The Bioarchaeological Analysis of a New Early Bronze Age Settlement in Central Anatolia: Harhar Deresi (3000-2700 BC)

Análisis Bioarqueológico de un Nuevo Asentamiento de la Edad del Bronce Temprana en Anatolia Central: Harhar Deresi (3000-2700 a. C.)

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ERKMAN, A. C.; SENER, E.; TAS, A.; ÖZBEY, S. Ö. & SHIRVAN, S. J. The bioarchaeological analysis of a new early bronze age settlement in central Anatolia: Harhar Deresi (3000-2700 BC). *Int. J. Morphol.*, 43(3):860-870, 2025.

SUMMARY: Konya Province, one of the most significant Bronze Age settlements in Anatolia, is notable for its unique mounds. Harhar Deresi, located in one of the distinctive plateaus of Central Anatolia, is a pastoral settlement that was overlooked during surface surveys conducted by many researchers due to the region's topographic features. This settlement was first discovered by chance in 2018 during the construction of the Ankara-Nigde Highway and its connecting roads, and a rescue excavation was carried out in part of the site. This study presents paleopathological findings that contribute to an understanding of daily life in a recently discovered settlement from the Early Bronze II period (3000-2700 BC). The research is guided by two primary objectives. Firstly, it seeks to provide a qualitative paleopathological assessment of diseases, informed by observations related to osteoarthritis, trauma, osteoid osteoma, enthesopathy, and supracondylar process syndrome. Efforts have been made to ensure that this study is quantitative by comparing the pathology rates with those of contemporary ancient Anatolian societies. Secondly, the study aimed to understand the general nutrition, health, and socio-economic structure of this society, as revealed by dental anthropological findings. Our research indicates that the population engaged in intensive agricultural activities and followed a low-protein diet, likely due to the demands of strenuous physical labor. Furthermore, this study endeavors to introduce the physiological stress and health conditions experienced by the newly discovered Early Bronze Age population, serendipitously located in the Central Anatolia region, into the academic literature through a bioarchaeological perspective.

KEY WORDS: Anatolia; Early Bronze Age (EBA); Bioanthropology; Dental anthropology; Osteoarcheology.

INTRODUCTION

The Central Anatolian Plateau, one of Anatolia's unique plateaus, has hosted a significant number of Bronze Age settlements. The process leading to the commencement of almost all excavations, research, and projects in these settlements, which have already been unearthed or are yet to be, gained considerable momentum in the years following the declaration of the Republic. The Alisar and Alacahöyük excavations, located in the same region as our study area and considered pioneers of comprehensive research in this field, are only a few among numerous projects. Although preliminary studies related to the region indicate the presence of significant settlements, these studies are limited in terms of establishing the region's chronology (Matsumura, 2020; Bertram & Ilgezdi-Bertram, 2021; Özdogan, 2023). Konya Province, one of the most important Bronze Age settlements in the region, is also notable for its unique mounds and nearby neighboring excavations. Surface surveys conducted by many researchers are highly valuable for discovering such settlements. However, sometimes these surveys may overlook certain sites due to the region's topographic features. Harhar Deresi, an example of such a settlement that emerged by chance during highway construction, is one of the best examples in this context. Unfortunately, this site was not found in earlier research conducted in the region by many scholars (Omura, 2005). The decline in population during the late Chalcolithic period and its subsequent increase and transition to urbanization during the Early Bronze Age profoundly impacted the socio-economic conditions and

Received: 2025-01-28 Accepted: 2025-03-19

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lifestyle of the region's inhabitants (Özdogan, 2023). Paleoanthropological and bioarchaeological studies are extremely important in revealing lifestyle. Considering the few studies conducted to understand the lifestyle of Early Bronze Age inhabitants, we believe that findings from the Harhar Deresi site will make a significant contribution to the literature.

This study presents novel paleopathological findings aimed at elucidating aspects of daily life within a recently discovered settlement unearthed during highway construction, dating to the Early Bronze Age II period (3000-2700 BC). The research addresses two primary objectives. First, it offers a qualitative assessment of diseases observed in a sample of only 10 human remains excavated during a brief rescue excavation, including an explanation for the limited sample size and the prevalence of paleopathological conditions in relation to the period. Second, the study explores the impact of oral and dental health data on societal health, nutrition, and ecological relationships. It is important to note that this investigation covers only a portion of the site uncovered during highway construction, as excavation was limited to the vicinity of the highway route. Nevertheless, this study provides a unique opportunity to examine daily life in the Central Anatolian region during the Early Bronze Age II period, a time characterized by the emergence of powerful principalities in Anatolia, such as Troia II, Alis ar, and Alacahöyük, alongside advancements in mining, art, and trade. The acquisition of bronze, dependent on copper and tin resources, signifies a critical development of this period, fostering trade relations with neighboring regions and moving away from isolated lifestyles.

Anatolia's richness, derived from favorable geographical and ecological conditions, has historically attracted diverse societies, with Harhar Deresi serving as one such example. The wealth of diagnostic data in the literature, combined with varied interpretations in paleopathology during this period marked by social, religious, and technological transformations, poses challenges for diagnosing Early Bronze Age II Anatolian populations. Nonetheless, diseases with multifactorial etiologies provide valuable insights into the complexities of daily life during this time.

Defining the diseases prevalent in ancient societies and understanding their lifestyles presents significant challenges. Skeletal remains are invaluable resources for comprehending past human activities in their diverse manifestations and can inform numerous inquiries. Limited studies focusing on the morphological, pathological, demographic, and cultural aspects of skeletal remains from

Early Bronze Age (EBA) Anatolian societies are crucial for elucidating biocultural evolution. Skeletons recovered from archaeological contexts encapsulate the collective experiences and circumstances of individuals, representing the most direct archaeological evidence of past populations (Larsen, 2018). Within this framework, osteoarchaeological analyses of skeletons provide insights into the quality of nutritional resources, the utilization of limited economic resources, lifestyle and activity levels, prevailing health conditions and stressors, genetic histories, population dynamics, and environmental and demographic factors shaping life (Ubelaker, 1989; Larsen, 2002; White & Folkens, 2005; Larsen, 2018). Additionally, teeth, which begin forming in the womb and persist until death, serve as invaluable sources of data regarding accumulated health indicators and stress levels (Martin et al., 2013; Agarwal et al., 2016).

Paleopathology, which entails the examination and reconstruction of historical human health and disease, constitutes a core area of bioarchaeology (Buzon, 2011). The skeletal structure, influenced by both natural and cultural factors, demonstrates functional adaptations to environmental changes. Consequently, the skeleton serves as a record of lifelong interactions with the environment, revealing physical responses to trauma, mechanical stress, and disease. This variability suggests that the skeleton embodies the historical context of social relationships (Sofaer, 2006; Buzon, 2011). Variations in subsistence strategies, economic conditions, and dietary practices differentially affect health risks related to disease vectors and injuries (Roberts & Manchester, 2012). The convergence of health, stress, and biocultural methodologies within bioarchaeology and skeletal biology has a long-standing tradition, with considerable efforts over the past four decades dedicated to advancing these studies within the field. Notably, the focus on 'stress' and 'health' in bioarchaeology has emerged from a comprehensive, problem-oriented framework associated with the resilience of skeletal biology established in the early 20th century (Temple & Goodman, 2014).

The skeletal and dental remains uncovered provide a unique perspective on the Bronze Age, offering a comprehensive record of humans as biological entities within their environmental context. When integrated with the archaeological record, this evidence becomes a powerful tool for understanding historical phenomena. This study marks a significant advancement in establishing a robust bioarchaeological framework within Anatolian literature. Its objective is to investigate the fundamental impacts of physiological stress and health conditions on the Bronze Age population in the Central Anatolia region.

MATERIAL AND METHOD

Excavation Area and Archaeological Context

The settlement was discovered during the construction of the Ankara-Nigde Highway and its connecting roads in 2018. A rescue excavation was carried out in collaboration with a private company, under the supervision of the Konya Museum Directorate. The excavation area was limited to a 100-meter-wide stretch along the east-west direction of the highway, allowing for focused analysis of the site (Fig. 1). In a total of 26 excavation units, each measuring 10x10 meters, the main soil level was reached. The overall architectural plan of the settlement indicates that it was a small-scale rural settlement (Fig. 2). There are at least 49 storage-like structures with a minimum of three phases of renovation present in the site (Ekim, 2024). The ceramic fragments obtained have been typologically identified as belonging to the Early Bronze Age II (Ekim, 2024).



Fig. 1. Location of Harhar Deresi settlement.



Fig. 2. Aerial view of the excavation site and architectural structures.

Demographic Analysis. While the excavation was confined to the immediate vicinity of the highway, it is presumed that the settlement area likely extends beyond this boundary. It is important to note that the anthropological analysis of the 10 individuals recovered may not fully represent the entire population. Nevertheless, this study is

significant in offering valuable insights into the period under investigation. Following the completion of highway construction, the excavation area was promptly closed, and the subterranean settlement resumed its historical trajectory.

Various types of burial practices and grave goods in archaeological sites, along with their placement, can provide information about funerary rituals. The positioning of individuals in relation to other burials or the use of cemetery areas is quite useful for understanding relationships among individuals (Glassow, 2005; Buzon, 2011). All individuals in the graves were buried in a hocker position. The graves are irregularly arranged without orientation unity and are poor in terms of archaeological finds (Ekim, 2024). Only a gold earplug, thought to be imported, was found in grave M3, and a vessel was found in grave M6 (Ekim, 2024). There is no widespread tradition of blocking the ears of the deceased in Central and Inner-Western Anatolia (Duru, 1975). Whether as an uncommon burial custom or due to a short-lived fashion, gold earplugs increased the number of common artifacts during the late Early Bronze Age in Central Anatolia, providing a strong chronological basis for comparisons among regions (Duru, 1975).

Method. To expedite highway construction, archaeological investigations were conducted rapidly within a limited area. As a result, the human remains uncovered during the excavation are exclusive to the section traversed by the road. Despite the deformation of skeletal remains from the Harhar Deresi community due to natural conditions, paleoanthropological analyses were carried out at the Anthropology Department laboratory of KAEU (Kırsehir Ahi Evran University, Turkey) (Table I). Demographic analyses employed various methodologies, including those outlined by Ubelaker (1989), Buikstra & Ubelaker (1994), Kaur & Jit (1990), White et al. (2012), and Çöloglu & Iscan (1998). For paleopathological analyses, methodologies from Mann & Hunt (2012), Mann et al. (2016), Ortner (2003), Aufderheide et al. (1998), Roberts & Manchester (2012), and Lovell (1997) were utilized. Dental pathology was examined using the methodologies outlined by Brothwell (1981), Hillson (1996, 2005), Bouville et al. (1983), and White *et al.* (2012).

Code	Sex	Age-Range	Grave Type	Burial Type	Position
M-1	Male	55-65	Pithos	Hocker	S4. 3.
M-2	Female	45-55	Pithos	Hocker	
M-3	Female	Adult	Pithos	Hocker	
M-4	Child	9±2	Pithos	Hocker	
M-5	Male	50-55	Stone coffin	Hocker	
M-6	Female + Baby	25-35 ?	Stone <u>coffin</u>	Hocker	
M-7	Child + <u>Adult</u>	12±2 ?	Pithos	Hocker	10
M-8	Male	35-45	Soil	Hocker	· 200

Table I. Age and sex distribution in the Harhar Deresi population.

Table II. General appearance and rates of paleopathological disorders in the Harhar Deresi populations.

PALEOPATHOLOGICAL RESULTS

While the limited number of Harhar skeletons may not comprehensively represent the societal conditions related to overall health issues, nutrition, lifestyles, and socio-economic structures, they nonetheless provide valuable insights and significant assessments. Paleopathological findings reflect the health attributes and physical activities of the society (Mann & Hunt, 2012). Consequently, paleopathology plays a crucial role in enhancing our understanding of the community (Table II).

n	O/D	O/ D	O/ D	General %
	(Right)	(Left)	(Total)	
Osteoarthrits				
Cervical			0/10	0
Thorokal			0/9	0
Lumbar			3/11	27,27
Phalanx			11/114	9,64
Osteophyte				
Fibula	0/2	1/2	1/4	25
Trauma				
Radius	0/3	1/3	1/6	16,6
Ulna	0/2	1/3	1/5	20
Enthosopathy				
Patella	1 / 2	1/3	2/5	40
Osteoid osteoma				
Fibula	0/2	1/2	1 / 4	25
Variation				
Supracondylar process				
Humerus	0/1	1 / 1	1 / 2	50
Total				100,00

O: Observed D: Determination.

Osteoarthritis. Paleopathological evaluation of the skeletons from Harhar Deresi indicates that osteoarthritis is the most prevalent joint disorder observed, as extensively documented in the literature. Over time, two bone joints lose flexibility and undergo stress, leading to the development of osteoarthritis formations. Alternatively, joint destruction resulting from trauma can initiate a rebuilding process, culminating in the appearance of osteoarthritis formations in the surrounding area. Typically, osteoarthritis progresses slowly. In terms of etiology, joints are generally capable of bearing normal loads; however, individuals engaged in strenuous labor may exceed this capacity. Consequently, osteoarthritis can provide valuable insights into the lifestyle and workload of ancient populations (Aufderheide et al., 1998; Ortner, 2003; Bronner & Farach-Carson, 2007). Osteoarthritis formations were observed in the lumbar vertebrae and tarsal bones of a male individual excavated from burial 8 (Fig. 3).



Fig. 3. a) Osteoarthritis formation in the lumbar of male M8. b) Osteoarthritis formations.

Trauma. Evidence of trauma is present in the left radius-ulna bone of individual M-8, who also exhibited signs of osteoarthritis. Traumatic injuries can arise from falls, impacts, or other incidents, leading to deformation of the bone structure (Lovell, 1997; Ortner, 2003). In this instance, trauma to the radius-ulna bones resulted in a fracture and subsequent fusion of the two bones at the same site, as confirmed radiologically (Fig. 4).

Osteoid Osteoma. Examination revealed the presence of a benign tumor located in the medial cortex of the fibular bone of an individual identified as M-5 (Fig. 5). The definitions of benign and malignant are not always accurate. The most important diagnostic tool used by pathologists is the microscopic appearance of tumor cells; however, this procedure is not suitable for anthropologists because it can only be observed in bone samples. Thus, the formation in this bone was radiologically examined at the pathology department of the Training and Research Hospital of KAEU. Osteoid osteoma is a benign bone tumor and constitutes about 10 % of benign bone tumors in current clinical studies. An X-ray of



Fig. 4. Radiological view of trauma formation in the left radius-ulna bone.

osteoid osteoma typically shows a small area of bone rarefaction surrounded by moderately thickened bone density, usually located in the cortex or spongy part of a long bone. Sometimes this bone density can become very prominent and cause noticeable swelling in the bone shaft (Morse, 1978). The formation of a single lesion-type benign tumor is not expected in different parts of the body. There is no situation where a benign tumor like osteoid osteoma transforms into a malignant tumor. Since osteoid osteoma typically presents with pain in long bones, it can be suggested that individual -5 likely experienced some difficult periods during their life. Benign tumors, as documented in the literature, typically remain confined within the boundaries of the originating bone structure and may induce bone growth in the affected area (Özkan et al., 2015). Furthermore, the development of such benign tumors often ceases, resolves, or does not metastasize to other sites (Kumar et al., 2014).



Fig. 5. Benign tumor in the left fibular bone cortex of the M-5 individual and its radiological appearance.

Enthesopathy. Pathological evidence of enthesopathy has been observed in the patella bones of individuals M-1 and M-2 (Fig. 6b). This condition results from the calcification of the quadriceps muscle's attachment to the patella over time and is commonly observed in various populations, particularly among elderly individuals and those exhibiting findings of diffuse idiopathic skeletal hyperostosis (DISH) (Mann & Hunt, 2012).



Fig. 6. a) M-6 Supracondylar process formation in the left humerus of the individual.b) Enthesopathy in the right patella of individual M-2. Enthesopathy seen in left patella of individual M-1.

Supracondylar Process Syndrome. The supracondylar process, also known as the supracondylar spur or supracondyloid process, manifests as a bony projection located on the distal end of the humerus, positioned just above the medial or lateral epicondyle. This anatomical variant is relatively rare, occurring in a small percentage of the population. The presence of supracondylar process syndrome (Fig. 6a) in the humerus of individual M-6, a non-metric feature observed in a female, was first identified by Tiedmann in 1818 and described by Struthers in 1841 as a beak-shaped bony prominence developing on the anteromedial surface of the humerus. Clinical studies suggest that this syndrome affects approximately 0.3 % to 2.7 % of the current population (Spinner et al., 1994). Individuals with supracondylar process syndrome commonly report experiencing pain, as indicated in current literature (Ivins, 1996; Opanova & Atkinson, 2014). While the presence of a supracondylar process typically does not lead to symptoms or functional impairments, it may occasionally result in nerve compression syndromes, particularly affecting adjacent nerves such as the median or

ulnar nerve. Consequently, affected individuals may present with symptoms such as pain, numbness, tingling, or weakness in the hand or fingers. In this context, individual M-6, who lived during the Early Bronze Age II period, likely experienced significant discomfort in her left arm due to pressure on the veins and nerves. Notably, this syndrome is observed as a variation in African and European populations. Given that the supracondylar process is found in climbing animals, as well as various reptiles and felines, it is generally considered a vestigial anatomical variant in evolutionary literature (Struthers, 2007; Bain *et al.*, 2016).

ORAL AND DENTAL HEALTH

Teeth play a pivotal role in anthropological studies, providing extensive insights into various aspects such as nutrition, oral hygiene, stress, occupation, cultural practices, environmental factors, and socio-economic conditions (Roberts & Manchester, 2012). The temporal evolution of lifestyle and dietary habits significantly influenced the oral and dental health of ancient Anatolian societies. In cases where the archaeological record is incomplete, odontological data obtained from human skeletons can enhance our understanding of past life. Despite their durable nature, teeth are ironically susceptible to decay and erosion throughout life, although they exhibit greater resistance to natural decay factors post-mortem compared to other body parts. The literature indicates a close correlation between dental pathologies and genetic predispositions, metabolic disorders, dietary habits, food preparation techniques, infectious diseases, and oral hygiene practices (Hillson, 2005). In total, only 38 permanent teeth were identified in the skeletons excavated from Harhar Deresi (4I,4I2,6C,5P1,5P2,5M1,6M2,3M3). While the limited number of teeth poses challenges in assessing pathological data due to the small sample size, the individuals from Harhar Deresi, dating back to approximately 3000-2700 BC, offer significant insights into food preparation and consumption practices during this period. Comparing the prevalence of dental pathologies in Harhar Deresi with those in other ancient Anatolian societies can provide valuable information (Table III).

Table III. Early Bronze Age (EBA) and M	iddle Bronz	e Age (MBA) o	dental pathology	rates in Ancient An	atolian Societies.
Researchers	Period	Caries %	Ab scess %	Hypoplasia %	Wear Degree
Karatas (Angel, 1970)	EB A	5,6	-	6	?
Resuloglu (Atamtürk & Duyar, 2010)	EB A	3,74	2,34	57,23	3-4
Hayaz Höyük (Özbek, 1984)	EB A	3,93	?	?	1-2
Küçük Höyük (Açıkkol,2000)	EB A	2,92	?	13,79	3-4
Salur (Yigit et al., 2011)	EB A	2,8	0	22,92	4
Asagı Salat (Basoglu et al., 2013)	EBA	9	?	?	4
Oylum Höyük (Sarı, 2014)	EB A	7,94	3,30	34,01	2-3-4
Ikiztepe (Schultz, 1989)	EBA	2,2			
Harhar Deresi (present study)	EBA	2,63	7,89	52,63	4
Panaztepe (Güleç & Duyar, 1997)	MBA	3,01	0	31,51	4-5-6-7
Salattepe (Basoglu & Erkman, 2015)	MBA	7,14	0	5,35	3-4

Severe caries was observed in the lower left M1 tooth of a 35-45-year-old male individual coded M8, along with an abscess identified in the upper right M1 tooth of the same individual (Fig. 7 a-b). A periapical lesion was identified in the upper right M3 tooth of an individual coded M-6, estimated to be between 25 and 35 years old (Fig. 7-c). The prevalence of caries among the inhabitants of Harhar Deresi is reported as 2.63 %, while the incidence of periapical lesions stands at 7.89 %. Despite the limited number of teeth examined, the caries prevalence within the Harhar Deresi community, dating to the Early Bronze Age period, aligns with rates observed in other settlements. For instance, Resuloglu reported a caries prevalence of 3.74 % (Atamtürk & Duyar, 2010), Salur reported 2.08 % (Yigit et al., 2011), Ikiztepe reported 2.20 % (Schultz, 1989), and Küçükhöyük reported 2.92 % (Açıkkol, 2000). Additionally, the incidence of abscesses exceeds 3.30 % in Oylum Höyük (Sarı, 2014) and 2.34 % in Resuloglu (Atamtürk & Duyar, 2010).

Tooth wear is a seemingly straightforward method that holds profound significance for anthropologists, providing valuable insights into aspects such as age estimation and the socio-economic status of the society individuals inhabited. The degree of wear was assessed using the scale developed by Bouville et al. (1983), to evaluate tooth wear in Ancient Anatolian societies. The average erosion rate of 4 degrees observed in the adult population of Harhar Deresi from the Early Bronze Age II period suggests an agrarian society, akin to contemporary settlements such as Oylum Höyük (Sarı, 2014), Salur (Yigit et al., 2011), and Küçük Höyük (Açıkkol, 2000). While abrasions are predominantly intense in the molar teeth, the presence of severe abrasions on the anterior incisors of some individuals (Fig. 7 d-e) indicates variations in socioeconomic status among individuals. However, it is important to note that the limited number of teeth examined may constrain definitive conclusions.

Dental calculus is typically more prevalent in societies with a predominantly cereal-based diet and serves as a significant indicator of economic status. In the Harhar Deresi community, the incidence of calculus is relatively low (Fig. 7 f-1), with a prevalence of 57.89 %. The level of alveolar loss is categorized as 'moderate,' observed in 75 % of individuals.

During amelogenesis, stress experienced by the organism can lead to temporary disruptions in ameloblastic activity, resulting in enamel defects that indicate developmental interruptions. These hypoplastic enamel defects may manifest in various forms, ranging from a single trace to a line, and from a line to a pit (White *et al.*, 2012). The causes of enamel defects are multifaceted, often linked to systemic metabolic stressors such as inherited anomalies,

localized trauma, malnutrition, or childhood diseases (Goodman & Rose, 1991; Roberts & Manchester, 2012). Hypoplasia was identified in 20 out of a total of 38 teeth examined, representing a prevalence of 52.63 %. Although the incidence of hypoplasia was relatively high, it was generally not severe (Fig. 7 1-h).

The morphological structure and shape of teeth are primarily determined by genetic factors, making them valuable for understanding long-term phylogenetic processes and variations (Scott & Turner, 1988, 1997a; Vodanovic' et al., 2013; Kazak, 2018). The presence of the Carabelli tubercle, a notable dental variation, is likely influenced by both genetic and environmental factors (Biggerstaff, 1973; Kazak, 2018). Carabelli tubercles were identified in the URM1 and ULM1 teeth of a child approximately 9 years old from the Harhar Deresi community (Fig. 7-g). According to ASUDAS standards developed by Dahlberg (1956) and Turner II et al. (1991), the Carabelli variation was observed at a 6–7-degree scale. This variation is less common in Asian populations but is considered distinctive in Europeans, with higher prevalence rates at degrees 5, 6, and 7 (Scott, 1980; Hsu et al., 1999; Scott & Irish, 2017; Smitha et al., 2018; Bhavyaa et al., 2021). These dental variations provide valuable insights into population genetics and are significant for enhancing our understanding of the biodiversity of Early Bronze Age II populations. The literature indicates that Carabelli variation is inherited through a dominant gene (Hanıhara, 1968; Scott & Turner, 1997b). It is likely that variation patterns should also appear in the family of individual M-4. However, the limited area of excavation, restricted to only the area affected by the highway, has resulted in a small number of skeletal samples. Additionally, the loss of teeth from the skeletons found in the grave (postmortem) before death has naturally constrained the results related to genetic and environmental factors.

DISCUSSION AND CONCLUSION

This study contributes to the bioarchaeological landscape by providing a comprehensive understanding of the primary effects of physiological stress and health conditions on the less prominent populations of the Early Bronze Age in the Central Anatolian region. In addition to illuminating the daily lives of individuals residing in a temporary settlement, likely dated to the Early Bronze Age II period (3000-2700 BC) based on architectural features, this research offers an estimated perspective from both geographical and temporal standpoints, distinguishing it from previous studies. The small size of the Harhar Deresi settlement and its location near a relatively large settlement may suggest the existence of a settlement system composed of small units associated with a larger center (Fig. 2). This is further supported by the low



Fig. 7. a) Caries of the M1 tooth leading to a periapical lesion. b) Periapical lesion in the upper right M1 tooth of individual M-8. c) A periapical lesion observed in the upper right M3 tooth of individual M-6. d) Abrasions noted on the teeth of individual M-8. e) Advanced wear observed on the incisors of individual M-2. f) Alveolar loss observed in female individual M-6. 1) Alveolar loss, hypoplasia, and dental calculus present in the mandible of male individual M-8. h) Hypoplasia findings in the upper right and left M1 teeth of child individual M-4. g) Carabelli variation observed on the upper right and left M1 lingual side of child individual M-4.

number of graves. It is likely that people transported their deceased to the settlement centers. Examination of the architectural structures, which have undergone various repairs, indicates the presence of a single-layer settlement (Ekim, 2024). This situation reflects a pastoral lifestyle with rural characteristics. Indeed, the pathological and dental data indicate that the population engaged in intensive agricultural activities and relied on a low-protein diet.

The predominant consumption of animal products in the Harhar Deresi settlement includes cattle (54.43%), sheep (15.19%), and horses (12.66%). This suggests that cattle, along with horses, played a significant role in agricultural and transportation activities, as well as serving as dietary staples. Notably, ongoing zooarchaeological investigations indicate that cattle were likely allowed to mature beyond their typical meat-producing age of approximately one and a half years, likely for milk production and agricultural purposes.

It is hypothesized that individuals from Harhar Deresi exhibited an increased prevalence of osteoarthritis due to muscle and joint wear, as well as age-related bone density loss (Aufderheide *et al.*, 1998; Ortner, 2003; Bronner & Farach-Carson, 2007). Osteoarthritis lesions were primarily observed in the lumbar vertebrae, while such lesions were infrequently detected in the carpal and tarsal bones (Fig. 3). Enthesopathy was identified in two individuals, with one case affecting the patella (Fig. 6), suggesting muscle-related stress likely resulting from heavy labor. This manifestation in middle-aged to older individuals indicates a higher level of physical activity compared to others in the population. Evidence of upper limb trauma further implies a potential association with the physical activities or accidents encountered in daily life (Fig. 4). These findings suggest that the inhabitants of Harhar Deresi were significantly engaged in animal husbandry and agriculture.

The most notable pathological finding within the Harhar Deresi community is the presence of a benign, nonmetastasizing tumor located in the fibular cortex of male individual M-5 (Fig. 5). While the exact etiology of this tumor remains unclear, prior studies have identified family history, ethnicity, and gender as significant risk factors. Although benign fibular tumors are relatively uncommon, they have been documented in the literature. Despite their stationary appearance, these tumors can induce bone destruction, formation, and deposition due to the dynamic regulation of bone tissue by osteoblasts and osteoclasts, which is influenced by various factors, including vitamin D levels, hormonal balance, physical activity, and age. Deficiencies in vitamins, hormonal imbalances, physical inactivity, and the aging process can disrupt this delicate balance. Consequently, it is plausible to hypothesize that the condition observed in individual M-5 may be attributable to malnutrition-induced vitamin deficiencies, resulting in impaired physiological functions.

Caries and abscess disorders are closely interconnected. In the skeletal remains from Harhar Deresi, the incidence of dental caries is 2.63 %, while the prevalence of periapical lesions is notably higher at 7.89 %. The presence of hypoplastic enamel defects within the community serves as a significant indicator of physiological stress (Goodman & Rose, 1991), with a prevalence rate of 52.63 % in Harhar Deresi. This level of stress is likely attributable to adverse conditions such as infectious diseases, nutritional deficiencies, or crises like famines and warfare, potentially exacerbated by early weaning practices during infancy. Additionally, the high levels of dental calculus and tooth wear indicate a diet primarily composed of grains. Furthermore, the similar degree of wear observed between the anterior incisors and molars in some individuals suggests a mixed diet that predominantly includes both animal and grain products.

The identification of Carabelli variations in the upper permanent first molars of the 9-year-old child M-4 (Fig. 10) and the presence of supracondylar process syndrome in the left humerus of the 25-year-old woman M-6 (Fig. 7) are significant non-metric features. Additionally, the enthesopathy observed in individuals M-1 and M-2 (Fig. 6) and the osteoarthritis formations detected in individuals M-8 and M-5 (Fig. 3) indicate that these individuals likely experienced pain and mobility issues in their joints. The trauma observed in the radius-ulna bones of individual M-8, resulting in a fracture and subsequent fusion (Fig. 4), may have occurred due to falls or daily activities. Such trauma often reflects the social dynamics associated with subsistence practices. From a biocultural perspective, evidence of non-fatal osteological trauma offers valuable insights into social relationships and the role of violence within these contexts (Martin & Harrod, 2015).

A pastoral lifestyle is evident at the Harhar Deresi settlement, which showcases a diversified food economy that integrates both agriculture and animal husbandry. The impacts of intensive agricultural and livestock activities are clearly reflected in paleoanthropological data, particularly in skeletal paleopathology. Architectural and archaeological remnants from the Early Bronze Age II (EBA II) suggest a transient nature of habitation in this locale. Current scholarship indicates that certain epigenetic traits identified in the skeletal remains bear resemblance to those found among individuals of European descent, highlighting their notable prevalence. This period may also have experienced shifts in the socio-political landscape, characterized by the rise of powerful principalities amid urbanization, mining, artistic endeavors, and trade in Anatolia. Inaddition to archaeological evidence of societal and technological transformations, paleopathological data illuminate the complex nature of diseases with multifactorial etiologies and the challenges of daily life. Unfortunately, the expedited completion of highway construction, undertaken without requisite studies, has disrupted the Harhar Deresi settlement, forcing its inhabitants to continue their historical trajectory under ironic circumstances.

ACKNOWLEDGEMENTS. The authors wish to express their gratitude to the Directorate of the Konya Archaeological Museum and to archaeologist Mehmed Sagir for their invaluable contributions to this study.

ERKMAN, A. C.; SENER, E.; TAS, A.; ÖZBEY, S. Ö. & SHIRVAN, S. J. Análisis bioarqueológico de un nuevo asentamiento de la Edad del Bronce temprana en Anatolia central: Harhar Deresi (3000-2700 a. C.). *Int. J. Morphol., 43(3)*:860-870, 2025.

RESUMEN:La provincia de Konya, uno de los asentamientos más importantes de la Edad del Bronce en Anatolia, destaca por sus singulares montículos. Harhar Deresi, ubicado en una de las mesetas distintivas de Anatolia central, es un asentamiento pastoral que pasó desapercibido durante los estudios de superficie realizados por numerosos investigadores debido a las características topográficas de la región. Este asentamiento se descubrió por casualidad en 2018 durante la construcción de la autopista Ankara-Nigde y sus vías de conexión, y se realizó una excavación de rescate en parte del yacimiento. Este estudio presenta hallazgos paleopatológicos que contribuyen a la comprensión de

la vida cotidiana en un asentamiento recientemente descubierto del Bronce Antiguo II (3000-2700 a. C.). La investigación se basa en dos objetivos principales. En primer lugar, busca proporcionar una evaluación paleopatológica cualitativa de las enfermedades, basada en observaciones relacionadas con osteoartritis, traumatismos, osteoma osteoide, entesopatía y síndrome del proceso supracondíleo. Se ha procurado que este estudio sea cuantitativo comparando las tasas de patología con las de las sociedades anatolias antiguas contemporáneas. En segundo lugar, el estudio buscó comprender la nutrición general, la salud y la estructura socioeconómica de esta sociedad, según lo revelado por los hallazgos antropológicos dentales. Nuestra investigación indica que la población se dedicaba a actividades agrícolas intensivas y seguía una dieta baja en proteínas, probablemente debido a las exigencias del trabajo físico extenuante. Además, este estudio busca introducir en la literatura académica, desde una perspectiva bioarqueológica, el estrés fisiológico y las condiciones de salud que experimentaba la población de la Edad del Bronce Antiguo recién fortuitamente descubierta, ubicada en la región de Anatolia central.

PALABRAS CLAVE: Anatolia; Edad del Bronce Antiguo (EBA); Bioantropología; Antropología dental; Osteoarqueología.

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