MORTUARY CORRELATES OF MAYA CRANIAL SHAPING IN THE PASIÓN REGION

An Undergraduate Research Scholars Thesis

by

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Submitted to Honors and Undergraduate Research

Texas A&M University

In partial fulfillment of the requirements for the designation as

UNDERGRADUATE RESEARCH SCHOLAR

Approved by
Research Advisor: Dr. Lori E. Wright

May 2013

Major: Anthropology

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ABSTRACT

Mortuary Correlates of Maya Cranial Shaping in the Pasión Region. (May 2013)

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In the Pasión region of the Southern Lowlands of Guatemala, the ancient Maya practiced various types of intentional cranial shaping. This permanent body modification was employed by different techniques, such as constricting bands wrapped circumferentially around the head or the use of compression devices, in order to attain desired head shapes. Using cranial data gathered from the sites within the Pasión region (such as Altar de Sacraficios, Seibal, Aguateca, Dos Pilas, and Tamarindito) along with the corresponding mortuary data, this paper evaluates the relationship between social status in ancient Maya society and the presence or absence of cranial shaping as well as the different types of cranial shapes. The mortuary data serve as a means to distinguish the social status of individuals in ancient Maya society be the presence or number of certain grave goods as well as the actual method of interment. The use of chi-square tests and Fisher's Exact tests allows this hypothesis to be addressed. The results show that there is no correspondence among the presence or absence of cranial modification and the mortuary data and therefore no correlation to social class. However, there are statistically significant results that exhibit patterning chronologically as well as among the sites which is consistent with cranial modification being more of an ethnic or culture change in the Pasión region.

ACKNOWLEDEMENTS

None of this research would have been possible without Dr. Lori Wright whose immense knowledge of the ancient Maya and her unwavering patience helped me every step of the way. It is through her guidance and mentorship that my love of bioarchaeology and the continuation of this field of research as a career has cemented itself within me and for that, I am forever in debt and forever in gratitude.

Much gratitude goes to the Texas A&M University College of Liberal Arts Cornerstone Fellowship, the Texas A&M University Department of Anthropology, and the Texas A&M Undergraduate Research Scholars Program for awarding me with funds in order travel to conferences where my knowledge of the ancient Maya and intentional cranial shaping were exponentially increased. It was at one of these conferences, the II Coloquio de Bioarqueología Internacional, in Mérida, México where I met Vera Tiesler whose research and theories of intentional cranial shaping profoundly influenced the interpretation of my results.

Lastly, without the constant love and support of my parents and sisters, I would not have been able to accomplish any of this research and so I dedicate this paper to them.

CHAPTER I

INTRODUCTION

Ancient societies all over the world practiced numerous forms of intentional body modifications, whether in vivo or to postmortem remains. Some of the most noticeable modifications are those performed on the head. These modifications could take many forms such as tattoos, scaring, piercings, or lip plates. However, these modifications affect the flesh and will therefore not be preserved in the archaeological record except for in rare cases meeting certain criteria that are conducive to flesh preservation, such as mummification or bodies recovered in bogs. Due to this factor, examples of head modifications that can be seen in the archaeological record are those that have affected the actual skeletal structure and shape of the skull.

Intentionally changing the shape of an individual's skull requires skillful knowledge and action during the first year or two after the birth of the individual while the bones of the skull are still soft and malleable. Cranial modification can be implemented in a variety of ways such as tight-fitting bands placed around the head or the use of cradle boards. The different apparatuses and methods are used to accomplish varying or desired styles of head shapes, such as the elongated oblique forms or the more erect forms. These different typologies vary from society to society as does the terminology which is used to describe them. As a result, the definitions and explanations of typologies can become convoluted. For this reason, past and presently used terminologies will be discussed in the following chapter.

Although cranial modification has been documented in numerous ancient societies around the world, this thesis will focus on cranial modifications in Mesoamerica and, more specifically, in the ancient Maya of the Pasión region of Guatemala. Figure 1.1 shows the Pasión area which is located in the Southern Lowlands in the modern Department of Petén, Guatemala. Within this area are the sites of Dos Pilas, Altar de Sacrificios, Seibal, Aguateca, Punta de Chimino, Tamarindito, Arroyo de Piedra, La Paciencia, and a few nearby caves from which skeletal material was recovered. The skeletal remains that are used in this study come from these sites with many of them excavated in late 1980s and early 1990s as part of Vanderbilt University's Petexbatun Regional Archaeological Project (Dos Pilas, Aguateca, Tamarindito, Arroyo de Piedra, and Punta de Chimino), the Harvard University excavations at Altar de Sacrificios in the 1950s, and from the Aguateca project by Yale University and continued later by the University of Arizona.

Figure 1.1 - Map of the Pasión region. From Inomata et al. (2007) Figure 1.1.

The reason behind this permanent body modification with respect to the ancient Maya is still unclear, though many theories have been postulated. In this study, individuals from the Pasión region exhibiting cranial modifications will be compared to their corresponding mortuary and burial data, such as skeletal elements present, orientation, position, tomb architecture, and

associated grave goods. This will be accomplished in order to evaluate the following hypothesis: individuals with cranial modifications from the Pasión region represent differences in vertical and horizontal social differentiations, but that cranial modifications act as a form of physical and social cohesion within the Pasión region.

CHAPTER II

A REVIEW OF THE MAYA AND CRANIAL MODIFICATIONS

The Maya: a brief history

The ancient Maya lived in a culturally rich society occupying a large area that comprises surprisingly differing ecosystems within Mesoamerican region. The region of Mesoamerica that the ancient Maya resided in includes parts of the modern areas of southern Mexico, Guatemala, Belize, Honduras, and El Salvador. Descendents of the ancient Maya still reside in areas occupied by their ancestors, as well as still speak the same language half a millennium after the arrival of the Europeans (Henderson 1997). The chronology of the ancient Maya is split up into three main phases: the Preclassic period (ca. 2000 B.C. to A.D. 250), the Classic period (A.D.250 to about 1000 depending on the site or region), and the Postclassic period (ca. A.D. 1000 to the early 16th century with the Spanish conquest). These phases are further broken up into the Early, Middle, and Late Preclassic, the Early, Late, and Terminal Classic, and the Early and Late Postclassic. The specific years for each of these phases will not be discussed here as they can vary from site to site or region to region. However, for the purpose of this study, the specific dates of these periods will be discussed in Chapter III over the history of the Pasión region as the dates relating to those sites are very relevant. Though many people think all of the Maya lived in humid tropical rainforest environments, they resided in many diverse environments. These environments include highlands full of pine trees, desert-like valleys, and of course the tropical rainforest with each ecosystem containing a wide variety of flora and fauna (Henderson 1997)

The Maya area is composed of three main regions: the Northern Lowlands, the Southern Lowlands, and the Highlands. The Northern Lowlands area is mostly comprised of the Yucatan Peninsula where the majority of modern Maya still reside. During the Preclassic, small farming villages were the main settlements. By the first century A.D., public buildings made of stone were being constructed. As the settlements grew larger and eventually into cities, a social hierarchy started to emerge, especially in the larger cities in the northern Yucatan. The Classic period in the Northern Lowlands experienced massive growth with large cities in the North becoming very powerful and influential, such as Chichen Itza, Dzibilchaltun, Uxmal, Coba, and Oxkintok (Henderson 1997). At the end of the Classic period, these large cities had all collapsed and the city of Mayapán emerged as the new dominant city. However, by the time the Spanish arrived in the 16th century, the area had become politically fragmented with small cities vying for an almost nonexistent power or dominance over each other.

The Southern Lowlands area stretches from the southern part of the Gulf of Mexico in the west to the Gulf of Honduras in the east. However, the Southern Lowlands do not reach down into the Pacific Ocean, but to the northern edge of the Sierra Madre de Chiapas Mountains. The Southern Lowlands lie in an area that receives heavy rainfall each year. Contrasting to the other regions, this area has many lakes, such as the Lake Petén Itzá in Guatemala. Rivers, such as the Usumacinta and the Río Pasión, originate up in the Highlands and travel through the Southern Lowlands. These rivers are near many of the larger cities in the area. Like those in the Northern Lowlands, the Preclassic Maya of the Southern Lowlands were farmers living in small settlements. Large-scale construction projects were already underway a few centuries before the 1st century A.D., giving rise to large cities such as Tikal, Calakmul, El Mirador, Caracol, and

Nakbé. The Classic period experienced enormous growth in population, architecture, art, and elaboration. One of the most important regions within the Southern Lowlands is the Petén, reaching from Belize to parts of Guatemala. The Petén witnessed massive growth during the Classic with the establishment of many large and powerful cities.

The final region of the Maya world is the Highlands. This region is made of a volcanic cordillera that contains the headwaters for many of the important rivers throughout the Maya area such as the Río Usumacinta, the Río Pasión, and the Río Motagua. More than a dozen Mayan languages are spoken in the area today (Henderson 1997). Not as much is known about the ancient Maya in this area as is in the Northern and Southern Lowlands. Archaeological evidence for the Highlands does not display the same type of diversity in art and architecture as in the other regions. However, there were a few large Maya cities with large-scale monumental architecture. Two of these main cities in the region are Kaminaljuyú and Toniná. Since there is such a difference between the art and architectural styles in the Highlands and the Lowlands, the cities and sites in the Highlands are sometimes not even considered to be truly Maya by some scholars.

Terminology

Before the history of and extent of knowledge of cranial modifications in Mesoamerica and the Maya region can be discussed, it is necessary to address the multiple terms and meanings surrounding the practice of changing the shape of a skull. Since this phenomenon has been studied in archaeological specimens for over a century, multiple and sometimes contradicting terminologies have been used by different archaeologists, therefore confounding the meanings

though this is most likely not the intention. As in other fields within and outside of anthropology, it is necessary to keep a regulated set of terminologies of that is used and understood by all, researchers and readers alike. Therefore, as stated earlier, in order to prevent any confusion in this study, a discussion of terms and phrases is first and foremost necessary to alleviate any confusion as a set of terminologies for this topic has yet to be regulated.

There are many words that are used to describe the phenomenon of intentional cranial modification. One of the first terms used was 'cranial deformation'. This phrasing, although technically correct, poses some problems. The use of 'deformation' implies that the irregular shape of the skull is due to some defect or possibly even a pathological condition. 'Deformation' imparts upon the reader that the individual might be unhealthy, abnormal, or that their physical appearance might be due to some congenital defect. In reality however, the shape of the skull is intentional and completely cultural. This word carries with it a negative connotation that can change how the reader might view or interpret the practice. Cranial shaping was a very carefully thought out and traditional procedure with the Maya by the time that the Spanish explorers arrived in the New World. Therefore, using the term 'deformation' to describe this does not convey the correct mentality or idea behind the aesthetic practice.

Another term that has already been used a few times thus far is 'cranial modification'. This value-free phrasing is more accurate in the attempt to convey the true form of the practice. The shape of the skull is being changed and modified from its original and natural form. 'Modification' eliminates the implication of a pathological condition or defect that is present in 'deformation'. The use of 'modification' is more successful in its attempt to describe the

physical description of this procedure than does 'deformation' inasmuch as it more correctly implies its intentionality. However, the term 'modification' conveys the physical form of the skull and does not truly address cultural meaning.

Another phrase, 'cranial modeling' is more accurate in this area. 'Cranial modeling' brings forth the cultural context behind the practice because if an object is modeled, it has been morphed and changed into what the modeler has envisioned. It implies more of a sense of creation and rendition rather than merely tweaking with the original form.

There is yet another phrase that has recently come more common. 'Cranial shaping' has started being used more and more when referring to this practice. I believe that this term acts as a bridge between the meanings and ideas behind the uses of 'modification' and 'modeling' though the metaphorical gap between them is not all that large. 'Cranial shaping' addresses the physical and biological form of the skull changes, their *shape*, while simultaneously addressing the cultural aspect and the intentionality of the practice, the *shaping* into the desired form.

There is also a small debate as to the uses of the phrases '*artificial* cranial shaping' and '*intentional* cranial shaping'. The use of 'artificial' presents an idea that these skull forms are fake or not real compared to unchanged skulls. I believe that the term 'intentional' is more accurate as it is more successfully conveys the idea that the shape of the skull was purposefully changed while 'artificial' fails to do so (Tiesler, personal communication, Oct. 2012).

The terminology for this cultural practice has been relatively unregulated and moderated since its discovery in human remains by archaeologists in the 19th century. Many of these terms and phrases convey slightly different ideas and meanings about the practice. The implementation of all of these different terms to convey the correct meaning in the correct sense would be very confusing and confounding and almost impossible to keep track of. Therefore, the term 'cranial modification' will be used throughout this study to refer to the compression of the cranial bones of individuals to achieve a head shape differing from what would be considered 'natural.'

What is cranial shaping?

Intentional cranial shaping is a phenomenon that has been documented in archaeological specimens all over the world. There are many styles and forms of cranial modifications, as well as different apparatuses used in order to achieve these certain desired head shapes (Tiesler 2012a). The cranial shaping process begins soon after birth while the bones of the skull are still malleable and have not yet fully ossified. This allows the calvarium to be modeled into the desired shape. In order to achieve different head shapes, various methods and apparatuses are implemented (Tiesler 2012a; Dembo and Imbelloni 1938). Accompanying these different head shapes are degrees in severity in their expression as some are more pronounced than others. The severity of the modification is due to how long the skull in induced to the shaping apparatus, as well as how frequently. Therefore, the longer the child endures the shaping process and the more frequently the apparatus is applied, the more marked and prevalent the cranial shape will be.

One of the first noticeable patterns that can be seen in collections of specimens with cranial modifications is the different styles and shapes of crania. There are many types and styles but

many scholars place them into two main categories: the annular and the tabular forms (Dembo and Imbelloni 1938).

Cranial shaping in ancient Mesoamerica

Intentional cranial modifications have been scientifically studied in Mesoamerica since the early 20th century. However, archaeological explorations had much deeper roots in the Old World. Therefore, the majority of classifications and typologies used by archaeologist in the early 20th century were based on Old World ideas and techniques. These European models and influences did not necessarily align with the vastly different societies of the New World. Though cranial modifications were first described in Europe by Hippocrates in 400 B.C., true analyses were not conducted until the 19th century (Duncan and Hofling 2011). Many authors formed their own classifications with a varying array of typologies ranging from nine to sixteen different cranial modification categories. It was not until the works of Dembo and Imbelloni (1938), however, that a classification system would be specifically designed for the Andean region.

Previous classifications mainly focused on descriptions and shapes of the skulls that would then aide in placing them into typologies. Dembo and Imbelloni (1938) were the first team to create a classificatory system that not only analyzed specific compression techniques that would achieve the desired shapes, but also studied different apparatuses that would accomplish this task.

The two overarching categories of cranial modification are the annular forms and the tabular forms (Dembo and Imbelloni 1938). These two forms differ in their approach to the final cranial shape, giving them very different end results. The annular form is accomplished by the use of

constricting bandages or elastic bands that are circumferentially wrapped around the head (Dembo and Imbelloni, 1938; Tiesler, 2012b). Sometimes referred to as the 'orbicular' modification, the annular types are not as common in the Maya area and are not in this specific sample and will therefore not be addressed further in this study.

The second main category described by Dembo and Imbelloni (1938) is the tabular form. This form differs from the annular forms by the implementation of compression boards instead of tightly wound bands. Many different apparatuses were used to achieve the tabular forms (see Figure 2.1). Dembo and Imbelloni (1938) divided the tabular forms into two distinct types: tabular oblique and tabular erect.

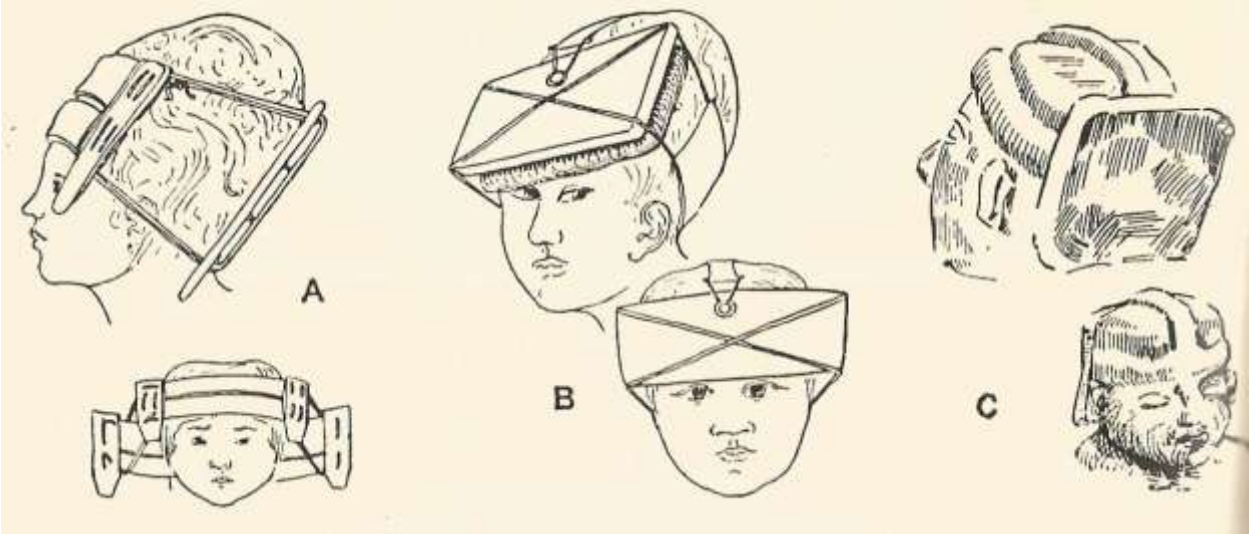

Figure 2.1 - Different compression devices used to shape the cranium. A: modification apparatus for the tabular oblique type; B: tabular oblique modification apparatus; C: carved statue showing a tabular erect modification apparatus. From Dembo and Imbelloni (1938), Figure 121.

Individuals with the tabular oblique type of modification are most easily identified by the elongation of the skull both superiorly and posteriorly. As shown in Figure 2.1A, 2.1B, and 2.2, this is accomplished by applying pressure along the frontal and the occipital planes of the cranium, most commonly referred to as fronto-occipital flattening (Tiesler 2012a; Dembo & Imbelloni 1938). Since these two compression planes result in a superior-inferior flattening of the skull, the bones therefore adjust their growth patterns and grow out laterally. The result of this is an overall wider calvarium than an unmodified skull would exhibit. The laterally growing parietals can be dealt with during the modification process if it is not desired. Tiesler (2006) describes that the head shape of K'inich Janaab' Pakal, the ruler of Palenque during the Classic Period, was tabular oblique and that the bilateral width of the skull was not too severe. She posits that along with the compression device, bands wrapped around the head were most likely used to minimize this bilateral width, though preservation issues hinder conclusions of this theory.

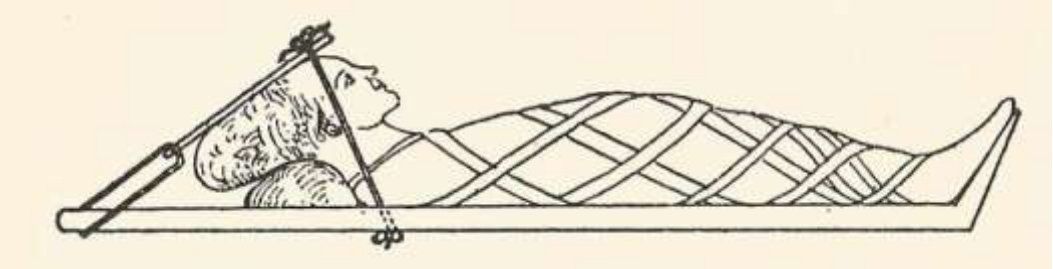

Figure 2.2 - Compression apparatus for the tabular oblique type. From Dembo and Imbelloni (1938) Figure 123.

When dealing with a fragmented skull exhibiting possible modification, the most tell-tale sign of a tabular oblique modification is the presence of a post-coronal sulcus. This is a sulcus that runs bilaterally across the parietals posterior and parallel to the coronal suture. Coinciding with this is a pre-coronal raised margin that also runs bilaterally, thus accentuating the post-coronal sulcus. These two may be the result of the modification process. This would mean that the apparatus used to shape the head caused the post-coronal sulcus.

In tabular oblique modifications, the frontal bone is usually severely flattened giving a very posteriorly sloping forehead on an individual. While in many cases, the frontal bone is flat, other cases of tabular oblique modification have a concavity of the frontal. This is a direct result of the head shaping apparatus in which a pad is placed on the forehead to mediate the pressure, thus causing a concave sagittal outline (Tiesler 2006). Within the tabular oblique type are some varieties.

The second of the two cranial shapes that is very common style throughout the Maya area and Mesoamerica is the tabular erect variety. Unlike, tabular oblique, tabular erect forms do not result in the elongation of the cranium, but almost have the opposite effect. In tabular erect cranial modification, the posterior compression is the most dominant force applied (Tiesler 2012a; Dembo and Imbelloni 1938) (see Figure 2.1 C above). Pressure on the frontal plane can also be applied, but it is not as prominent as the posterior compression. This results with the back of the head exhibiting a flattened and erect appearance, hence the name. In some instances, pressure is applied directly on the superior portion of the head, flattening it, giving the head a

square shape (Tiesler 2013). See Figure 2.3 for a comparison of the tabular oblique and tabular erect types.

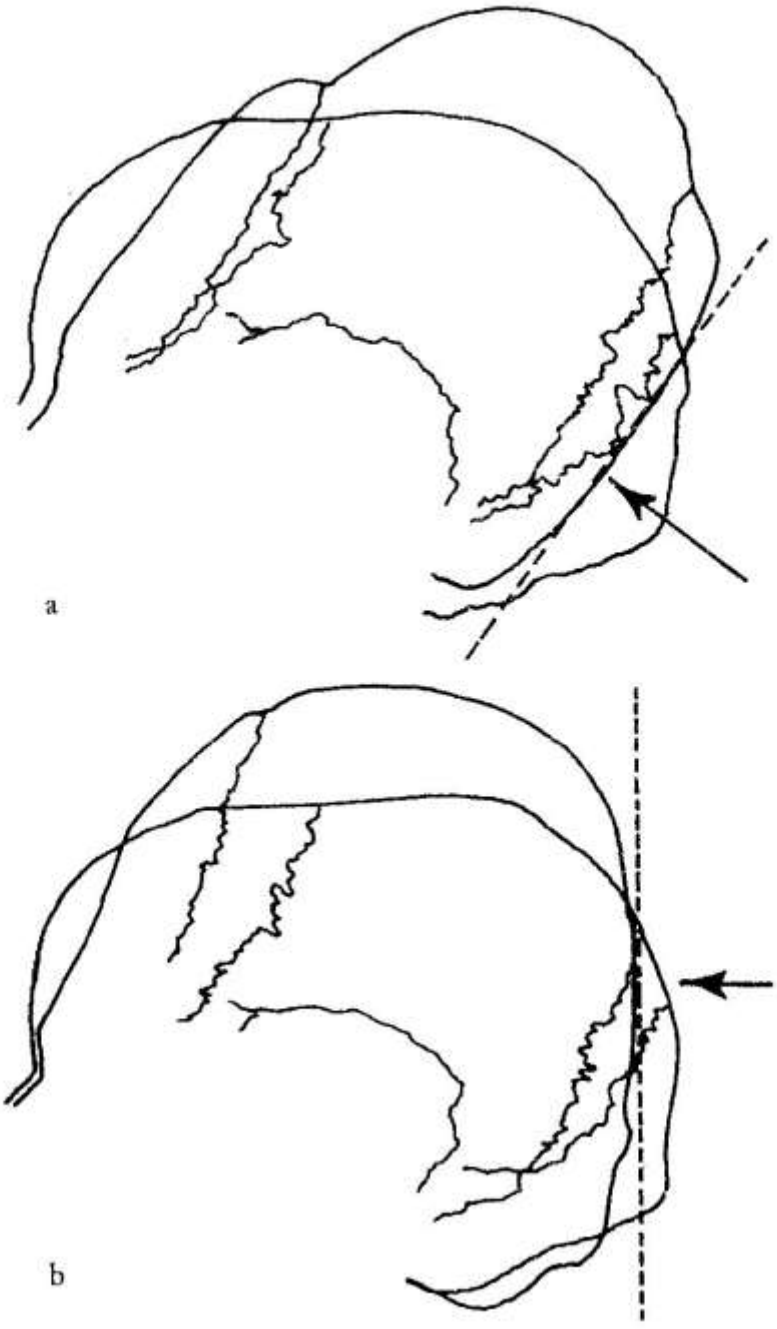

Figure 2.3 - Comparison of unmodified crania to modified crania; (a): tabular oblique; (b): tabular erect. Modified from Dembo and Imbelloni (1938) Figure 93.

Cranial shaping in the Maya world

The reason the Maya conducted such a time-intensive and permanent body modification is still debated and not entirely understood today. Iconographic representations of head shaping can be seen on many examples of pottery, stelae, statues, wall reliefs, and even some of the few surviving frescoes and wall paintings. There have been multiple and previous studies on the origin and reason behind such a practice, but due to lack of written records of the Maya that have survived to present day, it is still not fully understood.

Two of the most prevalent hypothyses behind the purpose of cranial modifications are for aesthetic reasons and also for vertical and/or horizontal social differentiations (Duncan and Hofling, 2011). The former is reason has an easier explanation as this practice can be easily identified upon a person depending on the severity of expression of the modification. These head shapes could have possibly been seen as a form of style or fashion that one would simply wear for the rest of their lives. People may have conducted this procedure simply because they could and they like the way they looked. What one culture or society considers socially acceptable and beautiful is completely subjective, but this behavior is almost impossible to observe in ancient and past societies. Without references such as written documents specifically addressing this issue, there can be no validation of such a claim, though it may appear a completely logical.

The other aspect that Duncan and Hofling (2011) mention is that of social differentiations, whether horizontally or vertically. The easiest of these to test would be the aspects of vertical social hierarchy with respect to cranial modifications. The head shapes of skeletal remains from easily identifiable elite or royal tombs and burials could be compared to head shapes of individuals from burials who have been identified as commoners or rural farmers. Though this can be and has been tested easily enough, the results can be quite conflicting. Tiesler (1998) explored this possibility in her study of the Maya settlement at Copan. According to Tiesler, there was a noticeable pattern in the forms of head shaping between different social strata. Individuals who had been attributed to the elite or noble arena of Copan society failed to exhibit any erect forms of cranial shaping. By contrast, individuals who were buried on the periphery of the site exhibited a higher rate of erect forms (Tiesler 1998). These data show that for the city of Copán, head shaping appears to have been an indicator of social status as the elite members of the society do not show any reported cases of the erect varieties while individuals belonging to lower economic status are much more likely to have erect head shapes. Though the erect variety may not be directly linked to a lower status but could indicate that the individuals were not originally from Copan.

This instance of head shaping as a vertical social factor cannot be accurately applied throughout the entire Maya area. In another study, Tiesler (2006) analyzed the remains of the ruler K'inich Janaab' Pakal of Palenque. According to epigraphic data, Janaab' Pakal reigned as the ruler of Palenque (Lakanhá) from A.D. 615 until his death in 683 (Tiesler 2006). Iconographic images of this ruler show him with a tabular oblique head shape, such as the Oval Tablet depicting his coronation and ascension into power at the age of 12 years old. Though the skeletal remains of

the ruler are not well preserved, cranial modification was observed. The head shape of Janaab' Pakal was scored as pronounced tabular oblique created by a free head-compression device (Tiesler, 2006). However in this case, this same type of head shape was documented in the majority of the people of Palenque, thus eliminating head shape as a social factor between the classes. It appears that specific head shapes and varieties have the potential to act as indicators of the social strata, yet this must be taken with caution as this phenomenon can occur on a site-to-site basis. No generalities can be accepted as fact in reference to head shapes and vertical social interactions.

Cranial modifications can also function socially in a horizontal fashion (Duncan and Hofling, 2011). In this sense, specific head shapes may have been favored by the Maya as a whole region, though there are multiple varieties, and are distinguishable iconographically from foreigners or outsiders. As discussed above in the Oval Tablet from Palenque, Janaab' Pakal exhibits a very distinctive variety of cranial modification, as does his mother who is also seen in the tablet. Unlike this representation, and possibly even exaggeration, of cranial head shapes on two true Maya, the head shape of an individual on a stela from Seibal is quite different. Stela 11 (Graham 1996:34) from Seibal shows a man with a different head shape, possibly unmodified or some other slight form of modification, that is distinct from most depictions of the Maya in that region.

An explanation for this difference in depictions of Maya versus non-Maya head shapes, and also another possible explanation for cranial modification in the first place, is the way the Maya viewed themselves. This includes there social personae and what it means to be truly Maya.

Duncan and Hofling (2011) address this in their assessment of embodiment and cranial modifications. Body modifications define and support who an individual chooses to be and how they identify themselves within a group. Due to the large number of individuals who partook in this behavior (or, more exactly, were modified by adults), cranial modifications may have acted as a form of social cohesion. Further yet, it may have also acted as a form of social integration, a way of becoming part of the community (Duncan and Hofling 2011). As discussed earlier, this could be a consolidation of social status or communal cohesion, yet it may also have acted as a defining ethnic factor that differentiated the Maya from outsiders and foreigners.

CHAPTER III

THE PASIÓN MAYA

Topography of the Pasión area

The Pasión region is an area that lies in the southwestern section of the Department of Petén, the largest and northernmost department of Guatemala. This region contains the area surrounding the Río del la Pasión and its subsequent tributaries, as well as other large rivers in the area. The Río de la Pasión has its headwaters in the highlands to the south, in Alta Verapaz (Wright 2006). A tropical climate dominates the landscape with an average temperature of 25°C and an average annual rainfall of 2,000 mm (Wright 2006). This climate would have thus allowed a wide variety of flora and fauna to have naturally occurred in the area, both on land and in the rivers.

One of the main rivers in this region is the Río de la Pasión which makes up the eastern and northern borders, though there is one site that lies on the northern side of the Río de la Pasión which will be discussed shortly. There is also another large river in the area called the Río Salinas which comprises the western border of the Pasión region. This Río Salinas then becomes the Río Usumacinta (the river that serves as the northwestern border of Guatemala and Mexico) just north of its confluence with the Río de la Pasión. There are also many tributaries and creeks (*riachuelos* in Spanish) that flow into the Río de la Pasión. Of these numerous creeks, the most important (in relating to the ancient Maya) is the Riachuelo Petexbatun, a tributary which flows north into the Pasión. The origin of this tributary is from the largest lake in the Pasión area, the Laguna Petexbatun.

History of the Pasión region

There have been many documented sites in the Pasión region, yet only those which have been excavated and those from which mortuary data has been collected will be used in this study. These sites include larger cities such as Altar de Sacrificios, Dos Pilas, Aguateca (and its subsequent grietas), and Seibal, along with smaller sites such as Punta de Chimino, Tamarindito, La Paciencia, Arroyo de Piedra, Quim Chi Hilan, intersite rural settlements, as well as some small cave deposits. Within the larger Pasión region is a smaller area known as the Petexbatun region which includes the land and sites that lie west of the Riachuelo Petexbatun. As previously discussed, this Riachuelo Petexbatun is a tributary that flows north and feeds into the Río de la Pasión. Of the sites listed above, those within the Petexbatun region include Aguateca, Dos Pilas, Arroyo de Piedra, Punta de Chimino, Quim Chi Hilan, and Tamarindito. It is in the Petexbatun region where there was the greatest density of Maya settlements in relation to proximity from one site to the next.

The Pasión region has had a very rich cultural history with settlements ranging in occupation from the Preclassic to the Terminal Classic and so the following brief history of the Pasión region will be presented in a chronological order.

The Preclassic

Archaeological evidence has shown that the earliest settlements in the Pasión region date to the Preclassic Period, but more specifically, the Middle Preclassic, dating from around 900–600/500 B.C. (depending on the site). These settlements were the beginnings of Altar de Sacrificios and Seibal with ceramic assemblages of the Xe, Real, and Isep phases respectively. During the

Middle Preclassic, each of these three sites consisted of small villages with no known public architecture. Excavations at Altar de Sacrificios and Seibal revealed that the villagers of these sites took advantage of the local flora and fauna for sustenance, as well as implemented agriculture (Willey 1973, 1990). However, there appears to be no evidence of settlements in the Petexbatun region during the Middle Preclassic Period.

During the later part of the Middle Preclassic (600-300 B.C.) public and monumental architecture was constructed at Altar de Sacrificios and Seibal. Most of these larger architectural feats were created with a limestone foundation topped with some kind of perishable superstructure, such as a wattle-and-daub structure. The sudden presence of large-scale architecture usually means an increase in population and/or the formation of some kind of hierarchical system. In the case of these sites, it is most likely both, though true and exaggerated population increase and hierarchies do not appear until the Late Classic Period.

It is not until the Late Preclassic (300 B.C.-A.D. 150-300) that there is evidence of small settlements in the Petexbatun region at the sites of Tamarindito, Aguateca, Punta de Chimino, and Arroyo de Piedra. However, these sites do not reach a large population or construct many large-scale architectural structures until the Late Classic. Large-scale architecture was constructed at Altar de Sacrificios and Seibal, many of them being ceremonial, as well as already existing structures were expanded. This again is all related to a large increase in populations in all of the sites. It has been estimated that during the Late Preclassic, the population of Seibal may have even reached between 5,000 and 10,000 (Willey 1990).

The Early Classic

Despite the population boom of monumental architecture during the Late Preclassic, some of the site in the Pasión region underwent a population decrease during the Early Classic Period (A.D. ca. 200-500). This occurred at Seibal and does not appear to change until the Late Classic Period. Hieroglyphic examples disappear during this phase, even at Altar de Sacrificios. However, unlike Seibal, the population at Altar de Sacrificios did not decrease. Some buildings were even expanded and brought up to their highest elevation during this period. Arroyo de Piedras and Tamarindito both saw the growth of local dynasties and communities in the Early Classic period, but neither were large sites.

The Late Classic

The Late Classic Period (A.D. 600-850/900) was a time of great flourishing of art and architecture, increase in population, and greater stratification of the social classes not only in the Pasión region, but in the entirety of the Maya world. During the first half of the Late Classic, large architectural elements were constructed at Altar de Sacrificios, such as temples and the ball court. It was also during this time that many of the monuments stopped being constructed out of the local sandstone. Instead, limestone was preferred and had to be shipped in from an outcrop downriver, thus increasing population along the route. Unlike many of the sites in the Pasión, Altar de Sacrificios appears to have been politically independent from any of the other sites. The city never had a twin capital, as is the case with two sites in the Petexbatun region, nor was it ever dominated by another city (Willey 1973).

Seibal underwent many changes during the first part of the Late Classic. The population increased to its former size and then constructed many new buildings, as well as added on to some already existing structures. During the first half of the Late Classic, Seibal followed the same trend as Altar de Sacrificios in that is was politically independent from the other sites, yet it never expanded to control other cities. However, this city's ruler was captured and sacrificed in A.D. 735 by the ruler of Dos Pilas, thus falling under its control for around 60 years. After Dos Pilas started to lose power, Seibal broke away and became a political powerhouse.

The Petexbatun region truly flourished during the Late Classic. Aguateca and Dos Pilas rose to become the leading powers in the area, surpassing Tamarindito, Punta de Chimino, and Arroyo de Piedra which had previously been the larger settlements. The main cultural center and political dominance of the Petexbatun region was located at Dos Pilas for most of the Late Classic, though it does shift to Aguateca at the tail end of the period. During the seventh century, a royal lineage from Tikal arrived and established a dynastic legacy and capital at Dos Pilas (Demarest 1997; Houston 1993). This new ruling class was the reason for the numerous monumental, public, and ceremonial architectural structures that were built during the Late Classic. This propelled Dos Pilas to become the most dominant city in the Petexbatun region was a very politically powerful city during this time, conquering other cities, strengthening ties with marriages to elites from other cities and even waging war with Tikal. Due to the large amount of power that Dos Pilas held, the city most likely controlled the Laguna Petexbatun and its tributaries, thus allowing the city to monitor and regulate trade within and outside of the Petexbatun area (Demarest 1997). Conflicts with nearby Tamarindito also occurred and may have been the reason of the power shift from Dos Pilas to Aguateca near the end of the Late

Classic. Around A.D. 760, the whole area seemed to enter into a period of warfare, not with foreign enemies, but with each other. Fortified areas and structures have been uncovered at most every site along with large defensive walls at the sites of Dos Pilas, Aguateca, and Punta de Chimino, the last of which even had moats (Demarest et al. 1997).

The Terminal Classic

Though many cities throughout the Maya world survived into the Terminal Classic, not many retained the former glory of the Late Classic. The Pasión region is no exception and might even be more played out than in other regions in the Maya area.

At Altar de Sacrificios, no new monumental construction projects appear and the population seems to decrease based on the number of occupied house mounds. The site thus appears to be completely abandoned by A.D. 950 (Smith 1972).

Seibal seems to have endured a different fate though. After the fall of Dos Pilas, Seibal regained its independence only to be defeated by a ruler from Ucanal in A.D. 830. The new ruler from Ucanal modified some of the existing structures, as well as built several new ones. Excavations show that the population density of the city increased after this and could be the result of immigrants coming from the Petexbatun sites, though the exact cause is not known. Though, like Altar de Sacrificios, the site core was eventually abandoned in the early part of the 10th century. There appears to be some evidence, though, of small settlements after the large abandonment, yet these did not persist past A.D. 1000 (Tourtellot 1990).

The Terminal Classic in the Petexbatun region is quite a different story from the rest of the Pasión area. After the fall of Dos Pilas near the end of the Late Classic, Aguateca became the leading center in the area. However, the smaller sites of Arroyo de Piedra and Tamarindito lasted longer than the two previous large capitals, though all sites had heavily declining populations. The only site in the whole Petexbatun area, even in the Pasión region, that lasted well into the Terminal Classic was the small center of Punta de Chimino. This site may have had political autonomy throughout its entire history, most likely due to its somewhat secluded location on a peninsula in Laguna Petexbatun. Multiple structures at this site were built during the Late Classic Period. The Terminal Classic did not witness any new constructions, but the structures were used and occupied into the Terminal Classic. Though it was the longest occupied site in the Petexbatun area, Punta de Chimino appears to have been abandoned around A.D. 950 based on ceramic chronology.

The omnipresent notion of the "Great Maya Collapse" was not correct for every area of the Maya sphere. Current research does not support the hypothesis that the Classic Maya collapse was due to a singular event, such as a drought, deforestation and overhunting, or a peasant revolt that affected their entire civilization. Though many, if not most, of the Maya cities did experience a decline in population, building, and customs during the ninth century A.D., some cities did not even reach their zenith until the Terminal Classic Period. Most scholars now believe that the collapse was on an area-to-area basis with different factors affecting each. However, the Pasión region appears to have experienced collapse earlier than many other lowland areas. Numerous wars between the sites in the area led to political instability, and vice versa. As a result, population decreased significantly until the site cores were abandoned and small periphery

settlements dotted the landscape. However, the Pasión region underwent this dramatic collapse relatively quickly and even earlier than most other areas of the Maya world (Demarest 1997, 2006; Demarest et al. 1997).

The cultural history of the Pasión region is multi-faceted. This region has a vibrant mixture of sites ranging from large and powerful cities to small and secluded villages. While some sites appear to have remained politically autonomous, others were waging war, creating and strengthening ties with other areas, or being conquered by foreign entities. The Pasión area is a unique glimpse at the well documented history of a region where so many closely situated cities and settlements interacted with one another.

CHAPTER IV

METHODS

Multiple methodologies are implemented in various facets of this study. First, there is the collection of biological data that must be addressed. In order to examine correlations within the sample of skeletal material, the skeletons must be scored to categories such as the sex of the individual and age-at-death.

Methodological Approaches to the Skeletal Material of the Pasión Region

Skeletal remains of the ancient Maya can sometimes pose a major problem to the osteologist or bioarchaeologist. Due to the humid conditions of the area occupied by the Maya, preservation of organic materials can be very random between and even within regions and sites. Some burials may contain nearly complete skeletons while others will only present a few teeth and mere fragments of a few bones. Due to this reason, the application of standard osteological techniques will not always allow the observing osteologist to obtain all the data that is desired and multiple resources must be implemented.

The skeletal material from the sites of Altar de Sacrificios and Seibal were not originally scored by Wright. However, Wright went back to the collections of these two sites and re-scored the skeletal material using the criteria she employed in her study of the Petexbatun samples, thus

ensuring that all of the individuals were scored using the same system so as to be as consistent as possible (Wright 2006).

The sex and age-at-death of the skeletons from Altar de Sacrificios were originally determined by Saul (1972) following the methods laid out by Hooton (1946), Krogman (1962), Brothwell (1963; 1965), Anderson (1962) and McKern and Stewart (1957) along with techniques from H. L. Shapiro. The age-at-death of the individuals were scored on a five-year increment scale (e.g. birth–4, 5–9, etc.). However, this was not always possible, especially with more mature individuals who were scored on broader intervals. Individuals from Seibal were originally studied by Saul and published by Tourtellot (1990) with the same methods implemented as above.

The sex and age-at-death of the individuals from the Petexbatun region were analyzed by Wright (1997a; 1997b; 1999; 2006). In the process of studying the remains of the individuals from these sites, Wright also re-examined the skeletal remains from Altar de Sacrificios and Seibal using the same criteria as was used in the Petexbatun projects. The original methods that were used to determine the sex and age-at-death of these two sites had by this point become dated. The rescoring of these individuals was accomplished using the more current and up-to-date methods that allowed a more accurate sex and age distribution throughout the entire Pasión region.

The remains from the Pasión region were examined by Wright using multiple methods to determine the sex, age-at-death, paleopathological conditions, and many other skeletal markers that help determine the demography of the area. However, only the first two are truly relevant

for the purposes of this study. Therefore, only the methodology for sex and age-at-death determinations will be addressed.

Definitions of Mortuary Variables

When encountering a burial during an archaeological excavation, there are numerous, and sometimes seemingly endless, individual markers to observe and score within just one burial. Though gathering as much data as possible from burials and the skeletal remains is the general and even required practice now, it was not so much the case during earlier excavations. Saul (1972) brings this point to light in his osteobiographic analysis of the Altar de Sacrificios skeletal remains. He notes that at the time of the publication of his monograph that very minimal data were recorded when encountering Maya burials and skeletal remains, limited to data on sex, age-at-death, and cultural manipulations on skulls and teeth. Although he acknowledges that these are important markers, Saul (1972) calls out for a more detailed approach when excavating and analyzing Maya burials and indicates only a handful of reports that do more than aforementioned criteria. Saul also points out that up to the point of his publication (or during the time when the excavations took place in the 1960s) most of the information about ancient cultures came from the ceramic artifacts and architectural elements that were discovered at sites. These are highly valuable as they teach us how technologies changed over time or how political hierarchies were consolidated and cities built and conquered. However, these are ultimately the *products* of the ancient people in question, but what about the actual people themselves? Do not the remains of the creators of the art and architecture deserve any attention or merit? It was not until the late 1960s and early 1970s that theories over mortuary practices and the skeletal remains truly exploded and became a focal point of archaeology.

With this new and great interest in burial and mortuary data, a need to derive ways to observe and record mortuary data shortly followed. Data collection and scoring methods for the skeletal material (such as sex, age-at-death, etc.) has well been established up to this point and still follows certain guidelines that are widely accepted and used though there is still ongoing research in order to more accurately determine these criteria. However, since each culture is as unique as the next, there cannot possibly be a single system that would work for all of the ancient cultures across the world. The tholos tombs of the Minoans of Bronze Age Crete cannot be studied in the same way that the tombs in the Valley of the Kings in Egypt are studied or in the same way as the ancient Andean societies of South America. There is no catch-all system. Instead, systems must be tailor-made for each culture, or even for regions within a single culture in some cases.

Since the data used in this study were collected from a compilation of separate excavation projects that were conducted from the 1950s all the way through the early 1990s, it can be easily assumed that there is an asymmetry between the terminologies employed and the individual markers in the burials that were scored. As mentioned previously, this is due to the progression and fine-tuning of mortuary analysis and the field of bioarchaeology over time. However, through the research of Dr. Lori E. Wright, burial data from the Pasión region has been consolidated with the end results in her book (Wright, 2006).

With these consolidated data, the burial styles were scored by Wright (2006) who employed the methods set by Welsh (1988) in his study of Lowland Maya burials in the Classic period. Welsh

(1988) was one of the first scholars to bring together the multiple burial methods recorded across the Maya Lowlands and create a single system from which to score and evaluate them, a major step in the direction of standardizing mortuary studies in the Maya world.

When dealing with mortuary practices from any culture, there is always some sort of sampling bias. This can be from only finding males or females, the absence of adolescents, and even specific ways of interment. Though this bias is unintended, it is ever present, yet the significance it has on the data set as a whole may or may not be visible. Within the sphere of Maya mortuary burials, however, the sampling bias arises in the location that the ultimate burial takes place. While many other cultures have well-planned and easily identifiable areas of corpse disposal such as cemeteries or mausoleums, the Maya did not conform to this behavior. Locations of corpse disposal range from underneath the floors of domestic structures, plazas, temples, ceremonial buildings, in *cenotes*, and in caves, just to name a few (Wright, 2006; Smith, 1972; Tourtellot, 1990).

The reason for using mortuary data when studying cranial modification is to test whether or not there is any association between presence or type of cranial modification and an individual's social status. The mortuary data helps define parameters as to what is considered a high status individual compared to a lower status individual.

One indicator of potential elevated status is the presence of jade or jadeite within a grave, whether it is in the form of beads, a carved figurine, or even in its raw form. For the ancient Maya, jade was a very precious stone that had aesthetic as well as symbolic meaning. Rulers and

individuals in positions of leadership are often linked with jade, defining it as a commodity reserved for those in higher positions. Jade has also been linked to maize, wealth, and water (Taube 2005). Taube (2005) has also made the argument that jade represented an individual's essence or a physical representation of the breath spirit. This coincides with some of the burials in the Pasión region where a lump of hade was found in the mouths of some individuals. Nonetheless, jade was a non-local stone in the Pasión region and would therefore had to have been imported. Those who could afford to have jade imported or could trade for it would have been of the upper echelons of Maya society.

Different forms of ceramic vessels and the number of ceramic vessels present in a grave were also recorded. The presence of different ceramic vessel forms can indicate social status by one form being favored over another by the different strata of society such that a bowl may have been a very common vessel and available to everyone while a vase or a jar may have been more valuable and therefore only available to upper class citizens. The vessel count for the graves has also been taken into account. As with the presence of jade, a high number of vessels in a grave seems to be reserved for those of elevated status. Figure 4.1 shows an example of a high status grave with a large amount of ceramic vessels. For the purpose of this study, vessels counts have been modeled after Wright (2006) such that true vessels count has been recorded only as a grave having less than six vessels in a grave and six vessels or more. As reported in Wright (2006), six seems to be a good cutoff because there is an ample number of graves that contained four or five vessels, but few that contained six or more. Therefore, six or more vessels serves as a good boundary for those who were buried with many ceramic vessels (individuals of higher status) compared to those who were buried with fewer vessels (individuals of lower status).

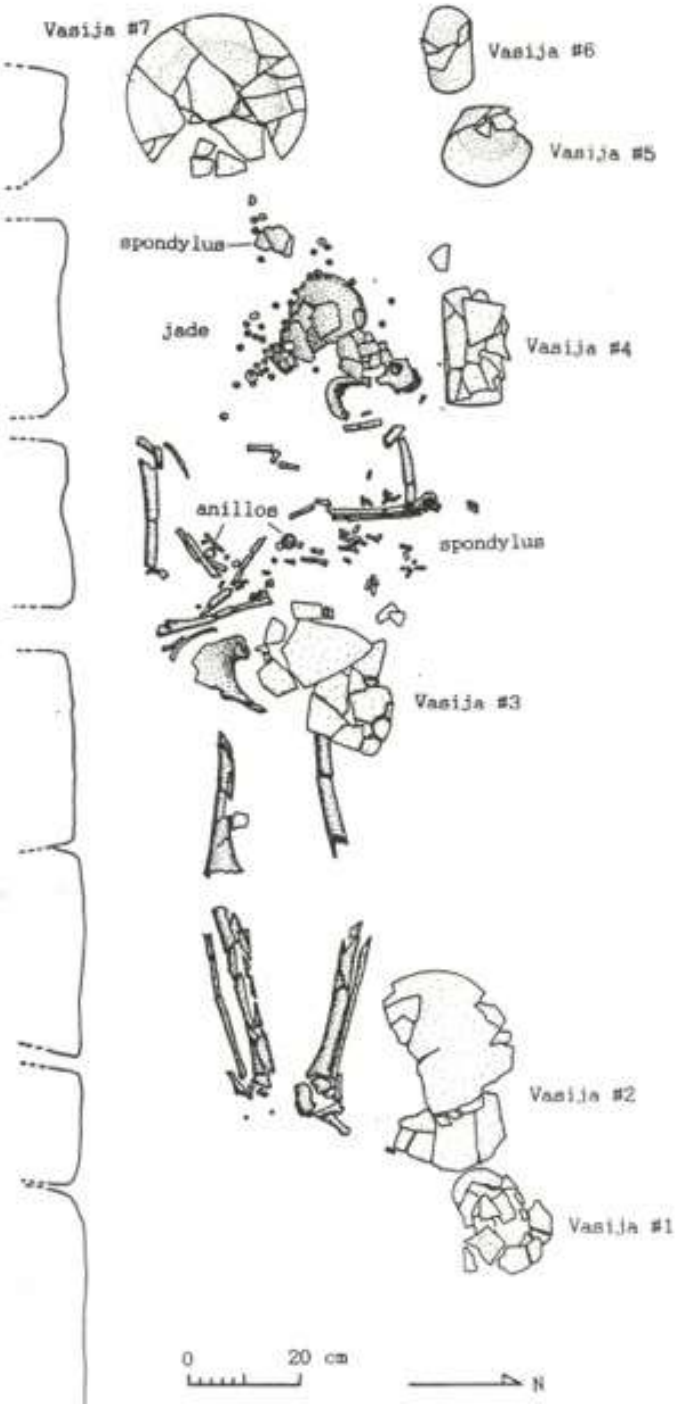

Figure 4.1 - Dos Pilas Burial 20 of an individual of elevated status with multiple ceramic vessels and vessel forms. Taken from Wolley and Wright (1990).

Table 4.1. Attributes used in statistical analysis of mortuary patterns (modified after Wright, 2006: Table 4.1)..

Skeletal Position	
extended	skeleton lies on back, legs fully extended but may be crossed at ankles, arms may be crossed over chest or extended.
flexed on back	legs and arms are flexed over supine thorax
flexed on left	flexed arms and legs, skeleton lying on its left side
flexed on right	flexed arms and legs, skeleton lying on its right side
flexed prone	flexed arms and legs are beneath face down thorax
seated	tightly flexed arms and legs against vertical thorax
head to north **	head lies to north on line drawn through head and hips
head to south	head lies to south on line drawn through head and hips
head to east	head lies to east on line drawn through head and hips
head to west	head lies to west on line drawn through head and hips
Grave Morphology	
Simple	an interment in construction fill with no special grave preparation. They are often thought to have been placed during building construction as no pit outlines are visible, but also include intrusive pit burialsfor which the nature of the fill and mound surface precludes observation of pit outlines (Welsh, 1988: 16; Tourtellot, 1990: 85).
*pit****	an unlined intrusive hole with its outline defined by a difference between soil contained in the pit and the surrounding fill, or because of a damaged floor above the burial (Welsh, 1988; Tourtellot, 1990; but includes some graves defined as "cist" by Smith, 1972).
*slab****	the body was placed upon a stone slab that was intentionally placed as flooring for the grave (Tourtellot, 1990). Also included here is Welsh's

	(1988) "ceiling slab" type, in which the body is placed upon the capstone slabs of a pre-existing burial (only DP40).
*cap****	an unlined pit with stone slabs placed directly upon the skeleton, and not resting on the walls of the pit, defined after Tourtellot (1990) and somewhat akin to Welsh's (1988) "partial cist." Tourtellot's (1990) "cap-slab" type is also included here, in which the skeleton is placed upon as well as covered by slabs.
*capped pit****	an unlined pit with capstones which cover the top of the pit and rest on its side walls but not directly upon the skeleton (Welsh, 1988; Tourtellot, 1990: "pit crypt").
*cist****	a crude ring of unshaped stones, or rough vertically placed slabs surrounding the skeleton, that is <u>not</u> covered by capstones (Welsh 1988; Tourtellot, 1990: "cist").
*head cist****	unshaped stones or rough slabs are placed around and/or over the cranial end of the skeleton only (Welsh, 1988; Tourtellot, 1990: "head crypt").
simple crypt	the skeleton is completely surrounded by vertically placed slabs or a few courses of horizontally placed slabs and covered by capstones which rest upon these grave walls (Welsh, 1988; Smith, 1972: "crypt"; Tourtellot, 1990: "crypt").
elaborate crypt	a much larger air filled chamber with walls of dressed stone slabs horizontally placed in courses and roofed with wooden beams, large dressed capstones, or a rough corbelled vault (Welsh, 1988; Smith, 1972: "crypt"; Tourtellot, 1990: "crypt").
<u>Grave Furniture</u>	
jar	a vessel with restricted neck and flaring rim
plate	a flat vessel, with sides slightly raised, often has feet
vase	a cylindric vessel, with height greater than diameter
bowl	a rounded serving vessel, with height less than orfice diameter
≥6 ceramic vessels	six or more vessels accompany the skeleton
jade bead	perforate jade or other greenstone, worn as a pendant

other jade artifacts	non-bead greenstone artifacts, e.g. earflares, plaques, mosaic pieces

* Secondary and primary crania clearly indicate very different mortuary behavior but are difficult to separate archaeologically because of poor preservation or incomplete recovery of associated vertebrae, hence are pooled together here.

** For orientations between the cardinal rules, some arbitrary rules were adopted. In flexed burials the cardinal direction to which the skull was facing was selected, according to whether it lay on the left or right side. In supine or prone positions, orientation was restricted to N or S, whichever was closest. For seated burials, head orientation was recorded as direction the body faced.

***Grave styles that were categorized as "Other" within the statistical tests. There is a smaller instance of any of these grave styles by themselves and all are a good middle ground between the simple graves (lower class) and the crypts (upper class).

In addition to these data that were collected for the skeletal material, sagittal profiles of the crania were drawn by Wright in the field during the excavations at Dos Pilas, Aguateca, and other sites where the Petexbatun project worked. These profiles were taken by the use of a bamboo contour gauge to obtain the full sagittal profile when available. When the full profile could not be taken, only the present portion is shown, such as just the frontal bone or occipital bone. Based on the profiles, the type of cranial shaping was recorded (if present) as tabular oblique or tabular erect. However, due to recent studies by Tiesler (1998; 2012a) there have been many varieties of these two styles. Figure 4.2 shows the different modification varieties within the tabular oblique and tabular erect types and the sagittal profiles drawings as well as

profile photographs of skulls from Altar de Sacrificios and Seibal (also taken by Wright) have been scored by the author into these cranial shaping varieties when possible.

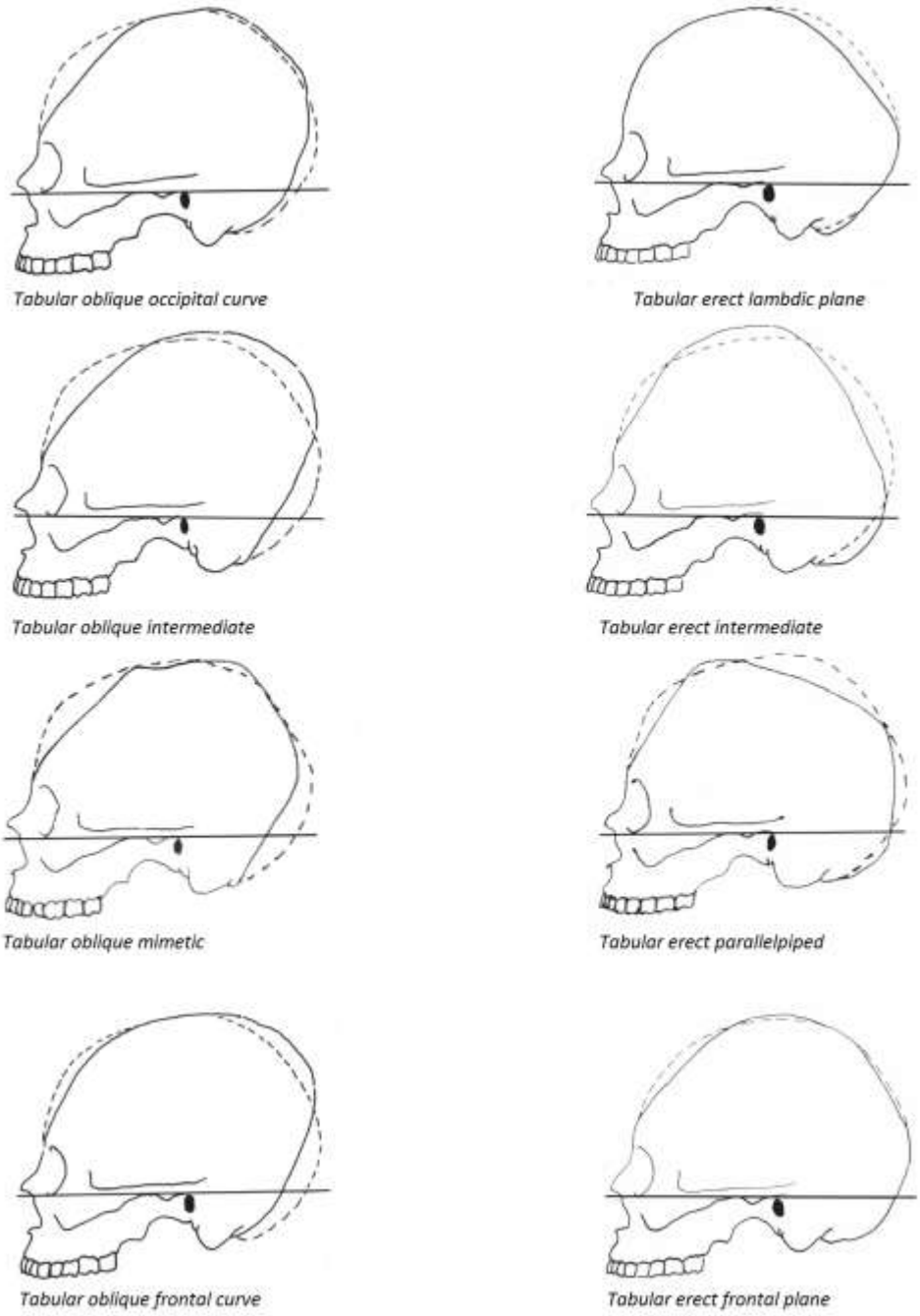

Figure 4.2 - Profile drawings of the different varieties within the tabular oblique and tabular erect types. Modified from Tiesler (2012a) Figure 4.

Statistical Analysis

In order to identify a correspondence between specified data groups and the presence or absence of cranial modification, statistical analyses must be employed. . Most of the mortuary data that were collected from the individual sites are taken on an absence or presence basis, rather than to which degree or an amount of a certain attribute. This approach makes it easier to identify correlations through the use of Chi-Square tests when possible, as well as Fisher's Exact Test to determine if there are any non-random associations between variables with a significance given to $p<.05$. However, some of the tests use a small sample size due to the correlation being tested and therefore a significance must be given to $p<.1$ with the acknowledgement that this significance level is lower and not as strong. In order to conduct the test, I used the statistical functions in Microsoft Excel.

CHAPTER V

RESULTS

The majority of the statistical tests examined the presence or absence of cranial modification and the multiple mortuary variables. This is done first in order to determine if there are any associations within and between the different aspects of the mortuary data set in relation to cranial modification.

Multiple chi-square tests are conducted as well as Fisher's Exact tests when possible. Though the typical cell size for a Fisher's Exact test is 4 (a 2X2 table), the program I use allows Fisher's Exact test to be conducted on tables with a cell size of 6, 8, and 9 (a 2X3, 2X4, and a 3X3 table, respectively). Over 100 individual tables were created in order to test these mortuary markers with the presence of cranial shaping. These are presented in the Appendix of this study. As it turns out, there are hardly any results that are statistically significant. Only a few of the calculations involving the mortuary markers are significant. There are more statistically significant values that address more general trends throughout the Pasión region and do not directly deal with the actual mortuary markers.

However, those that have been deemed significant should be heeded with caution. Due to the high number of tests that were conducted, type I error is likely to occur and might account for some of the significant results. Type I error indicates that there is a "false positive" that the tests report, that there is an association when there is not. This is most likely the reason for some of the significant *p*-values and Fisher's Exact values that were calculated. This is likely due to what

was actually being tested as some tests were so specific that only a handful of individual graves or mortuary markers could be addressed, thus skewing the results towards one direction that may not have actually been representative of the norm. Such is the case with Appendix 93 which is testing the relationship of the presence of cranial modification with the presence of jade in the Late Classic period in the Petexbatun region. The tests show that this test has a Chi-Square value of 4.99, df=1, and a *p*-value of .0255, falling well within the range of statistical significance. However, as seen in the table, while there are 21 individuals that present cranial modification, only 1 individual is lacking cranial modification in the Petexbatun region during the Late Classic. Moreover, only one instance of jade occurs within these parameters, so it is no surprise that the test reports a significance in the relationship. Yet, this test is not truly reporting a relationship between the instance of jade and cranial modification if only 1 skull is unshaped. This is not a true relationship with jade as the count is unfairly skewed. The results of this test can be useful in the sense that there are over 20 skulls with cranial shaping in the Late Classic Petexbatun period while there is only 1 that is unmodified. This is a fairly strong correlation that will be discussed later, but it was not the true intention of this test so this statistical significance must be explained by Type I error.

There are a few statistically significant test results that in fact do appear to be true and are not due to Type I error. These tests did not actually test the cranial shaping against mortuary markers, but rather cranial shaping against more broad and general aspects. Included in these are presence of cranial modification through time (Appendix 3: chi-square value=13.18, df=2, *p*=.0014, two-tailed probability=.00398), between sites (Appendix 1: chi-square value=6.61,

df=2, *p*=.0367), and even comparing the different styles of cranial modification, tabular oblique and tabular erect, through time (Appendix 4: chi-square=6.63, df=2, *p*=.0363).

There also appears to be a significant difference between the different varieties of the tabular oblique modification when compared to the sex of the individual (see Appendix 127: chi-square value=6.36, df=2, *p*=.0416). The different varieties within the tabular oblique style were accomplished by comparing the sagittal profile drawings made by Wright (mentioned in Chapter IV) and profile photographs of skulls with the classifications created by Tiesler (2012a). These tests results and their meanings and implications will be discussed further in the following chapter.

It is highly unlikely that any instances of Type II error occurred. Type II error is a "false negative" that is reported. In this case, a Type II error would indicate that there is a relationship between the mortuary markers and the presence of cranial modification when there is not. This is likely not the case as there is an overwhelmingly large number of tables and tests that report no relationship between the two, so Type II error is not an issue in this study.

Table 5.1 –Table of the statistical test results (see Appendix for individual tables)

APPENDIX #	SITE	TIME	COMPARE	VS	X	df	p	Fisher's Exact one-tailed	two-tailed
1	All	All	Mod vs. Not	Site	6.61	2	0.0367	-	-
2	All	All	Mod vs. Not	Sex	0.01	1	0.9203	0.4605	0.794
3	All	All	Mod vs. Not	Time	13.18	2	0.0014	-	0.004
4	All	All	Mod. Type	Time	6.63	2	0.0363	-	0.0365
5	AS	All	Mod vs. Not	Sex	1.85	1	0.1738	0.0855	0.1145
6	AS	All	Mod vs. Not	Time	9.84	2	0.0073	-	0.009
7	AS	All	Sex	Time	0.62	2	0.7334	-	0.7957
8	SE	All	Mod vs. Not	Sex	1.37	1	0.2418	0.1231	same
9	SE	All	Mod vs. Not	Time	0.69	2	0.7082		1
10	SE	All	Sex	Time	1.84	2	0.3985	-	0.4591
11	Petex	All	Mod vs. Not	Sex	0.02	1	0.8875	0.4688	0.6546
12	Petex	All	Mod vs. Not	Time	17.62	2	0.0001	-	0.0069
13	Petex	All	Sex	Time	0.02	2	0.99		1
14	All	All	Mod vs. Not	Grave type	2.68	2	0.2618	-	-
15	All	All	Mod vs. Not	Head orientation	5.37*	3	0.1466	-	-
16	All	All	Mod vs. Not	Body position	1.99	2	0.3697	-	0.5201
17	All	Pre/Early	Mod vs. Not	Sex	1.1	1	0.2943	0.1515	same
18	All	Late	Mod vs. Not	Sex	0.1	1	0.7518	0.6078	1
19	All	Terminal	Mod vs. Not	Sex	0.2	1	0.6547	0.3264	0.4316
20	All	Late	Mod vs. Not	Grave type	0.79	2	0.6737	-	0.6942
21	All	Terminal	Mod vs. Not	Grave type	0.22	2	0.8958	-	1
22	All	Late	Mod vs. Not	Body position	1.18	2	0.5543	-	0.5488
23	All	Terminal	Mod vs. Not	Body position	1.11	2	0.5741	-	0.7839
24	All	Late	Mod vs. Not	Head orientation	1.36	3	0.7149	-	1
25	All	Terminal	Mod vs. Not	Head orientation	2.84	3	0.417	-	0.4783
26	AS	All	Mod vs. Not	Grave type	4.69	2	0.0958	-	0.0917
27	AS	Late and Term.	Mod vs. Not	Grave type	2.6	2	0.2725	-	0.4241
28	AS	All	Mod vs. Not	Body position	0.89	2	0.6408	-	1
29	AS	All	Mod vs. Not	Head orientation	6.25	3	0.1001	-	0.079
30	AS	Late and Term.	Mod vs. Not	Head orientation	1.95	3	0.5828	-	0.3281
31	SE	All	Mod vs. Not	Grave type	2.57	2	0.2767	-	0.51
32	SE	All	Mod vs. Not	Body position	0.2	2	0.9048	-	1
33	SE	All	Mod vs. Not	Head orientation	2.01	3	0.5703	-	1
34	Petex	All	Mod vs. Not	Grave type	3.7	2	0.1572	-	0.1968
35	Petex	All	Mod vs. Not	Body position	0.77	2	0.6805	-	1

36	Petex	All	Mod vs. Not	Head orientation	0.32	3	0.9562	-	1
37	All	All	Mod. Type	Grave type	0.61	2	0.7371	-	0.7996
38	All	All	Mod vs. Not	Presence of Jade	0.01	1	0.9203	0.495	0.6884
39	AS	All	Mod vs. Not	Presence of Jade	1.16	1	0.2815	0.141	0.2821
40	SE	All	Mod vs. Not	Presence of Jade	1.14	1	0.2857	0.1428	0.286
41	Petex	All	Mod vs. Not	Presence of Jade	0.38	1	0.5376	0.6232	1
42	All	All	Mod. Type	Head orientation	2.83	3	0.4186	-	0.3938
43	All	All	Site	Mod. Head orient.	10.26	6	0.1141	-	-
44	All	All	Mod vs. Not	# of ceramic forms (includes none)	2.2	2	0.3329	-	0.3475
45	All	All	Mod vs. Not	# of ceramic forms (only if present)	1.22	1	0.2694	0.135	0.2404
46	All	All	Mod vs. Not	Ceramic - Bowl form only	4.83	2	0.0894	-	0.0838
47	All	All	Mod vs. Not	Presence of Bowls	0.05	1	0.8231	0.5829	1
48	All	All	Mod vs. Not	Presence of Plates	0.19	1	0.6629	0.3474	0.5202
49	All	All	Mod vs. Not	Presence of Jars	0.57	1	0.4503	0.2365	0.3431
50	All	All	Mod vs. Not	Presence of Vases	1.55	1	0.2131	0.1001	0.1819
51	AS	All	Mod vs. Not	Presence of Bowls	0.02	1	0.8875	0.4403	0.721
52	AS	All	Mod vs. Not	Presence of Plates	0.01	1	0.9203	0.491	0.6571
53	AS	All	Mod vs. Not	Presence of Jars	0.67	1	0.4131	0.2184	0.2874
54	AS	All	Mod vs. Not	Presence of Vases	1.06	1	0.3032	0.154	0.2693
55	SE	All	Mod vs. Not	Presence of Bowls	0.03	1	0.8625	0.4488	0.64
56	SE	All	Mod vs. Not	Presence of Plates	0.19	1	0.6629	0.6272	1
57	SE	All	Mod vs. Not	Presence of Jars	0.11	1	0.7401	0.6897	1
58	SE	All	Mod vs. Not	Presence of Vases	0.19	1	0.6629	0.3728	0.5562
59	Petex	All	Mod vs. Not	Presence of Bowls	0.21	1	0.6468	0.3048	0.5586
60	Petex	All	Mod vs. Not	Presence of Plates	0.01	1	0.9203	0.5342	1
61	Petex	All	Mod vs. Not	Presence of Jars	3	1	0.0833	0.931	1
62	Petex	All	Mod vs. Not	Presence of Vases	0.28	1	0.5967	0.7207	1
63	All	Pre/Early	Mod vs. Not	Presence of Bowls	0.17	1	0.6801	0.3427	0.5594
64	All	Late	Mod vs. Not	Presence of Bowls	0.13	1	0.7184	0.3541	0.634
65	All	Terminal	Mod vs. Not	Presence of Bowls	0.5	1	0.4795	0.2477	0.4073
66	All	Pre/Early	Mod vs. Not	Presence of Plates	0.43	1	0.512	0.7308	1
67	All	Late	Mod vs. Not	Presence of Plates	0.64	1	0.4237	0.2267	0.3102
68	All	Terminal	Mod vs. Not	Presence of Plates	0.05	1	0.8231	0.5303	1
69	All	Pre/Early	Mod vs. Not	Presence of Jars	not calculable	-	-	-	-
70	All	Late	Mod vs. Not	Presence of Jars	0.5	1	0.4795	0.8005	1
71	All	Terminal	Mod vs. Not	Presence of Jars	0.1	1	0.7518	0.6915	1
72	All	Pre/Early	Mod vs. Not	Presence of Vases	0.79	1	0.3741	0.1923	same
73	All	Late	Mod vs. Not	Presence of Vases	0.08	1	0.7773	0.6331	1
74	All	Terminal	Mod vs. Not	Presence of Vases	0.18	1	0.6714	0.3843	0.573

75	All	All	Mod vs. Not	6+ vessels	0.11	1	0.7401	0.4243	0.5757
76	All	All	Sex	6+ vessels	0	1	1	0.5037	1
77	All	All	Mod vs. Not	Presence of ceramic	0	1	1	0.5171	1
78	All	Late and Term.	Mod vs. Not	Grave type	0.27	1	0.8737	-	0.9238
79	All	Late	Mod vs. Not	Grave type	1.04	1	0.5945	-	0.6866
80	All	Terminal	Mod vs. Not	Grave type	0.22	1	0.8958	-	1
81	All	Late and Term.	Mod vs. Not	Site	2.55	2	0.2794	-	0.2618
82	All	Late	Mod vs. Not	Site	3.42	2	0.1809	-	0.1397
83	All	Terminal	Mod vs. Not	Site	0.15	2	0.9277	-	0.9999
84	All	Late and Term.	Mod vs. Not	Body position	1.85	2	0.3965	-	0.6066
85	All	Late	Mod vs. Not	Body position	1.24	2	0.5379	-	0.5447
86	All	Terminal	Mod vs. Not	Body position	1.11	2	0.5741	-	0.7839
87	AS	Late and Term.	Mod vs. Not	Sex	0.06	1	0.8065	0.5865	1
88	All	All	Sex	Time	0.11	2	0.9465	-	0.9326
89	AS	Late	Mod vs. Not	Presence of Jade	0.36	1	0.5485	0.2857	0.4286
90	AS	Terminal	Mod vs. Not	Presence of Jade	not calculable	-	-	1	1
91	SE	Late	Mod vs. Not	Presence of Jade	0.7	1	0.4028	0.7999	1
92	SE	Terminal	Mod vs. Not	Presence of Jade	0.65	1	0.4201	0.8095	1
93	Petex	Late	Mod vs. Not	Presence of Jade	4.99	1	0.0255	0.9545	1
94	Petex	Terminal	Mod vs. Not	Presence of Jade	not calculable	-	-	-	-
95	AS	Late	Mod vs. Not	Grave type	1.12	2	0.5712	-	1
96	AS	Terminal	Mod vs. Not	Grave type	1.8	2	0.4066	-	0.5147
97	SE	Late	Mod vs. Not	Grave type	4	2	0.1353	-	0.5
98	SE	Terminal	Mod vs. Not	Grave type	1.16	2	0.5599	-	1
99	Petex	Late	Mod vs. Not	Grave type	2.23	2	0.3279	-	0.5555
100	Petex	Terminal	Mod vs. Not	Grave type	0	2	1	-	1
101	AS	Late	Mod vs. Not	Body position	1.2	2	0.5488	-	1
102	AS	Terminal	Mod vs. Not	Body position	0.88	2	0.644	-	1
103	SE	Late	Mod vs. Not	Body position	1	2	0	-	1
104	SE	Terminal	Mod vs. Not	Body position	2.44	2	0.2952	-	0.3333
105	Petex	Late	Mod vs. Not	Body position	0.39	2	0.8228	-	1
106	Petex	Terminal	Mod vs. Not	Body position	-	-	-	-	-
107	AS	Late	Mod vs. Not	Head orientation	0.24	3	0.9709	-	1
108	AS	Terminal	Mod vs. Not	Head orientation	2.33	3	0.5068	-	0.5686
109	SE	Late	Mod vs. Not	Head orientation	1.88	3	0.5977	-	1
110	SE	Terminal	Mod vs. Not	Head orientation	0.78	3	0.8542	-	1
111	Petex	Late	Mod vs. Not	Head orientation	0.46	3	0.9276	-	1
112	Petex	Terminal	Mod vs. Not	Head orientation	-	-	-	-	-

113	AS	Late	Mod vs. Not	Presence of ceramic	0.26	1	0.6101	0.2857	same
114	AS	Terminal	Mod vs. Not	Presence of ceramic	0.52	1	0.4708	0.2509	0.2816
115	SE	Late	Mod vs. Not	Presence of ceramic	0.05	1	0.8231	0.5999	1
116	SE	Terminal	Mod vs. Not	Presence of ceramic	0.06	1	0.8065	0.4135	0.603
117	Petex	Late	Mod vs. Not	Presence of ceramic	0.79	1	0.3741	0.1921	same
118	Petex	Terminal	Mod vs. Not	Presence of ceramic	not calculable	-	-	-	-
119	AS	Late	Mod vs. Not	Presence of Bowls	0.26	1	0.6101	0.2857	same
120	AS	Terminal	Mod vs. Not	Presence of Bowls	0.3	1	0.5839	0.3193	0.5211
121	SE	Late	Mod vs. Not	Presence of Bowls	0.7	1	0.4028	0.7999	1
122	SE	Terminal	Mod vs. Not	Presence of Bowls	0	1	1	0.5018	1
123	Petex	Late	Mod vs. Not	Presence of Bowls	0.13	1	0.7184	0.3334	same
124	Petex	Terminal	Mod vs. Not	Presence of Bowls	not calculable	-	-	-	-
125	All	All	Tab. Oblique varieties	Site	4.66	4	0.324	-	0.4286
126	All	All	Tab. Oblique varieties	Time (Late & Term)	2.22	2	0.3296	-	0.5714
127	All	All	Tab. Oblique varieties	Sex	6.36	2	0.0416	-	0.0626
128	All	All	Tab. Oblique varieties	Grave type	2.92	4	0.5713	-	0.4493
129	All	All	Tab. Oblique varieties	Head orientation	6.29	6	0.3915	-	-
130	All	All	Tab. Oblique varieties	Body position	0.06	6	1	-	-
131	All	All	Tab. Oblique varieties	Presence of Jade	2.12	2	0.3465	-	0.7253

CHAPTER VI

DISCUSSION

As the statistics show and as discussed in the previous chapter, there is no apparent association between the mortuary goods and the presence or absence of cranial modification. In the case of this study, social status is measured by the types and numbers of specific artifacts within the graves (and even the graves themselves) and so the basis of social rank lies entirely within a mortuary context. Those few mortuary variables that are statistically significant are likely due to the large number of tests conducted and the specificity of the test and therefore are most likely a type I error.

There are still other trends that are significant, though they do not deal with the mortuary variables directly. Included in this small list are the correlations between the presence of cranial modification: between sites, through time; style of modification: through time; and variety of the tabular oblique modification: between sexes.

The lack of associations of cranial shaping with the funerary goods indicates that the act of shaping one's child's head was not motivated by social status. This goes against the common assumption that there was an association. Archaeologists originally held this as true, but recent studies have called this theory into question. Tiesler (2012a, 2012b, 2013) has argued that the presence of cranial modification has nothing to do with social status or the rank of an individual, but rather that it is an indicator of ethnic identity. Furthermore, she argues that a change in cranial modification style can be an indication of a cultural shift

Trends among the sites of the Pasión region

First to be discussed is patterning of cranial modification among the sites. The sample size for this specific test (N=119) included all of the individuals in the study which strengthens the argument for the significance of the correlation. In this test, there is a strong trend towards cranial modification being present as compared to not, especially in the Petexbatun sites. Almost half of the sample comes from the Petexbatun region alone (53 total). Unlike the ancient Inca or the Aztecs, the ancient Maya never had a single large empire that was unified over one ruler and had control over the entire Maya world (Coe 2005). Individual sites were typically their own political entity. Sites no doubt interacted as there is an overwhelming amount of evidence linking sites in the Maya world to those of Mexico to sites in nearby areas, such as the founders of Dos Pilas claiming ancestry to the rulers of Tikal (Demarest 1997), and most certainly with immediately neighboring sites. One of the best examples of these connections and relationships is the Pasión region itself. Within this area are the major, but separate, centers: Altar de Sacrificios, Seibal, and the Petexbatun kingdom which all interacted with each other. There is evidence that Dos Pilas conquered Seibal, a larger city, and captured its rulers but kept them on the throne but under the power and domain of Dos Pilas (Demarest, 1997; Coe 2005). It is also interesting that while Altar de Sacrificios and Seibal were single-site political entities, the Petexbatun kingdom was an amalgamation of sites within the south and central areas of the Pasión region. Dos Pilas was the capital of the Petexbatun for most of its history, but the whole area functioned as a single polity. The rulers in this area were able to consolidate power throughout the region and even defeat Seibal. Nonetheless, there was no single leader over the Maya area that ruled over all of the Maya lands.

The political and geographic separation of Maya sites would have led to slightly differing ideas about religion, ritual, art, and architecture. This can be seen in the large periphery sites of Copan and Palenque (Coe 2005). Their physical separation from other large settlements resulted in each site developing their own styles in art and architecture, essentially their own culture, thought these individual "cultures" may not differ drastically from one another.

This cultural variability within the Maya may explain some of the patterning in cranial modification among the sites. Table 6.1, as well as Appendix 1, show the distribution of modified versus not modified crania between the sites. Both Seibal and the Petexbatun kingdom show only five unmodified crania while Altar de Sacrificios has 11. This number, which is more than Seibal and the Petexbatun combined, is made even more statistically significant due to the large number of modified crania at sites of the Petexbatun. There are 48 modified crania in Petexbatun burials alone while there are 50 between Seibal and Altar de Sacrificios. Based on these data, it seems that cranial modification was more of an important aspect of society and culture in the Petexbatun than it was in any other site or area, especially in Altar de Sacrificios, which has previously been addressed, Seibal seems to fall right in the middle in terms of prevalence of cranial modification.

Table 6.1 – Modification between sites

OBSERVED

Site	Not Modified	Modified	**Total**
AS	11	25	**36**
SE	5	25	**30**
Petex	5	48	**53**
Total	**21**	**98**	**119**

X^2=6.61
df=2
p=.0367

One possible explanation of these differences among the sites is that cranial modification may be an indicator of ethnic or cultural identity. The previous discussion helps strengthen this argument. Since each Maya center was politically autonomous, ideas of identity would might differ, of only slightly, from center to center. However, chronological changes in the prevalence of modification over time, coupled with the varied occupation histories of the sites may also contribute to the intersite patterning.

Trends throughout time

The next significant trend to be addressed is that of the presence of modification through time. As seen in Table 6.2 and Appendix 3 (chi-square value=13.18, df=2, p=.0014) and in Table 5.1 this trend is highly significant. During the Preclassic and Early Classic periods, there are more unmodified crania than there are modified ones. However, there is a major shift during the Late Classic that continued through the Terminal Classic. Within the entire skeletal sample, there is evidence of a major population increase within the Pasión region starting in the Late Classic. This population increased is echoed in the prevalence of cranial modifications where modified skulls far outnumbered unmodified skulls.

Table 6.2 – Modification through time

OBSERVED	**Time**	Not Modified	Modified	**Total**
	Pre/Early Classic	8	5	**13**
	Late Classic	12	54	**66**
	Terminal Classic	8	40	**48**
	Total	**28**	**99**	**127**

X^2=13.18
df=2
p=.0014
Fisher's Exact: two-tailed=.004

During the Preclassic, while the Southern Highlands were in the midst of a cultural and population explosion, the Lowland Maya population remained low and few cities had megalithic and monumental architecture (with the possible exception of El Mirador) (Coe 1995). There was a massive population explosion in the Petén starting in the Early Classic, but becoming truly prominent in the Late Classic. The major cities of Tikal and Uaxactun rose to prominence during this time. The same goes for the sites in the Pasión region. Altar de Sacrificios and Seibal were much more ancient sites with roots back in Preclassic times, unlike many of the sites in the Petexbatun region, such as Dos Pilas and Aguateca, which were founded during the Classic era. Nonetheless, all of these sites witnessed a large increase in population and many large-scale construction projects of temples and royal residencies (Demarest 2006)

It was also during the Early Classic to Late Classic transition that Maya art proliferated. No doubt many Maya texts were written during this period, though most were burnt during the Spanish Conquest and by Bishop Diego de Landa in the sixteenth century (Coe 2005).

All of these great changes in the Early Classic to Late Classic transitions indicate that the Maya culture was consolidated, that it was becoming more regulated or better understood and followed by the citizens. Ideas and traditions were explored and expounded. One of these was most certainly the instance of cranial modification. Maya art and architecture were the material forms of Maya ideas and identity, the way the Maya portrayed themselves to other sites and even foreign people. Cranial modification was one biological and personal expression of Maya cultural identity

Trends among modification types

Another significant result of this study is patterning between the two varieties of cranial modification, tabular oblique and tabular erect, across the chronological phases. As Table 6.3 and Appendix 4 shows, tabular erect was obviously the least common head shape in this part of the Maya world. In both the Late and Terminal Classic periods, the tabular oblique variety dominated over tabular erect. For this study, the Preclassic and the Early Classic were pooled due to the small amount of burials recovered from both of these time periods. This again reinforces the massive population increase in the transition from the Early Classic to the Late Classic. However, it is interesting that during the Preclassic and Early Classic periods combined, only four crania were found that were modified and eight that were unmodified. Of those four modified crania, two were of the tabular erect type and two were tabular oblique. The two crania of the tabular erect type were dated only to the Preclassic, so no tabular erect skulls were found dating to the Early Classic. This may be a trend but since the sample size of the Preclassic and Early Classic is small it does not show a statistically significant one. Yet this does show that

modification was not as popular during the earlier periods and that there is no significant preference for which type of modification.

Table 6.3 – Modification types through time

OBSERVED	**Time**	Tabular oblique	Tabular erect	**Total**
	Pre/Early Classic	2	2	**4**
	Late Classic	32	2	**34**
	Terminal Classic	24	5	**29**
	Total	**58**	**9**	**67**

X^2=6.63
df=2
p=.0363
Fisher's Exact: two-tailed=.0365

The balanced occurrence of both of the modified types in the earlier phases is sharply contrasted by the Late Classic period data. In view of the combination of the massive population increase and the consolidation of Maya culture in the Late Classic period as discussed earlier, it comes as no surprise that there is an overwhelming majority of modified crania. Within the sample of modified skulls in the Late Classic (N=54) that could be specified as to which type of modification (N=34), only two exhibit the tabular erect style while the rest are tabular oblique. In the Pasión region, Dos Pilas and to the west have been identified as exhibiting >70% of the modified crania to be of the tabular oblique variety while sites east of Dos Pilas half exhibits 30 – 70% tabular oblique (see Figure 6.1) (Tiesler 2012b). Based on the results of the shape classifications for Seibal and the Petexbatun, the proportion of tabular oblique type is much closer to 70% rather than the much lower 30% designation.

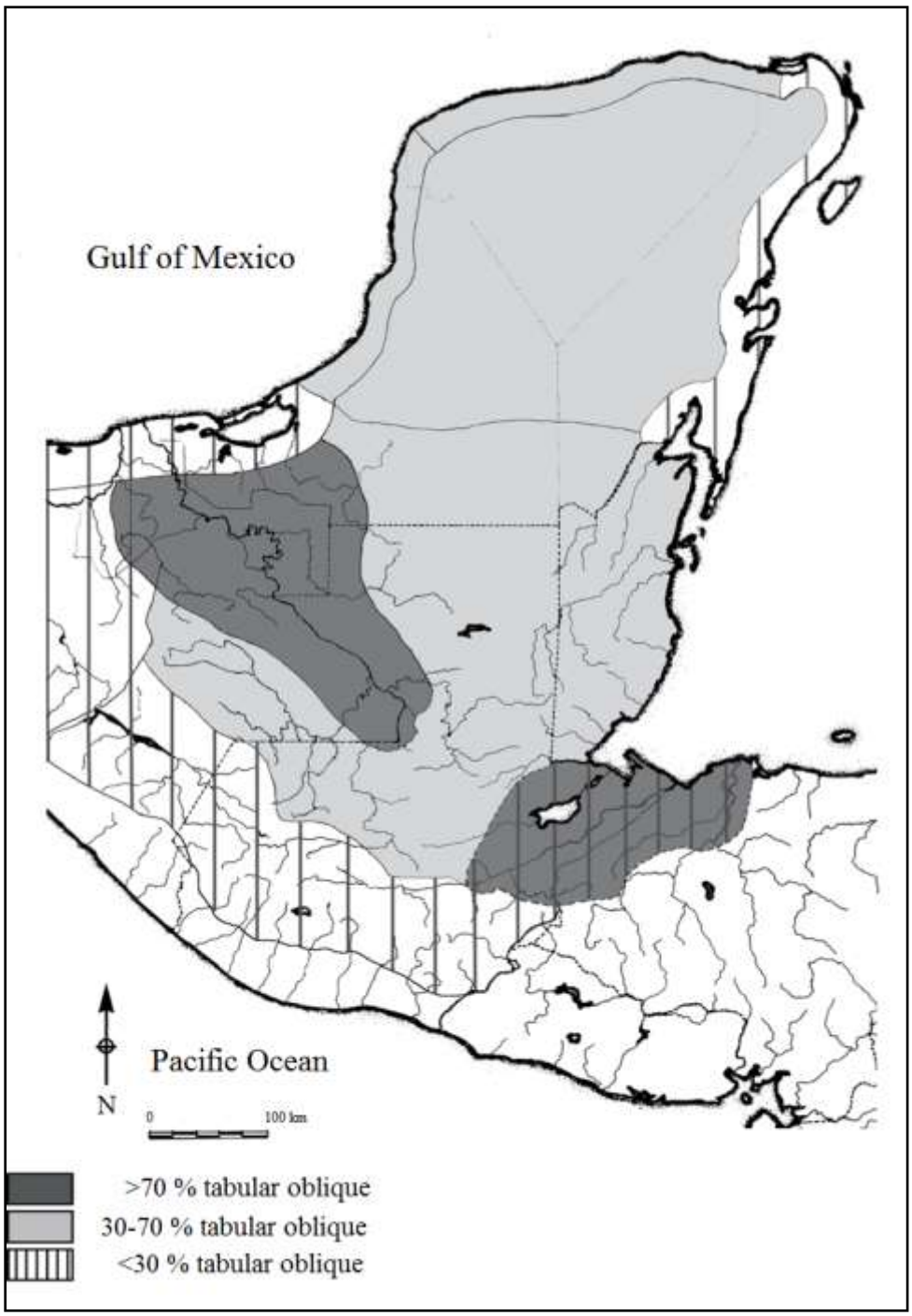

Figure 6.1 - Map of the prevalence of the tabular oblique type in the Late Classic.

During the Terminal Classic period, there appears to have been a further shift in cranial modification shapes. From the Terminal Classic, a total of 40 modified crania were recovered,

compared to eight unmodified crania. Of those 40 crania, 29 were classifiable with 24 being of the tabular oblique type and 5 of the tabular erect type. Though tabular oblique is still the overwhelming majority, it is interesting that there are more skulls of the tabular erect type in the Terminal Classic sample than there are in the Preclassic and Late Classic samples combined, though the number is still small. Despite this small number, there appears to be an explanation for this trend.

As discussed in Chapter III, the Pasión region fell into a period of endemic warfare during the mid 8th century, almost one hundred years before the "Classic Maya Collapse" that raged across the rest of the Petén Maya (Demarest 1997, 2006). This is evidenced by the extensive defensive walls in the Petexbatun sites (Demarest et al. 1997). Since the political centers collapsed earlier in this area, by the time of the Terminal Classic, many populations were moving in and out of the area. This small "resurgence" of the tabular erect type could be attributed to a foreign population moving where the tabular erect type was a more common practice. Recent studies identify the arrival at Seibal of a Terminal Classic leader named Wa 'tul Chatel who may have come from Ucanal, a site in the eastern part of the Petén. However, the exact nature of theis political transition is unknown (Tourtellot and Gonzáles 2004). Tielser (2013) reports that at the site of El Zapotal in the Veracruz culture, the tabular erect type was the far more popular head shape than the tabular oblique type, which was quite uncommon. Though it may not have been the any populations of the Veracruz culture that moved into the Pasión region during this time, it is likely that some population in which the tabular erect type was more common could have moved in to the city.

There is still an overwhelming majority of the tabular oblique type during the Terminal Classic. This could be due to cranial modification being a tradition that was passed down through the generations, no matter the political situation at the time. In addition, the collapse of the political systems in the Maya world meant that the sites were largely abandoned or if there was still a population that resided there, there would be a very unorganized political system. Thus, a strong argument can be made for cranial modification being an ethnic or cultural phenomenon based on the political history of the region in tandem with the skeletal remains.

Thus during the Terminal Classic, it is likely that a combination of foreign populations moving into the area and the native populations still adhering to traditions of the past resulted in a mixture of cranial modification still being practiced as well as a resurgence in the tabular erect type.

There is also a statistical significance among the specific varieties of the tabular oblique type (refer to Figure 4.2 for varieties). As Table 6.4 and Appendix 127 (chi-square value=6.36, df=2, p=.0416) shows, females have a higher prevalence of the tabular oblique mimetic variety while males have a higher prevalence of the tabular oblique occipital curve variety. The reason for this trend is not entirely known. The mimetic variety is more extreme in elongation than the Occipital curve variety. The tabular oblique intermediate variety is also present in the population, yet it is almost evenly distributed between the sexes. Yet it is the prevalence of mimetic and occipital curve varieties between males and females that is puzzling. One possible explanation is by who was actually modifying the skulls.

Table 6.4 – Tabular oblique varieties between males and females

OBSERVED

Tabular Oblique Variety	Male	Female	**Total**
Occipital curve	4	1	**5**
Intermediate	3	2	**5**
Mimetic	1	7	**8**
Total	**8**	**10**	**18**

X^2=6.36
df=2
p=.0416
Fisher's Exact: two-tailed= .0626

Duncan and Hofling (2011) argue that mostly women (probably the mother or grandmother) in the Maya culture actually modified the crania of infants. Thus it might follow that the adult females implemented a more extreme degree of elongation on female infants because they were female. In other words, perhaps there may have been favoritism for the heads of females to be modified to a greater degree, or for whatever cultural reason it was seen as appropriate to more greatly modify females. Therefore cranial modification could also be an aesthetic choice (by the adult, not the infant) of what was considered beautiful or desirable. As will be discussed shortly, the head for the Maya was the center of an individual's identity. However, this is speculative and more research is needed from other sites throughout the Maya area in order to determine if this is a widespread or a localized phenomenon.

CHAPTER VII

CONCLUSION

This aim of this study was to determine whether or not that cranial modification was an indication of social status within the ancient Maya world. The Pasión region in the southwestern portion of the Department of Petén, Guatemala was a perfect area in which to test this hypothesis due to the large number of excavated burials and the well understood political history of the region.

The statistical analyses show that only a small amount of the mortuary markers correlate to the presence of cranial modification. These correlations are likely attributed to Type I Error though and must be regarded with caution. Since the mortuary data are the basis for classifying the social status of an individual (in this study), there appears to be no association between cranial modification and social status and therefore the null hypothesis must be rejected.

Tiesler (2012a; 2012b; 2013) argues that cranial modification is an aspect of ethnic and cultural identity and that a shift in style of cranial modification is related to a cultural shift within the site. The statistically significant results deal with trends through time, between sites, and between the different types of cranial modification. The discussion of these trends has been previously presented and corresponds with Tiesler's hypothesis of cranial modification as an ethnic and cultural indicator. This is further evidenced by some other proposed meanings of cranial modification.

Houston and Taube (2005) specify that the Mayan word "*baah"* refers to the physical "head" as well as "personhood". They further describe "personhood" as an individual's essence or persona in a society. Houston and Taube (2005) also describe the head as the locus of an individual's soul while Duncan and Hofling (2011) indicate the soul was specifically located in the forehead. In the tabular oblique modification, the forehead is elongated, so it might be plausible that the Maya were potentially enlarging the forehead so as to have a larger soul or personal essence.

Other possible reasons for modifying the crania in the tabular oblique variety was to mimic the Maize God who is depicted as a contortionist with a very conically shaped head with grass and corn husk sprouting from the top, thus looking like an ear of corn (Houston and Taube 2005). For the Maya, *Zea mays* was staple, both for food and religion. Imitating the Maize God could have been a way to either worship him so areas where this type was predominant might indicate that maize may have been more highly regarded.

The tabular erect type does not usually elongate the forehead, so why was this shape preferred for some people? The far more ancient Olmec civilization is famous for its numerous stone carved heads in that are almost cuboid in shape. The superior portion is almost horizontal while the posterior portion is vertical, giving a very square profile. The Maya who implemented the tabular erect shape may have been emulating the Olmecan head style as a sort of reverence (Tiesler 2010). Within the Maya populations where the tabular erect type was more prevalent, the Olmec may have had a more significant impact in shaping their culture via cranial head shaping.

Cranial modifications have been present in the ancient Maya since the beginnings of Maya culture. The original interpretation of this phenomenon as an indicator of social status has been called into question with recent studies implying that it is more of an ethnic indicator. This study set out to test if cranial modification was indeed tied to social status. With the large sample size in combination with the well understood political history of the area, the Pasión region is an ideal area to test this hypothesis. The results indicate that the mortuary context has nothing to do with the presence of cranial modification, and therefore neither does social status.

This phenomenon is likely to be an indicator of ethnic identity based on the history of the area, the translated glyphs by Houston and Taube (2005), and the cultural ties to the Olmec as well as imitations of the Maize God or an individual of corn. Therefore, this study has disproven previous hypotheses about cranial modification, yet more research in neighboring areas could help strengthen this argument.

APPENDIX

1 **OBSERVED**

Site	Not Modified	Modified	**Total**
AS	11	25	**36**
SE	5	25	**30**
Petex	5	48	**53**
Total	**21**	**98**	**119**

EXPECTED

Site	Not Modified	Modified	**Total**
AS	6.35	29.65	**36**
SE	5.29	24.71	**30**
Petex	9.35	43.65	**53**
Total	**21**	**98**	**119**

2 **OBSERVED**

Sex	Not Modified	Modified	**Total**
Male	13	51	**64**
Female	6	29	**35**
Total	**19**	**80**	**99**

EXPECTED

Sex	Not Modified	Modified	**Total**
Male	12.28	51.72	**64**
Female	6.72	28.28	**35**
Total	**19**	**80**	**99**

3 **OBSERVED**

Time	Not Modified	Modified	**Total**
Pre/Early Classic	8	5	**13**
Late Classic	12	54	**66**
Terminal Classic	8	40	**48**
Total	**28**	**99**	**127**

EXPECTED

Time	Not Modified	Modified	**Total**
Pre/Early Classic	2.87	10.13	**13**
Late Classic	14.55	51.45	**66**
Terminal Classic	10.58	37.42	**48**
Total	**28**	**99**	**127**

-

4 **OBSERVED**

Time	Tabular oblique	Tabular erect	**Total**
Pre/Early Classic	2	2	**4**
Late Classic	32	2	**34**
Terminal Classic	24	5	**29**
Total	**58**	**9**	**67**

EXPECTED

Time	Tabular oblique	Tabular erect	**Total**
Pre/Early Classic	3.46	0.54	**4**
Late Classic	29.43	4.57	**34**
Terminal Classic	25.1	3.9	**29**
Total	**58**	**9**	**67**

5 **OBSERVED**

Sex	Not modified	Modified	**Total**
Male	7	8	**15**
Female	2	11	**13**
Total	**9**	**19**	**28**

EXPECTED

Sex	Not modified	Modified	**Total**
Male	4.82	10.18	**15**
Female	4.18	8.82	**13**
Total	**9**	**19**	**28**

6 **OBSERVED**

Date	Not modified	Modified	**Total**
Pre/Early Classic	6	2	**8**
Late Classic	2	6	**8**
Terminal Classic	3	17	**20**
Total	**11**	**25**	**36**

EXPECTED

Date	Not modified	Modified	**Total**
Pre/Early Classic	2.44	5.56	**8**
Late Classic	2.44	5.56	**8**
Terminal Classic	6.11	13.89	**20**
Total	**11**	**25**	**36**

7 **OBSERVED**

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	1	1	6	**8**
Female	1	3	7	**11**
Total	**2**	**4**	**13**	**19**

EXPECTED

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	0.84	1.68	5.47	**8**
Female	1.16	2.32	7.53	**11**
Total	**2**	**4**	**13**	**17**

8 **OBSERVED**

Sex	Not modified	Modified	**Total**
Male	2	18	**20**
Female	3	5	**8**
Total	**5**	**23**	**28**

EXPECTED

Sex	Not modified	Modified	**Total**
Male	3.57	16.43	**20**
Female	1.43	6.57	**8**
Total	**5**	**23**	**29**

9 **OBSERVED**

Date	Not modified	Modified	**Total**
Pre/Early Classic	0	3	**3**
Late Classic	1	5	**6**
Terminal Classic	4	17	**21**
Total	**5**	**25**	**30**

EXPECTED

Date	Not modified	Modified	**Total**
Pre/Early Classic	0.5	2.5	**3**
Late Classic	1	5	**6**
Terminal Classic	3.5	17.5	**21**
Total	**5**	**25**	**30**

10 **OBSERVED**

Sex	**Pre/Early Classic**	Late Classic	Terminal Classic	**Total**
Male	2	5	11	**18**
Female	1	0	4	**5**
Total	**3**	**5**	**15**	**23**

EXPECTED

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	2.35	3.91	11.74	**18**
Female	0.65	1.07	3.26	**5**
Total	**3**	**5**	**15**	**23**

11 **OBSERVED**

Sex	Not modified	Modified	**Total**
Male	4	25	**29**
Female	1	13	**14**
Total	**5**	**38**	**43**

EXPECTED

Sex	Not modified	Modified	**Total**
Male	3.37	25.63	**29**
Female	1.63	12.37	**14**
Total	**5**	**38**	**45**

12 **OBSERVED**

Date	Not modified	Modified	**Total**
Pre/Early Classic	2	0	**2**
Late Classic	2	35	**37**
Terminal Classic	1	6	**7**
Total	**5**	**41**	**46**

EXPECTED

Date	Not modified	Modified	**Total**
Pre/Early Classic	0.22	1.78	**2**
Late Classic	4.02	32.98	**37**
Terminal Classic	0.76	6.24	**7**
Total	**5**	**41**	**46**

13 **OBSERVED**

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	0	19	3	**22**
Female	0	11	2	**13**
Total	**0**	**30**	**5**	**35**

EXPECTED

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	0	18.86	3.14	**22**
Female	0	11.14	1.86	**13**
Total	**0**	**30**	**5**	**35**

14 **OBSERVED**

Grave type	Not Modified	Modified	**Total**
Simple	13	39	**52**
Crypt	1	13	**14**
Other	5	27	**32**
Total	**19**	**79**	**98**

Expected

Grave type	Not Modified	Modified	**Total**
Simple	10.08	41.92	**52**
Crypt	2.71	11.29	**14**
Other	6.2	25.8	**32**
Total	**19**	**79**	**98**

15 **OBSERVED**

Head orientation	Not Modified	Modified	**Total**
North	3	16	**19**
East	6	33	**39**
South	4	4	**8**
West	1	5	**6**
Total	**14**	**58**	**72**

EXPECTED

Head orientation	Not Modified	Modified	**Total**
North	3.69	15.31	**19**
East	7.58	31.42	**39**
South	1.56	6.44	**8**
West	1.17	4.83	**6**
Total	**14**	**58**	**72**

16 **OBSERVED**

Body Position	Not Modified	Modified	**Total**
Extended	2	19	**21**
Flexed	11	42	**53**
Seated	0	3	**3**
Total	**13**	**64**	**77**

EXPECTED

Body Position	Not Modified	Modified	**Total**
Extended	3.55	17.45	**21**
Flexed	8.95	44.05	**53**
Seated	0.51	2.49	**3**
Total	**13**	**64**	**77**

17 **OBSERVED**

Sex - Pre/Early Classic	Not Modified	Modified	**Total**
Male	7	3	**10**
Female	0	2	**2**
Total	**7**	**5**	**12**

EXPECTED

Sex - Pre/Early Classic	Not Modified	Modified	**Total**
Male	5.83	4.17	**10**
Female	1.17	0.83	**2**
Total	**7**	**5**	**12**

18 **OBSERVED**

Sex - Late Classic	Not Modified	Modified	**Total**
Male	3	25	**28**
Female	2	14	**16**
Total	**5**	**39**	**44**

EXPECTED

Sex - Late Classic	Not Modified	Modified	**Total**
Male	3.18	24.82	**28**
Female	1.82	14.18	**16**
Total	**5**	**39**	**44**

19 **OBSERVED**

Sex - Terminal Classic	Not Modified	Modified	**Total**
Male	3	20	**23**
Female	4	13	**17**
Total	**7**	**33**	**40**

EXPECTED

Sex - Terminal Classic	Not Modified	Modified	**Total**
Male	4.03	18.98	**23**
Female	2.98	14.03	**17**
Total	**7**	**33**	**40**

20 **OBSERVED**

Grave type - Late Classic	Not Modified	Modified	**Total**
Simple	2	17	**19**
Crypt	1	11	**12**
Other	2	8	**10**
Total	**5**	**36**	**41**

EXPECTED

Grave type - Late Classic	Not Modified	Modified	**Total**
Simple	2.32	16.68	**19**
Crypt	1.46	10.54	**12**
Other	1.22	8.78	**10**
Total	**5**	**36**	**41**

21 **OBSERVED**

Grave type - Terminal Classic	Not Modified	Modified	**Total**
Simple	4	18	**22**
Crypt	0	1	**1**
Other	4	19	**23**
Total	**8**	**38**	**46**

EXPECTED

Grave type - Terminal Classic	Not Modified	Modified	**Total**
Simple	3.83	18.17	**22**
Crypt	0.17	0.83	**1**
Other	4	19	**23**
Total	**8**	**38**	**46**

22 **OBSERVED**

Body Position - Late Classic	Not Modified	Modified	**Total**
Extended	0	9	**9**
Flexed	3	22	**25**
Seated	0	0	**0**
Total	**3**	**31**	**34**

EXPECTED

Body Position - Late Classic	Not Modified	Modified	**Total**
Extended	0.79	8.21	**9**
Flexed	2.21	22.79	**25**
Seated	0	0	**0**
Total	**3**	**31**	**34**

23 **OBSERVED**

Body Position - Terminal Classic	Not Modified	Modified	**Total**
Extended	1	9	**10**
Flexed	4	16	**20**
Seated	0	3	**3**
Total	**5**	**28**	**33**

EXPECTED

Body Position - Terminal Classic	Not Modified	Modified	**Total**
Extended	1.52	8.48	**10**
Flexed	3.03	16.97	**20**
Seated	0.45	2.55	**3**
Total	**5**	**28**	**33**

24 **OBSERVED**

Head orientation - Late Classic	Not Modified	Modified	**Total**
North	1	9	**10**
East	3	14	**17**
South	0	5	**5**
West	0	1	**1**
Total	**4**	**29**	**33**

EXPECTED

Head orientation - Late Classic	Not Modified	Modified	**Total**
North	1.21	8.79	**10**
East	2.06	14.94	**17**
South	0.61	4.39	**5**
West	0.12	0.88	**1**
Total	**4**	**29**	**33**

25 **OBSERVED**

Head orientation – Term. Classic	Not Modified	Modified	**Total**
North	1	7	**8**
East	2	17	**19**
South	1	1	**2**
West	0	2	**2**
Total	**4**	**27**	**31**

EXPECTED

Head orientation – Term. Classic	Not Modified	Modified	**Total**
North	1.03	6.97	**8**
East	2.45	16.55	**19**
South	0.26	1.74	**2**
West	0.26	1.74	**2**
Total	**4**	**27**	**31**

26 **OBSERVED**

Grave type - AS	Not Modified	Modified	**Total**
Simple	11	14	**25**
Crypt	0	1	**1**
Other	0	6	**6**
Total	**11**	**21**	**32**

Expected

Grave type	Not Modified	Modified	**Total**
Simple	8.59	16.41	**25**
Crypt	0.34	0.66	**1**
Other	2.06	3.94	**6**
Total	**11**	**21**	**32**

27 **OBSERVED**

Grave type - AS (No Pre/Early)	Not Modified	Modified	**Total**
Simple	5	12	**17**
Crypt	0	1	**1**
Other	0	6	**6**
Total	**5**	**19**	**24**

Expected

Grave type - AS (No Pre/Early)	Not Modified	Modified	**Total**
Simple	3.54	13.46	**17**
Crypt	0.21	0.79	**1**
Other	1.25	4.75	**6**
Total	**5**	**19**	**24**

28 **OBSERVED**

Body Position - AS	Not Modified	Modified	**Total**
Extended	1	6	**7**
Flexed	7	22	**29**
Seated	0	2	**2**
Total	**8**	**30**	**38**

EXPECTED

Body Position	Not Modified	Modified	**Total**
Extended	1.47	5.53	**7**
Flexed	6.12	22.89	**29**
Seated	0.41	1.58	**2**
Total	**8**	**30**	**38**

29 **OBSERVED**

Head orientation - AS	Not Modified	Modified	**Total**
North	2	5	**7**
East	3	16	**19**
South	3	1	**4**
West	1	1	**2**
Total	**9**	**23**	**32**

EXPECTED

Head orientation	Not Modified	Modified	**Total**
North	1.97	5.03	**7**
East	5.34	13.66	**19**
South	1.13	2.88	**4**
West	0.56	1.44	**2**
Total	**9**	**23**	**32**

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30 **OBSERVED**

Head orientation - AS - no Pre/Early Classic	Not Modified	Modified	**Total**
North	1	5	**6**
East	2	15	**17**
South	1	1	**2**
West	0	0	**0**
Total	**4**	**21**	**25**

EXPECTED

Head orientation - AS - no Pre/Early Classic	Not Modified	Modified	**Total**
North	0.96	5.04	**6**
East	2.72	14.28	**17**
South	0.32	1.68	**2**
West	0	0	**0**
Total	**4**	**21**	**25**

31 **OBSERVED**

Grave type - SE	Not Modified	Modified	**Total**
Simple	0	7	**7**
Crypt	0	2	**2**
Other	5	16	**21**
Total	**5**	**25**	**30**

Expected

Grave type	Not Modified	Modified	**Total**
Simple	1.17	5.83	**7**
Crypt	0.33	1.67	**2**
Other	3.5	17.5	**21**
Total	**5**	**25**	**30**

32 **OBSERVED**

Body Position - SE	Not Modified	Modified	**Total**
Extended	1	7	**8**
Flexed	2	11	**13**
Seated	0	1	**1**
Total	**3**	**19**	**22**

EXPECTED

Body Position	Not Modified	Modified	**Total**
Extended	1.09	6.91	**8**
Flexed	1.77	11.23	**13**
Seated	0.14	0.86	**1**
Total	**3**	**19**	**22**

33 **OBSERVED**

Head orientation - SE	Not Modified	Modified	**Total**
North	0	5	**5**
East	2	9	**11**
South	0	1	**1**
West	0	4	**4**
Total	**2**	**19**	**21**

EXPECTED

Head orientation	Not Modified	Modified	**Total**
North	0.47	4.52	**5**
East	1.05	9.95	**11**
South	0.1	0.9	**1**
West	0.38	3.62	**4**
Total	**2**	**19**	**21**

34 **OBSERVED**

Grave type - Petex	Not Modified	Modified	**Total**
Simple	1	18	**19**
Crypt	1	10	**11**
Other	2	4	**6**
Total	**4**	**32**	**36**

Expected

Grave type	Not Modified	Modified	**Total**
Simple	2.11	16.89	**19**
Crypt	1.22	9.78	**11**
Other	0.67	5.33	**6**
Total	**4**	**32**	**36**

35 **OBSERVED**

Body Position - Petex	Not Modified	Modified	**Total**
Extended	0	6	**6**
Flexed	2	15	**17**
Seated	0	0	**0**
Total	**2**	**21**	**23**

EXPECTED

Body Position	Not Modified	Modified	**Total**
Extended	0.52	5.48	**6**
Flexed	1.48	15.52	**17**
Seated	0	0	**0**
Total	**2**	**21**	**23**

36 **OBSERVED**

Orientation - Petex	Not Modified	Modified	**Total**
North	1	6	**7**
East	1	9	**10**
South	1	5	**6**
West	0	1	**1**
Total	**3**	**21**	**24**

EXPECTED

Orientation	Not Modified	Modified	**Total**
North	0.88	6.13	**7**
East	1.25	8.75	**10**
South	0.75	5.25	**6**
West	0.13	0.88	**1**
Total	**3**	**21**	**24**

37 **OBSERVED**

Grave type	Tabular oblique	Tabular erect	**Total**
Simple	25	4	**29**
Crypt	10	1	**11**
Other	17	4	**21**
Total	**52**	**9**	**61**

Expected

Grave type	Tabular oblique	Tabular erect	**Total**
Simple	24.72	4.28	**29**
Crypt	9.38	1.62	**11**
Other	17.9	3.1	**21**
Total	**52**	**9**	**61**

38 **OBSERVED**

	Not Modified	Modified	**Total**
Jade present	1	7	**8**
Jade absent	14	53	**67**
Total	**15**	**60**	**75**

OBSERVED

	Not Modified	Modified	**Total**
Jade present	1.6	6.4	**8**
Jade absent	13.4	53.6	**67**
Total	**15**	**60**	**75**

39 **OBSERVED**

Jade - AS	Not Modified	Modified	**Total**
Jade present	1	4	**5**
Jade absent	7	4	**11**
Total	**8**	**8**	**16**

EXPECTED

Jade - AS	Not Modified	Modified	**Total**
Jade present	2.5	2.5	**5**
Jade absent	5.5	5.5	**11**
Total	**8**	**8**	**16**

40 **OBSERVED**

Jade - SE	Not Modified	Modified	**Total**
Jade present	0	9	**9**
Jade absent	5	16	**21**
Total	**5**	**25**	**30**

EXPECTED

Jade - SE	Not Modified	Modified	**Total**
Jade present	1.5	7.5	**9**
Jade absent	3.5	17.5	**21**
Total	**5**	**25**	**30**

41 **OBSERVED**

Jade - Petex	Not Modified	Modified	**Total**
Jade present	0	6	**6**
Jade absent	2	21	**23**
Total	**2**	**27**	**29**

EXPECTED

Jade - Petex	Not Modified	Modified	**Total**
Jade present	0.41	5.59	**6**
Jade absent	1.59	21.41	**23**
Total	**2**	**27**	**29**

42 **OBSERVED**

Head orientation – Terminal Classic	Tabular oblique	Tabular erect	**Total**
North	11	1	**12**
East	24	3	**27**
South	6	1	**7**
West	1	1	**2**
Total	**42**	**6**	**48**

EXPECTED

Head orientation – Terminal Classic	Tabular oblique	Tabular erect	**Total**
North	10.5	1.5	**12**
East	23.63	3.38	**27**
South	6.13	0.88	**7**
West	1.75	0.25	**2**
Total	**42**	**6**	**48**

43 **OBSERVED**

Head orientation	Altar	Seibal	Petex	**Total**
North	5	5	6	**16**
East	16	9	9	**34**
South	1	1	5	**7**
West	1	4	1	**6**
Total	**23**	**19**	**21**	**63**

EXPECTED

Head orientation	Altar	Seibal	Petex	**Total**
North	5.84	4.83	5.33	**16**
East	12.41	10.25	11.333	**34**
South	2.56	2.11	2.33	**7**
West	2.19	1.81	2	**6**
Total	**23**	**19**	**21**	**63**

44 **OBERVED**

Ceramic Grave Goods	Not Modified	Modified	**Total**
1 ceramic form	6	16	**22**
2+ ceramic forms	2	19	**21**
No ceramic grave goods	11	45	**56**
Total	**19**	**80**	**99**

EXPECTED

Ceramic Grave Goods	Not Modified	Modified	**Total**
1 ceramic form	4.22	17.78	**22**
2+ ceramic forms	4.03	16.97	**21**
No ceramic grave goods	10.75	45.25	**56**
Total	**19**	**80**	**99**

45 **OBERVED**

Ceramic Grave Goods	Not Modified	Modified	**Total**
1 ceramic form	6	16	**22**
2+ ceramic forms	2	19	**21**
Total	**8**	**35**	**43**

EXPECTED

Ceramic Grave Goods	Not Modified	Modified	**Total**
1 ceramic form	4.09	17.91	**22**
2+ ceramic forms	3.91	17.09	**21**
Total	**8**	**35**	**43**

46 **OBSERVED**

Bowl(s) Only - modified sample	Not Modified	Modified	**Total**
AS	4	6	**10**
SE	0	5	**5**
Petex	1	0	**1**
Total	**5**	**11**	**16**

EXPECTED

Bowl(s) Only - modified sample	Not Modified	Modified	**Total**
AS	3.13	6.88	**10**
SE	1.56	3.44	**5**
Petex	0.313	0.69	**1**
Total	**5**	**11**	**16**

47 **OBSERVED**

Presence of Bowls	Not Modified	Modified	**Total**
1 or more bowls	7	28	**35**
No bowls	13	53	**66**
Total	**20**	**81**	**101**

EXPECTED

Presence of Bowls	Not Modified	Modified	**Total**
1 or more bowls	6.93	28.07	**35**
No bowls	13.07	52.9	**66**
Total	**20**	**81**	**101**

48 **OBSERVED**

Presence of Plates	Not Modified	Modified	**Total**
1 or more plates	2	14	**16**
No plates	18	68	**86**
Total	**20**	**82**	**102**

EXPECTED

Presence of Plates	Not Modified	Modified	**Total**
1 or more plates	3.14	12.86	**16**
No plates	16.86	69.14	**86**
Total	**20**	**82**	**102**

49 **OBSERVED**

Presence of Jars	Not Modified	Modified	**Total**
1 or more jars	0	7	**7**
No jars	16	66	**82**
Total	**16**	**73**	**89**

EXPECTED

Presence of Jars	Not Modified	Modified	**Total**
1 or more jars	1.26	5.74	**7**
No jars	14.74	67.26	**82**
Total	**16**	**73**	**89**

50 **OBSERVED**

Presence of Vases	Not Modified	Modified	**Total**
1 or more vases	1	16	**17**
No vases	19	65	**84**
Total	**20**	**81**	**101**

EXPECTED

Presence of Vases	Not Modified	Modified	**Total**
1 or more vases	3.37	13.63	**17**
No vases	16.63	67.37	**84**
Total	**20**	**81**	**101**

51 **OBSERVED**

Presence of Bowls - AS	Not Modified	Modified	**Total**
1 or more bowls	4	11	**15**
No bowls	7	13	**20**
Total	**11**	**24**	**35**

EXPECTED

Presence of Bowls - AS	Not Modified	Modified	**Total**
1 or more bowls	4.71	10.29	**15**
No bowls	6.29	13.71	**20**
Total	**11**	**24**	**35**

52 **OBSERVED**

Presence of Plates - AS	Not Modified	Modified	**Total**
1 or more plates	1	4	**5**
No plates	10	20	**30**
Total	**11**	**24**	**35**

EXPECTED

Presence of Plates - AS	Not Modified	Modified	**Total**
1 or more plates	1.57	3.43	**5**
No plates	9.43	20.57	**30**
Total	**11**	**24**	**35**

53 **OBSERVED**

Presence of Jars - AS	Not Modified	Modified	**Total**
1 or more jars	0	4	**4**
No jars	9	17	**26**
Total	**9**	**21**	**30**

EXPECTED

Presence of Jars - AS	Not Modified	Modified	**Total**
1 or more jars	1.2	2.8	**4**
No jars	7.8	18.2	**26**
Total	**9**	**21**	**30**

54 **OBSERVED**

Presence of Vases - AS	Not Modified	Modified	**Total**
1 or more vases	0	4	**4**
No vases	11	16	**27**
Total	**11**	**20**	**31**

EXPECTED

Presence of vases - AS	Not Modified	Modified	**Total**
1 or more vases	1.42	2.58	**4**
No vases	9.58	17.42	**27**
Total	**11**	**20**	**31**

55 **OBSERVED**

Presence of Bowls - SE	Not Modified	Modified	**Total**
1 or more bowls	1	9	**10**
No bowls	4	16	**20**
Total	**5**	**25**	**30**

EXPECTED

Presence of Bowls - SE	Not Modified	Modified	**Total**
1 or more bowls	1.67	8.33	**10**
No bowls	3.33	16.67	**20**
Total	**5**	**25**	**30**

56 **OBSERVED**

Presence of Plates - SE	Not Modified	Modified	**Total**
1 or more plates	1	4	**5**
No plates	4	21	**25**
Total	**5**	**25**	**30**

EXPECTED

Presence of Plates - SE	Not Modified	Modified	**Total**
1 or more plates	0.83	4.17	**5**
No plates	4.17	20.83	**25**
Total	**5**	**25**	**30**

57 **OBSERVED**

Presence of Jars - SE	Not Modified	Modified	**Total**
1 or more jars	0	2	**2**
No jars	5	23	**28**
Total	**5**	**25**	**30**

EXPECTED

Presence of Jars - SE	Not Modified	Modified	**Total**
1 or more jars	0.33	1.67	**2**
No jars	4.67	23.33	**28**
Total	**5**	**25**	**30**

58 **OBSERVED**

Presence of Vases - SE	Not Modified	Modified	**Total**
1 or more vases	0	5	**5**
No vases	5	20	**25**
Total	**5**	**25**	**30**

EXPECTED

Presence of vases - SE	Not Modified	Modified	**Total**
1 or more vases	0.83	4.17	**5**
No vases	4.17	20.83	**25**
Total	**5**	**25**	**30**

59 **OBSERVED**

Presence of Bowls - Petex	Not Modified	Modified	**Total**
1 or more bowls	2	8	**10**
No bowls	2	24	**26**
Total	**4**	**32**	**36**

EXPECTED

Presence of Bowls - Petex	Not Modified	Modified	**Total**
1 or more bowls	1.11	8.89	**10**
No bowls	2.89	23.11	**26**
Total	**4**	**32**	**36**

60 **OBSERVED**

Presence of Plates - Petex	Not Modified	Modified	**Total**
1 or more plates	0	5	**5**
No plates	4	27	**31**
Total	**4**	**32**	**36**

EXPECTED

Presence of Plates - Petex	Not Modified	Modified	**Total**
1 or more plates	0.56	4.44	**5**
No plates	3.44	27.56	**31**
Total	**4**	**32**	**36**

61 **OBSERVED**

Presence of Jars - Petex	Not Modified	Modified	**Total**
1 or more jars	0	1	**1**
No jars	2	26	**28**
Total	**2**	**27**	**29**

EXPECTED

Presence of Jars - Petex	Not Modified	Modified	**Total**
1 or more jars	0.07	0.93	**1**
No jars	1.93	26.07	**28**
Total	**2**	**27**	**29**

62 **OBSERVED**

Presence of Vases - SE	Not Modified	Modified	**Total**
1 or more vases	1	7	**8**
No vases	4	26	**30**
Total	**5**	**33**	**38**

EXPECTED

Presence of vases - SE	Not Modified	Modified	**Total**
1 or more vases	1.05	6.95	**8**
No vases	3.95	26.05	**30**
Total	**5**	**33**	**38**

63 **OBSERVED**

Presence of Bowls - Pre/Early	Not Modified	Modified	**Total**
1 or more bowls	3	1	**4**
No bowls	4	5	**9**
Total	**7**	**6**	**13**

EXPECTED

Presence of Bowls - Pre/Early	Not Modified	Modified	**Total**
1 or more bowls	2.15	1.85	**4**
No bowls	4.85	4.15	**9**
Total	**7**	**6**	**13**

64 **OBSERVED**

Presence of Bowls - Late	Not Modified	Modified	**Total**
1 or more bowls	3	14	**17**
No bowls	2	21	**23**
Total	**5**	**35**	**40**

EXPECTED

Presence of Bowls - Late	Not Modified	Modified	**Total**
1 or more bowls	2.13	14.88	**17**
No bowls	2.88	20.13	**23**
Total	**5**	**35**	**40**

65 **OBSERVED**

Presence of Bowls - Terminal	Not Modified	Modified	**Total**
1 or more bowls	1	13	**14**
No bowls	7	27	**34**
Total	**8**	**40**	**48**

EXPECTED

Presence of Bowls - Terminal	Not Modified	Modified	**Total**
1 or more bowls	2.33	11.67	**14**
No bowls	5.67	28.33	**34**
Total	**8**	**40**	**48**

66 **OBSERVED**

Presence of Plates - Pre/Early	Not Modified	Modified	**Total**
1 or more plates	1	1	**2**
No plates	6	5	**11**
Total	**7**	**6**	**13**

EXPECTED

Presence of Plates - Pre/Early	Not Modified	Modified	**Total**
1 or more plates	1.08	0.92	**2**
No plates	5.92	5.08	**11**
Total	**7**	**6**	**13**

67 **OBSERVED**

Presence of Plates - Late	Not Modified	Modified	**Total**
1 or more plates	0	10	**10**
No plates	5	26	**31**
Total	**5**	**36**	**41**

EXPECTED

Presence of Plates - Late	Not Modified	Modified	**Total**
1 or more plates	1.22	8.78	**10**
No plates	3.78	27.22	**31**
Total	**5**	**36**	**41**

68 **OBSERVED**

Presence of Plates - Terminal	Not Modified	Modified	**Total**
1 or more plates	1	3	**4**
No plates	7	37	**44**
Total	**8**	**40**	**48**

EXPECTED

Presence of Plates - Terminal	Not Modified	Modified	**Total**
1 or more plates	0.67	3.33	**4**
No plates	7.33	36.67	**44**
Total	**8**	**40**	**48**

69 **OBSERVED**

Presence of Jars - Pre/Early	Not Modified	Modified	**Total**
1 or more jars	0	0	**0**
No jars	6	8	**14**
Total	**6**	**8**	**14**

EXPECTED

Presence of Jars - Pre/Early	Not Modified	Modified	**Total**
1 or more jars	0	0	**0**
No jars	6	8	**14**
Total	**6**	**8**	**14**

70 **OBSERVED**

Presence of Jars - Late	Not Modified	Modified	**Total**
1 or more jars	0	3	**3**
No jars	2	24	**26**
Total	**2**	**27**	**29**

EXPECTED

Presence of Jars - Late	Not Modified	Modified	**Total**
1 or more jars	0.21	2.79	**3**
No jars	1.79	24.21	**26**
Total	**2**	**27**	**29**

71 **OBSERVED**

Presence of Jars - Terminal	Not Modified	Modified	**Total**
1 or more jars	0	2	**2**
No jars	8	38	**46**
Total	**8**	**40**	**48**

EXPECTED

Presence of Jars - Terminal	Not Modified	Modified	**Total**
1 or more jars	0.33	1.67	**2**
No jars	7.67	38.33	**46**
Total	**8**	**40**	**48**

72 **OBSERVED**

Presence of Vases - Pre/Early	Not Modified	Modified	**Total**
1 or more vases	0	2	**2**
No vases	7	4	**11**
Total	**7**	**6**	**13**

EXPECTED

Presence of vases - Pre/Early	Not Modified	Modified	**Total**
1 or more vases	1.08	0.92	**2**
No vases	5.92	5.08	**11**
Total	**7**	**6**	**13**

73 **OBSERVED**

Presence of Vases - Late	Not Modified	Modified	**Total**
1 or more vases	1	9	**10**
No vases	4	26	**30**
Total	**5**	**35**	**40**

EXPECTED

Presence of vases - Late	Not Modified	Modified	**Total**
1 or more vases	1.25	8.75	**10**
No vases	3.75	26.25	**30**
Total	**5**	**35**	**40**

74 **OBSERVED**

Presence of Vases - Terminal	Not Modified	Modified	**Total**
1 or more vases	0	5	**5**
No vases	8	35	**43**
Total	**8**	**40**	**48**

EXPECTED

Presence of vases - Terminal	Not Modified	Modified	**Total**
1 or more vases	0.83	4.17	**5**
No vases	7.17	35.83	**43**
Total	**8**	**40**	**48**

75 **OBSERVED**

	Not Modified	Modified	**Total**
6 or more vessels	0	4	**4**
less than 6 vessels	8	31	**39**
Total	**8**	**35**	**43**

EXPECTED

	Not Modified	Modified	**Total**
6 or more vessels	0.74	3.26	**4**
less than 6 vessels	7.26	31.74	**39**
Total	**8**	**35**	**43**

76 **OBSERVED**

	Male	Female	**Total**
6 or more vessels	2	2	**4**
less than 6 vessels	14	8	**22**
Total	**16**	**10**	**26**

EXPECTED

	Male	Female	**Total**
6 or more vessels	2.46	1.54	**4**
less than 6 vessels	13.54	8.46	**22**
Total	**16**	**10**	**26**

77 **OBSERVED**

	Not modified	Modified	**Total**
Ceramic vessels present	8	35	**43**
No ceramics	12	47	**59**
Total	**20**	**82**	**102**

EXPECTED

	Not modified	Modified	**Total**
Ceramic vessels present	8.43	34.57	**43**
No ceramics	11.57	47.43	**59**
Total	**20**	**82**	**102**

78 **OBSERVED**

Grave type - Late and Term.	Not Modified	Modified	**Total**
Simple	6	35	**41**
Crypt	2	12	**14**
Other	6	26	**32**
Total	**14**	**73**	**87**

Expected

Grave type - Late and Term.	Not Modified	Modified	**Total**
Simple	6.6	34.4	**41**
Crypt	2.25	11.75	**14**
Other	5.15	26.85	**32**
Total	**14**	**73**	**87**

79 **OBSERVED**

Grave type - Late	Not Modified	Modified	**Total**
Simple	2	17	**19**
Crypt	1	11	**12**
Other	2	7	**9**
Total	**5**	**35**	**40**

Expected

Grave type - Late	Not Modified	Modified	**Total**
Simple	2.38	16.63	**19**
Crypt	1.5	10.5	**12**
Other	1.13	7.88	**9**

Total	**5**	**35**	**40**

80 **OBSERVED**

Grave type - Terminal	Not Modified	Modified	**Total**
Simple	4	18	**22**
Crypt	0	1	**1**
Other	4	19	**23**
Total	**8**	**38**	**46**

Expected

Grave type - Terminal	Not Modified	Modified	**Total**
Simple	3.83	18.17	**22**
Crypt	0.17	0.83	**1**
Other	4	19	**23**
Total	**8**	**38**	**46**

81 **OBSERVED**

Site - Late and Term.	Not Modified	Modified	**Total**
AS	5	23	**28**
SE	5	24	**29**
Petexbatun	3	41	**44**
Total	**13**	**88**	**101**

EXPECTED

Site - Late and Term.	Not Modified	Modified	**Total**
AS	3.6	24.4	**28**
SE	3.73	25.27	**29**
Petexbatun	5.66	38.34	**44**
Total	**13**	**88**	**101**

82 **OBSERVED**

Site - Late	Not Modified	Modified	**Total**
AS	2	6	**8**
SE	1	4	**5**
Petexbatun	2	35	**37**
Total	**5**	**45**	**50**

EXPECTED

Site - Late	Not Modified	Modified	**Total**

AS	0.8	7.2	**8**
SE	0.5	4.5	**5**
Petexbatun	3.7	33.3	**37**
Total	**5**	**45**	**50**

83 **OBSERVED**

Site - Terminal	Not Modified	Modified	**Total**
AS	3	17	**20**
SE	4	17	**21**
Petexbatun	1	6	**7**
Total	**8**	**40**	**48**

EXPECTED

Site - Terminal	Not Modified	Modified	**Total**
AS	3.33	16.67	**20**
SE	3.5	17.5	**21**
Petexbatun	1.17	5.83	**7**
Total	**8**	**40**	**48**

84 **OBSERVED**

Body Position - Late and Term.	Not Modified	Modified	**Total**
Extended	1	18	**19**
Flexed	7	37	**44**
Seated	0	3	**3**
Total	**8**	**58**	**66**

EXPECTED

Body Position - Late and Term.	Not Modified	Modified	**Total**
Extended	2.3	16.7	**19**
Flexed	5.33	38.67	**44**
Seated	0.36	2.64	**3**
Total	**8**	**58**	**66**

85 **OBSERVED**

Body Position - Late	Not Modified	Modified	**Total**
Extended	0	9	**9**
Flexed	3	21	**24**
Seated	0	0	**0**
Total	**3**	**30**	**33**

EXPECTED

Body Position - Late	Not Modified	Modified	**Total**

Extended	0.82	8.18	**9**
Flexed	2.18	21.82	**24**
Seated	0	0	**0**
Total	**3**	**30**	**33**

86 **OBSERVED**

Body Position - Terminal	Not Modified	Modified	**Total**
Extended	1	9	**10**
Flexed	4	16	**20**
Seated	0	3	**3**
Total	**5**	**28**	**33**

EXPECTED

Body Position - Terminal	Not Modified	Modified	**Total**
Extended	1.52	8.48	**10**
Flexed	3.03	16.97	**20**
Seated	0.45	2.55	**3**
Total	**5**	**28**	**33**

87 **OBSERVED**

Sex - AS - Late and Term.	Not modified	Modified	**Total**
Male	2	7	**9**
Female	2	10	**12**
Total	**4**	**17**	**21**

EXPECTED

Sex - AS - Late and Term.	Not modified	Modified	**Total**
Male	1.71	7.29	**9**
Female	2.29	9.71	**12**
Total	**4**	**17**	**21**

88 **OBSERVED**

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	3	25	20	**48**
Female	2	14	13	**29**
Total	**5**	**39**	**33**	**77**

EXPECTED

Sex	Pre/Early Classic	Late Classic	Terminal Classic	**Total**
Male	3.12	24.31	20.57	**48**
Female	1.88	14.69	12.43	**29**
Total	**5**	**39**	**33**	**77**

89 **OBSERVED**

Jade - AS - Late	Not Modified	Modified	**Total**
Jade present	0	3	**3**
Jade absent	2	2	**4**
Total	**2**	**5**	**7**

EXPECTED

Jade - AS	Not Modified	Modified	**Total**
Jade present	0.86	2.14	**3**
Jade absent	1.14	2.86	**4**
Total	**2**	**5**	**7**

90 **OBSERVED**

Jade - AS - Terminal	Not Modified	Modified	**Total**
Jade present	0	0	**0**
Jade absent	3	17	**20**
Total	**3**	**17**	**20**

EXPECTED

Jade - AS - Terminal	Not Modified	Modified	**Total**
Jade present	0	0	**0**
Jade absent	3	17	**20**
Total	**3**	**17**	**20**

91 **OBSERVED**

Jade - SE - Late	Not Modified	Modified	**Total**
Jade present	0	1	**1**
Jade absent	1	3	**4**
Total	**1**	**4**	**5**

EXPECTED

Jade - SE - Late	Not Modified	Modified	**Total**
Jade present	0.2	0.8	**1**
Jade absent	0.8	3.2	**4**
Total	**1**	**4**	**5**

92 **OBSERVED**

Jade - SE - Terminal	Not Modified	Modified	**Total**
Jade present	0	1	**1**
Jade absent	4	16	**20**
Total	**4**	**17**	**21**

EXPECTED

Jade - SE - Terminal	Not Modified	Modified	**Total**
Jade present	0.19	0.81	**1**
Jade absent	3.81	16.19	**20**
Total	**4**	**17**	**21**

93 **OBSERVED**

Jade - Petex - Late	Not Modified	Modified	**Total**
Jade present	0	1	**1**
Jade absent	1	20	**21**
Total	**1**	**21**	**22**

EXPECTED

Jade - Petex - Late	Not Modified	Modified	**Total**
Jade present	0.05	0.95	**1**
Jade absent	0.95	20.05	**21**
Total	**1**	**21**	**22**

94 **OBSERVED**

Jade - Petex - Terminal	Not Modified	Modified	**Total**
Jade present	0	0	**0**
Jade absent	1	6	**7**
Total	**1**	**6**	**7**

EXPECTED

Jade - Petex - Terminal	Not Modified	Modified	**Total**
Jade present	0	0	**0**
Jade absent	1	6	**7**
Total	**1**	**6**	**7**

95 **OBSERVED**

Grave type - AS - Late	Not Modified	Modified	**Total**
Simple	2	3	**5**
Crypt	0	1	**1**
Other	0	1	**1**
Total	**2**	**5**	**7**

Expected

Grave type - AS - Late	Not Modified	Modified	**Total**
Simple	1.43	3.57	**5**
Crypt	0.29	0.71	**1**
Other	0.29	0.71	**1**
Total	**2**	**5**	**7**

96 **OBSERVED**

Grave type - AS - Terminal	Not Modified	Modified	**Total**
Simple	3	9	**12**
Crypt	0	0	**0**
Other	0	6	**6**
Total	**3**	**15**	**18**

Expected

Grave type - AS - Terminal	Not Modified	Modified	**Total**
Simple	2	10	**12**
Crypt	0	0	**0**
Other	1	5	**6**
Total	**3**	**15**	**18**

97 **OBSERVED**

Grave type - SE - Late	Not Modified	Modified	**Total**
Simple	**0**	**1**	**1**
Crypt	**1**	**0**	**1**
Other	**0**	**2**	**2**
Total	**1**	**3**	**4**

Expected

Grave type - SE - Late	Not Modified	Modified	**Total**
Simple	0.25	0.75	**1**
Crypt	0.25	0.75	**1**
Other	0.5	1.5	**2**
Total	**1**	**3**	**4**

98 **OBSERVED**

Grave type - SE - Terminal	Not Modified	Modified	**Total**
Simple	0	3	**3**
Crypt	0	1	**1**
Other	4	13	**17**
Total	**4**	**17**	**21**

Expected

Grave type - SE - Terminal	Not Modified	Modified	Total
Simple	0.57	2.43	**3**
Crypt	0.19	0.81	**1**
Other	3.24	13.76	**17**
Total	**4**	**17**	**21**

99 **OBSERVED**

Grave type - Petex - Late	Not Modified	Modified	Total
Simple	0	12	**12**
Crypt	1	10	**11**
Other	1	4	**5**
Total	**2**	**26**	**28**

Expected

Grave type - Petex - Late	Not Modified	Modified	Total
Simple	0.86	11.14	**12**
Crypt	0.79	10.21	**11**
Other	0.36	4.64	**5**
Total	**2**	**26**	**28**

100 **OBSERVED**

Grave type - Petex - Terminal	Not Modified	Modified	Total
Simple	1	6	**7**
Crypt	0	0	**0**
Other	0	0	**0**
Total	**1**	**6**	**7**

Expected

Grave type - Petex - Terminal	Not Modified	Modified	Total
Simple	1	6	**7**
Crypt	0	0	**0**
Other	0	0	**0**
Total	**1**	**6**	**7**

101 **OBSERVED**

Body Position - AS - Late	Not Modified	Modified	Total
Extended	0	3	**3**
Flexed	1	2	**3**
Seated	0	0	**0**
Total	**1**	**5**	**6**

EXPECTED

Body Position - AS - Late	Not Modified	Modified	**Total**
Extended	0.5	2.5	**3**
Flexed	0.5	2.5	**3**
Seated	0	0	**0**
Total	**1**	**5**	**6**

102 **OBSERVED**

Body Position - AS - Terminal	Not Modified	Modified	**Total**
Extended	0	2	**2**
Flexed	3	13	**16**
Seated	0	2	**2**
Total	**3**	**17**	**20**

EXPECTED

Body Position - AS - Terminal	Not Modified	Modified	**Total**
Extended	0.3	1.7	**2**
Flexed	2.4	13.6	**16**
Seated	0.3	1.7	**2**
Total	**3**	**17**	**20**

103 **OBSERVED**

Body Position - SE - Late	Not Modified	Modified	**Total**
Extended	0	0	**0**
Flexed	1	4	**5**
Seated	0	0	**0**
Total	**1**	**4**	**5**

EXPECTED

Body Position - SE - Late	Not Modified	Modified	**Total**
Extended	0	0	**0**
Flexed	1	4	**5**
Seated	0	0	**0**
Total	**1**	**4**	**5**

104 **OBSERVED**

Body Position - AS - Terminal	Not Modified	Modified	**Total**
Extended	1	7	**8**
Flexed	0	3	**3**
Seated	1	1	**2**
Total	**2**	**11**	**13**

EXPECTED

Body Position - AS - Terminal	Not Modified	Modified	**Total**
Extended	1.23	6.77	**8**
Flexed	0.45	2.54	**3**
Seated	0.31	1.69	**2**
Total	**2**	**11**	**13**

105 **OBSERVED**

Body Position - Petex - Late	Not Modified	Modified	**Total**
Extended	0	6	**6**
Flexed	1	15	**16**
Seated	0	0	**0**
Total	**1**	**21**	**22**

EXPECTED

Body Position - Petex - Late	Not Modified	Modified	**Total**
Extended	0.27	5.73	**6**
Flexed	0.73	15.27	**16**
Seated	0	0	**0**
Total	**1**	**21**	**22**

106 **OBSERVED**

Body Position - Petex – Term.	Not Modified	Modified	**Total**
Extended	0	0	**0**
Flexed	0	0	**0**
Seated	0	0	**0**
Total	**0**	**0**	**0**

No scores for these burials

EXPECTED

Body Position - Petex – Term.	Not Modified	Modified	**Total**
Extended	not calculable	not calculable	**not calculable**
Flexed	not calculable	not calculable	**not calculable**
Seated	not calculable	not calculable	**not calculable**
Total	**not calculable**	**not calculable**	**not calculable**

107 **OBSERVED**

Head orientation - AS - Late	Not Modified	Modified	**Total**
North	0	1	**1**
East	1	4	**5**
South	0	0	**0**
West	0	0	**0**
Total	**1**	**5**	**6**

EXPECTED	Head orientation - AS - Late	Not Modified	Modified	Total
	North	0.17	0.83	**1**
	East	0.83	4.17	**5**
	South	0	0	**0**
	West	0	0	**0**
	Total	**1**	**5**	**6**

108

OBSERVED	Head orientation - AS - Terminal	Not Modified	Modified	Total
	North	1	4	**5**
	East	1	11	**12**
	South	1	1	**2**
	West	0	0	**0**
	Total	**3**	**16**	**19**

EXPECTED	Head orientation - AS - Terminal	Not Modified	Modified	Total
	North	0.79	4.2	**5**
	East	1.89	10.12	**12**
	South	0.32	1.68	**2**
	West	0	0	**0**
	Total	**3**	**16**	**19**

109

OBSERVED	Head orientation - SE - Late	Not Modified	Modified	Total
	North	0	2	**2**
	East	1	1	**2**
	South	0	0	**0**
	West	0	1	**1**
	Total	**1**	**4**	**5**

EXPECTED	Head orientation - SE - Late	Not Modified	Modified	Total
	North	0.4	1.6	**2**
	East	0.4	1.6	**2**
	South	0	0	**0**
	West	0.2	0.8	**1**
	Total	**1**	**4**	**5**

110 **OBSERVED**

Head orientation - SE - Terminal	Not Modified	Modified	**Total**
North	0	3	**3**
East	1	6	**7**
South	0	0	**0**
West	0	2	**2**
Total	**1**	**11**	**12**

EXPECTED

Head orientation - SE - Terminal	Not Modified	Modified	**Total**
North	0.25	2.75	**3**
East	0.58	6.42	**7**
South	0	0	**0**
West	0.17	1.83	**2**
Total	**1**	**11**	**12**

111 **OBSERVED**

Head orientation - Petex - Late	Not Modified	Modified	**Total**
North	1	6	**7**
East	1	8	**9**
South	0	3	**3**
West	0	0	**0**
Total	**2**	**17**	**19**

EXPECTED

Head orientation - Petex - Late	Not Modified	Modified	**Total**
North	0.74	6.26	**7**
East	0.95	8.05	**9**
South	0.32	2.68	**3**
West	0	0	**0**
Total	**2**	**17**	**19**

112 **OBSERVED**

Head orientation - Petex - Terminal	Not Modified	Modified	**Total**
North	0	0	**0**
East	0	0	**0**
South	0	0	**0**
West	0	0	**0**
Total	**0**	**0**	**0**

No scores for these burials

EXPECTED

Head orientation - Petex - Terminal	Not Modified	Modified	**Total**
North	not calculable	not calculable	**not calculable**
East	not calculable	not calculable	**not calculable**
South	not calculable	not calculable	**not calculable**
West	not calculable	not calculable	**not calculable**
Total	**not calculable**	**not calculable**	**not calculable**

113 **OBSERVED**

Ceramics - AS - Late	Not Modified	Modified	**Total**
Ceramics present	1	5	**6**
Ceramics absent	1	0	**1**
Total	**2**	**5**	**7**

EXPECTED

Ceramics - AS - Late	Not Modified	Modified	**Total**
Ceramics present	1.71	4.29	**6**
Ceramics absent	0.29	0.71	**1**
Total	**2**	**5**	**7**

114 **OBSERVED**

Ceramics - AS - Terminal	Not Modified	Modified	**Total**
Ceramics present	0	7	**7**
Ceramics absent	3	10	**13**

Total	**3**	**17**	**20**

EXPECTED

Ceramics - AS - Terminal	Not Modified	Modified	**Total**
Ceramics present	1.05	5.95	**7**
Ceramics absent	1.95	11.05	**13**
Total	**3**	**17**	**20**

115 **OBSERVED**

Ceramics - SE - Late	Not Modified	Modified	**Total**
Ceramics present	0	2	**2**
Ceramics absent	1	2	**3**
Total	**1**	**4**	**5**

EXPECTED

Ceramics - SE - Late	Not Modified	Modified	**Total**
Ceramics present	0.4	1.6	**2**
Ceramics absent	0.6	2.4	**3**
Total	**1**	**4**	**5**

116 **OBSERVED**

Ceramics - SE - Terminal	Not Modified	Modified	**Total**
Ceramics present	1	8	**9**
Ceramics absent	3	9	**12**
Total	**4**	**17**	**21**

EXPECTED

Ceramics - SE - Terminal	Not Modified	Modified	**Total**
Ceramics present	1.71	7.29	**9**
Ceramics absent	2.29	9.71	**12**
Total	**4**	**17**	**21**

117 **OBSERVED**

Ceramics - Petex - Late	Not Modified	Modified	**Total**
Ceramics present	2	11	**13**
Ceramics absent	0	16	**16**
Total	**2**	**27**	**29**

EXPECTED

Ceramics - Petex - Late	Not Modified	Modified	**Total**
Ceramics present	0.9	12.1	**13**
Ceramics absent	1.1	14.9	**16**

Total	**2**	**27**	**29**

118 **OBSERVED**

Ceramics - Petex - Terminal	Not Modified	Modified	**Total**
Ceramics present	0	0	**0**
Ceramics absent	1	0	**1**
Total	**1**	**0**	**1**

EXPECTED

Ceramics - Petex - Terminal	Not Modified	Modified	**Total**
Ceramics present	0	0	**0**
Ceramics absent	1	0	**1**
Total	**1**	**0**	**1**

119 **OBSERVED**

Presence of Bowls - AS - Late	Not Modified	Modified	**Total**
Bowls present	1	5	**6**
No bowls	1	0	**1**
Total	**2**	**5**	**7**

EXPECTED

Presence of Bowls - AS - Late	Not Modified	Modified	**Total**
Bowls present	1.71	4.29	**6**
No bowls	0.29	0.71	**1**
Total	**2**	**5**	**7**

120 **OBSERVED**

Presence of Bowls - AS -Terminal	Not Modified	Modified	**Total**
Bowls present	0	6	**6**
No bowls	3	11	**14**
Total	**3**	**17**	**20**

EXPECTED

Presence of Bowls - AS -Terminal	Not Modified	Modified	**Total**
Bowls present	0.9	5.1	**6**
No bowls	2.1	11.9	**14**

Total	**3**	**17**	**20**

121 **OBSERVED**

Presence of Bowls - SE - Late	Not Modified	Modified	**Total**
Bowls present	0	1	**1**
No bowls	1	3	**4**
Total	**1**	**4**	**5**

EXPECTED

Presence of Bowls - SE - Late	Not Modified	Modified	**Total**
Bowls present	0.2	0.8	**1**
No bowls	0.8	3.2	**4**
Total	**1**	**4**	**5**

122 **OBSERVED**

Presence of Bowls - SE -Terminal	Not Modified	Modified	**Total**
Bowls present	1	7	**8**
No bowls	3	10	**13**
Total	**4**	**17**	**21**

EXPECTED

Presence of Bowls - SE -Terminal	Not Modified	Modified	**Total**
Bowls present	1.52	6.48	**8**
No bowls	2.48	10.52	**13**
Total	**4**	**17**	**21**

123 **OBSERVED**

Presence of Bowls - Petex - Late	Not Modified	Modified	**Total**
Bowls present	1	8	**9**
No bowls	0	18	**18**
Total	**1**	**26**	**27**

EXPECTED

Presence of Bowls - Petex - Late	Not Modified	Modified	**Total**
Bowls present	0.33	8.67	**9**
No bowls	0.67	17.33	**18**

Total	**1**	**26**	**27**

124 **OBSERVED**

Presence of Bowls - Petex - Terminal	Not Modified	Modified	**Total**
Bowls present	0	0	**0**
No bowls	1	6	**7**
Total	**1**	**6**	**7**

EXPECTED

Presence of Bowls - Petex - Terminal	Not Modified	Modified	**Total**
Bowls present	0	0	**0**
No bowls	1	6	**7**
Total	**1**	**6**	**7**

125 **OBSERVED**

Tabular Oblique Variety	AS	SE	Petex	**Total**
Occipital curve	0	1	5	**6**
Intermediate	3	0	7	**10**
Mimetic	1	0	5	**6**
Total	**4**	**1**	**17**	**22**

EXPECTED

Tabular Oblique Variety	AS	SE	Petex	**Total**
Occipital curve	1	0.25	4.25	**6**
Intermediate	1.5	0.38	6.38	**10**
Mimetic	1.5	0.38	6.38	**6**
Total	**4**	**1**	**17**	**22**

126 **OBSERVED**

Tabular Oblique Variety	Late	Terminal	**Total**
Occipital curve	4	1	**5**
Intermediate	8	0	**8**
Mimetic	6	2	**8**
Total	**18**	**3**	**21**

EXPECTED	**Tabular Oblique Variety**	Late	Terminal	**Total**
	Occipital curve	4.29	0.71	**5**
	Intermediate	6.86	1.14	**8**
	Mimetic	6.86	1.14	**8**
	Total	**18**	**3**	**21**

127 **OBSERVED**

Tabular Oblique Variety	Male	Female	**Total**
Occipital curve	4	1	**5**
Intermediate	3	2	**5**
Mimetic	1	7	**8**
Total	**8**	**10**	**18**

EXPECTED

Tabular Oblique Variety	Male	Female	**Total**
Occipital curve	2.22	2.78	**5**
Intermediate	2.22	2.78	**5**
Mimetic	3.56	4.44	**8**
Total	**8**	**10**	**18**

128 **OBSERVED**

Tabular Oblique Variety	Pit	Crypt	Other	**Total**
Occipital curve	1	1	2	**4**
Intermediate	4	2	0	**6**
Mimetic	2	3	1	**6**
Total	**7**	**6**	**3**	**16**

EXPECTED

Tabular Oblique Variety	Pit	Crypt	Other	**Total**
Occipital curve	1.91	1.64	0.82	**5.5**
Intermediate	3.18	2.73	1.36	**8.25**
Mimetic	1.91	1.64	0.82	**8.25**
Total	**7**	**6**	**3**	**22**

129 **OBSERVED**

Tabular Oblique Variety	North	East	South	West	**Total**
Occipital curve	2	1	0	0	**3**
Intermediate	1	3	2	0	**6**
Mimetic	0	3	0	0	**3**
Total	**3**	**7**	**2**	**0**	**12**

EXPECTED	**Tabular Oblique Variety**	North	East	South	West	**Total**
	Occipital curve	0.75	1.75	0.5	0	**3**
	Intermediate	1.5	3.5	1	0	**6**
	Mimetic	0.75	1.75	0.5	0	**3**
	Total	**3**	**7**	**2**	**0**	**12**

130 **OBSERVED**

Tabular Oblique Variety	Extended	Flexed	Seated	**Total**
Occipital curve	1	2	0	**3**
Intermediate	2	4	0	**6**
Mimetic	2	3	0	**5**
Total	**5**	**9**	**0**	**14**

EXPECTED

Tabular Oblique Variety	Extended	Flexed	Seated	**Total**
Occipital curve	1.07	1.93	0	**3**
Intermediate	2.14	3.86	0	**6**
Mimetic	1.79	3.21	0	**5**
Total	**5**	**9**	**0**	**14**

131 **OBSERVED**

Tabular Oblique Variety	Jade present	Jade absent	**Total**
Occipital curve	0	4	**4**
Intermediate	1	4	**5**
Mimetic	2	3	**5**
Total	**3**	**11**	**14**

EXPECTED

Tabular Oblique Variety	Jade present	Jade absent	**Total**
Occipital curve	0.86	3.14	**4**
Intermediate	1.07	3.93	**5**
Mimetic	1.07	3.93	**5**
Total	**3**	**11**	**14**

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