

Enamel extensions on deciduous teeth- an example on late medieval archaeological sample in Bosnia and Herzegovina*

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Abstract

Description of morphological dental traits is an important concept within dental anthropology. The aim of this paper is to describe the case of occurrence of the enamel extensions in deciduous teeth in archaeological sample. The case of occurrence of enamel extensions on deciduous teeth from late medieval child's skeletal remains is reported, along with other relevant data. Conclusion is that this might be the first such case described in medieval Bosnian archaeological population.

Keywords: enamel extensions; deciduous teeth; medieval population

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Introduction

Description of morphological dental traits is an important concept within dental anthropology. Among other nonmetric dental traits, enamel extensions are described by ASUDAS (Arizona State University Dental Anthropology System) as well. (1) They are defined as apically directed cervical enamel line toward the furcation of the roots in premolar and molar teeth. (2)

The description of enamel extensions and their grading is based on how much it can deviate from the horizontal axis, distinguishing them from a usual horizontal form of cervical line. The slight, moderate and pronounced enamel extensions are defined by Turner et al. (1) on the basis of how much the enamel extension derives from the horizontal axis (from 1 to more than 4 mm).

Although, the focal point to record this dental trait is the upper first molar it is also recommended to note enamel extensions if present on all upper and lower molars and premolars. Different studies described enamel extensions in teeth of both recent and archaeological populations. (3-8) Interestingly enough, review of literature couldn't provide resource of data on this dental trait in deciduous teeth.

The aim of this paper is to describe the case of occurrence of the enamel extensions in deciduous teeth in the archaeological sample.

Case report

The large late medieval cemetery at the Metaljica site in Vilovac near Tarčin, Hadžići municipality, is located on a gentle slope dominant in relation to the surroundings. There are at least 25 medieval tombstones (stećci) in the cemetery. Archaeological excavations of the site were conducted in October and November 2019 within the project: "Genetic characteristics of inhabitants of Medieval Bosnia." Three trenches covering a total area of about 85 m² were excavated. The trench no. 3 was opened on a small elevation similar to larger tumulus. Excavations showed that an intensive burial was performed in it. Within the trench, 21 graves were discovered on an area of 41 m². The skeletal remains were transferred to INGEB (Institute for Genetic Engineering and Biotechnology), University of Sarajevo for further analysis. Several skeletons were subadults. Among them is grave 6 which is the subject of this paper. It consisted of a skull that was found above grave 15 which is buried just below. The remains comprised fragments of maxilla and mandible with some teeth preserved. Preliminary results



Figure 1 Occlusal view of glued maxillary fragments.



Figure 2 Occlusal view of mandibular fragments.

suggest XIV or XV century as possible dating of the cemetery.

Maxillary fragments were glued at median palatine suture (Figure 1). Photographs of maxillary and mandibular fragments were taken from occlusal plane and several photographs on dental details. Anthropometric analysis was performed to record linear dimensions of the mandible fragment using digital calliper and result are shown in Table 1.

Dental status: Teeth 55,54,53 were presented at their positions in fragment of maxilla. Vestibular



Figure 3 Several tooth buds of permanent teeth recovered in tomb 6.



Figure 4 Enamel extension on maxillary second deciduous molar 55.



Figure 5 Enamel extension on the mandibular second deciduous molar 85.

plate of maxilla was severely resorbed. Teeth 52,51,61, 64,65, 75 were lost post-mortem. In mandibular fragment teeth 74,73,72,71,81,82,83,84 and 85 were at their

positions in the lower jaw (Figure 2). Teeth 62 and 63 were recovered as well, out of their sockets but proximal to the maxillary fragments. Some tooth germs for permanent teeth (16, 13,11,23,36 and 46) were also recovered near to jaw fragments (Figure 3). Metric analysis of teeth (9,10) was done with digital calliper and data collected are presented in Table 2.

Enamel extensions were noted at vestibular part of cervical line on deciduous teeth 55 and 85. (Figure 4 and 5). Enamel extension on tooth 55 was of grade 3, while enamel extension on tooth 85 was of grade 2.

Examination of tooth germ of tooth 16 revealed that crown was formed with beginning of formation of cervical third of roots. On this tooth, another enamel extension was noted and grade 2 was assigned due to uncomplete furcation formation (Figure 6).

The estimated age at death was 5 years (+/- 9 months) by Schour and Massler developmental chart, and confirmed as 5,5 years by London atlas of tooth development and eruption.

Skeletal remains were incomplete and without pelvis. Having in mind that this was child's remains the sex determination was not done. Although, there's an indication that this might be a boy, due to prominent and triangular shape of the mentum (Figure 7 a,b). This opinion is supported by analysis of linear measurements of mandible revealing relatively large mandibular height and ramus height, but without reference to medieval or contemporary Bosnian children's population anthropometric standards it could not be confirmed. The further analysis will include DNA testing, so we expect to have more information on sex of this archaeological sample in the future.

Discussion

This particular case was interesting for two reasons. The first reason was the fact that we couldn't find any reports on enamel extensions in deciduous teeth. The second reason was the occurrence of enamel extensions in several other skeletal remains from the same necropolis. Among twenty skeletal remains, recovered from this necropolis up to date, five of them had enamel extensions on molar teeth. That raises the question if some of those people buried in this necropolis were family connected. DNA analysis might reveal that.

Importance of enamel extensions in contemporary population has been described by other researchers (3,5) especially regarding their close association to periodontal disease.



Figure 6 Enamel extension on the tooth bud of the maxillary first permanent molar.

Extension of enamel toward cervical third of root is linked to periodontal disease since it can compromise and reduce level of periodontal attachment in this area. (11) Additionally, the enamel extensions are, from the anthropological point of view, very often related to specific geographical region. Up to date we have no data on prevalence of enamel extensions in contemporary and archaeological Bosnian populations.

Conclusion

This case of enamel extensions in deciduous teeth might be the first such case described in medieval Bosnian archaeological population. Further research on this morphological dental

trait and its relationship to periodontal disease could give more insight into dental anthropology and oral status of medieval population in Bosnia and Herzegovina.

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Figure 7 Prominent (A) and triangular shape of the mentum (B).

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Table 1. Anthropometric analysis* of mandibular right fragment (right side).

Anthropometric dimension	Size (mm)
Mandibular Foramen (FM)- lower mandibular edge distance	8,75
Mandibular Foramen (FM)- alveolar ridge distance	10,54
Mesio-distal diameter of FM	3,22
Caudo-cranial diameter of FM	1,64
Mandibular corpus height at FM level	20,44
Minimal ramus breadth	22,8
Maximal ramus breadth	23,7
FM- mental tuberculum distance	25,19
AP dimension of condyle	7,18
ML dimension of condyle	11,41

*Other anthropometric dimensions were not collected due to mandible fragmentation.

Table 2. The metric data for deciduous teeth.

Deciduous tooth (FDI)	MD diameter of crown	MD diameter of cervix	BL diameter of crown	Crown height	Tooth length	Root length
55	8,97	7,46	10,6	7,66	17,19	10,45
54	7,54	7,40	10,12	6,6	-	-
53	7,41	5,06	7,23	8,57	19,30	11,56
52	MPM					
51	MPM					
61	MPM					
62 (out of socket)	5,52	3,70	4,93	6,23	15,67	10,9
63	7,51	6,15	7,07	8,52	19,9	12,9
64	MPM					
65	MPM					
75	No data					
74	8,70	8,87	7,29	7,05	-	-
73	6,38	5,24	6,23	,07	17,49	10,58
72	4,89	3,22	5,02	6,40	15,78	9,79
71	4,18	3,15	4,11	5,58	13,99	7,99*
81	4,24	3,11	4,29	5,54	14,11	9,23
82	4,58	3,38	4,65	6,47	17,11	11,28
83	6,33	6,19	6,35	7,79	-	-
84	No data					
85	No data					

* signs of root resorption. Abbreviations: MD-mesio-distal, BL-bucco-lingual, MPM-missing post mortem)

