# A Comprehensive analysis of Dental Remains from the Early Bronze Age I site of Wadi Faynan 100, Jordan

by

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## Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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**Abstract**

Five looted Early Bronze Age Tombs were excavated at the site of Wadi Faynan 100, Southern Jordan, in 2019. While archaeological site looting is a common problem worldwide, the lack of research utilizing commingled and fragmented burial assemblages is an inherent bias in bioarchaeological research. This preliminary study uses dental anthropological methodology to learn as much as possible about the individuals buried at Wadi Faynan 100 despite their fragmentation and commingling due to looting, specifically by calculating minimum number of individuals (MNI), recording nonmetric traits, dental wear, tooth development for age-at death, and pathology (enamel defects, caries, and calculus). Results yielded an MNI of 14 using teeth alone and tooth development indicated a large proportion of subadult individuals, particularly in Grave 3. Nonmetric traits were not conclusive but not out of place when compared to other Jordanian archaeological populations. Dental wear rates were quite low, possibly a result of the age profile of the population, and pathology showed a high rate of linear enamel hypoplasia, suggesting childhood stress in the population, an extremely low caries rate and a low calculus rate, which again may be a result of the ages of the individuals. Overall, this research demonstrates the ability to use even fragmented and commingled assemblages to learn about individuals in the past, and guide future research projects.

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## List of Abbreviations

BCE – Before common era

BLP – Barqa Landscape Project

CEJ – Cementoenamel junction

DOA – Department of Antiquities

EBA – Early Bronze Age

EBI – Early Bronze Age I

EBII – Early Bronze Age II

EBIII – Early Bronze Age III

LEH – Linear Enamel Hypoplasia

MLNI – Most Likely Number of Individuals

MNI – Minimum Number of Individuals

WF100 – Wadi Faynan 100

# 1. Chapter 1: Looting in Southern Jordan

## 1.1. Introduction: The Looted Context of my Research

The nature of my thesis project, and the motivations and goals of my research are in response to archaeological site looting in Jordan, where it is a well documented problem (Bisheh, 2001; Contreras & Brodie, 2010; Kersel & Chesson, 2013a; Findlater et al. 1998, Kersel & Hill, 2020, Politis, 2002; Vella et al., 2015). The individuals whom I studied for this project were buried in an Early Bronze Age (EBA) I (ca. 3600-3000 BCE) cemetery at the site of Wadi Faynan 100 (WF100), in Southern Jordan, where looting activities have made it difficult to understand some burial contexts. Because looters remove artifacts, disturb the burial stratigraphy, move and even destroy, bones, oftentimes looted burials are overlooked because the remains are fragmentary and non-diagnostic, and the archaeological context has been destroyed. Teeth are often left behind at these sites, both whole and fragmentary, and can be used to learn about the individuals in these burials. This thesis aims to study the dental remains of the individuals excavated at Wadi Faynan 100 to learn as much as possible about them. Specifically, the Minimum Number of Individuals (MNI) will be calculated, nonmetric traits, dental wear, pathology, and tooth development/age-at-death will be recorded. Thus, this preliminary research will demonstrate the importance of dental anthropology in the study of cemetery sites that have been looted, which is crucial when sites across the world have been affected by looting activities. Instead of looted cemeteries being left overlooked, the information gained can be used to aid local, national, and global publics.

As discussed by Barker (2018), from a global perspective, the extent of archaeological site looting is likely worse than the number of reported cases. While novel strategies to study looting are being investigated, such as Contreras and Brodie's (2010) use of satellite imagery to examine looting at Bab edh-Dhra', the reality is that in many cases, like the graves excavated at WF100 in 2019, the damage has already been done. My research addresses that issue: How do we do what we can with what is left behind at archaeological sites? While many people are concerned with what has been taken from archaeological sites, there is little said for what remains. The existing literature regarding archaeological site looting, seems to be more concerned with the objects being removed and sold illicitly than the human remains that have been disturbed or possibly even destroyed by the looting (e.g. Bisheh, 2001; Brodie, 2002; Brodie, 2003; Elia, 1997). But as Kersel and Chesson (2013a) point out "the illegal, unrecorded excavation of burial sites results not only in the removal of saleable pots for the marketplace, but in the indirect (or direct) destruction of human remains, which ultimately means a loss of knowledge about burial customs and practices. Valuable information about mortuary traditions has been lost and our interpretation of the past may be skewed" (p. 677).

## 1.2. Looting in Jordan

Many authors have documented archaeological site looting across the country. Kersel & Hill (2020) have reported 425 sites that have been affected by illegal activity in Jordan, ranging from the Paleolithic (10,000 BCE or earlier) to the Islamic period (ca. 600-1918 CE) Research by Kersel & Chesson (2013a, 2013b) and Kersel & Hill (2019, 2020) has focused on the Early Bronze Age (ca. 3600-1200 BCE) Dead Sea Plain/Southern Ghor region, a collection of sites that are located north of Wadi Faynan 100; this includes the site of Bab edh-Dhra', which might have some connection to WF100 (Adams et al., 2019). In Wadi Faynan, excavations at the Khirbet Faynan cemetery in 1996 were undertaken in response to looting of the area (Findlater et al., 1998). In the report for the 2019 season of the Barqa Landscape Project (Adams et al., 2019), further excavations and protection by the Jordanian Department of Antiquities are recommended not just because of the threat of looting, but because farmers' fields are encroaching upon the protected archaeological sites. In addition to Wadi Faynan 100, and the cemeteries of the Dead Sea Plain, looting is an issue at many other sites across Jordan, including the famous site of Petra (Vella et al., 2015).

### 1.3. Scale

It has been demonstrated that looting is not an issue that is restricted to particular countries or sites; looting is a widespread global issue, affecting more sites than we are even aware of (Barker, 2018; Proulx, 2013) and it involves a network of actors, and various publics. Regarding scale, the archaeological focus of this research is quite narrow, concerning human remains at the site of Wadi Faynan 100 with relation to the site of Bab edh-Dhra' and other sites located within Jordan during the EBA. For a public issue focus, the scale is expanded. Nations have different legislation regarding looting and cultural heritage, but illicit goods often cross borders as part of the antiquities market. The existence of contemporary borders also serves to perpetuate the trade of illicit antiquities because variation in laws between countries allows for the legal sale of antiquities after they have left the country (Brodie, 2003). Though the trade of artifacts has been illegal in Jordan since 1976 (Bisheh, 2001), if they leave the country, it may be legal to sell them in other countries. In fact, it is possible to fake legal status of artifacts in neighbouring Israel if they can get over the border (Kersel, 2007). Therefore, the antiquities trade as it exists now cannot be studied in isolated areas as the antiquities trade is an entangled process on a global scale, involving multiple actors and publics, a phenomenon which has been termed "glocal" by Proulx, (2013). As it pertains to this project, the significance is twofold. First, archaeological site looting must be examined in both local and global context. Second, this emphasizes the public issues relevance of this topic because looting affects various publics and stakeholders, all in different ways.

## 1.4. Publics

The various publics involved in the network of the illicit antiquities trade include local looters (also characterized as subsistence diggers (Matsuda, 1998)), dealers of illicit antiquities, government and law enforcement, buyers of illicit antiquities, and archaeologists. While archaeologists view looting as a serious issue and a problem to be solved, assuming a universal appreciation for cultural heritage is unwise. Additionally, there have been arguments made in recognition of the necessity of looting in some regions which question the moral position of archaeologists who are unequivocally opposed to looting (Matsuda, 1998). This must be balanced with the understanding that the antiquities trade is part of a larger global market, driven by the demands of foreign buyers. Some have argued that looting cannot simply be excused on the grounds that it is an economic necessity, because that means that there is a need to address the underlying economic pressures that drive people to loot (Brodie, 2002).

In conversations with subsistence diggers in the Dead Sea region, Kersel, as part of the *Follow the Pots Project*, has learned that many people loot because they need a source of income during the agricultural off season (Kersel, 2019). It is also true that the tiered distribution system disproportionately advantages the people from larger cities, such as Amman and Kerak, who buy from the looters (Kersel, 2019). Therefore, some have argued that we cannot blame local people for wanting to loot (Matsuda, 1998) and doing so for a source of income. In response, others have pointed out that we must turn our gaze to the source of demand – tourists and wealthy people in other countries who drive the industry, and understand that looting is not necessarily a good solution to the economic needs of subsistence diggers (Elia, 1997).

As discussed by Hollowell (2006) it is important to distinguish between two types of looting. The first, what she calls “undocumented digging” which is simply, “the act of taking objects from the ground” (p.70) and the second being artifacts that are considered ‘looted’ as a result of museum theft, illegal crossing of borders, or from being implicated in other illicit activities. Hollowell (2006) identifies several moral positions held by archaeologists regarding subsistence digging. Some of the arguments and positions that Hollowell describes have already been mentioned, but they are as follows: “the economic justice argument” which states that it is not ethical to criticize people who dig because they need to for economic reasons (pp.74-75). The “diggers as victims of a global market” argument is similar, but argues that subsistence diggers are the victims exploited by dealers and collectors, who drive the market for illicit antiquities (p.78). “The ethic of non-commercialization” posits that archaeological material should not be sold for commercial reasons, because that might increase demand, causing further destruction of the archaeological record (p.79). “Improper management of cultural resources” suggests that because archaeological material is a non-renewable resource, subsistence digging is a mismanagement of that resource (p.82). “Lack of sustainability” builds from this, arguing that because archaeological material is non-renewable, even though subsistence digging might be a short-term solution, it will not endure long-term (p.83). “Damage to the archaeological record” rests on the inherent value placed on archaeological information and knowledge and is the concern that subsistence digging damages sites, permanently destroying archaeological context (p.85). “Archaeology as a public good” claims that the past belongs to all of humanity and therefore destroying archaeology is detrimental to information that is valuable to all people (p.86). “Culture and heritage loss” is the belief that if subsistence diggers knew about the value of archaeology to understanding their own cultural heritage, they would not dig (pp.87-88), and “cultural affiliation” asserts that people who dig for subsistence among their own cultural heritage have more of a claim to those resources than foreign archaeologists (p.89). These positions articulate the variation in attitudes within the public of the archaeologist and demonstrate how there will likely be no single unified approach to dealing with looting in the places where archaeologists work. Thinking more broadly to include local publics in this statement, Barker (2018) notes, “at the source level, the motivations for, economic context of, and local attitudes toward looting vary considerably, so no single strategy is likely to significantly suppress illicit excavation and spoliation” (p.458).

While Bisheh, former Director of the Jordanian Department of Antiquities (DOA) (2001) has suggested that illicit looting has increased since the sale of antiquities was deemed illegal and questioned whether making the antiquities market legal would be a better decision, Alshami et al. (2007) have outlined the position of the DOA, and their role in enforcing cultural heritage legislation. Alshami and colleagues’ (2007) conference paper describes perceived reasons for increased looting in Jordan, including demand from individual collectors and museums, increased prices of antiquities, and archaeological site destruction from development projects. Some of the DOA’s tactics for addressing site looting include hiring security guards to patrol sites, working with local law enforcement, the Drug Control Department, and the Customs Department. Further steps Alshami et al., suggested include archaeology training for airport customs officials to better identify artifacts, developing a special police unit, and public awareness for “developing national and cultural values among citizens” (2007, p.198). Ultimately these efforts are focused on addressing the physical act of looting and transporting looted goods, rather than the root causes of looting. This highlights the difficulty in addressing systemic multifaceted issues involving various parties across the world. While it may be difficult to say how can we address looting if issues stem from economic need and international demand, what does that mean for the role of the archaeologist?

### 1.5. The Archaeologist

Brodie (2003) suggests that local people are the key to reducing looting. This argument goes together with that which shifts the blame off the individuals who often loot for economic reasons. Brodie argues that looting will be reduced if archaeology is used for tourism to create revenue and economic benefit for the local communities, citing examples of archaeological tourism in Turkey, Kenya, Peru, and Sweden.

The position of archaeologists also means that they have an interest in looting. The maintenance of archaeological context is valuable to archaeologists because of its importance to the work they do. Bioarchaeologists are often international researchers who are benefiting from the remains of other people's ancestors. Looting is an unsustainable practice that provides more economic benefit to collectors and museums, while disadvantaging the people who rely on looting as a form of income. Taking a public issues perspective as an archaeologist means de-centering one's own experiences to consider the lives of others who live and work in the same region. As discussed, with various moral arguments in support of or against subsistence digging, concern about the archaeological record may not be the only way forward; similarly it is impossible to task the authorities who are dedicated to policing illicit antiquities to shut down the market completely. Furthermore, the issue is a global one, and cannot be solved only by working in individual locales. Therefore, for archaeologists, working with various publics, it is important that they consider what to do with what is left behind as well as how that might help local publics in the areas where they work.

## 1.6. Conclusions

Brodie (2003) mentions that no government has the ability to protect all of its archaeological heritage. This is glaringly true when considering all the archaeological sites in Jordan, 25,000 of which are registered, though there are many estimated unknown sites that have not been surveyed (Alshami et al., 2007). Further, Brodie says that “it is futile to demand that large countries such as Mali or India should protect their own heritage from depredations fuelled by rich collectors and institutions abroad” (2003, p.18). By finding ways to study what is left behind, archaeologists can aid local publics by providing valuable information about looted archaeological sites, which might otherwise be overlooked, and could even use community archaeology practices to engage local publics in their conceptions of cultural heritage, to possibly establish tourism or museums to ensure long term economic benefits, as opposed to the limited income from looting archaeological sites. The importance of this research from a public issues perspective is to give value to archaeological sites that might be otherwise overlooked because of looting, so that it can then be used to serve the goals of local, national, or even global publics.

## 1.7. Venue for Publication

My proposed venue for publication is the *International Journal of Osteoarchaeology*. I have chosen this peer reviewed journal because the aim and scope of the journal is to “publish theoretically informed studies that explore how human and animal remains can be examined to provide detailed and nuanced information about the behaviour and ideology of past cultures”

(International Journal of Osteoarchaeology, n.d.). Therefore, my research will be appropriate to submit to this journal because of my focus on learning about the lives of the past people who lived during the Early Bronze Age at Wadi Faynan 100 through their dental remains.

# 2. Chapter 2: Dental Anthropology of the Individuals from Wadi Faynan 100

## 2.1. Introduction

During the 2019 field season of the *Barqa Landscape Project* (Drs. R. Adams, A. Dolphin & C. Yakymchuk), five suspected charnel house graves were excavated at the site of Wadi Faynan 100, Jordan, as well as one grave from the BLP 2019 Cemetery site. The looted graves consisted of mostly fragmented and commingled individuals (Adams et al., 2019). This research project involves a comprehensive study of the dental remains excavated at WF100 in 2019. Not only were multiple individuals interred together in these charnel houses, but commingling and fragmentation has been exacerbated at this site because of looting, which is a very common problem in Jordan. Nonetheless, the study of commingled and fragmented burial assemblages is key in the forthcoming research in the bioarchaeology of Jordan. As Sheridan (2019) discussed, by ignoring commingled assemblages in favour of articulated complete skeletons, we are systematically overlooking a significant portion of human skeletal collections in Jordan and broader regions, and thus biasing research. Using macroscopic dental anthropological methods, my research will provide preliminary insights into the demographics of the individuals buried in the graves at Wadi Faynan 100 by calculating MNI, examining tooth development for age at death, recording nonmetric traits for biological relatedness, as well as initial information about some aspects of their lives gleaned through various dental pathologies and dental wear. This research will provide a basis for recording data during future cemetery excavations at Wadi Faynan 100, and has been conducted with the intent of promoting comparability to other relevant sites.

## 2.2. Site History

Wadi Faynan 100 is an Early Bronze Age I site located nearby a copper mine (Wright et al., 1998, Adams et al., 2019). Prior to the 2019 field season, work at the site was conducted during 1996 and 1997 by Wright and colleagues (1998), and the site was interpreted as a large settlement, possibly formed by multiple smaller occupations rather than as one single unit. The proximity to the copper mine in combination with the size of the site was what made it unique to the excavators, and questions about the role of the site in the larger economy were intended to be the focus of future research by the team, though it never took place.

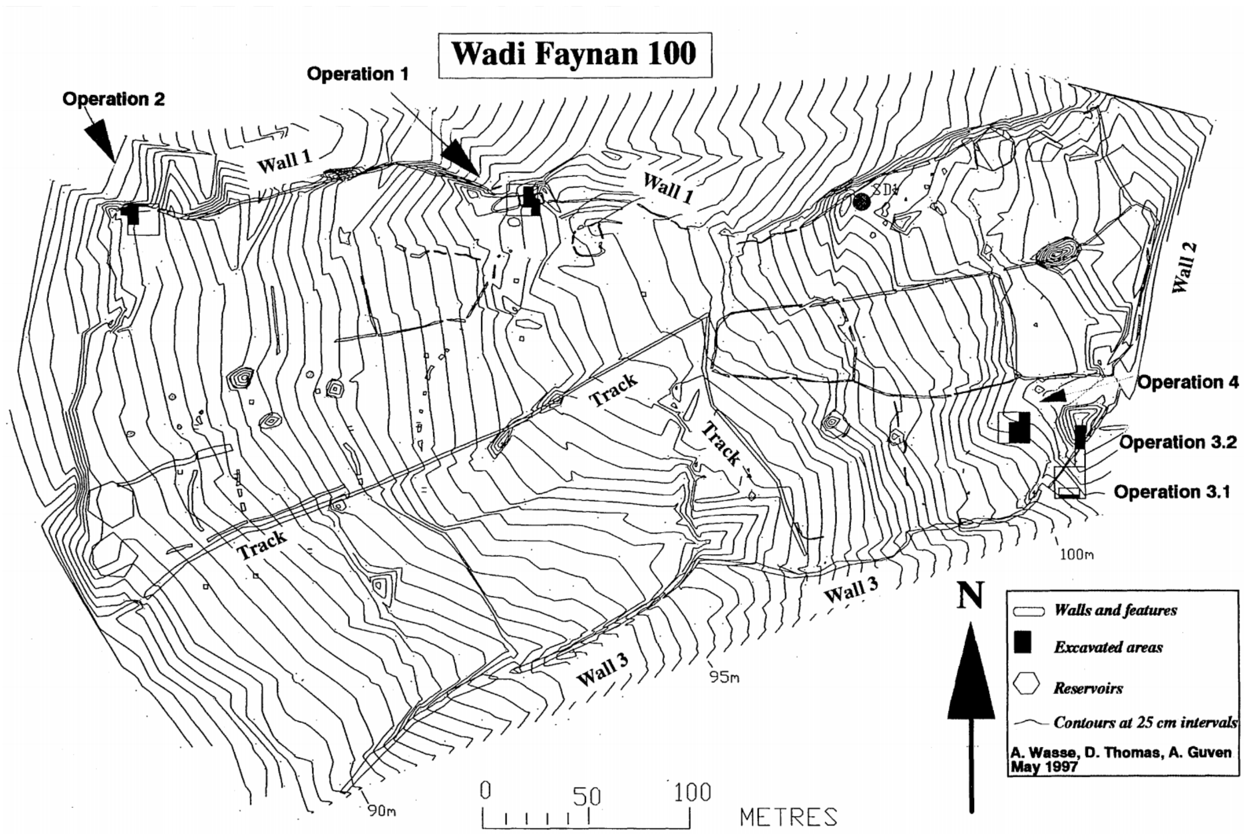


*Figure 1: Map of Wadi Faynan 100 (Wright et al. 1998, p.35)*

Research by Barker et al. (2007) was conducted as part of the study of the *Wadi Faynan Landscape Survey* (1996-2000). During pit excavation, Barker et al. (2007) found evidence for rainwater collection due to the dry landscape in the Wadi during the EBI, and palynological analysis of soil samples excavated by Wright et al. were found to be “consistent with a degraded steppeland, with cultivation of cereals and olives in the locality” (Barker et al., 2007, 243).

In relation to WF100, the site of Bab edh-Dhra’ is located approximately 150 kilometers north. While this is not extremely far away, it is still quite a distance considering travel would have been by foot or with animals. Therefore, the possible relations of these two sites is interesting, especially when accounting for the distance between them (Figure 2).

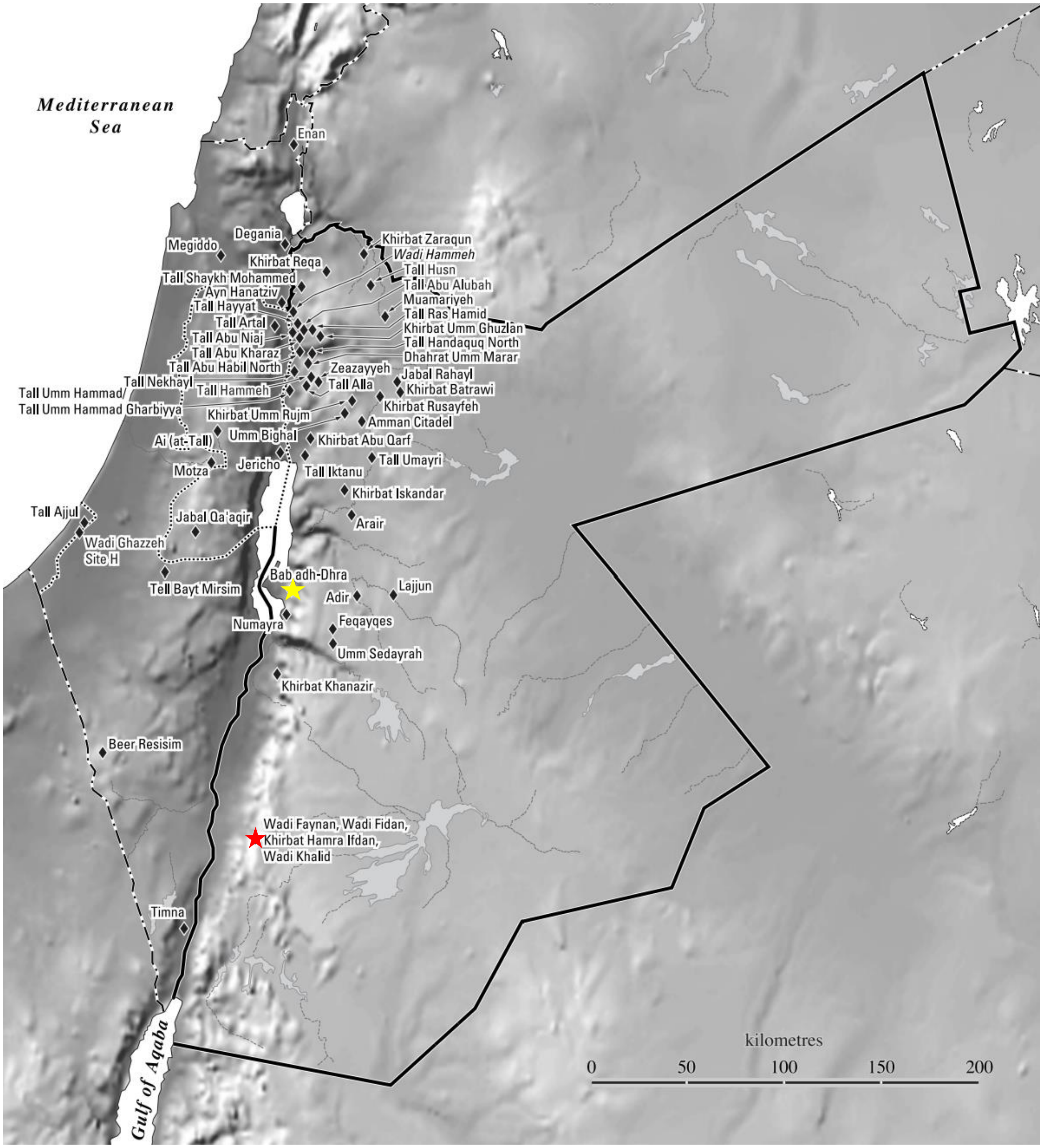


*Figure 2: Map of Early Bronze Age I-III sites in Jordan and Israel, including WF100 (red star) and Bab edh-Dhra' (yellow star) (Philip, 2008, p.162)*

## 2.3. The Early Bronze Age I in Jordan

The EBA in the Southern Levant has been characterized by increasing social complexity, though our understanding of the nature of that complexity has changed over time (Philip, 2008). The city state model was the popular interpretation of EBA social organization into the 1990s. This model persisted for several reasons, including, a desire to parallel the study of the Southern Levant to the study of Egypt and Mesopotamia, and to understand the EBA as an extension of city state society in the Middle and Late Bronze Age (Philip, 2008). The archaeological evidence for these changing times includes the presence of public architecture, structures built for defensive and administrative purposes, increasing social and political stratification, and economic specialization (Philip, 2008). Alternative hypotheses for these features have been proposed, but Philip (2008) argues that the EBA cannot be characterized by a single overarching societal structure, and is instead made up of various types of complex relationships between people that change across time and space. Evidently this would make understanding EBI sites temporally and spatially contingent. For this reason, WF100 becomes an extremely important site. As one of the few EBI cemeteries in Southern Jordan, any information gathered about people's lives is valuable, especially any specific information that can be learned from human remains.

### 2.3.1. Bab edh-Dhra'

EBI cemetery sites are rare in Southern Jordan. Ullinger (2010) provides a list of the Early Bronze Age sites with burials in the Southern Levant (pp.37-47), many of which include very few individuals and one or two tombs rather than extensive cemeteries. Few studies have been published that focus on the remains themselves. Bab edh-Dhra' is unique in that it is the only site in Jordan with cemeteries dating to all of the phases of the Early Bronze Age (Philip, 2008). Some other EBI cemetery sites include Feifa/Fifa and es-Safi, which are located near Bab edh-Dhra' in the Southern Ghor region of Jordan. The EBIA (ca. 3600-3300 BCE) cemetery at Feifa is thought to be the same size as the cemetery at Bab edh-Dhra' (Steele, 1990) but unfortunately it has been the subject of looting for over 40 years. While 11 tombs were excavated from 1989-1990 and salvage excavations of 50 graves were conducted by Mohammad Najjar as part of a Jordanian DOA salvage project in 2001 (Kersel & Chesson, 2013b), no publications about the remains were produced. Finding articles or reports about cemeteries dating to the EBI (with the exception of Bab edh-Dhra') is difficult, but finding research that focuses on the human remains themselves, rather than just reporting the cemetery, or focusing on the pottery and site chronology is even more challenging. As discussed by Sheridan (2017), bioarchaeology in the Near East has been hindered by the influence of British archaeology which is distinct from anthropology. This has resulted in a lack of integration between the anthropologically oriented study of human remains and the archaeological research in the region. Bab edh-Dhra' is unparalleled in the EBA Southern Levant from a publication perspective (Chesson, 1999; Gasperetti & Sheridan, 2013; Gregoricka et al, 2020; Ortner & Frohlich, 2008; Schaub & Rast, 1979; Sheridan et al., 2014; Ullinger et al., 2012; Ullinger et al., 2015).

The cemetery at Bab edh-Dhra' follows a specific burial pattern that Rast and Schaub (1979) describe as gradually evolving from the EBI to the EBII (ca. 3100-2750 BCE). Permanent settlement of the site began during the EBIB (ca. 3400-3000 BCE), but during the EBIA the site was primarily used as a cemetery, though there is evidence of occasional occupation (Rast & Schaub, 1979). During the EBIA, burials were placed in shaft tombs with multiple chambers. The burials were secondary and disarticulated, with skulls lined up toward the left of the chamber entrance, and a pile of disarticulated bones placed to the right of the skulls on a mat.

The perimeter of the chamber would be lined with grave goods, many of which were pots. During the EBIB the burials are considered transitional. Schaub and Rast (1979) describe a variety of EBIB tombs with EBIA and EBIB traditions. For example, one shaft tomb included EBIA pottery, only one chamber, but also transitional EBIA-EBIB pottery. Another EBIB chamber was part of an EBIA tomb but it included articulated burials, some EBIB pottery, and stones on the floor of the chamber. Other EBIB tombs were round mudbrick charnel houses with threshold stones and primary articulated burials. EBII tombs are characterized as large rectangular charnel houses with two levels and many individuals (Schaub & Rast, 1979; Lapp, 1966).

### 2.4. The Graves Excavated at Wadi Faynan 100 in 2019

In the 2019 field season, six suspected graves were excavated. Only one grave (Grave 1) was excavated at the BLP 2019 CEM site. The remaining graves were excavated at the WF100 CEM site (Graves 1 through 5). All graves displayed some evidence of looting to varying degrees (Adams et al. 2019). Pottery from the Southern Ghor region (includes the sites Bab edh-Dhra', Feifa, and es-Safi) was found in the graves (Adams et al., 2019), suggesting there may be a relationship between those sites and WF100. The graves are rectilinear charnel houses, similar in some respects to the EBI tombs and EBII charnel houses at Bab edh-Dhra'. The graves do not resemble the physical structure of the EBIA tombs with a shaft and multiple chambers, or the circular shape of the EBIB and early EBII charnel houses. In the early EBII charnel house descriptions there are stone entrances to the charnel houses which were found at WF100 and the EBII charnel houses are rectilinear, like the charnel houses at WF100. The WF100 charnel houses are much smaller than the EBII charnel houses at Bab edh-Dhra' and are similar in area to the early EBII charnel houses at Bab edh-Dhra'. Regarding burial practices, the graves at WF100 are variable. Grave 5 at WF100 had three skulls lined up like what has been observed in the EBIA Bab edh-Dhra' tombs, though in a different tomb structure (rectilinear charnel house as opposed to shaft tomb with multiple chambers), and in a different location in the grave (to the right, not left, side of the entrance). In addition, while there was a pile of disarticulated bones found within the tomb entrance, they were not placed on a mat like what is found in the EBIA Bab edh-Dhra' tombs. We cannot say whether this was the same for all of the charnel houses because of the damage to graves from looting activity, but in Grave 3, there were articulated feet, which is not typical of disarticulated EBIA Bab edh-Dhra' Burials (Adams et al. 2019), but which were found in the EBIB and early EBII. Evidently the tombs at WF100 do not clearly fit into the Bab edh-Dhra' EBIA burial type or the EBII burial type, even though the cemetery site has been dated to the EBIA. In addition, radiocarbon dates are not yet available, so it is not certain how close or distant in time the individual graves at WF100 are from each other. While there are similarities between the Wadi Faynan charnel houses and Bab edh-Dhra' burials, and Bab edh-Dhra' pottery was found at Wadi Faynan 100, more research must be conducted to determine how these sites are related.

## 2.5. Research Methodology

### 2.5.1. Initial Sorting and Identification

During the 2019 excavation at WF100, teeth and tooth fragments were recovered from each grave, with distinct areas within each grave being separated into a number of loci. For this project, teeth were first sorted and reconstruction of fragmented teeth was attempted. Sorting and reconstruction was first attempted within each grave locus, and then fragments were cross checked between loci within the same grave. Teeth that were reconstructed were bagged individually and fragments that did not match were grouped and bagged together according to tooth type. Teeth were identified using Hillson (1996). Roots were not studied for this project and reconstruction of teeth using roots was not attempted because roots would have been difficult to put back together. Because roots do not shear like crowns do, they are harder to match together. Roots were bagged separately and included in the database, with the potential to be used for other studies in the future. Data from the BLP 2019 CEM site were recorded but will not be analyzed for the purpose of this research because of the unclear relationship between the two sites, including the uncertainty around whether BLP 2019 CEM also dates to the EBI. This database was created to establish an inventory, necessary for calculating MNI, as well as for recording measurements, nonmetric traits, dental wear, tooth development, and pathology (caries, calculus and enamel hypoplasia)(See Appendices A, B, and C).

### 2.5.2. Minimum Number of Individuals

Calculating the MNI is a way to identify the fewest number of people that could have been buried in a given commingled burial context. For this project, MNI was calculated using the most common method, Max (L, R), meaning for all teeth, separated by side, the most repeated tooth represents the MNI (Adams & Konigsberg, 2008). The MNI will likely underrepresent the actual number of individuals who were buried in the graves, but the method Most Likely Number of Individuals (MLNI) that corrects for the underestimation of MNI is not appropriate for this collection. While the MLNI calculation has been described as a more ideal calculation for estimating the original number of individuals that make up a burial assemblage (Adams & Konigsberg, 2008), the MLNI relies on pair matching and is not suitable for fragmented collections (Adams & Konigsberg, 2004). The Grand Minimum Total calculation (Left+Right-

Pairs) was also not used because pair matching is not feasible for this collection. MNI can also be calculated using the Minimum Number of Elements (MNE). As outlined by Robb (2016), the typical procedure involves first inventorying the assemblage, then calculating the MNE for each bone using the highest number of specific regions present for each bone, then MNI is calculated by finding the largest MNE of all the bones. Calculating the MNE would help ensure that no tooth is represented more than once because it was fragmented, though it might lower the MNI further. This method was deemed unnecessary because teeth are small, and it was unlikely that multiple fragments from a single tooth could be identified correctly but also not then put together. MNE is more appropriate for larger bones with distinct landmarks.

### 2.5.3. Dental Nonmetrics

Nonmetric and metric traits are commonly used in place of genetic information (aDNA) and can be used to study biodistance, relatedness, and population migration. Recent work has validated the efficacy of using nonmetric traits as proxies for genetic data (Irish et al., 2020). The Arizona State University Dental Anthropology System (ASUDAS) (Turner et al., 1991) is a widely used system for scoring nonmetric dental traits in archaeological populations. Despite its widespread use, there are still issues in comparison between studies because of continuous variation of nonmetric traits and researcher subjectivity in interpreting degree of expression, as well as differences between studies in combining the different grades on the plaques (Hillson, 1996). Because it is ideal to compare nonmetric traits in the teeth between Wadi Faynan 100 and Bab edh-Dhra’, it would be best to use the same standards as those used in the nonmetric trait studies conducted with the Bab edh-Dhra’ individuals. Bentley & Perry (2008) used the ASUDAS (Turner et al., 1991) and Dahlberg (1956) standards. When they combined grades from the standards for certain traits, they noted where and how they were combined, so it is possible to replicate how exactly the standards were followed. ASUDAS traits were recorded using the Dahlberg plaques which were available in the University of Waterloo Bioanthropology laboratory, along with the original publication (Turner et al. 1991) and a reference volume including many detailed photographs (Scott & Irish, 2017). Because the sample size was small, statistical analyses were not performed.

#### 2.5.4. Dental Metrics

Dental metrics were recorded using digital calipers, following Buikstra and Ubelaker (1994) after Mayhall (1992) and Moorees (1957) for crown height, mesiodistal, and buccolingual crown measurements, and Hillson et al. (2005) for cementoenamel junction (CEJ) and diagonal crown measurements. Dental metrics were recorded for posterity but will not be analyzed for the purposes of this project because there are very few publications including dental metric analyses of any comparable populations in the Southern Levant. Also, due to the fragmentary nature of the dental remains, not all measurements could be taken for all teeth, reducing the sample size drastically, and preventing any reliable statistical analyses, which would be necessary for any meaningful interpretation of dental metrics.

#### 2.5.5. Tooth Development/Age-at-Death Estimation

Tooth development stages and age-at-death were recorded using the London Atlas of Tooth Development (AlQahtani et al., 2010) for each tooth. If the tooth was completely formed, the age was listed as the age of the completed tooth development or greater. The estimation of age-at-death for this sample using macroscopic methods was limited to the assessment of tooth development. While age-at-death can be estimated using dental wear, dental wear is population specific, and there have been no other studies of an EBA population in the Southern Levant that were able study dental wear for individuals of known ages in a large enough sample to create a standard. Therefore, any age estimation using dental wear would likely be inaccurate. The Miles method (1962, 1963, 2001), and any modifications of the method (eg. Gilmore & Grote, 2012), were not appropriate because they rely upon a seriation of subadult individuals to establish the wear rate for the population. This was not possible for the present project because the collection is comprised of single teeth and few individuals, so there was not enough subadult material or complete dentitions to calculate the wear rate.

### 2.5.6. Dental Wear and Health

While dental wear cannot be used for aging this population, it is still useful to record for health implications. Dental wear was recorded using Scott (1979) (Figure 3) and Smith (1984) (Figure 4) for the molars and remainder of the teeth, respectively. These standards were chosen because they were used in a study by Ullinger et al. (2015) in which they examined the dental health of EBIA individuals from Bab edh-Dhra'. Because of the potential link between the sites, comparison to the data from Bab edh-Dhra' would be useful. Incisors canines and premolars were scored from stages 1-8 on the Smith (1984) wear chart (Figure 4). Molars were scored according to the Scott (1979) technique which involves visually dividing the tooth into four quadrants and assigning a value of 1-10 to each quadrant and adding the quadrants together for a total (Figure 3). For analysis, the molars were grouped together by break points defined in Ullinger et al. 2015. The number of deciduous teeth was low, so the same standards were used for both deciduous and permanent teeth, though deciduous teeth were not observed in comparable research so the data were collected for posterity. Dental wear was not recorded for molars that were less than 75% present and premolars, canines and incisors that were less than 50% present. Dental wear was also not recorded for teeth that were unerupted or possibly unerupted.

TABLE 1

*Attrition scoring technique*

| Score | Description |
|---|---|
| 0 | No information available (tooth not occluding, unerupted, antemortem or postmortem loss, etc.) |
| 1 | Wear facets invisible or very small |
| 2 | Wear facets large, but large cusps still present and surface features (crenulations, noncarious pits) very evident. It is possible to have pinprick size dentine exposures or "dots" which should be ignored. This is a quadrant with *much* enamel. |
| 3 | Any cusp in the quadrant area is rounded rather than being clearly defined as in 2. The cusp is becoming obliterated but is not yet worn flat. |
| 4 | Quadrant area is worn flat (horizontal) but there is no dentine exposure other than a possible pinprick sized "dot." |
| 5 | Quadrant is flat, with dentine exposure one-fourth of quadrant or less. (Be careful not to confuse noncarious pits with dentine exposure.) |
| 6 | Dentine exposure greater: more than one-fourth of quadrant area is involved, but there is still much enamel present. If the quadrant is visualized as having three "sides" (as in the diagram) the dentine patch is still surrounded on all three "sides" by a ring of enamel. |
| 7 | Enamel is found on only two "sides" of the quadrant. |
| 8 | Enamel on only one "side" (usually outer rim) but the enamel is thick to medium on this edge. |
| 9 | Enamel on only one "side" as in 8, but the enamel is very thin—just a strip. Part of the "edge" may be worn through at one or more places. |
| 10 | No enamel on any part of quadrant—dentine exposure complete. Wear is extended below the cervicoenamel junction into the root. |

*Figure 3: Scott (1979) molar wear stages (p.214)*

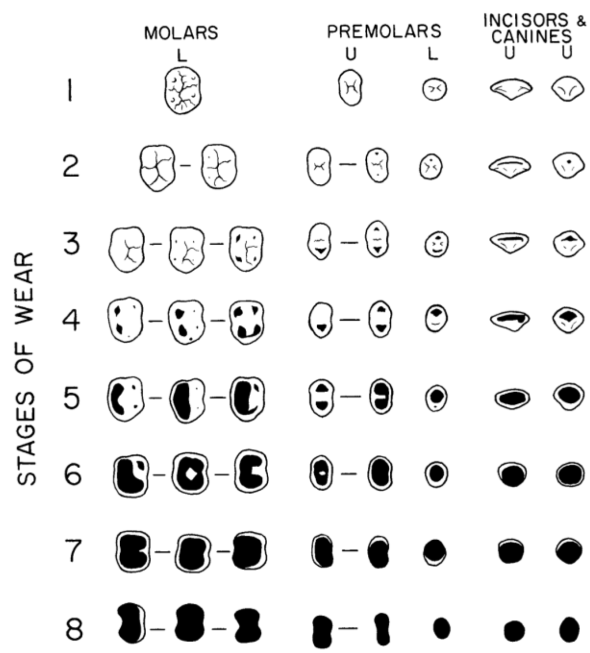


*Figure 4: Smith (1984) wear stages (p.46). Only premolar,incisor and canine stages used.*

### 2.5.7. Pathology

Dental pathology is studied to gain some understanding about the dental health of a population. Enamel defects, specifically linear enamel hypoplasia (LEH) can be informative about physiological stress experienced by infants and children during tooth development. The Developmental Defects of Enamel (DDE) Index (Commission on Oral Health, 1982) was used for recording enamel defects which, unlike many other standards, was made for scoring single teeth and therefore quite appropriate for the collection. Opacities and discolourations were not recorded because of taphonomic processes potentially affecting the appearance of enamel in the teeth from WF100. Linear enamel hypoplasia, pit defects, plane defects and furrows were recorded where observed. Digital calipers were used to measure LEH from the cementoenamel junction (CEJ) to the most occlusal point of the hypoplasia as recommended by Buikstra and Ubelaker (1994).

Caries is a common pathological condition leading to the destruction of the enamel, and progressively, dentine and cementum, resulting from acid produced by bacteria found in plaque. Calculus occurs when plaque on the surface of the tooth becomes mineralized (Hillson, 1996). Not only can caries and calculus be informative about the dental health of the population, they can also be related to, and informative about, diet in past populations as high caries prevalence tends to be associated with carbohydrate consumption and the transition to an agricultural diet. Caries were recorded according to Buikstra and Ubelaker's (1994) modification of Moore & Corbett (1971) and dental calculus was recorded according to Buikstra and Ubelaker (1994) from Brothwell (1981). Caries and calculus were not recorded for molars that were less than 75% present, and premolars, canines and incisors that were less than 50% present.

## 2.6. Results

### 2.6.1. Data Collection

The complete database inventory across all graves from WF100 included 280 entries. An entry could be a: 1) whole, completely identified tooth; 2) reconstructed tooth identified to varying degrees of specificity; or 3) a bulk bag including several fragments of a single tooth type that would not provide much specific information if studied on their own. Most of the collection is made up of teeth from WF100 CEM Grave 3. Of all entries, 109 were teeth that were completely identified (side, quadrant, tooth type, and position). Of the 280 database entries, 89 were teeth or portions of teeth that had been put back together. Of those reconstructed teeth 47 were completely identified (see Figures 5 and 6). Therefore, approximately one third of all database entries were successfully reassembled teeth (of varying degrees of completeness), over half of the reconstructed teeth were completely identified and slightly less than half of all completely identified teeth were reconstructed teeth.

| | | BLP 2019 Inventory | | Identification Success | |
|---|---|---|---|---|---|
| Grave | Locus | Entries | Total Entries Per Grave | Completely ID Teeth | Completely ID Teeth Per Grave |
| WF100 CEM Grave 1 | 1 | 17 | 17 | 6 | 6 |
| WF100 CEM Grave 2 | 1 | 4 | 4 | 1 | 1 |
| WF100 CEM Grave 3 | 1 | 87 | 223 | 34 | 86 |
| WF100 CEM Grave 3 | 2 | 8 | | 4 | |
| WF100 CEM Grave 3 | 3 | 28 | | 12 | |
| WF100 CEM Grave 3 | 4 | 16 | | 4 | |
| WF100 CEM Grave 3 | 5 | 3 | | 1 | |
| WF100 CEM Grave 3 | 6 | 10 | | 6 | |
| WF100 CEM Grave 3 | 99 | 71 | | 25 | |
| WF100 CEM Grave 4 | 1 | 1 | 1 | 0 | 0 |
| WF100 CEM Grave 5 | 1 | 4 | 35 | 0 | 16 |
| WF100 CEM Grave 5 | 3 | 3 | | 0 | |
| WF100 CEM Grave 5 | 4 | 28 | | 16 | |
| Total | | | 280 | | 109 |

*Table 1: Summary of data collected from each grave and locus*

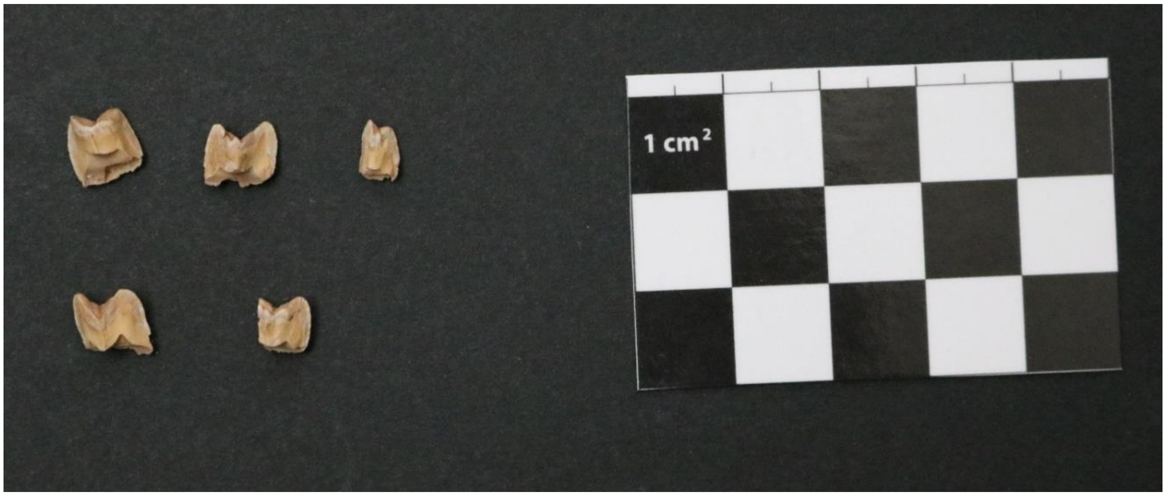


*Figure 5: Bag #65 a RM$_1$ in fragments that was reconstructed*

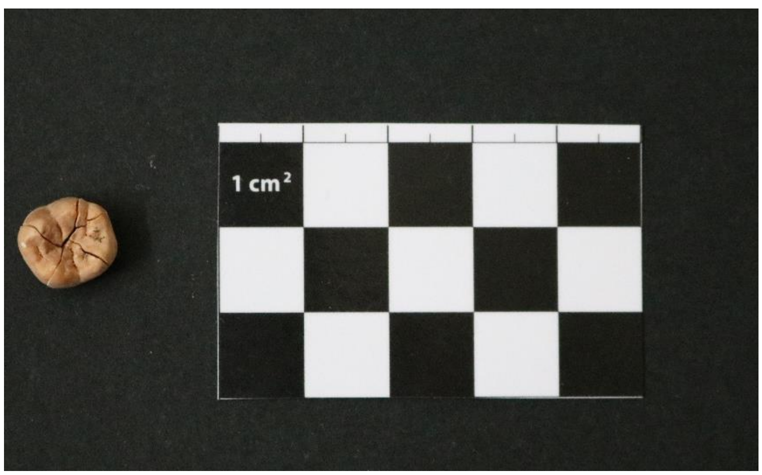


Figure 6: Bag #65 RM$_1$ reassembled

2.6.2. Minimum Number of Individuals

. The MNI for WF100 CEM Graves 1 and 2 is one individual each (Table 2), though the excavation report indicates that MNI for Grave 1 is two based on observations of adult and subadult bones. The minimum number of individuals for WF100 CEM Grave 3 is five, based on the presence of five each of the RPM$^1$, LPM$_1$, and LM$_1$ (Table 2). The MNI for this grave can be refined by considering the implications of tooth development results (see Table 12). While the

MNI is five from the $LM_1$, they are all unerupted. The upper and lower first molars are the first of the permanent dentition to erupt (AlQahtani et al. 2010). Therefore, any permanent tooth other than the first molar that has erupted cannot belong to any of the five individuals with unerupted $LM_1$. In Grave 3 there are four erupted $RI^2$ (Table 12) meaning that the MNI when accounting for tooth eruption is nine. The MNI for WF100 Grave 5 is three from the $RM^1$ (Table 2), though it is known that there were at least five individuals (four adults, one juvenile) in Grave 5 based on the excavation recordings of human bone material found in the charnel house (Adams et al. 2019).

| Grave | Dental MNI | Excavation Report | MNI from Combined Dental and Excavation Data |
|---|---|---|---|
| 1 | 1 | 2 | 2 |
| 2 | 1 | 1 | 1 |
| 3 | 9 | 3 | 9 |
| 5 | 3 | 5 | 5 |
| Total: | 14 | 11 | 17 |

*Table 2: MNI per grave from dental data and excavation report*

Based on the dental remains, and the excavation report (Table 2), the MNI for each of the graves is one for Grave 1 (two from using the excavation report), one for Grave 2, nine for Grave 3 and three for Grave 5 (five from using the excavation report). The total MNI for all graves is therefore, 14 from dental data alone and 17 if using dental data with the excavation report.

| | WF100 CEM Grave 1 | WF100 CEM Grave 2 | WF100 CEM Grave 3 | WF100 CEM Grave 5 |
|---|---|---|---|---|
| $RM^3$ | | | 2 | 1 |
| $RM^2$ | | | 2 | 2 |
| $RM^1$ | 1 | | 4 | **3** |
| $RPM^2$ | | | 2 | |
| $RPM^1$ | | | **5** | 1 |
| $RC^-$ | | | 4 | 1 |
| $RI^2$ | | | 4 | |
| $RI^1$ | | | | |
| $LI^1$ | 1 | | 4 | |
| $LI^2$ | | | 4 | |
| $LC^-$ | | | | |
| $LPM^1$ | 1 | | 1 | 2 |
| $LPM^2$ | | | | 1 |
| $LM^1$ | | | 2 | |
| $LM^2$ | | | 3 | 1 |
| $LM^3$ | | | 3 | 1 |
| $RM_3$ | | | 1 | |
| $RM_2$ | | | 3 | |
| $RM_1$ | 1 | 1 | 2 | |
| $RPM_2$ | 1 | | 3 | |
| $RPM_1$ | | | 3 | |
| $RC_-$ | | | 2 | |
| $RI_2$ | | | | |
| $RI_1$ | | | 1 | |
| $LI_1$ | | | | |
| $LI_2$ | | | | |
| $LC_-$ | | | 2 | |
| $LPM_1$ | | | **5** | |
| $LPM_2$ | 1 | | 3 | |
| $LM_1$ | | | **5** | |
| $LM_2$ | | | 4 | |
| $LM_3$ | | | 1 | |
| MNI | **1** | **1** | **5** | **3** |

*Table 3: Data used for MAX (L, R) MNI calculation*

2.6.3. Nonmetric Traits

While all 29 ASUDAS traits were recorded, only traits of interest, determined by previous publications (Ullinger et al. 2005, Bentley & Perry, 2008) will be analyzed. Traits were only observable on 22 permanent incisors, 15 canines, 27 premolars and 41 molars. While these numbers themselves are not small, it is important to note that not all traits were observable on all of the teeth, as well, for comparison to other research, teeth were only included when they were identified completely (side, upper or lower, tooth type, and position). This left a small enough sample (Tables 3, 4, 5, and 6) that it was determined that statistics should not be used. Notable trait presence or absence will be mentioned and discussed. Notable findings include: out of all the incisors only one $LI^2$ exhibited shoveling. As well, a tuberculum dentale was observed on only one $LI^1$, and double shoveling was observed on two incisors (Table 3).

| | Shoveling + = 3-7 | Double Shoveling + = 2+ | Interruption Groove + = 2+ | Tuberculum Dentale + = 1+ |
|---|---|---|---|---|
| $RI^1$ | - | - | - | - |
| $LI^1$ | 0/4 | 1/4 | 0/3 | 0/1 |
| $RI^2$ | 0/2 | 0/3 | 0/1 | 0/2 |
| $LI^2$ | 1/4 | 0/2 | 0/1 | 0/3 |
| $RI_1$ | 0/1 | 0/1 | - | - |
| $LI_1$ | - | - | - | - |
| $RI_2$ | - | - | - | - |
| $LI_2$ | - | - | - | - |
| I | 1/19 | 2/17 | 0/9 | 1/12 |

*Table 4: Incisor nonmetric trait frequencies (break points from Ullinger et al. 2005)*

In canines, the distal accessory ridge was present in 2/7 teeth (Table 4), and in upper molars cusp 5 was observed in 1/6 $M^2$ and Carabelli's trait in 3/6 $M^1$ (Table 5).

| Premolar Nonmetric Traits | | Canine Nonmetric Traits | |
|---|---|---|---|
| | Lingual Cusps + = 2+ | | Distal Accessory Ridge + = 1+ |
| $RP_2$ | 2/2 | $RC^-$ | 1/3 |
| $LP_2$ | 3/3 | $LC^-$ | - |
| | | $RC_-$ | 0/1 |
| | | $LC_-$ | 1/2 |
| | | C | 2/7 |

*Table 5: Premolar and canine nonmetric trait frequencies (break points from Ullinger et al. 2005)*

| | Hypocone + = +2-5 | Cusp 5 + = 1+ | Carabelli trait + = 2-7 | Parastyle + = 1 + |
|---|---|---|---|---|
| $RM^1$ | 7/7 | 0/6 | 2/5 | 0/5 |
| $LM^1$ | 1/1 | 0/1 | 1/1 | - |
| $RM^2$ | 3/3 | 1/2 | 0/3 | 0/3 |
| $LM^2$ | 4/4 | 0/4 | 0/3 | 0/5 |
| $RM^3$ | 1/3 | 0/3 | 0/3 | 0/3 |
| $LM^3$ | 2/3 | 0/4 | 0/4 | 0/3 |

*Table 6: Upper molar nonmetric trait frequencies (break points from Ullinger et al. 2005)*

In lower molars, the protostylid was observed in 4/16 $M_1$ and $M_2$ and the Y groove pattern was the predominant lower molar groove pattern. Of 16 lower molars one $LM_1$ displayed a cusp 6 and of 18 lower molars one $LM_3$ displayed a cusp 7. One out of eight $M_2$ did not have 4 cusps, and no lower molars displayed a deflecting wrinkle (Table 6).

| | Protostylid + = 1+ | Groove Pattern (Y) | Cusp 6 + = 1+ | Cusp # ($M_2$ 4) | Deflecting Wrinkle + = 3 | Cusp 7 + = 1+ |
|---|---|---|---|---|---|---|
| $RM_1$ | 1/4 | 3/4 | 0/3 | - | 0/2 | 0/3 |
| $LM_1$ | 1/5 | 4/5 | 1/4 | - | 0/5 | 0/5 |
| $RM_2$ | 1/4 | 1/4 | 0/4 | 4/4 | 0/4 | 0/4 |
| $LM_2$ | 1/3 | 2/4 | 0/3 | 3/4 | 0/3 | 0/4 |
| $RM_3$ | 0/1 | 0/1 | 0/1 | - | 0/1 | 0/1 |
| $LM_3$ | 0/1 | 0/1 | 0/1 | - | 0/1 | 1/1 |

*Table 7: Lower molar nonmetric trait frequencies (break points from Ullinger et al. 2005)*

The number of teeth for which a trait was recorded as present or absent could vary because breakage and wear could prevent some traits from being recorded for all teeth.

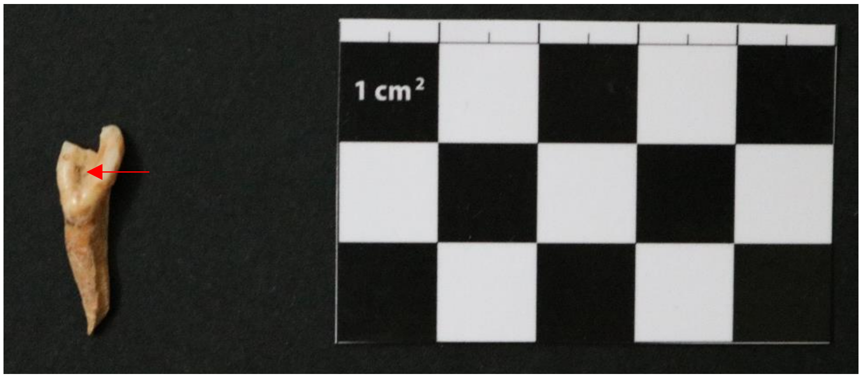


Figure 7: Bag #2218, $LI^2$ exhibiting shoveling

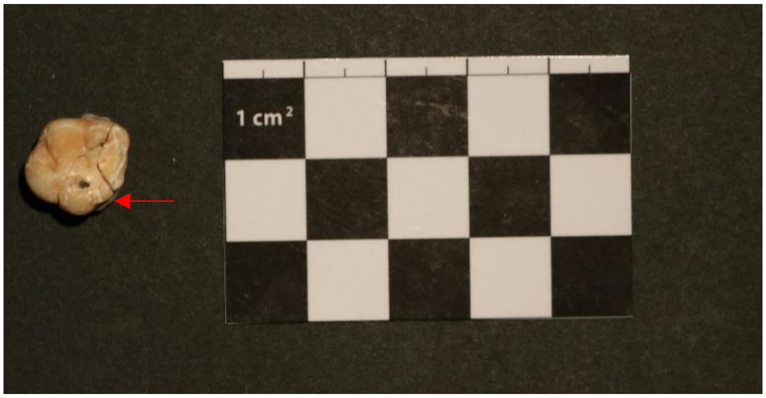


*Figure 8: Bag #163, $RM^1$ exhibiting Carabelli's trait*

2.6.4. Wear

Though the sample size is small, it is clear that wear rates are low (Table 7 and 8). Data are presented for the permanent incisors, canines and premolars and deciduous incisors and canines using broad tooth categories including teeth that were completely identified, teeth that could only be identified by tooth type, or other incomplete combinations. Of 55 anterior teeth that could be scored for wear (at least 50% completeness), 18 were grade 1, 19 were grade 2, 12 were grade 3, five were grade 4, and one was grade 5 (a deciduous incisor). None were grade 6,7 or 8.

| | | Wear Score | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Tooth Type | n | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Mean |
| I | 12 | 3 | 6 | 2 | 1 | - | - | - | - | 2.1 |
| C | 5 | 1 | - | 3 | 1 | - | - | - | - | 2.8 |
| P | 27 | 12 | 10 | 3 | 2 | - | - | - | - | 1.8 |
| i | 6 | - | 1 | 3 | 1 | 1 | - | - | - | 3.3 |
| c | 5 | 2 | 2 | 1 | - | - | - | - | - | 1.8 |
| Total | 55 | 18 | 19 | 12 | 5 | 1 | - | - | - | 2.1 |

*Table 8: Wear for anterior teeth, for all graves, including all teeth identified as I, C, P, i, c*

Molars were not separated into specific and nonspecific wear totals because there were no molars that were at least 75% complete that could not be completely identified. For all graves there were 21 permanent molars and 2 deciduous molars. Of the 21 permanent molars, the highest number was in the lowest grade (Table 8), most of the teeth were from Grave 5 and 3. In Grave 3 half of the molars were in the lowest grade, with the remainder being spread between grades 5-20. No permanent teeth were in the upper five wear brackets. In Grave 5, seven molars were observed and most were concentrated between grades 13 and 24, with none in the 25-40 brackets either. In both the anterior and posterior teeth wear was low overall and only minor differences were observed across graves. The mean deciduous incisor and molar wear rates are also higher than the wear rates for the permanent incisors and molars.

| Molars | n | 4 | 5-8 | 9-12 | 13-16 | 17-20 | 21-24 | 25-28 | 29-32 | 33-36 | 37-40 | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $LM^1$ | 0 | | | | | | | | | | | |
| $RM^1$ | 5 | 1 | | 1 | | 2 | | 1 | | | | 15.4 |
| $LM^2$ | 3 | | | | 2 | 1 | | | | | | 16.7 |
| $RM^2$ | 2 | 1 | | | | | 1 | | | | | 13.5 |
| $LM^3$ | 2 | 1 | | 1 | | | | | | | | 7.5 |
| $RM^3$ | 3 | 2 | | | 1 | | | | | | | 8 |
| $LM_1$ | | | | | | | | | | | | |
| $RM_1$ | 1 | 1 | | | | | | | | | | 4 |
| $LM_2$ | 1 | | | | 1 | | | | | | | 13 |
| $RM_2$ | 3 | | 1 | | 1 | 1 | | | | | | 13.3 |
| $LM_3$ | | | | | | | | | | | | |
| $RM_3$ | 1 | 1 | | | | | | | | | | 4 |
| All Molars | 21 | 7 | 1 | 2 | 5 | 4 | 1 | 1 | | | | 12.1 |
| $Rm^1$ | | | | | | | | | | | | |
| $Lm^1$ | | | | | | | | | | | | |
| $Rm^2$ | | | | | | | | | | | | |
| $Lm^2$ | | | | | | | | | | | | |
| $Rm_1$ | 1 | | | | | | | 1 | | | | |
| $Lm_1$ | | | | | | | | | | | | |
| $Rm_2$ | | | | | | | | | | | | |
| $Lm_2$ | 1 | | | | 1 | | | | | | | |
| All Molars | 2 | | | | 1 | | | 1 | | | | 20.5 |

*Table 9: Wear score for molars by tooth (chart format and wear ranges from Ullinger et al., 2015)*

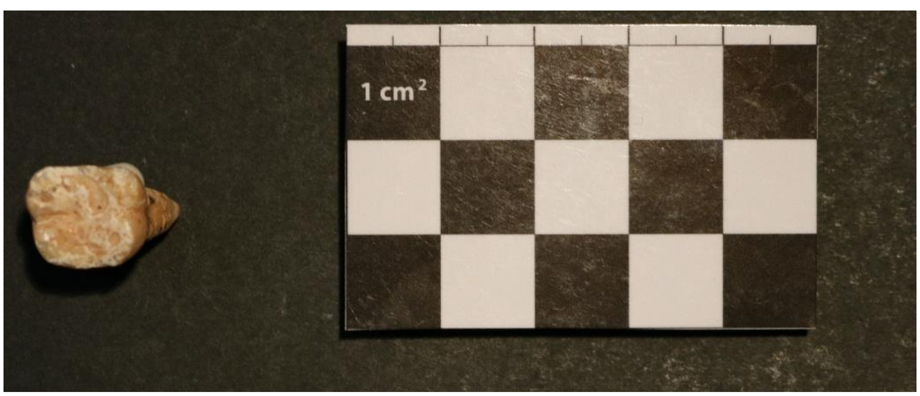


Figure 9: Bag #70, $RM^1$, wear score 19

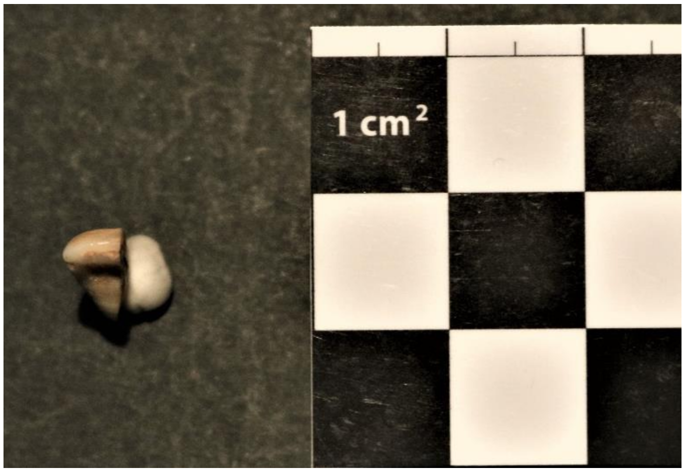


*Figure 10: Bag #1112, $I^1$, wear score 2*

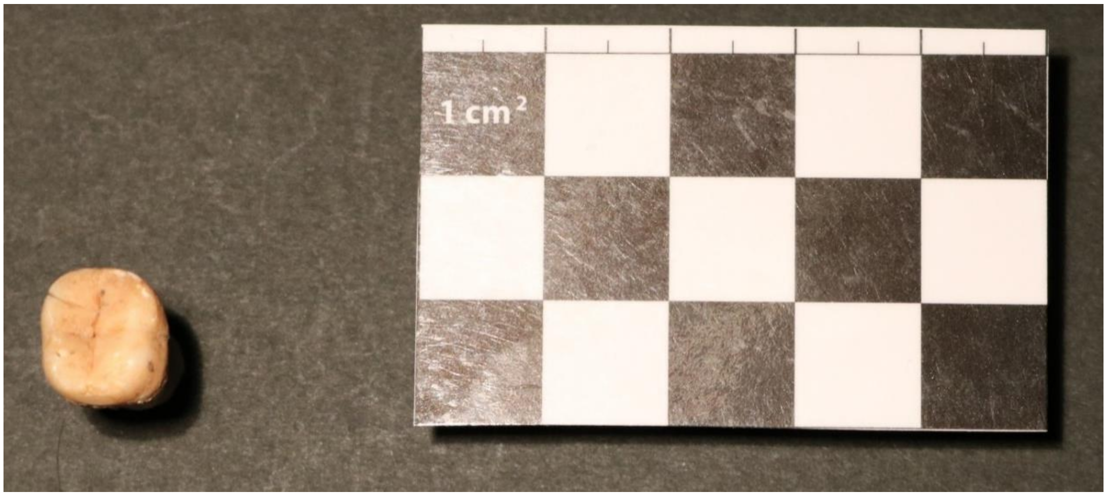


*Figure 11: Bag #174, $LM_2$, wear score 13*

### 2.6.5. Pathology

Of all types of hypoplasia that were considered when examining the teeth, only enamel pits and LEH were observed on any teeth. No hypoplasia were observed on any deciduous teeth. When pooling permanent teeth from all graves, of 28 incisors, 12 (43%) had no defects, none had enamel pits, and 16 (57%) had LEH. Of 22 canines, 6 (27%) had no defects, 2 (9%) had enamel pits and 14 (64%) had LEH. Of 40 premolars, 22 (55%) had no defects, 2 (5%) had enamel pits and 16 (40%) had LEH. Of 40 molars 32 (80%) had no defects, 1 (2%) had enamel pits, and 7 (18%) had LEH (Table 9). Grave 1 only included one incisor and two canines but all three (100%) had LEH. Of three premolars, two (66%) had no defects and one (33%) had LEH. Of two molars both had no defects. No pathology were observable on teeth from Grave 2. All the deciduous teeth and most of the permanent teeth were in Grave 3. Of 26 incisors, 11 (42%) had no defects and 15 (58%) had LEH, of 20 canines, 6 (30%) had no defects, 2 (10%) had enamel pits, and 12 (60%) had LEH. Of 32 premolars, 16 (50%) had no defects, 2 (6%) had enamel pits, and 15 (47%) had LEH, (percentages do not add up to 100% because one premolar had both enamel pits and LEH) and of 29 molars, 21 (72%) had no defects, 1 (3%) had enamel pits and 7 (24%) had LEH. In Grave 5, of the nine permanent molars, 4 premolars and 1 incisor, none had any defects. Therefore, though the sample size for this grave is small, Grave 5 does not reflect the overall graves pooled data because there were no observed hypoplasia, WF100 Grave 1 had higher incidence of LEH in I and C but an extremely small sample size, and generally, Grave 3 is reflective of the pooled data. Overall, molars showed lower levels of hypoplasia than anterior teeth, which, like the absence of hypoplasia on deciduous teeth, is common.

| Tooth | n | No Defects | Enamel Pits | Linear Enamel Hypoplasia |
|---|---|---|---|---|
| I | 28 | 12 | 0 | 16 |
| C | 22 | 6 | 2 | 14 |
| P | 40 | 22 | 2 | 16 |
| M | 40 | 32 | 1 | 7 |
| i | 5 | 5 | 0 | 0 |
| c | 7 | 7 | 0 | 0 |
| m | 6 | 6 | 0 | 0 |

*Table 10: Enamel defects by tooth type for all graves*

Caries were only found on only two teeth in the entire sample of 104 teeth that were deemed appropriate for caries observation (Table 10). The two teeth affected by caries are a $LM^2$ in Grave 5 and a $RP_2$ in Grave 3. Both were located on the occlusal surface.

| Tooth Type | n | Teeth with Caries |
|---|---|---|
| M | 25 | 1 |
| P | 29 | 1 |
| C | 12 | 0 |
| I | 14 | 0 |
| m | 5 | 0 |
| c | 6 | 0 |
| i | 5 | 0 |
| Total | 96 | 2 |

*Table 11: Caries by tooth type for all graves*

Calculus presence was also recorded for 96 teeth. Calculus was not observed on 83 teeth (86%), grade 1 calculus was observed on 11 teeth (11%) and grade 2 calculus was observed on 2 teeth (2%) (Table 11). Teeth with calculus were only observed at WF100 Grave 3 and Grave 5. Calculus was observed on none of the deciduous teeth, 2% of permanent molars, 2% of premolars, 2% of permanent canines, and 0% of permanent incisors. Grave 2 had no teeth that were scored for calculus. Of the 2 molars, 2 premolars, and 2 canines in Grave 1, none had calculus.

| Tooth type | n | Calculus grade 0 | Calculus grade 1 | Calculus grade 2 | Calculus grade 3 |
|---|---|---|---|---|---|
| M | 25 | 19 | 6 | 0 | 0 |
| P | 27 | 22 | 4 | 1 | 0 |
| C | 12 | 10 | 1 | 1 | 0 |
| I | 16 | 16 | 0 | 0 | 0 |
| m | 5 | 5 | 0 | 0 | 0 |
| c | 6 | 6 | 0 | 0 | 0 |
| i | 5 | 5 | 0 | 0 | 0 |
| Total | 96 | 83 | 11 | 2 | 0 |

*Table 12: Calculus by tooth type for all graves*

### 2.6.6. Tooth Development

All of the following data are available in Table 12. In WF100 Grave 1, 4/6 (67%) of the teeth were unerupted. The only completely identified tooth ($RM_1$) in WF100 Grave 2 was erupted. In WF100 CEM Grave 3, out of 70 teeth, 37 (53%) were erupted and 33 (47%) were unerupted. In WF100 CEM Grave 5 out of 15 teeth, only one tooth (7%) was unerupted. While unerupted teeth were present in most of the graves, there was a significant proportion of unerupted teeth in Grave 3 and Grave 1, though the sample size is very small for Grave 1. Further, examining which permanent teeth were erupted versus which teeth were unerupted, in Grave 3 out of the nine incisors observed (all upper) only one $LI^2$ was unerupted (11%), six of seven canines (86%) were unerupted, 14 of 22 premolars were unerupted (64%) and eight (36%) were erupted. Upper and lower molars of the same position generally erupt at around the same time. In Grave 3, out of 13 first molars, nine are unerupted (69%) and four (31%) are erupted. Out of 12 second molars, seven are unerupted (58%) and five (42%) are erupted, and out of seven third molars, five are erupted (71%) and two are unerupted (29%). A higher proportion of the third molars are erupted compared to first and second, meaning that these teeth are likely from several different individuals. What is definite is that there are a significant number of subadult individuals in Grave 3, particularly considering the high number of unerupted molars. From the five unerupted $LM_1$ there are certainly five individuals younger than 6.5 years of age in the grave.

| | **WF 100 Grave 1** | | **WF100 Grave 2** | | **WF100 Grave 3** | | **WF100 Grave 5** | | **Total** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Tooth** | nE | nU | nE | nU | nE | nU | nE | nU | nE | nU |
| $RI^1$ | | | | | | | | | | |
| $LI^1$ | | 1 | | | 2 | | | | 2 | 1 |
| $RI^2$ | | | | | 4 | | | | 4 | |
| $LI^2$ | | | | | 2 | 1 | | | 2 | 1 |
| $RC^-$ | | | | | 1 | 2 | 1 | | 2 | 2 |
| $LC^-$ | | | | | | | | | | |
| $RP^1$ | | | | | 4 | 1 | 1 | | 5 | 1 |
| $LP^1$ | | 1 | | | 1 | | 2 | | 3 | 1 |
| $RP^2$ | | | | | 2 | | | | 2 | |
| $LP^2$ | | | | | | | 1 | | 1 | |
| $LM^1$ | | | | | 1 | 1 | | | 1 | 1 |
| $RM^1$ | | 1 | | | 3 | 1 | 2 | 1 | 5 | 3 |

| | WF 100 Grave 1 | | WF100 Grave 2 | | WF100 Grave 3 | | WF100 Grave 5 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| $LM^2$ | | | | | 1 | 2 | 2 | | 3 | 2 |
| $RM^2$ | | | | | 1 | 1 | 2 | | 3 | 1 |
| $LM^3$ | | | | | 2 | 1 | 2 | | 4 | 1 |
| $RM^3$ | | | | | 2 | | 1 | | 3 | |
| $RI_1$ | | | | | | | | | | |
| $LI_1$ | | | | | | | | | | |
| $RI_2$ | | | | | | | | | | |
| $LI_2$ | | | | | | | | | | |
| $RC_-$ | | | | | | 2 | | | | 2 |
| $LC_-$ | | | | | | 2 | | | | 2 |
| $RP_1$ | | | | | 2 | 1 | | | 2 | 1 |
| $LP_1$ | | | | | 2 | 3 | | | 2 | 3 |
| $RP_2$ | | | | | 2 | 1 | | | 2 | 2 |
| $LP_2$ | | 1 | | | 1 | 2 | | | 1 | 3 |
| $LM_1$ | | | | | | 5 | | | | 5 |
| $RM_1$ | 1 | | 1 | | | 2 | | | 2 | 2 |
| $LM_2$ | | | | | 1 | 3 | | | 1 | 3 |
| $RM_2$ | 1 | | | | 2 | 1 | | | 3 | 1 |
| $LM_3$ | | | | | | 1 | | | | 1 |
| $RM_3$ | | | | | 1 | | | | 1 | |
| $Ri^1$ | | | | | 1 | | | | 1 | |
| $Li^1$ | | | | | 1 | | | | 1 | |
| $Ri^2$ | | | | | 1 | | | | 1 | |
| $Li^2$ | | | | | | | | | | |
| $Rc^-$ | | | | | | | | | | |
| $Lc^-$ | | | | | 1 | | | | 1 | |
| $Rm^1$ | | | | | | 1 | | | | 1 |
| $Lm^1$ | | | | | | | | | | |
| $Rm^2$ | | | | | | | 1 | | 1 | |
| $Lm^2$ | | | | | | | | | | |
| $Ri_1$ | | | | | 2 | | | | 2 | |
| $Li_1$ | | | | | | | | | | |
| $Ri_2$ | | | | | | | | | | |
| $Li_2$ | | | | | | | | | | |
| $Rc_-$ | | | | | | | | | | |
| $Lc_-$ | | | | | 1 | | | | 1 | |
| $Rm_1$ | | | | | 1 | | | | 1 | |
| $Lm_1$ | | | | | | | | | | |
| $Rm_2$ | | | | | | | | | | |
| $Lm_2$ | | | | | 1 | | | | 1 | |

*Table 13: Tooth eruption breakdown for all graves, by specific tooth*

*nE = number of erupted teeth, nU = number of unerupted teeth*

## 2.7. Discussion

### 2.7.1. Data Collection

Because teeth are pooled by tooth type rather than individual, it is possible that certain individuals are overrepresented in the sample if more of their teeth are present compared to other individuals. For example, this is clear in Grave 5 where Individual 2 has more teeth present than many of the other individuals, therefore skewing the results to be more representative of that individual compared to Individuals 1, 3 and 4.

Another potential issue with data collection is that lower incisors are much less represented than upper incisors. This could be because they are generally thinner and smaller than upper incisors which makes them more fragmentary. They also tend to be quite symmetrical and there is less of a size difference between the central and lateral lower incisors than there is in upper incisors. Thus, when these teeth are broken, they might be harder to side and distinguish between central and lateral, resulting in their being included in bulk bags.

### 2.7.2. MNI/Tooth Development

When comparing the MNI derived solely from the dental remains to the preliminary MNI from the site excavation, it is evident that the dental MNI sometimes underrepresented the MNI including bones (Graves 1, 5), but it also revealed more individuals than MNI from just the bones (Grave 3). This is interesting when considering the use of dental anthropology in looted, fragmented, and commingled contexts. This research has demonstrated that by using dental anthropological methods, not limited to tooth identification, the MNI calculation can potentially be more accurate and not as much of an underestimation (Grave 3), though it may also result in an underestimation (Graves 1, 5). Evidently this suggests the importance of examining both the teeth and the bones for the most accurate results. In Southern Jordan and at sites like Feifa, and

Bab edh-Dhra' where looting has been a documented issue for decades, using dental anthropology in addition to studying bones in these commingled and fragmented contexts may be an appropriate strategy to learn as much as possible about the lives of these individuals. In addition, the calculation of MNI is insightful in comparing burial practices with those of EBI and EBII Bab edh-Dhra'. For example, while the shape of the structure of the WF100 charnel houses is similar to (though smaller than) the EBII charnel houses at Bab edh-Dhra', the MNI suggests that there may have been fewer individuals in the graves at WF100 than there were at Bab edh-Dhra', where the EBII charnel houses had 41-200 individuals (Chesson, 1999), though looting and commingling likely resulted in a lower MNI at WF100 than actual number of people that were buried there.

While using tooth development to help with MNI calculation proved valuable, there are some issues that may result in bias in the data. First, it is possible that there are so many unerupted teeth compared to erupted teeth because they were protected inside the mandibles and maxillae of subadult individuals, meaning that the interpreted high proportion of subadult individuals in Grave 3 would not be reflective of the actual population demographics. That being said, Grave 5 did have a high proportion of adult individuals, and we cannot be certain of how the remains were affected exactly by the looting activity. Nonetheless, it is a possibility that the high proportions of subadult individuals in Grave 3 is the result of bias. Another potential issue with relying on tooth development for MNI calculation is that the AlQahtani et al. (2010) standard was based on the British Spitalfields Collection and Maurice Stack's Collections, as well as radiographs from white and Bangladeshi individuals from the Institute of Dentistry, Barts and the London School of Medicine and Dentistry (AlQahtani et al. 2010). There are no Middle Eastern/Near Eastern population standards or any more appropriate standards to apply to this population, and there is the possibility that there may be differences in tooth development between the individuals used for the creation of the standard and the individuals from EBA Jordan.

### 2.7.3. Nonmetric Traits

Unfortunately, due to the small sample size and inability to perform statistical analyses, comparison of nonmetric traits observed at WF100 to other sites is difficult. Ullinger (2010) did not analyze dental remains for nonmetric traits at Bab edh-Dhra' because the sample size was too small (less than five for each trait for each tooth) for statistical analysis. Bentley and Perry (2008) conducted nonmetric trait analysis of the EBIA individuals at Bab edh-Dhra', specifically, between and within shaft tombs using 98 relatively complete dentitions, 49 partial dentitions and 330 loose teeth. Bentley and Perry (2008) found that for the most part, the individuals at Bab edh-Dhra' were very homogeneous in their dental morphological traits, though they did not include any data in the publication which allowed for comparison or which indicated specific trait frequencies.

WF100 data were compared to Ullinger et al. (2005) who examined the Late Bronze Age – Early Iron Age transition in the Southern Levant via the sites Dothan and Lachish (Table 13). This comparison was deemed most appropriate because though it was not an EBA site, the presentation of their results best allowed for data comparison. They only analyzed one tooth for each trait, which further reduced the sample for the WF100 individuals (see Table 13). Though statistical analyses would be required to determine if any of the differences were significant, generally, what is observed with the WF100 traits is similar to what is observed at Dothan and Lachish. For example, some traits with low frequency at WF100 were also low at Dothan and Lachish including, cusp 5 [0/7 (0%) at WF100; 8/89 (9%) at Dothan; 3/294 (1%) at Lachish], parastyle [0/6 (0%) at WF100; 2/75 (3%) at Dothan; 4/143 (3%) at Lachish], deflecting wrinkle [0/11 (0%) at WF100; 4/40 (10%) at Dothan; 0/5 (0%) at Lachish] and cusp 7 [0/12 (0%) at WF100; 6/118 (5%) at Dothan; 1/82 (1%) at Lachish]. Some numbers from WF100 that stand out as particularly different from the Dothan and Lachish individuals is that there was a higher frequency of double shoveling [1/4 (25%) at WF100; 13/177 (7%) at Dothan; 0/23 (0%) at Lachish)], and lingual cusps [5/5 (100%) at WF100; 60/74 (81%) at Dothan; 16/21 (76%) at Lachish)], and there is a lower frequency of the protostylid [2/9 (22%) at WF100; 50/106 (47%) at Dothan; 16/53 (30%) at Lachish]. It is difficult to say whether these differences are the result of the small sample, but overall, the traits observed in the WF100 individuals seem to be in the range for the Dothan and Lachish populations and the data may suggest that the nonmetric traits observed at WF100 are not unlike what is observed at other Jordanian archaeological sites.

| Traits | WF100 | | Dothan | | Lachish | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Shoveling (UI1, + = 3-7) | 0/4 | 0 | 26/176 | 15 | 0/23 | 0 |
| Double Shovel (UI1, + = 2 +) | 1/4 | 25 | 13/177 | 7 | 0/23 | 0 |
| Interruption Groove (UI2, +) | 0/2 | 0 | 21/139 | 15 | 1/42 | 2 |
| Tuberculum dentale (UI2, + = 1 +) | 0/5 | 0 | 22/126 | 17 | 6/39 | 15 |
| Distal Accessory Ridge (UC, + = 1 +) | 1/3 | 33 | 20/53 | 38 | 3/13 | 23 |
| Hypocone (UM2, + = 2-5) | 7/7 | 100 | 89/110 | 81 | 174/248 | 70 |
| Cusp 5 (UM1, + = 1+) | 0/7 | 0 | 8/85 | 9 | 3/294 | 1 |
| Carabelli Trait (UM1,+ = 2-7) | 3/6 | 50 | 57/88 | 65 | 44/170 | 26 |
| Parastyle (UM3, + = 1+) | 0/6 | 0 | 2/75 | 3 | 4/143 | 3 |
| Lingual Cusps (LP2, + = 2+) | 5/5 | 100 | 60/74 | 81 | 16/21 | 76 |
| Protostylid (LM1, + = 1+) | 2/9 | 22 | 50/106 | 47 | 16/53 | 30 |
| Groove Pattern (LM2, Y) | 3/8 | 38 | 32/111 | 29 | 15/62 | 24 |
| Cusp 6 (LM1, + = 1+) | 1/7 | 14 | 3/101 | 3 | 0/59 | 0 |
| Cusp number (LM2, 4) | 7/8 | 88 | 121/134 | 90 | 99/104 | 95 |
| Deflecting wrinkle (LM1, + = 3) | 0/7 | 0 | 4/40 | 10 | 0/5 | 0 |
| Cusp 7 (LM1, + = 1+) | 0/8 | 0 | 6/118 | 5 | 1/82 | 1 |

*Table 14: Comparison of nonmetric traits between WF100 and data for Dothan and Lachish Table modeled after Ullinger et al. (2005, p.472)*

Considering the WF100 sample itself, it is interesting that only one tooth out of 21 incisors exhibited shoveling. This may want to be noted in future studies to determine if this individual may be an outlier from the rest of the population in any other respects (e.g. isotopic data or elemental concentrations). Ultimately the small sample size prevented any in-depth analysis from being conducted on this population, or from examining differences between the graves within the site. From this preliminary analysis no conclusions can be made about the population. Furthermore, if nonmetric trait analysis were to be conducted in a productive way at WF100, a much larger sample size would be required, and ideally, with less fragmentation, which prevented many teeth from being observed for nonmetric traits in this sample. Finally, this preliminary analysis performed on a limited sample size revealed nothing that was out of place for an ancient Jordanian population.

### 2.7.4. Wear

Overall, the wear in all the graves is low. Dental wear can be correlated with age, as teeth are subjected to abrasion throughout the lifetime. Diet may also have an effect on dental wear depending on the type of food that is consumed. As well, how food is processed may result in less attrition if it results in a softer product, or more attrition if particles from stone grinding tools are entering foods. The environment may also play a role, such as sand particles entering food, as well as behaviour like using teeth as tools, or bruxism (tooth grinding). Perhaps then, the wear rate at WF 100 is low because the graves are made up of many young individuals. This is supported by the high number of unerupted and still developing permanent teeth found in Grave 3, in particular. While the possibility that wear is low is supported by tooth development, it is not certain that this is the cause. It could be that what they were eating was not conducive to high wear rates. Previous research in the Southern Levant has suggested that after the introduction of agriculture in the region, tooth wear decreased (Eshed et al. 2006). Finally, there is the possibility that worn teeth did not survive as well as the unworn teeth, which had more enamel protecting the tooth, and decreasing the wear scores for the population.

Ullinger et al. (2015) examined dental wear in the EBIA and EBII-III individuals from Bab edh-Dhra'. During the EBIA they found that the mean wear for permanent incisors was 3.3, canines was 3.1, premolars was 3.9 and molars was 20.2. During the EBII-III, the mean wear score for permanent incisors was 3.3, canines was 3.8, premolars was 2.9, and molars was 15.2. The mean wear for the teeth from WF100 including all teeth that wear could be identified for was 2.1 for permanent incisors, 2.8 for canines, and 1.8 for premolars and 12.1 for molars. The mean wear for the teeth from WF100 using only teeth that could be completely identified was 2.3 for permanent incisors, 1 for canines, 1.5 for premolars, and 12.1 for molars. There were no molars that could be scored for wear which could not be completely identified. In both cases, the wear is slightly lower at WF100 compared to both the EBIA and the EBII-III at Bab edh-Dhra'. In addition, the wear rates for the anterior teeth that could be completely identified are lower than for the teeth that were in the general tooth category, meaning that teeth that are more worn may be more prone to breakage. The mean molar wear is noticeably lower at WF100, especially when comparing the EBIA Bab edh-Dhra' individuals to the WF100 individuals. The difference between the sites could be because of age-at-death, particularly because of the high number of subadult individuals at WF100. It could also be because of dietary differences, though previous palynological analysis conducted on samples from WF100 are consistent with cereal and olive cultivation (Barker, 2007) meaning that they were practicing agriculture.

Because deciduous teeth cannot be directly compared to adult teeth they should only be compared amongst themselves and because there are so few of them at WF100, all that can be said is that the data show that deciduous teeth in the population were quite worn. Deciduous teeth are prone to wear because of their thinner enamel, but the fact that they are worn more than the permanent teeth might also suggest that the low wear on the permanent teeth is reflective of a young population with less time for teeth to wear.

Based on the profiles of the individuals in Grave 5 we know that there were four adults and one juvenile individual. This suggests that there may be demographic differences between Graves 3 and 5, and thus, this may be why the wear seems to be more significant in Grave 5 - there could be more adult individuals relative to subadult individuals in Grave 5 compared to Grave 3.

### 2.7.5. Pathology

Enamel hypoplasia has not been studied at Bab edh-Dhra' or another Early Bronze Age site in Jordan. While the frequency of pit defects was low in the Wadi Faynan 100 samples, the frequency of linear enamel hypoplasia occurred in 57% of incisors, 64% of canines, 40% of premolars and 18% of molars. While no other studies have been conducted studying enamel defects more broadly, or linear enamel hypoplasia more specifically, in EBA Jordan, Al-Abbasi and Sarie' (1997) found high rates of "dental enamel hypoplasia" which they describe as including pits and linear enamel defects. While not directly comparable, they still found 60% presence in anterior teeth and 21.4% presence in posterior teeth and 38.4% of all teeth in a Pre-Pottery Neolithic B (PPNB) (7500-6000 BCE) group from Wadi Shu'eib. Evidently, though the PPNB and the EBA are separated by several thousand years, the hypoplasia rate between the two sites were similar, indicating that childhood stress was common in both periods in Jordan, though the causes in either period cannot be determined.

The high rates of LEH in the incisors, canines and premolars suggest that the individuals were subject to stress in their childhood. Linear enamel hypoplasia is a non-specific indicator of stress, meaning that it is not possible to tell exactly what caused the stress. This is notable in two regards: first, the high incidence of LEH suggests a stressful childhood, which may also provide some insight into the high proportion of subadults in the grave. In contrast, the Osteological Paradox (Wood et al. 1992) reminds us that the evidence of stress in the remains is not evidence that the stressful event resulted in mortality of the child, but that the child was able to survive the episode.

Ullinger and colleagues' (2015) research also examined caries at EBIA and EBII-III Bab edh-Dhra'. They found no caries on incisors for either period, 0.8% of canines for the EBIA and none for the EBII, 1.2% of premolars for the EBIA, and 0.8% for the EBII, 12.6% of molars for the EBIA and 12.9% of molars for the EBII-III. The caries rate for all teeth during the EBIA was 6.1% and during the EBII-III was 7.3 %. When comparing to worldwide samples (Turner, 1979) the values were between what is found in agricultural populations and mixed economies. Most interestingly, they found no correlation between age and caries frequency. Examining a later Byzantine (324-638 CE) population from Sa'ad, Jordan, Al Bashaireh & Al Shorman (2010) found coronal caries in 3.8% of incisors, 7.4% of canines, 7.1% of premolars, 25% of molars and 13.9% of all teeth. They argue that this high caries rate was a result of reliance on carbohydrate rich agricultural products.

The caries rate at WF100 is extremely low, with only 2% of teeth exhibiting caries, which is more consistent with a hunting and gathering economy (Turner, 1979). While this may be related to the age of the individuals, there were four adult individuals in WF100 Grave 5. The one molar with caries was from Grave 5, making the caries rate for molars in Grave 5, 11%.

Because this is a preliminary study, with an extremely limited sample size, is it difficult to generalize or conclude why the caries rate is so low. There is a possibility that it is diet related, though we know that Wadi Faynan was home to agriculture in the Early Bronze Age (Barker, 2007), but there is also some indication that the sample is largely made of young individuals which could affect the caries rate.

Concerning dental calculus, using the same break point as this study (0 being calculus absence, calculus grades 1, 2 and 3 being present), Ullinger (2010) found that in the EBIA 56% of teeth had calculus presence and 28% of teeth during the EBII-III had calculus presence. Again, the Wadi Faynan 100 individuals display a lesser frequency of calculus than the EBIA and EBII-III individuals at Bab edh-Dhra'. Eshed et al. (2006) produced another article which also examined calculus in the southern levant in Natufian (10,500-8300 BCE) and Neolithic (8300-5500 BCE) populations across the Southern Levant. They found that there was a higher calculus rate for Neolithic teeth (50.2% mandibular, 44.6% maxillary) than Natufian (14.3% mandibular, 15.9% maxillary), which they argue could be from transition to a carbohydrate rich diet with agriculture, or change in hygiene related behaviour. The WF100 individuals exhibit less calculus than both of these groups as well. Again, the lower calculus frequency in the WF100 individuals could be related to diet, age, hygiene, or some combination. If the individuals were younger, there could be less calculus accumulation over time.

## 2.8 Conclusions

While the five graves excavated at the EBI cemetery site of Wadi Faynan 100, Jordan, were looted, and the dental remains were predominately commingled and fragmented, this preliminary analysis demonstrated the possibility of what information can be learned about the individuals in these contexts. Calculating MNI was successful in identifying a larger number of individuals than what was estimated during excavation, and a larger number still by combining tooth development and basic MNI calculations. Dental wear results were low, possibly a reflection of the age profile of the individuals in Grave 3. Nonmetric traits were not conclusive, but also were not unexpected for an ancient Jordanian population. Pathology suggested that the group experienced childhood stress, and the extremely low caries rate is possibly reflective of a hunter-gatherer rather than an agricultural diet, though again, this may be impacted by the age of the individuals given what is known from archaeological research in the Wadi. What is evident from the comparisons of wear and pathology between EBIA and EBII-III Bab edh-Dhra' and preliminary study of individuals from EBIA Wadi Faynan, is that there appears to be reduced wear and a reduced frequency of caries and calculus, meaning that there is not direct comparability between these two sites. This is only a preliminary analysis that is possibly impacted by preservation or age of the individuals, but it reflects the importance of future studies with a larger sample size to further parse out the similarities and differences between these two groups. While the small sample size was limiting, the advantage of this preliminary study is that it allows for study of a type of skeletal collection that is predominately overlooked (Sheridan, 2019) and can give researchers a better idea of how to direct future research. For example, based on the many developing and subadult teeth, investigation into affects of mining and metallurgy and the impact on childhood is particularly important (though adult teeth do not remodel so they can also be informative about childhood), or the use of cementum annulation analysis to further study the age of the individuals through study of  tooth roots. In addition, this preliminary study has provided a model for future analyses of dental remains excavated at the site.

Ultimately, this research has revealed some information about the lives of the people that were buried at Wadi Faynan 100 in the Early Bronze Age. We know that childhood was a vulnerable time from the high number of children in Grave 3. We also know that the fact that the individuals were so young can likely explain the results of dental wear and pathology observations. In addition, the people buried in Grave 5 were older and buried in a different way than the individuals in Grave 3. While the EBI was a period defined by variability, how people bury their dead is significant and reflects social identity (Chesson, 1999), meaning that the differences in burials across the site may reflect differences in social identity. Future excavations at the site and future comparisons to Bab edh-Dhra' will hopefully elucidate how the different graves and sites, and thus relationships between people are significant.

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## Appendix A: Inventory Data

For “Number of Fragments” 0 = complete crown (greater than 75% complete), 1 = a tooth that is not complete (75% or less) any number > 1 = number of fragments are in the bag. If the fragments in the bag fit together it is indicated as “Yes” under the “Match” Section.

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| BLP 2019 CEM | 1 | 2 | 1 | C | 1 | |
| BLP 2019 CEM | 1 | 2 | 2 | I | 1 | |
| BLP 2019 CEM | 1 | 2 | 3 | Root | 2 | Yes |
| BLP 2019 CEM | 1 | 2 | 4 | Crown fragments | 9 | |
| BLP 2019 CEM | 1 | 2 | 5 | $RM_1$ | 3 | Yes |
| BLP 2019 CEM | 1 | 2 | 6 | $RM_1$ | 3 | Yes |
| BLP 2019 CEM | 1 | 2 | 7 | $LM_1$ | 4 | Yes |
| BLP 2019 CEM | 1 | 2 | 8 | $LM_1$ | 3 | Yes |
| BLP 2019 CEM | 1 | 2 | 9 | $LM^2$ | 2 | Yes |
| BLP 2019 CEM | 1 | 2 | 10 | $I^2$ | 1 | |
| BLP 2019 CEM | 1 | 2 | 11 | $LC_{-}$ | 1 | |
| BLP 2019 CEM | 1 | 2 | 12 | $RP_2$ | 0 | |
| BLP 2019 CEM | 1 | 2 | 13 | Root fragments | 36 | |
| BLP 2019 CEM | 1 | 2 | 14 | Unidentified fragments | 8 | |
| BLP 2019 CEM | 1 | 2 | 15 | I | 1 | |
| BLP 2019 CEM | 1 | 2 | 16 | $P^1$ | 2 | Yes |
| BLP 2019 CEM | 1 | 2 | 17 | Upper molar | 1 | |
| BLP 2019 CEM | 1 | 2 | 18 | P | 1 | |
| BLP 2019 CEM | 1 | 2 | 19 | M | 1 | |
| BLP 2019 CEM | 1 | 2 | 20 | $P_{-}$ | 1 | |
| WF100 CEM | 1 | 1 | 21 | $LI^1$ | 2 | Yes |
| WF100 CEM | 1 | 1 | 22 | $RM_1$ | 0 | |
| WF100 CEM | 1 | 1 | 23 | $RM_2$ | 0 | |
| WF100 CEM | 1 | 1 | 24 | $LP_2$ | 0 | |
| WF100 CEM | 1 | 1 | 25 | $LP^1$ | 0 | |
| WF100 CEM | 1 | 1 | 26 | $RM^1$ | 3 | Yes |
| WF100 CEM | 1 | 1 | 27 | M- | 2 | Yes |
| WF100 CEM | 1 | 1 | 28 | M | 2 | Yes |
| WF100 CEM | 1 | 1 | 29 | P | 1 | |
| WF100 CEM | 1 | 1 | 30 | $C^1$ | 1 | |
| WF100 CEM | 1 | 1 | 31 | $M^{-}$ | 1 | |
| WF100 CEM | 1 | 1 | 32 | $M^{-}$ | 1 | |
| WF100 CEM | 1 | 1 | 33 | M fragment | 1 | |
| WF100 CEM | 1 | 1 | 34 | C fragment | 1 | |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 1 | 1 | 35 | I fragment | 1 | |
| WF100 CEM | 1 | 1 | 36 | Root fragments | 17 | |
| WF100 CEM | 1 | 1 | 37 | Crown fragments | 2 | |
| WF100 CEM | 2 | 1 | 38 | $RM_1$ | 4 | Yes |
| WF100 CEM | 2 | 1 | 39 | $M_1$ | 1 | |
| WF100 CEM | 2 | 1 | 40 | $M_1$ | 1 | |
| WF100 CEM | 2 | 1 | 41 | Roots | 6 | |
| WF100 CEM | 3 | 1 | 42 | $m^-$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 43 | $P^2$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 44 | $c_-$ | 1 | |
| WF100 CEM | 3 | 1 | 45 | $m_-$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 46 | $RM_2$ | 0 | |
| WF100 CEM | 3 | 1 | 47 | $LM_3$ | 0 | |
| WF100 CEM | 3 | 1 | 48 | $LM^1$ | 1 | |
| WF100 CEM | 3 | 1 | 49 | $M^3$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 50 | M | 2 | Yes |
| WF100 CEM | 3 | 1 | 51 | $P^-$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 52 | $RP^1$ | 1 | |
| WF100 CEM | 3 | 1 | 53 | $RM_2$ | 0 | |
| WF100 CEM | 3 | 1 | 54 | $LM^3$ | 0 | |
| WF100 CEM | 3 | 1 | 55 | $RP^1$ | 0 | |
| WF100 CEM | 3 | 1 | 56 | $LP^1$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 57 | $Ri^2$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 58 | $LM_1$ | 3 | Yes |
| WF100 CEM | 3 | 1 | 59 | $LI^2$ | 0 | |
| WF100 CEM | 3 | 1 | 60 | $RC_1$ | 0 | |
| WF100 CEM | 3 | 1 | 61 | $LP_1$ | 1 | |
| WF100 CEM | 3 | 1 | 62 | $LP_2$ | 0 | |
| WF100 CEM | 3 | 1 | 63 | $RP^2$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 64 | $RP_2$ | 0 | |
| WF100 CEM | 3 | 1 | 65 | $RM_1$ | 5 | Yes |
| WF100 CEM | 3 | 1 | 66 | $LM_2$ | 0 | |
| WF100 CEM | 3 | 1 | 67 | $LM^1$ | 0 | |
| WF100 CEM | 3 | 1 | 68 | $LM^2$ | 3 | Yes |
| WF100 CEM | 3 | 1 | 69 | $RM^1$ | 1 | |
| WF100 CEM | 3 | 1 | 70 | $RM^1$ | 0 | |
| WF100 CEM | 3 | 1 | 71 | $RM^3$ | 0 | |
| WF100 CEM | 3 | 1 | 72 | $LM_2$ | 0 | |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 1 | 73 | $RM_2$ | 0 | |
| WF100 CEM | 3 | 1 | 74 | $Li^1$ | 0 | |
| WF100 CEM | 3 | 1 | 75 | $LM^3$ | 16 | Yes |
| WF100 CEM | 3 | 1 | 76 | $RM^2$ | 28 | Yes |
| WF100 CEM | 3 | 1 | 77 | $LI^1$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 78 | $m^{1/2}$ | 2 | Yes |
| WF100 CEM | 3 | 1 | 79 | $RC^1$ | 1 | |
| WF100 CEM | 3 | 1 | 80 | $Lm^2$ | 1 | |
| WF100 CEM | 3 | 1 | 81 | M | 1 | |
| WF100 CEM | 3 | 1 | 82 | $P_{-}$ Forming | 1 | |
| WF100 CEM | 3 | 1 | 83 | $P_{-}$ Forming | 1 | |
| WF100 CEM | 3 | 1 | 84 | $I^{-}$ Forming | 1 | |
| WF100 CEM | 3 | 1 | 85 | $RC^{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 86 | $P_{-}$ Forming | 1 | |
| WF100 CEM | 3 | 1 | 87 | C | 1 | |
| WF100 CEM | 3 | 1 | 88 | Root fragments | 119 | |
| WF100 CEM | 3 | 1 | 89 | Deciduous crown fragments | 5 | |
| WF100 CEM | 3 | 1 | 90 | Deciduous molar fragments | 17 | |
| WF100 CEM | 3 | 1 | 91 | $I^1$ | 4 | |
| WF100 CEM | 3 | 1 | 92 | $I^2$ fragment | 2 | |
| WF100 CEM | 3 | 1 | 93 | $I_{-}$ | 4 | |
| WF100 CEM | 3 | 1 | 94 | I | 6 | |
| WF100 CEM | 3 | 1 | 95 | $C_{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 96 | $C^{-}$ | 2 | |
| WF100 CEM | 3 | 1 | 97 | C | 11 | |
| WF100 CEM | 3 | 1 | 98 | I or C | 14 | |
| WF100 CEM | 3 | 1 | 99 | $P_{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 100 | P | 15 | |
| WF100 CEM | 3 | 1 | 101 | $P_{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 102 | $M_{-}$ | 7 | |
| WF100 CEM | 3 | 1 | 103 | $M^{-}$ | 9 | |
| WF100 CEM | 3 | 1 | 104 | M | 27 | |
| WF100 CEM | 3 | 1 | 105 | Crown fragments | 148 | |
| WF100 CEM | 3 | 1 | 1106 | $RI_{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 1107 | $I^1$ | 1 | |
| WF100 CEM | 3 | 1 | 1108 | $I^{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 1109 | $LP_1$ | 1 | |
| WF100 CEM | 3 | 1 | 1110 | $RM^{-}$ | 1 | |
| WF100 CEM | 3 | 1 | 1111 | $LI^1$ | 1 | |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 1 | 1112 | $I^1$ | 1 | |
| WF100 CEM | 3 | 1 | 1113 | $I_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1114 | $I_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1115 | C | 1 | |
| WF100 CEM | 3 | 1 | 1116 | $C^-$ | 1 | |
| WF100 CEM | 3 | 1 | 1117 | $C^-$ | 1 | |
| WF100 CEM | 3 | 1 | 1118 | $RI^2$ | 1 | |
| WF100 CEM | 3 | 1 | 1119 | $C_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1120 | $C_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1121 | $C_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1122 | $I^2$ | 1 | |
| WF100 CEM | 3 | 1 | 1123 | $I_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1124 | $RI^-$ | 1 | |
| WF100 CEM | 3 | 1 | 1125 | $I^2$ | 1 | |
| WF100 CEM | 3 | 1 | 1126 | $P_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1127 | $P_-$ | 1 | |
| WF100 CEM | 3 | 1 | 1128 | $P_-$ | 1 | |
| WF100 CEM | 3 | 2 | 106 | $P^1$ | 1 | |
| WF100 CEM | 3 | 2 | 107 | $LM^2$ | 0 | |
| WF100 CEM | 3 | 2 | 108 | $LI^2$ | 1 | |
| WF100 CEM | 3 | 2 | 109 | $RI^2$ | 2 | Yes |
| WF100 CEM | 3 | 2 | 110 | $RC^-$ | 2 | Yes |
| WF100 CEM | 3 | 2 | 111 | I | 1 | |
| WF100 CEM | 3 | 2 | 112 | m | 1 | |
| WF100 CEM | 3 | 2 | 113 | M | 1 | |
| WF100 CEM | 3 | 3 | 114 | $LI^2$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 115 | m | 3 | Yes |
| WF100 CEM | 3 | 3 | 116 | $RM^2$ | 0 | |
| WF100 CEM | 3 | 3 | 117 | $LM_1$ | 0 | |
| WF100 CEM | 3 | 3 | 118 | $Ri_1$ | 0 | |
| WF100 CEM | 3 | 3 | 119 | $C_-$ | 1 | |
| WF100 CEM | 3 | 3 | 120 | I | 4 | |
| WF100 CEM | 3 | 3 | 121 | $m^-$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 122 | $RI_1$ | 4 | Yes |
| WF100 CEM | 3 | 3 | 123 | $Lm_2$ | 5 | Yes |
| WF100 CEM | 3 | 3 | 124 | $m_2$ | 4 | Yes |
| WF100 CEM | 3 | 3 | 125 | $I_-$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 126 | m | 2 | Yes |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 3 | 127 | m | 2 | |
| WF100 CEM | 3 | 3 | 128 | LC$_{-}$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 129 | Root fragments | 11 | |
| WF100 CEM | 3 | 3 | 130 | I | 2 | Yes |
| WF100 CEM | 3 | 3 | 131 | I | 1 | |
| WF100 CEM | 3 | 3 | 1131 | RM$_1$ | 0 | |
| WF100 CEM | 3 | 3 | 1132 | LP$_2$ | 0 | |
| WF100 CEM | 3 | 3 | 1133 | LP$_1$ | 0 | |
| WF100 CEM | 3 | 3 | 1134 | I$_{-}$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 1135 | I$_{-}$ | 2 | Yes |
| WF100 CEM | 3 | 3 | 1136 | m$_2$ | 4 | Yes |
| WF100 CEM | 3 | 3 | 1137 | m | 2 | Yes |
| WF100 CEM | 3 | 3 | 1138 | m | 5 | |
| WF100 CEM | 3 | 3 | 1139 | RC$_{-}$ | 0 | |
| WF100 CEM | 3 | 3 | 1140 | RP$_1$ | 0 | |
| WF100 CEM | 3 | 4 | 132 | RM$^3$ | 4 | Yes |
| WF100 CEM | 3 | 4 | 133 | Rm$^1$ | 0 | |
| WF100 CEM | 3 | 4 | 134 | LM$_1$ | 4 | Yes |
| WF100 CEM | 3 | 4 | 135 | Incisor or canine root | 5 | Yes |
| WF100 CEM | 3 | 4 | 136 | M$^{-}$ | 2 | Yes |
| WF100 CEM | 3 | 4 | 137 | M$^{-}$ | 2 | Yes |
| WF100 CEM | 3 | 4 | 138 | RP$_2$ | 1 | |
| WF100 CEM | 3 | 4 | 139 | I | 3 | |
| WF100 CEM | 3 | 4 | 140 | C | 1 | |
| WF100 CEM | 3 | 4 | 141 | C | 2 | Yes |
| WF100 CEM | 3 | 4 | 142 | M | 1 | |
| WF100 CEM | 3 | 4 | 143 | M | 3 | |
| WF100 CEM | 3 | 4 | 144 | P | 3 | |
| WF100 CEM | 3 | 4 | 145 | Crown fragments | 44 | |
| WF100 CEM | 3 | 4 | 146 | Root fragments | 39 | |
| WF100 CEM | 3 | 4 | 1146 | C | 1 | |
| WF100 CEM | 3 | 5 | 147 | Root fragments | 7 | |
| WF100 CEM | 3 | 5 | 148 | Fragments | 19 | |
| WF100 CEM | 3 | 5 | 149 | LI$^1$ | 3 | Yes |
| WF100 CEM | 3 | 6 | 150 | Ri$_1$ | 0 | |
| WF100 CEM | 3 | 6 | 151 | Lc$^{-}$ | 1 | |
| WF100 CEM | 3 | 6 | 152 | LC$_{-}$ | 3 | Yes |
| WF100 CEM | 3 | 6 | 153 | I$^1$ | 1 | |
| WF100 CEM | 3 | 6 | 154 | Lm$_2$ | 0 | |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 6 | 155 | LM$^3$ | 0 | |
| WF100 CEM | 3 | 6 | 156 | M | 1 | |
| WF100 CEM | 3 | 6 | 157 | Fragments | 8 | |
| WF100 CEM | 3 | 6 | 158 | Root fragments | 6 | |
| WF100 CEM | 3 | 6 | 1158 | LM$_1$ | 0 | |
| WF100 CEM | 3 | 99 | 159 | Lc$_-$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 160 | Rm$_1$ | 0 | |
| WF100 CEM | 3 | 99 | 161 | LI$^1$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 162 | RI$^2$ | 0 | |
| WF100 CEM | 3 | 99 | 163 | RM$^1$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 164 | LP$_2$ | 0 | |
| WF100 CEM | 3 | 99 | 165 | LM$^2$ | 0 | |
| WF100 CEM | 3 | 99 | 166 | LM$_2$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 167 | RM$_3$ | 4 | Yes |
| WF100 CEM | 3 | 99 | 168 | RP$^1$ | 4 | Yes |
| WF100 CEM | 3 | 99 | 169 | P | 4 | Yes |
| WF100 CEM | 3 | 99 | 170 | RC$^-$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 171 | LM$_1$ | 0 | |
| WF100 CEM | 3 | 99 | 172 | RP$^1$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 173 | RP$_1$ | 0 | |
| WF100 CEM | 3 | 99 | 174 | LM$_2$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 175 | RI$^2$ | 0 | |
| WF100 CEM | 3 | 99 | 176 | RP$^1$ | 0 | |
| WF100 CEM | 3 | 99 | 177 | RP$^2$ | 0 | |
| WF100 CEM | 3 | 99 | 178 | RM$^1$ | 4 | Yes |
| WF100 CEM | 3 | 99 | 179 | RP$_2$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 180 | Ri$^1$ | 0 | |
| WF100 CEM | 3 | 99 | 181 | Infant maxilla and teeth | | |
| WF100 CEM | 3 | 99 | 182 | LP$_1$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 183 | RP$_1$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 184 | M$^-$ | 1 | |
| WF100 CEM | 3 | 99 | 185 | M$_-$ | 1 | |
| WF100 CEM | 3 | 99 | 186 | M$^-$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 187 | M | 2 | Yes |
| WF100 CEM | 3 | 99 | 188 | M | 3 | Yes |
| WF100 CEM | 3 | 99 | 189 | M | 3 | Yes |
| WF100 CEM | 3 | 99 | 190 | C$_-$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 191 | RP$_-$ | 4 | Yes |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 99 | 192 | $LP_1$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 193 | $P_{-}$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 194 | $LP_{-}$ | 3 | Yes |
| WF100 CEM | 3 | 99 | 195 | $C_{-}$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 196 | $P_{-}$ | 6 | Yes |
| WF100 CEM | 3 | 99 | 197 | Fragments | 2 | Yes |
| WF100 CEM | 3 | 99 | 198 | $m^1$ | 2 | Yes |
| WF100 CEM | 3 | 99 | 199 | Root | 2 | Yes |
| WF100 CEM | 3 | 99 | 200 | $I^1$ | 1 | |
| WF100 CEM | 3 | 99 | 201 | $I_{-}$ | 1 | |
| WF100 CEM | 3 | 99 | 202 | $I^{-}$ | 3 | |
| WF100 CEM | 3 | 99 | 203 | I | 10 | |
| WF100 CEM | 3 | 99 | 204 | I or C | 5 | |
| WF100 CEM | 3 | 99 | 205 | $C^{-}$ | 1 | |
| WF100 CEM | 3 | 99 | 206 | $I^2$ | 1 | |
| WF100 CEM | 3 | 99 | 207 | C | 2 | |
| WF100 CEM | 3 | 99 | 208 | P | 15 | |
| WF100 CEM | 3 | 99 | 209 | M | 13 | |
| WF100 CEM | 3 | 99 | 210 | $i^1$ | 4 | Yes |
| WF100 CEM | 3 | 99 | 211 | m | 3 | Yes |
| WF100 CEM | 3 | 99 | 212 | m | 8 | |
| WF100 CEM | 3 | 99 | 213 | c | 2 | |
| WF100 CEM | 3 | 99 | 214 | i | 4 | |
| WF100 CEM | 3 | 99 | 215 | Deciduous fragments | 10 | |
| WF100 CEM | 3 | 99 | 216 | Roots | 133 | |
| WF100 CEM | 3 | 99 | 217 | Crown fragments | 68 | |
| WF100 CEM | 3 | 99 | 218 | Tooth fragments | 81 | |
| WF100 CEM | 3 | 99 | 2218 | $LI^2$ | 1 | |
| WF100 CEM | 3 | 99 | 2219 | $I^{-}$ | 1 | |
| WF100 CEM | 3 | 99 | 2220 | I | 1 | |
| WF100 CEM | 3 | 99 | 2221 | $I^1$ | 1 | |
| WF100 CEM | 3 | 99 | 2222 | $C^{-}$ | 1 | |
| WF100 CEM | 3 | 99 | 2223 | $C^{-}$ | 1 | |
| WF100 CEM | 3 | 99 | 2224 | C | 1 | |
| WF100 CEM | 3 | 99 | 2225 | C | 1 | |
| WF100 CEM | 3 | 99 | 2226 | c | 1 | |
| WF100 CEM | 3 | 99 | 2227 | c | 1 | |
| WF100 CEM | 3 | 99 | 2228 | c | 1 | |
| WF100 CEM | 4 | 1 | 219 | Enamel fragment | 1 | |
| WF100 CEM | 5 | 1 | 220 | $I^2$ | 1 | |

| Site | Grave | locus | Bag # | Identification | Number of Fragments | Match |
|---|---|---|---|---|---|---|
| WF100 CEM | 5 | 1 | 221 | M or P | 1 | |
| WF100 CEM | 5 | 1 | 222 | M | 2 | |
| WF100 CEM | 5 | 1 | 223 | Tooth fragments | 5 | |
| WF100 CEM | 5 | 3 | 224 | Crown fragments | 1 | |
| WF100 CEM | 5 | 3 | 225 | Root | 2 | Yes |
| WF100 CEM | 5 | 3 | 226 | P | 1 | |
| WF100 CEM | 5 | 4 | 227 | P | 1 | |
| WF100 CEM | 5 | 4 | 228 | $C^-$ | 1 | |
| WF100 CEM | 5 | 4 | 229 | C | 1 | |
| WF100 CEM | 5 | 4 | 230 | $LP^2$ | 0 | |
| WF100 CEM | 5 | 4 | 231 | $LP^1$ | 0 | |
| WF100 CEM | 5 | 4 | 232 | Root fragments | 3 | |
| WF100 CEM | 5 | 4 | 233 | M | 6 | |
| WF100 CEM | 5 | 4 | 234 | $LM^2$ | 3 | Yes |
| WF100 CEM | 5 | 4 | 235 | $LM^3$ | 2 | Yes |
| WF100 CEM | 5 | 4 | 236 | Root fragments | 14 | |
| WF100 CEM | 5 | 4 | 237 | $RM^3$ | 4 | Yes |
| WF100 CEM | 5 | 4 | 238 | $LM^2$ | 3 | Yes |
| WF100 CEM | 5 | 4 | 239 | $RM^2$ | 5 | Yes |
| WF100 CEM | 5 | 4 | 240 | $LP^1$ | 0 | |
| WF100 CEM | 5 | 4 | 241 | Roots | 22 | |
| WF100 CEM | 5 | 4 | 242 | $RM^2$ | 7 | Yes |
| WF100 CEM | 5 | 4 | 243 | $RC^-$ | 1 | |
| WF100 CEM | 5 | 4 | 244 | $RM^1$ | 2 | Yes |
| WF100 CEM | 5 | 4 | 245 | $RM^1$ | 6 | Yes |
| WF100 CEM | 5 | 4 | 246 | $Rm^2$ | 3 | Yes |
| WF100 CEM | 5 | 4 | 247 | $P^-$ | 1 | |
| WF100 CEM | 5 | 4 | 248 | Root | 1 | |
| WF100 CEM | 5 | 4 | 249 | Crown | 21 | |
| WF100 CEM | 5 | 4 | 250 | $LM^3$ | 4 | Yes |
| WF100 CEM | 5 | 4 | 251 | $RP^1$ | 2 | Yes |
| WF100 CEM | 5 | 4 | 252 | $M^-$ | 8 | Yes |
| WF100 CEM | 5 | 4 | 253 | I/C | 1 | |
| WF100 CEM | 5 | 4 | 254 | $RM^1$ | 7 | Yes |

## Appendix B: Tooth Measurements

| Site | Grave | Locus | Bag # | Tooth | MD diameter | BL diameter | Crown height | MD cervical diameter | BL cervical diameter | MB DL crown diameter | ML DB crown diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BLP2019 CEM | 1 | 2 | 5 | $RM_1$ | 11.28mm | 10.22 mm | - | - | - | 11.46mm | 11.32 mm |
| BLP2019 CEM | 1 | 2 | 6 | $RM_1$ | 10.60 mm | 9.55 mm | - | - | - | 10.58 mm | 10.61mm |
| BLP2019 CEM | 1 | 2 | 7 | $LM_1$ | 11.24mm | 10.20 mm | 6.64 mm | | - | 11.46mm | 11.25mm |
| BLP2019 CEM | 1 | 2 | 8 | $LM_1$ | 10.60mm | 9.72 mm | - | - | - | 10.88mm | 10.61mm |
| BLP2019 CEM | 1 | 2 | 10 | $I^2$ | - | 6.56mm | 8.54 mm | - | - | - | - |
| BLP2019 CEM | 1 | 2 | 11 | $LC_-$ | - | 6.24mm | 7.51 mm | - | - | - | - |
| BLP2019 CEM | 1 | 2 | 12 | $RP_2$ | 6.92 mm | 7.52 mm | 5.52mm | 5.88mm | 7.62 mm | - | - |
| WF100 CEM | 1 | 1 | 21 | $LI^1$ | 7.65mm | 6.20mm | 9.88mm | 6.4 mm | 6.07mm | - | - |
| WF100 CEM | 1 | 1 | 22 | $RM_1$ | 10.77mm | 9.62mm | - | - | - | 10.28mm | 11.04mm |
| WF100 CEM | 1 | 1 | 23 | $RM_2$ | 10.38mm | 9.40mm | 5.12mm | - | - | 10.70mm | 10.66mm |
| WF100 CEM | 1 | 1 | 24 | $LP_2$ | 7.36mm | 7.55mm | 7.90mm | 5.18mm | 7.19mm | - | - |
| WF100 CEM | 1 | 1 | 25 | $LP^1$ | 6.09mm | - | 4.75mm | - | - | - | - |
| WF100 CEM | 1 | 1 | 34 | I or C | - | - | 9.17mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 44 | $c_-$ | - | - | 6.63mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 46 | $RM_2$ | 10.18mm | 9.36mm | 6.71mm | - | - | 10.43mm | 10.53mm |
| WF100 CEM | 3 | 1 | 47 | $LM_3$ | 10.69mm | 9.41mm | 5.93mm | 9.52mm | 8.02mm | 10.60mm | 11.10mm |
| WF100 CEM | 3 | 1 | 53 | $RM_2$ | 9.97mm | 8.56mm | 5.96mm | - | - | 10.06mm | 10.32mm |
| WF100 CEM | 3 | 1 | 54 | $LM^3$ | - | 11.02mm | - | - | - | 11.13mm | - |
| WF100 CEM | 3 | 1 | 55 | $RP^1$ | 6.49mm | 8.10mm | - | - | - | - | - |
| WF100 CEM | 3 | 1 | 56 | $LP^1$ | 6.87mm | 5.48mm | 8.79mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 57 | $Ri^2$ | 4.58mm | 4.32mm | 6.18mm | 3.82mm | 4.20mm | - | - |
| WF100 CEM | 3 | 1 | 59 | $LI^2$ | 6.32mm | 4.10mm | 5.58 mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 60 | $RC_1$ | 6.82 mm | 8.21 mm | 10.87mm | 5.39mm | 8.26mm | - | - |

| Site | Grave | Locus | Bag # | Tooth | MD diameter | BL diameter | Crown height | MD cervical diameter | BL cervical diameter | MB DL crown diameter | ML DB crown diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 1 | 61 | $LPM_1$ | 6.63mm | - | 7.58mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 62 | $LP_2$ | 7.46mm | 8.45mm | - | - | - | - | - |
| WF100 CEM | 3 | 1 | 63 | $RP^2$ | 7.08mm | 9.30mm | 6.35mm | - | - | 9.15mm | 8.71mm |
| WF100 CEM | 3 | 1 | 64 | $RP_2$ | 6.73mm | 7.39mm | - | - | - | - | - |
| WF100 CEM | 3 | 1 | 65 | $RM_1$ | 10.63mm | 9.63mm | 7.15 mm | - | - | 11.09mm | 10.64mm |
| WF100 CEM | 3 | 1 | 66 | $LM_2$ | 10.18mm | 9.17mm | - | - | - | 10.82mm | - |
| WF100 CEM | 3 | 1 | 67 | $LM^1$ | - | 11.34mm | - | - | - | 11.28mm | - |
| WF100 CEM | 3 | 1 | 68 | $LM^2$ | 12.56mm | 9.82mm | 7.11mm | 12.1mm | 8.05mm | 10.84 est | 12.81mm |
| WF100 CEM | 3 | 1 | 70 | $RM^1$ | 10.80mm | 12.49mm | - | 9.15mm | 12.12mm | 13.18mm | 12.79mm |
| WF100 CEM | 3 | 1 | 71 | $RM^3$ | 9.33mm | 11.17mm | 5.79mm | 8.22mm | 10.82mm | 9.21mm | 11.40mm |
| WF100 CEM | 3 | 1 | 72 | $LM_2$ | 13.01mm | 11.04mm | - | - | - | 13.22mm | 13.38mm |
| WF100 CEM | 3 | 1 | 73 | $RM_2$ | 10.74mm | 10.08mm | - | 9.07mm | 9.69mm | 10.83mm | 11.12mm |
| WF100 CEM | 3 | 1 | 74 | $Li^1$ | 6.26mm | 5.55mm | - | 4.30mm | 5.04mm | - | - |
| WF100 CEM | 3 | 1 | 77 | $LI^1$ | - | 7.94mm | 10.80mm | 7.76mm | - | - | - |
| WF100 CEM | 3 | 1 | 79 | $RC^1$ | - | 7.27mm | 8.24mm | - | - | - | - |
| WF100 CEM | 3 | 1 | 1109 | $LP_1$ | 7.37mm | - | 8.12mm | 5.24mm | - | - | - |
| WF100 CEM | 3 | 2 | 108 | $LI^2$ | - | 5.97mm | 9.27mm | - | - | - | - |
| WF100 CEM | 3 | 2 | 109 | $RI^2$ | - | 8.17mm | - | - | 7.85mm | - | - |
| WF100 CEM | 3 | 2 | 107 | $LM^2$ | 9.25mm | 9.84mm | - | - | - | 10.71mm | 9.38mm |
| WF100 CEM | 3 | 3 | 116 | $RM^2$ | 9.88mm | - | - | - | - | - | - |
| WF100 CEM | 3 | 3 | 117 | $LM_1$ | 11.88mm | 9.89mm | - | - | - | 11.70mm | 11.81mm |
| WF100 CEM | 3 | 3 | 118 | $Ri_1$ | 4.44mm | 4.13mm | - | 3.25mm | 3.59mm | - | - |
| WF100 CEM | 3 | 3 | 128 | $LC_{-}$ | 6.74mm | - | - | - | - | - | - |
| WF100 CEM | 3 | 3 | 1131 | $RM_1$ | 11.84mm | 10.09mm | - | - | - | 11.84mm | 11.85mm |
| WF100 CEM | 3 | 3 | 1132 | $LPM_2$ | 7.45mm | 8.29mm | - | - | - | - | - |
| WF100 CEM | 3 | 3 | 1133 | $LPM_1$ | 7.37mm | 7.63mm | - | - | - | - | - |

| Site | Grave | Locus | Bag # | Tooth | MD diameter | BL diameter | Crown height | MD cervical diameter | BL cervical diameter | MB DL crown diameter | ML DB crown diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 4 | 132 | $RM^3$ | 10.66mm | 10.15mm | - | - | - | 10.39mm | 10.45mm |
| WF100 CEM | 3 | 4 | 134 | $LM_1$ | 11.39mm | 10.55mm | 8.30mm | - | - | - | - |
| WF100 CEM | 3 | 6 | 152 | $LC_-$ | 7.41mm | 8.67mm | 11.46mm | 5.97mm | 8.80mm | - | - |
| WF100 CEM | 3 | 6 | 150 | $Ri_1$ | 3.83mm | - | - | 3.83mm | - | - | - |
| WF100 CEM | 3 | 6 | 154 | $Lm_2$ | 11.98mm | 10.24mm | - | 9.33mm | 8.30mm | - | 11.99mm |
| WF100 CEM | 3 | 6 | 155 | $RM^3$ | 9.75mm | 12.50mm | - | - | - | 11.16mm | 12.61mm |
| WF100 CEM | 3 | 99 | 160 | $Rm_1$ | 7.85mm | 6.74mm | - | 6.93mm | 5.71mm | 8.09mm | 7.05mm |
| WF100 CEM | 3 | 99 | 159 | $LC_-$ | 5.77mm | 5.06mm | 6.41mm | 4.39mm | 4.75mm | - | - |
| WF100 CEM | 3 | 99 | 161 | $LI^1$ | 8.45mm | 7.55mm | 11.56mm | 7.11mm | 6.76mm | - | - |
| WF100 CEM | 3 | 99 | 162 | $RI^2$ | 6.44mm | 5.48mm | 10.22mm | 5.19mm | 5.29mm | - | - |
| WF100 CEM | 3 | 99 | 163 | $RM^1$ | 11.82mm | 12.13mm | - | - | - | - | - |
| WF100 CEM | 3 | 99 | 164 | $LP_2$ | 7.18mm | 8.63mm | 7.14mm | 5.91mm | 8.34mm | - | - |
| WF100 CEM | 3 | 99 | 165 | $LM^2$ | 10.08mm | 10.96mm | 6.87mm | 7.90mm | 11.03mm | 10.39mm | 11.65mm |
| WF100 CEM | 3 | 99 | 166 | $LM_2$ | 11.03mm | 10.41mm | - | - | - | 11.36mm | 11.38mm |
| WF100 CEM | 3 | 99 | 167 | $RM_3$ | 10.03mm | 8.88mm | - | - | - | - | - |
| WF100 CEM | 3 | 99 | 168 | $RP^1$ | 6.72mm | 9.24mm | - | - | - | - | - |
| WF100 CEM | 3 | 99 | 171 | $LM_1$ | 11.41mm | 10.16mm | - | - | - | - | - |
| WF100 CEM | 3 | 99 | 172 | $RP^1$ | 6.35mm | 9.01mm | 5.90mm | 4.31mm | 8.48mm | - | - |
| WF100 CEM | 3 | 99 | 174 | $LM_2$ | 10.66mm | 9.70mm | - | 9.69mm | 9.31mm | 11.10mm | 10.88mm |
| WF100 CEM | 3 | 99 | 180 | $Ri^1$ | 5.32mm | 4.56mm | - | 3.29mm | 4.48mm | - | - |
| WF100 CEM | 3 | 99 | 170 | $RC^-$ | 7.35mm | 7.74mm | 9.77mm | - | - | - | - |
| WF100 CEM | 3 | 99 | 175 | $RI^2$ | 7.20mm | 6.28mm | - | 5.93mm | 5.89mm | - | - |
| WF100 CEM | 3 | 99 | 176 | $RP^1$ | 7.11mm | 8.68mm | - | 5.52mm | 8.26mm | - | - |
| WF100 CEM | 3 | 99 | 177 | $RP^2$ | 7.20mm | 9.20mm | - | 6.15mm | 9.06mm | - | - |
| WF100 CEM | 3 | 99 | 173 | $RP_1$ | 8.23mm | 7.57mm | - | 5.20mm | 6.88mm | - | - |
| WF100 CEM | 3 | 99 | 179 | $RP_2$ | 7.99mm | 9.28mm | - | 5.50mm | 8.06mm | - | - |

| Site | Grave | Locus | Bag # | Tooth | MD diameter | BL diameter | Crown height | MD cervical diameter | BL cervical diameter | MB DL crown diameter | ML DB crown diameter |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WF100 CEM | 3 | 99 | 178 | $RM^1$ | 9.75mm | 12.27mm | 6.48mm | - | - | 12.68mm | 10.30mm |
| WF100 CEM | 5 | 4 | 237 | $LM^3$ | 8.85mm | 9.57mm | - | 6.83mm | 9.69mm | 9.26mm | 10.07mm |
| WF100 CEM | 5 | 4 | 230 | $LP^2$ | 6.29mm | 8.01mm | - | 4.43mm | 7.04mm | - | - |
| WF100 CEM | 5 | 4 | 231 | $LP^1$ | 6.07mm | 7.61mm | 5.34mm | 4.23mm | 6.73mm | - | - |
| WF100 CEM | 5 | 4 | 235 | $LM^3$ | 7.84mm | 8.29mm | 5.26mm | 5.86mm | 7.74mm | 8.32mm | 7.66mm |
| WF100 CEM | 5 | 4 | 234 | $LM^2$ | 8.81mm | 9.30mm | - | - | 9.06mm | - | - |
| WF100 CEM | 5 | 4 | 244 | $RM^1$ | 10.83mm | 11.58mm | - | 8.63mm | 11.33mm | 12.62mm | 11.14mm |

# Appendix C: Dental Wear

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| BLP 2019 CEM | 1 | 2 | 1 | C | 0 |
| BLP 2019 CEM | 1 | 2 | 2 | I | 0 |
| BLP 2019 CEM | 1 | 2 | 3 | Root | 0 |
| BLP 2019 CEM | 1 | 2 | 4 | Crown fragments | 0 |
| BLP 2019 CEM | 1 | 2 | 5 | $RM_1$ | 20 |
| BLP 2019 CEM | 1 | 2 | 6 | $RM_1$ | 0 |
| BLP 2019 CEM | 1 | 2 | 7 | $LM_1$ | 14 |
| BLP 2019 CEM | 1 | 2 | 8 | $LM_1$ | 6 |
| BLP 2019 CEM | 1 | 2 | 9 | $LM_2$ | 4 |
| BLP 2019 CEM | 1 | 2 | 10 | $I^2$ | 0 |
| BLP 2019 CEM | 1 | 2 | 11 | $LC_-$ | 0 |
| BLP 2019 CEM | 1 | 2 | 12 | $RP_2$ | 1 |
| BLP 2019 CEM | 1 | 2 | 13 | Roots | 0 |
| BLP 2019 CEM | 1 | 2 | 14 | Fragments | 0 |
| BLP 2019 CEM | 1 | 2 | 15 | I | 0 |
| BLP 2019 CEM | 1 | 2 | 16 | $P^1$ | 1 |
| BLP 2019 CEM | 1 | 2 | 17 | $M^-$ | 0 |
| BLP 2019 CEM | 1 | 2 | 18 | P | 0 |
| BLP 2019 CEM | 1 | 2 | 19 | M | 0 |
| BLP 2019 CEM | 1 | 2 | 20 | $P_-$ | 2 |
| WF100 CEM | 1 | 1 | 21 | $LI^1$ | 0 |
| WF100 CEM | 1 | 1 | 22 | $RM_1$ | 0 |
| WF100 CEM | 1 | 1 | 23 | $RM_2$ | 7 |
| WF100 CEM | 1 | 1 | 24 | $LP_2$ | 0 |
| WF100 CEM | 1 | 1 | 25 | $LP^1$ | 0 |
| WF100 CEM | 1 | 1 | 26 | $RM^1$ | 0 |
| WF100 CEM | 1 | 1 | 27 | $M^-$ | 0 |
| WF100 CEM | 1 | 1 | 28 | M | 0 |
| WF100 CEM | 1 | 1 | 29 | P | 1 |
| WF100 CEM | 1 | 1 | 30 | $C^1$ | 0 |
| WF100 CEM | 1 | 1 | 31 | $M^-$ | 0 |
| WF100 CEM | 1 | 1 | 32 | $M^-$ | 0 |
| WF100 CEM | 1 | 1 | 33 | M fragment | 0 |
| WF100 CEM | 1 | 1 | 34 | C | 0 |
| WF100 CEM | 1 | 1 | 35 | I fragment | 0 |
| WF100 CEM | 1 | 1 | 36 | Roots | 0 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 1 | 1 | 37 | Crown fragments | 0 |
| WF100 CEM | 2 | 1 | 38 | $RM_1$ | 4 |
| WF100 CEM | 2 | 1 | 39 | $M_1$ | 0 |
| WF100 CEM | 2 | 1 | 40 | $M_1$ | 0 |
| WF100 CEM | 2 | 1 | 41 | Roots | 0 |
| WF100 CEM | 3 | 1 | 42 | $m^{-}$ | 0 |
| WF100 CEM | 3 | 1 | 43 | $P^2$ | 2 |
| WF100 CEM | 3 | 1 | 44 | $c_{-}$ | 0 |
| WF100 CEM | 3 | 1 | 45 | $m_{-}$ | 0 |
| WF100 CEM | 3 | 1 | 46 | $RM_2$ | 13 |
| WF100 CEM | 3 | 1 | 47 | $LM_3$ | 0 |
| WF100 CEM | 3 | 1 | 48 | $LM^1$ | 0 |
| WF100 CEM | 3 | 1 | 49 | $M^3$ | 0 |
| WF100 CEM | 3 | 1 | 50 | M | 0 |
| WF100 CEM | 3 | 1 | 51 | $P^{-}$ | 3/4 |
| WF100 CEM | 3 | 1 | 52 | $RP^1$ | 1 |
| WF100 CEM | 3 | 1 | 53 | $RM_2$ | 0 |
| WF100 CEM | 3 | 1 | 54 | $LM^3$ | 0 |
| WF100 CEM | 3 | 1 | 55 | $RP^1$ | 0 |
| WF100 CEM | 3 | 1 | 56 | $LP^1$ | 0 |
| WF100 CEM | 3 | 1 | 57 | $Ri^2$ | 2 |
| WF100 CEM | 3 | 1 | 58 | $LM_1$ | 0 |
| WF100 CEM | 3 | 1 | 59 | $LI^2$ | 0 |
| WF100 CEM | 3 | 1 | 60 | $RC_1$ | 0 |
| WF100 CEM | 3 | 1 | 61 | $LP_1$ | 0 |
| WF100 CEM | 3 | 1 | 62 | $LP_2$ | 0 |
| WF100 CEM | 3 | 1 | 63 | $RP^2$ | 1 |
| WF100 CEM | 3 | 1 | 64 | $RP_2$ | 0 |
| WF100 CEM | 3 | 1 | 65 | $RM_1$ | 0 |
| WF100 CEM | 3 | 1 | 66 | $LM_2$ | 0 |
| WF100 CEM | 3 | 1 | 67 | $LM^1$ | 0 |
| WF100 CEM | 3 | 1 | 68 | $LM^2$ | 14 |
| WF100 CEM | 3 | 1 | 69 | $RM^1$ | 0 |
| WF100 CEM | 3 | 1 | 70 | $RM^1$ | 19 |
| WF100 CEM | 3 | 1 | 71 | $RM^3$ | 4 |
| WF100 CEM | 3 | 1 | 72 | $LM_2$ | 0 |
| WF100 CEM | 3 | 1 | 73 | $RM_2$ | 20 |
| WF100 CEM | 3 | 1 | 74 | $Li^1$ | 3 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 3 | 1 | 75 | $LM^3$ | 0 |
| WF100 CEM | 3 | 1 | 76 | $RM^2$ | 0 |
| WF100 CEM | 3 | 1 | 77 | $LI^1$ | 0 |
| WF100 CEM | 3 | 1 | 78 | $m^{1/2}$ | 0 |
| WF100 CEM | 3 | 1 | 79 | $RC^1$ | 0 |
| WF100 CEM | 3 | 1 | 80 | $Lm^2$ | 0 |
| WF100 CEM | 3 | 1 | 81 | M | 0 |
| WF100 CEM | 3 | 1 | 82 | $P_-$ forming | 0 |
| WF100 CEM | 3 | 1 | 83 | $P_-$ forming | 0 |
| WF100 CEM | 3 | 1 | 84 | $I^-$ forming | 0 |
| WF100 CEM | 3 | 1 | 85 | $RC^-$ | 0 |
| WF100 CEM | 3 | 1 | 86 | $P_-$ forming | 0 |
| WF100 CEM | 3 | 1 | 87 | c | 0 |
| WF100 CEM | 3 | 1 | 88 | Root fragments | 0 |
| WF100 CEM | 3 | 1 | 89 | Deciduous crown fragments | 0 |
| WF100 CEM | 3 | 1 | 90 | m fragments | 0 |
| WF100 CEM | 3 | 1 | 91 | $I^1$ | 0 |
| WF100 CEM | 3 | 1 | 92 | $I^2$ | 0 |
| WF100 CEM | 3 | 1 | 93 | $I_-$ | 0 |
| WF100 CEM | 3 | 1 | 94 | I | 0 |
| WF100 CEM | 3 | 1 | 95 | $C_-$ | 0 |
| WF100 CEM | 3 | 1 | 96 | $C^-$ | 0 |
| WF100 CEM | 3 | 1 | 97 | C | 0 |
| WF100 CEM | 3 | 1 | 98 | I or C | 0 |
| WF100 CEM | 3 | 1 | 99 | $P_-$ | 1 |
| WF100 CEM | 3 | 1 | 100 | P | 0 |
| WF100 CEM | 3 | 1 | 101 | $P_-$ | 0 |
| WF100 CEM | 3 | 1 | 102 | $M_-$ | 0 |
| WF100 CEM | 3 | 1 | 103 | $M^-$ | 0 |
| WF100 CEM | 3 | 1 | 104 | M | 0 |
| WF100 CEM | 3 | 1 | 105 | Crown fragments | 0 |
| WF100 CEM | 3 | 1 | 1106 | $RI_-$ | 0 |
| WF100 CEM | 3 | 1 | 1107 | $I^1$ | 0 |
| WF100 CEM | 3 | 1 | 1108 | $I^-$ | 0 |
| WF100 CEM | 3 | 1 | 1109 | $LP_1$ | 0 |
| WF100 CEM | 3 | 1 | 1110 | $RM^-$ | 0 |
| WF100 CEM | 3 | 1 | 1111 | $LI^1$ | 0 |
| WF100 CEM | 3 | 1 | 1112 | $I^1$ | 2 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 3 | 1 | 1113 | $I_-$ | 1 |
| WF100 CEM | 3 | 1 | 1114 | $I_-$ | 2 |
| WF100 CEM | 3 | 1 | 1115 | C | 0 |
| WF100 CEM | 3 | 1 | 1116 | $C^-$ | 0 |
| WF100 CEM | 3 | 1 | 1117 | $C^-$ | 0 |
| WF100 CEM | 3 | 1 | 1118 | $RI^2$ | 4 |
| WF100 CEM | 3 | 1 | 1119 | $C_-$ | 3 |
| WF100 CEM | 3 | 1 | 1120 | $C_-$ | 0 |
| WF100 CEM | 3 | 1 | 1121 | $C_-$ | 0 |
| WF100 CEM | 3 | 1 | 1122 | $I^2$ | 0 |
| WF100 CEM | 3 | 1 | 1123 | $I_-$ | 0 |
| WF100 CEM | 3 | 1 | 1124 | $RI^-$ | 1 |
| WF100 CEM | 3 | 1 | 1125 | $I^2$ | 0 |
| WF100 CEM | 3 | 1 | 1126 | $P_-$ | 1 |
| WF100 CEM | 3 | 1 | 1127 | $P_-$ | 3 |
| WF100 CEM | 3 | 1 | 1128 | $P_-$ | 0 |
| WF100 CEM | 3 | 2 | 106 | $P^1$ | 0 |
| WF100 CEM | 3 | 2 | 107 | $LM^2$ | 0 |
| WF100 CEM | 3 | 2 | 108 | $LI^2$ | 0 |
| WF100 CEM | 3 | 2 | 109 | $RI^2$ | 3 |
| WF100 CEM | 3 | 2 | 110 | $RC^-$ | 0 |
| WF100 CEM | 3 | 2 | 111 | I | 0 |
| WF100 CEM | 3 | 2 | 112 | m | 0 |
| WF100 CEM | 3 | 2 | 113 | M | 0 |
| WF100 CEM | 3 | 3 | 114 | $LI^2$ | 3 |
| WF100 CEM | 3 | 3 | 115 | m | 0 |
| WF100 CEM | 3 | 3 | 116 | $RM^2$ | 0 |
| WF100 CEM | 3 | 3 | 117 | $LM_1$ | 0 |
| WF100 CEM | 3 | 3 | 118 | $Ri_1$ | 4 |
| WF100 CEM | 3 | 3 | 119 | $C_-$ | 0 |
| WF100 CEM | 3 | 3 | 120 | I | 0 |
| WF100 CEM | 3 | 3 | 121 | $m^-$ | 0 |
| WF100 CEM | 3 | 3 | 122 | $RI_1$ | 0 |
| WF100 CEM | 3 | 3 | 123 | $Lm_2$ | 0 |
| WF100 CEM | 3 | 3 | 124 | $m_2$ | 0 |
| WF100 CEM | 3 | 3 | 125 | $I_-$ | 2 |
| WF100 CEM | 3 | 3 | 126 | m | 0 |
| WF100 CEM | 3 | 3 | 127 | m | 0 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 3 | 3 | 128 | $LC_-$ | 0 |
| WF100 CEM | 3 | 3 | 129 | Root fragments | 0 |
| WF100 CEM | 3 | 3 | 130 | I | 0 |
| WF100 CEM | 3 | 3 | 131 | I | 0 |
| WF100 CEM | 3 | 3 | 1131 | $RM_1$ | 0 |
| WF100 CEM | 3 | 3 | 1132 | $LP_2$ | 0 |
| WF100 CEM | 3 | 3 | 1133 | $LP_1$ | 0 |
| WF100 CEM | 3 | 3 | 1134 | $I_-$ | 0 |
| WF100 CEM | 3 | 3 | 1135 | $I_-$ | 0 |
| WF100 CEM | 3 | 3 | 1136 | $m_2$ | 0 |
| WF100 CEM | 3 | 3 | 1137 | m | 0 |
| WF100 CEM | 3 | 3 | 1138 | m | 0 |
| WF100 CEM | 3 | 3 | 1139 | $RC_-$ | 0 |
| WF100 CEM | 3 | 3 | 1140 | $RP_1$ | 0 |
| WF100 CEM | 3 | 4 | 132 | $RM^3$ | 4 |
| WF100 CEM | 3 | 4 | 133 | $Rm^1$ | 0 |
| WF100 CEM | 3 | 4 | 134 | $LM_1$ | 0 |
| WF100 CEM | 3 | 4 | 135 | Incisor or canine root | 0 |
| WF100 CEM | 3 | 4 | 136 | $M^-$ | 0 |
| WF100 CEM | 3 | 4 | 137 | $M^-$ | 0 |
| WF100 CEM | 3 | 4 | 138 | $RP_2$ | 2 |
| WF100 CEM | 3 | 4 | 139 | I | 0 |
| WF100 CEM | 3 | 4 | 140 | C | 0 |
| WF100 CEM | 3 | 4 | 141 | C | 0 |
| WF100 CEM | 3 | 4 | 142 | m | 0 |
| WF100 CEM | 3 | 4 | 143 | M | 0 |
| WF100 CEM | 3 | 4 | 144 | P | 0 |
| WF100 CEM | 3 | 4 | 145 | Crown fragments | 0 |
| WF100 CEM | 3 | 4 | 146 | Root fragments | 0 |
| WF100 CEM | 3 | 4 | 1146 | C | 1 |
| WF100 CEM | 3 | 5 | 147 | Root fragments | 0 |
| WF100 CEM | 3 | 5 | 148 | Fragments | 0 |
| WF100 CEM | 3 | 5 | 149 | $LI^1$ | 0 |
| WF100 CEM | 3 | 6 | 150 | $Ri_1$ | 5 |
| WF100 CEM | 3 | 6 | 151 | $Lc^-$ | 3 |
| WF100 CEM | 3 | 6 | 152 | $LC_-$ | 0 |
| WF100 CEM | 3 | 6 | 153 | $I^1$ | 0 |
| WF100 CEM | 3 | 6 | 154 | $Lm_2$ | 15 |
| WF100 CEM | 3 | 6 | 155 | $LM^3$ | 0 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 3 | 6 | 156 | M | 0 |
| WF100 CEM | 3 | 6 | 157 | Fragments | 0 |
| WF100 CEM | 3 | 6 | 158 | Root fragments | 0 |
| WF100 CEM | 3 | 6 | 1158 | $LM_1$ | 0 |
| WF100 CEM | 3 | 99 | 159 | $Lc_{-}$ | 1 |
| WF100 CEM | 3 | 99 | 160 | $Rm_1$ | 26 |
| WF100 CEM | 3 | 99 | 161 | $LI^1$ | 1 |
| WF100 CEM | 3 | 99 | 162 | $RI^2$ | 2 |
| WF100 CEM | 3 | 99 | 163 | $RM^1$ | 11 |
| WF100 CEM | 3 | 99 | 164 | $LP_2$ | 1 |
| WF100 CEM | 3 | 99 | 165 | $LM^2$ | 0 |
| WF100 CEM | 3 | 99 | 166 | $LM_2$ | 0 |
| WF100 CEM | 3 | 99 | 167 | $RM_3$ | 4 |
| WF100 CEM | 3 | 99 | 168 | $RP^1$ | 2 |
| WF100 CEM | 3 | 99 | 169 | P | 3 |
| WF100 CEM | 3 | 99 | 170 | $RC^{-}$ | 1 |
| WF100 CEM | 3 | 99 | 171 | $LM_1$ | 0 |
| WF100 CEM | 3 | 99 | 172 | $RP^1$ | 1 |
| WF100 CEM | 3 | 99 | 173 | $RP_1$ | 1 |
| WF100 CEM | 3 | 99 | 174 | $LM_2$ | 13 |
| WF100 CEM | 3 | 99 | 175 | $RI^2$ | 2 |
| WF100 CEM | 3 | 99 | 176 | $RP^1$ | 2 |
| WF100 CEM | 3 | 99 | 177 | $RP^2$ | 1 |
| WF100 CEM | 3 | 99 | 178 | $RM^1$ | 4 |
| WF100 CEM | 3 | 99 | 179 | $RP_2$ | 1 |
| WF100 CEM | 3 | 99 | 180 | $Ri^1$ | 3 |
| WF100 CEM | 3 | 99 | 181 | Infant maxilla and teeth | 0 |
| WF100 CEM | 3 | 99 | 182 | $LP_1$ | 1 |
| WF100 CEM | 3 | 99 | 183 | $RP_1$ | 1 |
| WF100 CEM | 3 | 99 | 184 | $M^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 185 | $M_{-}$ | 0 |
| WF100 CEM | 3 | 99 | 186 | $M^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 187 | M | 0 |
| WF100 CEM | 3 | 99 | 188 | M | 0 |
| WF100 CEM | 3 | 99 | 189 | M | 0 |
| WF100 CEM | 3 | 99 | 190 | $C_{-}$ | 3 |
| WF100 CEM | 3 | 99 | 191 | $RP_{-}$ | 4 |
| WF100 CEM | 3 | 99 | 192 | $LP_1$ | 2 |
| WF100 CEM | 3 | 99 | 193 | $P_{-}$ | 2 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 3 | 99 | 194 | $LP_{-}$ | 2 |
| WF100 CEM | 3 | 99 | 195 | $C_{-}$ | 0 |
| WF100 CEM | 3 | 99 | 196 | $P_{-}$ | 4 |
| WF100 CEM | 3 | 99 | 197 | Fragments | 0 |
| WF100 CEM | 3 | 99 | 198 | $m^1$ | 0 |
| WF100 CEM | 3 | 99 | 199 | Root | 0 |
| WF100 CEM | 3 | 99 | 200 | $I^1$ | 0 |
| WF100 CEM | 3 | 99 | 201 | $I_{-}$ | 0 |
| WF100 CEM | 3 | 99 | 202 | $I^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 203 | I | 0 |
| WF100 CEM | 3 | 99 | 204 | I or C | 0 |
| WF100 CEM | 3 | 99 | 205 | $C^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 206 | $I^2$ | 2 |
| WF100 CEM | 3 | 99 | 207 | C | 0 |
| WF100 CEM | 3 | 99 | 208 | P | 0 |
| WF100 CEM | 3 | 99 | 209 | M | 0 |
| WF100 CEM | 3 | 99 | 210 | $i^1$ | 3 |
| WF100 CEM | 3 | 99 | 211 | m | 0 |
| WF100 CEM | 3 | 99 | 212 | m | 0 |
| WF100 CEM | 3 | 99 | 213 | c | 0 |
| WF100 CEM | 3 | 99 | 214 | i | 0 |
| WF100 CEM | 3 | 99 | 215 | Deciduous fragments | 0 |
| WF100 CEM | 3 | 99 | 216 | Roots | 0 |
| WF100 CEM | 3 | 99 | 217 | Crown fragments | 0 |
| WF100 CEM | 3 | 99 | 218 | Tooth fragments | 0 |
| WF100 CEM | 3 | 99 | 2218 | $LI^2$ | 0 |
| WF100 CEM | 3 | 99 | 2219 | $I^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 2220 | I | 0 |
| WF100 CEM | 3 | 99 | 2221 | $I^1$ | 0 |
| WF100 CEM | 3 | 99 | 2222 | $C^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 2223 | $C^{-}$ | 0 |
| WF100 CEM | 3 | 99 | 2224 | C | 4 |
| WF100 CEM | 3 | 99 | 2225 | C | 3 |
| WF100 CEM | 3 | 99 | 2226 | c | 2 |
| WF100 CEM | 3 | 99 | 2227 | c | 1 |
| WF100 CEM | 3 | 99 | 2228 | c | 2 |
| WF100 CEM | 4 | 1 | 219 | Enamel fragment | 0 |
| WF100 CEM | 5 | 1 | 220 | $I^2$ | 0 |
| WF100 CEM | 5 | 1 | 221 | M or P | 0 |
| WF100 CEM | 5 | 1 | 222 | M | 0 |

| Site | Grave | Locus | Bag # | Tooth | Wear Score |
|---|---|---|---|---|---|
| WF100 CEM | 5 | 1 | 223 | Tooth fragments | 0 |
| WF100 CEM | 5 | 3 | 224 | Crown fragments | 0 |
| WF100 CEM | 5 | 3 | 225 | Root | 0 |
| WF100 CEM | 5 | 3 | 226 | P | 0 |
| WF100 CEM | 5 | 4 | 227 | P | 0 |
| WF100 CEM | 5 | 4 | 228 | $C^-$ | 0 |
| WF100 CEM | 5 | 4 | 229 | C | 0 |
| WF100 CEM | 5 | 4 | 230 | $LP^2$ | 2 |
| WF100 CEM | 5 | 4 | 231 | $LP^1$ | 2 |
| WF100 CEM | 5 | 4 | 232 | Root fragments | 0 |
| WF100 CEM | 5 | 4 | 233 | M | 0 |
| WF100 CEM | 5 | 4 | 234 | $LM^2$ | 16 |
| WF100 CEM | 5 | 4 | 235 | $LM^3$ | 4 |
| WF100 CEM | 5 | 4 | 236 | Root fragments | 0 |
| WF100 CEM | 5 | 4 | 237 | $RM^3$ | 16 |
| WF100 CEM | 5 | 4 | 238 | $LM^2$ | 20 |
| WF100 CEM | 5 | 4 | 239 | $RM^2$ | 23 |
| WF100 CEM | 5 | 4 | 240 | $LP^1$ | 3 |
| WF100 CEM | 5 | 4 | 241 | Roots | 0 |
| WF100 CEM | 5 | 4 | 242 | $RM^2$ | 4 |
| WF100 CEM | 5 | 4 | 243 | $RC^-$ | 0 |
| WF100 CEM | 5 | 4 | 244 | $RM^1$ | 18 |
| WF100 CEM | 5 | 4 | 245 | $RM^1$ | 0 |
| WF100 CEM | 5 | 4 | 246 | $Rm^2$ | 0 |
| WF100 CEM | 5 | 4 | 247 | $P^-$ | 0 |
| WF100 CEM | 5 | 4 | 248 | Root | 0 |
| WF100 CEM | 5 | 4 | 249 | Crown | 0 |
| WF100 CEM | 5 | 4 | 250 | $LM^3$ | 11 |
| WF100 CEM | 5 | 4 | 251 | $RP^1$ | 2 |
| WF100 CEM | 5 | 4 | 252 | $M^-$ | 0 |
| WF100 CEM | 5 | 4 | 253 | I/C | 0 |
| WF100 CEM | 5 | 4 | 254 | $RM^1$ | 25 |