7 DIET, HEALTH, AND DEATH AT PUSILHÁ, BELIZE

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We examine Late and Terminal Classic human remains from Pusilhá, Toledo District, Belize, and consider patterns of burial, health, diet, and cultural modification. Our paleopathological analyses reveal that elites were healthier than commoners and consumed relatively greater quantities of maize. In certain cases, our analyses allow us to differentiate between human sacrifice and ancestor veneration. Finally, strontium isotope analysis suggests that individuals at Pusilhá may have come from as many as three distinct regions.

Introduction

Classic Maya elites employed an array of strategies to legitimize their social positions, political rights, and economic privileges. Ancient mortuary contexts often reflect these strategies. Elite Maya mortuary practices included the interment of valuable grave furnishings, the construction of labor-intensive burial chambers in important locations, and the inclusion of additional human remains—called funerary companions—as potent symbols of authority (Marcus 1992:262).

The capture and sacrifice of enemy warriors was especially important in building elite prestige and authority (Schele and Miller 1986:220; Tiesler and Cucina 2007). Some Maya burial companions were warriors slain in battle or kept for sacrifice. Other burial companions could have been foreign or local slaves. Early colonial records indicate that most victims of sacrificial rituals were members of the peripheral subgroups of society (de Landa 1978:48). Sacrificial victims included not only foreign captives taken in war, but also local slaves, orphans, and delinquents. But not all companion burials imply captive taking or human sacrifice. Maya elites curated and used the remains of venerated ancestors to ensure claims to heritable resources (Marcus 1992:262; McAnany 1995). The inclusion of the bones or teeth of revered ancestors in funerary rituals symbolized descent and rightful succession. Thus, the dead endorsed the authority of the living. Finally, sequential interments in the same spot could be family burials, or indicate membership in other types of identity groups linked to specific places or property.

Unfortunately, distinguishing among different kinds of multiple-individual funerary practices can be difficult because of the generally poor preservation of human remains in the Maya area, which often obscures signs of violent death and dismemberment (Tiesler and Cucina 2007). Frequently, the lack of clear anthropogenic cut marks on bone forces researchers to rely on demographic and contextual evidence to identify sacrificial victims in the archaeological record (Fowler 1984; McAnany et al. 1999; Tiesler 2007; Welsh 1988).

Our presentation considers the problem of interpreting companion burials. We investigate Late and Terminal Classic diet, health, and funerary practices at Pusilhá, Toledo District, Belize. Key to our argument is the assumption that in multiple burials containing the remains of revered ancestors or other family members, both principal figures and companion individuals shared a common identity and lifestyle. In these cases, we expect roughly similar measurements of health, similar diet, and similar patterns of cultural modification of the body. We also expect that isotope analyses should most often indicate the same place of origin, although migration is possible. In contrast, in cases where either peripheral members of society or foreigners were interred as funerary companions, we might encounter evidence of different dietary patterns, health indices, and cultural modification practices. Interred foreign captives additionally would be expected to show distinct isotopic patterns.

Our paleopathological analyses of human remains from Pusilhá reveal that principal individuals were generally healthier than their funerary companions and consumed relatively greater quantities of maize. In the case of one companion burial, divergent patterns in the biological markers of principal and

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companion diet and health allow us to differentiate between human sacrifice and ancestor veneration. Contextual analysis of another multiple burial is most consistent with a pattern of repeated interment of members of the same family. Finally, Strontium isotope analysis suggests that individuals at Pusilhá could have come from three or more distinct locations. Although foreign burial companions are often interpreted as victims of capture, we argue that our single foreign burial companion probably was a revered ancestor.

Pusilhá and its Mortuary Assemblage

Located in the modern village of San Benito Poité, Pusilhá is situated approximately one kilometer east of the border between Guatemala and Belize. During the Late and Terminal Classic periods (A.D. 600-850), Pusilhá was the largest Maya city in the region. Settlement studies allow us to estimate that the population was about 6,600 people (Volta 2007). The ancient community was approximately 6 km2 in extent and was organized around a central axis of major architectural groups extending northwest to southeast from the Stela Plaza to the Gateway Hill Acropolis. The latter was the dynastic palace and administrative complex of the city.

The excavated Pusilhá mortuary population is a small and nonrandom sample drawn from 17 funerary contexts containing the remains of 22 individuals. We were able to assess age-at-death for twenty of these individuals. These ages ranged from young childhood to old age. We could determine the sex of just ten individuals; three are female and seven are male.

The majority of the burials excavated at Pusilhá were located in the Gateway Hill Acropolis and Lower Group I, a moderately sized plazuela group inhabited by non-royal elites (Figure 1). Our most spectacular burial is that thought to be of Ruler G, the last important ajaw of Pusilhá. This is the only case in Belize to date in which the remains of a historically known ruler have been identified (Braswell et al. 2005).

Companion Burials at Pusilhá

The three companion burials from Pusilhá that we discuss were associated with two platforms, Structure 3 and Structure 8, positioned in the southeastern end of the Gateway Hill Acropolis. In all three cases, "principal figures" are those individuals placed in an extended position with capstones over their heads. Principal figures also have associated grave goods, and are oriented with their heads to the north. In contrast, "companions" are either incomplete sets of remains or complete bodies placed in flexed positions at the head or feet of the principal figures.

Burial 3/1 was located at the top of Structure 3, behind a cut stone feature running along the center of the platform mound. This feature defined an area specifically devoted to ritual interments. Behind this cut stone line and flanking the central burial were two more interments that seem to be contemporary with Burial 3/1. These are called Burial 3/1A and 3/1B. Burial 3/2 was located near the central axis of the same structure and at the base of its stair. Burial 8/3 was a simple crypt sealed with three capstones. It was discovered cut into the plaza floor in front of the staircase along the western side of Structure 8. After discussing each of these burials, we will turn to biological and cultural markers of lifestyles as manifested by the individuals in them.

Burial 3/1. Burial 3/1 consists of the articulated remains of a principal individual as well as the partial, secondary dental remains of two more companion individuals. The principal individual was a male who died as a young adult. Notable skeletal features include dental filing as well as periosteal bone formation on the right femur, indicating a healed fracture. The Burial 3/1 companion individuals are represented by two distinct sets of dentition, found in two distinct locations within the burial. Dental attrition reveals that these individuals survived until at least early adulthood. The first set of dental remains, called Companion #1, was found within a flaring-walled redware vessel located near the pelvis of the primary individual. Companion #2 consists of a set of loose teeth, some of which contain pyrite inlays, placed near the head of the principal individual. Burials 3/1A and 3/1B, located north and south of this central burial, each contained a single individual. The individual in Burial 3/1A was.

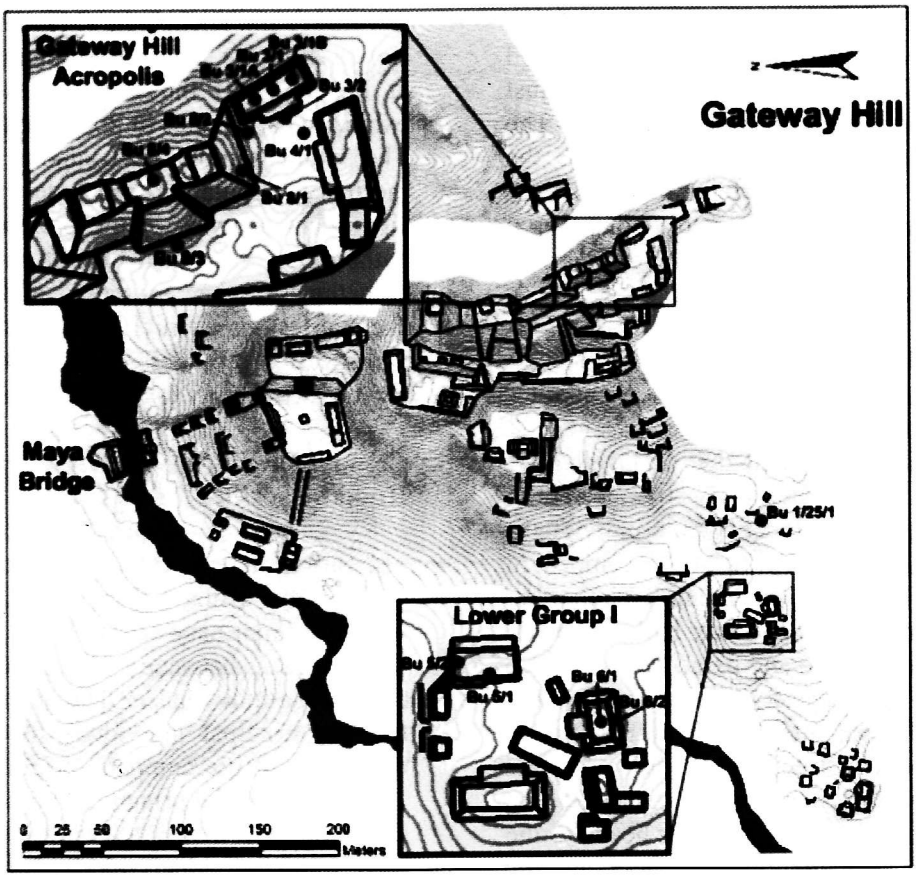

Figure 1. The locations of burials on Gateway Hill (after Braswell 2007:Figure 6).

male, and that in Burial 3/1B was probably female. Ceramics in all three burials seem to belong to a single set of vessels dating to the Late Classic period. We do not know if Burials 3/1, 3/1A, and 3/1B are contemporary, but if our interpretation that the vessels from all three form a single set, they are probably close in date.

Burial 3/2. Burial 3/2, at the foot of the stair of the same platform, is a Terminal Classic crypt that contained remains of two male individuals who survived until late adulthood. The principal individual was arranged in an extended, supine position and oriented north-south with his head to the north. The companion was placed in a flexed position at the feet of the principal individual. The principal individual exhibits no skeletal pathologies, but does display biocultural modifications including jade dental inlays, dental filing, and annular oblique cranial modification. The presence of this form of cranial modification is a unique occurrence in this mortuary population and may indicate the individual's membership in a particular status or identity group. Unlike the principal individual in Burial 3/2, the companion exhibits much skeletal pathology concentrated in his lower appendages. Additionally, the presence of linear enamel hypoplasia indicates that the companion suffered an episode of systemic stress during his childhood.

Burial 8/3. Within Burial 8/3 were the remains of three individuals who died during the Terminal Classic period. In contrast to Burials 3/1 and 3/2, which appear to have included multiple individuals interred in one depositional episode, it is apparent that this multiple burial involved three distinct depositional events. The remains of Individual #3, a small child of at least five years of age, were found disarticulated throughout the crypt. These remains were scattered, indicating that they were disturbed by the subsequent interment of Individual #1, a male who survived until middle adulthood. Because of his location and burial position, we

classify Individual #1 as the principal individual in the crypt. The last to be buried was Individual #2, a female who survived into late adulthood and who was discovered in a flexed position just north of the cranium of Individual #1. The repeated opening of the crypt, as well as the ages, sexes, and comparable health of the individuals found in it, suggest to us that Burial 8/3 probably represents the interment of a nuclear family.

Elite Diet and Health at Pusilhá

Although our presentation concentrates on these three companion burials, general patterns of elite health and diet at Pusilhá are also apparent from the study of the entire mortuary sample. We identify elite individuals, including principal figures from the companion burials, by: (1) their placement in important buildings in or near the Gateway Hill Acropolis, the royal administrative and palace complex; (2) the inclusion of grave furnishings with these individuals; (3) their interment in formal graves within masonry structures; and (4) the ceremonial arrangement of the bodies in extended supine position with their heads to the north. These elite individuals—including the principals from the three companion burials—exhibit an average caries rate of 28.6%, which is higher than the entire mortuary population average of 22.0% (Table 1). This evidence suggests that the diet of elite individuals at Pusilhá was marked by greater access to cariogenic foodstuffs than the diet of non-elites who constitute the rest of our sample. A clear example of this pattern can be seen in the teeth of Ruler G – a confirmed ajaw of Pusilhá – who exhibits considerable caries at 26.9%.

For the ancient Maya, caries rates are highly correlated with maize consumption (White 1994:281). The dental analyses at Pusilhá therefore suggest a high consumption of maize by elite individuals. High-status individuals in Maya society typically had greater access to more nourishing foods, as well as socially and ideologically valued foods such as maize (Gerry 1997; Reed 1999; White et al. 1993; 2001; Whittington 1999). The elevated consumption of maize by high-status individuals at Pusilhá may be due to feasting activities limited to the elite classes of society. Dental analyses conducted at Lamanai (White 1994:291) and Kichpanha (Magennis 1999:142), Belize show the same sort of pattern as observed at Pusilhá. At those two sites, elite groups exhibited caries rates of 20.1% and 28.5%.

The small sample size of the total Pusilhá mortuary population precludes a statistically significant analysis of the presence of skeletal pathologies and biocultural practices. Nonetheless, the presence and absence of skeletal lesions, cranial modification, and dental modification provides supplemental evidence of a generally healthy elite population.

Companion Burial and Indirect Evidence of Human Sacrifice

These status-based patterns of diet and general health are reflected in the companion burials at Pusilhá. First, dental pathologies within the mortuary assemblage indicate dietary differences between the principal and companion individuals. The average caries rate for the principal individuals is approximately twice that of the companion individuals (Table 1). Moreover, the principal individuals exhibit a slightly lower average calculus score than the companion individuals, although it is higher than the average for the entire adult population. Overall, the diet of the principal individuals consisted of a greater proportion of cariogenic foods than the diet of the companion individuals. From these results, it can be concluded that, when considered as two homogeneous groups, the principal individuals interred in the companion burials at Pusilhá enjoyed higher status than their companions.

Despite these general findings, when the companions are each considered separately, clearly defined differences in dental health between the principal and companion individuals are less visible (Table 2). For instance, the companion individual of Burial 3/2 appears to be an outlier due to his caries rate of 0.0% and high calculus score of 1.67, however, these scores may be skewed due to the fact that only six teeth were recovered, all of which have a single root. Therefore, the apparent absence of caries in this individual may be due to his lack of molars, which are more likely to develop caries than canines and incisors. An explanation for the high calculus score for this individual

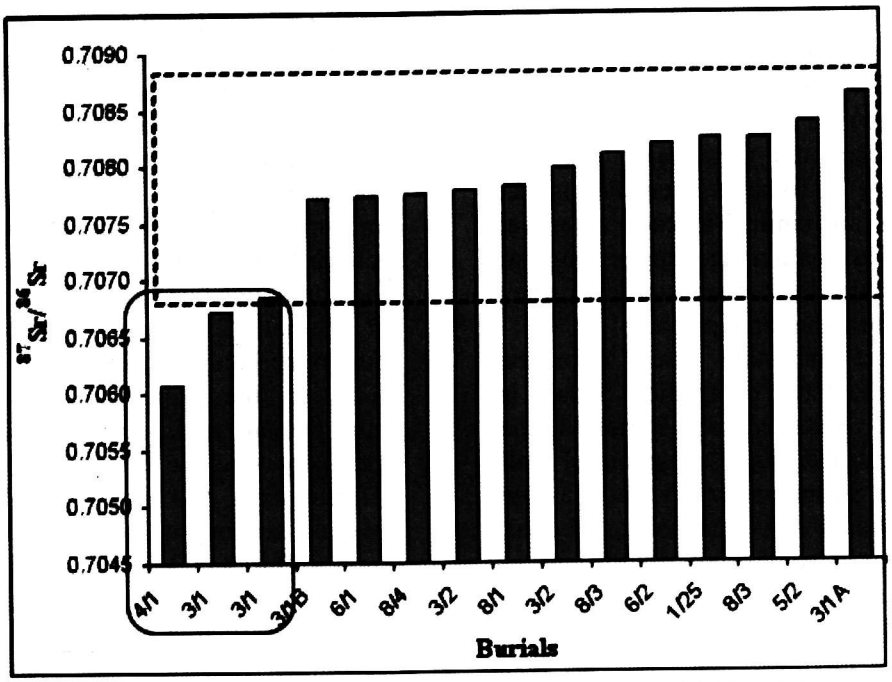

Figure 2. Strontium isotope ratios by individual indicate that the individual from Burial 4/1 and the two principal individuals from Burial 3/1 may not be local to Pusilhá (modified from Somerville 2009:Figure 3). Dashed box represents two sigma baseline range for Pusilhá once the $^{87}Sr/^{86}Sr$ value of Burial is 4/1 excluded.

caries than canines and incisors. An explanation for the high calculus score for this individual may be due to the advanced age of the individual because calculus continues to accumulate over a lifetime. Additionally, the dental health of Companion #1 of Burial 3/1 is consistent with that of the principal individuals, but the teeth from Companion #2 exhibit a caries rate similar to low-status individuals.

The lack of skeletal remains for the companion individuals interred in Burial 3/1 prevents an assessment of pathological differences for this burial, but clear differences are apparent in Burial 3/2. In that double burial, the principal individual enjoyed better health than the companion who suffered from growth disruptions, as indicated by linear enamel hypoplasia, as well as periostitis on the majority of his lower longbones.

Defining Foreign and Local: Strontium Isotope Analysis

Osteological methods alone do not allow us to test the hypothesis that some of the companions were foreign to Pusilhá. But Strontium isotope assay, conducted by Andrew Somerville of the Department of Anthropology at the University of California, San Diego, allows us to begin to identify foreigners in the population. Somerville's results are presented here only in summary form.

Strontium isotope ratios, as well as the total concentrations of several other elements, were determined for 15 individuals from Pusilhá. Unfortunately, teeth from Companion #2 of Burial 3/1 were not available for study, and a sample from Burial 5/1 (a child with the jade inlays) appeared to be slightly contaminated so is excluded from discussion. Results fall into at least three clusters (Figure 2). The single most obvious far outlier is Burial 4/1. This consisted of the partial remains of a woman found resting on top of the Terminal Classic plaza floor of the Gateway Hill Acropolis. Given that the site was most likely already abandoned when her remains were left on the plaza floor, it is not surprising that she was of non-local origin. We cannot date her death, but the fact that a flat stone was placed on her cranium suggests continuation of mortuary

patterns common in both the Late and Terminal Classic.

The other individuals had Strontium isotopic ratios [87Sr/86Sr] averaging 0.7079 ± 0.0005 (n=14, 1σ). Two other outliers are the principal individual and Companion #1 from Burial 3/1 (Figure 2). What is interesting is that these two ratios are similar to each other yet differ from the Pusilhá average, suggesting that although they could have been non-local, they probably came from the same place.

The most important result from the perspective of the three companion burials is that in Burial 8/3, Burial 3/1, and Burial 3/2, the individuals identified as "companions" all shared the same Strontium isotope ratio as the principal individual in the same burial, regardless of their place of origin. In the case of Burial 8/3 and Burial 3/2, the individuals are all local, and hence, it does not appear that the companions were foreign prisoners. In the case of Burial 3/1, the principal figure shows a non-local pattern, but the companion shares that same non-local signal. Given that the principal individual in Burial 3/1, although a foreigner was given preferential burial treatment, it seems most likely to us that the companion teeth (from the same place of origin) represents not a captured enemy, but a relative.

Conclusions

Companion burials are the material reflections of important funerary rituals that served specific social and political functions in society at large. At the beginning of this report, we proposed that the relationship between principal individuals and their funerary companions could be understood in terms of companion sacrifice, ancestor veneration, or family burial practices. Following the assumption that each of these practices is linked to specific lifestyle patterns, we argue that differences with respect to diet, general health, and cultural modification practices between the principal and companion individuals should indicate the practice of companion sacrifice. Specifically, study of the entire mortuary sample from Pusilhá reveals that elites in single burials and the principal figures in the three companion burials had higher rates of caries than did the rest of the population, consistent with preferential access to maize. These elites also enjoyed greater health, as measured by skeletal pathologies, than did the community as a whole. Together, paleopathological and Strontium isotope analyses reveal that the three companion burials discussed here display three distinct behavioral patterns. Our analysis of the three companion burials reveals only one case where such differences in diet, general health, and biocultural practices can be observed: Burial 3/2. Burial 3/2 contained two local individuals with remarkably different health indicators. Moreover, the principal individual displayed both cranial and dental modification. We tentatively conclude that the companion was of a different class and was probably a sacrificed slave or servant of local (or at least nearby) origin. Burial 8/3 appears to be a reopened family crypt containing a nuclear family. The two adults in that crypt were of local origin and had similar diets and health indices, and, we therefore assume, were both members of the elite class. Finally, Burial 3/1 contained the partial or complete remains of three individuals. Only two sets of remains were subject to Strontium isotope analysis, but both appear to be of non-local origin and from the same place. Since one of the foreigners is a principal figure and the other a companion, it seems likely that the companion represents a revered ancestor brought to be buried at Pusilhá with his or her descendent. Strontium isotope analyses are not on there own enough to identify a single place of origin, but the values exhibited by these two individuals are consistent with the geologies of Quiriguá, Copán, and - without a doubt - many poorly-known, small sites within a 100 km radius of Pusilhá.

Archaeologists, epigraphers, and biological anthropologists will no doubt continue to discuss the importance of group identity, human sacrifice, and ancestor worship to the ancient Maya. At Pusilhá, it now seems likely that all three influenced group mortuary behavior during the Late Classic and Terminal Classic periods.

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