TRAUMA ANALYSIS OF HUMAN SKELETAL REMAINS FROM THE ASSYRIAN TRADE COLONIES PERIOD AT KÜLTEPE, CENTRAL ANATOLIA/TURKEY

Tolga KÖROĞLU [*]

Ayla SEVİM EROL [**]

Fikri KULAKOĞLU [***]

ABSTRACT

The subject of the study is the demographic analysis and traumas of the people who lived during the Middle Bronze Age Assyrian Trade Colonies Period, excavated from Kültepe on the Central Anatolian plateau. A total of 61 individuals were identified from the examined human skeletal remains, including 25 males, 24 females, 6 individuals of undetermined gender, and 6 children and adolescents. Various traumas were detected on the skeletal remains of these individuals. After analyzing the distribution of traumas based on age and gender, the types of these traumas were explained. Comparisons were made with other societies that existed in Anatolia during the same period. While various traumas caused by violence were encountered in other societies, it is understood that the traumas observed in the population of Kültepe were mainly the result of accidents, falls, and occupational incidents. It is stated that the inhabitants of Kültepe consisted of various ethnic communities. Archaeological studies indicate that the residents of Kültepe, comprised of multiple ethnic groups, lived in accordance with the laws and rules established by the regional authorities. The results obtained from human skeletal remains support these archaeological results.

Keywords: Kültepe, Middle Bronze Age, Skeletal Traumas, Anthropology, Bioarchaeology

KÜLTEPE (İÇ ANADOLU/TÜRKİYE) ASUR TİCARET KOLONİLERİ DÖNEMİNE AİT İNSAN İSKELET KALINTILARININ TRAVMA ANALİZİ

ÖZET

Çalışmanın konusunu, Orta Anadolu platosunda yer alan Kültepe'den çıkarılan ve Orta Tunç Çağı Asur Ticaret Kolonileri Dönemi'nde yaşamış insanların demografik analizi ve travmaları oluşturmaktadır. İncelenen insan iskelet kalıntılarından 25 erkek, 24 kadın, 6 cinsiyeti saptanamamış ve 6 çocuk ve adölesan olmak üzere toplam 61 birey saptanmıştır. Bireylere ait iskeletler üzerinde çeşitli travmalar saptanmıştır. Bireylerin yaş ve cinsiyete göre travma dağılımları yapıldıktan sonra, bu travmaların çeşitleri açıklanmıştır. Anadolu'da aynı dönemde yaşamış olan diğer toplumlar ile karşılaştırmalar yapılmıştır. Diğer toplumlar içerisinde şiddet kaynaklı çeşitli travmalar ile karşılaşılırken, Kültepe popülasyonunda karşılaşılan travmaların kazalardan, düşmelerden ve mesleki travmalardan kaynaklandığı anlaşılmaktadır. Yaşanılan dönemde Kültepe'nin sakinlerinin çeşitli etnik topluluklardan oluştuğu bilinmektedir. Çoklu etnik grupların oluşturduğu Kültepe sakinlerinin bölge yöneticilerinin oluşturduğu yasa ve kurallara uygun şekilde yaşadığı, arkeolojik çalışmalarda belirtilmektedir. İnsan iskelet kalıntılarından elde edilen sonuçlar, elde edilen arkeolojik sonuçları desteklemektedir.

Anahtar Kelimeler: Kültepe, Orta Tunç Çağı, İskelet Travmaları, Antropoloji, Biyoarkeoloji

[*] Dr. Ankara University, Faculty of Humanities (DTCF) Department of Anthropology 06100 Sıhhiye, Ankara, tkoroglu1989@gmail.com, ORCID: 0000-0002-8391-2640

[**] Prof. Dr. Ankara University, Faculty of Humanities (DTCF) Department of Anthropology 06100 Sıhhiye, Ankara, aylasevimerol@gmail.com, ORCİD: 0000-0002-5841-9459

[***] Prof. Dr. Ankara University, Faculty of Humanities (DTCF) Department of Archaeology 06100 Sıhhiye, Ankara; The Head of Kültepe Excavation kulakoglu@ankara.edu.tr, ORCID: 0000-0002-8163-1378

Research article Pp: 349- 365

Received Date: 17.04. 2023 Accepted Date: 26.05.2023 Publication Date: 30.06.2023

1. INTRODUCTION

Human skeletal remains unearthed from an archaeological site have important traces in terms of understanding both human individuals and social lifestyle of ancient times. Information on health conditions, diet, daily activities, and epigenetic structures can be obtained from anthropological analyses on human skeletons. Moreover, the demographic structures can be understood by estimating the age, sex, and stature of the skeletons. This subject, which contains extensive knowledge of osteology and anthropology, belongs to the field of anthropological studies.

Information on aggression, conflict and war in ancient societies can be accessed with the help of archaeological evidence and through human remains. For ancient times, skeletal remains can often be the primary evidence of such sources. Not only skeletal trauma, but also finds around the skeletal remains can help to understand the violence, accident, or disease in an ancient population (Agnew et al., 2015). Skeletons provide important information for historical research of archaeological sites and medical history research (Licata et al., 2014). One of the most interesting aspects of paleopathology is traumatology. Traumatic injuries in ancient human remains represent a direct source for analyzing the lifestyle of past populations, in contrast to the historical and archaeological record, which is subject to interpretative barriers (Walker, 2001). Anthropologists are able to identify traumatic traces as the traumatic experiences during the lifetime are commonly preserved in bones even long after death. In paleotrauma analysis, proper examination of trauma types, interpersonal violence, intergroup conflict, or daily activities, especially when the paleoepidemiological perspective explores different exposures to risk in different age groups and between sexes (Licata et al., 2014). It is important to note that research on the severity of trauma in osteoarchaeological collections is difficult to evaluate and interpret for a variety of reasons. The first limitation is that archaeological bones are often poorly preserved, and their fragmentation may obscure the correct diagnosis. Postmortem events (diagenetic effects and taphonomy) represent the second limit in paleopathological studies. In fact, postmortem bone changes can be confused with traumas. Furthermore, childhood injuries can cause remodeling at the time of death, especially if they occur very early in life (Steyn et al., 2010). Another frontier in paleopathology interpretation of past trauma is the lack of clinical literature cumulative injury (Judd, 2002).

Specific sources in the study of paleopathology may include skeletal traumas such as fractures caused by blunt force trauma injuries, sharp forces injuries, dislocations, deformation, mutilation, abrasions, trephination, birth-related traumas, symphysis pubica, soft tissue traumas, spondylosis (fracture in the vertebral neural arch, usually between the lower and upper articular processes), burned human remains and tooth loss (intentional or accidental) (Ortner & Putschar, 1985; Merbs, 1983; Rogers & Waldron 1995; Aufderheide & Rodriguez-Martin, 1998; Bennike, 2008; Wurmb-Schwark et al, 2005). Most clinical descriptions relate to various injuries caused by accidents, including fractures of the lower leg (tibia, fibula), clavicle, ribs, forearm, and hip fractures (especially femoral neck) (Ortner & Putschar, 1985). Studies show that ribs, tibia, radius, clavicle, and ulna are respectively the bones commonly broken in accidents (Amponsah & Gorleku, 2015). Such injuries are also observed in ancient human populations. There is a high incidence of radius and ulna fractures compared to fractures in other body parts in ancient human populations (Grauer & Roberts, 1996; Ortner & Putschar, 1985; Ubelaker, 1981).

Understanding when fractures occurred on skeletal remains is important in anthropology and forensic studies. Three categories based on the structures of the bone tissue are followed to understand whether the fractures on the bones occurred before the death of the individual, after death or at the time of death. These are the so-called antemortem, perimortem and postmortem traumas. Antemortem trauma is defined as trauma that occurs before the death of the human individual (Sauer, 1998; Galloway, Zephro, & Wedel, 2014). Regarding

skeletal analysis, antemortem trauma cannot be identified unless there is visible healing on the bone. The healing process is highly variable and depends on the age and health of the individual, as well as the location and severity of the injury (Galloway, 1999; Claes, 2012; Galloway, Zephro, & Wedel, 2014). Antemortem traumas include accidents, fractures, and surgeries that the individual has experienced long before death and has an important place in the identification of the victims. The detection of antemortem traumas on the bones is easy. Fractures show fusion from the place where they were broken, and a new bone formation is seen around it. In some cases, the healing has been completed, and in some cases, it may still be in a process of fusion. This is an indication that the individual has experienced this trauma a certain time before she/he died (Çeker, 2014). Perimortem fractures can be defined as fractures that occur for various reasons, starting from the moment of death, during the death process of the body and after death, until the time when the bone is still fresh and does not lose its collagen structure. Postmortem fractures manifest themselves in any part of the body with their flat shaped, rough, raised, bumpy and lighter colors than cortical bone. In postmortem fractures, a more smooth-edged fracture, crushing, or comminution is seen due to the dryness of the bone. Bone loss occurs in postmortem traumas due to the absence of soft tissue surrounding it.

There is usually no bone loss in perimortem traumas; because the bone is surrounded by soft tissue that protects it (Çeker, 2014). Antemortem injuries provide evidence of bone remodeling, but perimortem trauma shows no signs of skull healing. Distinguishing between perimortem trauma and postmortem damage is not always easy, especially when bone preservation at any particular archaeological site is poor or when the injury happens close to the time of death (Milner & Smith, 1989; Smith, 1997). To exclude traumas occurring after death, we verified that the place of the trauma had a homogenous coloring (Sauer, 1998).

2. THE SİTE

Kültepe is located in the middle of the plain at the foot of Mount Erciyes, the highest mountain of the Central Anatolian Plateau, located approximately 20 kilometers northeast of modern city of Kayseri. The plain on which Kültepe was built was enriched with alluvial deposits of the Sarımsaklı Creek, which flows into the Kızılırmak in the north of the Kayseri Plain (MAP 1) (Kulakoğlu, 2011).

The site was first introduced to the scientific world with the Assyrian Trade Colonial period cuneiforms published by T. G. Pinches in 1881. Later, it was excavated for very short periods, between 1893 and1984, under the direction of E. Chantre. Subsequent research was carried out by H. Winckler and H. Grothe in 1906. The results obtained in the excavations carried out by B. Hrozny in 1925 revealed the importance of Kültepe in Anatolian archaeology and that the mound was the city of Kanesh mentioned in the cuneiforms published by Pinches. Scientific excavations were carried out under the auspices of the Turkish Historical Society from 1948 to 2005 under the direction of Tahsin Özgüç. Afterwards, excavations have been carried out by Fikri Kulakoğlu which are still ongoing (Özgüç, 2005; Kulakoğlu, 2011). The mound, known as Kültepe today, was called Kaneš or Neša in ancient times. Kültepe was the capital of the Kaneš Kingdom, which reigned in the first quarter of the 2nd millennium BC, and the long-distance trade system established by the Assyrians in Anatolia (Özgüç, 2005).

Kültepe consists of two areas, the Hill, and the Lower City. The hill is 21 meters higher than the plain located around it and has a circular appearance with a length of 550 meters in the north-south direction and 500 meters in the east-west direction. The stratigraphy of the Hill so far revealed 18 cultural layers, from the Early Bronze Age to the Late Roman Period (TAB. 1). The Lower City is an area that is thought to be inhabited for at least 250 years. It was founded long after the hill and abandoned long before. The Kaneš Karum (Port of Kaneš), the center of the Assyrian Trading Colonies in Anatolia, is located here. The Lower City consists of four well-

defined building levels (Özgüç, 2005; Kulakoğlu, 2011). The earliest settlement in the Lower Town, the IV. and III. Layers are in the period between the late phases of the Early Bronze Age and early phases of Middle Bronze Age. The most important finds of the Lower City are unearthed from layer II, dating approximately between 1950 BCE and 1835 BCE, according to archaeological stratigraphy, written sources and dendrochronological data (Özgüç, 2003). After Layer II, the city was destroyed by fire and a new settlement began in 1830 BC, recorded as Layer Ib. This period lasted until about 1700 BC, when there was a great fire (Barjamovic et al., 2012; Atıcı, 2014).

TAB. 1. Building Layers and Cultural Periods at Kültepe

Layers	Periods
18. building level	Early Bronze Age I
17-14 building levels	Early Bronze Age II
13-11. building levels	Early Bronze Age III
10-9. building levels / Karum III-IV	Early Bronze Age III – Middle Bronze Age
8. building level / Karum II	Assyrian Colonies Age
7. building level / Karum Ib	Assyrian Colonies Age
6 – 5. building levels / Karum Ia	Assyrian Colonies – Hittite Ages
4 – 3. building levels	Iron Age
2 – 1. building levels	Helenistic and Roman Period

The dead in Karum were buried in all layers, mainly on the house floor, in stone tombs and in jars, or directly in the ground (FIG. 1 and FIG. 2) It is argued that the deads were buried with ceramic pottery or metal vessel, coins, weapons, and jewelry to meet their needs in the next world (Kulakoğlu, 2011).

3. METHODS

The skeletons of Kültepe presented in this study were unearthed throughout 1948-1954 excavations. Although in small numbers, some skeletons also came from 1956, 1957 and 1958 excavations. Skeletal remains were delivered to the Department of Anthropology, Ankara University Faculty of Humanities (DTCF), by Prof. Dr. Tahsin Özgüç, the director of Kültepe excavations at that time. These skeletons were unearthed from the III, II, Ia and Ib building layers of Kültepe. As many years have passed since they were unearthed, the skeletons were damaged and mingled. As a result of the studies, skeletons, which have reassembled and individual distinctions have been made, cleared of suspicious situations and the number of individuals has reviewed. Sex determination has been carried out on the morphology of long bones, skull, and pelvis (Brothwell, 1981; Buikstra & Ubelaker, 1994; Mays, 1998; Phenice, 1969; Ubelaker, 1989; WEA, 1980). Changes in the symphysis pubis, facies auricularis and sternal ends of the ribs were used for estimating the age ranges of the individuals. Age estimation in infants and children was determined from teeth eruption and epiphyseal fusion (Baker, Dupras, & Tocheri, 2005, Scheuer & Black, 2000, Brothwell, 1981). Metric measurements were obtained from long bones (Alt, Rösing, & Teschler-Nikola, 1998; Brooks & Suchey, 1990; Brothwell, 1981; Buikstra & Ubelaker, 1994; Rösing, et al., 2005; Lovejoy, Meindl, Pryzbeck, & Mensforth, 1985; WEA, 1980; İşcan & Kennedy, 1989).

4. RESULTS

Demographic analyses were conducted on Kültepe human skeleton remains. At least a total of 61 individuals were identified, comprising of 25 males (40.98%), 24 females (39.34%), and 6 children and juvenile (9.84%). The sex of the remaining 6 individuals (9.84%), comprising of adults, was indeterminate (TAB. 2).

TAB. 2. Sex Distribution of Kültepe Population

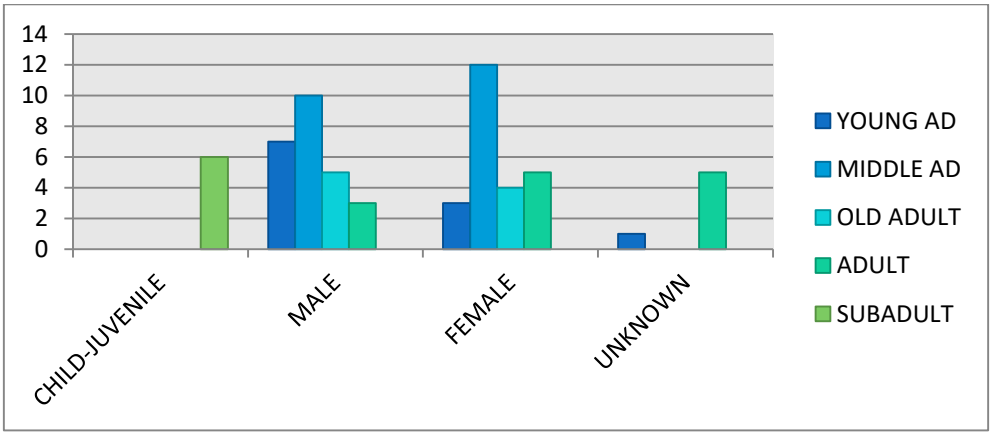
	N	Percent %
Child-Juvenile	6	9.84%
Male	25	40.98%
Female	24	39.34%
Indeterminate	6	9.84%
Total	61	100%

The age distribution of male adults revealed 7 individuals as young adults, 10 individuals as middle adults, and 5 individuals as old adults, while the age distribution of 3 adult male was indeterminate. The age distribution of female adults revealed 3 individuals as young adults, 12 individuals as middle adults, and 4 individuals as old adults; while the age distribution of 5 female adults was not possible to perform. One of the children was between the ages of 2 and 3, one was between the age of 12 and15 and another was between the ages of 2 and 10. The age of the remaining child was indeterminate. Among the 2 juveniles, one was estimated between the ages of 15 and 16 and the other was in the age range of 15-17 years. In addition, one of the individuals whose sexing was not possible to perform was identified to be a young adult. On the other hand, although the exact age range of the remaining 5 individuals was not possible to determine, they appeared to be adult individuals (see TAB. 3 and GRAPH. 1).

TAB. 3. Demographic Distributions of Kültepe Population

Age Range	Male	Female	Unknown	Total	**%**
Child-Juvenile (3-17.9)				6	9.84%
Young adults (18-29.9)	7	3	1	11	18.03%
Middle adults (30-44.9)	10	12		22	36.07%
Old adults (45-+)	5	4		9	14.75%
Indeterminate adult	3	5	5	13	21.31%
Total	**25**	**24**	**6**	**61**	100.00%

It was observed that the densest age group for females and males were middle adult, with 36.07% of total identified individuals. The young adult population constitutes the second largest group, with 18.03%, while the old adult group constitutes 14.75% of the population. It was determined that almost one out of every ten individuals of the population (9.84%) were child or adolescent. In addition, there is an adult population whose age range was indeterminate, comprising 2131% of the population.



GRAPH. 1. Demographic distribution of Kültepe population

5. ANALYSIS OF TRAUMAS

Traumas from the human skeletons unearthed from Kültepe were examined. Traumas were detected in 10 of 61 individuals studied.

Traumas from both sexes were found in the population. No signs of trauma were found in children and juvenile individuals. Traumas were found in 5 of the male individuals and in 3 of the female individuals. Trauma-related formations were detected in two adult isolated bones. The age range of trauma-detected male individuals revealed 4 individuals as old adults and one as a middle-aged individual. Two females were identified as middle adult, and one was identified as old adult individual. The individual whose sex cannot be determined was identified within the young adult age range. The sex of one of the isolated bones was male, but the sex of the other bone remained indeterminate (TAB. 4).

TAB. 4. Demographic Distribution of Traumas Observed in Kültepe Population

Excavation Year	Layer	Sexes	Age Range	Location of Trauma	Type
1949	II	Female	Middle Adult	Ulna Fracture	Antemortem
1949	AII	Male	Middle Adult	Fibula Fracture	Antemortem
1950	-	Male	Old Age	Rib Fracture	Antemortem
1950	-	Female	Middle Adult	Radius Fracture	Antemortem
1956	IB	Male	Old Adult	Distal Femur	Antemortem
1958	II	Male	Old Adult	Fibula Fracture	Antemortem
1958		Male	Old Adult	Tibia & Fibula Fracture	Antemortem
-	AI	Unknown	Young Adult	Radius Fracture	Antemortem
-	-	Unknown	Adult	Clavicle	Antemortem
-	-	Male ??	Adult	Skull	Perimortem
-	III	Female	Old Adult	Fibula Fracture	Antemortem

Four traumatized males were old adults. Healed fractures were observed in the ribs of a male (No: 6) individual (FIG. 3). These antemortem traumas were observed in three ribs. Although the ribs were not complete, one of them had an articular facet where it was articulated with the vertebrae. A male individual (1958 II No: 2) was observed with healed fracture on the left fibula (FIG. 3), and another male individual (1956 IB No: 1) was observed with a trauma-related deformation on the right distal femur (FIG. 4). As the trauma in the medial condyle of the femur fused the deformation and swelling occurred in this area. A trauma caused by a heavy, hard, and sharp-edged object is encountered on a skull (BI No: 4), which was found isolated but identified to be the skull of a male individual (FIG. 5). As the collagen tissue and greenish structure on the bone were still visible, it was concluded that this trauma was perimortem. It was clearly understood that the individual died because of this trauma. The blow to supraorbital region of frontal part of the skull appeared to be caused by an accident.

Trauma-related deformations were also observed in the fibula and tibia of an old adult male individual (B2 N0: 2). Periosteal reactions occurred because of this trauma on the articular surface of the distal end of the tibia. This was resulted by infectious organisms in the bone tissue during the healing process of the fracture. During healing, new irregular bone formations occurred in the bone tissue (FIG. 8). This individual also had healed fracture trauma in the midline of the fibula. Healed fracture trauma was also observed in the midline of the fibula in a middle adult male individual (No: 16).

Traumas on forearms were encountered in two female individuals. A trace of fusion was occurred after fracture in the midline of the right ulna of a middle adult female (No: 21) who was unearthed from the building level II (FIG. 6). Another middle adult female (No: 10), who was unearthed in 1950, was observed with healed

trauma in her left radius (FIG. 9). An old adult female (III N0:2) was observed with a fibula fracture (FIG. 10). A healed fracture was observed in the radius of a young adult individual (No: 3ab), unearthed from layer Ia. Bone deformation resulted by antemortem trauma was observed in the corpus of an isolated clavicle (IZ1), which was found to be an adult individual, but the sex of this individual remained indeterminate (FIG. 7).

6. DISCUSSION

Demographic analysis of Kültepe population, consisting of a minimum of 61 individuals, was performed in this study. Of these, antemortem traumas were encountered in 11 individuals. It is understood that examples of each of the trauma types was present in Kültepe population, in particular from the young adult, middle adult to the old adult age groups.

According to Van Staa et al (2001) the ribs are the primary bones with most traumas seen among males in an archaeological society. Following, radius is the second, and ulna, hand bones and fibula are the third. Respectively, tibia, skull, clavicle, humerus, vertebrae and femur fractures are other fracture traumas observed in ancient male population. In female individuals, respectively ribs, hand bones, fibula, tibia, radius, ulna, vertebrae, clavicle, femur, foot, humerus and skull fractures are found more vulnerable to fracture traumas. In Kültepe population, healed fracture of three ribs was observed in a male individual (No: 6). It is understood that these fractures were caused by the impact of a hard object on the back of the individual. Although the location of the ribs in the anatomical position is not fully understood, it is determined that they were in the posterior region from the articular surfaces. A healed fracture was detected in the midline of the fibula of an old adult male (BII No: 2). It is observed that the bone fused quite well during the healing process. Traumas were also observed in two old adult individuals, one female and one male, and the fibula of the mid-adult male.

Trauma was detected at the lower end of the femoral bone of an old adult male (Ib No:1). This trauma, observed in the medial condyle in the epicondyle, was caused a partial deterioration and swelling in the bone tissue. Since this region does not have the patella and tibia to which it articulates, the determination of the dimensions of the blow is not fully understood. This trauma could occur because of a medial blow to the knee. In consider to the facts presented by Van Staa et al (2001) femoral traumas, which rank last in trauma levels among archaeological societies (Van Staa et al., 2001), the trauma seen in this Kültepe individual stands as a good example. Elderly people with distal femur fractures typically have poor bone quality. With the aging, bones get thinner. Bones can become very weak and fragile. A lower-force event, such as a fall from standing, can cause a distal femur fracture in older individuals who commonly have weak bones (Orthoinfo, 2022).

Humerus fracture and distal radius fracture are among of the most common fractures in any archaeological populations. They occur as the individual tries to balance with the forearm because of fall. Intentional injuries include cranial blunt traumas, forearm fractures, sharp force traumas, and multiple injuries. Parry fracture, which occurs in the midline or distal diaphysis of the ulna and radius bones, is a common trauma in various human populations (Ubelaker; 1981; Larsen, 1998). In line with the archaeological evidence, Parry fracture seen in females may often be the result of abuse. Three of the eight traumas found in Kültepe population are in the forearm bones. Two of the forearm traumas are observed in females, and indeterminate individual. Since no trace of violence trauma is observed, it can be thought that these traumas were related to falls, accidents, or the result of excessive labor.

Clavicle, which is an element of shoulder joint, is a tubular, S-shaped bone. Its medial end articulates with manubrium and lateral end articulates with acromial process of scapula. Clavicle affected by weights placed on

chest and back. In the midshaft region, the bone is relatively free of the strong ligamentous and muscular attachments that characterize both the sternal and acromial ends (Galloway, 2014). Clavicle fractures are often associated with falls on the shoulder and outstretched hand (Lowell, 2008), accidents, sport activities and occupational hazards (Robinson, 1998; Sigurdardottir *et al.* 2011; Galloway, 2014). There is a possibility that the clavicle fractures observed in Kültepe males may be resulted by the plow used in farming and gardening in the region. It is also possible that this trauma was a result of the pressure of sacks or heavy loads carrying over the back to clavicle. In addition, clavicle fracture in Kültepe males could also be caused by interpersonal violence (Paladini et al., 2012; Novak & Slaus, 2010; Yüce, 2021).

Trauma analyses of Anatolian Bronze Age populations were previously done by other researchers. During the Birecik Dam excavations, human skeletal remains dated to Early Bronze Age were unearthed and cut marks were determined on some of these remains. Of 62 individuals in total, cut marks were observed on various bones of 13 individuals, comprising 20.97% of the total population. It was argued that these cut marks were related to the burial ritual or cannibalism (Sevim et al., 1999). Trephination was determined in the skull of an old male from the Early Bronze Age site of Küçük Höyük (Güleç & Açıkkol, 2000). Another study was performed on the skeletal remains of the Early Bronze Age population of the Nif Mountain excavation. In this study, two females and two males were examined and both male individuals were observed with skull trauma. Considering the severity of the blows of the traumas, it was argued that the male individuals were warriors or laborer under heavy work conditions (Yiğit et al., 2007). Trephination was found on the skull of a male individual aged between 25 and 37 years, excavated from Çavlum, dated to Middle Bronze Age. There is no trace of trauma in the other body bones of the individual, and the trephination was performed using the cutting technique on the left coronal suture of the skull (Güleç et al., 2004). Five skeletons of children were identified from the Early Bronze Age occupation at Çiledir Höyük. Of these, an individual aging about 15 (+/- 2) was observed with a sharp force trauma due to the strike of a sharp object on the left frontal skull. It was concluded that the individual survived for a while after the trauma. Another child, aged 9 (+/- 2) years old, was observed with a trauma on left frontal side of the skull. This trauma extends from the nasal part to the end of the frontal part (Surul et al., 2011). İkiztepe Early Bronze Age population consists of a total of 452 individuals. Among them, trauma was observed in 85 individuals (Erdal, 2010). Traumas were seen in five children, 61 males and 15 females (Erdal, 2005). Most of these traumas were skull injuries. It was argued that these injuries in the human skeletons, which were overlapped with various weapons, were caused by the blows received during wars and conflicts (Erdal, 2006). Among these traumas, trephinations were found in five skulls. While one of these skulls belonged to a female, the other four belonged to male individuals. Except for one, the other four trephinations were thought to be related to the injuries received during the war (Erdal, 2005). Human skeletal remains were also found in the subsequent excavations at Kültepe; which coincided with the same period as the skeletal remains presented in this study. Anthropological analyses were carried on the skeletons unearthed between 2005 and 2008 excavations. The analyses were performed on a total of 45 individuals, 14 of which were infants, children, and juveniles, and 31 were adult individuals. However, paleopathological studies on them reveled the sign of trauma on only one individual: a young adult female with a healed head trauma located in the left parietal bone of the skull (Üstündağ, 2014).

7. CONCLUSIONS

In this study presented the trauma analyses of a total of 61 individuals lived during the Kültepe Assyrian Trade Colony Period. Of these, 11 individuals were observed with various bone traumas. In terms of their formation, these traumas were injuries caused by actions such as falling, crushing and accidents. It is understood that contrary to other contemporary Anatolian populations such as Birecik Dam, Nif Mountain, Çiledir Höyük

and İkiztepe individuals, Kültepe inhabitants did not have any traumas due to violence or conflict, indicating that they lived a quiet and comparatively peaceful life.

Kültepe was an important site for multi-regional trade and commerce of this period. The site was also an important center for rich agricultural practice in the region. The original inhabitants of Kültepe were local, Anatolian people. At the beginning of the second millennium BC, local population, and merchants from other places, especially from Assyria, settled at the site and lived together. The people who came later lived peacefully with the locals, traded with them, got married and had children. These people never interfered with the politics of the city and did commercial activities within the framework of the rules set by the Kanesh King. There were also differences in the political structure, social organization, trade and economy, religion and language between the locals and the Assyrians (Özgüç, 2005). Trauma analyses from a skeletal population are almost impossible to understand with certainty; therefore, the results of such studies should be supported by multidisciplinary studies in order to obtain clear results. However, overall, this study identifies perimortem and antemortem traumas are among the common types of traumas in Kültepe population. No sharp force trauma was found in the skeletal remains of the 61 individuals examined in this study.

BIBLIOGRAPHY

Agnew, A. M., Betsinger, T. K., & Justus, H. M. (2015). Post-Cranial Traumatic Injury Patterns in Two Medieval Polish Populations: The Effects of Lifestyle Differences. *PLoS ONE 10 (6)*, 1-18.

Alt, K. W., Rösing, F. W., & Teschler-Nicola, M. (1998). Dental Anthropology - An Introduction. K. W. Alt, F. W. Rösing, & M. Teschler-Nicola içinde, *Dental Anthropology.* Vienna: Springer.

Amponsah, G., & Gorleku, P. N. (2015). Bony Injuries in Trauma Patients Diognased by Radiological Examination. *Ghana Medical Journal Vol. 49 No. 2*, 97-101.

Atıcı, L. (2014). Food and Ethnicity at Kültepe-Kanesh: Preliminary Zooarchaeological Evidence. L. Atıcı, F. Kulakoğlu, G. Bajramovic, & A. Fairbairn in, *Current Research at Kültepe/ Kanesh: An Interdisciplinary and Integrative Approach to Trade Networks* (s. 195-212). Atlanta: Lockwood Press.

Aufderheide, A. C., & Rodiguez-Martin, C. (1998). *The Cambridge Encyclopedia of Human Paleopathology.* Cambridge: Cambridge University Press.

Baker, B., Dupras, T. J., & Tocheri, M. T. (2005). *The Osteology of Infants and Children.* Texas: Texas A&M University Press.

Barjamovic, G., Hertel, T., & Larsen, M. T. (2012). *Ups and Downs at Kanesh.* Leiden: Nederlands Instituut voor Het Nabije Oosten.

Bennike, P. (2008). Trauma. R. Pinhasi, & S. Mays in, *Advances in Human Palaeopathology* (s. 309-329). Southern Gate, Chichester, West Sussex: John Wiley & Sons Ltd.

Brooks, S., & Suchey, J. M. (1990). Skeletal age determination based on the os pubis: A comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods. *Hum. Evol. 5*, 227-238.

Brothwell, D. R. (1981). *Digging up Bones.* New York: Cornell University Press.

Buikstra, J. E., & Ubelaker, D. (1994). *Standards for data collection from human skeletal remains.* Fayetteville, Arkansas: Arkansas archeological survey research series no 44.

Çeker, D. (2014). Adli Antropolojide Perimortem ve Postmortem Kırıkların Ayırımı ve Travma Analizlerindeki Önemi. *Antropoloji 27*, 47-64.

Erdal, Y. S. (2005). İkiztepe Erken Tunç Çağı İnsanlarında Trepanasyon: Olası Nedenleri. *20. Arkeometri Sonuçları Toplantısı*, 101-112.

Erdal, Y. S. (2006). Cranial traumas and their probable reasons in İkiztepe (Northern Anatolia, Early Bronze Age Population). *5th International Congress on the Archaeology of the Ancient Near East.* Madrid.

Erdal, Y. S. (2010). İkiztepe Yerleşimi Işığında Orta Karadeniz Bölgesi İnsanlarının Antropolojik Analizi. *Anadolu Araştırmaları 19 (1)*, 67-97.

Galloway, A. (2014). The Upper Extremity Clavicle. V. L. Wedel, & A. Galloway in, *Broken Bones: Anthropological Analysis of Blunt Force Trauma* (s. 196198). Springfield: Charles C Thomas.

Galloway, A., Zephro, L., & Wedel, V. L. (2014). Diagnostic Criteria for The Determination of Timing And Fracture Mechanism. V. L. Wedel, & A. Galloway in, *Broken bones : anthropological analysis of blunt force trauma Second Edition* (s. 47-58). Springfield Illinois: Charles C Thomas.

Grauer, A. L., & Roberts, C. A. (1996). Paleoepidemiology, Healing, and Possible Treatment of Trauma in The Medieval Cemetery Population of St. Helen-on-The-Walls, York, England. *American Journal of Physical Anthropology 100 (4)*, 531-544.

Güleç, E., & Açıkkol, A. (2000). Küçükhöyük İskeletler Serisinde Bir Trepanasyon Vakası. *16. Arkeometri Sonuçları Toplantısı*, 71-80.

Güleç, E., Yılmaz, H., Sevim, A., Şimşek, N., & Açıkkol, A. (2004). Çavlum Toplumunda Bir Trepanasyon Olgusu. *19. Arkeometri Sonuçları Toplantısı*, 40-50.

İşcan, Y., & Kennedy, K. A. (1989). *Reconstruction of life from the skeleton.* New York: Wiley-Liss.

Judd, M. (2002). Ancient Injury Recidivism: An Example from The Kerma Period of Ancient Nubia. *International Journal of Osteoarchaeology 12*, 86-106.

Khudaverdyan, A. Y. (2012). Bioarchaeological Analysis of Human Skeletal Remains of Iron Age from the Shirakavan Cemetery, Shirak Plateau, Armenia. *Advances in Anthropology 2*, 224-233.

Kulakoğlu, F. (2011). Kültepe Kaniş Karumu: Anadolu'nun En Eski Uluslararası Ticaret Merkezi. *Anadolu'nun Önsözü Kültepe-Kaniš Karumu*, 40-51.

Larsen, C. S. (1998). *Bioarchaeology Interpreting behavior from the human skeleton.* Cambridge: Cambridge University Press.

Licata, M., Ronga, M., Cherubino, P., & Armocida, G. (2014). Different Types of Traumatic Lesions on Mediaeval Skeletons from Archaeological Sites in Varese (North Italy): Diagnosis on Ante Mortal Fractures Using Macroscopic, Radiological and CT Analysis. *Injury 45*.

Lovejoy, C. O., Meindl, R. S., Pryzbeck, T. R., & Mensforth, R. P. (1985). Chronological metamorphosis of the auricular surface of the ilium: A new method for the determination of adult skeletal age at death. *American Journal of Physical Anthropology 68*, 15-28.

Lowell, N. C. (2008). Analysis and interpretation of skeletal trauma. M. A. Katzenberg, & S. R. Saunders in, *Biological Anthropology of the Human Skeleton* (s. 341-386). New Jersey: John Wiley & Sons.

Mann, R. W., & Hunt, D. R. (2005). *Photographic regional atlas of bone disease : a guide to pathologic and normal variation in the human skeleton.* Springfield: Charles C Thomas Publisher LTD.

Mays, S. (1998). *The Archaeology of Human Bones.* New York: Routledge.

Merbs, C. F. (1983). Patterns of activity-induced pathology in a Canadian Inuit population. *national museum of man mercury series archaeological survey of Canada, Paper No.119*.

Milner, G. R., & Smith, V. G. (1989). Carnivore Alteration of Human Bone from a Late Prehistoric Site in Illinois. *American Journal of Physical Anthropology 79*, 43-49.

Novak, M., & Slaus, M. (2010). Bone Traumas in Late Antique Populations from Croatia. *Collegium Anthropologicum 34 (4)*, 1239-1248.

Orthoinfo. (2022, 05 03). *Distal Femur (Thighbone) Fractures of the Knee*. https://orthoinfo.aaos.org: https://orthoinfo.aaos.org/en/diseases--conditions/distal-femur-thighbone-fractures-of-the-knee/ adresinden alındı

Ortner, D. J., & Putschar, W. G. (1985). *Identification of pathological conditions in human skeletal remains.* Washington: Smithsonian Institution Press.

Özgüç, T. (2003). *Kültepe/Kaniş-Neşa. The Earliest International Trade Center and the Oldest Capital City of the Hittites.* İstanbul: The Middle Eastern Culture Center in Japan.

Özgüç, T. (2005). *Kültepe - Kanis / Nesa.* İstanbul: Yapı Kredi Yayınları.

Paladini, P., Pellegrini, A., Merolla, G., Campi, F., & Porcellini, G. (2012). Treatment of Clevicle Fractures. *Translational Medicine 2 (6)*, 47-58.

Phenice, T. W. (1969). A newly developed visual method of sexing the os pubis. *Am J Phys Anthropol 30*, 297-302.

Robinson, C. M. (1998). Fractures of The Clavicle in The Adult: Epidemiology and Classification. *Journal of Bone and Joint Surgery 80 (3)*, 476-484.

Rogers, J., & Waldron, T. (1995). *A Field Guide to Joint Disease in Archaeology.* New York: Wiley.

Rösing, F. W., Graw, M., Marre, B., Ritz-Timme, S., Rothschild, M. A., Rötzscher, K., . . . Geserick, G. (2007). Recommendations for the forensic diagnosis of sex and age from skeletons. *Journal of Comparative Human Biology 58*, 75-89.

Sauer, N. J. (1998). The timing of injuries and manner of death: Distinguishing among antemortem, perimortem and postmortem trauma. K. Reichs in, *Forensic Osteology* (s. 321-332). Springfield, IL: Charles C. Thomas.

Scheuer, L., & Black, S. (2000). *Developmental Juvenile Osteology* . San Diego: Elsevier Academic Press.

Sevim, A., Pehlevan, C., Arman, O., Yiğit , A., & Güleç, E. (1999). Birecik Barajı Eski Tunç Mezarlığı'ndan Çıkarılan İskeletlerin Paleantropolojik Analizi. *14. Arkeometri Sonuçları Toplantısı*, 65-73.

Sigurdardottir, K., Halldorsson, S., & Robertsson, J. (2011). Epidemiology and Treatment of Distal Radius Fractures in Reykjavik, Iceland, in 2004. *Acta Orthopaedica, 82:4*, 494-498.

Smith, M. O. (1997). Osteological indications of warfare in the Archaic period of the western Tennessee Valley. D. Martin, & D. Frayer in, *Troubled Times: Violence and Warfare in the Past.* Langhorne: Gordon and Breach.

Steyn, M., İşcan, M. Y., De Kock, Kranioti, E. F., Michalodimitrakis , M., & L'abbe, E. N. (2010). Analysis of Ante Mortem Trauma in Three Modern Skeletal Populations. *International Journal of Osteoarchaeology 20*, 561-571.

Surul, Ö., Erkman, A. C., Türktüzün, M., Alkan, Y., Sağır, S., & Şimşek , Ö. (2011). Çiledir Höyük ve Tokul Şapel Kazısı İskeletlerinin Paleoantropolojik Açıdan Değerlendirilmesi. *27. Arkeometri Sonuçları Toplantısı*, 179-195.

Şenyürek, M. S. (1952). A Study Of The Human Skeletons From Kültepe, Excavated Under The Auspıces - Of The Turkish Historical Society. *Belleten 63*, 323-343.

Ubelaker, D. H. (1981). *Ayalán Cemetery: A Late Integration Period Burial Site on the South Coast of Ecuador.* Washington: Smithsonian Institution Press.

Ubelaker, D. H. (1989). *Human Skeletal Remains.* Washington: Taraxacum.

Üstündağ, H. (2014). Human Remains from Kültepe-Kanesh: Preliminary Results of the Old Assyrian Burials from the 2005-2008 Excavations. L. Atıcı, F. Kulakoğlu, G. Bajramovic, & A. Fairbairn in, *Current Research at Kültepe-Kanesh. An Interdisciplinary and Integrative Approach to Trade Networks, Internationalism, and Identity* (s. 157-176). Atlanta: Lockwood Press.

Van Staa, T. P., Dennisson, E. M., Leufkens, H. G., & Cooper, C. (2001). Epidemiology of fractures in England and Wales. *Bone 6*, 517-522.

Walker, P. L. (2001). A Bioarchaeological Perspective on The History of Violence. *Annual Review of Anthropology 30*, 573-596.

WEA. (1980). Recommendations for Age and Sex Diagnosis of Skeletons. *Journal of Human Evolution 9*, 517-549.

Wurmb-Schwark, N., Ringleb, A., Gebühr, M., & Simeoni, E. (2005). Genetic Analysis of Modern and Historical Burned Human Remains. *Anthropologischer Anzeiger 63*, 1-12.

Yiğit, A., Gözlük Kırmızıoğlu, P., & Yavuz, A. (2007). Nif Olympos Dağ Kazısı. *23. Arkeometri Sonuçları Toplantısı*, 111-126.

Yüce, A. (2021). An Evaluation of the Mechanisms of Isolated Orthopedic Injuries in Farm Accidents. *Anadolu Kliniği Tıp Bilimleri Dergisi Cilt: 26 Sayı: 2*, 187-193.

Zimmerman, M. R., & Kelley, M. A. (1982). *Atlas of human paleopathology.* New York: Preager.

MAP 1 Assyrian Colony Period Anatolia Settlements herein Kültepe/Kanesh (Atıcı, 2014)

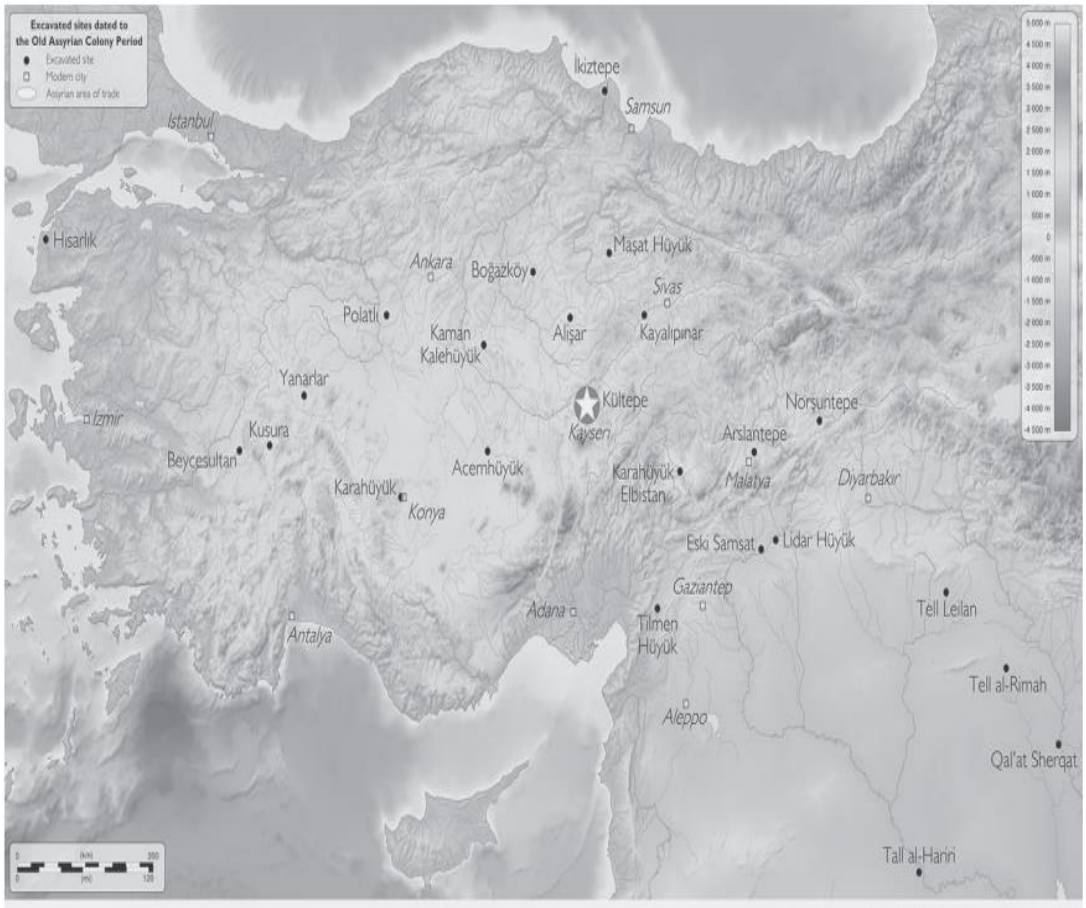


FIG. 1 Cyst Tomb Belongs to Layers Ib and II of 1953 Excavation (From Kültepe Archive)

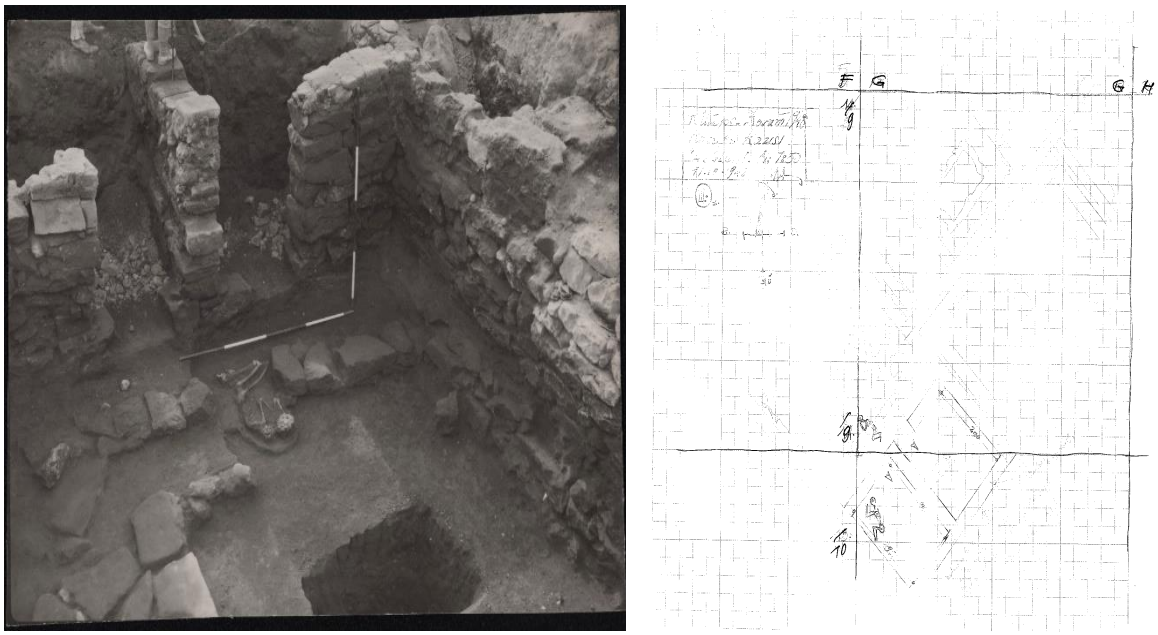


FIG. 2 Inhumation Burial Type and Sketches in 1948 Excavation Season (From Kültepe Archive)

FIG. 3 Healed and Fused Traumas of Male (No:6) on The Ribs

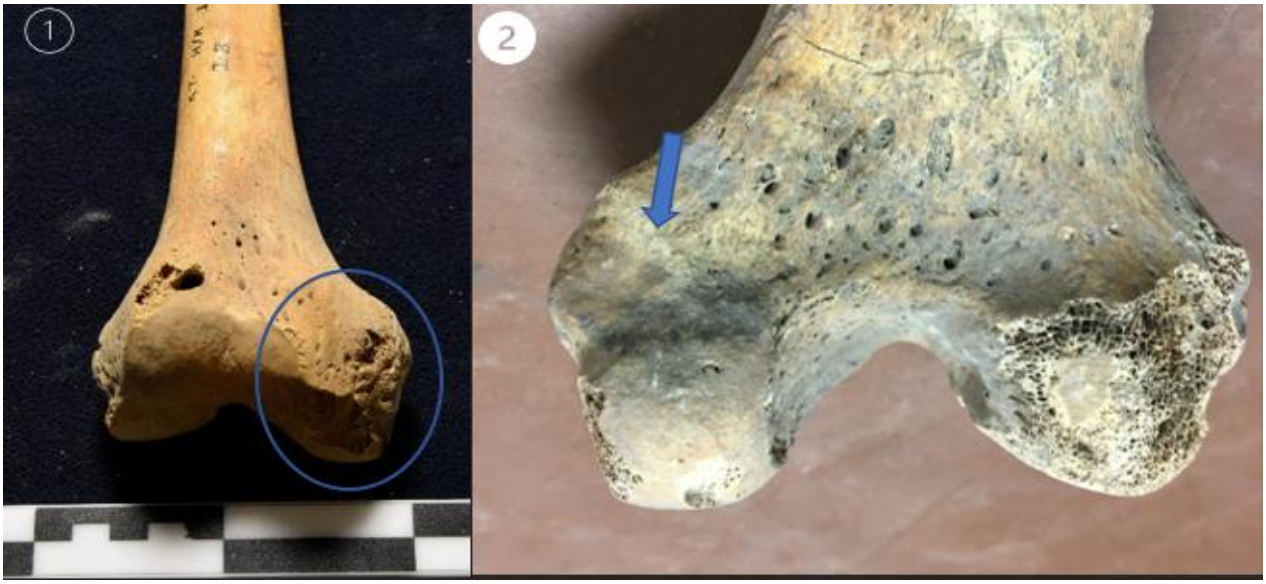


FIG. 4 Trauma in The Distal Femur of a Male (IIB No: 1) Number 1: Anterior View of Distal Femur. Seen Abnormal Swelling and Deformation. Number 2: Posterior View of Distal Femur. Impact-İnduced Collapse of Bone Tissue

FIG. 5 Perimortem Trauma Observed in the Skull of Individual BI No:4

FIG. 6 Healed and fused fracture trauma of the ulna of individual No:21

FIG. 7 Fracture in Midline of The Clavicle of Isolated No. IZ1 and Subsequent Deformation of Bone

FIG 8 Distal Tibial Trauma from Individual B:2 NO:2

FIG 9 Distal Radius Trauma from Individual NO: 10

FIG 10 Fibula Trauma from Individual III NO: 2

Çatışma Beyanı: Bu çalışma ile ilgili taraf olabilecek herhangi bir kişi ya da finansal ilişki bulunmamakta, dolayısıyla herhangi bir çıkar çatışması olmamaktadır.

Destek ve Teşekkür: Çalışmada herhangi bir kurum ya da kuruluştan destek alınmamıştır.

Etik Kurul Kararı: Bu araştırma, Etik Kurul Kararı gerektiren makaleler arasında yer almamaktadır.

Katkı Oranı: Yazarlar makaleye eşit oranda katkıda bulunmuşlardır.