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CASE REPORT
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MAKSILARNI MEZIODENSI U KASNO SREDNJOVEKOVNIM ARHEOLOŠKIM OSTACIMA SKELETA IZ RUDINE, HRVATSKA

MAXILLARY MESIODENS IN LATE MEDIEVAL AGE ARCHAEOLOGICAL SKELETAL REMAINS FROM RUDINA, CROATIA

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Sažetak

Uvod: Pojava meziodensa je donekle retka, međutim, kod pacijenata s prekobrojnim zubima prilično je česta. Sa antropološke tačke gledišta, interesantno je potvrditi razvoj meziodensa u različitim istorijskim periodima.

Prikaz slučaja analizira meziodensiolne skeletne ostatke koji datiraju iz kasnog srednjeg veka (13–16. vek), što potvrđuje pojavu meziodensa i upućuje na zaključak da je meziodens, kao oblik prekobrojnih zuba, prisutan kroz istoriju.

Zaključak: Meziodens u arheološkom kontekstu dokazuje da je pojava ove vrste prekobrojnih zuba prisutna najmanje pola milenijuma.

Cljučne reči: meziodens, dentalna antropologija, arheologija, paleontologija

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Abstract

Introduction: The occurrence of mesiodens is somewhat rare, but among patients with any kind of supernumerary teeth, it is rather common. From an anthropological point of view, it is interesting to confirm the development of mesiodens in various historical ages.

Case report analyses a mesiodens and the surrounding skeletal remains dating from the late medieval ages (13th-16th centuries) which confirms the incidence of the mesiodens and presents the conclusion that historically, mesiodens, as a form of supernumerary teeth has been present throughout history.

Conclusion finding of a mesiodens in an archaeological context proves that the occurrence of this type of accessory teeth has been present for at least half a millennium.

Key words: mesiodens, dental anthropology, archaeology, palaeontology

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Uvod

Meziodensi su najčešći oblik prekobrojnih zuba, koji se javljaju kod 0,15–1,9% populacije^{1,2}. Njihova incidencija može biti izolovana ili povezana sa određenim sindromima: kleidokranijalna displazija, porodična adenomatozna polipoza, trihorhino-falangealni sindrom tip I, Rubinstein-Taibi sindrom, Nance-Horan sindrom, Opitz BBB/G sindrom, okulofaciokardio dental sindrom autozomno dominantni Robinov sindrom³. Ovi sindromi su generalno povezani sa hiperdontijom⁴. Meziodensi su dva puta češći kod muškaraca nego kod žena⁵. S obzirom na veliku učestalost, opšti stomatolog treba da zna o znacima i simptomima meziodensa i da razmotri odgovarajući plan lečenja za svog pacijenta⁶.

Uzrok meziodensa nije u potpunosti shvaćen, iako neka istraživanja ukazuju da proliferacija dentalne lamine i genetski faktori mogu imati uticaj^{6,7}. Meziodens može biti uzrok odložene ili ektopične erupcije sekutića, što može uticati na okluziju i izgled⁸. Ovo može uključivati dijasteme ili jako rotirane sekutiće, a oba stanja su estetski i funkcionalno neprihvatljiva za pacijente. Štaviše, impaktirani meziodens može izazvati resorpciju korena mlečnih i/ili susednih trajnih zuba, što može trajno oštetiti stomatognatski sistem. Za kliničara je važno da dijagnostikuje meziodens u ranoj fazi razvoja kako bi se obezbedio minimalno invazivan tretman.

Hirurška ekstrakcija meziodensa je obično opcija lečenja. Ako normalni stalni zubi (obično sekutići) ne niknu u razumnom roku nakon ekstrakcije meziodensa, može biti potrebno hirurško izlaganje i ortodontski tretman kako bi se omogućilo nicanje i pravilno pozicioniranje zuba. Neki slučajevi zahtevaju fiksnu ortodontsku terapiju kako bi se stvorilo dovoljno prostora za luk pre erupcije i pozicioniranja sekutića. Pored toga, postoje i neke komplikacije vezane za ekstrakciju meziodensa koje treba uzeti u obzir, kao što su povrede palatinalnih nerava i prekomerno krvarenje iz gornjih ili donjih nepčanih grana maksilarne arterije^{9,10}. Ako se meziodens nalazi u blizini ili kranijalno od nazopalatinskih nerava, postoji i rizik od oštećenja čulnih nerava *palatum durum*⁹. Rana dijagnoza je ključ za odabir najboljeg lečenja jer može sprečiti ortodontski tretman i moguće komplikacije.

Introduction

Mesiodentes are the most common form of supernumerary teeth, occurring in 0.15% to 1.9% of the population^{1,2}. Their incidence may be isolated or related to certain syndromes: cleidocranial dysplasia, familial adenomatous polyposis, trichorhinophalangeal syndrome type I, Rubinstein-Taybi syndrome, Nance-Horan syndrome, Opitz BBB/G syndrome, oculofaciocardiodental syndrome and autosomal dominant Robinow syndrome³. These syndromes are generally associated with hyperdontia⁴. Mesiodentes are twice more common in men than in women⁵. Given the high frequency, a general dentist should know about the signs and symptoms of mesiodentes and consider an appropriate treatment plan for their patient⁶.

The cause of mesiodentes is not fully understood, although some research indicates that the proliferation of the dental lamina can have an impact as well as genetic factors^{6,7}. Mesiodentes can be the cause of delayed or ectopic incisor eruption, which can affect occlusion and appearance⁸. This can include diastemas or severely rotated incisors, both of which conditions are aesthetically and functionally unacceptable for patients. Moreover, an impacted mesiodens can cause root resorption of the succeeding teeth or adjacent permanent teeth which can permanently damage the stomatognathic system. It is important for the clinician to diagnose mesiodens early in development to ensure minimally invasive treatment.

Surgical extraction of the mesiodens is usually the treatment option. If the normal permanent teeth (usually incisors) do not erupt in a reasonable period after the extraction of the mesiodens, surgical exposure and orthodontic treatment may be required to enable eruption and proper teeth positioning. Some cases require fixed orthodontic therapy in order to create sufficient arch space before eruption and positioning of the incisors. Additionally, there are some complications connected to the extraction of the mesiodens that need to be taken into consideration, such as palatal nerves injuries and excessive bleeding from upper or lesser palatine branches of the maxillary artery^{9,10}. If the mesiodens is positioned in the vicinity or cranially of nasopalatine nerves the risk of sensory nerve damage of the *palatum durum* is also present⁹. Early diagnosis is the key to selecting the best treatment because it can prevent orthodontic treatment and possible complications.

Arheološki kontekst:

Analizirani primerak pronađen je na arheološkom nalazištu u opatiji u Rudini u Hrvatskoj, tačnije u benediktinskoj opatiji Svetog arhanđela Mihaila u Rudini, koja se nalazi na jugoistočnim padinama Psunja¹¹. Veruje se da su Borići osnovali opatiju negde u drugoj polovini 12. veka. Manastir se prvi put pominje u dokumentu iz vladavine kralja Bele IV iz 1250. godine. Opatija je napuštena u drugoj četvrtini 16. veka usled osmanske pretnje^{11,12}. Konzervatorski odsek Požega i Hrvatski restauratorski zavod su 2013. godine saradivali na pokretanju programa arheoloških istraživanja i izrade preliminarne dokumentacije za ruševine benediktinske opatije Rudina. Rezultati ovog istraživanja utvrdili su preduslove za dobro predstavljene konzervatorsko-restauratorske projekte.

Prikaz slučaja:

Uzorak se sastoji od fragmenta maksile koji je relativno dobro očuvan. Nažalost, postkranijalni skelet je bio u lošem stanju, tako da određivanje pola pojedinca nije moglo biti urađeno sa sigurnošću, iako se verovatno radi o muškarcu¹³. Ostaci su pažljivo očišćeni neabrazivnim četkama da bi se obezbedilo minimalno oštećenje i maksimalno očuvanje uzorka. Nisu pronađeni kutnjaci koji bi imali mogućnost pozitivnog podudaranja sa maksilom. Apikalno, levo od centralnog stalnog sekutića, nalazi se dodatni zub u palatinalno postavljen. Morfologija mu je tipična za meziodens⁵, (Slika 1) sa malom konusnom krunom koja podseća na veoma kratak očnjak (Slika 2). U Tabeli 1 navedena su dentalna antropološka merenja i upoređena za referencu. U poređenju sa prosečnim normalnim sekutićem, centralnim i bočnim, meziodens je značajno manji u svim dimenzijama (Slika 3). Sa kliničkog aspekta, zub je prilično dobro pozicioniran i pretpostavljamo da nije bilo parafunkcije ili resorpcije korena stalnih zuba 12, 11, 21 i 22 (FDI sistem dentalne nomenklature) (Slika 4). Meziodens nije ekstrahovan dok je pacijent bio živ, što bi potkrepilo hipotezu da nije bilo parafunkcije kod pacijenta. I kruna i koren zuba bili su intaktni, što ukazuje da kruna meziodensa nije u potpunosti ili delimično izbila u usnu duplju pacijenta.

Archaeological context

The analysed specimen was found at an archaeological site in an abbey in Rudina, Croatia. More precisely, the Benedictine Abbey of St. Michael the Archangel in Rudina that is located on the southeastern slopes of Psunj¹¹. It is believed that the Borić family members founded the abbey somewhere in the second half of the 12th century. The monastery was first mentioned in a document from the reign of King Bela IV, dated 1250. The abbey was abandoned in the second quarter of the 16th century as a result of the Ottoman threat^{11,12}. In 2013, the Požega Conservation Department and the Croatian Restoration Institute collaborated to launch a program of archaeological excavations and the creation of preliminary documentation for the Rudina Benedictine Abbey's ruins. The results of this survey established the prerequisites for well-presented conservation-restoration projects.

Case presentation

The sample consisted of a fragment of the maxilla which was relatively well preserved. Unfortunately, the postcranial skeleton was in a poor state of preservation so the sex determination of the individual could not have been done with certainty, although the subject was probably male¹³. The remains were carefully cleaned with non-abrasive brushes to ensure minimal damage and maximal preservation of the specimen. No molars were found that would have the possibility of a positive match to the maxilla. Apically, left of the central permanent incisor, there was an observable accessory tooth embedded in the palatine. Its morphology is typical of mesiodens⁵, (Figure 1) with a small conical crown that resembles a very short canine (Figure 2). In Table 1, the dental anthropological measurements are stated and compared for reference. In comparison to an average normal incisor, both central and lateral, the mesiodens is significantly smaller in all dimensions (Figure 3). From a clinical aspect, the tooth is positioned fairly well, and we assume there were no parafunction or root resorptions of permanent teeth 12, 11, 21 and 22 (FDI dental notation system) (Figure 4). The mesiodens was not extracted while the patient was alive which would support the hypothesis that there were not any parafunction for the patient. Both the crown and root of the tooth were intact which indicates the mesiodens crown did not entirely nor partially erupt into the oral cavity of the patient.

Tabela 1. Dimenzije zuba, poređenje trajnih maksilarnih sekutića i pronađenih meziodensa⁵**Table 1.** Tooth dimensions, comparing permanent maxillary incisors and found mesiodens⁵

	Meziodens /Mesiodens	Prosečan maksilarni centralni sekutić Average maxillary central incisor	Prosečni maksilarni bočni sekutić Average maxillary lateral incisor
Dužina krune/ Crown length	7.99 mm	10.5 mm	9.0 mm
Širina krune (mezijalno- distalno) Crown width (mesial- distal)	4.54 mm	8.2 mm	6.4 mm
Širina krune (vestibulo- oralno) Crown width (vestibulo- oral)	6.08 mm	6.9 mm	6.4 mm
Dužina korena Root length	4.29 mm	13.5 mm	13.0 mm
Ukupna dužina zuba Tooth total length	10.13 mm	23.5 mm	22.0 mm

**Slika 1.** Meziodens i njegova tipična morfologija**Figure 1.** Mesiodens and its typical morphology



Slika 2. Mala konusna kruna meziodensa
Figure 2. Small conical crown of a mesiodens



Slika 3. Položaj meziodensa u maksili
Figure 3. Position of mesiodens in maxilla



Slika 4. Zub 11 bez resorpcije (levo) i meziodens (desno)

Figure 4. Tooth 11 without resorption (left) and mesiodens (right)

Diskusija

Iako je meziodens prilično mali prekobrojni zub, može izazvati neke značajne probleme ako se ne dijagnostikuje na vreme i pravilno. Trenutno je najčešći metod identifikacije meziodensa ortopantomogram (OPG) zbog činjenice da su OPG-ovi i dalje glavna radiološka metoda uz klinički pregled svih pacijenata u razvijenim zemljama¹⁴. Povremeno se meziodens može pojaviti kao osetljiva struktura zbog geometrije panoramske radiografije. OPG-ovi imaju mnogo nedostataka, kao što su zamućenje slike, izobličenje, niska rezolucija i superpozicija okolnih struktura. Razvoj veštačke inteligencije u automatskoj dijagnostici meziodensa uz pomoć panoramske radiografije istraživali su Eun-Giu i sar.¹ su 2022. god. i Ahn i sar.¹⁵ 2021. god. Danas CBCT snimanje postaje sve dostupnije u stomatološkim klinikama širom sveta, što može da obezbedi pravilnu dijagnostiku i tačan izbor plana terapije. U nekim slučajevima, kao što je primećeno u uzorku, meziodensi se mogu postaviti palatalno i, pod uslovom da postoji dovoljna količina koštane strukture, ostati neaktivni tokom celog života pacijenta.

Discussion

Even though the mesiodens is a rather small accessory tooth, it can cause some significant problems if not diagnosed in time and correctly. Currently, the most often method of mesiodens identification is the orthopantomography (OPG) due to the fact that OPG is still the main radiological method of supporting the clinical check-up of all patients in developed countries¹⁴. Occasionally, the mesiodens can appear as a susceptible structure because of the geometry of panoramic radiography. There are many disadvantages to OPG, such as image blurring, distortion, low resolution, and superposition of surrounding structures. Research in the development of artificial intelligence (AI) in the automatic diagnostic of mesiodens using panoramic radiography was already explored by Eun-Gyu et al. in 2022 and Ahn Y et al. in 2021^{1,15}.

Conclusion

The finding of a mesiodens in an archaeological context proves that the occurrence of this type of accessory teeth has been present for at least half a millennium. As this is an archaeological case, the mesiodens was most certainly untreated.

Zaključak

Nalaz meziodensa u arheološkom kontekstu dokazuje da je pojava ove vrste prekobrojnih zuba prisutna najmanje pola milenijuma. Pošto je reč o arheološkom slučaju, meziodens je svakako bio intaktan. Može se samo nagađati da li je ovo stanje izazvalo probleme za ovu osobu koja je živela između 13. i 16. veka. Rana dijagnoza je ključna kako bi se osiguralo da nema patologije za pacijenta. Ovo se obično radi od strane stomatologa, uz redovne stomatološke kliničke kontrole i uz inspekciju pacijentovog OPG-a. Potrebno je sprovesti dalja istraživanja kako bi se razvio klinički koristan AI model koji bi automatski identifikovao meziodense iz OPG-a.

Zahvalnica:

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One can only speculate if this condition caused any problems to this individual that lived between the 13th-16th centuries. More often than not, early diagnosis is crucial to ensure no pathology for the patient. This is usually done manually by the dentist during a regular dental clinical check-up and supported by an inspection of the patient's OPG. Further research needs to be conducted in order to develop a clinically useful AI model that would identify mesiodens automatically from an OPG.

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