شاخص‌های سلامتی و جایگاه اجتماعی تدفین‌های انسانی دوره مفرغ، سلوکی و اشکانی در تپه حسنلو

سارا خلیفه سلطانی

چکیده

محوطه باستانی تپه حسنلو، واقع در آذربایجان غربی تحت نظر رابرت دایسون بین سال‌های ۱۳۳۵ تا ۱۳۵۶ کاوش شد که در نتیجه آن بیش از ۴۰۰ اسکلت در گورستان پشته جانبی یافت شد. از این تعداد تنها ۹۷ اسکلت برای مطالعات استخوان‌شناسی حفظ و در انبار موزه دانشگاه پنسیلوانیا نگهداری شد. در مطالعه حاضر ۱۱۳ تدفین بررسی شد که تعداد ۸۸ اسکلت مربوط به پشته جانبی و تعداد ۲۵ اسکلت مربوط پشته مرکزی هستند. در حال حاضر اسکلت‌های انسانی و سایر بقایای به‌دست‌آمده از این کاوش‌ها در موزه پنسیلوانیا و موزه ملی ایران نگهداری می‌شود. این مطالعه با تمرکز بر تدفین‌های به‌دست‌آمده از تپه حسنلو، قصد دارد از طریق روش‌های زیست‌باستان‌شناسی، استخوان‌شناسی و باستان‌شناسی اطلاعاتی درباره شیوه‌های تدفین، سلامت جمعیت، و اقتصاد احتمالی شهر باستانی مذکور کسب کند.

نتایج این پژوهش در قالب پایان‌نامه کارشناسی ارشد نگارنده در سال ۱۳۹۹ میلادی در چارچوب برنامه انسان‌شناسی پزشکی قانونی دانشگاه بوستون ارائه شد. این مقاله خلاصه‌ای از پژوهش و نتایج پایان‌نامه نگارنده است. فرض بر این بود که بین شرایط آسیب‌شناختی، جنسیت، و وضعیت اقتصادی/اجتماعی تدفین‌های دوره مفرغ و دوره‌های سلوکی-اشکانی در حسنلو همسانی وجود دارد. این فرضیه از طریق بررسی بقایای اسکلت انسانی و تجزیه و تحلیل گزارش‌های باستان‌شناسی مورد آزمایش قرار گرفت و مشخص شد که شرایط آسیب‌شناختی فردی با تدفین‌هایی که در سطوح مختلف اقتصادی-سطح ۰، ۱ و -۲ طبقه‌بندی شده‌اند، مرتبط است. تدفین‌های طبقه‌بندی شده در سطوح ۱ و ۲ دارای نرخ‌های بسیار متفاوتی از شرایط آسیب‌شناختی فردی هستند، با این حال، گروه سطح ۰ متغیرتر است.

واژگان کلیدی: تپه حسنلو، دوره مفرغ، دوره سلوکی - اشکانی، تدفین، اسکلت انسانی.

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Antemortem Health Indicators and Burial Status of the Bronze, and Seleuco-Parthian Period Burials,Tepe Hasanlu

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Abstract

From 1956 through 1977, Archaeologist Robert H. Dyson, Jr., directed the excavations of the archaeological site of Tepe Hasanlu, located in the West Azerbaijan region of Iran. There were over 400 skeletons discovered in Hasanlu's Lower Mound cemetery, though only 97 were retained for museum storage. Totaling 113 burials for this study, 88-individuals were excavated from the Low Mound, and 25 individuals originate from the High Mound.

The artifacts and skeletons obtained from these early excavations are currently divided between The Pennsylvania Museum and the Iran National Museum in Tehran. Targetting burials from the High and low Mound, the skeletons and their burial sphere were examined through bioarchaeological, osteological, and archaeological methodologies in an attempt to reveal the burial practices, population health, and possible economies of Hasanlu.

This research was presented in 2020 to Boston University's Forensic Anthropology Program in fulfillment of the requirements for the degree of Master of Science. This text is a summarized form of the research and results of this thesis. It was hypothesized that there is a correlation between pathological conditions, biological sex, and the perceived economic/social status of the Bronze through Seleuco-Parthian burials at Hasanlu. This hypothesis was tested through skeletal and analysis of archaeological reports, and it was found that individual pathological conditions correlate with burials classified under different perceived economic varieties (Level 0, 1, and 2). Burials classified under Levels 1 and 2 have drastically different rates of individual pathological conditions, however, the Level 0 group is more variable.

Keywords: Tepe Hasanlu, Bronze, Seleuco-Parthian Period, Burial, Human skeleton.

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Introduction

Located in Iran's Gadar river valley (Fig. 1.1), Tepe Hasanlu has been extensively excavated on its High Mound, with several periods of habitation ranging from the Bronze age to the 3rd century AD (Danti 2013). Prior to excavation, the site had sporadic habitation and looting over thousands of years on both the High and Low Mounds. Good archaeological preservation allowed for extensive and detailed excavations of some skeletal material.

The location of Hasanlu with its relation to Lake Urmia and the local mountain passes allowed the region to be a gateway for connecting the southern Caucasus, Mesopotamia, eastern Anatolia, and the Iranian Plateau (Danti 2013:7). Historical sources on the Iron II emphasize Hasanlu's importance in its regional relationships within the ancient world (Danti 2013: 7).

Chronology of the Hasanlu site contains some issues, which can be attributed to the focus of the excavations in the 1960's-1970, and was centered upon the recovery of sufficiently preserved Low Mound burials and the IVb destruction layer. The most famous layer is period IVb, or the destruction layer, was followed by the site's abandonment, sporadic burials, and habitation of periods III and II. After the IVb destruction of the city, the mound would see relatively short periods of habitation for the remaining of its archaeological record, giving way to different periods and cultures such as the Urartian's (IIIa-b), Achmenid empire (IIIc), the Seleuco-Parthians (II), and the Ilkhanid (I). However, the graves located on the Low Mound (VII, V, and IV) and the later High Mound periods (III and II) were of interest in this study, and are significant to Hasanlu's history.

Hasanlu's High Mound (Fig. 1.2) is a 200-meter diameter surface, 25 meters high. The Low Mound is 600-meters surrounding the High Mound, and contains the most burials (from the early periods X-IV) (Danti 2013:11). Habitation in later periods exclusively occurs in the High Mound, along with their period III and II burials (periods III-II), according to archaeological analysis of the burials (Pennsylvania Museum Excavation Notebooks). Tepe Hasanlu is rendered as one of the most extensively excavated Iranian archaeological sites (Danti 2013: 8-10; Muscarella 1971, Muscarella 2000), with excavations targeted in the Low

Fig. 1.1. The geologic location of Hasanlu (Danti 2011:12).

Mound and High Mounds (or citadel area). The periods (Table 1.1) of interest range from the early (Hasanlu period VII) 3rd millennium B.C. (3,000 B.C.) to ~275 B.C. (Hasanlu period II).

One hundred and eight individuals from UPM (University of Pennsylvania Museum) were retrieved for examinations, while five burials retrieved from the INM were combined to complete this study. Approximately 36 individuals were examined at the Iranian National Museum, however, it was later determined from excavation notebooks provided by the Pennsylvania museum that only five of those individuals were burials, and the remaining were derived from the Period IV destruction layer. Nevertheless, it was an important goal of this research to include the Iranian Museum Hasanlu collections, as they remained largely unstudied and under-published. The findings on the remaining 31 skeletal remains from the destruction layer from the Iranian National Museum are to be released in a later publication.

Methods

Accepted osteological methods for determining biological profile were applied (Brooks and Suchey 1990, Buckberry and Chamberlain 2002, Buikstra and Ubelaker 1994, İşcan et al. 1984, 1985, Klales et al. 2012, Lovejoy 1985a 1985b, Mincer et al. 1993, O'Connell 2004, Scheuer et al. 2009, Snodgrass 2004, Ubelaker 1999, and White 2012). Extensive bio-archaeological and archaeological analyses structured the classifications of observed burial and biological characteristics among the Tepe Hasanlu burials, such as the formation of burial classes (ranked 0-2) and classifications of burial position, burial side, form of graves, grave types (internments), location of goods, burial period, burial location, biological age, biological sex, and notable pathological changes to the skeleton (Aufderheide et al. 1998, Brickley and Ives 2008, Hengen 1971, Kennedy 1998, Krenz-Niedbala 2009, Lallo et al. 1977, Pathria et al. 2016, Rivera and Lahr 2016, Stuart-Mac-

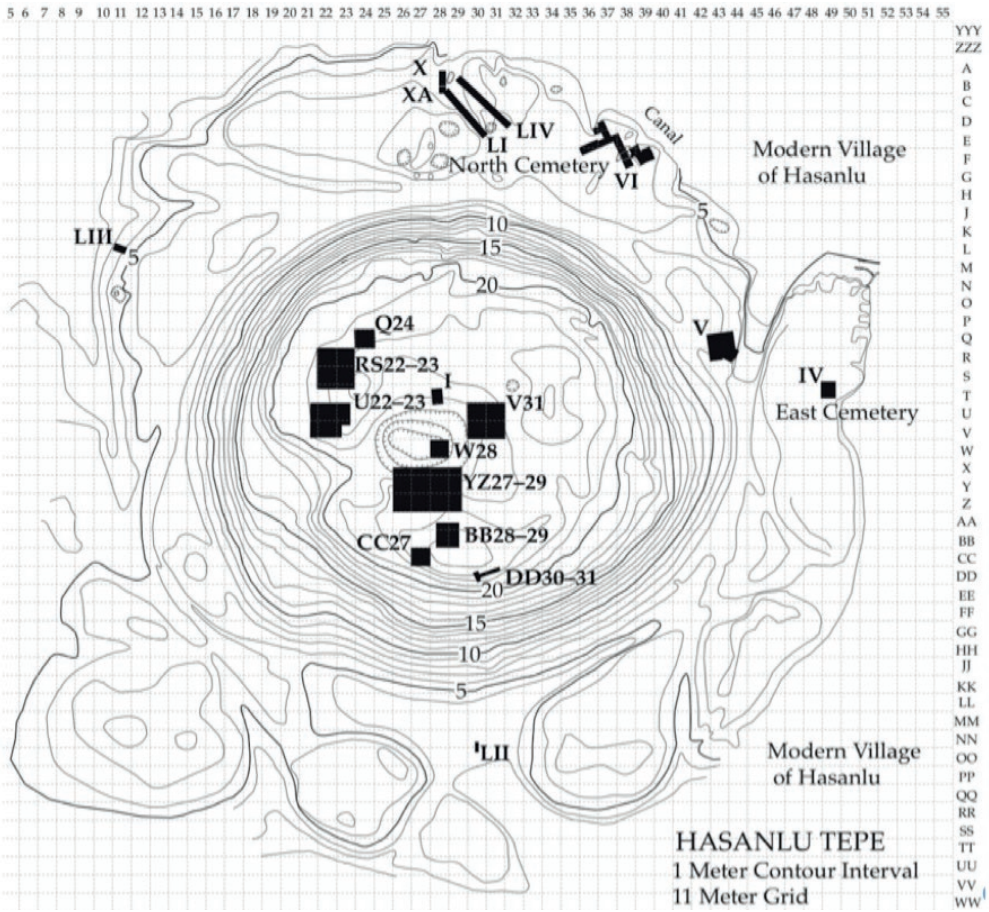

Fig. 1.2. Excavation areas of Hasanlu (Danti 2013:18).

Period	Cultural Period	Dates
VII	Early Brronze I (VIIc) Early Bronze II (VIIb) Early Bronze III (VIIa)	3000-2500 BC
VI	Middle Bronze I (VIc) Middle Bronze II (VIb) Middle Bronze III (VIa)	2100-1450 BC
V	Late Bronze	1450-1250 BC
IVc	Iron I	1250-1050 BC
IVb	Iron II	1050-800 BC
IVa	Iron III	800-700 BC
III	Urartian Fortress (IIIc) Iron III (IIIb) Achaemenid (IIIa)	750-300BC
II	Seleuco-Partian	300-275 BC
I	Ilkhanid	13th and 14th cent. AD

Table 1.1. Hasanlu Periods simplified (Danti 2011, Selinsky 2009).

adam 1989, Toebbe 2005). All categories (Table 1.2) were compared, and their patterns, and lack thereof, were noted. Many factors are not directly related to the research's hypothesis, and serve as a form of comparative analysis for future reference and research.

There were three main hypotheses posed for this research. First, that there is a correlation between the frequency of pathological conditions and the perceived socioeconomic status of the buried individuals (Binford 1971, Brown 1971, Brown 1981, Cannon 1989, Hodder 1982, Pader 1982, Robb et al. 2001, Shay 1985), where wealthier individuals will reflect less antemortem degeneration than the individuals with poorer burial goods. Second, that individuals with greater social importance were buried with a higher quality and quantity of goods (Saxe 1970). Third, that it is possible to determine the societal structure and burial personae based upon burial goods (Saxe 1970). Several other comparisons were made in this research, and excel beyond the posed hypotheses, but serve as the basis for possible future research and additional information.

Findings

The burial sample contained 40 adults (35%) and 73 non-adults (65%), which is indicative of higher mortality rates among juveniles. In comparing the prevalence of pathological conditions to burial good levels (Fig. 1.3), there was no correlation, as the prevalence of pathological conditions in all burial good levels is statistically equal (~72% average presence). The high presence of cribra orbitalia and porotic hyperostosis among Level 2 (mostly juvenile individuals), could alter these results. Dental calculus and attrition were also included in the analysis (Fig. 1.3). However, after individual pathological conditions were examined, a pattern emerged.

Level 1 and Level 0 (Fig. 1.2) burials contain the highest rates of all pathological conditions compared. Level 1 is the only burial goods level in which pathological conditions have the highest prevalence. Level 2 is the level with the least variability in their rates of pathological conditions in the sample, is consistently the lowest, except for the presence of cribra orbitalia, although, this may be influenced by the high number of juveniles classified in the Level 2 category.

There was a large correlation between individual pathological conditions and age (Fig. 1.4). This was expected in the research, but several outliers were observed.

Dental caries and attrition begin to increase at the subadult (SA) age, dental caries and abscesses dissipate at middle adult (MA) age, when antemortem tooth loss becomes more common, obstructing the results. These trends seem to follow the expected pattern of dental aging.

Dental calculus → Caries/ Attrition → Abscesses (if present) → Antemortem Tooth Loss

Dental loss and attrition at Hasanlu peaks around the middle adult (MA; 35-49 years) and the old adult (OA; 50+ years) ages. Abscess appear to have no distinct age correlation.

Osteoarthritis begins, at its earliest, at the young adult (YA; 20-34 years) age, with its frequency peaking at 60% in the old adult (OA) age group. The fragmentation of the skeletal sample can influence this result, as it could have been more prevalent than observed in the sample due to preservation rates from excavation

Comparative Factors
Levels (0, 1, or 2)
Burial Position (flexed, semi-flexed, extended)
Burial Side (supine, prone, left, and right)
Grave Construction (stone-lined, pithos, pit, mudbrick)
Grave Type (Single or multiple burial)
Location of goods (overhead, on-person, at-feet, overhead/on-person, none)
Periods (VII, V, IV, III, II)
Mound Location (HM/LM)
Age
Sex
Pathological changes

Level 0	Level 1	Level 2
No Burial Goods	Small rings, beads, and pins	Cylinder seals
	Lithic tools	Metal ware and jewelry
		Beads
		Precious metals
		Bangles
		Elaborate jewelry
		Ceramics

Table 1.2 The bio-archaeological features examined and the level rankings of burial goods.

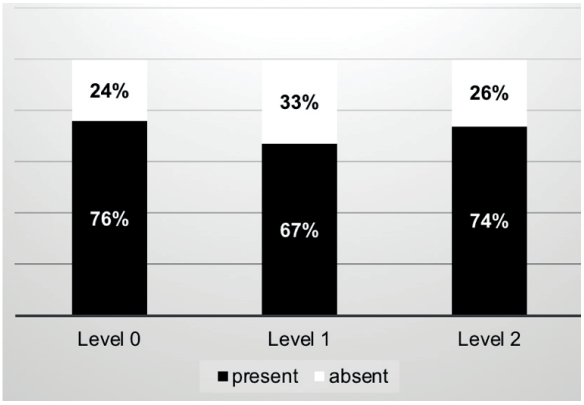

Fig. 1.3. Burial goods levels and pathological conditions.

recovery, preservation, and the surrounding burial environment (Pokines and Baker 2014a, Pokines and Baker 2014b).

Periostitis was observed in 12% of the sample, peaking in infant (IN; birth-3yrs) and old adult (OA) ages, representing about 25% of the IN and OA populations. The periostitis result could be reflective of individuals with weaker immune defenses, reflective of their mortality in the population. No notable findings were observed in the child population (CH; 4-11 years). Lastly, cribra orbitalia was observed in 12 individuals representing 11% of the total skeletal population, or 70% of the subadult (SA; 12-19 years) population. This pathological condition is extremely evident in subadults, and could serve as a basis of future research regarding cribra orbitalia trends in subadults and children in an ancient population.

Another notable finding was observed between burial goods levels and biological sex. The majority of Level 2 was observed most among females (73%) and juveniles (83%). The individuals with the 'lowest-level' burial goods (Level 0) are attributed to the male sample (40%) (Fig. 1.5). The data displays a higher frequency of organic goods among males (Fig. 1.6). This may indicate a discrepancy in burial-good preferences between the different sexes. This data reflects a grouping of females and juveniles, which was an unexpected grouping, but understandable. It is unknown if these differences reflect individual preferences, societal norms for burial differing between the various periods at Hasanlu, or a representation of gender-based burial preferences. The frequencies noted in this sample could also be the result of indirect age and sex discrepancies due to archaeological preservation (Walker et al. 1988). Interestingly, the early and later periods of the site (separated by HM and LM burials) reveal a drastic change in burial preferences as the cultures inhabiting Hasanlu change (Fig. 1.6).

Linear Enamel Hypoplasias (LEH) was scored by its degree of spread, represented in

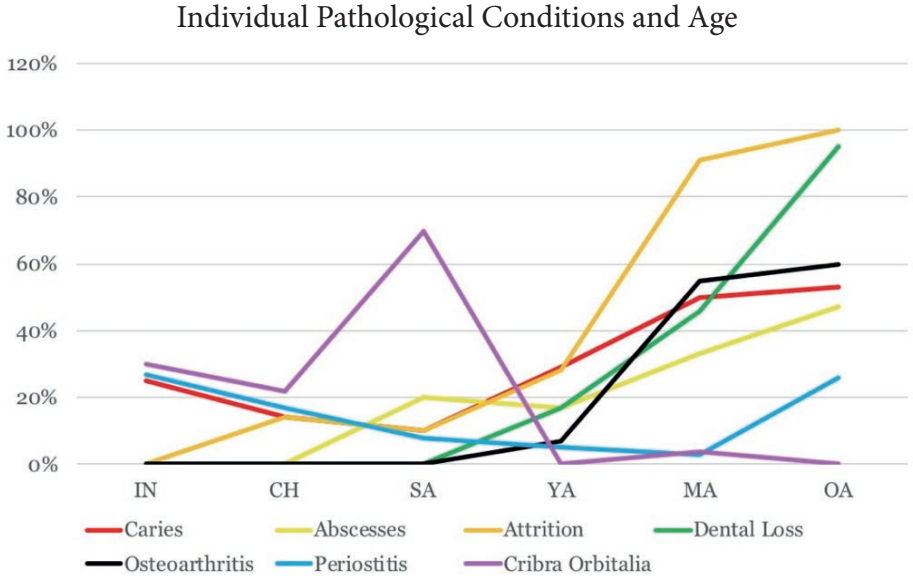

Fig. 1.4. Pathological conditions and age groupings.

Rates in Sample	Level 0	Level 1	Level 2
Highest	Antemortem tooth loss, caries, dental attrition, dental calculus, and periostitis	Antemortem tooth loss, caries, abscesses, dental calculus, dental attrition, linear enamel hypoplasias, osteoarthritis, periostitis, and cribra orbitalia	Cribra orbitalia
Lowest	Abscesses, linear enamel hypoplasias, osteoarthrtis, and cribra orbitalia	none	Antemortem tooth loss, caries, abscesses, dental calculus, dental attrition, linear enamel hypoplasias, osteoarthritis, and periostitis

Table 1.3. Burial goods levels and the frequency of individual pathological conditions. Note the increased prevalence in Level 0 and 1, decreasing in Level 2.

the numbers 0 (absence), 1 (slight presence, represented by LEH markers on only the incisors), and 2 (widespread presence, affecting all present incisors, or any canines, or premolars). These categories were split differently than the simple presence versus absence scoring, following Goodman and Rose (1991) and Ortner (2003), which posits that hypoplasias could also be a manifestation of developmental stress caused by weaning, thought to affect incisors. LEH presence can be associated with the different burial goods levels. Dental hypoplasias, thought to be the biological upset of dentition, was most present in Level 1, followed by Level 0 and 2. This gives rise to the idea that Level 1 burials may be the economic lower class of Hasanlu society, and that Level 0 is not a true representation of economic status (as it mimics Level 2 in this regard), and is a consequence of decomposed burial goods.

Analysis

The variants discovered while examining Level classifications (1 and 2) and their individual pathological frequencies reveal a high rate of specific pathological conditions among Level 1, and a low rate among Level 2 burials. It is possible that the different associated economic classes at Hasanlu reveal dissimilar biological susceptibilities, nutrition, health, and lifestyles relating to their pathological conditions. However, this could be a result of differential sampling, or a class-based cemetery. Further research and routine excavation of burial grounds would increase sampling to the burials of different periods, and expand this research's parameters regarding the conclusions made, and period/culturally-specific osteological analysis at Hasanlu.

Burial Levels and Periods

The High (HM) and Low Mounds (LM) burials

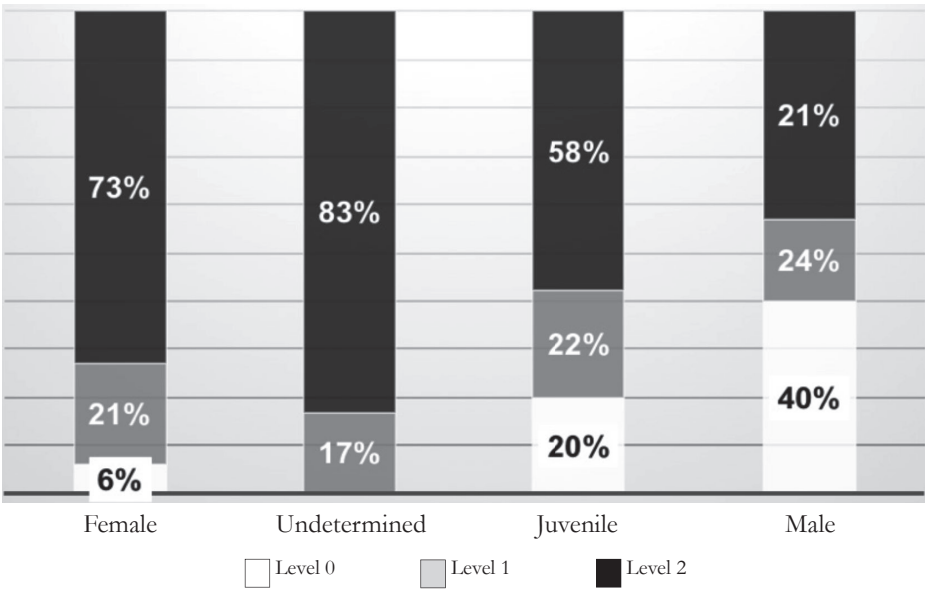

Fig. 1.5. Biological sex and burial goods levels.

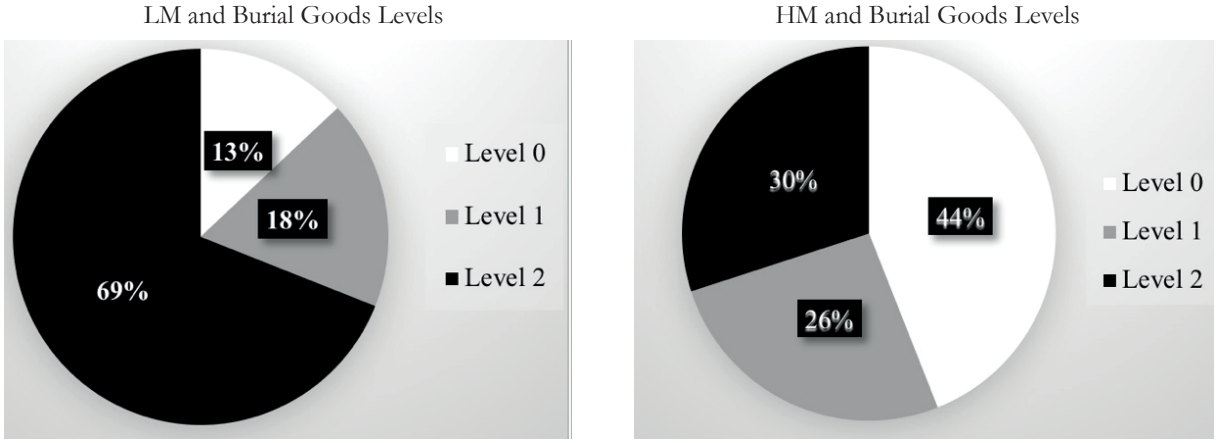

Fig. 1.6. Differential burial good preferences displayed by High Mound (HM) and Low Mound (LM) burial goods levels 0-2.

appear to be considerably different their burial Levels (0, 1, 2). The LM exhibited the most Level 2 , while the HM was partial to burials with little (Level 1) or no grave goods (Level 0). This result indicates different social structures, values, and/or economies in the LM and HM. Such ideas sync with the archaeological findings of separate cultures habituating at Hasanlu (Danti 2011, Danti 2013, Dyson and Muscarella 1989). Economic representation seemed to vary among the early and later cultures (Seleuco-Parthian, Urartu, Achaemenid) at the site, which could represent separate class structures of the buried individuals (egalitarian/non-egalitarian), or the individual's/societal economic wealth.

The Level differences observed in the early burials, specifically early periods of IV and V (making up the majority of the burial sample), is clear when the archaeological background of Hasanlu IV and V is analyzed (Danti 2013). Before its destruction in IVb, archaeologists estimate that period V and IV are of one consistent culture, not Assyrian (Cifarelli 2013), exemplified by burnished black, tan, grey, and red ceramic remains discovered (Dyson and Muscarella 1989). This period is attributed to major building developments, riches (such as the Hasanlu gold bowl), external trade (Cifarelli 2013), and long habitation periods resulting in economic stability, as seen in the articles included within the burials examined (Level 2 rank).

Beginning in period III, the site became a Urartian Fortress and burial location, as well as the culture associated with the site at this period, had changed drastically. These last few periods at Hasanlu were influenced by a power

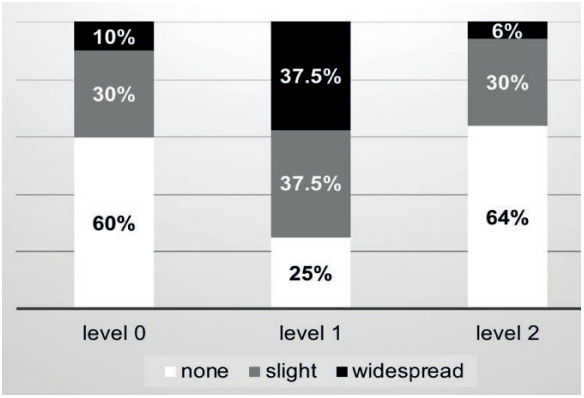

Fig. 1.7. Linear Enamel Hypoplasias (LEH) and burial goods levels.

struggle over the land by different groups of cultures and empires. Period III at Hasanlu is associated as an Urartu habitation city in control of the area. Individuals of all ages were found attributed to this period, and into the Seleuco-Parthian period (several skeletons classified as II/III). The temporariness of the city itself by the Urartu explains burials of individuals within the high mound habitation area, which is attributed to burials associated with periods III and III/II. Although the extent of the economic stability of the Urartu at Hasanlu is not fully known, it and its later inhabitants reveal a smaller population size, based on the amount of II/III period burials recovered. However, this could easily be due to excavator preservation, discovery, and taphonomic factors. Further examination on individual cultural factors and their influence on the burials cannot be conducted due to the variation of dates for most HM burials, and the size of the individual period II and III burial samples.

There seems to be a large change in burial goods between the different periods of the Low Mound and High Mound of Hasanlu. Period VII-II reveal a large decrease (39%) of Level 2 burials, a stable representation of Level 1 (8% increase), and a 31% increase of Level 0 burial representations. This appears to be reflective of differential burial trends, or a change in the Hasanlu economy, availability of resources, or social trends associated with differing societies thought to be at Hasanlu.

Hypothesis 2 of this study, states that individuals with higher social importance were buried with a higher quality and quantity of goods (Saxe 1970). In support of this, the disparity between burial goods frequencies in High Mound and the Low Mound are largely noticed (Figure 1.6). This result is likely representative of differentiating societies known to be at Hasanlu with variable economies and burial styles, as the Low Mound is idealized as a much earlier period than the High Mound. This hypothesis with regards to social importance in Hasanlu society is not fully proven, as economic differences are evident in the Hasanlu burials, and their frequencies vary dramatically from the earlier periods of V and IV (LM) and the later periods of II/III (HM). To note, more information was obtained than expected about the possible social connotations influencing the Hasanlu population through the factors mentioned, and the wealth of burial goods and location should be compared among their period-specific societies, especially against burials in any upcoming excavations.

Skeletal Pathologies and their Connotations

From the data, there is a possible correlation between social value and age at Hasanlu, with the lowest classes of individuals being the infants and old adults, and the highest being the subadult population (all Level 2's). As expected, age was a major influence in degenerative pathological conditions (Fig. 1.4), which was especially evident in the dentition. Dental conditions decreased as burial Level numbers increased. Level 2 and 0 were found to be similar in their pathological representations among abscesses and enamel hypoplasias, which cannot exclusively be representative of accuracy, as this could be reflective of the categorization error of Level 0 due to grave good recovery and survival. In a separate regard, the young age of individuals associated with many Level 2 burials, even though may lack pathological conditions, many contained pathological conditions such as periostitis and cribra orbitalia. It remains possible that the different perceived economic classes of Hasanlu experienced different lifestyles, overall health, or nutrition, but may equally be the result of differential burial styles or the localized excavation of a wealthi-

er cemetery. These results are not necessarily the true manifestation of population health, but a scientific approximation based upon pathological conditions represented on the skeletons which were preserved in the archaeological record.

Burial goods location

The most popular burial goods location was overhead and/or on-person, which appears to continue in practice in both the HM and LM, throughout different cultural periods. Different age groups (old adult and infant) displayed the greatest variety in burial goods location and level classes, which could represent different social guidelines of Hasanlu within the burial domain. Biological sex appeared to have influenced the determination of burial goods placed in the burial domain. Females and juveniles have the highest rates of the Level 2 category, while males exhibited the largest percentage of Level 0 among all groups. In this scope of analysis, females and juveniles may have been the most important members of society (or examples of familial wealth), differing in burial good-types (Level 0/1) to males, or could be the result of random excavational sampling.

Level 1 contained high rates of osteoarthritis, antemortem tooth loss, dental caries, dental attrition, dental absences, enamel hypoplasia, and periostitis. Level 1 also has the largest amounts of individuals on the opposite ends of the age scope, such as old adult, sub adult, and infant individuals. The high percentage of old adults in the Level 1 sample could have influenced the frequencies of pathological conditions in that level. Level 1 represents the most stable burial goods level (~20-25% of population studied) and biological sex (~20% in each), reflecting a steady economy or burial tradition throughout the sampled burial periods. This is not supported by what is known about Hasanlu throughout the periods, as there is believed to be several cultural disturbances at the site.

The first hypothesis of this study, that pathologies and grave goods levels correlate with each other, is seemingly true. The highest rates of pathological conditions was observed in Level 1, having the largest number of individuals with a skeletal condition. The lowest rate of pathological conditions was observed in Level 2 (largest burial goods level sample). The results observed in Level 1 and 2 could represent differential economic rankings or individual lifestyles among the different societies of Hasanlu, though many more burials are needed in order to separate these into period-specific analysis. Level 0, or the lack of burial goods, represented the most variable rates of pathological conditions, positioning, location, burial position, grave construction, and grave type. Level 0 is very likely the subject of differential sampling, and/or poor preservation (organic material), rather than a differing social/economic class.

Conclusion

Many questions arise while establishing research data. In the High Mound, were the Level 0 or 1 burials equal in their societal importance, or were they economically separate from the individuals of Level 2 in the HM? Does Level 1 and 0 in the Low Mound exhibit the entire lower class of Hasanlu? Are these findings the results of differential economies and burial preferences along with differentiating societies? More research is needed on the unrecovered burials of the Pennsylvania excavations, coupled with new excavational research.

From the data, Hasanlu appears to be a non-egalitarian society in the Low Mound, possibly continuing into the High Mound. However, the small representation of Level 2 burials in the High Mound may be indicated as a transition into a local shift of economies and burial practices of the later II/III periods. The burial sample for the Low Mound sample was much larger than the HM, and could account for this differentiation. The High Mound had a slightly higher frequency of dental abscesses, caries, and attrition, which is dissimilar to Selinsky's (2009) findings. Further excavations and skeletal analysis are needed to gain a better accuracy of individual pathologies in the burial's population.

While the burial population is limited, the individual burial preferences, for unknown reasons, at Hasanlu seems to have influenced near-

ly every aspect of the burial space. The replication of several burial styles within each period and location imply social variety and individual preferences, where the most common styles were the norm for some time (LM trends), and later the norm changed (HM trends), representative of cultural changes in the inhabitants of the city. The lesser-observed characteristic groupings (positions, burial side) were also evident, and appear to be burial deviations of the 'norm', influenced by factors that can only be speculated. Large statistical frequencies in the sample contained many similarities and differences of certain characteristics, leading to the conclusion that this sample could represent a relatively accurate depiction of osteological and archaeological frequencies of the Hasanlu population.

These findings could be influenced by differential preservation/fragmentation, differential recovery, the excavation of a class-based cemetery, or other unknown social or environmental factors. Cribra orbitalia and porotic hyperostosis noted in the juvenile population supports the idea that bone marrow in juveniles are extremely susceptible to biological and/or environmental stressors, and could aid in future research in this topic. Unfortunately, the majority of excavated burials from Hasanlu were not maintained for museum collections, and were discarded into the backfill at the site, according to excavation notebooks provided by the University of Pennsylvania Museum. This likely influenced the patterns observed in this analytical study, and limit the certainty of the data provided.

This data is not aimed to determine the overall 'health' of individuals at the time of their death, but as an approximation of skeletal and dental degeneration frequencies in the Hasanlu population. It should be understood that there is likely a general underestimation of pathologies and degenerative illnesses at Hasanlu due to fragmentation, the osteological paradox, and interobserver error. The examined skeletal population ranges several centuries in time, and the population could have varying pathological frequencies and postmortem burial styles within these periods of time, and could cloud the period-specific analysis. There seems to be noteworthy archaeological and osteological differences between the Low Mound and High Mounds with regards to societal burial trends.

It is suggested for future excavation of the remaining Hasanlu cemetery, and further consultation of burial reports from non-recovered skeletons, which would be a purely archaeological analysis. These suggestions will help gain a better understanding Hasanlu's burial practices, preferences, reflect the economy of the period, support or challenge further archaeological research of Hasanlu, and expose social differences between the early Low Mound periods and later High Mound periods.

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