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Date______________________________
Osteology of the Chalillo Dam Archaeology Salvage Project, Upper Macal River Valley,
Belize

A Thesis
Presented for the
Master of Arts
Degree
The University of Mississippi

Lenna M. Nash
M.A., University of Mississippi
Dec 2010
DEDICATION

This work is dedicated to my loving parents

who have encouraged my independence

and made this project possible.
ACKNOWLEDGMENTS

I would like to thank Dr. Gabriel Wrobel for providing me with this opportunity, for suggesting the importance and significance of this study and for believing in me, supporting me and guiding me throughout this whole process. I would also like to thank the other members of my committee for guidance and their patience as well as Jaime Awe, Myka Schwanke, Rafael Guerra and Gwendolyn Raley for providing me with the materials needed and their assistance along the way. My special thanks to Michael Lansdell, Carissa Herrera, Anne Blocker and the many other important people in my life who have always supported and encouraged me.
This study focuses on the analysis of the skeletal remains excavated from the Chalillo region prior to the inundation of the area due to the building of the Chalillo dam. The majority of the remains were located in tombs and crypts, specifically from within eastern structures. The associated mortuary patterns include: evidence of re-entry into the tombs and crypts, multiple individual burials, and mixed mortuary treatments of primary, disturbed primary and secondary. These data are representative of a pattern of extended mortuary ritual often attributed to ancestor veneration among the Maya.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>a. Project Background</td>
<td>1</td>
</tr>
<tr>
<td>b. The Ancient Maya Way of Death</td>
<td>7</td>
</tr>
<tr>
<td>II. MATERIAL AND METHODS</td>
<td>19</td>
</tr>
<tr>
<td>a. Site Descriptions</td>
<td>19</td>
</tr>
<tr>
<td>b. Burial Context</td>
<td>22</td>
</tr>
<tr>
<td>c. Skeletal Inventory and Minimum Number of Individuals</td>
<td>26</td>
</tr>
<tr>
<td>d. Sex and Age</td>
<td>27</td>
</tr>
<tr>
<td>e. Pathology</td>
<td>32</td>
</tr>
<tr>
<td>III. RESULTS</td>
<td>40</td>
</tr>
<tr>
<td>a. Garapata</td>
<td>40</td>
</tr>
<tr>
<td>b. Bejuco</td>
<td>59</td>
</tr>
<tr>
<td>c. Peligroso</td>
<td>59</td>
</tr>
<tr>
<td>d. Ramonal</td>
<td>66</td>
</tr>
<tr>
<td>e. Bajo de Lago</td>
<td>87</td>
</tr>
<tr>
<td>f. Rubber Camp</td>
<td>88</td>
</tr>
<tr>
<td>IV. DISCUSSION</td>
<td>89</td>
</tr>
<tr>
<td>V. CONCLUSIONS</td>
<td>97</td>
</tr>
<tr>
<td>WORKS CITED</td>
<td>99</td>
</tr>
<tr>
<td>VITA</td>
<td>106</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

1.1 Map of Chalillo Project Area ................................................................. 2
1.2 Map of Maya Lowlands........................................................................ 6
3.1 Garapata, Eastern Structure, Burial 1 .................................................. 42
3.2 Garapata Burial 1 Canine Dental Modification.................................... 49
3.3 Garapata Burial 1 Incisor Dental Modification..................................... 50
3.4 Garapata, Eastern Structure, Burial 2 .................................................. 51
3.5 Garapata, Eastern Structure, Burial 4 .................................................. 53
3.6 Peligroso, Eastern Structure, Burial 8, Level 1 ................................... 61
3.7 Peligroso Burial 8 Fibular Periostitis..................................................... 65
3.8 Peligroso Burial 8 Tibial and Femural Periostitis.................................. 65
3.9 Peligroso Burial 8 Metatarsal Pathology............................................. 65
3.10 Ramonal, Plaza A, Eastern Structure, Burial 1 .................................... 67
3.11 Ramonal, Plaza A, Eastern Structure, Burial 2 ................................... 69
3.12 Ramonal Burial 2 Dental Modification............................................... 70
3.13 Ramonal Burial 3 Dental Modification............................................... 73
3.14 Ramonal Burial 5 Dental Modification............................................... 79
3.15 Ramonal, Plaza C, Burial 7 ................................................................. 81
3.16 Ramonal Burial 7 Cribra Orbitalia...................................................... 82
3.17 Ramonal, Plaza C, Eastern Structure, Burial 8 ................................... 83
3.18 Ramonal Burial 8 Hypoplastic Pitting............................................... 85
3.19 Ramonal Burial 8 Vertebral Pathology............................................... 86
## LIST OF TABLES

1.1 Description of Site Type ........................................................................................................3

1.2 Attributes of Excavated Sties .................................................................................................4

2.1 Basic Descriptions of Burial Contexts ..................................................................................24

3.1 Site and Burial Results ............................................................................................................41

3.2 Garapata Burial 1 Dental Wear/Age .......................................................................................45

3.3 Garapata Burial 1 Calculus .....................................................................................................47

3.4 Garapata Burial 1 Caries .........................................................................................................48

3.5 Garapata Burial 4 Dental Wear/Age .......................................................................................56

3.6 Garapata Burial 4 Calculus .....................................................................................................57

3.7 Garapata Burial 4 Caries .........................................................................................................58

3.8 Peligroso Burial 4 Dental Wear/Age .......................................................................................63

3.9 Peligroso Burial 4 Calculus .....................................................................................................63

3.10 Peligroso Burial 4 Caries .......................................................................................................64
CHAPTER 1
INTRODUCTION

PROJECT BACKGROUND

In 2003 and 2004, the Belize Valley Archaeological Reconnaissance (BVAR) Project conducted salvage excavations of 17 square kilometers in the Upper Macal River Valley of Belize prior to the building of the Chalillo Dam, which now has inundated a number of Maya sites (see Figure 1.1). This previously unexplored region is located on the Upper Macal and Raspaculo branches of the Macal River, near the sites of Caledonia, Maria Camp, Mountain Cow, Blue Hole Camp and the largest site in Belize, Caracol, which is also the closest ceremonial site to the Chalillo research area. Based on the proximity of these sites to one another, as well as their location along the Macal River system, it is highly likely that political and economic relations existed between these communities.

The Chalillo research area is ecologically diverse and encompasses sites within two environmental zones: the Mountain Pine Ridge and the Chiquibul. Having been deemed “predominantly unsuitable for arable farming”, the Mountain Pine Ridge is characterized by soils derived from granite, shale, sandstone, quartzite and limestone (Awe et al. 2005:7). The Chiquibul is characterized by a limestone mantel covered by a semi-evergreen forest, which hosts a diversity of faunal species (Awe et al. 2005:7). In both environments, the presence of limestone creates soils with a high pH, which help to preserve skeletal remains. This set of circumstances is not especially common in pre-Columbian Maya contexts.
In total, the survey identified 334 structures ranging in size from simple "isolated structures" to complex "multiple plazas" (see Table 1.1). In general, the dispersal of large plazuelas, small plazuelas, and isolated structures was relatively uniform throughout the region. Four multiple plazas sites were identified, however project constraints only allowed for three to be examined (Ramonal, Rubber Camp, and Bajo de Lago). The multiple plaza sites represent the largest and most complex sites located within the Chalillo region. Furthermore, the close proximity to one another suggests that they might have shared influence over the region (Awe et al. 2005:14). Of these, Bajo de Lago demonstrated the largest monumental construction and was also the only site located on
the fertile soil of the Chalillo River's south bank, which led to it being identified as at the
top of the hierarchy of sites within the Chalillo region.

Further investigations were focused on areas first to be affected and most likely to
contain features of archaeological interest based on the survey (Awe et al. 2005:11).
Unfortunately, time and budget limited excavations to nine sites during the course of two
phases, and generally focused on elite contexts (see Table 1.2). Four of the sites
(Garapata, Bejuco, Peligroso and Rubber Camp) chosen for excavation were previously
recorded sites requiring excavation under the project’s Terms of Reference (see
Thompson 1931, 1938, 1939). Three sites (El Chiquero, Ramonal, and Bajo del Lago)
were chosen for their size or likelihood to provide valuable archaeological information.
The remaining two sites (Cocoyal, Abispera) were chosen for excavation due to the
presence of structural attributes such as a collapsed tomb or chultun-like feature.
Specifically, the project targeted eastern structures, which previously have been
associated with ancestral shrines and sealed context such as tombs and crypts. Such
contexts can provide valuable evidence of ritual behavior relating to ancient Maya
sociopolitical and economic organization.

Table 1.1 Descriptions of Site Types (Rafael Guerra, pers. comm.).

<table>
<thead>
<tr>
<th>Site Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Isolated Structure</td>
<td>A single informal structure.</td>
</tr>
<tr>
<td>Small Plazuelas</td>
<td>An informal or a formal group of three or four structures with a height shorter than two meters.</td>
</tr>
<tr>
<td>Large Plazuelas</td>
<td>An informal or a formal group of four to ten structures with a height between two and six meters.</td>
</tr>
<tr>
<td>Multiple Plaza</td>
<td>An informal or a formal group of multiple plaza formations with more than ten structures and a height greater than six meters.</td>
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Human remains were recovered from six of the nine sites including Garapata, Bejuco, Peligroso, Ramonal, Bajo de Lago, and Rubber Camp. Burials from these sites were located in a variety of structural contexts, including crypts, tombs, cists and simple graves. In total, twenty burials consisting of primary and secondary interments were excavated mainly from within the eastern structures and from beneath the floors of surrounding plazas. Had time allowed for further excavations, it is likely that skeletal remains also would have been found at the sites of Cocoyal and Abispera due to the presence of what appeared to be collapsed tomb-like structures at both sites. The same holds true for the site of El Chiquero where time constraints and safety concerns limited the excavation of the eastern structure.
The plan to inundate the Chalillo region led to the swift recovery of a large collection of archaeological and osteological material from a number of previously unexplored sites of the Maya Lowland region (see Figure 1.2). The salvage nature of the project constrained time and funding, and thus focused on tombs within eastern structures, which provide a range of important data related to social, political and economic organization of these communities. Consequently, the recovered skeletal sample does not represent the general population from these settlements, but instead allows a unique opportunity to examine and characterize the mortuary practices and skeletal biology of elites within area. Thus the focus of the present study is a descriptive analysis of the skeletal remains recovered from these sites, including basic inventories, sex and age profiles of individuals, and basic information about diet and health. These data are subsequently used to examine particular aspects of mortuary behavior, which can provide insights into the purpose or function that these rituals served, and how they reflect other aspects of social, economic, and political organization (Goldstein 1976,1981; Hertz 1960; Saxe 1970; Tainter 1978). Specifically, this study focuses on mortuary behaviors related to ancestor veneration; these include the entombment of individuals within residential/ritual context as well as within solely ceremonial contexts, the use and reuse of tombs, and the particular mortuary treatment of multiple individual burials, which is exhibited as primary, disturbed primary and secondary burial (Chase and Chase 1996; Healey et al. 1998; McAnany 1995; McAnany et al. 1999).
Figure 1.2 Map of the Maya Lowland Region.
THE ANCIENT MAYA WAY OF DEATH

Death prompts a negotiation and renegotiation of relations amongst the living, where the manipulation of the deceased can be seen as a reflection of the social, political and economic organization of a population (Metcalf and Huntington 1991; Parker Pearson 1999). Within this context, the mortuary rituals function as symbolic markers expressing and maintaining relationships, both within and between societies (McAnany 1995). Specific cultural and biological aspects of these rituals, such as burial location, interment practices, as well as the osteological remains themselves, are visible in the archaeological record and it is the variations of these mortuary data that provide clues to aid in interpreting and reconstructing ancient social organization.

Analyses focused on the mortuary practices of ancient cultures have primarily focused on aspects of social organization, including gender, age, kinship, status, rank and power (Parker Pearson 1999:72). Studies focused on identifying and defining levels of vertical status within a population often try to quantify mortuary treatment by the amount of effort and/or wealth displayed in the ritual, with seemingly non-quantifiable dimensions relegated to the ambiguous category of "religious beliefs" (for Maya examples of this, see Rathje 1970: 362-366; Welsh 1988: 102-104,153). Archaeological indicators of status generally relate to differential access to resources of individuals within a social group. In mortuary contexts, data suggestive of status can include grave wealth (Coe 1988) and the time and energy expended during the mortuary ritual (Coe 1956; Tainter 1978), as well as biological markers of health and nutrition visible on the
bones (Helmuth and Pendergast 1989; Storey 2005). These studies are able to
de demonstrate a culture's complexity by identifying levels of social stratification.

One of the more popular methods of mortuary analysis revolves around
identifying the varying levels of sociopolitical and economic status. Examples of this
approach in Maya archaeology include Coe (1956), who examined temple funerary
structures and determined that due to the immense amount of labor required to erect such
structures, it is reasonable to assume that the individuals within such structures possess a
great degree of political power. In a later analysis, Coe (1975) concluded that the
differentiation found in burial practices during the Classic and Postclassic periods is
reflective of the efforts by elites to distinguish themselves from other members of society
not just in the world of the living but also upon death. Comparably, Rathje (1970:359)
examined excavated burial data that indicated a change in sociopolitical and economic
organization due to wealth becoming ascribed. Haviland (1997) found political
complexity associated with dynastic rule at Tikal during the Classic period, as Tikal
transformed into a state with hereditary rulers and stratified societies.

Unfortunately, as in most archaeological settings, the study of Maya mortuary
ritual generally reflects a research bias focused on the elite sectors of society, thus
limiting our samples to the most extreme and complex mortuary treatments practiced by
the smallest (albeit the most influential) segment of society. Perhaps this is in part due to
the ease in locating elite architecture as well as in the enormous amount of highly
treasured artifacts, which are frequently found in association with the elite sectors of
society. This approach generally assumes that different aspects of mortuary behavior
symbolize social, political, and economic categories within a society, and thus an individual's treatment in death directly reflects his or her role in life.

An alternative approach to the model discussed above examines instead the role of the living in determining mortuary symbolism, since it is they who ultimately perform the rituals. While in many cases family members are in charge of organizing and carrying out funerals, this responsibility can fall to other groups to which the deceased belonged (Parker Pearson 1999:73-74). Thus, a more appropriately general term for these relations in life is "corporate group," which appears in various forms within societies and which can be expressed across different status levels. Barrett (1996:395) best describes how corporate groups are formed and why they are an important function of society; “Corporate groups do not do anything. They result from institutionalized practices by which people maintain relations of affinity, obligation and enmity, thereby controlling access to certain material and human resources”.

From an archaeological perspective, the identification of corporate group behavior in mortuary ritual is important in modeling economic and political organization within a community. Saxe (1970) proposed a series of hypotheses relating to mortuary ritual from ethnographic observations in Papua New Guinea that had been made regarding the practice of affirming land title rights through ties with founding ancestors. In his Hypothesis 8, Saxe determined that corporate groups use formal disposal areas as a means of legitimizing claims to restricted resources (Parker Pearson 1999:29-30). In a later analysis, Saxe's Hypothesis 8 was further explored, tested and found not applicable to all societies by Goldstein (1976; Parker Pearson 1999:30), who examined 30 ethnographic examples to determine how each society’s corporate groups affirmed rights
to resources. While cemeteries provide one approach to determining corporate groups' right to resources, there are a number of different strategies with which to investigate these divisions, such as looking for individual differences in health, location of site boundaries, or distribution of local and imported goods, that also can discern how a society’s corporate groups affirm resources rights.

While many studies tend to focus on formal disposal areas such as cemeteries, pre-Hispanic Maya archaeological sites generally lack such contexts (Welsh 1988). However, recent studies of Maya mortuary patterns have identified aspects of funerary behavior that do seem to reflect the importance of corporate groups in Maya society, and these often focus on ancestor veneration. Both Gillespie (2002) and Joyce (1999) attest to an association between ancestral inheritance of a corporate group and the identification of resource rights. In her ethnohistoric study of the Maya, Gillespie (2002) determined that families or kin-based corporate groups maintained property rights across generations through the burial of the deceased within residential structures. Joyce (1999) also demonstrates the importance that ancestors play in the identification of group access to available resources through the decoration or costume worn by the deceased.

McAnany (1995, 1998; McAnany et al. 1999) has most clearly demonstrated archaeologically the role ancestor veneration played among the Maya. Focusing on the Formative and Early Classic period site of K’axob, she demonstrates how an increase in the elaboration of mortuary ritual reflected the social status differentiation and the efforts of individuals to define and maintain power through lineage membership by the ritual deposition of gathered ancestral remains. McAnany found that many of the basic elements within the Maya mortuary ritual system were associated with ancestor
veneration due to their practice of trans-generational inheritance as the determining factor of land and resource rights. The mortuary rituals practiced by individuals of authority can therefore be seen as a method aimed at maintaining and solidifying kinship relations and thus decreasing conflicts relating to inheritance and access to power. In this light, mortuary practices could be viewed as a “complex series of rituals” where “active lines of communication were maintained between the living and the dead” (McAnany 1995:1).

There are several aspects of Maya mortuary ritual that have been attributed to corporate groups. For instance, the location chosen for burial is a rational and politically motivated decision, bounded by the deceased individual’s membership within corporate groups, such as a lineage. Corporate groups use burial location as a way of expressing and maintaining relations for the ultimate purpose of claiming rights to important resources. The placement of the burial location in reference to the landscape, the placement of the burial within a particular structure, the placement of the structure within a group of structures, or even the type of grave structure built to house the deceased are specific aspects of burial location that can provide insights into a population’s sociopolitical and economic organization. For example, among the Neolithic and Early Bronze age cultures in Europe, lines of authority and inheritance were reinforced through social activity by the strategic placement of monuments on the landscape in such a way that they were incorporated into the daily life of society (Barrett 1996:395-409).

Alternatively, Parker Pearson (1999:193) focuses on the use of tombs as a way of indicating political and socioeconomic power stating, “Tombs are not simply symbolic markers but are real components of political actuality, forming a principal means of acquiring and demonstrating power”. The idea that corporate groups will use formal
disposal areas for political objectives originated from Saxe’s Hypothesis 8 and subsequent modifications to Hypothesis 8 by other researchers.

Also visible in the archaeological record are the interment practices relating to how the body is treated. Through the manipulation of the body, corporate groups express and maintain relations. At K’axob, an increase in elaboration in mortuary ritual was linked to ancestors and lineage depth and was found to signal differentiation in social status and political authority (McAnany et al. 1999). Perhaps the most frequently cited postmortem treatment related to ancestor veneration is the practice of secondary burial. Secondary burial refers to the subsequent reburial of skeletal remains after an initial primary burial has occurred. The identification of secondary burials in the archaeological record is typically seen in the form of the disarticulated and incomplete interment of at least one individual. A number of early theorists such as Van Gennep, Turner, and Hertz, examined the correlation between secondary mortuary rituals and rites of passage, whereby the once living’s soul makes the journey to the world of the dead (Metcalf and Huntington 1991:29-33; Parker Pearson 1999:22, 50). However, the practice of secondary burial is often indicative of more than just a rite a passage; it also serves as a method of expressing and maintaining relations. For instance, Metcalf and Huntington (1991:108-110) found secondary burial among the Malagasy, served as a symbolic marker expressing the varying sociopolitical values of the eighteen different major ethnic groups, which comprise the society. Clearly, culturally determined aspects of mortuary ritual, such as how the body is treated, can provide insights into the social, political, and economical spheres of a society.
Burial location, interment practices, and the skeletal remains themselves are three fundamental aspects of mortuary ritual that are visible in the archaeological record. These aspects can lead to insights regarding the social practices of a society and how such societies of the past functioned within their own cultural and historical conditions. Bioarchaeology is a unique field that incorporates both the cultural and biological aspects of mortuary ritual in an effort to construct a population’s “life history” or to determine how an individual lived and survived within a particular environment (Saul and Saul 1989).

A number of behaviors representing the ancient Maya society have been found to reflect the importance of ancestor veneration among the elite and non-elite. First, the Classic period represents the period of time when social stratification was most pronounced (Coe 1988:222). Within socially stratified society, an individuals’ need to demonstrate and reassert their place within society is at it’s highest due to the variances in lifestyle different social standings bring. As stated by Parker Pearson (1999:84), “Mortuary practices have been treated as passive reflection of abstract concepts of society and social structure, whereas they should be treated as the arena of activity in which are molded the institutions through which social relationships are actively brought into being, transformed and terminated through exchanges and alliances”. Second, although the vast majority of research exploring the practice of ancestor veneration has been on the elite, the practice was not limited to the elite sectors of society and was just as important of a practice for non-elite individuals (McAnany 1995:49-55). The need to distinguish ones’ place within society extended beyond the broad categories of elite and non-elite, as within these categories varying levels of social status existed. Third, the veneration of
ancestors occurred in both residential contexts as well as in exclusively ritual contexts, specifically within eastern structures (Chase 1997; Chase and Chase 1996). Both the elite and non-elite had respective locations designated for the practice of ancestor veneration, which identified one’s socioeconomic and political standing within society. Fourth, specific mortuary practices of Classic Maya society, such as the use and reuse of tombs and crypts, multiple individual burials, and secondary as well as disturbed primary burial practices, have been tied to the ritual of ancestor veneration (Chase 1997). Furthermore, these practices ultimately serve the same function as cemeteries as formal disposal areas (see Goldstein 1976; Saxe 1970). These behaviors reflect the importance that ancestor veneration played in Maya society, specifically in the maintaining of relations and solidifying of rights to important resources.

Throughout the Classic period, Maya societies became increasingly stratified (Coe 1988:222). The onset of the Classic period was defined by greater variation in the size of political units, such that the smaller units began to coexist with larger agglomerative ones, which resulted in highly stratified societies (McAnany 1995:88). Rathje's (1970:359) and Haviland's (1997) studies, discussed above, demonstrate how these organizational changes were related to increasing complexity in mortuary behavior. Whatever the catalyst, by the Late Classic period, authority of the Maya was completely institutionalized (McAnany et al. 1999). Ancestors, serving as facilitators of power transfers between generations, played a crucial role during times of social transformation (McAnany 1998:272). Through the veneration of ancestors any existing social and economical inequalities were reinforced through the lineage structure (McAnany 1995:111).
The veneration of ancestors has been found to occur in both residential contexts as well as in more public ritual contexts. The strategic placement of ancestral shrines can been viewed as providing a historical texture to the landscape, serving as both a guide to the living and a testimony to the ancestors (McAnany 1995:85). Through the practice of interring the deceased in residential/ritual contexts, the Maya were “living with the ancestors” (1995:1). Within residential compounds, the focus of many excavations has been on eastern structures since they are thought to serve as the primary place for ancestral shrines (Chase and Chase 1996; Chase 1994, 1997; Healey et al. 1998; McAnany 1995). One approach to understanding the importance that residential burial held within the Maya complex views residential burial as a strategic act, ensuring control over the souls of the dead, where the domestic space is best thought of as a place of curation, transformation and regeneration (Gillespie 2002:67). Alternatively, McAnany (1998:272) states that the burial of ancestors within the core of a structure creates a sense of residence or ‘home’ where ancestors serve as guardians of fields and forests, passing down from one generation to the next the inheritance of resources. In either approach, residential burial serves as an important aspect of Maya ritual that reinforces the lines of inheritance and rights to resources.

Outside of the residence, temple structures are also often interpreted as ancestral shrines containing the royal ancestors. As far back as Ricketson (1925:386), royal tombs have been associated with temple-pyramids. The reverence of royal ancestors is indicated by long sequences of reuse and expansion. McAnany (1998:273) suggests, just as ancestors within residential complexes create a sense of "home", ancestors within solely ritual contexts, such as temple structures, also create a sense of "home". However, in this
case "home" is represented on the grander scale of the site, serving too as guardians of fields and forests. At the site of Tikal, a tomb found within the North acropolis contained multiple individuals that had been sequentially interred over a period of a thousand years (McAnany 1995:51-52).

There are a number of specific burial practices associated with the mortuary ritual of ancestor veneration. Frequently found within eastern structures, tomb and crypts exhibiting evidence of sequential use over an extended period of time are thought to represent the practice of burying the deceased with past ancestors. Such burials have been noted throughout the Maya area (Chase 1997; Chase and Chase 1996; Coe 1990; Healy et al. 1998; McAnany et al. 1999). A possible explanation given for such occurrence is that the tomb may reflect the practice of retaining skeletal elements of an individual until a later reburial alongside a primary individual (Weiss-Krejci 2001:369). Characteristics found to be representative of sequential use or reentry of a tomb include the presences of multiple individuals, specifically where secondary interments are found in association with articulated individuals, and the existence a formal entrance way, allowing for easier re-entry (Schwake 2008:8). However, as Chase and Chase (1996:66) have found at Caracol, a formal entrance is not a necessary aspect of tomb construction for it to have been used multiple times throughout a period of time. A tomb that exhibits sequential use, either with or without a formal entrance, reflects the practice of ancestor veneration especially, when accompanied with the presence of multiple individuals.

Burials containing multiple individuals have been described in the literature from sites in both the highlands and lowlands for many years though these earlier studies failed to provide an explanation for the practice (Ruz Lhullier 1968; Thompson 1931). Later
studies acknowledged that many of the interments were secondary in nature but rather than viewing the burial practices in light of the ritual of ancestor veneration, they were attributed to the ritual of sacrifice even when evidence in the form of perimortem trauma did not exist (Haviland 1997:2; Welsh 1988:168). Most recently, burials associated with ancestor veneration have been found to include individuals exhibiting a variety of treatments including combinations of secondary, disturbed primary and primary burial (Chase 1994, 1997; Chase and Chase 1996; Healey et al. 1998). These burial practices, which are found among individuals of varying age and both sexes, support an interpretation of tombs being familial in nature.

Tombs showing evidence of sequential use and containing multiple individuals have long been suggestive of familial relations. Hammond et al. (1975), discovered at the site of Lubaantún, a tomb containing 18 individuals whom he believed shared familial relations based on dental characteristics as well as the deposition of skeletal material, which appeared to have been swept aside for successive burials. Based on the dating of the ceramics, the use of the tomb spanned about 100 years suggesting the tomb represented a collection, over time, of the remains of related individuals. Similarly, McAnany (1999) interpreted familial relations among interments within a single burial based on the varying ages of the individuals and the mixed mortuary treatments of primary and secondary practices. At the Río Azul tomb, where murals on the wall of the tomb linked dominating families through kinship to the rulers at Tikal, Adams and Robichaux (1992) found the individuals within the tomb to be either rulers or members of their extended families. Healey et al. (1998:271) suggest that individuals being placed...
into previously occupied tombs served as a way of demonstrating connections to particular lineages even at the time of death.

While tombs associated with ancestor veneration have been found throughout the Maya area, the most convincing evidence has come from the work done at the site of Caracol in the Maya Lowlands. Within the burial sample from Caracol, 65% of the interments were found in eastern structures within residential architectural compounds (Chase 1997). Furthermore, the Caracol burial sample is largely represented by multiple individual burials (Chase 1997; Chase and Chase 1996). A number of the tomb burials exhibited patterns representative of ancestor veneration. Specifically, the mixed mortuary treatments of primary and secondary burial within tombs containing individuals of varying ages were found to represent the reuse of the tombs over a period of time (Chase and Chase 1996). Ultimately, these patterns indicated that “tombs were not always either the first or the final resting place for members of Caracol society” (Chase 1994:125).

However, Caracol is not the only Maya Lowland site where the mortuary practices found indicate the ritual of ancestor veneration. At the Early to Late Classic site of Caledonia, Healey et al. (1998) has discovered tombs, containing multiple individuals, occurred in three out five graves and many exhibiting reuse over a period of time. They determined the increase in sequential burials might reflect the increase in social complexity. However, there is no evidence of secondary burial practices; rather, the interments appear to be sequentially placed primary burials, which were pushed aside for later interments.
CHAPTER 2
MATERIALS AND METHODS

Over the course of a year, beginning in June 2007, analysis of the Chalillo sample was drawn from the field notes and skeletal data recorded during the 2003 and 2004 field excavations. The first two months of analysis were conducted in Belize, after which the remaining sample was exported and the analysis was completed at the University of Mississippi. The salvage nature of the project resulted in a slightly disorganized and partially misplaced collection of skeletal remains representing the Chalillo region. At the start of my time with the collection, other individuals, associated with BVAR, had previously washed most of the material. Due to this process occurring over multiple years and by multiple people, many of the bags originally used for the placement of individual bones or sometimes multiple bones representing an ‘area’ of the body, had been intermixed. Many of the maps drawn of the excavated burials either were not complete due to time or had been temporarily misplaced. Furthermore, this disarray coupled with commingling of some burials provided many obstacles to overcome in order to provide the best analysis of this sample.

SITE DESCRIPTIONS

Garapata

Located along the Macal River, Garapata was identified as a large plazuela group consisting of six structures. The dimensions of the site are approximately 32.5 meters North/South by 25 meters East/West. The features of immediate interest included what
appeared to be a collapsed tomb within the eastern structure, as well as a well-like feature that penetrated the western structure from its summit platform (Awe 2005:16).

**Bejuco**

Bejuco was identified as a large plazuela group consisting of five structures. The dimensions of the site are approximately 300 meters North/South by 540 meters East/West. The features of immediate interest included the large eastern structure, as well as the southern structure for its open alley, that connects two low lying platforms, located along the primary axis, on the structure’s summit (Awe 2005:31).

**Peligroso**

Peligroso was identified as a large plazuela consisting five structures. The dimensions of the site are approximately 400 meters North/South by 800 meters East/West. The focus of excavation was on the eastern structure.

**Cocoyal**

Cocoyal was identified as a small plazuela consisting of two structures. The dimensions of the site are approximately 135 meters North/South by 135 meters East/West. The feature of immediate interest was what appeared to be a collapsed tomb or chultun-like feature. However, work was halted early due to high water table levels that made excavation impossible, and thus no skeletal remains were documented (Awe 2005:45-46).

**Abispera**

Abispera was identified as a small plazuela consisting of two structures. Dimensions of the site are not available. The feature of immediate interest was a chultun-
like depression. However, work was halted early due to time constraints and no skeletal remains were documented (Awe 2005:46).

**Ramonal**

Ramonal was located along the northern bank of the Macal River and was the largest site upstream from the Chalillo dam. Ramonal was identified as a multiple plaza site consisting of 22 structure and three plazas. The site was described as having three formal patio groups with peripheral house mounds (Awe 2005:54). The dimensions of the site are approximately 95 meters north/south by 150 meters east/west. The foci of excavations were on the eastern structures of each plaza, as well as the southern structure due to the identification of collapsed capstones indicating the presence of a tomb (Awe 2005:54).

**Bajo de Lago**

Bajo de Lago was located along the southern bank of the Macal River and was the largest site east of the Chalillo dam. Bajo de Lago was identified as a multiple plaza site consisting of sixteen structure and three plazas. The site was described as having three formal patio groups with house mounds placed intermittently (Awe 2005:71). The dimensions of the site are approximately 200 meters North/South by 475 meters East/West. The foci of the excavations were on the eastern, western and ball court structures of Plaza A (Awe 2005:71).

**Rubber Camp**

Rubber Camp was identified as a multiple plaza group consisting of ten structures and two plazas. The dimensions of the site are approximately 30 meters North/South by 120 meters East/West. The foci of the excavations were on the eastern structure of Plaza
A due to the presence of what appeared to be collapsed capstones, a series of small plaza platforms extending from the western axis, and the site's largest eastern structure in Plaza A (Awe 2005:80).

**EL CHIQUERO**

El Chiquero was located along the Upper Macal River near the sites of Ramonal and Rubber Camp. El Chiquero was identified as a small plazuela consisting of four structures. The dimensions of the site are approximately 32 meters North/South by 42 meters East/West. The focus of excavation was on the eastern structure in an effort to test the relationship between the sites of El Chiquero, Ramonal and Rubber Camp (Awe 2005:84).

**BURIAL CONTEXT**

Applying archaeological data, such as burial context, to an osteological analysis provides for a more holistic examination of a population. Burial context, the descriptive and visual documentation of the excavation process, provides valuable insight into the understanding of the mortuary rituals. Osteological data alone do not allow for much study beyond analysis of diet, health, and lifestyle. However, osteological data coupled with the archaeological data offers up insights into the social, political and economic sphere of society. Providing an opportunity to move beyond basic analysis of diet, health, and lifestyle and into a more rounded examination into the people who practiced these rituals.

Because of the salvage nature of the Chalillo project, excavations focused on larger, elite residential/ritual architectural groups and the associated eastern “shrine”
structures. Thus, the majority of the burials were recovered from tombs and crypts found mostly along the structures' primary axes. However, six burials were found outside of tombs or crypts with all but one located beneath plaza floors near eastern structures.

There are four main types of grave construction found in the Chalillo project area that contain human remains: simple graves, cists, crypts and tombs (see Figure 2.1). The terms and the definitions of each follow the ones used for the writing of the Chalillo report (Rafael Guerra 2008, pers. comm.) with the exception of a "simple grave", which follows the definition by Welsh (1988:16). A tomb is defined as a burial structure that has architecture on all sides, has a floor and is sealed with capstones. Specifically, tombs contain an empty air-filled space. A crypt is defined as a burial structure that is lined with stones on the sides, though frequently only on the two longest sides, and that is sealed with capstones. Crypts are much smaller than tombs and often lack the empty air filled space. A cist is defined as a burial structure lacking architecture, with the exception of capstones placed over the body, and is often dug into sterile soil. A simple grave is defined as an unlined intrusive pit placed in the ground or structural fill, lacking any intentionally placed stone.
<table>
<thead>
<tr>
<th>Site Name</th>
<th>Burial</th>
<th>Type of Grave</th>
<th>Burial Treatment</th>
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</thead>
<tbody>
<tr>
<td>Garapata</td>
<td>#1</td>
<td>Tomb</td>
<td>Compound</td>
</tr>
<tr>
<td>Garapata</td>
<td>#2*</td>
<td>Tomb</td>
<td>Secondary</td>
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<tr>
<td>Garapata</td>
<td>#3*</td>
<td>Tomb</td>
<td>Compound</td>
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<tr>
<td>Garapata</td>
<td>#4*</td>
<td>Tomb</td>
<td>Compound</td>
</tr>
<tr>
<td>Garapata</td>
<td>#6</td>
<td>Tomb</td>
<td>Secondary/Disturbed Primary</td>
</tr>
<tr>
<td>Bejuco</td>
<td>#5</td>
<td>Cist</td>
<td>Secondary/Disturbed Primary</td>
</tr>
<tr>
<td>Peligroso</td>
<td>#7*</td>
<td>Tomb</td>
<td>Primary</td>
</tr>
<tr>
<td>Peligroso</td>
<td>#8*</td>
<td>Tomb</td>
<td>Compound</td>
</tr>
<tr>
<td>Ramonal</td>
<td>#1</td>
<td>Tomb</td>
<td>Misidentified faunal</td>
</tr>
<tr>
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<td>#2</td>
<td>Simple</td>
<td>Primary</td>
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<tr>
<td>Ramonal</td>
<td>#3</td>
<td>Crypt</td>
<td>Compound</td>
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<tr>
<td>Ramonal</td>
<td>#4</td>
<td>Simple</td>
<td>Secondary</td>
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<td>Ramonal</td>
<td>#5</td>
<td>Tomb</td>
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<tr>
<td>Ramonal</td>
<td>#10</td>
<td>Tomb</td>
<td>Compound</td>
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<tr>
<td>Bajo de Lago</td>
<td>#1</td>
<td>Crypt</td>
<td>Secondary/Disturbed Primary</td>
</tr>
<tr>
<td>Rubber Camp</td>
<td>#1</td>
<td>Tomb</td>
<td>Secondary/Disturbed Primary</td>
</tr>
</tbody>
</table>

*Garapata burials 2,3,4 represent one tomb. Peligroso burials 7 and 8 represent one tomb.

Postmortem treatment in the Maya region varies considerably (Welsh 1988). The variation in interments within the Chalillo contexts included primary, secondary, and compound burials (see Table 2.1). The following terms and definitions are developed from the description and inventory used in the writing of the Chalillo report. A primary
burial refers to an articulated, single individual interment that has not been disturbed and therefore is thought to remain in original context. A secondary burial refers to the complete or incomplete disarticulated remains of a single individual, which have been removed from their original context. These result from disturbances to primary burials, and can be either intentional, as is often the case with protracted mortuary rituals, or be unintentional. Secondary burials appear as bundles, stacks, or piles of partially or completely disarticulated skeletal elements. A compound burial refers to the remains of multiple individuals found in a context where both primary and secondary remains may be present. Most commonly, compound burials are found within tomb structures. In such contexts, skeletal remains that appear to have been intentionally pushed aside are identified as "disturbed primary" rather than secondary. The concept of disturbed primary burial stems from the use of tombs over generations, which in theory, would allow for the burial of multiple primary interments. Admittedly, however, these two behaviors, which can be further confused by other unintentional taphonomic alterations such as weathering or animal damage, can result in similar arrangements of bones, making them difficult to distinguish (Cook 1999: 44-45).

While an exact period of occupation for the region is not currently available, an estimated time span of occupation for the region can be derived from preliminary ceramic identification of vessels located within two tombs. At the site of Garapata, one tomb produced a large number of varying vessel types including Sotero Red-Brown and Dolphin Head Red, that are indicative of a Late Classic occupation (Awe 2005:23). At the site of Peligroso, a multiple individual burial contained 17 ceramic vessels dating to the Early Classic to Late Classic transitional period (Awe 2005:23, 41).
occupation this great closely parallels with the archaeological and osteological finds indicating tomb reuse over an extended period of time. However, tomb use may not in fact correlate with site inhabitance due to the frequent disturbance of context associated with tomb burials, including the removal and deposition of grave goods and skeletal remains. While broad, the two burials provide an estimated time span of occupation for the region limited to the Classic Period.

Basic osteological data were gathered for each burial, including the determination of minimum number of individuals (MNI), age, sex, skeletal pathologies, and cultural modifications.

**SKELETAL INVENTORY AND MINIMUM NUMBER OF INDIVIDUALS**

Determining a minimum number of individuals (MNI) is the first essential step to the interpretation of mortuary practices. The creation of an inventory for each context was necessary to determine the MNI. MNI refers to an estimated minimum number of individuals comprising a burial and therefore, at the very least, the determination of MNI will help to distinguish a simple burial from a complex burial. Because of the fragmentary nature of the remains in many of these contexts, the MNI was generally determined most reliably using the dentition. Furthermore, in an effort to better understand the use of tombs and crypts containing multiple individuals, when possible an MNI was also determined by long bone count. In the cases of simple primary burials or of single secondary burials, this process was relatively straightforward. However, in the case of compound burials, elements had been collected and labeled individually or in groups based on their location within the tomb.
Contextual data were important since eventually they could be used to reconstruct funerary processes related to the manipulation of burials. In some cases, maps of the bones were available for these contexts, making the reconstructions easier. The first step of the skeletal analysis was to create an inventory of each bag, noting the types of bones and sides. The amount of skeletal material in each bag varied from a single fragment to multiple bones. The preservation varied from burial to burial from well-preserved to fragmentary, which might have caused confusion about the number of possible individuals that these fragments represented. For that reason, I noted what portion was present or roughly how many fragments of each bone element were present (i.e. noting “the acromial end of the clavicle” or “5 fragments belong to the left parietal”). The long bones generally exhibited fairly good preservation, but were almost always incomplete due to susceptibility of epiphyses to fragmentation. Furthermore, the processes of weathering have taken their toll on many of the long bones resulting in multiple breaks of the shaft, and rarely could fragments be fitted back together to form a complete shaft. The recording of long bones included the identification of whether the proximal epiphysis, proximal 3rd, mid 3rd, distal 3rd, and distal epiphysis were present. When a section of a long bone was incomplete I noted roughly how much was present by recording the percentage of the element present, or the number of fragments of that element.

**SEX AND AGE**

Sex can only be determined for adult individuals whose bones have fully developed, and therefore not on subadults. For the determination of sex I used both
discriminant function analysis and sexually dimorphic features of the cranium and subpubic region. Wrobel et al. (2002) developed a set of discriminant function equations based on the burial population from the Historic Maya cemetery of Tipu. This technique estimates sex by comparison of a set of standardized measurements of the long bones to the reference sample (Historic Tipu). The equations can be used with single or multiple measurements from an individual. Single measurement functions refer to any one measurement taken off a single long bone. They are typically less reliable than multiple measurement functions and many do not meet the acceptable Eigenvalue standard, which is a measure of the reliability of an equation for separating the two groups. The multiple measurement functions utilize a combination of measurements to get a broader, more accurate picture of an individual's morphology. Only functions with Eigenvalues greater than 1.5 meet acceptable standards for use and therefore, were the only measurements used in this study for identification. Furthermore, the greater distance away from a function’s section point the result is, the more reliable the identification of sex.

Sexually dimorphic features of the human skeleton can also provide an estimate of an individual’s sex. The majority of current research in Maya bioarchaeology applies sexually dimorphic characteristics of the cranium and subpubic region in the estimation of sex (Lund 2003; Song 1995; Helmuth and Pendergast 1989). Poor preservation generally limits these results. While sexual dimorphism of tooth size and form has been used as an alternative to determine sex estimates (Hammond et al 1975), these are generally unreliable, so were not used in the current study.

Buikstra and Ubelaker (1994) provide standards for scoring a set of features on the cranium that have been found to be particularly useful in determining sex. These
characteristics include the nuchal crest, mastoid process, supra-orbital margin, supra-orbital ridge/glabella and mental eminence, all of which can be scored on a 1-5 scale on degree of expression. A 1 and 2 indicate a gracile expression, which is suggestive of a female individual, a 4 and 5 indicate a robust expression, which is suggestive of a male, and a 3 is neither gracile nor robust and results in an indeterminate conclusion (Buikstra and Ubelaker 1994). In addition, sex can be determined from the gonial angle formed by the mandibular body and ramus. A mandibular ramus exhibiting a 90° angle or less is suggestive of a male, while an angle greater than 90° is suggestive of female (White 2000:363). In the happenstance that an individual showed signs of cranial modification these standards would not apply, as cranial modification would alter an individual's natural morphology.

Sexually dimorphic features of the subpubic region are the most accurate. Saul and Saul (1989:289) state, “the pelvis is the ideal structure to examine for sex information, as the configuration of the female pelvis has evolved through generation after generation of selection for success in childbearing”. Phenice’s (1969) techniques provide an accuracy rate ranging from 96 to 100% for adult specimens. The techniques' accuracy is such that they are the most widespread in osteological analysis (White 2000:367-368). In application, three sexually dimorphic characteristic of the pelvis are examined, including the ventral arc, subpubic concavity and the medial aspect of the ischiopubic ramus. The ventral arc is a slightly raised ridge, only present in females, which “sets off the inferior, medial corner of the pubic bone in ventral view” (White 2000:369). The subpubic concavity, which is more extreme on females, is located on the medial edge of the ischiopubic ramus (when the dorsal surface of the pubic is facing the
examiner). The medial aspect of the ischiopubic ramus is located inferior to the pubic symphysis; the medial edge of the ischiopubic ramus of females is sharp, whereas in males the surface is broad and flat (White 2000:368-369). Furthermore, the greater sciatic notch is another reliable method for determining sex, and can be scored on a 1 to 5 scale (Ubelaker 1989:18). In females the greater sciatic notch tends to be broad=1 while in males it is narrow=5 (White 2000:369).

The Chalillo skeletal collection was aged based on commonly used standards. For subadults, dental eruption data were the most useful and estimated ages were derived using Ubelaker's (1989) standards. More general data providing estimates of age-at-death for sub-adults were derived from longbone length and epiphyseal fusion (Ubelaker 1989:43). Determining age-at-death for adult skeletons is difficult, especially in cases like the Chalillo remains, which are fragmentary and often have eroded surfaces. In most cases, only very general indicators of age were available for analysis and for this reason, adults were divided only into two basic groups: young adults (18-30) and old adults (30+). The division at 30 years of age between young adults and old adults was determined based on the completion of most epiphyseal fusion of primary ossification centers occurring by the age of 30. Since teeth were the most consistently preserved elements in the contexts studied, relative ages were assessed using the dental attrition standards created by Lovejoy (1985) in his study of the Late Woodland Libben site in Ohio. Lovejoy’s standards identify a category with a corresponding age range based on phases of dental attrition for an adult individual (Category: A=12-18, B₁=16-20 without 3rd molars, B₂=16-20 with 3rd molars, C=18-22, D=20-24, E=24-30, F=30-35, G=35-40, H(maxillary)=40-50, H(mandibular)=40-45, I=45-55). For multiple interment burials
containing multiple dentitions, specifically, those that were not easily separated into specific individuals, age was relatively determined by quantifying each tooth’s dental attrition by category. Categories $B_1$ and $B_2$ were combined into a single Category B (16-20), due to the difference relating only to the presence or absence of 3rd molars rather than difference in age range. In situations where dental attrition was indeterminable, such as falling in between two categories, broken, exhibiting a large caries or cultural modified, it did not get counted.

The pubic symphysis is an additional feature useful in estimating age, although it only provides an approximate age range based on six phases of morphology specific to each sex (Brooks and Suchey 1990). Even though the age ranges are 95% accurate, they are actually quite broad (Females: Phase 1=15-24, Phase 2=19-40, Phase 3=21-53, Phase 4=26-70, Phase 5=25-83, Phase 6=42-87; Males: Phase 1=15-23, Phase 2=19-34, Phase 3=21-46, Phase 4=23-57, Phase 5=27-66, Phase 6=34-86) and therefore, were only used in this study as a way of reaffirming or supporting whether an adult individual was young or old.

Cranial suture closure and the presence of arthritis were also examined in an effort to determine approximate age. Cranial suture closure examines the degree of ectocranial, palatal and endocranial suture closure (Ubelaker 1989:32-38). The degree is scored on a 0-3 scale with 0 representing open and 3 representing complete obliteration. A composite score is then calculated by summing the scores for the ‘vault’ sites and ‘lateral-anterior’ sites, which is then compared to a table that examines the association between chronological age and ectocranial suture composite score for the cranial vault and the lateral-anterior region. An interdecile range along with the mean is provided from
this table. All suture closure scores must be available in order for a composite score to be determined. Therefore, considering the fragmentary and eroded nature of the skeletal material, cranial suture closure only provided additional information about young vs. old adults.

The presence of arthritis was also a factor used in the determining of young vs. old adults. Arthritis can be a result of either trauma or of bone and joint infections that cause an inflammation of the joint. The most common type of arthritis is osteoarthritis, which is an inherent part of the aging process. With the primary cause of this disease being mechanical, osteoarthritis is mostly found in the load-bearing joints such as the spine, hip and knees and is characterized by the destruction of the articular cartilage in a joint and the formation of the adjacent bone (White 2000:397-398). Due to the mechanical nature of arthritis, the presence was only used as a method of providing additional information about young vs. old adults.

Obviously, the specificity of age estimates was dependent upon the presence and preservation of diagnostic skeletal elements. Where these were absent or difficult to observe, age estimates reflect general categories, like "adult," "subadult," or "infant." Though most of the standards employed for this study were formulated for non-Maya populations, these standards represent the most commonly used and thus, in the absence of more appropriate comparisons, at least provide a general estimate of age.

**PATHOLOGY**

The osteological remains themselves are also frequently found in the archaeological record and can provide insights into the biological and cultural processes,
which once affected the living. A number of severe or prolonged illnesses will leave
marks on the skeleton, which under analysis can provide an understanding into the health,
diet and lifestyle of an individual. The goal of osteological analysis is to derive general
inferences about the whole population from the given population sample. Ultimately, the
skeletal indicators of diet and disease can be used as an indicator of an individual’s
access to resources, specifically during childhood when the skeletal system is still
developing. However, the Chalillo skeletal sample, consisting of a few selected
individuals from multiple locations, cannot be viewed as a real population and thus, a
statistical comparison cannot be made. Therefore, the purpose of my inclusion of these
data is for 1) to create a general description of individuals described in the study, and 2)
to facilitate future studies of regional populations.

Maya bioarchaeological research traditionally has focused on assessments of diet
and health, most frequently identified from individual’s dentition due to poor
preservation of bone in tropical climates. Dental pathologies that are indicative of diet
and health include enamel hypoplasias, calculus build-up, and the type and frequency of
caries. Despite that, pathologies of the bone tissue can also relay information about an
individual’s lifestyle and access to resources. The most frequently cited pathologies
found among the Maya that are recognizable on bone tissue include porotic hyperostosis,
arthritis, and periostitis (Chase 1994; Lund 2003; Story 2005; Wright and Chew 1999).

Enamel hypoplasias provide an opportunity to examine an individual’s health
during childhood. They are characterized by a disruption in enamel formation, and can be
exhibited as linear bands, deep acutely depressed bands, shallow broad depressed zones,
or linear arrangements of pits (Goodman and Rose 1990). Previous research has focused
on forming a link between stresses caused by weaning and the presence of enamel hypoplasias (Saul 1979; Song 1995). More recently, Wright (2006) has used statistical analysis to measure the prevalence of enamel hypoplasias by chronological period. Furthermore, she develops regression equations for determining the age at which a stress occurred (Wright 2006).

For this study, I scored all enamel hypoplasias for each tooth by type and measured the distance from the cemento-enamel junction (CEJ) to the midpoint of each hypoplasia to the nearest 0.02 mm using sliding calipers. A scorable LEH was determined by both visual and "fingernail" recognition. If the pronunciation of the LEH groove could not be clearly seen or felt by use of my fingernail, an LEH was not recorded as present. Following Wright (2006), an appropriate regression formula was then applied to determine an estimated age for when the nutritional deficiency occurred. For simple burials containing one individual I measured the tooth (typically an incisor or canine) with the greatest hypoplastic expression. For burials containing multiple individuals, each tooth was examined separately unless separation of individual dentitions was possible. Furthermore, in cases where the exact position of the tooth, such as first, second, or third, was not discernable, a regression equation was not applied.

Two common pathologies found on the dentition include calculus and caries. These pathologies are found to result from diets high in starch and may indicate changes in diet, health and lifestyle, possibly suggesting a change in sociopolitical or economic state (Healey et al. 1998:268; Magennis 1999:143-145). Previous research has examined the frequency of dental calculus and caries with changes in health and lifestyle of populations. For instance, Magennis (1999) found a significant increase in the frequency
of caries and calculus from the Protoclassic to the Late/Terminal Classic suggesting a dietary change, specifically in the amount of maize and other carbohydrate consumption. Similarly, Healey et al. (1998) concluded that a diet consisting of maize was the major contributing factor to the formation of calculus among the individuals at the site of Caledonia due to the presence of heavy calculus build-up of all teeth, especially the molars.

For the scoring of dental calculus and caries I followed Buikstra and Ubelaker's (1994) standards. Calculus was scored on a 1-3 scale representing minimal, moderate, or heavy calculus. For caries I recorded the location (i.e., tooth surface), such as occlusal, interproximal, smooth, cervical, and root. Furthermore, I noted the relative size in terms of small, medium or large. Small being 1mm or less in size, medium being 1mm-2mm in size and large being 2mm or greater.

Other skeletal pathologies include porotic hyperostosis, arthritis, and periostitis. Porotic hyperostosis occurs as the skeletal manifestation of a prolonged childhood anemia. Evidence of this nutritional deficiency is marked by porotic lesions that form from the expansion of cranial diplöe in response to anemia, typically located in the orbital roof (cribra orbitalia) on younger children and on the parietal bosses and occipital squama of older children in the form of stippling or pitting (Wright and Chew 1999:924-925). The presence of porotic hyperostosis is frequently associated with a lack of access to iron rich foods, such as meats and has been used in the interpretation of status distinctions within a population (Storey 1999; Whittington and Reed 1997). However, Wright and Chew (1999) took slightly different approach to the presence of porotic hyperostosis and found that the large differences in frequency of porotic hyperostosis
between the ancient Maya and modern Maya did not revolve around populations experiencing greater malnutrition but rather with less children surviving childhood today as they did in the past.

For scoring porotic hyperostosis, I applied Buikstra and Ubelaker (1994) standards, indicating location, degree, and activity. Location refers to the individual bone that exhibits the lesions, degree refers to how severe the case is (barely discernible, porosity only, coalesce of foramina), and activity refers to whether the lesions are active, healed or mixed (including active and healed lesions).

Arthritis is a degenerate joint disease that is exhibited in multiple forms in varying degrees including osteophyte development, lipping, porosity, and eburnation of the joint surfaces, in varying degrees (Lund 2003). The presence of arthritis on an individual can be an indicator of lifestyle activities and health and thus, may indicate sociopolitical and economic differences when extreme differences are found within a skeletal sample. Story (2005:335) uses arthritic and crest information as an indication of the physical labor performed during adult years. She suggests that while gracile individuals may be considered typical of society’s upper strata, robust individuals might also represent society’s upper strata due to Maya rulers being proficient in warfare and most likely the ball game. For the purpose of this paper I followed Lund (2003), recording the location and type.

Periostitis is the inflammation of the periosteum or outer layer of bone that appears as a sleeve of woven bone formed over the cortical bone (White 2000:392). Typically, periostitis is the result of trauma or infection and therefore, is indicative of health and lifestyle activities (White 2000:392). In an effort to determine the cause, I
noted whether the periostitis is systemic and seen on multiple bones or if it was localized, occurring on a single bone. Hypothetically, if the periostitis results from trauma one would expect the lesions to be localized while an infection would most likely produce lesions on multiple bones.

Biological problems are not the only evidence of a population’s lifeways that are evident through osteological analysis. Cultural modification such as dental inlaying, incising and cranial modification, have been applied to the interpretation of difference between status, sex, and age (Chase 1997; Havill et al. 1997; Tiesler 2001; Williams and White 2006). Chase (1997) applied statistical analysis to dental modification frequency, at the sites of Caracol, Santa Rita Corozal and Tayasal, in an effort to test a number of possible correlates including differences in gender or frequency within varying structures. Chase concluded the presence of dental modification alone does not have direct correlation with status but rather more specifically, particular patterns may in fact be the indicator of status differences. Similarly, Havill et al. (1997) found no correlations to exist between the occurrence and types of dental modifications with social status and sex at the sites of Chau Hiix and Tipu. However, they did find all individuals whom exhibited dental modification to be adult. Williams and White (2006) tested the hypothesis that dental modification is unrelated to sex or socioeconomic status at the site of Lamanai, and concluded dental modification was more likely a symbol demonstrating particular social or political affiliations. In the largest of these studies, Tiesler (2001) confirmed these results.

Unfortunately, the small size and biased aspects of Chalillo skeletal sample inhibit such determinations relating to status, sex and age. That being the case, for this study, I
followed Romero’s (1970) classification system that scores by to category (A-G) and variants (#). In the situation where a tooth exhibited a filing that was not listed in the Romero’s classification system, I noted which categories the tooth was most similar to and described the differences.

A less observed cultural modification for the Maya region is cranial modification or head shaping. Most previous research has simply described and noted the presence of this abnormality. In addition, some studies have associated this presence with a higher social standing within the community (Stewart 1974). It was not until Stewart (1974) that an attempt was made to review and create a typology for the patterns of head shaping that had been observed. What Stewart found was that most descriptions fit into six specific typologies including Fontal only, Occipital only, Fronto-occipital, Fronto-vertico-occipital, Lambdoid only, Fronto-lambdoid, and Tabular oblique. Furthermore, Stewart found that all types of deformity recognized as occurring in the Maya region have been observed in other parts of the New World (Stewart 1974:222). Another important observation was that within the southern lowland region most deformed skulls date to the time interval of the Classic period and because of this and the presence of all types of cranial modification, evidence of a clear succession of deformity type is lacking (Stewart 1974:220). For the purpose of my study, cranial fragments were examined for evidence of head shaping based on Stewart's (1974) classification from Dzibilchaltun, Yucatan, Mexico.

While biological and cultural pathologies are frequently used in the analysis of health and lifestyle interpretations, there are limitations to osteological analysis that can hinder conclusions made about a population. Storey (2005) identified three main
physiological issues with osteological analysis. First, not all diseases or physiological stress leave marks on the skeleton. Second, for a mark to be left on the skeleton the stress must be severe or chronic. Third, evidence of stress is only visible if the individual survived for a period of time after the initial occurrence (Storey 2005:333). These issues must be considered when making assumptions about a population’s health and lifestyle. Similarly, Sault and Saul (1989) identified taphonomic processes, such as decomposition, rodent gnawing, insect activity, as well as vegetation, which can interfere with an osteological analysis due to the fact that many of these taphonomic alterations mimic real pathologies. Most importantly, interpretations made about the overall population may in fact be based on a biased skeletal sample due to demographic issues such as lack of consideration for migration, over-estimation of prevalence, or simply that the skeletal samples represent only a small percentage of the total population alive at any given time (Chase 1997; Wood et al 1992). What these statements indicate is that caution must be observed when applying osteological analysis to the study of past societies.
Phase 1 excavations, which recovered human remains, included the sites of Garapata, Bejuco, and Peligroso. Phase 2 excavations included the sites of Ramonal, Bajo del Lago, and Rubber Camp. Burial numbers increase incrementally from 1 to 8 during Phase 1 and begin at 1 for each site during Phase 2 (see Table 3.1).

**Garapata**

Excavations focused on the Eastern Structure included a test unit located on the northwest corner of the structure and a primary axis trench initiated from the base of the mound to its summit. A unit placed to investigate the plaza floor, at the west base of the structure revealed Burial 1, located beneath Plaza Floor 2 within a tomb (see Figure 3.1). All sides of Tomb 1 were faced with large slate stones. Associated artifacts for this burial include obsidian blade fragments oriented in cardinal directions, a complete ceramic vessel, shell beads, a large shell pendant, and worked faunal bone (Awe et al. 2005).
**Table 3.1 Site and Burial Results**

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Burial #</th>
<th>Type of Grave</th>
<th>Burial Treatment</th>
<th>MNI</th>
<th>AGE</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
<td>Tomb</td>
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<td>Both</td>
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<tr>
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<td>Compound</td>
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</tr>
<tr>
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<td>Both</td>
</tr>
<tr>
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<td>Tomb</td>
<td>Secondary/Disturbed Primary</td>
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<td></td>
</tr>
<tr>
<td>Bejuco</td>
<td>5</td>
<td>Cist</td>
<td>Secondary/Disturbed Primary</td>
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<td>Juvenile</td>
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</tr>
<tr>
<td>Peligroso</td>
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<td>Juvenile</td>
<td></td>
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<tr>
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<td>8*</td>
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</tr>
<tr>
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<td>1</td>
<td>Adult</td>
<td>F</td>
</tr>
<tr>
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<td>3</td>
<td>Crypt</td>
<td>Compound</td>
<td>3</td>
<td>Mixed</td>
<td>Both</td>
</tr>
<tr>
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<td>Simple</td>
<td>Secondary</td>
<td>1</td>
<td>Juvenile</td>
<td></td>
</tr>
<tr>
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<td>Tomb</td>
<td>Compound</td>
<td>5</td>
<td>Adults</td>
<td>Both</td>
</tr>
<tr>
<td>Ramonal</td>
<td>6</td>
<td>Simple</td>
<td>Primary</td>
<td>1</td>
<td>Adult</td>
<td>M</td>
</tr>
<tr>
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<td>7</td>
<td>Simple</td>
<td>Primary</td>
<td>1</td>
<td>Juvenile</td>
<td></td>
</tr>
<tr>
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<td>Simple</td>
<td>Compound</td>
<td>2</td>
<td>Mixed</td>
<td>M</td>
</tr>
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<tr>
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<td>Mixed</td>
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<tr>
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<td>Secondary/Disturbed Primary</td>
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</tr>
<tr>
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<td>Tomb</td>
<td>Secondary/Disturbed Primary</td>
<td>1</td>
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<td></td>
</tr>
</tbody>
</table>

*Garapata burials 2,3,4 represent one tomb. Peligroso burials 7 and 8 represent one tomb.*
Burial 1 supports sequential use of the tomb over time, and included the remains of multiple individuals. Even though the distribution of the skeletal material appeared secondary in nature, it is possible that these individuals originally were placed in the tomb as primary interments and later, after the removal of particular skeletal elements, were pushed aside resulting in the commingled appearance. A MNI=9 was determined based on the count of upper canines. Two juveniles, of differing age, were identified based on the presence of an unfused hyoid, which fuses during adolescences, a number of small MC and MT shafts and cervical vertebrae with unfused bodies, as well as varying small sizes of incomplete, mainly upper long bones. Including one humerus that exhibited unfused epiphyses. In addition two adults were identified, one individual’s bones were
light in color and exhibited better preservation while another adult individual’s bones were very weathered and fragmentary, and included a mandible with alveolar resorption of multiple teeth.

The burial contained three incomplete and fragmentary crania, one consisted of occipital and temporal fragments, including the right mastoid, one consisted of mainly frontal fragments but also included seven parietal fragments, one temporal fragment, the left zygomatic and part of the right mandible and one consisted on partial left maxilla and fragments of the temporal, frontal and parietal bones. Long bones present for this burial include the partial remains of two left humeri and four right humeri, two left radii and four right radii, two left ulnas, one left femur and two right femurs, and a left fibula. Due to the overwhelming amount of upper long bones as compared to lower long bones, only pairs of rights and lefts were separated into individuals. These include a pair of ulnas, a pair of humeri, a pair of weathered femurs belonging to an adolescent individual, and a pair of radii, which exhibited a light color appearance and probably belonged to a young adult female due to the relatively small size of the adult bones, were able to be separated into individuals.

The sex of the individuals present in the burial was determined by cranial morphology and by discriminant function analysis using single measurements. A female was identified by the gracile appearance of a right mastoid process and mental eminence. At least two males were identified by the robust appearance of a mental eminence and a deep mandibular ramus, exhibiting a 90° angle. An additional mental eminence with gracile appearance was also present but due to the small size may actually belong to the juvenile. Of the single measurement functions, which met acceptable standards for use, a
left humerus identified a female with a distance from the section point of 8.099 and a right radius identified a female with a distance from the section point of -3.852.

The relative ages of individuals present within the burial were based on attrition scores of the dentition (see Table 3.2). At least one individual was a young adult due to four teeth exhibiting wear similar to category A, and 25 teeth exhibiting wear similar to category B. At least one individual was a mid adult due to nine teeth exhibiting wear similar to category C, 27 teeth exhibiting wear similar to category D, and ten exhibiting wear similar to category E. At least one individual was an older adult due to four teeth exhibiting wear similar to category F, nine teeth exhibiting wear similar to category G, and three teeth exhibiting wear similar to category H. Finally, an upper left premolar and upper right first and second molar appeared to have been unerupted, with no root growth, suggesting an individual was around eight years old.
Table 3.2 Garapata Burial 1 Dental Wear/Age.

<table>
<thead>
<tr>
<th>A</th>
<th>B1 or B2</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
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<tbody>
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<td>rl¹</td>
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<td>rl¹</td>
<td>rP¹</td>
<td>IC¹</td>
<td>rP¹ or ²</td>
<td>IP¹ or ²</td>
</tr>
<tr>
<td>ll²</td>
<td>ll¹*</td>
<td>rC¹</td>
<td>rl¹</td>
<td>rl¹</td>
<td>IC¹</td>
<td>rM¹</td>
<td>IM¹</td>
</tr>
<tr>
<td>rC¹</td>
<td>rl²</td>
<td>IC¹</td>
<td>IC¹</td>
<td>rP²</td>
<td>rP¹</td>
<td>rM¹</td>
<td>rC₁</td>
</tr>
<tr>
<td>IP¹ or ²</td>
<td>rl²</td>
<td>rC₁</td>
<td>IC¹</td>
<td>rP¹</td>
<td>rP₂</td>
<td>rP₂</td>
<td>IM²</td>
</tr>
<tr>
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<td>rl²</td>
<td>rP¹</td>
<td>rP¹</td>
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<td>rP²</td>
<td>rM³</td>
<td>IM¹</td>
<td>IM¹</td>
<td>IM²</td>
</tr>
<tr>
<td>rI</td>
<td>rl¹</td>
<td>rP²</td>
<td>rl²</td>
<td>rM²</td>
<td>rl¹</td>
<td>rl²</td>
<td>rC₁</td>
</tr>
<tr>
<td>rI</td>
<td>ll¹</td>
<td>rC₁</td>
<td>rC₁</td>
<td>rC₁</td>
<td>ll¹</td>
<td>rl¹</td>
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</tr>
<tr>
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<td>rl¹</td>
<td>rP₁</td>
</tr>
<tr>
<td>rC</td>
<td>rl¹</td>
<td>rC</td>
<td>rl¹</td>
<td>rl¹</td>
<td>rC</td>
<td>rl¹</td>
<td>rl¹</td>
</tr>
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<td>rP</td>
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<td>rl¹</td>
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<td>rP</td>
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<tr>
<td>IP</td>
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<td>rl¹</td>
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<td>IM</td>
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<td>rl¹</td>
<td>rl¹</td>
<td>IM</td>
<td>rl¹</td>
<td>rl¹</td>
</tr>
</tbody>
</table>

*individual had incomplete root formation suggesting an age of 15+/- 3 yrs
The presence of partial mandibles and maxillas, with dentition still intact, allowed for identification of a three individuals. Individual 1 consisted of an incomplete right mandible exhibiting alveolar resorption of most of the teeth. This is suggestive of an older individual or possibly may have been the result of poor dental health. Individual 2 consisted of an incomplete mandible containing the right canine through the left first molar, exhibiting alveolar resorption of the lower left second premolar. This individual exhibited dental wear equivalent to category D, with the exception of the molars, which were worn down flat but with no dentine exposed. The extreme wear of the molars possibly was the result of an activity requiring grinding with the back teeth. Individual 3 consisted of a maxilla and three mandibular teeth, with root growth development similar to around 15 years of age.

Health indicators were noted on a number of teeth for this burial. Out of the three identifiable individual’s dentitions, Individual 1 exhibited enamel hypoplasias including a linear enamel hypoplasia and two major growth arrests. These suggest the individual experienced a reoccurring nutritional deficiency from around the age of two through four years. From the remaining teeth in the burial, six linear enamel hypoplasias were noted on an upper right canine indicating a consistent nutritional deficiency for the individual from around the age of four through the age of five. A linear enamel hypoplasia was noted on a lower right canine suggesting the individual experience a nutritional deficiency around the age of four. A linear enamel hypoplasia noted on a lower left canine, belonging to a separate individual than the right, also suggested a nutritional deficiency around the age of four.
Out of the three identifiable individuals dentition Individual 3, with dental development similar to that of a 15 year old, exhibited a minimal amount of calculus. From the remaining teeth in the burial, calculus was minimally expressed on five and heavily expressed on one (see Table 3.3).

Out of the three identifiable individual’s dentition, Individual 2 exhibited an occlusal surface caries located on the upper third molars and lower right second molar, and interproximal surface caries located on the upper central incisors and lower left first premolar. From the remaining teeth in the burial, a lower right first molar exhibited a cervical and occlusal surface caries. Eleven teeth exhibited a cervical surfaces caries ranging in size from small to medium, five teeth exhibited a large surface caries and one tooth exhibited a smooth surface caries (see Table 3.4).

<table>
<thead>
<tr>
<th>Table 3.3 Garapata Burial 1 Calculus</th>
</tr>
</thead>
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<tr>
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<tr>
<td>Amount of Calculus</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>rl¹</td>
</tr>
<tr>
<td>rC¹</td>
</tr>
<tr>
<td>rl₁ -</td>
</tr>
<tr>
<td>rl²</td>
</tr>
<tr>
<td>l₁²</td>
</tr>
<tr>
<td>Location of Carious Lesion</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>Occlusal</td>
</tr>
<tr>
<td>Interproximal</td>
</tr>
<tr>
<td>Smooth</td>
</tr>
<tr>
<td>Cervical</td>
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<tr>
<td>Root</td>
</tr>
<tr>
<td>Large</td>
</tr>
<tr>
<td>Non-Carious</td>
</tr>
</tbody>
</table>

*same tooth

Out of the three identifiable individual’s dentition, cultural modifications were present on Individual 3 and Individual 2. Individual 3 had filed canines similar to B1 (see Figure 3.2) and Individual 2 exhibited a smoothing of the enamel on the lingual surface of both upper canines, with a glassy appearance of having been filed (see Figure 3.14 for example). Interestingly, such an occurrence has been noted on present day bulimic individuals and is known as perimyolysis. From the remaining teeth in the burial, one upper right central incisor was filed similar to G4, a pair of upper central incisors were both filed similar to C6, an additional upper right central incisor was filed similar to C6, and a pair of upper lateral incisors were also filed similar to C6, totaling 5 but equal to 3 separate individuals. An upper right canine filed similar to C6 and an upper left canine filed most similar to B6, with the difference being a rounded point, appeared to
belong to the same individual based on tooth shape and wear. An upper right canine filed similar to B1, making three teeth with this filing. An upper central incisor was filed most similar to C3 or C6 but also included diagonal incising of the corners (see Figure 3.3). A lower right central incisor and lower left canine were filed similar to A4 but may be the result of heavy wear. Furthermore, a lower right lateral incisor and a lower left canine exhibited an unusual wear pattern.
Excavations focused south of the primary axis revealed Tomb 2, which supports sequential use and included the remains of multiple individuals. Within this tomb, burials 2, 3, and 4 were identified placed one on top of the other, with a layer of soil separating each burial (Awe et al 2005).

Unfortunately, in the case of Burial 2, the skeletal material recorded during the excavation process was not present in the sample analyzed. Therefore, I must rely on the information provided by the field report. Burial 2 consisted of a poorly preserved secondary interment, represented by a small bundle of bones and included no associated artifacts (Awe et al. 2005:20) (see Figure 3.4).
Figure 3.4 Garapata, Eastern Structure, Burial 2 (Awe et al. 2005:20).
Burial 3 and associated artifacts were located about 10 cm below Burial 2 and recovered from an area measuring 1.3 meters NS by .7 meters EW. Associated artifacts include a complete ceramic ‘finger bowl’ which contained human phalanges and obsidian placed in a cardinal direction (Awe et al. 2005:21). In addition, a number of long bone fragments including the femur and fibula exhibit animal activity in the form of teeth marks and scratching (Vera Tiesler, pers. comm.).

Burial 3 consisted of the incomplete secondary interments of an adult and juvenile, based on the presence of two left humeri and in addition to an adult dentition, an unerupted upper left premolar. The contents included an incomplete crania consisting of frontal, parietal, occipital, and left temporal bone fragments and the right mandible of the adult. Long bones present for this burial include two left humeri, a right humerus, a left femur, a left tibia, a right tibia, and a left fibula, all of which were incomplete and fragmentary.

The adult was identified as female by the gracile appearance of the cranial morphology and discriminant function analysis, which also suggested a female based on both the individual measurement function of the tibial nutrient foramen and multiple measurement function of the humerus and tibia. Furthermore, she was estimated to be in her mid to late adult years due to dental wear associated with category E. The juvenile was estimated to be around six years of age using dental development standards.

Health indicators, such as enamel hypoplasias, calculus and caries were noted on a number of teeth belonging to the adult individual. Three linear enamel hypoplasias were present on a permanent upper left second incisor, indicating a consistent nutritional
deficiency around three and a half to four and a half years of age. In addition, a small CEJ caries was present on the lower central incisor and a smooth caries was located on the lower right first molar.

Burial 4 was located beneath Burial 3 and encompassed an area of 1.25 meters NS by .7 meters EW (see Figure 3.5). Associated artifacts include obsidian located over the lower pelvis of the articulated torso, a pyrite disk, a number of complete and nearly complete ceramics and a whole vessel (Awe et al. 2005: 21). In addition, animal activity, in the form of scratch marks, was noted on left humerus shaft and on weathered femur fragments (Vera Tiesler, pers. comm.).

Figure 3.5 Garapata, Eastern Structure, Burial 4 (Awe et al. 2005:22).
Burial 4 contained the remains of multiple individuals and with the exception of an articulated ribcage and vertebral column, all the skeletal remains were in a disarticulated state, suggesting a protracted mortuary ritual and the use of the tomb for primary interments and possibly secondary interments. A MNI=6 was determined based on the count of upper canines. At least one juvenile was identified by the presence of an unfused hyoid as well as at least three adults were identified based on the color of bones and the amount of weathering.

Long bone counts for this burial include the incomplete and fragmentary remains of two left humeri, two right humeri, one left radius, three right radii, four left femurs, four right femurs, one left tibia, one right tibia, one left fibula, and two right fibulas. From these pairs of rights and lefts were separated out into individuals including, a pair of fibulas, femurs and humeri. Furthermore, based on the color and size of the bones, a right radius and ulna belonged to the same individual and a right humerus and ulna belonged to the same individual. Unlike the dentition, the total MNI count by long bones is equal to four.

The sexing of individuals present within in the burial was determined by sexual characteristics of the cranium and discriminant function analysis. Either a robust adult female or a gracile adult male was identified by the presence of a mental eminence. In addition, the presence of a deep mandibular ramus, that exhibited a 90° angle, which suggested an adult male interment. Discriminant function analysis was only performed using single measurement functions due to multiple measurement functions not meeting acceptable Eigenvalue standards. Of the single measurement functions, which met acceptable standards for use, one right radius identified a male with a distance of .1439
from the section point and another right radius also identified a male with a distance of .1439 from the section point. A humerus identified a female with a distance of -1.029 from the section point.

The relative ages of individuals present within the burial were based on attrition scores of the dentition (see Table 3.5). These indicate that most if not all the individuals died during their young to mid adult years. This is evident by large amount of teeth which fall within categories B, C and D, where 18 teeth fell within category C, 12 teeth fell within category D and 8 fell within category B. Furthermore, it is possibly that at least one individual died during their late adult years due to the presence of three teeth within category E, two within category F, and two within category G. Although, it should be noted that categories E, F and G are represented only by molar teeth, which might represent one individual and indicate wear associated with a specific use. The presence of an upper left premolar whose root is not yet fully formed, suggested that one individual might have been around 10 years old. Individual dentitions were not easily separated and therefore, each tooth was recorded individually by cluster.
Table 3.5 Garapata Burial 4 Dental Wear/Age

<table>
<thead>
<tr>
<th>A</th>
<th>B1 or B2</th>
<th>C</th>
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<th>F</th>
<th>G</th>
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</tr>
<tr>
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<td>IM^1</td>
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<td></td>
<td>IP^1</td>
<td></td>
<td>IM^1</td>
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<tr>
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<td>rP1</td>
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</tr>
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<td>rP^1 or 2</td>
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<td>IP</td>
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</tr>
<tr>
<td>rM</td>
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<td>IM^2</td>
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<td>rM</td>
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<td>rM_1</td>
</tr>
<tr>
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<td>rC_1</td>
<td></td>
<td>IM_2</td>
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<td>rM_2</td>
</tr>
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<td>rM_2</td>
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<tr>
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<td>IP_1</td>
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<td>IP</td>
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<td>rM_2</td>
</tr>
<tr>
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<td></td>
<td>IP_2</td>
<td></td>
<td>rP_2</td>
<td></td>
<td>IP</td>
</tr>
<tr>
<td>rI</td>
<td></td>
<td>rP_2</td>
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<tr>
<td>rI</td>
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<td>IP_2</td>
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</table>

<table>
<thead>
<tr>
<th>Age Grouping</th>
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<td>3</td>
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<tr>
<td>2</td>
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<tr>
<td>2</td>
</tr>
</tbody>
</table>
Health indicators, such as enamel hypoplasias, calculus and caries were noted on a number of teeth for this burial. Three very faint linear enamel hypoplasias were noted on an upper right central incisor, suggesting a consistent nutritional deficiency for this individual around the age of three and four. Two enamel hypoplasias, one classified as a major growth arrest, were noted on an upper right lateral incisor, suggesting a prolonged nutritional deficiency for this individual around the age of four. Two linear enamel hypoplasias were noted on an upper right canine, suggesting a nutritional deficiency for this individual around the age of three and five. Two linear enamel hypoplasias were noted on an upper left canine, suggesting a nutritional deficiency for this individual around the age of five and six. Two light linear enamel hypoplasias were noted on another upper right canine, suggesting a prolonged nutritional deficiency for this individual around the age of six. Finally, a linear enamel hypoplasia was noted on a lower left second molar, suggesting a nutritional deficiency for this individual around the age of six.

Calculus was present on six teeth with a minimal expression and in a moderate amount on one tooth (see Table 3.6).

<table>
<thead>
<tr>
<th>Figure 3.6 Garapata Burial 4 Calculus</th>
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<tr>
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<td>1</td>
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<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>lP&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>lP&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>rI&lt;sub&gt;2&lt;/sub&gt;</td>
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<tr>
<td>rP&lt;sub&gt;2&lt;/sub&gt;</td>
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<tr>
<td>IP&lt;sub&gt;2&lt;/sub&gt;</td>
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</table>
### Table 3.7 Garapata Burial 4 Caries

<table>
<thead>
<tr>
<th>Occlusal</th>
<th>Interproximal</th>
<th>Smooth</th>
<th>Cervical</th>
<th>Root</th>
<th>Large</th>
<th>Non-Carious</th>
</tr>
</thead>
<tbody>
<tr>
<td>rM₃</td>
<td>rM₁</td>
<td>IM₂</td>
<td></td>
<td></td>
<td>IM²</td>
<td>IM₃</td>
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<tr>
<td>rM₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Caries were present on a number of upper and lower molars (see Table 3.7). A small occlusal surface caries was on a lower right first molar. A medium cervical surface caries was present on a lower second molar and a large caries entirely covered an upper left second molar and a lower left first molar.

Burial 6 was discovered south of primary axis trench within Tomb 3. This tomb was constructed out of cut slate blocks with a single large slate slab forming the floor and roof. The floor bore many cut marks and the tomb contained a number of associated artifacts including a mano and metate, shell beads, obsidian, and a number of polychrome and bichrome vessels that are indicative of Late Classic occupations (Awe et al. 2005:22-23).

Unfortunately, the skeletal material recorded during the excavation process, was not present in the sample analyzed. Therefore, I must rely on the information provided by the field report. According to the report, the burial consisted of a poorly preserved and incomplete interment with an MNI=1. The interment was represented by a small amount of long bone fragments and part of the mandible.
**BEJUCO**

Excavations focused on the Eastern Structure’s primary axis trench revealed Burial 5. Burial 5 was a small cist that had been carved into bedrock and covered with slate slabs and contain the possibly secondary interment of a juvenile. The only associated artifact for this burial included one obsidian blade fragment.

The contents of the burial consisted of fragments of the crania, including the frontal bone, the temporal bones, right zygomatic, the mandible and the maxilla. All deciduous teeth and 12 of the permanent teeth were present. The postcranial consisted of fragments belonging to the cervical and thoracic vertebrae, including the atlas, the ribs, a fibula shaft, the proximal third of both the right and left femur, the distal third of the left tibia and one fragment of both a humerus radius.

Dental development provided an approximate age for this individual of 5 years old. Health indicators, such as enamel hypoplasias, calculus and caries were present on a number of teeth. A linear enamel hypoplasia was noted on both of the upper right and left adult central incisors, which suggested a nutritional deficiency for this individual around the age of three and half years old. A large amount of cervical calculus was present on all deciduous molars and a small occlusal caries was noted on the deciduous upper right first molar.

**PELIGROSO**

Excavations of the Eastern Structure focused on extensive horizontal excavation and a primary axis trench. Units placed at the base of the west face of the structure exposed the plaza floor. Located beneath Floor 3 were a number of capstones belonging
to Tomb 1. Within the matrix below the capstones, Burial 7 was discovered (Awe et al. 2005:39-41).

Burial 7 consisted of the primary burial of a single individual that faced east and who appeared to have been “placed in seated position with arms bound behind it’s back” (Awe et al. 2005:41). In addition, two caches were found on top of the tomb. One consisted of a small black unslipped cup, which contained seven human phalanges (Awe et al. 2005:40-41). Unfortunately, most of the skeletal material recorded during the excavation process was not present in the sample analyzed. All that could be ascertained was that the individual was juvenile based on the presence of fragmented unfused long bone epiphyses.

Excavation continued on the primary axis trench, into the structure due to the tomb’s appearance to continue eastward. After the removal of the remaining capstone Burial 8 was discovered (see Figure 3.6). Associated artifacts for this burial include a large number of vessels, one of which contained nine human teeth, a jade bead, slate disk, obsidian, worked bone, chert flakes, and worked shell. The tomb can be dated to the transitional period from Early to Late Classic based on preliminary identification of vessel forms (Awe et al. 2005:41). Furthermore, a number of long bone fragments exhibited animal activity in the form of animal gnawing and scratching (Vera Tiesler, pers. comm.).
Figure 3.6 Peligroso, Eastern Structure, Burial 8, Level 1 (Awe et al. 2005:42).

Burial 8 includes the incomplete remains of multiple individuals and supports the sequential use of the tomb overtime, with stacks of skeletal remains that appeared to have “swept aside to allow for the interment of additional individuals” (Awe et al. 2005:41). A MNI=3 was determined by the total count of upper central incisors, upper first molars and lower canines. Although, when the teeth located within vessel 17 are considered separately, the MNI became 5 due to the incomplete dental remains of at least two individuals. All the skeletal remains belonged to adult or young adult/adolescent individuals based on all the presence of all permanent teeth and an unfused hyoid bone, which fuses during adolescence.

Contents of this burial include at least two incomplete and fragmentary crania, including a partial right mandible with alveolar resorption of the right canine through the second molar. Long bones present for the burial include a partial left radius, a partial right radius, a left femur, one fragment of a right femur, a partial left and right fibula, and a partial tibia mid shaft. No humeri, or ulnas were present.
Unfortunately, the sexing of individuals present was not possible although, one mandibular fragment exhibited strong masseter muscle attachment suggesting an adult male.

The relative ages of individuals present within the burial were based on attrition scores of the dentition (see Table 3.8). At least one individual is estimated to have been a mid to late adult, based on the presence of seven teeth within category E, six teeth within category F, and three teeth within category G. Furthermore, is estimated to have been young adult based on the presence of four teeth within category A, and two teeth within both categories C and D. Within vessel 17, the majority of teeth exhibited dental wear equivalent to category E, suggesting the individual was in their mid adult life while another individual appeared to be younger due to two teeth, a lower right canine and 1st molar, which exhibited dental wear equivalent to category C. In addition, alveolar resorption of the canine through second molar was noted on a mandible, which suggested it either belonged to an older individual or an individual who experienced poor dental health.
Table 3.8 Peligroso Burial 8 Dental Wear/Age

<table>
<thead>
<tr>
<th>Age Grouping</th>
<th>A</th>
<th>B₁ or B₂</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I₁¹</td>
<td></td>
<td>rC₁</td>
<td>r₁²</td>
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<td>rC₁</td>
<td>r₁²</td>
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<tr>
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<td>r₁²</td>
<td></td>
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<td>I₁²</td>
<td></td>
<td>rM₁</td>
<td>I₁²</td>
</tr>
<tr>
<td></td>
<td>lC₁</td>
<td>I₁²</td>
<td></td>
<td></td>
<td>I₁²</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>lP₂</td>
<td>I₁²</td>
<td></td>
<td></td>
<td>lM¹</td>
<td>I₁²</td>
<td></td>
</tr>
</tbody>
</table>

| 4 | 2 | 2 | 7 | 6 | 3 |

Health indicators, such as enamel hypoplasias, calculus and caries were noted on a few teeth for this burial. A linear enamel hypoplasia was present on a lower lateral incisor, which indicated a nutritional deficiency for this individual around the age of three and half. A linear enamel hypoplasia was present on the lower first premolar, which indicated a nutritional deficiency for this individual around the age of five and half.

Calculus was present on two teeth with a minimal expression and in a moderate amount on one tooth (see Table 3.9).

Table 3.9 Peligroso Burial 8 Calculus

<table>
<thead>
<tr>
<th>Amount of Calculus</th>
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<td>l₁¹</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>r₁²</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>lM₁</td>
<td></td>
<td>IM²</td>
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</tr>
</tbody>
</table>

63
Table 3.10 Peligroso Burial 8 Caries

<table>
<thead>
<tr>
<th>Location of Carious Lesions</th>
<th>Occlusal</th>
<th>Interproximal</th>
<th>Smooth</th>
<th>Cervical</th>
<th>Root</th>
<th>Large</th>
<th>Non-Carious</th>
</tr>
</thead>
<tbody>
<tr>
<td>rM₃</td>
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<td>rM₂</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>rM₁</td>
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</tbody>
</table>

Caries were present on three upper molars and on a lower molar (see Table 3.10). A medium occlusal surface caries was present on three upper molars and a medium cervical surface caries was present on a lower molar.

Postcranial health indicators include a number of long bone fragments including both fibulas exhibiting slight periostitis in the form of systematic lesions, while the left femur and tibia exhibited moderate periostitis. The distal end of the femur appears to have been the originating place of the periostitis, which later progressed into the systematic lesions seen elsewhere (see Figures 3.7, 3.8). Osteoarthritis in the form of lipping, was noted on a few vertebral bodies belong the thoracic and lumbar vertebrae. In addition, a right 5th metatarsal exhibited an unusual growth located on the ventral side, which after consulting with Dr. Rami Calis, was deemed to be most likely evidence of polydactylysm or a possible osteochondroma due to the slight mushroom-like appearance of the cap that suggests the cap may have been cartilaginous (see Figure 3.9). However, it is for certain the growth is not due to an infection.
Figure 3.7 Peligroso Burial 8 Fibular Periostitis.

Figure 3.8 Peligroso Burial 8 Tibial and Femural Periostitis.

Figure 3.9 Peligroso Burial 8 Metatarsal Pathology.
Cultural modifications, in the form of incised teeth, were noted on a number of teeth for this burial. A lower second incisor and an upper second incisor belong to the same individual exhibited either filing most similar to F4 or may actually be the result of unusual wear. Furthermore, also representing one individual, a first premolar exhibited filing most similar to F4, a lower central incisor and lower canine exhibited filing similar to A4. These may actually be the result of unusual wear associated with an activity such as repetitively pulling string through the teeth.

RAMONAL

Ramonal was composed of three main plazas and was the largest known settlement area upstream from Chalillo Dam. Skeletal remains were recovered from the Eastern Structures associated with Plaza A and Plaza C. Excavations of Plaza A’s Eastern Structure focused on a primary axis trench and multiple units placed on the west and east faces of the structure. Excavations of Plaza C’s tripartite Eastern Structure (A, B, C) focused on vertical testing in the plaza and on units placed on two of the three summits (Awe et al. 2005:54-55).

Burial 1 was encountered within a unit placed on Platform 1, which extended from the base of Step 1 to the plaza (see Figure 3.10). The burial was located beneath five large slate capstones, which had been placed on three limestone blocks near the western edge of the platform. Aligned north to south, the tomb was oval shaped and constructed out of slate. Associated artifacts include multiple vessels, three of which were lined up at the south end, modified marine shell, two large Pomacea shells, jadeite beads, quartz located in and around the vessels, an obsidian blade fragment, and two small rectangular
limestone blocks. The limestone blocks measured 5 x 1 x 1 cm; one was located inside a vessel and the other was placed on the floor. Whether the limestone blocks served ritual or utilitarian purposes is unclear (Awe et al. 2005:56).

Figure 3.10 Ramonal, Plaza A, Eastern Structure, Burial 1 (Awe et al. 2005:57).
Burial 1 was misidentified and consisted mainly of faunal bones and a few long bone fragments, which may be human but due to the poor preservation and extreme weathering was unable to make a positive identification. If human, the fragments are similar in thickness to femur or tibia. The fragments were found on the floor at the north end, as well as in and around the vessels lined up at south end.

The poor quality of the few fragments did not allow for the determination of sex or age.

Excavations focused on penetrating the plaza directly west of Platform 1 revealed Burial 2 located about ten centimeters below Plaza Floor 1 within the fill matrix. Burial 2 contained the remains of a young adult individual placed on flat hard stones, who “appeared to be interred in a seated and reclined position, facing north with the legs flexed” (Awe et al. 2005:58). Looking at the photograph (see Figure 3.11) of Burial 2, the individual is definitely in a seated position with legs flexed but the reclined position may have been occurred after burial as decomposition progressed. Associated artifacts include faunal and modified marine shell in the form of beads, which at one time probably formed a necklace. These include two pink shell beads and hundreds of tiny Olivella shells (Awe et al. 2005:58).
The skeletal remains for this burial exhibited decent preservation but were fragmentary. The crania consisted of the frontal, occipital, parietal, right zygomatic, left temporal, incus bone, and with the exclusion of the lower right and left canines the dentition was complete. The postcrania consisted of the clavicles, scapulae fragments, a partial right patella, the body of the sacrum, os coxae fragments, vertebral fragments belonging to the cervical, thoracic and lumbar vertebrae, rib fragments, the incomplete hands, feet, and all long bones.

The sex of the individuals present in the burial was determined by cranial morphology and discriminant function analysis. The interment was identified as female due to a gracile mental eminence, the mastoid processes and the mandibular ramus,
which was shallow forming an angle larger than 90˚. Discriminant function analysis was performed using multiple measurement functions. Nine multiple measurement functions met the Eigenvalue acceptable standards for use and all support the assessment of a female interment.

The amount of dental wear the maxillary and mandibular dentition exhibited was relatively light, similar to category B. This suggests the individual was a young adult, most likely in her teen years.

Health indicators, such as calculus and caries, were present on the individual’s dentition. Calculus was minimally expressed on most of the dentition and a large interproximal caries was present on the upper right first molar.

Cultural modifications of the dentition were also present on this individual. The maxilla had upper canines filed and inlaid with pyrite similar to G1 and upper incisors inlaid with jade similar to E1 (see Figure 3.12), lower central incisors filed similar to B4 and lateral incisors filed similar to A4.

Figure 3.12 Ramonal Burial 2 Dental Modification.
Excavations focused on a slate constructed feature, south of Burial 2, revealed a crypt that was aligned north to south. Within the crypt, a series of burials were found extending vertically, below the architecture of the crypt itself, with no cultural features separating the remains. These were collectively identified as Burial 3. Preliminary observation suggested the interments were secondary due to the disarticulated state of the remains. Associated artifacts include worked faunal bone and a number of ceramic vessels; one vessel contained human remains within its matrix (Awe et al 2005:59).

Burial 3 supported the sequential use of the tomb overtime and included the incomplete remains of at least three individuals based on permanent dentitions, which could be separated into three individuals by appearance and diagnostic characteristics such as enamel hypoplasias, and calculus. These include Individual 1 who is represented by an incomplete maxilla including the right second molar, both canines, both later incisors, both central incisors, and the left first and second premolar, Individual 2 who is represented by an upper right central incisor, an upper left second premolar, and lower right and left canines, and Individual 3 who is represented by lower right and left canines and the left lateral incisor. There are three additional upper molars that are currently loaned out and therefore, could not identified as belonging to an individual. By appearance of long bones, at least two adults could be identified and a young adult/adolescent was also identified due to the presence of unfused long bone epiphyses.

The burial contained two incomplete and fragmented crania, one that was darker in color and consisted of the nasals, temporals, parietals and one occipital fragment. The other skull was lighter in color and consisted of occipital, parietal, the left temporal, the left frontal and a very small portion of the left sphenoid. Furthermore, scattered
throughout the burial were a number of random skull fragments. The total amount of long bones present for this burial include three right humeri and two left humeri, two right and left radii, two right ulnas and three left ulnas, two right and left femurs, and one left tibia. I was able to separate a majority of these into three individuals based on color and preservation (lighter-A, darker-B, most weathered-C). Individual A, exhibiting a lighter color of bone, consisted of a partial left femur, a partial left tibia, a partial right humerus, a partial right and left ulna and a partial right and left radius. Individual B, exhibiting a darker color of bone, consisted of a partial right femur with a visible unfused distal epiphysis, and partial right and left humerus, a partial right radius, and a partial left ulna. Individual C, exhibiting the most weathering, consisted of a partial left humerus, a partial left radius, and a partial left ulna. Unfortunately, I was not able to positively identify long bones with dentition.

The sex of the individuals present in the burial was determined by cranial morphology and by discriminant function analysis. A male was identified by the robust appearance of a nuchal crest, mastoid process, and supra-orbital ridge. Two additional gracile mastoid processes, belonging to one individual, were also present. These suggested a female but may actually belong to an adolescent. Discriminant function analysis was performed using multiple measurement functions for Individual A and B and single measurement functions for Individual C due to the minimal amount of long bones that were measurable. The results of discriminant function analysis performed on Individual A’s bones, indicated the individual was most likely female. The results of discriminant function analysis performed on Individual B’s bones, indicated the
individual was most likely male. The results of discriminant function analysis performed on the Individual C’s bones, indicated the individual was most likely female.

The relative ages of individuals present within the burial were based on attrition scores of the dentition. Individual 1 exhibited wear similar to category B, suggesting the individual was a young adult. Unfortunately, Individual 2 and Individual 3 exhibited either filing or unusual wear, which made attrition scores inaccurate. On individual 2, the central incisor, and both lower canines look most similar to B2 or B4 filing with slight variation, but due to the upper second premolar exhibiting unusual wear of the lingual cusp, these may actually be the result of a repeated activity (see Figure 3.13). On Individual 3, the lower lateral incisor exhibited filing similar to A4, and the lower canines exhibited filing most similar to B2, once again the filing may actually be activity related.

Figure 3.13 Ramonal Burial 3 Dental Modification.
Health indicators were noted on a number of teeth from this burial. Only Individual 1 exhibited two linear enamel hypoplasias, which were present on an upper right and left central and lateral incisors, an upper right and left canine, all suggesting the individual experienced a prolonged nutritional deficiency around four years of age.

Calculus was present on five teeth from this burial. Individual 2 exhibited slight calculus on the lower premolars. Individual 3 exhibited heavy calculus on all three teeth.

Caries were noted on three teeth. Individual 2 exhibited a medium caries was present on the smooth surface of an upper right first molar. Not associated with an individual, a small smooth surface caries was present on an upper right first molar and a large cervical surface caries was present on an upper left third molar.

Excavations focused on the stairs of Terrace 1 revealed Burial 4 within the cobble and slate core of Plaza 2. Burial 4, a simple burial, contained the remains of a child. The burial consisted of a fragmentary cranium and a couple rib fragments, which is consistent with the report’s description of the burial. The cranium including frontal fragments, occipital fragment, the right zygomatic, the petrous portions of both temporals, a malleus and a partial deciduous dentition consisting of a upper right canine, upper left first molar, lower right central and lateral incisor, a lower right first molar, a lower left central incisor, a lower left canine, and a lower left first and second molar. In addition, a permanent upper right first incisor and lower right first molar were also present but were not yet erupted. Based on the dental development, the child was around two years old and exhibited no indicators of poor health.

Excavation focused to the west of Burial 2, revealed Tomb 2, aligned north to south, and within which was Burial 5. Burial 5 contained the remains of at least five
adult individuals, including a primary individual placed in a flexed position, with the head to the south. Supporting sequential use of the tomb over time, all other skeletal remains were disarticulated and appear to have been stacked or pushed aside for subsequent interments. Associated artifacts include worked faunal bone, jaguar tooth pendants, worked Olivella shells, obsidian blades, and a large number of ceramic vessels (Awe et al 2005:60).

The contents of the burial include the remains of four crania and a large number of long bones. The presence of two maxilllas and three mandibles allowed for the separation of dentition into five individuals. Individual 1, the primary interment, consisted of complete maxilla and most of the mandible with the exception of the lower right first molar and lower right first premolar. Individual 2 consisted of a partial maxilla including upper right third molar, both upper right premolars, both of the upper right incisors, and a partial mandible including all of the lower right dentition, with the exception of the second molar that exhibits alveolar absorption, and all of the lower right with the exception of the central incisor, second premolar, first molar. Individual 3 consist only of a lower right and left canine. Individual 4 consist only of a lower left canine and upper left canine. Individual 5, teeth below a vessel, consist upper right and left later incisors, and mandibular right first molar, both right premolars, right canine, both central incisors, left lateral incisor, left canine, both left premolars and second left molar. The good preservation also allowed for easy separation of long bones into particular individuals, which also resulted in an MNI of five with one primary interment. Other than with the primary individual’s dentition, it was not possible to match up long bones with dentitions.
The sex of the individuals present in the burial was determined by cranial morphology and discriminant function analysis. The primary individual was identified as a male due to a robust mental eminence and a deep mandibular ramus, which exhibited a 90° angle. Other cranial morphology for the burial included a shallow mandibular ramus, which exhibited an angle greater than 90°, suggesting a female and an additional mental eminence that could either be from a gracile male or a robust female thus being inconclusive. Discriminant function analysis was only able to be performed on Individual 1, Individual 2, and Individual 3 using multiple measurement functions from the long bones. Discriminant function analysis performed on Individual 1 resulted in mix conclusions. Six multiple measurement functions, which met the Eigenvalue acceptable standards for use, indicated a female interment but five multiple measurements supported the assessment of a male interment. Therefore, discriminant function analysis was inconclusive for Individual 1. Discriminant function analysis was only able to be performed using single measurements, due to the multiple measurement functions not meeting Eigenvalue acceptable standards. The results indicate the individual was most likely female. Discriminant function analysis performed on Individual 3 also resulted in mix result. Four multiple measurement functions significantly indicated a female interment with a distance from the section point being at least -1.571, where as only one multiple measurement function indicated a male but was not significant due to the distance from the section point only be .895.

The relative age of the individuals present within the burial were based on attrition scores of the dentition. Individual 1 exhibited maxillary wear most similar to category C and mandibular wear most similar to category D, suggesting the individual
Individual 1 exhibited two linear enamel hypoplasias and one major growth arrest, suggesting the individual experienced a prolonged nutritional deficiency around the age of three and four. Individual 4 exhibited two linear enamel hypoplasias, suggesting a nutritional deficiency around the age of five.

Calculus was only present on two individuals. Individual 1 exhibited a minimal amount of calculus. Individual 5 exhibited a moderate amount of calculus on the canine and incisors.

Caries were only present on two individuals. Individual 1 exhibited three small occlusal surface caries were present lower second molar. Individual 2 exhibited a total of seven caries including a small root caries located on the upper right central incisor, a large caries that completely covered the lower left third molar, a small occlusal surface caries present on the lower right second premolar, a medium occlusal surface caries
present on the upper right third molar and lower right first molar, and a large occlusal surface caries present on the lower right third molar and lower left second molar.

Postcranial health indicators for this burial include periostitis and arthritis. Systemic periostitis, in the form of a slightly raised ridge, was present on the Individual 1’s lower long bones and mildly present on an additional right femur, left femur and left fibula. Arthritic lipping was present on a number of fragmented lumbar and thoracic vertebrae bodies.

Cultural modifications of the dentition were noted on two individuals. Individual 2 exhibited filing of the lower incisors and canines, most similar to A4 and exhibited a diagonal incised line located on the mesial-buccal surface of the upper left second incisor which is not represented in Romero’s standards. Furthermore, this individual’s upper right first incisor exhibited a smoothing of the enamel on the lingual surface, with a glassy appearance of having been filed, similar to the upper canines from Garapata Burial 1 (see Figure 3.14). Individual 4’s lower left canine exhibited an empty inlay hole similar to E1 and the tooth also exhibited filing similar to B4 but due to the filing running into the inlay hole, I believe it is not filing but unusual wear associated with a activity. This is very similar to what was seen in Burial 3 from this site.
Excavation units placed on the plaza in front of Eastern Structure B of Plaza C revealed Burial 6 located on Plaza Floor 3. Burial 6 was a simple burial consisting of an adult individual placed supine in a flexed position with their head to the south. There were no associated artifacts for the burial (Awe et al. 2005:66-67).

Unfortunately, a few of the bags containing skeletal material that recorded during the excavation process were not present in the sample analyzed, possibly resulting in the recording of an incomplete interment during analysis. The skeletal material analyzed was fragmented and includes the occipital and parietal bones, three teeth, a right clavicle, the scapulae, the os coxae, including a pubic symphysis, the sacrum, a couple vertebrae, a majority of the left hand, a partial right hand, a majority of the left and right feet, the left humerus, a partial left radius, the right radius, the proximal epiphysis of the left ulna, the right ulna, left and right femur, left and a partial right tibia, a partial left and right fibula.

The sex of the individual was determined by morphology of the subpubic region and discriminant function analysis. The shape of the pubic symphysis, suggest the individual was male. Discriminant function analysis was performed using multiple measurement functions of the long bones. Three multiple measurement functions, which
met the Eigenvalue acceptable standards for use, suggested the individual was most likely a female interment. The conflicting results may indicate a gracile male or a juvenile but due complete long bone epiphysis fusion, the later is not a possibility in this case.

A relative age of the individual was based on attrition scores of the dentition and the morphology of the pubic symphysis. The amount of dental wear associated with the three teeth present was most similar to category E, suggesting the individual was an older adult. The pubic symphysis was most similar to category 3 or 4, also suggesting a mid adult individual.

Health indicators were present on this individual. A moderate amount of calculus was present on the lower second right incisor and a minimal amount of calculus was present on the upper first right incisor. A large caries was present on the occlusal surface of the upper second left molar. Health indicators on the postcrania include arthritic lipping of the cervical and thoracic vertebrae bodies, no lumbar vertebrae were found exhibiting the arthritic lipping but this does not mean it did not exist.

Excavations extended north of Burial 6, revealed Burial 7 (see Figure 3.15). This burial consisted of a juvenile interment placed on Plaza Floor 3, lying supine, in a semi-flexed position, with their head to the south faced east. There were no associated artifacts for this burial (Awe et al. 2005:66-67).
Burial 7 had a MNI of 1 but also included the presence of an extra deciduous upper left first incisor. The individual was almost complete and fairly well preserved. The cranium consisting of frontal, parietal and occipital fragments, right and left zygomatic, both palatines, both petrous portion, the left malleus, the nasal bones, almost complete sphenoid and the incomplete maxilla and mandible. The maxilla included both central and lateral incisors, both canines, left first molar, both second molars, both permanent first molars, and both unerupted permanent second molars. The mandible included both central incisor, the left lateral incisor, both canines, both first and second molars and both permanent first molars. The postcrania consisted of a fragments whole vertebral column, manubrium, a partial left and right scapula, a left patella, the sternal end of a clavicle, a large number of fragmented ribs, and most of the long bones. The long bones included a partial left humerus, most of the right humerus, a partial right radius, a partial left and right ulna, most of the left and right femur, a partial left and right tibia, and a partial left and right fibula, resulting in only the left radius unaccounted for.
It is unclear as to whether the incompleteness of the interment is a result of mortuary treatment or unavailability of skeletal material for analysis.

Sex was unable to be determined due to the individual being a juvenile.

A relative age of the individual was determined based on dental development, suggesting an age around four years old. The extra deciduous incisor was not able to determine an age for that individual.

The extra deciduous incisor exhibited caries on the interproximal surface.

Porotic hyperostosis was the only indicator of health, which was noted on the primary individual. Porotic hyperostosis was present on the cranial bones of the frontal, and included cribra orbitalia (see Figure 3.16). The degree varied from barely discernable to porosity only and the activity consisted of a mixed reaction of healed and active lesions.

Figure 3.16 Ramonal Burial 7 Cribra Orbitalia.
Excavations focused on the summit of Structure B, along the primary axis, revealed Burial 8 located 1.2 meters below the summit platform within the core of the structure (see Figure 3.17). The interment was placed head to the south, in a semi-flexed position. Associated artifacts include two ceramic vessels placed in the right hand as well as some faunal remains. Furthermore, there was evidence of animal gnawing on the right tibia, and the right and left femurs (Awe et al. 2005:68).

Figure 3.17 Ramonal, Plaza C, Eastern Structure, Burial 8 (Awe et al. 2005:67).
Burial 8 consisted of a primary adult individual accompanied by the incomplete remains of a juvenile. The context information was not available for a few bags that were recorded during the excavation process resulting the appearance of missing material from the collection. Unfortunately, this makes deciding if the incomplete interment is a result of mortuary treatment or material unavailability. Therefore, the primary individual consisted of an incomplete crania and postcrania. The cranium consisted of occipital fragments, parietal fragments, right temporal, the right zygomatic, and the dentition, which included all of the mandibular teeth and for the maxillary teeth the right second premolar, left second molar, left third molar, and the right third molar. The long bones present in the burial include the fragmented remains of the right humerus, a partial left and right radius, a partial left ulna, an almost complete right ulna, a partial left and right femur, the partial left and right tibia, and the partial left and right fibulas. The younger individual consisted of an incomplete right temporal, and the dentition, which included a mixture of deciduous and unerupted permanent. In addition a pegged tooth was present that I believed belonged to the juvenile. Long bones present for the juvenile interment include humeral shaft fragments, a partial radial shaft, fibular shaft fragments and femoral head and shaft fragments.

The sex of the adult individual was determined by cranial morphology and discriminant function analysis. A gracile mastoid process was present for this burial but I believe it belongs to the juvenile individual. Discriminant function analysis was performed using multiple measurement functions of the long bones. Seven multiple measurement functions, which met the Eigenvalue acceptable standards for use,
suggested the individual was most likely a male interment with the greatest distance from
the section point being 1.418.

A relative age of the individuals present in the burial was based on attrition scores
of the permanent dentition and dental development of the deciduous dentition. The
permanent dentition exhibited dental wear most similar to category C, indicating the
presence a young adult while dental development suggest the juvenile interment was
around five years of age.

Health indicators were noted on the permanent dentition. Hypoplastic pitting was
present on the occlusal surface of an upper right and left third molar (see Figure 3.18). A
moderate amount of calculus was present on the lower second incisors and a minimal
amount was present on the upper right second incisor, upper right canine, and upper right
first premolar. In addition, one loose pegged tooth was present but was unable to be
identified as to what individual it belonged to and as to which tooth it was. Furthermore,
one lumbar vertebra exhibited an indentation where the right inferior facet should be (see
Figure 3.19).

Figure 3.18 Ramonal Burial 8 Hypoplastic Pitting.
Unfortunately, Burial 9 was not present in the sample analyzed. Therefore, I must rely on the information provided by the field report. Excavations focused on the removal of Burial 6 revealed Burial 9 located beneath Plaza Floor 3. A simple interment, the burial consisted of the poorly preserved and possibly incomplete remains of a cranium and long bone fragments. The burial contained no associated artifacts or architecture (Awe et al. 2005:67).

Excavation focused on Structure C’s Ch’en feature revealed a large oval shaped tomb within the summit of the structure. Burial 10 contained human remains found in small clusters, exhibiting no articulation. Associated artifacts include worked faunal bone and a chert point (Awe et al. 2005:69).

A MNI of two was determined based on differential preservation of bone fragments and the presence of three teeth exhibiting different amounts of wear.

Long bones present for this burial include a partial right humerus, a partial radial proximal epiphysis, a partial left and right ulna, femur mid shaft fragments, a partial left tibia, and a partial left and right fibula.
Unfortunately, sex could not be identified for the burial because of poor preservation.

The relative age of the individuals present was limited to the amount of dental wear exhibited on three teeth. At least one individual was a young adult due to a lower left first premolar and an upper right first incisor, both exhibiting wear similar to category B. At least one individual was an older adult due to a lower left second premolar exhibiting wear similar to category H.

The only indicator of health for this burial was the presence of a right ulna with arthritic lipping of the coronoid process.

**Bajo de Lago**

Excavations conducted on the Eastern tripartite structure of Plaza A, focused on units placed along the west face and within the core of the structure and plaza. Within the central structure, a primary axis trench revealed the crude walls, floor, and capstones of a small crypt placed in sterile soil, measuring only 97cm by 75 cm. Associated artifacts include one obsidian blade and a possible stela, which appeared to have been erected within the architecture and on top of the skeletal remains (Awe et al. 2005:73-75). In addition, animal gnawing was noted on a long bone shaft fragment.

Burial 1 consisted of the poorly preserved, secondary interment, of a young adult. The contents of the burial included a fragmentary and incomplete cranium, 19 permanent teeth and an incomplete postcranium, which consisted fragments of left clavicle, the distal right femur shaft, the proximal right tibia shaft, the left fibula shaft.
Unfortunately, the sex was unable to be determined due to the incomplete and fragmentary state of the remains.

The relative ages of the individual was based on the attrition score of the dentition, which was similar to category B suggesting the individual was a young adult/adolescent.

Health indicators, such as enamel hypoplasias and calculus were recorded for this individual. A lightly expressed linear enamel hypoplasia was present on the upper right central incisor, which indicated a nutritional deficiency around four years of age. In addition, a small amount of cervical calculus was noted on the incisors.

**RUBBER CAMP**

Excavations conducted at the summit of Plaza A’s western most structure revealed Burial 1. Associated artifacts for this burial include a partial vessel and a small amount of jute shell (Awe et al. 2005:82). Burial 1 consisted of a very fragmented, incomplete, and most likely secondary interment of at least one individual who “was placed on a flat slate stone at southern end of tomb” (Awe et al. 2005:82). The burial consisted of a large number of small weathered fragments, belonging to a number of different long bones including a possible femur, tibia, and humerus. Unfortunately, no sex or age was able to be determined due to the present state of the remains.
This study of sites in the Chalillo region of Belize provides examples of mortuary variation in the region. Due to the salvage nature of the project, eastern structures were the focus of the majority of excavations based on their general association with ancestral shrines. As expected, the majority of the eastern structures contained tombs housing skeletal remains. Additionally, other burials were found located in contexts adjacent to eastern structures, such as beneath floors within plazas, and at the site of Rubber Camp where the only skeletal material that was found came from within the western structure. As a result of this sampling procedure, the Chalillo data are somewhat restricted to these particular contexts, which are likely elite, giving a very limited view of the mortuary practices within these communities. However, a study of these data is important since it can reflect upon the nature and meaning of these particular types of interments, as well as the individuals utilizing them. Based on the relatively small study sample, much of these data are simply descriptive, though this study also sought to identify possible correlations between patterns of post-mortem treatment, interment location, and the sex and age of individuals interred within these contexts.

The analysis of mortuary patterns in the Chalillo study sample focused primarily on determining the location and placement of bodies and isolated elements in an attempt to determine mortuary pathways. Despite the very targeted nature of the excavations focusing on a limited range of architectural contexts (i.e., elite plazas) the mortuary features within the Chalillo study sample included a variety of postmortem treatments.
For the purposes of this study, I simplified the range of behavior to several basic categories to which burials could be assigned. These include primary burial, secondary burial, and disturbed primary burial. These basic categories reflect different mortuary processes, some of which were extended and included several stages of manipulation. I also hypothesized that the location of the mortuary contexts would be correlated with the type of interment, and that the most complex behavior would be associated with tombs, which can be reopened and reused. I categorized location by the type of architectural feature in which the mortuary feature was interred (i.e., within a building or beneath a plaza floor) as well as by the grave construction (i.e., tombs, crypts, cists, or simple graves). Furthermore, I considered the overall architectural complexity of each site in an attempt to determine whether larger sites with multiple plazas displayed more complex mortuary behavior than smaller sites with only isolated plazuelas. Osteological analysis focused on creating an inventory of elements, on determining a minimum number of individuals for each context, and on performing basic forensic techniques of the individuals, including the determination of age, sex, and the presence of pathologies. These data were useful in determining a basic “osteobiographical” profile of the individuals participating in the mortuary program.

Within the Chalillo region correlations between location of mortuary context and type of postmortem treatment do appear to exist. First, architecture does appear to have significant correlations with types of postmortem treatment as well as with mortuary behavior complexity. Graves located within structures exhibited all types of postmortem treatment and tended to exhibit more complex mortuary behavior, such as the presence of compound burials. On the other hand, graves located within plaza floors tended to
contain primary burials lacking more complex mortuary behaviors such as secondary or disturbed primary. The exception to his correlation is at the site of Ramonal where Burial 4 produced possible secondary remains of a two year old, though taphonomic processes may in fact be the cause for incompleteness and appearance of disturbance.

Second, the type of grave construction also appears to have correlations with specific types of postmortem treatments. Tombs and crypts appear to have been used for similar purposes exhibiting evidence of reuse over an extended period of time. This is evident by the frequency of compound burial treatments, consisting of all types of postmortem treatments and containing the remains of multiple individuals. Five out of the six tombs identified in the Chalillo region contained multiple individuals of varying age and sexes. The one exception to this correlation is a tomb burial that contained the remains of five adult individuals of both sexes. Cist graves were rare--only one was located. The cist contained the secondary remains of a young juvenile. Across the board, simple graves were found to correlate with plaza floor burials. Most often, these burials contained primary internments. The exception to this correlation, again, is Burial 4 at the site of Ramonal.

An effort to identify correlations between overall architectural complexity and mortuary behavior complexity proved difficult as time constraints limited excavations, rendering comparisons to only be made between large plazuela sites and multiple plaza sites. Large plazuela sites included Garapata, Bejuco and Peligroso. Multiple plaza sites included Ramonal, Bajo de Lago and Rubber Camp. Three interesting patterns were identified. First, both types of architectural complexity exhibit all types of postmortem treatments. Second, both large plazuela and multiple plaza sites exhibit complex grave
construction such as tombs and crypts but also contain one or the other less complex grave construction such as simple graves and cist. Third, while in total, multiple plaza sites produced the most burials containing skeletal remains, large plazuela sites contained grave constructions with greater numbers of individuals represented in them. For instance, Garapata contained a tomb with a MNI of nine individuals, while Ramonal produced ten burials but only had a maximum MNI of five for a single tomb. Both large plazuela and multiple plaza sites demonstrate varying elements of complex mortuary behavior, and unless it is possible to know which aspects of complex mortuary behavior have greater importance and significance within those specific populations, nothing without question can be said about the meaning of overall architectural complexity with mortuary behavior complexity.

Osteological analysis provided no correlations between particular types of location or types of postmortem treatments and specific ages or sexes. However, the lack of any specific correlations may say something in itself. Age seemed to have no bearing on type of mortuary context. All ages were found to exist in all types of locations as well as with all types of postmortem treatment. The only exception is the cist burial where the remains were of a juvenile. However a sample of one does not lend itself to the identification of patterns. Most importantly, though, compound burial context were found to contain individuals of all ages. While frequently difficult to discern, sex also did not appear to have any bearing on type of mortuary context. Males and females were found to occur in all types of locations as well as with all types of postmortem treatments and furthermore, both occur in most mortuary contexts. Once again, it is important to note that within compound burial contexts, both males and females were present. The presence
of particular pathologies also did not appear to have any correlation with the type of mortuary context. Overall, pathologies were minimal and most constituted carious lesions, calculus and occasionally osteoarthritis. In a comparison of afflicting pathologies from one site to another, no one site exhibited a significant amount more than another, or at least not enough to identify any possible patterns existing within the Chalillo region.

Researchers have cited multiple uses for tombs (Chase and Chase 1996; Parker Pearson 1999). The most obvious and frequently recognized use is for the final interment of a deceased individual. However, tombs are also used for the temporary placement of a deceased individual where, after an extended period of time, the tomb is reopened and all or part of the skeletal material is collected for the use in a following ritual. Of course, these two uses are not mutually exclusive. This range of behavior is often documented in bioarchaeological studies of tomb contexts through the analysis and reconstruction of mortuary behavior (Chase 1994; Chase and Chase 1996; Coe 1990; Healy et al. 1998; McAnany et al. 1999). Many tombs exhibit evidence of use and re-use over an extended period of time due to the presence of multiple individuals found in compound burial context, where various types of postmortem treatments were present. Often separated by thin layers of soil/matrix, these multiple individual burials are thought to be familial in nature due to the interments varying in age and sex. One explanation for these mortuary patterns, found throughout the Chalillo region and other sites within the Maya Lowland area, is the ritual of ancestor veneration (Chase 1994, 1997; Chase and Chase 1996; Healey et al. 1998; McAnany et al 1999).

Tomb use for the purpose of temporary housing is frequently found to occur within the Chalillo region. Of the five eastern structure tomb/crypt burials, where skeletal
remains were available for study, five contained multiple individuals. Most of these tomb burials exhibited various postmortem treatments, specifically secondary and/or disturbed primary. Similar mortuary patterns have been noted at the site of Caracol. Chase and Chase (1996:67) determined that in situation where only a single skeletal fragment was found the deceased individual must have been placed within the tomb and later completely removed. Furthermore, Chase and Chase (1996:77) refer to mortuary patterns of multiple individual interments, evidence of re-entry and secondary treatments as an uncommon practice within the Southern lowland area. The Chalillo data shows similar context and supports the statement that the presence of only single fragment found within a tomb suggest the use for temporary housing purposes. Furthermore, the data calls into the question the rarity of these specific mortuary practices within the Southern Lowland area.

Most often, tombs are not used for the purpose of housing a single individual. Rather, individuals are interred or disinterred over an extended period of time. The majority of the tombs from this region appear to have been in a state of constant fluctuation where, the re-entry resulted in the expression of multiple mortuary treatments. While the presence of multiple individuals does not necessarily indicate subsequent burials, interments separated by thin layers of soil or cultural features do. While only noted twice within the Chalillo region, the various mortuary treatments found within all tombs containing multiple individuals, it is likely that they too reflect subsequent burial episodes. Healey et al. (1998:271), has suggested that an increase in sequential multiple burials during the Late Preclassic may reflect an increase in social complexity. Furthermore, he suggested that individuals placed in previously occupied crypts allowed
for the demonstration of individual relations with particular lineages. Similarly, Chase (1994:134) has associated the change in nature of Caracol interments over time to the changing social conditions at the site during the Late Classic. Lastly, McAnany (1998:275) also found an association between a change in mortuary behavior complexity with a change in political complexity. The current collection is not yet dated, however it is likely that the data may reflect similar conclusions.

An alternative interpretation for frequent occurrence of multiple individual burials was taken by Schwake (2008), who examined a number of sites located along the river ways of the SE Peten down through the Belize Valley. In this regional examination of the frequency of multiple individual burials in relation to total population, Schwake (2008:10) concluded that a system of political integration existed due to the sites sharing similar environments, settlement patterns, political organization and mortuary practices. Perhaps, a similar situation existed among the many sites and isolated structures, which were found within the Chalillo region.

The Chalillo data supports other researchers findings (Adams and Robichaux 1992; Hammond et al. 1975) that familial relations may have existed within the tombs due to the varying ages and sex of the interred individuals. Just as McAnany et al. (1999:141-144) demonstrates, secondary interments or deposition of gathered ancestral remains serve as a way of negotiating power relations. Her findings suggest, that both ritual elaboration and differentiation in burial treatment as well as individuals of varying age, support the argument for familial relations. While from a demographic perspective, the total number of interments within a tomb are insufficient to account for the whole
family/population, it is possibly to speculate that one burial occurred per generation, as is seen at Tetimpa and Teotihuacán (Uruñuela and Plunket 2007:39).

Previously, specific dental traits, such as number of cusps and patterns have been identified as ideal for genetic analyses and thus, can be used to determine familial relations (Saul and Saul 1989). While this study does not focus on dental traits, particular inlay pattern (jade incisors and pyrite canines) seen on at least one individual within the Chalillo region is similar to patterns frequently seen at Caracol. Chase (1997:26) found that these patterns might represent the site’s prosperity or an intentional establishment of a distinct Caracol identity. The occurrence of such patterns within the Chalillo region might either suggest an extension of the Caracol identity or perhaps a regional identity of the Maya Lowlands; both possibly indicating sociopolitical and economic ties.

While mortuary practices suggestive of ancestor veneration have been documented throughout the Maya Lowland region, the acceptance these mortuary patterns representing a common ritual associated with ancestor veneration is still being introduced (Chase and Chase 1996; Chase 1994, 1997; Healey et al. 1998; McAnany 1995, 1998; McAnany et al. 1999). Considering the frequency of which these mortuary practices have been identified within the Chalillo region, it may be possible to assume that these patterns are more common in the Maya lowland area than originally thought. The data collected from the Chalillo region supports what recent researchers have stated and contributes to the overall understanding of mortuary practices relating to ancestor veneration. However, future research, with an attention paid to such practices, is still needed as the concept is still fairly new within the Maya archaeological literature.
Salvage excavations from the now inundated Chalillo region, located in the Upper Macal River Valley, identified 334 structures ranging in size including isolated structures, small plazuelas, large plazuelas and multiple plazas. However, time and budget constraints limited excavation to nine sites. These nine consisted of a variety of small plazuela, large plazuela, and multiple plaza sites and were chosen for likelihood to provide valuable archaeological information. Specifically, though, the project targeted eastern structures for their association with ancestral shrines and sealed context such as tombs and crypts. Skeletal material was recovered from six of the nine sites within the region. Analysis of the skeletal material was bioarchaeologically oriented, focusing primarily on 1) the mortuary context and 2) the osteology. Mortuary context data gathered included the location, such as architecture, grave construction as well as type of postmortem treatment. Osteological data gathered included the creation of a skeletal inventory, determination of minimum number of individuals, and performing basic forensic analysis. These bioarchaeological methods were expected to hopefully identify any patterns that may exist.

A number of specific mortuary patterns were identified and have been previously noted elsewhere within the Maya Lowland region, specifically at the sites of Caracol, Caledonia and K’axob. Tombs appear to have been used and reused over an extended period of time due to the presence of multiple individuals found in compound burial context, where many of the postmortem treatments are in themselves one of several
stages of manipulation within protracted mortuary rituals. These mortuary patterns seen both within the Chalillo region as well as within the greater Maya Lowland region have been associated with the ritual of ancestor veneration.
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VITA

EDUCATION

2006-2010  Masters Degree in Anthropology
Focus was on Bioarchaeology with an emphasis on skeletal analysis
University of Mississippi Oxford, Mississippi

2004-2005  Bachelors Degree in Anthropology
Minor in Criminal Justice
Texas State University San Marcos, Texas

2001-2004  Associates Degree in Anthropology
Austin Community College, Austin, Texas

CERTIFICATIONS  NEPA

EMPLOYMENT

2009-Present  Physical Anthropologist and Field Technician for Brockington and
Associates

Fall 2006-Spring 2008  Graduate Assistant for the University of Mississippi

Summer 2007  Belize Valley Archaeological Reconnaissance Project- Staff
Caves Branch, Belize
Lab Assistant: Helped maintain an orderly lab, helped and provided
guidance to field school students in lab related duties including
washing, identification and preparation of cultural remains for cataloging

Summer 2006  Belize Valley Archaeological Reconnaissance Project- Junior Staff
Caves Branch, Belize
Assisted in excavations, provided guidance to field school students and
helped with lab related duties

2001-2005  Administrative Assistant, Your Office USA
Worked with various computer applications. Answered a multi-line
phone system. Performed accounting and other office-related duties.

FIELD EXPERIENCE

Fall 2009  Union Bethel AME Cemetery relocation of 300+ individuals in Atlanta,
GA. Served as Physical Anthropologist. Duties included
evacuation as well as assessment of skeletal remains for age,
sex and gross pathologies

Summer 2009  Reid St. Cemetery relocation of 400+ individuals in Charleston SC.
Served as Physical Anthropologist. Duties included excavation as well
as assessment of skeletal remains for age, sex and gross pathologies

Spring 2008  Geophysical survey of the Jacob Thompson House in Oxford,
Mississippi in search of the original 19th century home. Data was
collected using Total Station, Magnetometry, Resistivity and GPR.
Spring 2008  Excavation of intact Mississippian structure at the Leflore site Leflore, Mississippi

2007-2008  Geophysical survey and excavation of test units at the Cedarscape Tract in Tupelo, Mississippi as an employee of The Center for Archaeological Research

November 2007  Surface collection at the Rochdale site in Rochdale, Mississippi

Fall '07- Spr. '08  Survey, surface collection, excavation of test units and pit features at Carson Mound Group Stovall, Mississippi

Summer 2007  Thesis skeletal analysis

October 2006  Phase 1 archaeological survey of the Columbus Industrial Park in Columbus, Mississippi as an employee of The Center for Archaeological Research

Summer 2006  Excavation of a rockshelter cemetery at Caves Branch Rockshelter in Caves Branch, Belize. Duties performed included preparation of test units, as well as the identification, removal, and washing of skeletal remains.

Summer 2005  Texas State Archaeology Field School
Assisted Professor Gabriel Wrobel in skeletal analysis in San Ignacio, Belize. Jobs performed included washing, identification of skeletal material and helped maintain lab by providing guidance to other field school students in how to handle skeletal remains.

Summer 2004  Texas State Archaeology Field School
Assisted in the excavation of a plaza down to bedrock at the Cahal Pech site in San Ignacio, Belize. Excavations included the removal of a number of ceramic vessels as well as other various cultural material including jade, obsidian, chert and shell. Assisted with lab related duties including washing and preparation for cataloging

Fall 2003  Boggy Creek Farm
Assisted in the excavation of a Historic period homestead at the Boggy Creek Farm site in Austin, Texas

PUBLICATIONS AND PRESENTATIONS

March 2008  SAA conference in Vancouver, BC
Poster session Analysis of Skeletal Remains from the Chalillo Dam Salvage Excavations of the Upper Macal River Valley, Belize