

Prevalence of tooth loss in Adrianapolis historical population*

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Abstract

Relationship between ante-mortem tooth loss and age in past human populations was evaluated in this article. The skeletal remains found during the archeological investigations at Hadrianopolis region by Edirne Museum during 2002-2003 were related to Eastern Roman-Byzantium period. From a total of 114 human skeletal remains were studied. The aim of this study was to determine the prevalence of antemortem tooth loss in the skeletal remains also discusses the correlation of these findings with the community's nutritional, cultural and environmental factors.

Keywords: dental status; tooth loss; ancient populations

** Author is responsible for language correctness and content.*

Introduction

The science of anthropology obtains data on health, disease and death from ancient populations. Research on the skeletal remains of human teeth and surrounding tissues provides useful information on the evolutionary perspective of dental and periodontal diseases (1). Various oral and dental pathologies are frequently analyzed as part of bioarcheological and paleopathological investigations of the skeletal remains of past populations. These pathologies include dental caries (i.e., cavities), enamel hypoplasia, periodontal disease, and antemortem tooth loss (2-7). Masticatory system needed a complete dentition to remain healthy and provide satisfactory function. Loss of teeth from the jaws is a complex and multi causal process. Tooth loss can be produced as a consequence of continuous eruption, a natural physiological process related to the need for the maintenance of biting capacity in heavily worn teeth. Its differential etiology in archaeological samples has yet to be fully understood (8). The focus of this article is the relationship between antemortem tooth loss and age in past human populations.

The aim of this study was to determine the prevalence and the severity of periodontal diseases and ante-mortem tooth loss in the skeletal remains of 114 Adrianapolis inhabitants from the X. century AD. This paper also discusses the correlation of these findings with the community's nutritional, cultural and environmental factors.

Historical Background

Edirne, formerly Adrianople or Hadrianople, city, extreme western Turkey (Figure 1). It lies at the junction of the Tunca and Maritsa rivers, near the borders of Greece and Bulgaria. The largest and oldest part of the town occupies a meander of the Tunca around the ruins of an ancient citadel. Edirne's site and turbulent history were determined by its strategic position on the main route from Asia Minor (Anatolia) to the Balkans. The tower of Macedonia is located in the Edirne. The skeletal remains found during the archeological investigations at Adrianapolis region by Edirne Museum during 2002-2003 were related to Eastern Roman-Byzantium period (Figures 2-3).

Materials and Methods

From a total of 114 human skeletal remains were studied. Among these, 11 skeletons had total ante-mortem tooth loss on both jaws. The

age of death and sex of the skeletons could not be identified due to poor storage conditions as well as bones being found separately. For this reason in this study we have worked on upper and lower jaws of 106 young adult, adult and elderly sex identified intact skeletons.

In the previous paleoanthropologic studies the age identifications of the skeletons of Adrianapolis inhabitants was performed by analysing body bone epiphysial junction for young adults, costal, symphyisal, sutural and dental aging for adults. This study was carried out on the upper and lower jaws of young adults (age 18-25), adults (age 25-45) and elderly (age over 45) individuals. All morphological differences especially pelvic and cranial were taken into consideration regarding sex determination. Criteria to be sex determination in this study was; cranial indicators included variation in prominence of the supra-orbital torus and nuchal lines, sharpness of the superior lateral margin of the orbit, frontal and parietal bossing, size of the mastoid process and supra-mastoid eminence, and the sagittal contour of the frontal bone from glabella to bregma. Features of mandibular morphology used were prominence and shape of the mental and lateral eminences, angulation of the ascending ramus at gonion, rugosity and eversion of the gonial margin, and symphyseal height (9).

The measurement of ante-mortem tooth loss was the proportion of extracted teeth to the total of the existing alveoli plus the ante-mortem teeth (10-12).



Figure 1. Location of Adrianapolis community.

Results

Of the total 114 individuals; 24 were young adults (22.7%), 61 were adults (57.5%), 21 were elderly (19.8%) and 8 of them were unidentified age or sex group. Regarding the general age of

the population; adult percentage is significantly higher than other identified age. Elderly peoples are the lowest percentage group. Forty one of the skeletons were females and 65 of them were males. The average age of death was 34.98 for females and 36.74 for males. The average age of death for the population is 36.41. Among these, 11 skeletons had total ante-mortem tooth loss on both jaws. One of these in adult group and another's are elderly. Table 1 shows the age and gender groups, number of individuals, number of teeth, number of post-mortem and ante-mortem teeth. Regarding these findings; there is significant relevance between age and amount of ante-mortem tooth loss and significant relevance between aging and ante-mortem tooth loss ($p < 0.05$). At the same time, tooth loss in all age groups is more in males than in females and this difference is statistically significant ($p < 0.05$).



Figure2. Hadrianopolis skeleton by Edirne Museum during 2002-2003 were related to Eastern Roman-Byzantium period.

Discussion

In the present study, 106 individuals with sufficient skeletal remains were studied. Eleven individuals had complete tooth loss and all were male. In 106 individuals, the number of tooth loss was 906. Loss of teeth from the jaws is a complex and multi causal process. Despite the valuable insights that can be derived from the careful study of antemortem tooth loss patterns, dental palaeo pathologists seem to have neglected this potentially rewarding area of investigation. Four primary causal factors contribute to premature loss of teeth: (1) variations in dietary consistency (2) nutritional deficiency diseases (3) cultural or ritual ablation and (4) trauma (13-15). Variations in diet may be especially complex since antemortem tooth loss can result from recognizably distinctive etiological pathways. Firstly abrasive foods may cause severe attrition, resulting in pulp exposure, dental abscess, and ultimate tooth loss (16). Secondly, soft foods and refined diets, high in carbohydrates, may encourage development of large caries lesions, producing pulp exposure, abscess formation, and finally tooth loss (17). In elderly group ante-mortem tooth loss prevalence was very high and this difference statistically significance ($p < 0.05$). These results are in agreement with previous studies (18,19). It is well known from archaeological data that the population was largely reliant upon dried meat or fish. Severe occlusal forces caused by the nutrition may account for the progression of the disease, especially for molar teeth. Additionally, other kind of foods, like dry figs and honey, might be the cause of the increasing number of caries and ante-mortem tooth loss (20).

In this study, antemortem tooth loss was greater in males than females. Especially tooth loss in the anterior region may be caused by trauma. This can be explained by the fact that males are warriors. Another risk factor for the population might be the probable use of teeth as tools. The shape of wear and enamel cracks observed on the anterior teeth of some samples suggests a pulling action, possibly fibres for fish-net or rope making. These factors may explain the high ante-mortem teeth loss prevalence in elderly group. This result might be related to the short of their life.

Recording and reporting data that permit the partitioning of total tooth loss into its multifactorial etiological components will result in greater insight into the behaviour of earlier human populations. In conclusion, there is a

special interest to study the frequency of periodontitis and other tooth diseases in different ancient populations. The differences may lead us to useful conclusions about the conditions of life in antiquity. This study may be a useful topic for further research in this direction.



Figure 3. Hadrianopolis skeleton by Edirne Museum during 2002-2003 were related to Eastern Roman-Byzantium period.

Group	Gender	N I	N T	N PM	N AM
Young adult N=24	F	11	188	106	14
	M	13	264	78	22
Adult N=61	F	24	77	402	193
	M	37	539	211	286
Elderly) N=21	F	6	31	29	108
	M	15	75	62	283
Total N=106	F	41	296	537	315
	M	65	878	351	591

F-female; M-male; N-number; I-individuals; T-teeth; PM-postmortem lost teeth; AM-antemortem lost teeth

Table 1. According to age and gender groups; number of individuals, number of teeth, number of post-mortem and ante-mortem teeth.

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