Females' reproductive cycle is seasonal and occurs once a year. Females reach sexual maturity at approximately two years and gestation lasts 63 days, after which litters

of between one and eleven pups are born, with an average of four. Thanks to Jorge Servín's studies, it is known that the majority of births occur between the third week of March and the fourth week of May, with a greater frequency in the third week of April. The offspring feed on mother's milk, then on food regurgitated by both parents and finally on solid food (Soto et al. 2013, Servín 1997, Boitani 2000). This is important for our isotopy study, which will be discussed later.

The Mexican wolf (*Canis lupus baileyi*) is the smallest and southernmost subspecies of the grey wolf. Females weigh between 20.2 kg and 37.4 kg, while males range from 21.8 kg to 41.3 kg, with an average height of 70 to 80 cm. They are currently extinct in the wild due to human hunting. Today there are captive wolves, as well as a reintroduced population that descends from three lineages. For this reason, this population does not reflect the genetic variability of the past. Some authors disagree on the historical distribution of wolves, but the broadest estimate includes the southern United States (part of New Mexico, Arizona and Texas), the Eastern and Western Sierra Madre, semi-arid areas of the Central Highlands and the Sierra de Oaxaca (Fredickson and Hedrick 2001, Mexican Gray Wolf Husbandry Manual 2009, Navarrete Flores et al 2014, Hendricks et al 2016). The 16th century *Relaciones Geográficas* agree in general terms with the historical distribution proposed by some authors, having reports for the current states of Mexico, Michoacán, Guerrero, Hidalgo, Morelos, Puebla, Tlaxcala, Veracruz, with repeated mentions in Oaxaca. Their wide distribution, their intelligence, cooperation between the pack and their physical appearance deeply impressed the ancient Mesoamericans.

a) Individualization, anatomical and taxonomic identification

For taxonomic identification, I used contemporary specimens (adults and pups) for direct comparison with archeological bone remains. In the case of the pups, specialists Jorge Servín and Xóchitl Ramos Magaña loaned me six specimens of Mexican wolves between one day and two and a half months old. [449] Two correspond to corpses that were studied radiologically and three correspond to skeletons (figures 243 and 244). In addition to the morphological observation of these specimens, I took measurements of different anatomical elements.

Specimen	**Age**	**Description**
1	One day	Preserved in formaldehyde (radiological study). Congenital conditions
2	28 days	Frozen (radiological study).
3	2.5 months	Skull. Maxillary with congenital disease
4	1 day	Skeleton 1-UAM
5	13 days	Skeleton 2-UAM
6	17 days	Skeleton 3-UAM

Table 50. Reference collection of Mexican wolf pups

[449] From the Autonomous Metropolitan University and the Chapultepec Zoo, respectively.

Figure 243. Specimens 1 and 2. X-ray: lateral and ventral views. Image by CT Scanner

Figure 244. Specimens 6, 5 and 4, UAM-Xochimilco reference collection, after cleaning and individualizing.

Due to the small size of the pups recovered inside Offering 126 and the lack of skulls, they were erroneously identified as felines during excavation. At the lab I identified them as wolves due to features listed on table 51.

Feature	**Canids**	**Felids**	**Offering 126**
Hypoglossal canal	Separated from the jugular foramen by a bone bridge	United to the jugular foramen	Separated from the jugular foramen by a bone bridge
Condyle morphology	Straight	Angled	Straight
Jugular process	Prominent and well-defined	Smaller and separated from condyles	Prominent and well-defined
Humerus nutrient foramen	Posterior, well-defined	Lateral or imperceptible	Posterior, well-defined
Humerus deltoid tuberosity	Ridge projecting laterally	Line that does not form a ridge	Developing, but more similar to canids
Humerus entepicondylar foramen	Absent	Present	Absent
Supratroclear humerus foramen	Present	Absent	In formation (clastic activity and thinning)
Scapula neck	Open angle	Closed angle	Open angle
Scapula caudal edge	Curved	Straight	Curved
Scapula Acromion	Rounded and prominent	Sharpened and with a notch	Rounded and prominent
Scapula morphology	Long and narrow	Rounded	Rounded
Ulnar diaphysis	Prominent and curved	Straight and flat	Prominent and curved
Ischial tuberosity	Prominent and projected laterally	Flat	Prominent and projected laterally
Ventral gluteal line	Curved	Straight	Curved
Shape of the iliac crest	Asymmetrical, ventrally projected	Symmetrical and straight	Asymmetrical, ventrally projected
Cranial and caudal ventral iliac spine	Ventrally projected	Straight	Ventrally projected

Table 51. Morphological differences between canid and felid pups.

Through comparison with contemporary skeletons, I found that the most diagnostic bone for wolf identification is the pelvis (figure 245). [450] In addition, this study proved useful for age estimation, as will be discussed later.

Figure 245. Differences between canids and felids, where the pelvis is the most diagnostic bone. 1) Asymmetrical iliac crest in canids; 2) symmetrical and straighter iliac crest in felids; 3) curved ventral gluteal line in canids; 4) Straight ventral gluteal line in felids.

For adults, I utilized four specimens from the National Mammal Collection curated by Fernando Cervantes with the support of Julieta Vargas. Two of them were captive (Aragón and San Cayetano) and two more were wild specimens (from Las Playas Durango); all are pure wolves confirmed by genetic analysis. Additionally, the Templo Mayor Project has started its own reference collection; [451] so far there are five specimens whose bodies were

[450] Considering their size and skeletal development, they are not dogs. However, these specimens will undergo genetic analysis to definitively rule out this possibility.
[451] Approved by SEMARNAT, thanks to the Direction of Wildlife and to the Binational Program for the recovery of Mexican Wolf, with support of specialist Mónica de la Fuente.

processed by our team. These were helpful data for age estimation, sex determination, and to understand flaying, defleshing and disarticulation techniques (Figure 246).

Figure 246. Specimens from the Templo Mayor Project reference collection. General view and detail.

For the present study I posed the question of whether the bones were of wolves or hybrids, as the team coordinated by Raúl Valadez and Alicia Blanco suggested that specimens from offerings 1 and H were "loberros", hybrids between wolves and dogs. The authors reached this conclusion based on size and morphology. However, in their study they do not take into account variability within the species, resulting from geographical distribution and sexual dimorphism. In addition, when comparing current Mexican wolf populations with those from the past, it must be noted that modern wolves have lost their original genetic diversity. As was described previously, wolves went extinct in the wild as a consequence of hunting, and surviving specimens come from only three lineages: there is a bottleneck effect and a loss of original diversity. In addition, hybrid offspring do not simply

demonstrate intermediate size or morphology, as they generally undergo heterosis or "hybrid vigor". This implies that they are larger and stronger than their parents (Ackerman et al. 2006; Ackerman and Bishop 2009; Ackerman et al. 2010). In addition, hybrids often experience abnormalities resulting from early developmental failures, such as the presence of supernumerary teeth and cranial suture variations (Goodwin 1998). None of these features is found in the archaeological collection. Finally, Navarrete (2014) and colleagues noted that hybrids are even more difficult to handle than wild wolves, as they are unpredictable and aggressive.

Considering that wolves from Offering 126 are incomplete, their identification relied on a comparison with contemporary and archaeological specimens. Five specimens recovered in offerings 115, 120, 125 and H were examined morphologically and genetically, and all are consistent with wolves. Greater diversity was observed in the archaeological collection, which was to be expected, as contemporary wolves descend only from three lineages.

As for DNA results on complete specimens, the first analysis was conducted by Steven Fain from the US Fish and Wildlife Services Forensic Laboratory, based in Oregon. Profiles of specimens from offerings 115 and 125 were obtained, and are consistent with wolves. Subsequently, five samples from H, 115, 120 and 125 offerings were sent to the Wayne laboratory at the University of California, Los Angeles. Partial mitochondrial DNA profiles were obtained from four samples that were consistent with Mexican wolves; there are no indicators that these are dog-wolf hybrids.

Based on these results and from bone comparisons I identified the remains from Offering 126 as wolves. The estimated MNI was based on repetition of anatomical

elements. I concluded that there are 23 adults and subadults, as well as five pups, for a total of 28 wolves.

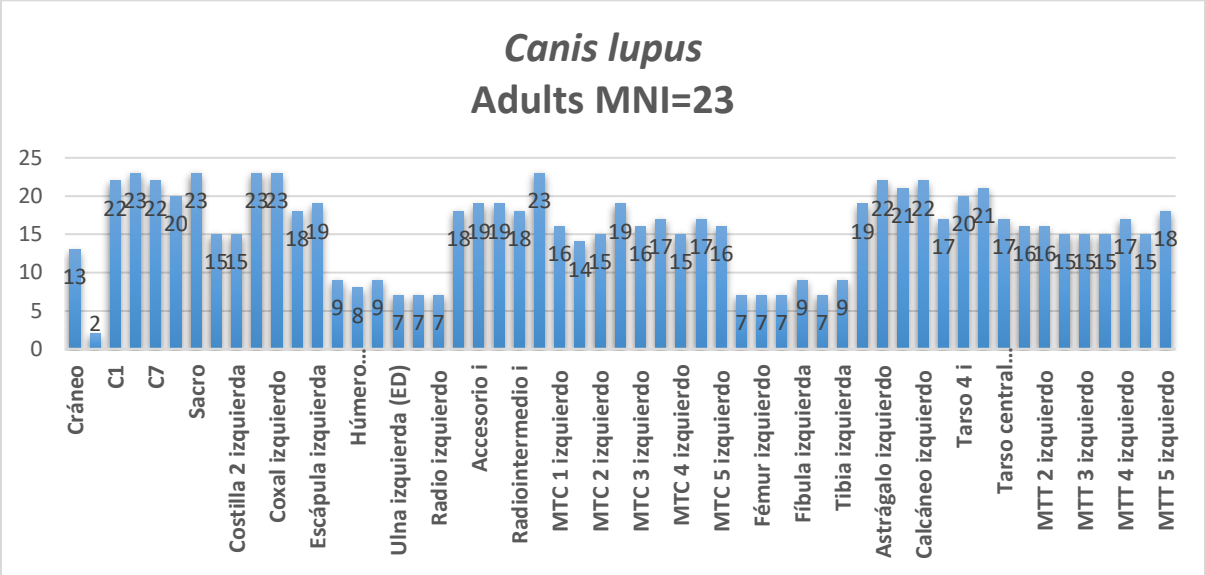


Figure 247. MNI of adult and subadult wolves. To these must be added five pups that were counted separately, to prevent underestimating the number of specimens.

Adult and subadult specimens were individualized only by anatomical regions. The fact that there are so many commingled specimens of the same ages and sizes made this task difficult. However, this could be done for the pups by using field osteoarcheology methods (Duday 1997).

Their individualization was based on a meticulous field recovery. However, the fact that they were deposited in a small area caused them to commingle. In addition, water table variations displaced bones. Some of the puppies' forelimbs were amputated and deposited in other quadrants of the offering, which made it difficult to individualize them. Therefore, it was necessary to examine all bone remains of the whole deposit in order to separate those corresponding to pups. Once this was carried out, I placed on the lab table all bones that

were identified in the field, in an anatomical position. From this it was possible to attribute numerous bones to each puppy that were found outside their original position (table 52).

Individual	**Bones**
Pup 1	151
Pup 2	131
Pup 3	137
Pup 4	179
Pup 5	154
Undetermined[452]	217

Table 52. Individualization of Mexican wolf pups.

- *Pup 1* (MO 4519)

From laboratory analysis I determined that this individual is composed of 151 bones; it lacks some metacarpals, metatarsals, phalanges, caudal and, especially, thoracic vertebrae (figure 248).

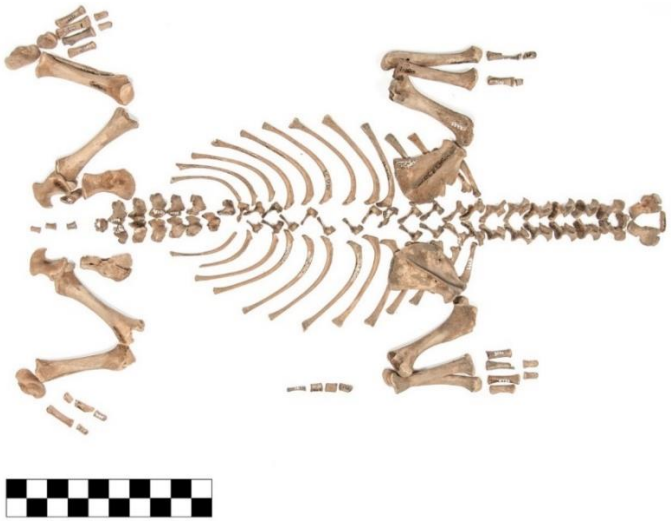


Figure 248. Pup 1, Offering 126. Photograph by Mirsa Islas.

[452] Although a large number of bones could not be attributed (N=217), these correspond mainly to secondary ossification centers, vertebral bodies and fragments, which do not change interpretations of posthumous treatments.

- *Pup 2* (MO 4521)

From laboratory analysis I determined that it corresponds to 132 bones; it lacks a metacarpal and a metatarsal, as well as several phalanges. In addition, the thoracic region and the sternum are incomplete as soil samples were taken from this area during excavation (figure 249).

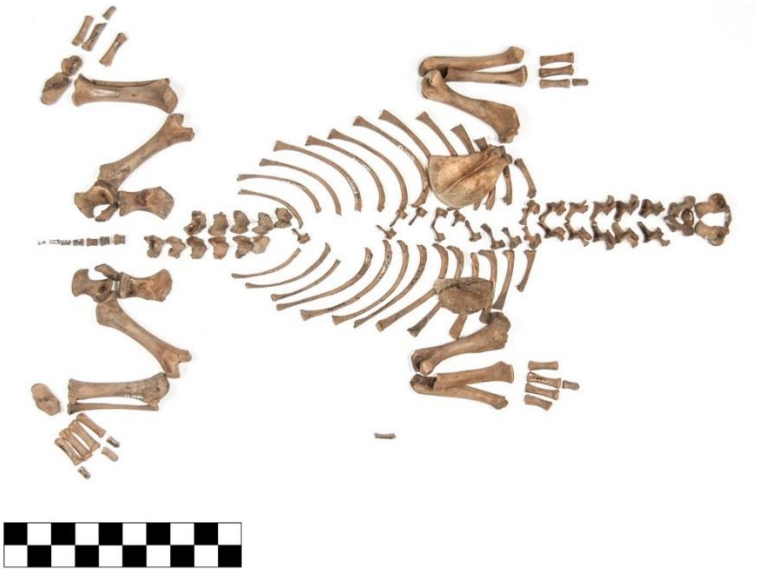


Figure 249. Pup 2. Offering 126. Photograph by Mirsa Islas.

- *Pup 3* (MO 4467)

From laboratory analysis I determined that it corresponds to 137 bones. It lacks mainly caudal and thoracic vertebrae, as well as phalanges, as soil samples were taken from this area (Figure 250).

Figure 250. Pup 3. Offering 126. Photograph by Mirsa Islas.

- *Pup 4* (MO 4509)

From laboratory analysis I determined that 179 bones belong to this individual. This pup is the most complete, as it was less commingled. In addition, considering that it is the largest of the group, its individualization was simpler. Despite the difference in size, skeletal development is practically identical to the other pups, which implies that most likely all five wolves might correspond to the same litter. This specimen lacks portions of multiple thoracic vertebrae, three phalanges and some caudal vertebrae (figure 251).

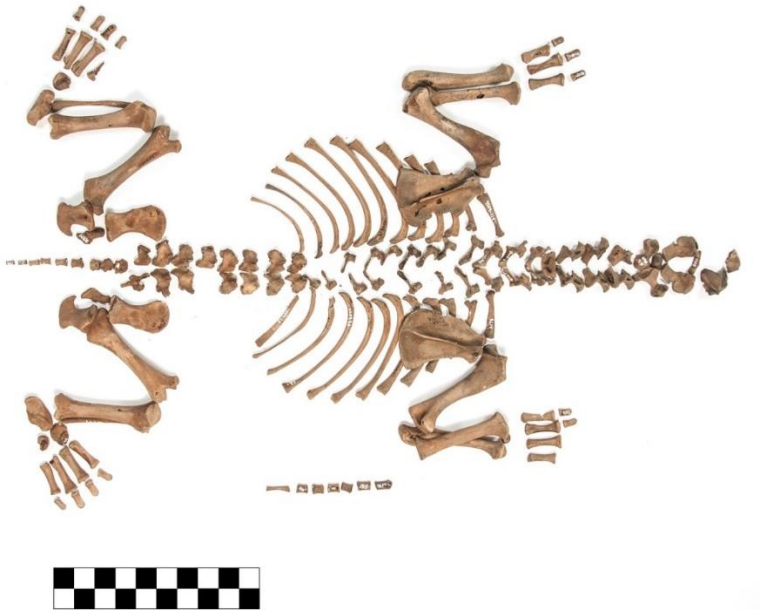


Figure 251. Pup 4. Offering 126. Photograph by Mirsa Islas.

- *Pup 5* (MO 6390)

From laboratory analysis I determined that it is composed of 154 bones; it lacks ten phalanges, a metatarsal and a metacarpal, as well as several thoracic vertebrae (figure 252).

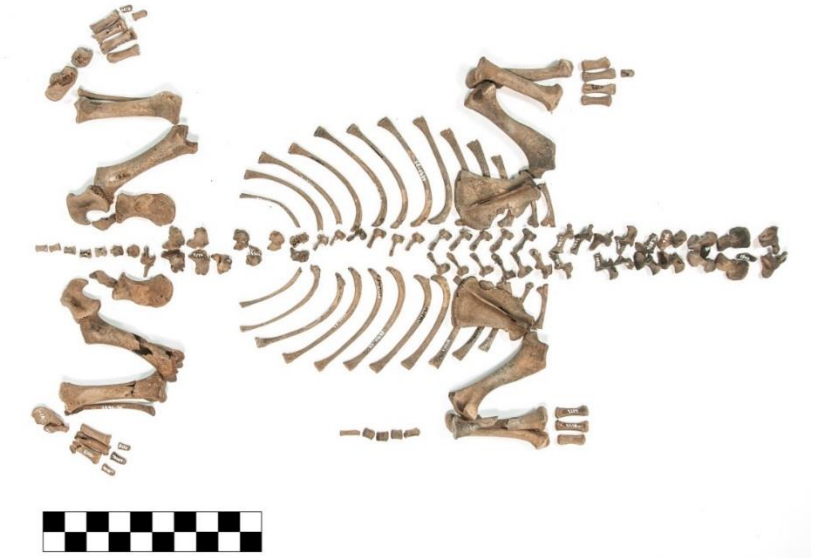


Figure 252. Pup 5. Offering 126. Photograph by Mirsa Islas.

b) Biological profile

Whenever possible, I estimated sex and age and observed health conditions. In addition, I estimated the season of birth for pups as wells as osteological evidence of captivity. Estimating sex was difficult, as the skeletons are incomplete[453] and most are juveniles. From the reference collection, I determined that the most informative features to determine sex are the birth canal and the pubic pecten, which are larger and more rounded in females. [454] Despite the limitations in the collection, I was able to determine that both males and females were buried: ten are compatible with males, seven with females and the rest are indeterminate. This indicates that both males and females were buried in the offering; however, these are incomplete skeletons for which more conclusive data could only be obtained from DNA analysis (table 53).

Bone	**Female-like features**	**Male-like features**	**Undetermined**
Pelvis (birth canal and pubic pecten)	7	10	6
Skull (size and shape of occipital crest)	2	7	4

Table 53. Sex determination. Wolves from Offering 126, based on the observation of pelvis and skull.

For age estimation I examined primary and secondary ossification centers of the appendicular skeleton. Five are pups of approximately seven weeks old, four specimens were between three and five months old, eight were juveniles between five and ten months old, seven were subadults or adults of an undetermined range[455] and two were possible old

[453] Skulls were cut as a result of the pelt preparation technique.
[454] As for the pelvis, I noticed that in canines the ischial arch is not informative, as Blanco and collaborators claim (2009). According to these researchers, this anatomical point is wider in females, however, I observed in the reference collection that this is not the case, as it was even wider in some males. The reason is that this anatomical landmark does not interfere with birth. In this regard, the area that must evaluated in an articulated pelvis, which has greater dimorphism, is the birth canal and the pubic pecten.
[455] Age could not be determined because it was not possible to individualize them.

adults; in sum, there is no evidence of an age-based selection pattern. The age of the pups was calculated with more accuracy, given that the reference specimens' age was known. Assessing their length and development compared to the reference collection, I concluded that they would be approximately seven weeks old (see Appendix).

In addition to length, pups would be more than six weeks old because, according to Blanco and co-workers (2009: 166):

> When the pup was over six weeks old, its bones present the diaphysis zone with more compact bone tissue, but also most of the epiphyses already have an ossified section that manifests itself as a complement of bone.

On the other hand, atlas fusion begins approximately in week eight (Harris 1978), a feature that is not present in any of our specimens, for which reason it is most appropriate to estimate their age in approximately seven weeks. The age of the other specimens was calculated from data available for domestic dogs, which have a similar development (see Appendix).

In general the wolves appear to have been healthy animals, although they are numerous antemortem fractures on at least five wolves.[456] In most cases these are very old fractures, located in the ribs or in vertebral spinous processes. This is consistent with the fracture patterns observed in the reference collection, where these injuries are common as a consequence of falling during captivity.

It is noteworthy that a fracture was seen on Pup 5 pelvis and in one of the ribs, although most likely it did not affect life quality (figure 253). Considering that bone

[456] To calculate this number I rely on the repetition of bones and the age of the specimens.

regeneration in pups is faster, these lesions were recent. In addition, lines of bone deposition associated to growth were noted, which are very marked in the metapodials. As they resemble Harris lines, they may be the result of metabolic stress, but there is no additional information to confirm this. These are absent in the rest of the puppies.

a) b)

Figure 253. a) Pup 5 rib, with antemortem fracture; b) Pup 5 right ischion, with antemortem fractures (healing).

Two specimens have signs of joint disease in the spine,[457] corresponding to bone bridges in the vetebral bodies; these might be indicators of captivity according to Elizalde (2017). At least three wolves presented evidence of subperiosteal bone deposition; these are in different stages: healed, active, and healing. They could be effects of non-specific infection or trauma and are, located on phalanges, ribs, metatarsals, metacarpals and vertebrae. In no case are they severe.

Oxygen isotope analysis was conducted for one of the pups. A rib was sent to the Laboratory for Stable Isotope Analysis at the University of Western Ontario. The seven-

[457] One specimen in T6-T10, T12, L1-L3. The other specimen on T10-L1.

week-old pup had bone values compatible with the range of the Basin of Mexico. According to Moreiras Reynaga and Longstaffe (2018) this implies that it was local to this region, most likely born in captivity. The isotopic composition could reflect a lactation effect produced by the consumption of the breast milk. However, at this age pups also fed on regurgitated food from their parents and pieces of meat, so this effect was considered to be minimal. In any case, these results, along with those obtained in wolves from Offering H, indicate that the Mexica kept wolves for reproduction, taking care of both mothers and offspring to use them for rituals (Moreiras Reynaga and Longstaffe 2018).

In addition, I was interested in the study of wolf's reproductive cycle, as the season in which the wolves were sacrificed can be inferred from it. As noted previously, according to Servín (1997), all births of the pups occur between the first week of April and the first week of May, with the highest frequency during the third week of April. Taking into account both data (time of birth and age) it is possible to infer the season in which they would have been sacrificed, which is important for the interpretation of the offering. This conclusion is based in the fact that they are primary burials and it was possible to calculate their age.

Pups from Offering 126 were buried just after death at the bottom of the stone box, and their deposit marked the beginning of the ceremony. If the wolf pups were born during the month of April or May and were approximately seven weeks old, this would imply that Offering 126 was deposited in June or July. This means that it may have coincided with the arrival of the rain or with the summer solstice, a propitious time to consecrate the monolith of Tlaltecuhtli, prolific goddess of the earth, symbol of fertility, who integrates life and death in the same cycle.

c) Sacrifice and posthumous treatments

When analyzing the wolf remains I discovered evidence of arrow shooting. Two specimens have lesions in the dorsal part of the iliac crest, caused by a projectile point. In fact, one of the individuals retains an obsidian arrow fragment embedded in bone (figures 254 and 255). In addition, in both cases I documented irradiating fractures and plastic deformation, typical of perimortem lesions. The left scapula of one of these individuals has two fractures that could also be caused by projectiles. However, this bone is very difficult to assess as it is very thin and fractures easily. In both cases, the direction of the force places the shooter at the back and higher than the animals. No other sacrificial techniques were documented on the wolves.

Figure 254. Wolf's pelvis, with a projectile point embedded in the left iliac crest. Detail of the arrow. Photo by Mirsa Islas.

Figure 255. Wolf's pelvis, with a projectile lesion in left os coxae. It has radiating fractures and shows plastic deformation. Photo by Ximena Chávez Balderas

Posthumous treatments given to wolves are similar to those described for felids. After their sacrifice their skins were removed, some segments were disarticulated, their muscles were taken out and long bones were used as raw material to make bloodletting instruments, as documented by Elizalde, Robles, Valentín and Pérez Roldán.

A total of 2095 wolf bones (45.8 % of the remains) had cultural modifications corresponding to sharp force, blunt force, blunt/sharp force and indirect thermal exposure.[458]. Although not all bones have cut marks, most likely all specimens received posthumous manipulation (figures 256 and 257).

[458] A single bone can combine different types of modifications.

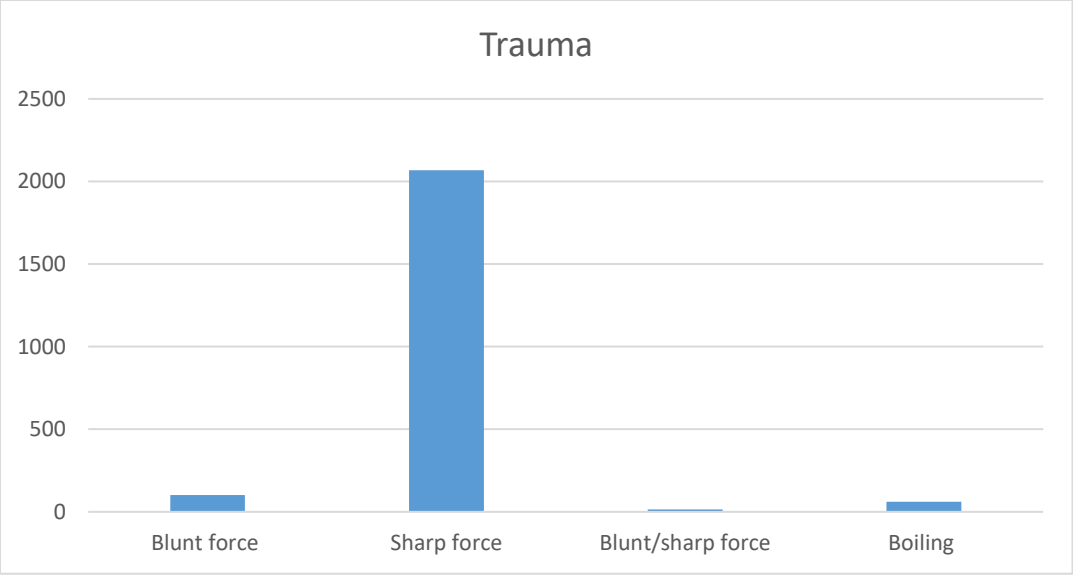


Figure 256. Perimortem trauma, wolf bones, Offering 126.

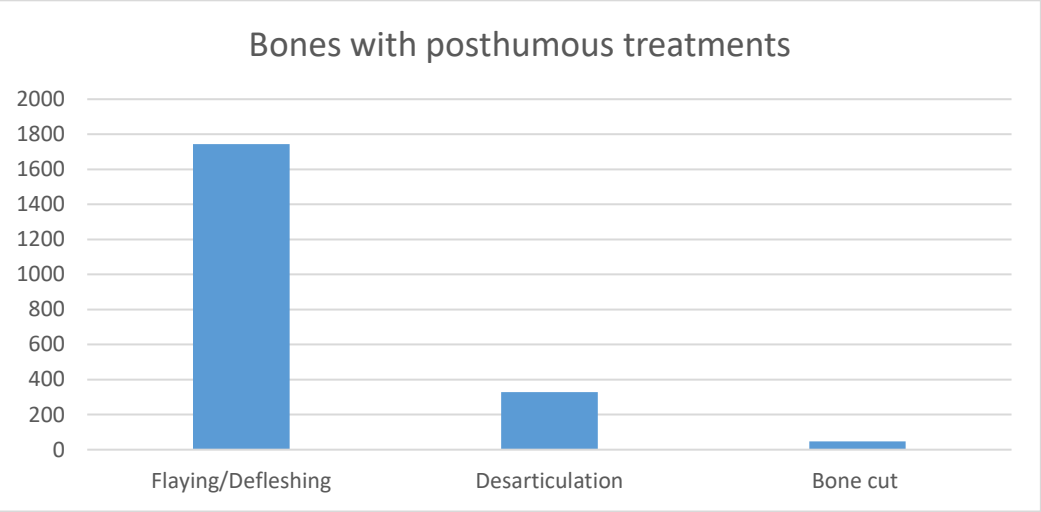


Figure 257. Bones with posthumous treatments (flaying, defleshing, disarticulation and cut).

Wolf corpses were disarticulated to separate the bones that remained in pelts (claws and anterior part of the skull), but also to divide them into parts to facilitate their manipulation (see Appendix 2).

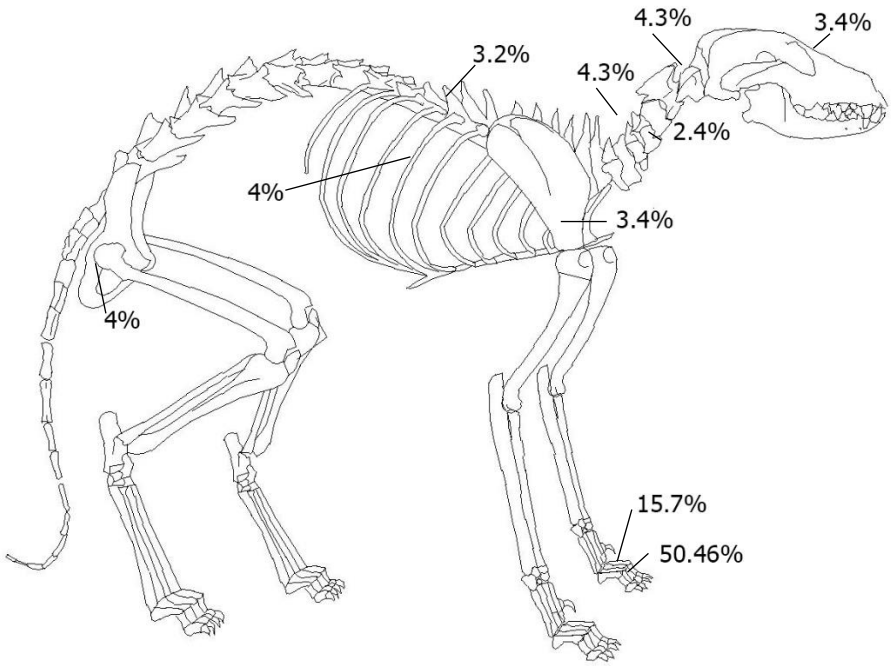


Figure 258. Percentage of cut marks documented in main articulations. Dismemberment was done to remove their skins and to facilitate corpse handling. Drawing by Israel Elizalde

Disarticulation or defleshing may go unnoticed when done carefully. In the case of wolf pups, this is even more likely. For example, Pup 1 is represented by 151 bones and none has cut marks. However, the absence of skull and claws, as well as the comparison with the other puppies suggest that it was beheaded and flayed, judging by the absence of intermediate and distal phalanges. In the case of the pups, their fragility and the amount of cartilage makes it easier to disarticulate them without leaving traces.

In particular, wolf pups have 22 cut marks, accidentally caused during flaying. Fifteen correspond to proximal phalanges from all limbs, while six were documented in metapodials and one more on a possible hyoid fragment. The disarticulation of their claws happened between the proximal and intermediate phalanx (figure 259). In adults it occurs instead between the intermediate and distal phalanx. Most likely, this was due to the small size of the pups, in which it was easier to disarticulate proximally.

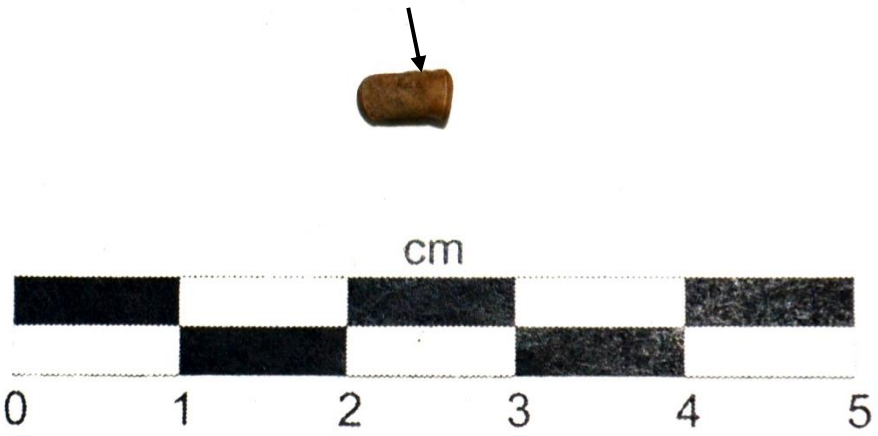


Figure 259. Proximal phalanx with cut marks. Photo by Ximena Chávez Balderas.

In addition to removal of the pelt, I documented another treatment in the pups: dismemberment of one of their forelimbs. Three of them had their left limbs removed, one their right limb and the last one had all its limbs and it was placed in the center of the burial area. Although this disarticulation did not leave marks, it is not a natural taphonomic process, as the limbs were deposited articulated around the pups. The reason for this practice is unknown, but the priests carefully placed the pups with the side of amputated limb directly on the floor. Table 54 summarizes these posthumous treatments.

Specimen	Decapitation	Defleshing and dismemberment	Limb severing
Pup 1	Decapitated between C1 and occipital condyles	No visible cut marks; absence of intermediate and distal phalanges	Left
Pup 2	Decapitated between C1 and occipital condyles	Disarticulation cut marks in three proximal phalanges	Left
Pup 3	Decapitation by disarticulation of left occipital condyle	Three metapodials have cut marks that can be associated with flaying. Disarticulation marks in proximal phalanx	Left
Pup 4	Decapitation by disarticulation of right occipital condyle	Three metapodials have cut marks that can be associated with flaying. Disarticulation marks in four proximal phalanges. Cut mark in hyoid.	No
Pup 5	Decapitation by disarticulation of both occipital condyles	Disarticulation marks in four proximal phalanges	Right

Table 54. Cultural treatments given to wolf pups.

Wolves were buried as: 1) articulated and flayed corpses; 2) clusters of defleshed and disarticulated bones belonging to one specimen; 3) clusters of bones with similar morphology, but from different individuals, 4) scattered disarticulated bones and 5) bone artifacts. Of these I would like to focus on the five articulated pups, as well as some segments mainly corresponding to articulated portions of the spine.

Mexica priests deposited 41 clusters of ribs. These are composed of 3 (3), 4 (1), 5 (1), 7 (1), 8 (2), 9 (3), 10 (1), 11 (1), 12 (5), 13 (7), 14 (3), 15 (1), 16 (1), 17 (1), 18 (1), 19 (2), 21 (2), 22 (1) and 25 (4) ribs. Most clusters are composed of bones from one or two wolves, although sometimes these also contained puma and jaguar bones.

d) Wolves and sacrifice

This ritual deposit proves the importance of wolf sacrifice in Mexica ceremonies. However, the importance of wolves in has been underestimated in early written sources. First, there is controversy on the name of these animals (*cuetlachtli*), which I discuss in detail in another paper (Chávez Balderas et al., in press). The name "cuetlachtli" was associated with other animals by Sahagún. This confusion might derive from his informants or from the fact that this name was used for other animals whose pelts were exploited, as this word makes reference to hides. The Spaniards knew wolves perfectly well and, in fact, used them to describe coyotes, which were unknown to them. Other historical sources clearly identify the wolf as *cuetlachtli* (*Relación de Tezcoco,* Pomar 1986, Alvarado Tezozómoc 1949, 17; Hernández 1959).

Although wolves are mentioned in myths, they are absent in iconography, unlike coyotes, which are abundant. In this regard, I would like to draw attention to the work of Navarrete Flores and colleagues (2014) who, from a biological perspective, analyze numerous representations of canines in Mesoamerican art. The authors conclude that images of wolves have been misinterpreted and minimized by many authors who have confused them with coyotes. This is due to the great resemblance between the two species and the little interest that the chroniclers showed in the wolves, which resulted in few mentions of the species. In contrast, wolves are central to sacrificial myths (see Chapter 3 on the *Leyenda de los Soles* 1945: 122-125).

Another interesting aspect is the relationship between wolves and the god Huehuecóyotl, explored by Velázquez (2000) almost two decades ago, who analyzed the attire of one of the wolves found in Offering H, concluding that the animal wear a pectoral

oyohualli, characteristic of this deity; in addition, this animal was surrounded with musical instruments, which is consistent with the representation of this musician god. This leads him to propose that the ancient nahuas possibly did not make a difference between the two species, as modern biology does. This idea would be supported by the glosses of folio 10v of *Codex Telleriano Remensis* (1995) where it is mentioned that "the year of the rabbit the first man fasting, is called Huehuecóyotl as the old wolf. However, there is no evidence that in Offering 126 wolves were representing this god.

Wolves were important either for their role in the sacrificial myths or for their links with the deities. For this reason 28 specimens, females and males of different ages, were placed inside this ritual deposit. They were not sacrificed at the same time, as they were in different states of decomposition when they were buried. For example, some bones were disarticulated by decomposition; in contrast, pups apparently had died right before the offering was set, which helped to determine that it was deposited at the beginning of the rainy season. The number of wolves in the offering, along with results of the isotopic analysis and the diseases suffered by some specimens, suggest that many were probably kept in captivity. Future studies will help to test this hypothesis.

Two specimens were shot with arrows, which may indicate how they were sacrificed. It is possible that the pups died due to illness, as today it is common for entire litters to die from ailments such as pneumonia that are accentuated with the arrival of the rains. It is not known how the rest of the wolves died, although it is difficult to imagine that they suffered natural deaths, since they are wild animals. As I previously discussed in the case of exotic fauna, hunting and sacrifice are two concepts that are clearly intertwined.

In any case wolves were subjected to standardized posthumous treatments in order to obtain their skins, which indicates a local industry of pelt acquisition and processing. It is interesting to note that the skins of these specimens had not been previously reported in other offerings. This may be due to one of two reasons: It is possible that pelts from these canids were not used in the Templo Mayor but in other areas of the Sacred Precinct, or that their use was popular only during the rule of Ahuítzotl, the period to which Offering 126 corresponds. In fact this ritual deposit is exceptional because of the large number of wolves, which makes them the most numerous carnivorous mammal in the Sacred Precinct to date.

Other Mammals: Rabbit and Mice

In addition to felids and wolves, two mammal species were found inside this deposit: rabbits (*Sylvilagus floridanus*) and mice (*Peromyscus maniculatus*). The first is only represented by one calcaneus with defleshing marks. It is hard to tell is this species was deliberately buried in the ritual deposit or of it was commingled with other bones and unnoticed by the priests. Of the mice, 21 bones correspond to two specimens that show no visible cultural treatments. Most likely these mice were intrusive fauna, as has been documented in other deposits. No data could be recorded for biological profile analysis or taphonomic information.

Birds of prey

Birds of prey are unique animals of incomparable beauty, power and strength, which is why they had great symbolic importance among the Mexica. They were represented in

sculptures, paintings and ceramics; in addition, birds of prey were offered in rituals (Chávez Balderas and Elizalde 2017). Five species of raptors were buried inside this offering. These correspond to families Accipitridae, Falconidae and Strigidae. The first two are diurnal hunters, while the third is nocturnal.

From the Accipitridae family, golden eagles (*Aquila chrysaetos*), roadside hawks (*Rupornis magnirostris*) and red-tailed hawks (*Buteo jamaicensis*) were buried in this offering. The Falconidae family is represented by two American kestrel *(Falco sparverius*), while the Strigidae are represented by a great horned owl (*Bubo virginianus*). All these families have reverse sexual dimorphism, which means that females are considerable larger in size than males.

- Eagles and hawks (Accipitridae)

This family corresponds to diurnal birds with hooked claws and beaks that feed mainly on small mammals, birds, reptiles and insects (Peterson and Chalif 1973)

Roadside hawks (*Rupornis magnirostris*) are grayish-brown, relatively small birds, distributed from Jalisco and Tamaulipas to the south, including the Yucatán Peninsula. They inhabit lower elevations, open woods, savannas and roadsides, as they easily adapt to different ecosystems. Red-tailed hawks (*Buteo jamaicensis*) are distributed in almost all of Mexico with the exception of the Yucatán Peninsula. Adults have a reddish tail. They are found in wooded areas, deserts, grasslands, and in rural and urban settings (Peterson and Chalif 2008; Perrins 2011).

Golden eagles (*Aquila chrysaetos*) are distributed from the north of Mexico to Central Highlands; they are one of the biggest raptors in Mexico, and can weigh 6 kg and

have a wingspan up to 2.20 meters. When they reach adulthood their feathers acquire a yellowish brown color which in the sun gives them a golden aspect (Peterson and Chalif 2008; Eccardi 2010:22, Perrins 2011). Thanks to historical sources it is known that eagle chicks were captured by experts and were kept in captivity with the best possible care (Chávez Balderas and Elizalde 2017). This has also been confirmed by archaeological evidence (Elizalde 2017).

The Accipitridae family is represented by 216 bones corresponding to at least seven individuals. Golden eagles are the best represented and most abundant (table 55).

Species	**Bones**	**MNI**
Buteo jamaicensis	2	1
Rupornis magnirostris	1	1
Aquila chrysaetos	213	5

Table 55. Specimens from the Accipitridae family. *Buteo jamaiciensis* and *Rupornis magnirostris* were identified by biologist Montserrat Mejía, from INAH.

Regarding their distribution, the 16th Century *Relaciones Geográficas* includes some mention of birds of prey, but there is no information on which species they might correspond to. They are listed for the state of Mexico, Puebla, Oaxaca, Guerrero, Veracruz, Hidalgo, as well as for Guatemala.

Roadside hawks (*Rupornis magnirostris*) are only represented by one tarsometatarsal with disarticulation cut marks, while read-tailed hawks correspond to two radii from the same specimen, with defleshing and disarticulating cut marks. No additional data could be obtained from these bones. In contrast Golden eagles were very informative.

A MNI of five was calculated from 213 bones. From these, 128 bones were individualized (figure 260).

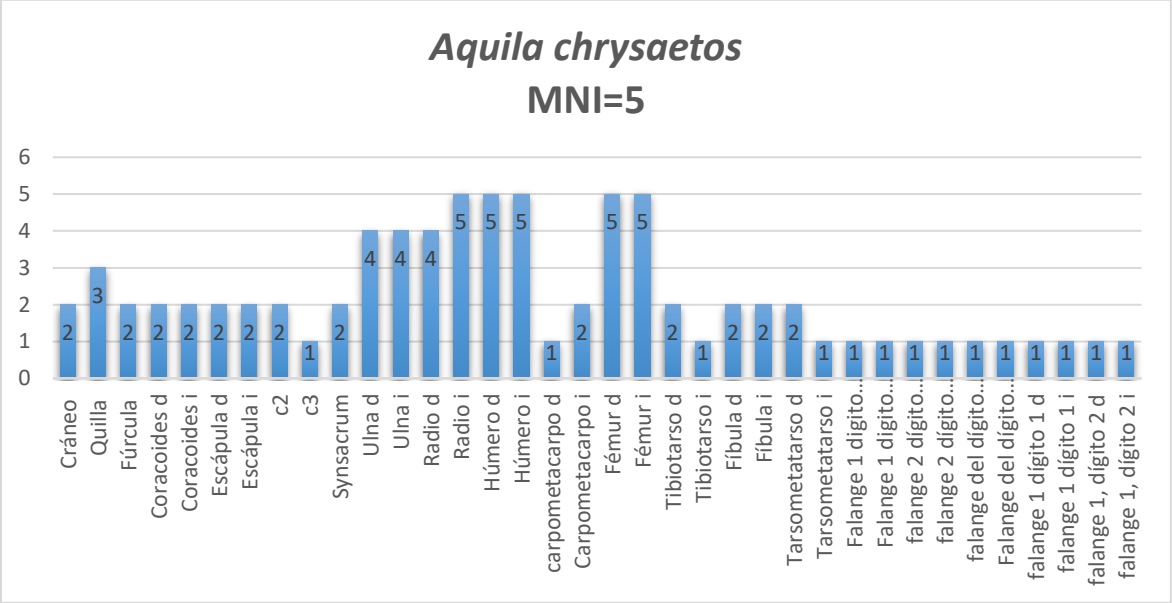


Figure 260. MNI determination. Golden eagle, Offering 126.

1) Biological profile

Although eagle skeletons are incomplete, it is clear that both females and males are present. The first are considerable bigger due to reversed sexual dimorphism. All specimens correspond to adults, although of unknown ages.

In general terms bone health conditions are good. Only one sternal rib presented a fracture. As for infectious processes the most distinctive case is the proximal end of a femur that lacks the head and has a circular canal instead (figure 261). This is a case of osteomyelitis, as there is infection of the medullary canal. The loss of the femoral head and its dislocation from the pelvis are possible indicators of captivity, as limbs have to be healthy for hunting; this type of lesion jeopardizes the survival of the bird. Without human

care, this bird would have been condemned to an early death.

Figure 261. Golden eagle femur. It lacks a femoral head and it has a circular canal (a cloaca) in its place. In addition, there is both new and necrotic bone (*involucrum* and *secuestrum*) in the surrounding area.

2) Sacrificial and posthumous treatments

Despite of the lack of biological information for these birds, they provide important data concerning sacrifice and posthumous treatments. One of the eagles has two lesions consistent with projectile points: the first goes through the keel and the other crossed the furculum (wishbone) on the left side. The latter shows the direction of the force: the shooter was much lower than the animal as the direction of the projectile is lower-superior and lateral-medial. This implies that the bird may have been perched when it was shot down. The keel also has fractures in the lower edge that might correspond to posthumous treatments (figure 262). There is no bone response, which implies that it did not survive. These perimortem lesions might be linked to hunting of a wild bird or to sacrifice if it was confined. In any case both categories (sacrifice and hunting) were intertwined for the Mexica, as previously discussed. Further isotope analysis will help to elucidate this issue.

Figure 262. A projectile point injury to the keel and the inferior part of furculum of a golden eagle. Photograph by Ximena Chávez Balderas.

A second specimen has numerous marks on the inner surface of the keel; they are repetitive and longitudinal (Figure 263). There are no muscles or articulations in these areas, so these are not defleshing or disarticulation marks. It is possible that these are scraping marks to remove periosteum, in which case it is striking that they are all elongated and oriented to the same direction. Another possibility is that these are marks corresponding to heart extraction, by the abdominal access technique, using the bone as a cutting surface. Although this is a possibility, the direction in which one would expect to find these cuts would be transverse, not longitudinal. Whatever the case, heart extraction in birds has been documented in historical sources, as I discussed in Chapter 4.

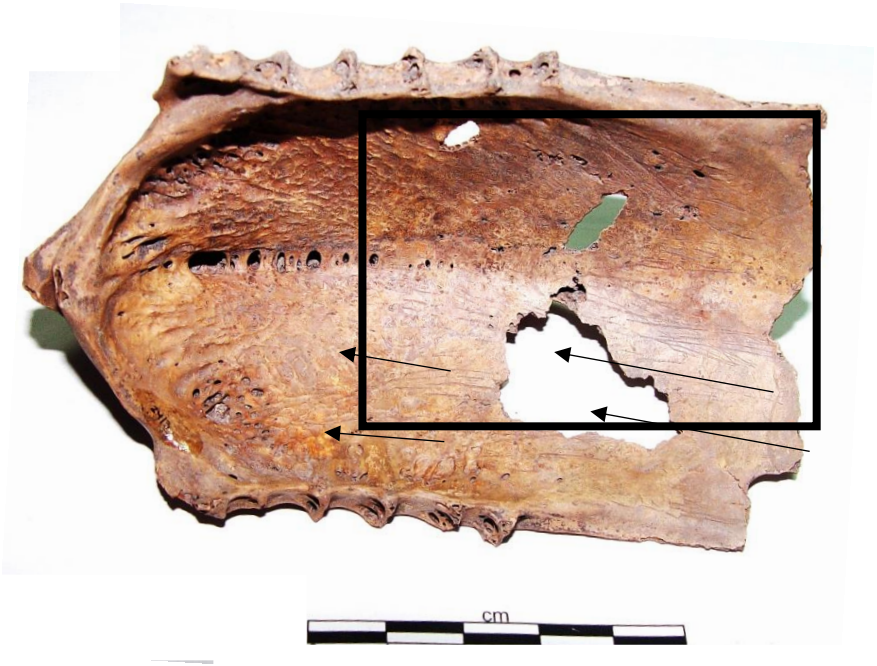


Figure 263. Cut marks on the keel's inner surface. Area where they tend to concentrate and direction in which they were made. Photograph by Ximena Chávez Balderas.

One of the golden eagles was sacrificed shortly before the consecration of the Tlaltecuhtli monolith. Although it was deposited incomplete, its thorax and abdomen were found in anatomical connection. In addition, close to the eastern wall of the offering, both lower extremities from an eagle were found articulated. These may correspond to the same individual. On top of these limbs the priest buried 45 disarticulated bones from the legs of at least two additional eagles.

Ninety-five of the bones have marks indicating flaying, defleshing and disarticulation, treatments that are consistent with the preparation of their pelts. No specimen was deposited complete and all presented some kind of posthumous manipulation. Eagle pelts

could be manufactured using different techniques: in some cases they were deposited with the lower extremities, in others they were removed; sometimes they were left with long bones on the wings or just the phalanges. In all cases the organs and bones of the axial skeleton were removed to avoid decomposition (Quezada et al. 2010 and Argüelles in press).

- Falcons (Falconidae)

This is the second largest group of birds of prey. However, the American kestrel (sparrow hawk) is the smallest raptor in the American continent, distributed from Baja California to Guerrero and Chiapas. Commonly they are perch, awaiting their prey, although they can hunt in the air. Only 19 bones were recovered from this species: five from the skull and the rest from postcranial skeleton. According to Morales Mejía (2016), they correspond to two specimens and at least one of them was prepared to be deposited in the offering (disarticulated and defleshed).

- Owls (Strigidae)

Great horned owls are large and characterized by having feathers that resemble "ears". They are distributed throughout Mexico, although they are rare in the Yucatán Peninsula. They can adapt to different ecosystems and are therefore very successful. Owls are difficult to observe because they are nocturnal, which is why they were associated with death and the underworld; in addition, their plumage camouflages them. Their main prey are small mammals. Four great horned owls were found inside Offering 126 and all could be individualized (table 56).

Specimen	Bones
Owl 1	56
Owl 2	52
Owl 3	67
Owl 4	83

Table 56. MNI, Great horned owls (*Bubo virginianus*).

All birds analyzed for this dissertation were adults with the exception of two juvenile owls. Sex was not determined as their skeletons are incomplete. One owl has a phalanx fracture and another has subperiosteal bone growth (in the process of healing at the time of death), on the left femur and tibiotarsus. Only 10 bones have cut marks, although all four specimens received posthumous treatments as they lack claws and the anterior part of the skull.

Diurnal raptors were associated to the sun and to Huitzilopochtli, god of war. As I mentioned before these birds were highly esteemed for sacrifice, as they were central to myths and they were some of the first animals to be sacrificed (*Leyenda de los Soles* 1945: 122-125). Of these birds, eagles were one of the most important animals and not only for the Mexica, as their sacredness extended to all of Mesoamerica. For the Mexica they were symbols of the power of the empire, of their pilgrimage, rulers, war and sacrifice (Garza 2001). For this reason, it is not surprising that they are one of species of vertebrates best represented in the ritual contexts of the Sacred Precinct with 49 specimens discovered to date (Elizalde, personal communication, March 2019).

Quail (Calliplepla squamata)

According to historical sources quail were the most frequently sacrificed birds. As I mentioned in Chapter 3, they could be offered in domestic spaces, but they were also

sacrificed by the ruler himself. Apparently they were easy to obtain, to keep captive and to sacrifice. Two specimens of scaled quail (*Calliplepa squamata*) (Morales Mejía 2016) were deposited in Offering 126. These birds have white feathers that appear to be a crest. They are white with black, with a scaled appearance, and currently are distributed from Sonora to Central Mexico, in grasslands and arid or shrub regions (Peterson and Chalif 2008). The quail found in this offering comprise a total of 87 bones that do not show marks of posthumous modifications. Most of them were found associated with a vessel, on a different excavation level, but no map was made of their distribution, so it is difficult to have conclusive data on these animals. It is likely that they were deposited incomplete.

Offering 126 and animal sacrifice

This ritual deposit is one of the most important for understanding animal sacrifice, as well as posthumous treatments and the practice of storing bones awaiting for the occasion to bury them. This offering combines primary and secondary burials[459] of animals that were sacrificed on different occasions but were deposited in the same ceremony and in different states of decomposition.

Type of burial	Primary and secondary
Original space	Empty (with sediment infiltration)
Type of deposit	Simultaneous (all bones buried in the same event; animals died on different occasions).
Natural biostratinomic processes	Passive disarticulation (by decomposition)
Natural and diagenetic taphonomic processes associated with burial	Fractures, stains and adhering undetermined residues

Table 57. Deposit of animal bones, Offering 126.

[459] Primary burials decomposed in situ; secondary burials decomposed on a different placed (Duday 1997).

Although the skeletons are incomplete and mixed, I was able to obtain some data regarding the biological profile of these animals. The priests buried females and males in this deposit. The age ranges could not be calculated with accuracy, but it is remarkable that approximately half of them were killed at a young age (juveniles and young adults). However, most of the juveniles had almost reached their adult size. Health conditions of most specimens appear to have been good. Some presented antemortem fractures, most located in ribs and limbs that did not affect their quality of life.

A large number of the injuries documented on these animals were not incapacitating. However, two jaguars suffered from infectious and articular disease, chronic and severe, affecting locomotion and hunting capacity. For this reason I believe that they were captive specimens. Captivity permitted Mexica rulers to have animals available all year round for rituals and as raw material for pelts and other objects (Elizalde 2017: 180), without having to hunt them as many of them are elusive. Future isotope analyses might help to understand what percentage corresponds to wild caught/killed animals and how many are consistent with captivity.

It can be assumed that the species that compose this deposit were chosen for their symbolic importance, which may also have determined the sacrificial technique. Heart extraction has been only documented for jaguars and possibly for an eagle. Instead, arrow shooting was observed in wolves and an eagle. Posthumous treatments are quite standardized and there is direct evidence of pelt preparation for all individuals except for bobcats. This evidence consists of flaying, defleshing and disarticulation marks, as well as the absence of distal phalanges (claws) and the anterior part of the skull. It is possible that

the skins of bobcats were also prepared, but as priests only deposited their long bones it is not possible to prove this.

Bone marks corresponding to posthumous treatments were documented in a total of 4178 bones. Of these 4151 correspond to sharp force, 240 to blunt force, 41 combine blunt and sharp force and 178 present another type of treatment, among which boiling is the most common. It is important to point out that the same bone usually combines more than one type of cultural alterations. Although in more than half of the bones there were no marks, this does not imply that the specimens were not prepared, as previously discussed.

What did the priests do with the flesh obtained from these animals? I consider it unlikely that meat was discarded due to the important symbolism of each species. For the same reason, bones corresponding to manufacturing debris were not thrown away either. It is possible that their flesh was used in ritual feasts or to feed other specimens, as discussed in Chapter 5.

There are two types of disarticulation cut marks: the first disarticulated bones that would remain attached to pelts and the second was used to obtain body parts or to facilitate corpse handling. As for the first, most of the cut marks are found in intermediate phalanges to leave the claws adhered to the skins. In historical sources there is also evidence of this technique as there are numerous pictographs where skins appear preserving claws and the anterior part of the skulls (Figure 264). Bone evidence suggest the existence of a strong local pelt industry. While many were obtained by tribute, a large number were processed in Tenochtitlan. The bones discarded were kept, awaiting to be reutilized.

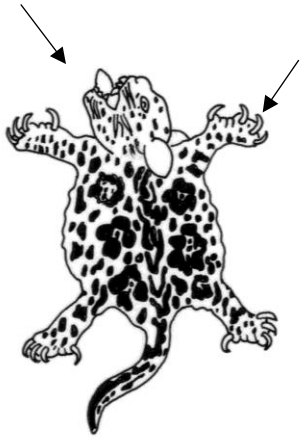


Figure 264. A jaguar skin preserves the claws and the anterior part of the skull. *Codex Magliabechi*, 1996: 68r.

Regarding pelt preparation, it is necessary to question whether these animals were considered only as raw material. More likely, given the fact that they correspond to exotic species of undeniable symbolic importance, their death was highly ritualized. In other offerings the same species were dressed and buried (López Luján et al 2014). In addition, heart extraction and arrow shooting suggest that these were ritual acts that went beyond the pelt industry. Heart extraction was the most important type of immolation according to historical sources. In contrast, arrow shooting may evoke a mythical hunt. In other words, all lines of evidence indicate that these deaths were ritual acts and did not simply function for the acquisition of raw material.

Most of the corpses of these animals were defleshed to obtain a skeletal appearance. Body parts and bones apparently were stored, and many became disarticulated as a result of decomposition. Some specimens did not pass through this hypothetical storage, as they were deposited soon after death. Such is the case of 11 individuals: five wolves, four owls,

a golden eagle and an ocelot. The remaining individuals died weeks, months and even years before the ritual as suggested by the different decomposition stages in which they were deposited. In sum, all bone debris resulting from the pelt preparation was carefully stored in a sort of warehouse until the ritual consecration of the monolith of the goddess Tlaltecuhtli.

Once the ceremony began, bone remains were carefully arranged. First, the priests deposited the articulated five seven-week-old wolf pups. These animals are only born in the months of April and May, so the offering was deposited near the summer solstice or the arrival of the rains. Then, the priest placed a set of eagle bones, including the articulated lower extremities of one of these birds. They also placed two articulated paws of an ocelot. Then they covered the entire floor of the stone box with the smallest bones. Later they buried sets of bones (ribs, vertebrae, metapodials, phalanges and long bones). At the same time they placed the remains of an eagle and four owls, which were incomplete but articulated. On top of this they placed some still articulated spines. After burying this skeletonized layer, the priests proceeded to place marine organisms that symbolized the aquatic level of the cosmos.

From the analysis I classified the remains into seven categories, according to the way they were deposited by the priests: 1) articulated and flayed corpses; 2) articulated and defleshed anatomical segments; 3) clusters of defleshed and disarticulated bones, belonging to one specimen; 4) clusters of bones with similar morphology, but from

different individuals; 5) bones from different parts of the body, simulating to be articulated; 6) scattered disarticulated bones; and 7) bone artifacts.[460]

Offering 126 is an unparalleled ritual deposit in Mesoamerica in terms of its biological wealth. It not only stands out for the diversity of organisms, both vertebrates and invertebrates, but also for the large number of specimens and the difficulties that would be inherent in obtaining these animals and keeping them captive. The time of year in which this ceremony took place (June or July) must have been an ideal moment to consecrate the monolith of the telluric goddess, who devoured corpses and in exchange gave sustenance and life.

I consider Offering 126 to be a cosmogram -a model of the cosmos in miniature- (López Luján 1993). Under this premise, the dense layer of defleshed bones would evoke the underworld. Similarly, the dense layer of aquatic organisms composed of the remains of fish, bivalves, gastropods, corals, sea urchins and starfish, among others, represented the aquatic level, a symbolism that is repeated in almost all offerings at the Templo Mayor. The floating land was represented by the rostral cartilage of a sawfish.

The Mictlan, the underworld, was considered as a dark place, without windows and "without holes for the exit of smoke" (López Austin 2004: 381-382). Although there is no evidence of animal remains in this site, it is known that it was considered the place where bones were kept. In the *Leyenda de los Soles* (1945), Quetzalcóatl descended to the underworld to steal the matter with which he would create humanity: bones. In the words of Patrick Johansson (1997), this myth proves that pre-Hispanic cultures thought that

[460] Corresponding to bloodletting instruments currently under analysis.

existence arises from death, where bones can be equated to seeds. As I have previously mentioned (Chávez Balderas et al. 2011, González López et al. 2012), this level of bones could evoke the underworld or the crop-warehouse of Monte Sagrado, which treasured the wealth of the subterranean world (López Austin 1994). According to López Austin and López Luján (2009), the house of the dead has the shape of the cave of Monte Sagrado, iconographically speaking: a reptilian monster. According to González López and collaborators (2012) the zoomorphic relief of Tlaltecuhtli, which was part of one of the floors associated to the offering, could allude to this reptile. In sum, most likely all these animals had a ritualized death and later their corpses were processed to make pelts and bloodletting instruments. Debris resulting from this process was stored awaiting the propitious moment to consecrate the monolith of the goddess Tlaltecuhlti, where bones functioned as a dense skeletonized layer that evoked the underworld within this mythical three-dimensional landscape.

Concluding remarks

Ritual death is a controversial topic characterized by substantial disagreements. It has even been suggested by some scholars that the word "sacrifice" should not be used to describe ritual killing, as it represents the colonialist justification for dominating native populations. The Mexica themselves, other native populations of Mexico, mestizos and, particularly Spanish chroniclers, laid the foundations for the creation of this negative stereotype that has accompanied the "Aztecs" through the centuries.

Independently from academic and popular debates this practice existed among the Mexica and it was clearly associated with complex rituals and ceremonial architecture; thus these killings cannot be considered as executions or, in the case of animals, as subsistence hunting. Following the definition of sacrifice as the destruction of a victim to transform it into something sacred or to establish a link with the supernatural realm, the skeletal remains analyzed for this dissertation clearly belong to this category. The places where the immolation was carried out and where the remains were deposited are key to distinguish sacrifice from other practices. In this case ritual killing was done at the foot of the Sacred Mountain - Templo Mayor-, and in other spaces of primary ritual importance. The Mexica are not equal to sacrifice, as this practice was only a ritual component of religious life.

The link of this practice to the sacred sphere and its different functions can be found in Nahuatl words for victims: "payments" (*nextlahualtin*), "images" (*teteo imixiptlahuan* or *ixiptlahuan*), "beds of the gods" (*pepechtin*) and "skin owners" (*xipeme*) (López Austin 1996:433-435). In addition, the Mexica distinguished between two types of death:

tlalmiquiztli and *tlacamictliliztli*, natural and ritual death. According to López Austin (personal communication, April 2019), *tlalmiquiztli* can be translated as "to die for terrestrial motives", alluding to common death caused by the gods of the underworld. In contrast *tlacamictiliztli* means "to kill people", but it is used with a ritual connotation, not to refer to war executions.

The offering of life involved a complexity that was not noted by historical sources as it included all kinds of living beings and most likely objects that were thought to be charged with life. It was done in sacred spaces with standardized procedures, carried out periodically or on exceptional occasions (funerals, accessions to the throne, famines, etc.). Some decades ago it was believed that most of the victims were warriors and that they were killed to feed the sun and to guarantee the continuity of the universe. The most extreme positions even suggested that war was waged exclusively to obtain sacrificial victims and that their bodies were cannibalized as the Mesoamerican diet did not provide sufficient protein. These creative but flawed scenarios have been discounted through the systematic evaluation of historical sources and bone remains.

The work of numerous researchers, including González Torres, Graulich, Carrasco and Dehouve (see Chapter 2), has revealed that ritual death is a polysemic phenomenon. It was carried out for different reasons that could be combined in the same ceremony as "sacrifice consists of superimposed layers of meanings" (Graulich 2000:371). Sacrifice could be performed to obtain benefits, to pay for favors, to consecrate temples or monuments, to ask for forgiveness, as expiation, to feed a supernatural entity, to transfer energy and to renew a particular deity. Archaeological evidence suggests that most likely oblation, expiation, divinity, consecration, termination, and retainers' sacrifices were

performed in the Sacred Precinct of Tenochtitlan, involving both human and animal victims. In addition to these functions, ritual killing had additional functions, such as to instill fear in enemies and competing polities and to acquire social status through bravery on the battlefield and the taking of captives, among other motivations.

Historical sources provide information on sacrificial actors, places and instruments. Although many of the chroniclers were not eyewitnesses, their narratives coincide in many aspects with the available material evidence. As for sacrifiers they are practically invisible in the archaeological record. They selected the victims, but their motives are unknown. Sacrificers are visible through the techniques they used to kill victims—human or animal—and because of the way in which they prepared the corpses. Most likely they were priests with detailed anatomical knowledge and experience, specialized in conducting these rituals in the most expeditious way.

There is no doubt that the victim provides most of the information available in the archaeological record. They represent a unique opportunity to identify biological profiles, to understand sacrificial techniques and posthumous treatments. For this dissertation, I analyzed both human and animal victims, as comparative study provides a more comprehensive view of the offering of life.

The biological profiles of human and animal victims are quite interesting. Skeletal remains revealed that while most of human victims are male, females and children were also sacrificed. Most victims were between the ages of 15 and 30 years. In terms of health as can be identified in skeletal remains, those from Offering 141 present a bone irritation at bregma that suggests that they had a scalp injury, an infection, or that they carried a load or an object on this part of their heads. Three have morphological variants in their superior

right lateral incisors which might not be simple coincidence. Possibly they were selected for this feature, but there is not enough information to prove it. The provenance of human victims reveals complexity in terms of the mobility of the populations in the Late Postclassic and confirms that the victims were not captured in distant locations and brought immediately for sacrifice. From the analyzed sample four of them are from local origin to the Basin of Mexico (although not necessarily Mexica) and remained in this place until their sacrifice. Three of them have a non-local origin, but interestingly were long-term residents of the Tenochtitlan area. They could be slaves acquired in remote regions, individuals collected as tribute, civil prisoners or even enemy warriors who were assimilated by the city of Tenochtitlan. They could also be donations or criminals, but these sources seem to be secondary. In any case they resided many years in the region before being sacrificed. The two children analyzed were natives of the Basin of Mexico, and spent practically all their lives in this area. It is not known if they were born in this place or if their mother spent the pregnancy in another locality, since the analysis of their teeth is still in process. The female found in Offering 141 stands out, because she was born in Basin of Mexico, migrated to another region and then returned to Tenochtitlan before her sacrifice.

Profiles of animal victims are equally interesting. They are noteworthy both for their biological diversity and for being exotic animals. In Offering 126, four species of felids were recovered. As was discussed in Chapter 7, there may have been an equivalence for the Mexica of jaguars and pumas due to the fact that they both have spots as juveniles. This is suggested by the fact that most of the sacrificed pumas are juveniles or young adults. Undoubtedly, the most unexpected aspect of the field season was the large number of wolves, which makes this mammal the most abundant in the Sacred Precinct so far. The

lack of attention given to wolves in early historic accounts appears to be because they did not attract the attention of the Spaniards who were familiar to the Iberian wolf. Also these canids seem to have been mistaken for coyotes in historical sources. Five species of birds of prey were recovered, four of them of diurnal symbolism and one linked to the underworld, night and darkness. The original symbolism of these animals was transformed when they were buried skeletonized, alluding to the underworld in the cosmic levels represented in the offering.

Some of these animals have evidence of being held in captivity. This is confirmed by isotope analysis and the existence of disabling diseases. Animals could have come from the Tenochtitlan vivarium, which allowed the Mexica rulers to have animals available for ceremonies throughout the year (Elizalde 2017). In particular the age of the wolves and their season of birth confirm that this offering was consecrated to the monolith near the summer solstice or the arrival of the rains, appropriate for a goddess related to fertility, life and death. Animal victims could be obtained through hunting, tribute, trade, as gifts, or from captivity and breeding. They were not domestic animals, but rather exotic specimens with a symbolism linked to deities and myths.

Animal sacrifice was not invented by the Mexica either. It has been documented for different sites in the Maya area (see Götz and Emery 2014). Exotic animals were sacrificed in Teotihuacan and extraordinary coincidences can be noted in terms of management, sacrifice and body treatments (Sugiyama et al. 2013). Similarly, the Teotihuacanos used animals as sacrificial victims and as raw material to elaborate luxury goods, inspired by the symbolism of the species. As Sugiyama (2014) suggests, these animals were not those from the landscape surrounding the city, but were reserved for the State; they corresponded

to felids, wolves, eagles and rattlesnakes. Although a greater diversity of fauna has been found in Tenochtitlan, these same species are the most recurrent in the ritual contexts of the Sacred Precinct.

Another similarity is that these animals were held captive, which implies a complex management of fauna achieved by the Teotihuacanos a millennium before the Mexica. In addition to the techniques for capturing and confining animals, sacrificial and posthumous treatments are similar, although differences can be noted. For example, in Tenochtitlan, animal heads were not dedicated. I agree with Sugiyama (2014) on the link between these animals and the concept of the sacred mountain. As I previously discussed, the Templo Mayor symbolized the sacred mountain, which contained natural wealth (López Austin and López Luján 2009: 308). This was true on a symbolic level, but it was also materialized by depositing the remains of the victims inside the temple.

How were they killed? To answer this question I evaluated historical sources and physical evidence. First of all it is necessary to consider that there are three types of treatments: pre-sacrificial torture, sacrifice and posthumous modifications. Secondly, it must be kept in mind that not all forms of death leave marks in bones.

Exposure to fire can be considered as a torture as there is no evidence that this was a sacrificial technique. In contrast, throwing victims' bodies from heights would be, according to most historical sources, a posthumous treatment. There is also the possibility that it was a sacrificial technique, but there is no conclusive evidence from the Sacred Precinct. The only case that can be linked to falls corresponds to a wolf with costal fractures, but it is unknown whether it was an accident shortly before death or a consequence of the handling of the corpse.

According to historical sources, arrow shooting could mark either torture or sacrifice. Hunting and sacrifice are two concepts that are intertwined, both for humans and animals. In this study osteological evidence was only observed in animals: two wolves and an eagle. These could represent wounds incurred in hunting or in captivity, in a highly ritualized act. Future isotopy studies will help to elucidate this issue. No evidence of arrow wounds were found in human remains, although it should be noted that most post-cranial skeletons were taken outside the Sacred Precinct and were not a focus of my research.

Blunt force trauma to the head is another sacrificial technique mentioned by historical sources. While it could be argued that these injuries correspond to war wounds, I must point out that they have been found in three females, a male and a wolf. All these individuals were buried in rich offerings, linking them to a ritual act. In all cases there is a single and severe blow to the head, which is not consistent with multiple injuries that would be expected in lapidation (stoning).

Heart extraction would seem to be the most important sacrificial technique according to historical sources, although there is little osteological evidence to confirm this, since the bodies of victims were taken out of Tenochtitlan. However, I documented five cases suggesting heart removal in two human victims and three animals. Two correspond to primary burials while the others received complex posthumous treatments. The technique consisted in cutting the abdomen to slide the hand inside the chest and to cut veins and arteries.

There is no convincing evidence of slitting of the throat, either because this procedure left no traces (which is feasible if done laterally) or because the victims were beheaded. In the latter case it is not possible to evaluate whether the individual was

sacrificed by slitting of the throat and then decapitated or if they were killed using another technique. None of the animals analyzed has evidence of these procedures. Other possible sacrificial techniques such as starvation or drowning do not leave evidence in the bones.

Ritual death could be a massive act, a dramatic performance conveying a powerful message to the attendees. It was also possible for some acts to be private (with no witnesses), but no less theatrical. Despite the fact that there is not much direct evidence of the sacrificial techniques, patterns of selection of victims and the way in which their bodies were treated and placed in offering contexts indicates that they do not correspond to natural deaths or executions.

Unlike sacrificial techniques, posthumous treatments left countless marks in the bones recovered in the Sacred Precinct. These correspond to highly standardized procedures that were used on both humans and animals. One of the most important was flaying. Bone evidence proves that human and animal skins were obtained leaving cut marks in areas where muscles are thin. As for humans, it was possible to document a technique that had not been noted before. The skin of the head could be separated by one of two incisions: the first is longitudinal and the second is transverse. This procedure that involves a transverse cut has only been observed for skulls from Stage VI corresponding to the government of Ahuítzotl (AD 1486-1502). This difference may correspond to a technical innovation or to a particular ritual need in order to recover the skin of the face. On the other hand, most of the animals recovered in Offering 126 were flayed. This is confirmed by the cut marks and the absence of distal phalanges and the anterior part of the skull which remained adhered to the skin.

Direct and indirect thermal alteration were common posthumous treatments. The first was carried out during the burial of bone remains where fire was set or incandescent material was thrown into the offering as a possible purification ritual for both human and animal remains. In addition, numerous fragments of dry bones were cremated prior to being buried in Offering 123. In this deposit bones seem to be part of a mythical discourse in which they accompany a supernatural being that represents a bundle that will be cremated. Cremains may reiterate the importance of fire. In addition, in the construction fills cremated fragments were deposited as part of consecration or termination rituals. Some were cremated dry and others when bones were still fresh. Indirect fire exposure refers to evidence of boiling. This could have been carried out to clean the bones as all were defleshed. I do not rule out that this also could have been related to consumption. However, there are no direct indicators as there is no association with culinary spices like those reported by Trujillo Mederos and colleagues for Tlatecomila (2015).

Defleshing is one of the most common posthumous treatments, documented for both human and animal victims. Muscles were removed to obtain a skeletal appearance, avoiding decomposition. It is likely that the meat was utilized, but it is unknown whether it was consumed by humans or animals, or used in other rituals. Almost half of the bones analyzed for this dissertation have defleshing cut marks. Another treatment commonly found in bones is disarticulation. This was done to obtain more manageable body parts or segments needed for a specific ritual. Disarticulation of cervical region of the neck in order to obtain the head from human victims was the most common procedure. In the case of animals, the most common type of disarticulation was done to separate distal and intermediate phalanges when preparing pelts. Other posthumous treatments documented

are scraping to remove periosteum and perforations to keep the bones "articulated", to suspend them, or to attach hair or ornaments to them.

Decapitation was a recurrent treatment for human victims. Almost all were decapitated. The heads were preserved in the Sacred Precinct, to be deposited with soft tissues in consecration offerings or alternatively to undergo complex treatments to be displayed or reused. Most of the evidence of this treatment was found associated with the Ball Court, the Calmécac, the West Plaza, the Cuauhxicalco, Templo Mayor and, of course, the Huei Tzompantli. Severed heads used for consecration were not defleshed and were buried with articulated vertebrae, which were especially important to document decapitation techniques. My analysis indicates that this was done with the individual in supine position, in an anterior-posterior direction, sectioning the intervertebral discs by using sharp force or sharp/blunt force (chopping). In this dissertation I analyzed two decapitated children, whose feet and hands were also amputated. This treatment of children had not been previously documented in the Sacred Precinct.

Some of the skulls were reused. At first they were flayed and defleshed. Some have lateral perforations marking their prior display on the tzompantli, while others had a basal perforation that could have been used for individual exhibition. Skulls recovered in Offering 141 were removed from the site where they were exhibited painted to represent Mictlantecuhtli and Cihuacóatl. This identification was established from the analysis of their polychromy and associated objects, as they were exceptionally well-preserved. Their original symbolism was transformed with reuse and placement in this ritual deposit. The skull from Offering 151 is an exception, as it has a hole in the vault and small perforations, suggesting that it could have been used as a container, although not for liquids.

Undoubtedly one of the most interesting findings of the seventh field season were fragmentary human bones inside the construction fills. Such contexts may have been found in past decades, but were not systematically excavated or analyzed until now. These findings help to understand posthumous treatments such as the manufacture of tzompantli skulls, their reuse to elaborate the so-called skull masks, as well as the prolonged exhibition of skulls showing weathering and breakage. These fragments are not homogeneous as they correspond to 1) teeth; 2) tzompantli skulls manufacture debris; 3) skull masks manufacture debris; 4) cremated bones; 5) fragmentary skulls (5a) and post-cranial bones (5b); and 6) undetermined fragments. They were not obtained in the same sacrificial ritual as some of the bones are weathered; these materials are not secondary trash, as the dirt was clean lacking obsidian and ceramics. Bones were deposited in the Plaza, at least over on two different occasions, as suggested by the presence of a floor base that covered some of the fills.

It is relevant that regardless of their small size these fragments were kept for being used in ceremonies associated with the enlargement of the West Plaza or for termination rituals in other buildings. Most likely through the inclusion of these fragments in the constructions were thought to be infused with the symbolic qualities of these individuals. "Problematic deposits" (Tiesler 2007) such as these have been documented for other sites in Mesoamerica, suggesting that it was not only a uniquely Mexica tradition but that it would seem to have been taken to an extreme given the number of fragments and contexts in which they were deposited.

As for animal remains the analysis revealed that there was a large local pelt industry in Tenochtitlan. After sacrifice, meat, skins and some bones of these animals were

exploited; the rest of the skeleton was not discarded. Similar to human bone fragments, they were stored until reused for consecration and termination rituals. In Offering 126, bones were deposited in the same ceremony, but were obtained on different occasions as they were buried inside this deposit in different decomposition stages.

Human and animal victims help to understand ritual death from a unified perspective as all of them are part of the same phenomenon: the offering of life. There are concordances between the sacrificial techniques and some posthumous treatments given to both humans and animals, as well as the reuse of the debris resulting from these procedures. Life was the most precious gift dedicated to the supernatural world which is why even the smallest bone fragments were recovered.

While ritual killing was conducted at the Templo Mayor, but this clearly was not the place destined for burial of all skeletal remains. The area where almost all the human remains and a great amount of animal bones are concentrated is the West Plaza, as well as the buildings aligned with the Huitzilopochtli shrine, that is to say, linked to the warrior and solar aspects of the temple. Most likely processing of the bodies may have taken place in the West Plaza, but more evidence needs to be found to confirm this. The different states of decomposition shown by the remains skeletal remains found in the plaza suggest that it is possible that such processing was carried out in this area.

The complexity of sacrificial techniques and posthumous treatments is not fully reflected in historical sources, although there are important overlaps between the narratives and the osteological evidence. Hopefully it can be appreciated from this analysis the importance of establishing specialized field and laboratory methods and the participation of interdisciplinary teams in the study of Mexica sacrifice. Fortunately, time and resources

generously made available to carefully excavate and to analyze these remains by the Templo Mayor Project was key to obtaining these results. Excavations in the area continue and are showing potential for learning more about the offering of life by the Mexica.

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AGN/ Archivo General de la Nación
SEP- Secretaría de Educación Pública
UAT- Universidad Autónoma de Tlaxcala
CIESAS- Centro de Investigaciones y Estudios Superiores en Antropología Social
ENAH- Escuela Nacional de Antropología e Historia
INAH- Instituto Nacional de Antropología e Historia
UNAM- Universidad Nacional Autónoma de México
FCE-Fondo de Cultura Económica
INI- Instituto Nacional Indigenista
CEMCA Centro de Estudios Mexicanos y Centro Americanos
ASU-Arizona State University.
CONACULTA- Consejo Nacional para la Cultura y las Artes
IVEC-Instituto Veracruzano de Cultura

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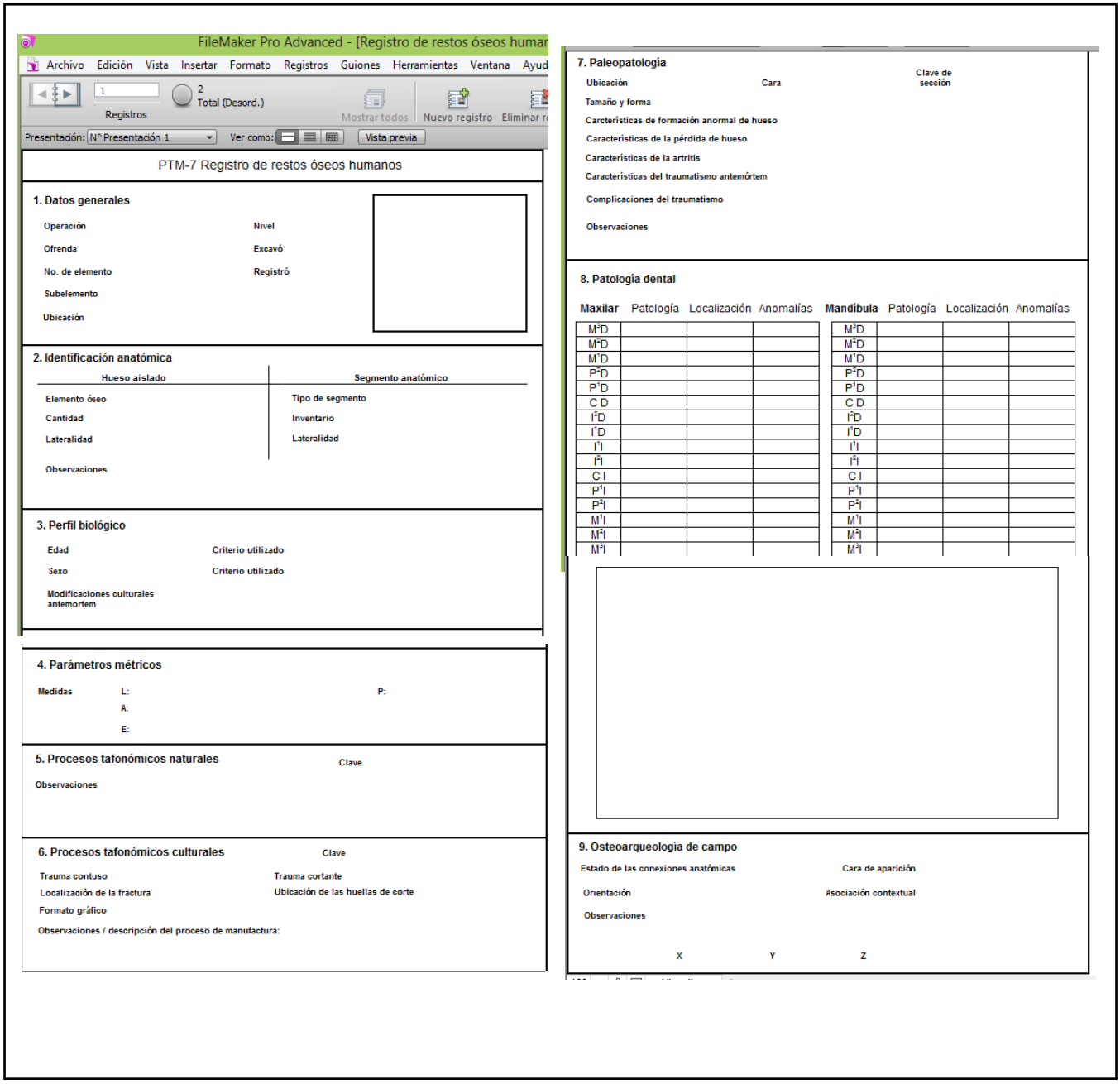
Appendix 1

Human remains

1. FileMaker database for human remains data collection
2. Codes for antemortem, perimortem and postmortem alterations utilized on databases
3. Landmarks for calculating MNI in bone fragments
4. Description of bone fragments by group
5. Correlation between muscles and cut marks
6. Cut marks forms. Offerings 141 and 151

1. Database for human remains data collection



FileMaker Pro Advanced - [Registro de restos óseos humar

Archivo Edición Vista Insertar Formato Registros Guiones Herramientas Ventana Ayud

Registros 2 Total (Desord.) Mostrar todos Nuevo registro Eliminar r

Presentación: Nº Presentación 1 Ver como: Vista previa

PTM-7 Registro de restos óseos humanos

1. Datos generales

Operación Nivel

Ofrenda Excavó

No. de elemento Registró

Subelemento

Ubicación

2. Identificación anatómica

Hueso aislado	Segmento anatómico
Elemento óseo	Tipo de segmento
Cantidad	Inventario
Lateralidad	Lateralidad

Observaciones

3. Perfil biológico

Edad Criterio utilizado

Sexo Criterio utilizado

Modificaciones culturales antemortem

4. Parámetros métricos

Medidas L: P:

A:

E:

5. Procesos tafonómicos naturales Clave

Observaciones

6. Procesos tafonómicos culturales Clave

Trauma contuso Trauma cortante

Localización de la fractura Ubicación de las huellas de corte

Formato gráfico

Observaciones / descripción del proceso de manufactura:

7. Paleopatología

Ubicación Cara Clave de sección

Tamaño y forma

Características de formación anormal de hueso

Características de la pérdida de hueso

Características de la artritis

Características del traumatismo antemórtem

Complicaciones del traumatismo

Observaciones

8. Patología dental

Maxilar	Patología	Localización	Anomalías	Mandíbula	Patología	Localización	Anomalías
M^3D				M_3D			
M^2D				M_2D			
M^1D				M_1D			
P^2D				P_2D			
P^1D				P_1D			
C D				C D			
I^2D				I_2D			
I^1D				I_1D			
I^1I				I_1I			
I^2I				I_2I			
C I				C I			
P^1I				P_1I			
P^2I				P_2I			
M^1I				M_1I			
M^2I				M_2I			
M^3I				M_3I			

9. Osteoarqueología de campo

Estado de las conexiones anatómicas Cara de aparición

Orientación Asociación contextual

Observaciones

X Y Z

2. Codes for antemortem, perimortem and postmortem alterations

Antemortem

1.1 Active bone growth (woven bone)	10 Osteophytes	21 Neoplasm
1.2 Healing (woven bone con fused edges)	11 Eburnation	22 Scoliosis
1.3 Healed (organized, compact bone)	12 Myositis ossificans	23 Khyfosis
2 Abnormal bone loss	13 Enthesopathies	24 Cleft palate
3 Abnormal porosity	14 Accessory Facet	25 Other congenital conditions
4 Healed fracture	15 Osteomyelitis	26 Schmorl nodes
5 Healing fracture	16 Spongy Hyperostosis	27 Lipping
6 Healed fracture with shortening or defective fusion	17 Cribra Orbitalia	28 Others
7 Depressed fracture	18 Osteoma	29 Dental pathology
8 Compression fracture	19 Neoplasm	
9 Pseudoartrosis	20 Bifid spine	

Perimortem

A1 Depressed fracture	A16 Loss of diploe and inner table	C1 Chopping in metaphysis
A2 Comminute fracture	A17 Punctures	C2 Disarticulation chopping
A3 Linear fracture	B1 Flaying mark	C3 Chopping in diaphysis (incomplete)
A4 Oblique fracture	B2 Defleshing mark	C4 Chopping in diaphysis with fracture
A5 Spiral fracture	B3 Disarticulation mark	D Unknown trauma
A6 Radiating fracture	B1 Flaying mark	E Boiling
A7 Concentric fracture	B2 Defleshing mark	F1 Cremation (fresh bone)
A8 Adhered fracture	B3 Disarticulation mark	F2 Cremation (dry bone)
A9 Bevelling	B4 Bone cut	F3 Cremation (light brown)
A10 Torsion fracture	B5 Cut by wear	F4 Cremation (dark brown)
A11 Fracture for defleshing or disarticulating	B6 Heart extraction mark	F5 Cremation (black)
A12 Plastic deformation	B7 Fracture secondary to cut	F6 Cremation (gray)
A13 Percussion fracture	B8 Others (Sharp force)	F7 Cremation (white)
A14 Other (blunt force)	B9 Rib-scapula separation	
A15 Undetermined fracture	B10 Periosteal removal	

Postmortem

G Stains	N Postmortem thermal alteration	R Weathering
H Bleaching	Ñ Gnawing	U Porosity
I Roots marks	O Demineralization	T Exfoliation
J Fracture cause by roots	P Mineralization	V Restored
K Erosion	Q Adhered material	W Fissures
L Damage due to excavation	R Weathering	X Others
M Postmortem fracture	S Damage due to handle and storage-	

3. Skull features used for calculating MNI with fragmentary bones

1. Right supraorbital foramen/notch	29. Right frontal process of maxilla
2. Left supraorbital foramen/notch	30. Left frontal process of maxilla
3. Right zygomatic process of frontal bone	31. Right zygomatic process of maxilla
4. Left zygomatic process of frontal bone	32. Left zygomatic process of maxilla
5. Frontal crest	33. Right infraorbital foramen
6. Right parietal foramen	34. Left infraorbital foramen
7. Left parietal foramen	35. Incisor foramen
8. Right external acoustic meatus	36. Right frontal process of zygomatic
9. Left external acoustic meatus	37. Left frontal process of zygomatic
10. Right zygomatic process of temporal bone	38. Right maxilla process of zygomatic
11. Left zygomatic process of temporal bone	39. Left maxilla process of zygomatic
12. Right mastoid process	40. Right mandibular condyle
13. Left mastoid process	41. Left mandibular condyle
14. Right internal acoustic meatus	42. Right mandibular foramen
15. Left internal acoustic meatus	43. Left mandibular foramen
16. Right mandibular fossa	44. Mental spine
17. Left mandibular fossa	45. Right lingula
18. Right foramen ovale	46. Left lingula
19. Left foramen ovale	47. Right coronoid process
20. Foramen magnum (right half)	48. Left coronoid process
21. Foramen magnum (left half)	49. Right mandibular notch
22. Right occipital condyle	50. Left mandibular notch
23. Left occipital condyle	51. Right oblique line
24. Right condylar foramen	52. Left oblique line
25. Left condylar foramen	53. Right mental foramen
26. Right hypoglossal canal	54. Left mental foramen
27. Left hypoglossal canal	55. Mental eminence
28. Cruciform eminence	

4. Description of bone fragments groups

1) Teeth

This group consists of incisors, canines, premolars and molars, complete and fragmentary. I examined the maxilla and mandibular fragments, corroborating that teeth were lost during the postmortem interval. Teeth reveal a diversity in health conditions (cavities, calculus and enamel hypoplasia) and wear. Most likely they corresponded to skulls that were exhibited or reused. Their presence suggests an intense manipulation of bone remains in the Sacred Precinct and corroborates the idea that victim's body parts were important and were not to be discarded.

2) Tzompantli skull manufacture debris

In this group I included all the parietal and temporal fragments that correspond to the area where the tzompantli skulls perforation is located. These are very small fragments with concentric perimortem fractures, with bevelling on the inner table, plastic deformation and, sometimes, adhered fragments. It is possible to distinguish that some were impacted with a pointed instrument. Some fragments were boiled (presenting light color, compact texture and vitreous aspect). Most of them show cut marks or punctures. They are numerous and could not be glued back together as they are commingled.

3) Skull masks manufacture debris

This group includes all the skull fragments with perimortem fractures corresponding to the bones that were removed to manufacture skull masks: parietals, occipital and part of the temporal bones. These would have been fractured during the perimortem interval as corroborated by fracture patterns. These fragments show signs of defleshing and sometimes flaying. Some have weathering.

4) Cremated bones

Within this category I included all bone fragments that were exposed to direct fire. Some bones were burned while fresh and others dry, suggesting different origins. They have a variation in color because they were exposed to different temperatures. Bone fragments correspond to the skull and post-cranial skeleton, which links them to rituals beyond decapitation.

5a) Fragmentary skulls

In this group are small skull fragments that was not possible to identify the manufacturing process to which these bones were exposed. Some have weathering and other cut marks (defleshing); most have perimortem fractures.

5b) Post-cranial bones

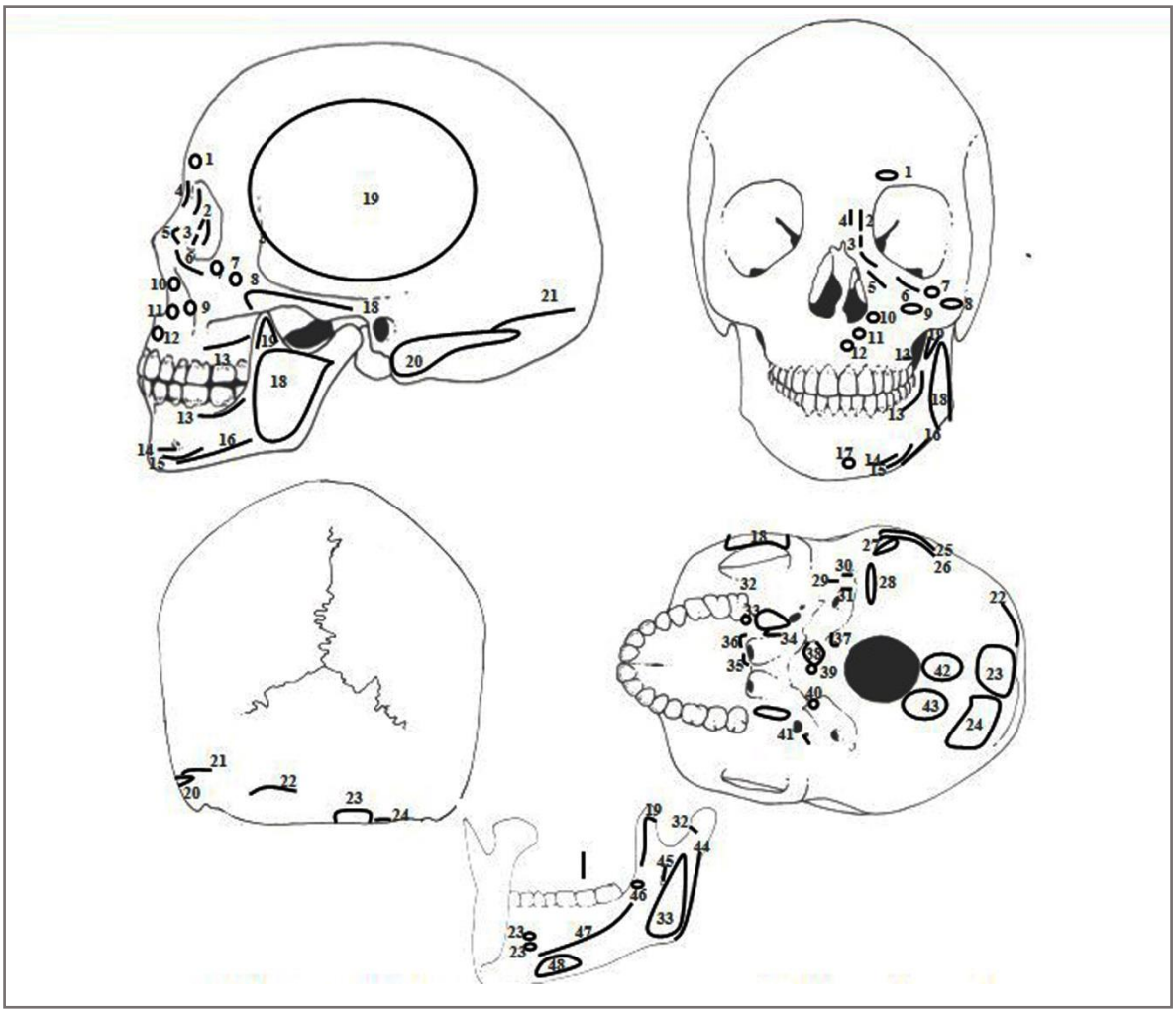
In this category were grouped all the bones of the post-cranial skeleton; they undergone a great variety of posthumous treatments. Cervical vertebrae from this group are related

to decapitation. It is also common to find ribs or even a sternum. Some have perimortem modifications and others lack of it; the latter could correspond to victims who were buried with no posthumous treatments or to burials that were disturbed.

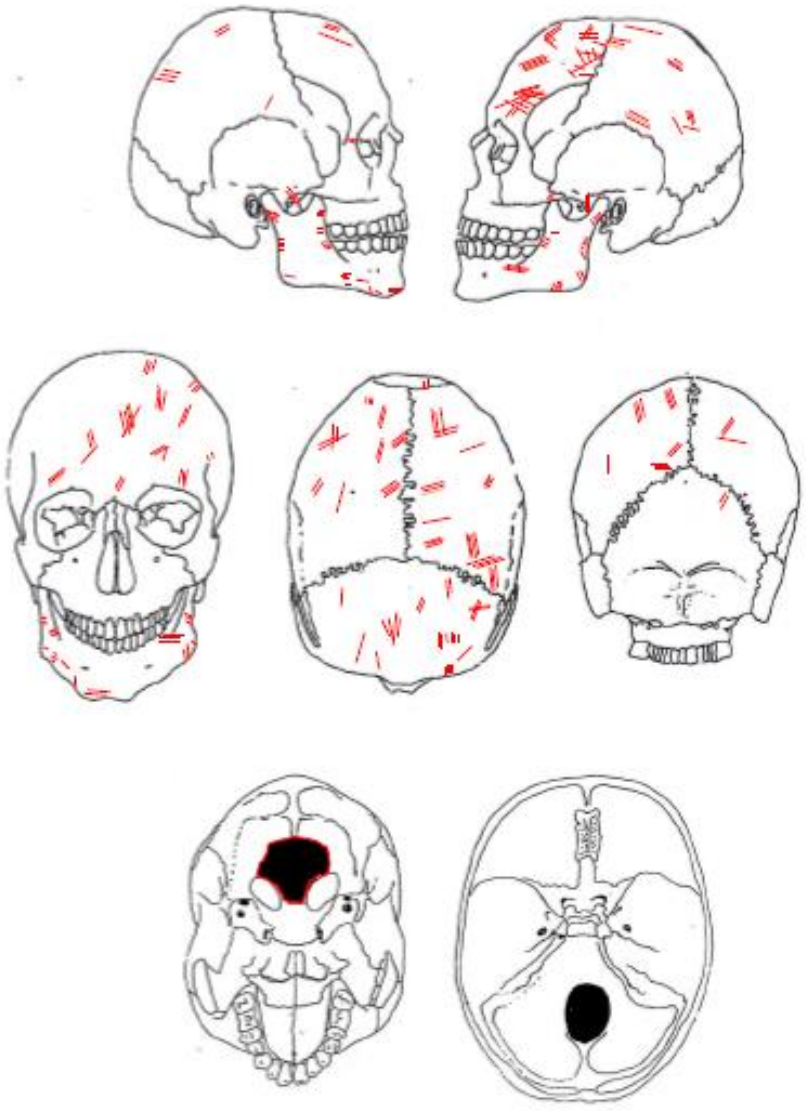
6) Undetermined fragments

This category is composed of small fragments that it was not possible to identify them or infer the posthumous treatments to which they were exposed. Some of them present weathering.

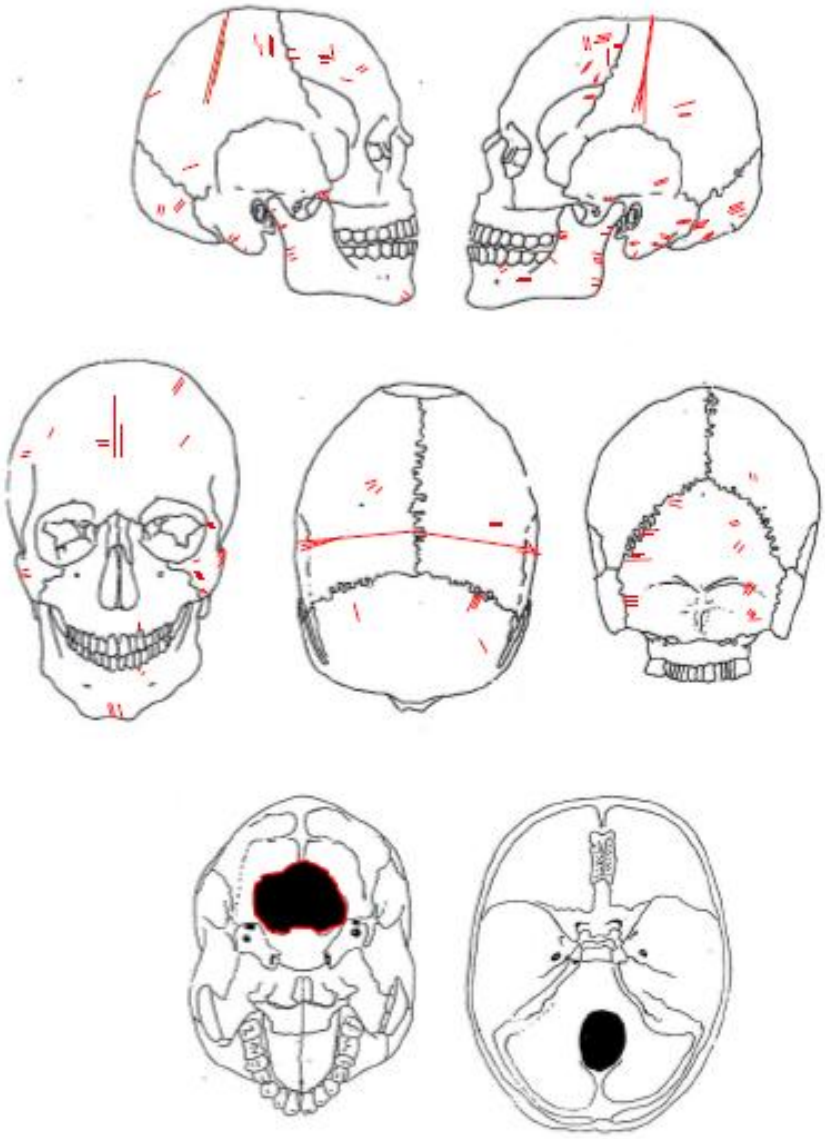
5. Correlation between muscles and cut marks



Musculoskeletal anatomy of the skull. The location of cut marks correspond to defleshing of muscles and ligaments listed below: 1) *corrugator supercilii*, 2) *orbicularis oculi*, 3) palpebral ligament, 4) *procerus*, 5) *levator labii superioris alaeque nasi*, 6) *levator labii superioris*, 7) *zygomaticus* menor, 8) *zygomaticus* major, 9) *levator angulis oris*, 10) *nasalis* (transversa), 11) *nasalis* (wing), 12) *depresor septi*, 13) *buccinator*, 14) *depressor labii inferioris*, 15) *depressor anguli oris*, 16) *platysma*, 17) *mentalis*, 18) maseter, 19) *temporalis*, 20) sternocleidomastoid, 21) occipital belly of *frontalis*, 22) *trapezius*, 23) *semiespinalis capiti*, 24) superior oblique, 25) *splenius capitis*, 26) *longissimus capitis*, 27) digastric posterior belly, 28) *rectus capitis lateralis*, 29) *styloglossus*, 30) *stylohyoideo*, 31) *stylopharingeus*, 32) pterigoid (lateral), 33) pterigoide (medial), 34) constrictor superior of pharinx, 35) *uvulae*, 36) *palatopharyngeus*, 37) *rectus capitis*, 38) *longus capitis*, 39) rafe pharinx, 40) *levator veli palatini*, 41) tensor *veli palatini*, 42) *rectus capitis* posterior menor, 43) *rectus capitis* posterior mayor, 44) *stylomandibula* ligament *r*, 45) *sphenomandibular* ligament, 46) *pterygomandibular-constrictor (superior* of pharynx), 47) *mylohyod*, 48) anterior belly of digastric, 49) *geniohyodeo* an 50) *genioglossus*. Modified from Logan *et al*. (2004: 4, 10, 18, 34, 35).



Templo Mayor Project
Offering 141
Individual 1



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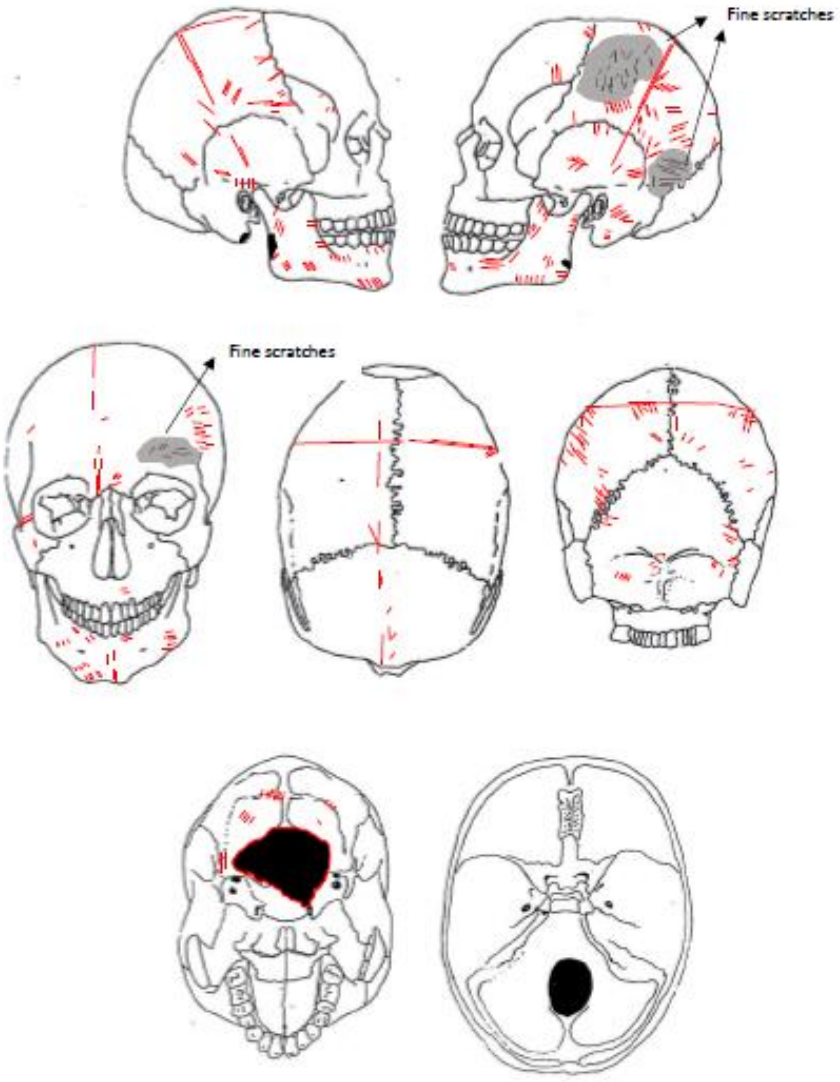

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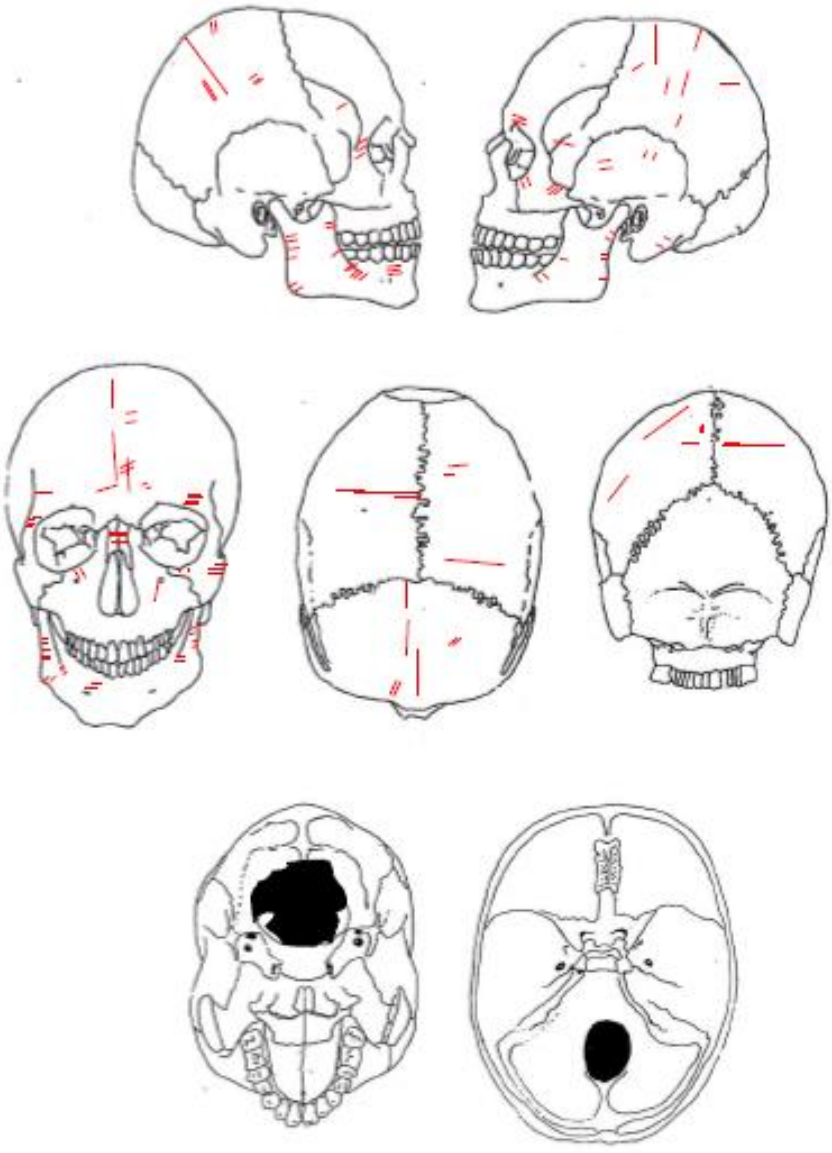

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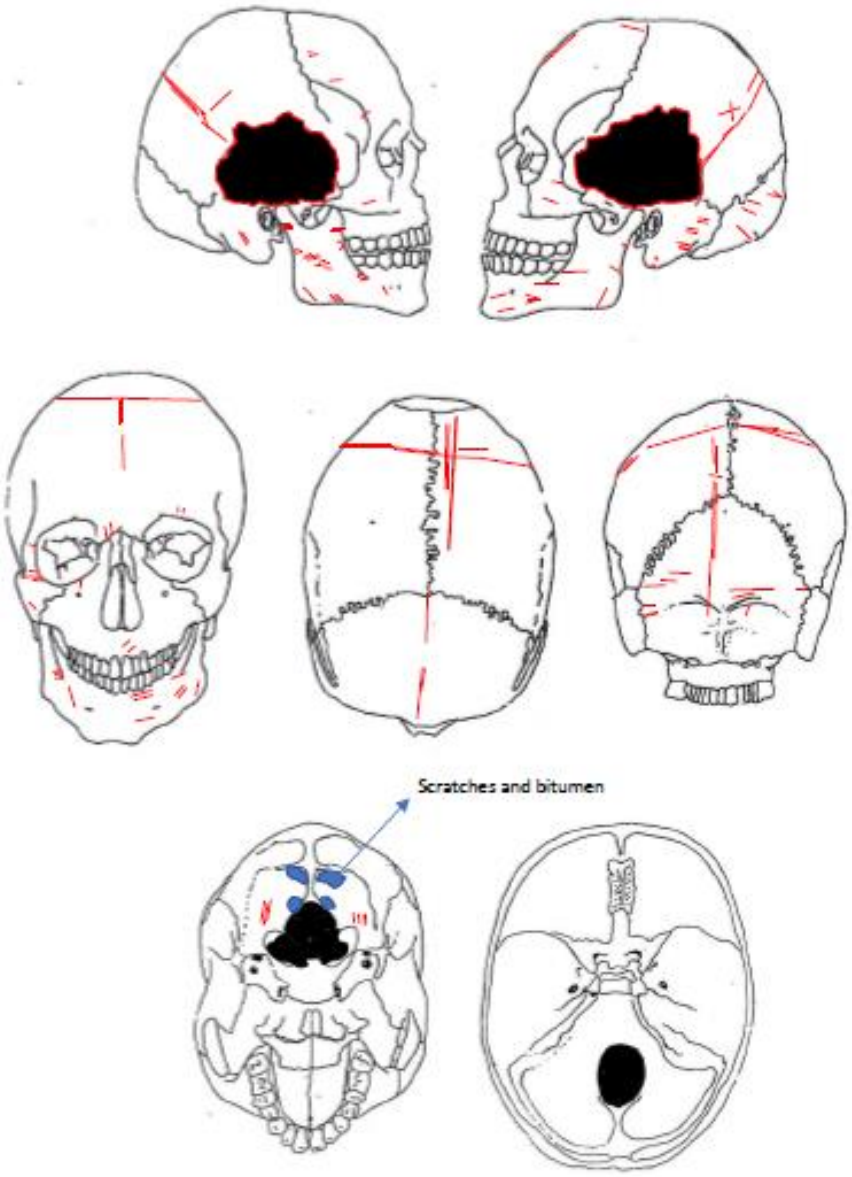

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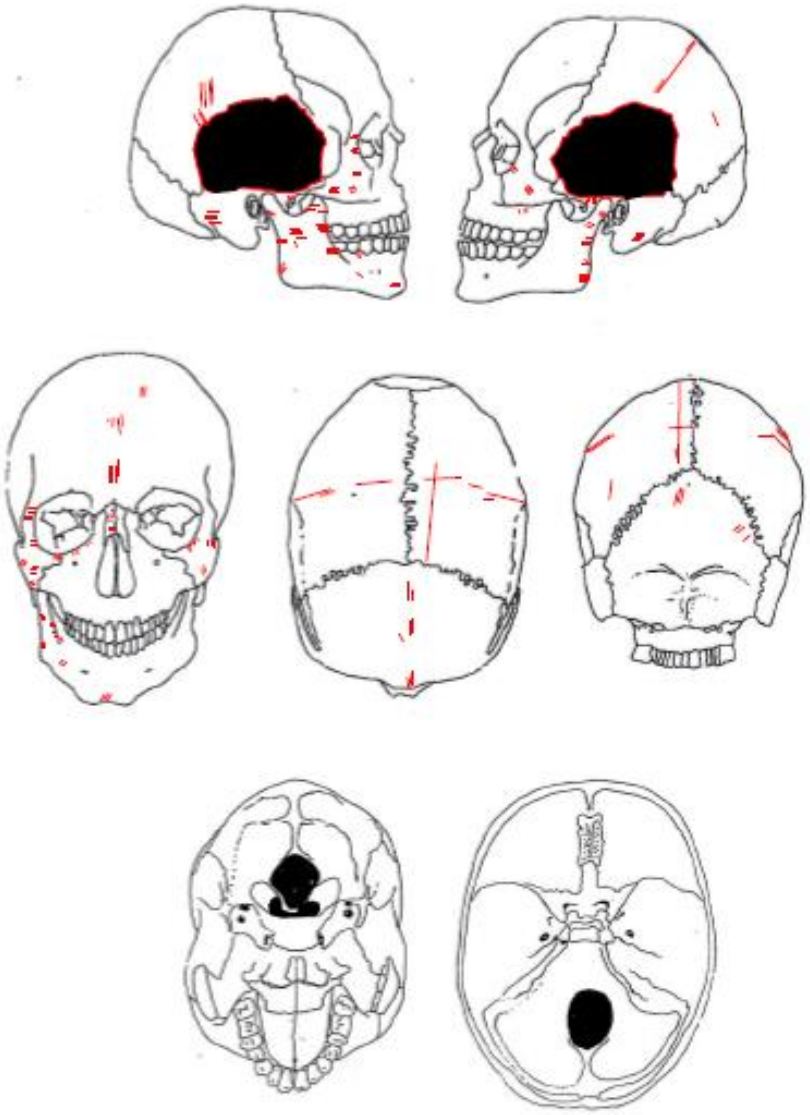

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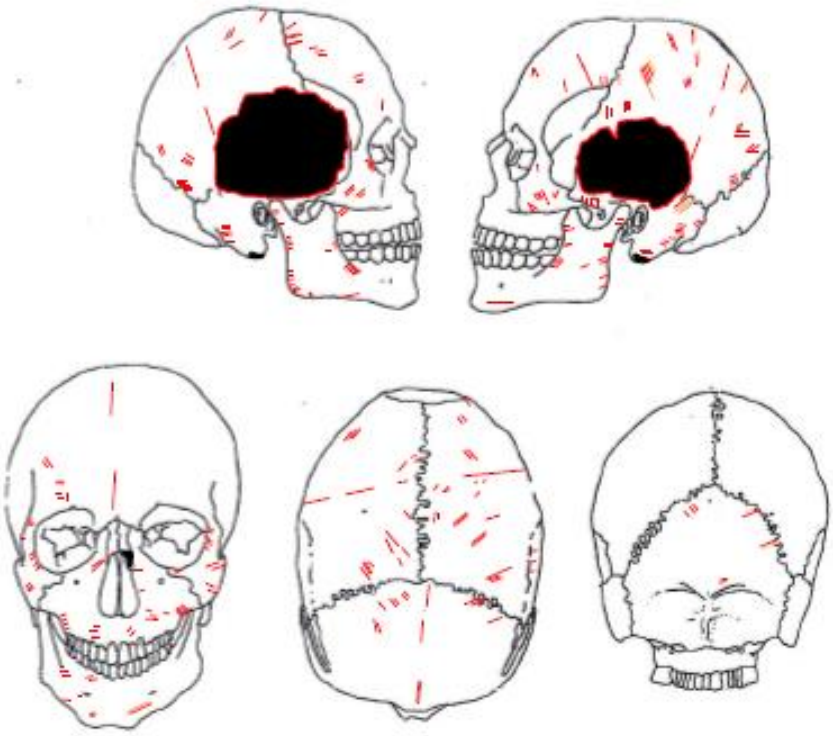
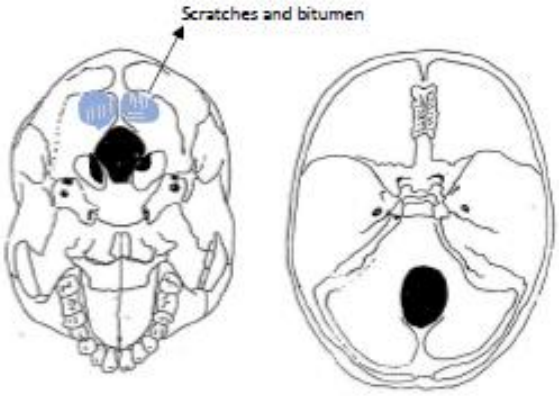
Individual 6





Templo Mayor Project
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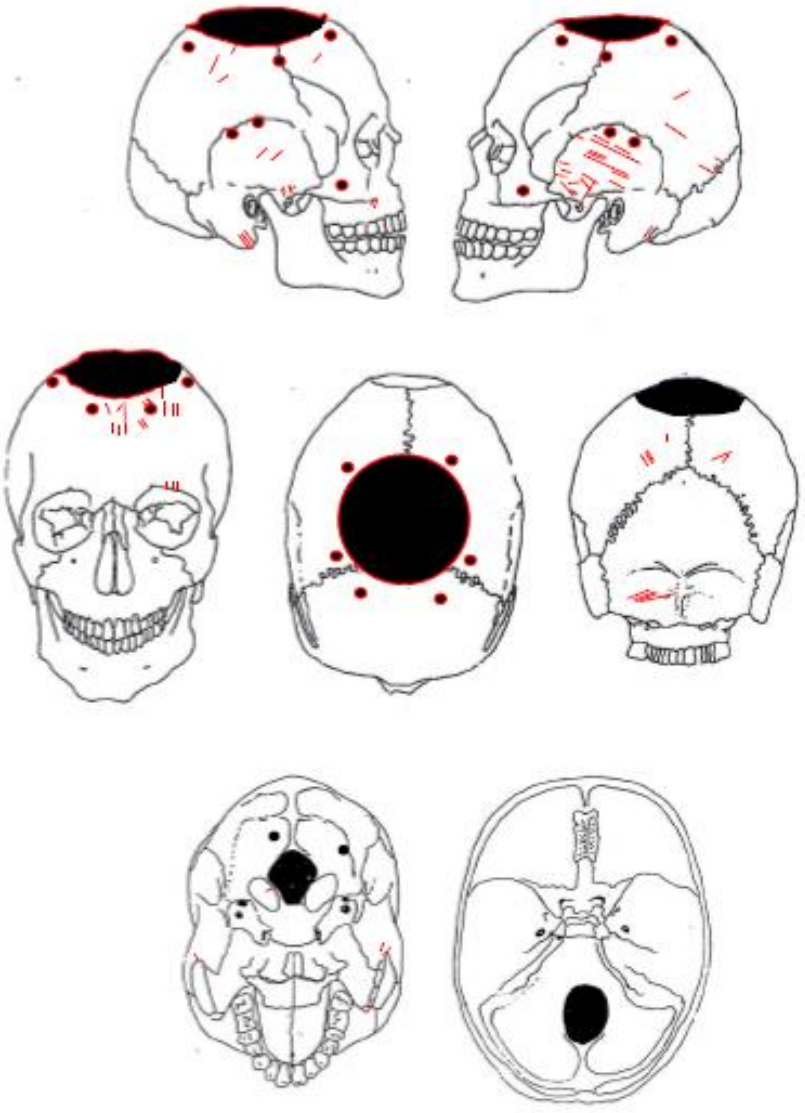
Individual 7



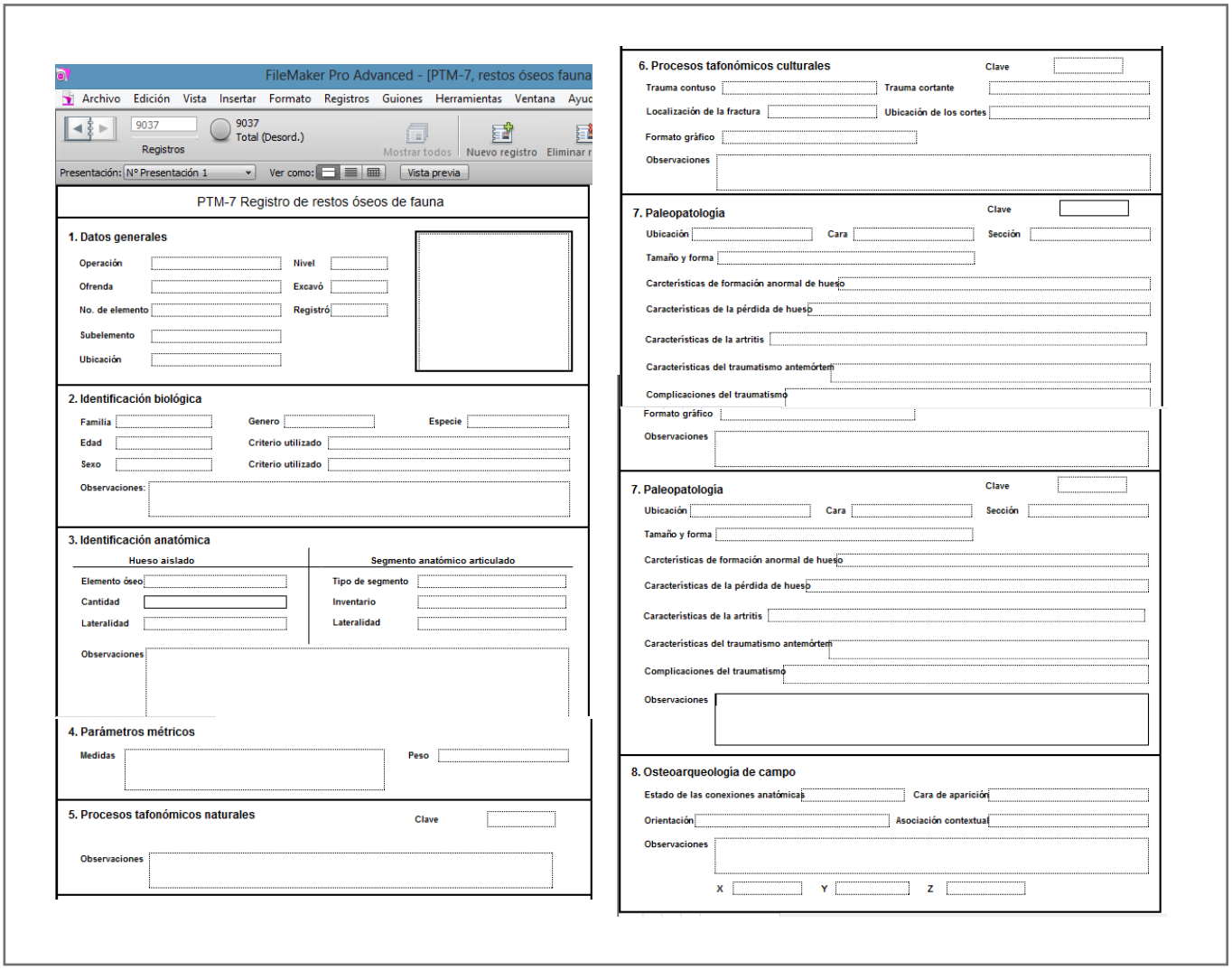
Templo Mayor Project
Offering 151
Individual 1

Appendix 2

Animal remains

1. FileMaker database for animal remains data collection
2. Ossification centers closure in dogs and cats
3. Diagnostic features to identify *Lynx rufus* from *Leopardus Pardalis*
4. Offering 126. Jaguars 2 and 3, description of bone lesions
5. Dismemberment patterns
6. Distribution of animal species according to the 16th Century *Relaciones Geográficas*

1. FileMaker database for animal remains data collection



2. Ossification centers closure in dogs and cats

Centro de osificación secundaria	Edad de fusión en perros [461]	Edad de fusión en gatos[462]	Lobos Ofrenda 126 F	Lobos Ofrenda 126 S/F	Pumas Ofrenda 126 F	Pumas Ofrenda 126 S/F	Jaguar Ofrenda 126 F	Lince Ofrenda 126 F	Lince Ofrenda 126 S/F
Epífisis proximal de húmero	**10-12 meses**	**14-20 meses**	2	8	0	8	-	10	3
Epífisis distal de húmero	**5-8 meses**	**4-8 meses**	2	-	0	1	-	10	-
Epífisis proximal de ulna	**5-8 meses**	**8-14 meses**	2	-	1	5	-	9	1
Epífisis distal de ulna	**5-11 meses**	**14-20 meses**	1	8	1	13	-	9	6
Epífisis de radio proximal	**5-9 meses**	**4-8 meses**	0	7	2	3	-	13	0
Epífisis distal de radio	**6-11 meses**	**14-20 meses**	0	7	2	9	-	13	5
Carpo accesorio	**10 s-5 meses**	**-**	19	0	8	4	1	--	-
Epífisis distal de metacarpianos II-V	**5-7 meses**	**-**	16	1	4	5	3	--	--
Epífisis proximal de fémur	**6-12 meses**	**8-14 meses**	0	6	0	3	-	10	0
Epífisis distal de fémur	**6-11 meses**	**14-20 meses**	0	7	0	10	-	10	4
Epífisis proximal de tibia	**6-12 meses**	**14-20 meses**	0	9	0	11	-	12	6
Epífisis distal de tibia	**5-11 meses**	**8-14 meses**	0	5	0	7	-	12	3

[461] Pfeil y DeCamp (2009).
[462] Balsa y Robinson (2016).

Epífisis proximal de fíbula	**6-11 meses**	**14-20 meses**	3	1	2	7	-	6	3
Epífisis distal de fíbula	**5-11 meses**	**8-14 meses**	3	5	2	7	-	6	3
Calcáneo	**11s-8 meses**	**-**	22	0	8	5	-	0	0
Epífisis distal de metatarsianos II-V	**5-8 meses**	**-**	17	3	5	4	3	0	0

Centro de osificación	Edad de cierre (Harris 1978)	Lobos Ofrenda 126
Sacro	**4.7-5.5 meses**	4< 5.5 meses 19> 5.5 meses
C2 (caudal)	**6.5-6.7 meses**	9< 6.7 meses 14> 6.7 meses

3) Diagnostic features to identify bobcat (*Lynx rufus)* from ocelotl (*Leopardus Pardalis)*

- Femur

1) 1) The upper edge of the trochanteric fossa is more elongated and symmetrical in bobcats. In ocelots it is more asymmetrical and curved.
2) 2) The greater trochanter seen from the anterior aspect is larger and thinner in bobcats, whereas it is wider and smaller in ocelots.
3) 3) The articular facet of the patella is slightly more symmetrical in bobcats.
4) 4) The edge of the lateral epicondyle is pronounced and sharp in bobcats; in the ocelot it is rounded and smooth.
5) 5) The lower edge of the neck is more curved in the ocelot than in bobcats. [463]
6) 6) In bobcats the lesser trochanter is visible in an upper view of anterior aspect.
7) 7) There are notable differences between the two species when calculating the following femoral indices: length/width of the proximal epiphysis and length/width of the distal epiphysis.

- Tibia

1) In the anterior aspect of the proximal epiphysis, bobcats have a process anterior to the articular facet with the fibula; this is posterior in ocelot.
2) Proximal epiphysis in bobcats are elongated in a lateral-medial aspect and in ocelot it is more rounded. In ocelot it has a higher transverse length and a shorter anterior-posterior length; in contrast bobcats have a shorter transverse length and a longer anterior-posterior length.
3) The proximal articular facet with fibula is anterior in ocelot and posterior in bobcats.
4) The proximal lateral edge is more curved in the ocelot and straighter in bobcats.

[463] Feature identified by Arce (2009) but described as "major trochanter region". However, this anatomical landmark is on the opposite side.

5) When seeing bobcat's internal malleolus from above the lateral facet is higher and has a triangular surface formed on the lateral edge.
6) When seeing the internal malleolus in medial view, bobcats have a groove with two pronounced edges.
7) There are notable differences between the two species when calculating the following tibial indices: length/transverse width of the proximal epiphysis and length/transverse width of the distal epiphysis.

- Ulna

  1) The olecranean process is straigh in bobcats (rectangular and with a marked pit).

  2) The interosseous ridge is sharper in bobcats.

  3) The styloid process is wider in bobcats.

  4) The distal groove is deeper in bobcats; in ocelot it is wider.

  5) The diaphysis in is wider in the ocelot.

  6) The olecranean process is higher in bobcats.

  7) There are notable differences between the two species when calculating the following ulnal indices: length/width of the proximal epiphysis; and length between widths of the distal epiphysis.

- Radius

  1) The interosseous fossa is more marked and deeper in bobcats.

  2) The head is wider in bobcats.

  3) The bicipital tuberosity is larger in bobcats; wider in ocelot.

  4) The diaphysis is straighter in the ocelot.

  5) There are notable differences between the two species when calculating the following radial indices: length/width of the proximal epiphysis; and length between widths of the distal epiphysis.

- Humerus
    1) The bicipital groove is wider in ocelot and narrower in bobcats.
    2) The deltoid tuberosity is larger in ocelot, smaller in bobcats.
    3) The supracondylar foramen is more elongated in bobcats.
    4) The angle of trochlea is wider in ocelot, narrower in bobcats.
    5) The lateral edge is curved in ocelot.
    6) The medial condyle seen from the above is rounded in ocelot and angled in bobcats
    7) There are notable differences between both species when calculating the following radial indices: length/width of the proximal epiphysis, length between width of the distal epiphysis and length/diameter of the intermediate portion of the diaphysis (MSD).

4. Offering 126. Jaguars 2 and 3, description of bone lesions

Jaguar 2

Placement	Description
Digit 3, right posterior limb	Dorsal, lateral and ventral bone growth
Digit 4, right posterior limb	Dorsal, lateral, medial and ventral bone growth. Continuity with bone growth of digits 3 and 5 (intermediate-proximal). Labiation in proximal joint
Digit 5, right posterior limb	Dorsal, lateral, medial and ventral bone growth. Continuity with bone growth of digit 4 (intermediate-proximal). Labiation in proximal joint. Initiated ankylosing between fingers 4 and 5.
Right ectocuneiform	Compact dorsal growth
Digit 2, left anterior limb	Dorsal, lateral, ventral and medial bone growth in the proximal part, which is consistent with bone growth in digit 3.
Digit 3, left anterior limb	Dorsal, lateral, ventral and medial bone growth in the proximal part, which is consistent with bone growth in digits 2 and 4.
Digit 4, left anterior limb	Dorsal, lateral, ventral and medial bone growth in the proximal part, which is consistent with bone growth in digit 3.
Digit 5, left anterior limb	Dorsal, ventral and medial bone growth in the proximal part. Bone loss in the proximal joint.
Left intermedium	Labiation
Carpal III	Dorsal bone growth and labiation in distal facet
Manubrium	Bone growth on all sides (intermediate and caudal). Labiation in joint with sternum 1. Growth in costal joints
Sternebrae 1	Upper bone growth that corresponds to manubrium
Left 1st rib	Ventral and cranial bone growth, in the sternal part
Left seventh rib	Bone growth, compact and organized in ventral aspect
Left eight rib	Bone growth, compact and organized in ventral aspect

Jaguar 3

Placement	Description
Occipital condyle	Lipping
C1	Lipping that coincides with occipital condyle lipping
C2	Lipping on articulation with C1, on the right side
C5	Lippin in craneal facets
T1	Osteophytes on body's edge. Costal articulations have wear, lipping and the right has eburnation, that is also present on the first rib. Eburnation on articular facet for second ribs, with pitting.
Left first rib	Bone growth in cranial, ventral and caudal aspects, active and healing. Eburnación in the head.
T2	Lipping in transeverse process articular facets.
Right second rib	Bone growth on sternal part. Lipping in the head.

T3	Lipping in transeverse process articular facets.
Right tird rib	Lipping on articular facet
Left fourth rib	Lipping on articular facet
Right four rib	Lipping on the head
L3	Asymmetry
L4	Asymmetry
L5	Asymmetry
L6	Asymmetry
L7	Congenital sacralization of L7 on the right side. Presents a pseudoarticulation with the sacrum. Anterior bone growth in transverse process.
Sacrum	Pseudoarticulation on right side for L7
Pelvis	Bone growth in an area in contact with L7
Left sixth rib	Lipping in facet for transverse process
Left seventh rib	Lipping on costal head. Possible healed fracture.
Right fifth rib	Mild lipping on facet
Right eight rib	Mild lipping on facet
RIght seventh rib	Mild lipping on facet
Manubrium	Bone growth, cranial and caudal lipping. Growth in rib joint.
Sternebrae	Bone growth in cranial and lateral aspects
Xyphoid process	Cranial lipping and bone growth on four aspects
	Left forelimb
Left accesory	Lipping on articular facets. Bone growth (healed) on four aspects. Spicules.
Left fourht carpal	Lipping on facet for MTC 4.
Left third carpal	Lipping on facet for MTC 3 and eburnation.
Left first and second carpal	Lipping and eburnation. Healed dorsal bone growth.
Left MTC 1	Lipping on proximal facet, bone growth on lateral facet (healed), distal lipping (ventral).
Left proximal first phalanx	Proximal lipping and eburnation (coinciding with MTC 1)
Left MTC 2	Dorsal bone growth (proximal). Spicules on lateral aspecto. Eburnation on proximal facet coinciding with second carpal. Lipping on proximal facet (plantar). Eburnation on lateral facet for MTC 3
Left intermediate second phalanx	Medial-dorsal bone growth. Mild lipping on distal epyphisis (dorsal).
Left MTC 3	Mild eburnation on facet for MTC 2. Bone growth (proximal) on four aspects. Lateral eburnation on facets for MTC 4. Distal bone growth on four aspects, with ventral lipping. Eburnation on distal epyphisis coinciding with eburnation on proximal phalanx. Distal eburnation in carpal facet.
Left proximal third phalanx	Proximal (medial y dorsal) bone growth. Proximal lipping. Eburnation on articular facet for MTC 3
Left MTC 4	Proximal and distal growth on four aspects. Distal (ventral) lipping. Eburnation in proximal facets for for MTC 3 and MTC 5. Distal eburnation coinciding with proximal phalanx.
Left proximal fourth phalanx	Proximal bone growth on four aspects. Eburnation in proximal facet for MTC 4.

Left MTC 5	Proximal bone growth (dorsal, medial and ventral). Distal lipping. Eburnation on facet for MTC 4. Proximal facet with bone growth and loss. Eburnation on distal articulation.
Left intermediate fifth phalanx	Proximal lipping (dorsal, lateral and medial).
Sesamoids	Lipping
	Left hindlimb
Left central tarsal	Dorsal bone growth
Left ectocuneiform	Dorsal bone growth (continues on MTT 3). Distal lipping (plantar). Distal eburnation on facet for MTT 3
Left MTT 3	Proximal bone growth on four aspects. Proximal lipping (plantar). Eburnation in facet for tarsal.
Left fourth tarsal	Bone growth specially on dorsal aspect (spicules). Distal lipping
Left MTT 4	Proximal bone growth (in four aspects). Proximal lipping.
Left intermediate fourth phalanx	Proximal lipping (lateral, medial)
Tarsal 2	Dorsal and lateral bone growth
Sesamoids	Lipping
	Right forelimb
Right first and second carpal	Lipping
Right MTC 1	Labiación (distal). Eburnación distal (ventral) que coincide con la falange
Right proximal first phalanx	Wear and proximal eburnation
Right MTC 2	Dorsal bone growth. Proximal lipping
Right second proximal phalanx	Ventral bone growth
Sesamoids	Bone growth and lipping
Right third carpal	Dorsal lipping (distal)
Right MTC 3	Proximal bone growth (dorsal and medial). Proximal and distal lipping. Mild eburnation on MTC 4
Right proximal third phalanx	Bone growth. Proximal lipping.
Right four carpal	Distal lipping
Right MTC 4	Bone growth (dorsal, lateral and ventral). Proximal lipping. Proximal eburnation on MTC 3 and MTC 5 facets
Right fouth proximal phalanx	Proximal lipping
Right intermediante four phalanx	Wear on proximal facet
Right MTC 5	Proximal bone growth. Eburnation on MTC 4 facet
Right proximal fifth phalanx	Possible myositis ossificans in lateral insertion. Proximal lipping
Right intermediante fifth phalanx	Bone growth and distal lipping
	Right hindlimb
Right central tarsal	Proximal bone growth (plantar, lateral).
Right second tarsal	Dorsal bone growth and lipping

Right MTT 2	Proximal and distal bone growth. Proximal lipping. Mild eburnation
Right proximal second phalanx	Proximal lipping
Right ectocuneiform	Dorsal bone growth. Possible plantar antemortem fracture. Lipping and distal eburnación in facet for MTT 3
Right MTT 3	Proximal and distal bone growth (plantar). Proximal lipping. Proximal eburnation in facet for ectocuneiform, MTT 4 and MTT 2.
RIght intermediante third phalanx	Distal lipping
Right four tarsal	Dorsal, medial and lateral bone growth. Proximal and distal lipping. Eburnation in facet for MTT 4
Right MTT 4	Bone growth and wear. Eburnation with MTT 3 (non-articular, but due to bone growth). Proximal lippingl.
Right proximal fourth phalanx	Lipping.
Right MTT 5	Proximal bone growth. Proximal and distal lipping. Eburnation in facet for tarsal.
Right proximal fifth phalanx	Distal lipping
Sesamoids	Bone growth

5. Dismemberment patterns

Treatment	Bones
Skull fracture (percussion)	9
Skull fracture (percussion) and cut	9
Skull cut	1
Disarticulation of proximal and intermediate phalanges	62
Disarticulation of intermediate and distal phalanges	270[464]
Disarticulation of proximal and distal first phalanges	22

Treatment given to mammals to disarticulate the phalanges and separate the skull as a result of pelt preparation.

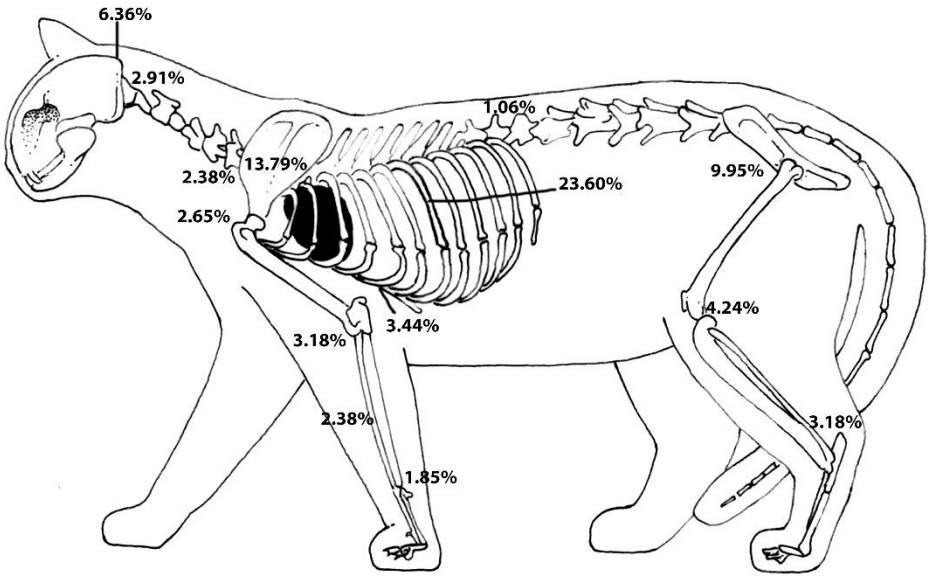
[464] Most of the intermediate phalanges recovered show signs of flayinf or defleshing. Not all exhibited disarticulation marks, however this does not imply that they have not been disarticulated, as the absence of the distal phalanges prove that they were. During the preparation of our reference skeletons I was able to corroborate that it is feasible to separate them from the claws without leaving traces.

Segment disarticulated	Bones
Skull-C1	24
C1-C2	11
C2-C3	3
C3-C4	5
C4-C5	2
C5-C6	1
C6-C7	9
C7-T1	5
T3-T2	3
T4-T5	1
T5-T6	1
T6-T7	1
T7-T8	1
T12-T13	4
T13-L1	2
L1-L2	1
L2-L3	3
L3-L4	1
L6-L7	3
Sacrum-pelvis	2
Sacrum-caudal vertebrae 1	3
Caudal 1-caudal 2	1
Caudal 3-caudal 2	2
Caudal 6-caudal 7	2
Caudal 8-caudal 9	1
Caudal 10-caudal 11	1
Caudal 11-12	1
Caudal 15-caudal 16	1
Sternebrae	13
Vertebrae-ribs	89
Fémur-pelvis	30
Fémur-tibia	16
Tibia-fíbula	5
Patella-femur	1
Tibia-talus	12
Talus-calcaneus	3

Tarsals	3
Scapula-ribs	52
Humerus-scapula	10
Humerus-ulna	12
Humerus-radius	3
Radius-ulna	9
Radius-carpals	7
MTC 1-proximal phalanx	2
MTC 2- carpals	1
MTC 2- proximal phalanx	1
MTC 4-carpals	2
MTC 4- proximal phalanx	2
MTC 5-carpal	1
MTC 5- proximal phalanx	2
MTT 3-phalanx	2
MTT 4-phalanx	2
MTT 5-phalanx	1
MTT 5-tarsal	1

Articulations in which mammals were disarticulated. It does not reflect the number of disarticulations, as some bones showed disarticulations in both epiphyses[465]

[465]In addition, not all disarticulations leave visible marks, depending on the care taken.



Percentage of marks documented in main articulations. This dismemberment facilitated the handling of specimens (in segments).

Segment	Bones
C3-C4	1
C4-C5	1
C6-C7	2
Keel-ribs	1
Scapula	1
Humerus-shoulder girdle	6
Humerus-ulna/radius	7
Radius-carpals	5
Carpals-Carpalmetacarpus	1
Femur-synsacrum	2
Femur-tibiotarsus	3
Tibiotarsus-tarsometatarsus	6

Main disarticulations sites for birds

6. Distribution of animal species according to the 16th Century *Relaciones Geográficas*

Source	Current location	Jaguar	Puma	Small felids	Wolves
Relación de la Ciudad y Provincia de Tezcoco (Acuña 1986: III,8: 112)	State of México	X	X	X	X
Relación de Minas de Zultepec (Acuña 1986: III,8: 186)	State of México	X	X	X	X
Relación de Minas de Zumpango (Acuña 1986: III,8: 200)	State of México	X	X	x	
Relación de Totolapan y su Partido (Acuña 1986, III, 8:163)	State of México				X
Relación de Coatepec y su Partido (Acuña 1985, I, 6: 152)	Ixtapaluca, State of México	X	X		X
Relación de las Minas de Temazcaltepec y Tuzantla (Acuña 1986: II,7, 160)	Temazcaltepec y Tuzantla, Tierra Caliente (State of México and Michoacán)	X			X
Relación de Citlaltomahua y Anenecuilco (Acuña 1985: I, 6: 120)	Guerrero	X	X	X	
Relación de la Alcaldía Mayor de Meztitlan y su Jurisdicción (Acuña 1986: II,7: 72)	Hidalgo	X	X		X
Relación de Cempoala, Epazoyuca y Tetliztaca (Acuña 1985: I, 6:89)	Hidalgo		x		X
Relación de Tepeapulco (Acuña 1986, II, 7:179)	Hidalgo		X		X
Relación de Tequixquiac y su Partido (Acuña 1986, II, 7:196)	Hidalgo		x		X
Relación de las Minas de Cimapan (Acuña 1985, I, 6: 103)	Hidalgo		X		X

Relación de Ichcateupan y su Partido (Acuña 1985, I, 6: 266-267, 273, 285-289, 297, 303, 307, 313, 326)	Ixcateopan, Oztuma, Teloloapan, Tetela, Tzicaputzalco, Tlacotepeque. Utatlan and Coatepeque (Guerrero)	X	X	X	X
Relación de Minas de Tasco (Acuña 1986: II,7: 129)	Guerrero	X	X		X
Relación de Ocopetlayucan (Acuña 1986, II, 7:89)	Morelos or Guerrero or Hidalgo		X		
Relación de Cuautla (Acuña 1984: I,2: 145, 151)	Huautla y Jaltepetongo, Oaxaca	X	X	X	X
Relación de Chinantla (Acuña 1984: I, 2: 107)	Oaxaca	X	X		
Relación de Guatulco (Acuña 1984: I,2: 191, 206)	Puerto and Pueblo de Huatulco, Oaxaca	X	X	X	
Relación de Itztepexic (Acuña 1984: I,2: 259)	Oaxaca	X	X	X	
Relación de Ixcatlan (Acuña 1984, I,2: 240)	Tecomahuaca, Oaxaca	X	X		
Relación de Atlatlauca (Acuña 1984, I, 2: 57)	Oaxaca		X		
Relación de Iztepec (Acuña 1984: I,2: 272)	Oaxaca	X	X		X
Relación de Nexapa (Acuña 1984: I,2: 349)	Oaxaca	X	X		
Relación de Justlahuaca (Acuña 1984: I,2: 290)	Oaxaca	X	X		X
Relación de Suchitepec (Acuña 1984: II,3: 63)	Oaxaca	X	X		
Relación de Teguantepec (Acuña 1984: II,3: 119)	Oaxaca	X	X		
Relación de Tlacolula y Miquitla (Acuña 1984: II,3: 262)	Oaxaca	X	X		X

Relación de Tetiquipa y Cozauhtepec (Acuña 1984: II,3: 182, 188)	Oaxaca	X	X			
Relación de Ucila (Acuña 1984: II, 3: 275)	Oaxaca	X	X			
Relación de Teozalcualco y Amoltepeque (Acuña 1984: II,3: 146)	Oaxaca	X	X			X
Relación de los Pueblos de Tecuicuilco, Atepeque, Zoquiapa y Xaltianguis (Acuña 1984: II,3: 101)	Oaxaca		X			
Relación de Macuisúchitl (Acuña 1984: I, 2:332)	Oaxaca		X			X
Relación de Papaloticpac y su Partido (Acuña 1984: I, 3: 32)	Oaxaca		X			
Relación de Tilantongo (Acuña 1984: II,3: 236)	Oaxaca		X			X
Relación de Talistaca (Acuña 1984: II,3: 81)	Oaxaca		X			X
Relación de Teticpac (Acuña 1984: II,3: 173)	Oaxaca		X			X
Relación de Teutitlan (Acuña 1984: II,3: 204)	Oaxaca		X			X
Relación de Teozapotlan (Acuña 1984: II,3: 163)	Oaxaca		X	X		
Relación de Atlatlauca (Acuña 1984, I, 2: 57)	Oaxaca		X			
Relación de Acatlán y su Partido (Acuña 1985: II, 5: 40)	Mixteca baja, Puebla.	X				X
Relación de las Cuatro Villas (Acuña 1985: I, 6: 194, 210)	Morelos		X	X		X
Relación de Tetela y Hueyapan (Acuña 1986, II, 7: 269)	Morelos		X	X		
Relación de Tepeaca y su Partido (Acuña 1985: II, 5:255)	Puebla	X	X			

Relación de Cuicatlan (Acuña 1984: I,2: 170)	Puebla		X	X	
Relación de Xonotla y Tetela (Acuña 1985: II, 5: 387, 409-410, 424, 435, 429)	Xonotla, Tetela, Capulapa, Tutula. Zuzumba, Puebla	X	X	X	X
Relación de Quauhtlatlaucan y Huehuetlan (Acuña 1985: II, 5: 212)	Huehuetlan, Puebla	X	X	X	
Relación de Ahuatlán y su Partido (Acuña 1985: II, 5: 74, 84)	Texalucan and Coatzinco, Puebla.	X			
Relación de Cuzcatlan (Acuña 1985: II, 5: 101)	Puebla	X	X	X	X
Relación de Tistla y Muchitlan (Acuña 1985: II, 5:274)	Tistla, Puebla	X	X	X	
Relación de Chilapan (Acuña 1985: II, 5: 117)	Puebla	X	X	X	
Relación de Ahuatlan y su Partido (Acuña 1985, II, 5:80)	Puebla		X		
Relación de Misantla (Acuña 1985, II, 5:192)	Puebla		X		
Relación de Hueytlapa y su Partido (Acuña 1985: II,5: 158)	Puebla	X	X		
Relación de la Provincia de Tabasco (1898, I:325)	Tabasco	X			
Relación de la Villa de la Santa María de Victoria (1898, I: 354)	Tabasco	X			
Relación de Misantla (Acuña 1985, II, 5:192)	Tlaxcala		X		
Relación de la Ciudad de Veracruz y su Comarca (Acuña 1985: II, 5: 347)	Veracruz	X	X		
Relación de Coatzacualco (Acuña 1984: I,2: 122)	Veracruz	X	X T		
Relación de Xalapa de la Veracruz (Acuña 1985: II, 5: 347, 353)	Xalapa y Tlacolula, Veracruz	X	X	X	X

Relación de Tlacotalpa (Acuña 1985: II,5: 293)	Tlacotalpa, Veracruz	X	X	
Relación de la Ciudad de Mérida (1898, I: 63)	Yucatán	X	X	X
Relación de Mutul (1898, I:86)	Yucatán	X	X	X
Relación del pueblo de Mama (1898, I: 169)	Yucatán	X	X	X
Relación de Oscuzcas (1898, I:238)	Yucatán	X	X	
Relación de los pueblos de Tetzal y Temax (1898, I:300)	Yucatán	X	X	x
Relación de la Ciudad de Valladolid (1900, II:36)	Yucatán	X	X	
Relación de Teçoco, Tecay y Çosil (1900, II:91)	Yucatán	X	X	
Relación del pueblo de Çucopo (1900, II: 106)	Yucatán	X	X	
Relación del Pueblo de Temul (1900, II:124)	Yucatán	X	X	
Relación de los pueblos de Cacalc y Tancuy (1900, II: 148)	Yucatán	X	X	
Relación de Santiago Atitlan (Acuña 1982: 1 95)	Guatemala	X	X	
Relación de Zapotitlan (Acuña 1982, 1: 47)	Guatemala	X		
Relación de la provincia de Honduras e Higueras (1898, I:389, 390)	Honduras	X		