

CASE REPORTS

PRIKAZI SLUČAJEVA

University of Novi Sad, Faculty of Medicine Novi Sad¹
Dentistry Clinic of Vojvodina, Novi Sad²

Case report
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TYPE III DENS IN DENTE (DENS INVAGINATUS) AS A REASON FOR ENDODONTIC TREATMENT FAILURE – CASE REPORT

ZUB U ZUBU (DENS INVAGINATUS) TIP III KAO RAZLOG NEUSPEHA
ENDODONTSKOG LEČENJA – PRIKAZ SLUČAJA

Aleksandar ANĐELKOVIĆ¹, Isidora NEŠKOVIĆ^{1,2} and Milan DROBAC^{1,2}

Summary

Introduction. Dens invaginatus is an infrequent developmental anomaly of teeth with an unknown etiology. The prevalence rate ranges from 0.25% to 10%. The most affected teeth are lateral maxillary incisors. Various classifications have been proposed to categorize the different types of dens in dente. However, the Oehlers classification, named after the dentist who first described it, is the most commonly used for this malformation. This classification has three primary types and was introduced in 1957. **Case Report.** A 17-year-old female patient appeared at the Dentistry Clinic of Vojvodina, Novi Sad with a lateral maxillary incisor exhibiting dens invaginatus (Oehlers type IIIA). The pulp was necrotic, accompanied by a large periradicular lesion. The patient had previously been prescribed penicillin antibiotics, and we initiated endodontic therapy. The patient returned for the scheduled check-up appointment with swelling in the area of the canine fossa above the upper left lateral incisor. In consultation with an oral surgeon, the tooth was extracted with purulent content. Four days after the extraction, the patient received a resin bonded bridge. **Conclusion.** The clinical significance and importance of dens in dente lie primarily in its potential to manifest with various symptomatic indications and its association with the occurrence and development of dental caries. It is crucial for clinicians and dental professionals to remain highly attentive, vigilant, and alert to the potential presence of dens in dente. This involves considering and acknowledging the wide array of diverse presentations and manifestations that this anomaly can exhibit.

Key words: Dens in Dente; Tooth Abnormalities; Endodontics; Dental Pulp Necrosis; Periapical Diseases; Denture, Partial, Fixed, Resin-Bonded

Introduction

The concept of dens in dente, a developmental malformation of teeth, has long piqued the interest of dental professionals and researchers. The clinical implications of this condition, characterized by an

Sažetak

Uvod. Zub u zubu je retka anomalija razvoja zuba nepoznate etiologije. Stopa učestalosti je od 0,25% do 10%. Najčešće zahvaćeni zubi su maksimalni bočni sekutići. Postoje različite klasifikacije koje su predložene za kategorizaciju različitih tipova zuba u zubu. Međutim, Olerova klasifikacija, nazvana po stomatologu koji ju je prvi opisao, najrasprostranjenija je klasifikacija za ovu malformaciju. Ova klasifikacija ima tri osnovna tipa i uvedena je 1957. godine. **Prikaz slučaja.** Pacijentkinja stara 17 godina javila se na Kliniku za stomatologiju Vojvodine u Novom Sadu sa maksimalnim lateralnim sekutićem koji ima razvojnu anomaliju zvanu „zub u zubu“ (Oler tip IIIa). Pulpa je bila nekrotična sa udruženom velikom periradikularnom lezijom. Pacijentkinji je prethodno prepisan penicilinski antibiotik i započeto je endodontsko lečenje. Pacijentkinja se javila na zakazanu kontrolu sa otokom u predelu fose kanina iznad gornjeg levog bočnog sekutića. U konsultaciji sa oralnim hirurgom, zub je izvađen, uz obilan gnojni sadržaj. Četiri dana nakon ekstrakcije, pacijentu je izrađen adhezivni most. **Zaključak.** Klinički značaj i značaj zuba u zubu leži prvenstveno u njegovom potencijalu da se manifestuje različitim simptomatskim indikacijama kao i njegovoj korelaciji sa nastankom i razvojem zubnog karijesa. Za kliničare i stomatologe je od najveće važnosti da budu veoma pažljivi i predusretljivi na potencijalno prisustvo i postojanje zuba u zubu, uzimajući u obzir širok spektar raznovrsnih manifestacija koje ova anomalija može da ispolji.

Ključne reči: zub u zubu; anomalije zuba; endodoncija; nekroza zubne pulpe; periapikalna oboljenja; adhezivni most

invagination or deepening of the enamel and dentin layers, necessitate thorough investigation [1].

Dens in dente is an infrequent developmental anomaly of teeth with an unknown etiology, having a prevalence rate ranging from 0.25% to 10%. The upper lateral maxillary incisors are most often af-

Abbreviations

CBCT – cone-beam computed tomography

ected by this abnormality, followed by maxillary central incisors, while mandibular teeth are rarely involved [1, 2].

This anomaly has been described as an infolding of the enamel organ into the dental papilla during the soft-tissue stage of tooth formation. It may be restricted to the pulp chamber, extend to the root, or, in extreme cases, reach the apex [2].

Various classifications have been proposed to categorize the different types of dens in dente; however, the Oehlers classification, named after the dentist who first described it, is the most commonly used for this malformation [3].

Oehlers classification is a method employed to classify dens invaginatus, also known as dens in dente, based on the gravity and profundity of the invagination. This classification was introduced by Oehlers in 1957. Within Oehlers classification, there are three primary types:

Type I: Invagination with Enamel Lining – this classification encompasses an invagination that possesses an enamel lining that does not extend beyond the enamel-dentin junction. It is regarded as the least severe variant.

Type II: Invagination Extending into the Dentin – the invagination extends beyond the enamel-dentin junction but does not communicate with the dental pulp. Although the invagination may extend into the dentin, it does not enter the pulp chamber.

Type III: Invagination Penetrating into the Pulp Chamber – this variant is considered the most severe, where the invagination penetrates into the pulp chamber, establishing a direct communication between the invagination and the pulp. Type III is associated with a heightened risk of infection or necrosis in the pulp tissue [4].

Clinical treatment includes different techniques, ranging from the simplest conservative to surgical techniques.

If surgical extraction of the tooth becomes necessary, it becomes imperative to identify a suitable approach for replacing the extracted tooth, as exemplified in our specific scenario.

Case Report

A 17-year-old female patient appeared at the Dentistry Clinic of Vojvodina, Novi Sad, seeking medical treatment. Her medical records indicate that she has been undergoing treatment with the antibiotic penicillin for the past three days, as prescribed by the dentist to alleviate severe pain in the upper left jaw area, specifically in the projection of the upper left lateral incisor and canine. The general dentist performed an intervention to drain the upper left lateral incisor, resulting in subjective improvement for the patient. Subsequent dental examination and analysis of a retroalveolar X-ray revealed the presence of a periapical lesion in the region of teeth 21 and 22 (**Figure 1**). Tooth 22



Figure 1. Initial retroalveolar X-ray showing periapical lesion of tooth 22

Slika 1. Početni retroalveolarni rendgenski snimak na kom se uočava periapikalna lezija zuba 22

exhibited an access cavity. The examination further detected a distal perforation of the crown in the cavity. A comprehensive clinical examination led to the diagnosis of false pathway in the cervical region of tooth 22. The initial step in treatment involved repairing the perforation using MTA (MTA Universal OptiCaps, Harvard, Germany). The X-ray revealed the existence of an additional canal, which is caused by the presence of type III dens invaginatus (Oehlers). The primary canal of the tooth is located, and both canals are treated with copious irrigation of 2.5% NaOCl solution (Sodium Hypochlorite Solution, i-dental, Lithuania). The working length of the distal canal is 22.5 mm, while the mesial canal is 12 mm. The root canal procedure was performed using stainless steel hand K-files (K-Files, NIC, China). The distal canal was enlarged with ISO 35, while the mesial canal was enlarged with ISO 25. After disinfection of the canal with 2.5% NaOCl (Sodium Hypochlorite Solution, i-dental, Lithuania) and 17% EDTA (i-EDTA, i-dental, Lithuania), medication in the form of calcium hydroxide paste (TempCanal, Pulpdent Corp, USA) was placed. Gutta Percha Points (NIC, China) were used as a carrier of medication, placed at an appropriate working length, following which a control retroalveolar X-ray was taken (**Figure 2**). The check-up was scheduled 9 days later, and the access cavity was sealed with temporary restoration (Orafil-G, PrevestDenPro, India).



Figure 2. Control retroalveolar X-ray showing the length of canals on tooth 22

Slika 2. Kontrolni retroalveolarni rendgenski snimak na kom se vidi dužina kanala zuba 22

The patient returned for the scheduled check-up appointment with swelling in the area of the canine fossa above the upper left lateral incisor. The swelling appeared that morning along with pain in the same region. In consultation with an oral surgeon and a pediatric dentist, the proposed treatment plan was extrac-

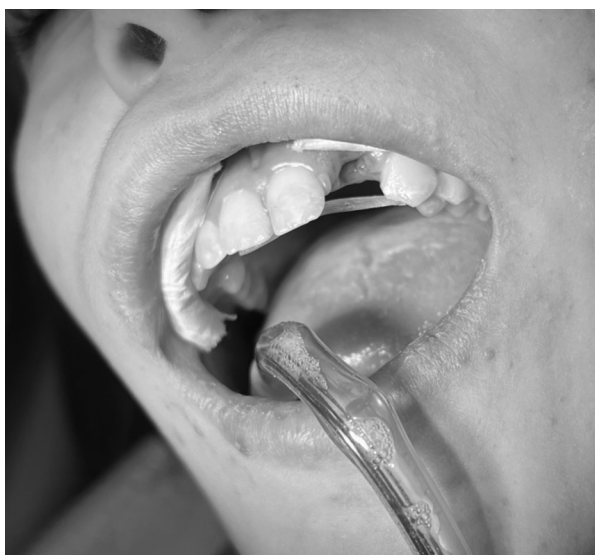


Figure 5. The stage of establishing resin bonded bridge

Slika 5. Faza postavke adhezivnog mosta



Figure 3. Postoperative intraoral photography four days after the extraction of tooth 22

Slika 3. Postoperativna intraoralna fotografija četiri dana nakon vađenja zuba 22



Figure 4. Access cavity of tooth 22 photographed after the extraction

Slika 4. Pristupni kavitet zuba 22 fotografisan nakon ekstrakcije

tion of the upper left lateral incisor followed by the creation of a resin-bonded bridge, pending the age conditions for implantology therapy to be met. The patient agreed to the proposed therapy plan. The extraction was performed by an oral surgeon, and purulent content was obtained after the extraction. The oral surgeon prescribed antibiotic therapy (Clindamycin film tbl 600 mg S: 2x1) (**Figures 3 and 4**).

Four days after the intervention, the patient reported to the Clinic, where the resin-bonded bridge was made using the direct method (**Figures 5 and 6**).

Discussion

Dens in dente, also known as dens invaginatus, is a developmental anomaly characterized by the invagination of the enamel organ in the dental papilla, the

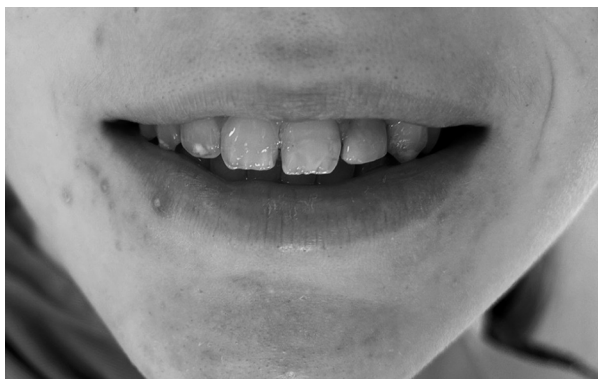


Figure 6. Final outcome after the therapeutic intervention
Slika 6. Krajnja situacija nakon terapijskog zahvata

embryonic structure responsible for tooth formation. This condition can affect both primary and permanent dentitions, with the maxillary lateral incisor, located on the upper jaw, being the tooth most commonly affected by this anomaly [5]. The etiology, or cause, of dens in dente is not fully understood; however, it is believed to result from an abnormality that occurs during the tooth development process [6].

Regarding treatment options for dens in dente, several approaches can be considered. These include root canal treatment, involving the removal of infected or damaged pulp tissue from the tooth and the sealing of root canals to prevent further infection. Another option is extraction, which involves the complete removal of the affected tooth [7]. To accurately diagnose and plan treatment for dens in dente, cone-beam computed tomography (CBCT) and magnification are commonly utilized as valuable tools that provide detailed information about the affected tooth and its surrounding structures. In our case, CBCT imaging was not performed due to complications in the form of swelling and the need for emergency tooth extraction.

Clinical identification of the radicular variant of dens in dente poses a complex challenge due to its predominantly asymptomatic nature, exhibiting a clinically normal-looking crown, and its incidental discovery through radiographic imaging. Pain and inflammation, as observed in our case and reported by researchers, are common features in symptomatic cases. Some instances have also been associated with dental caries, where caries progression is accelerated due to dilated root canals, creating “pathways” for infection spread and resulting in an unfavorable prognosis [8, 9]. To confirm the involvement of a tooth with the radicular variant of dens in dente, a clinician should conduct a comprehensive dental and radiographic examination, assess tooth vitality, and look for signs of discharge. In recent times, clinicians have utilized spiral computed tomography to obtain more detailed information about root anatomy, thereby improving clinical outcomes [8]. The execution of appropriate restorative/endodontic procedures should be approached with caution to prevent the need for extraction of the affected tooth [9–12]. Nevertheless, in the current instance, the presence of inflammation and infection made it unattainable to

retain the tooth, regardless of all attempts to perform endodontic treatment, resulting in its extraction.

The extraction of dens in dente is often considered a last resort, with various treatment options available depending on the severity of the anomaly. Successful endodontic treatment has been reported, emphasizing the importance of early and correct diagnosis [8, 13]. Complications such as halitosis and purulent exudate can occur, requiring root canal treatment and restoration [6].

In our case report, we observed the radicular variant of dens in dente, accompanied by significant pain and inflammation. These symptoms are consistent with documented cases in the literature that exhibited same symptoms. The predominantly asymptomatic nature of this anomaly poses a challenge for clinical identification. Therefore, conducting thorough dental and radiographic examinations is crucial. Our findings support previous research reporting an association between dens in dente and dental caries. The dilated root canals in this anomaly may facilitate the spread of infection. In recent times, spiral computed tomography has emerged as a valuable tool for detailed assessment of root anatomy, with the potential to enhance diagnostic precision and treatment planning.

Recognizing the specific type of dens in dente is very important as it influences the severity and potential complications associated with the anomaly. Despite having various treatment options, ranging from successful endodontic treatments to tooth extraction as a last resort, our case required tooth removal due to inflammation and infection. When managing dens in dente, it is crucial to consider individual variations and clinical circumstances in the decision-making process.

The significance of early and accurate diagnosis is underscored by the varied presentations and complications of dens in dente, as demonstrated in our case. Ongoing research in this field is crucial for refining diagnostic approaches and treatment methods. This will ensure that clinicians can effectively address the diverse manifestations of dens in dente.

Conclusion

The clinical significance and importance of dens in dente primarily lie in its potential to manifest with various symptomatic indications, its association and correlation with the occurrence and development of dental caries, and the numerous challenges encountered in terms of accurate diagnosis and effective treatment methods. It is of utmost importance for clinicians and dental professionals to remain highly attentive, vigilant, and alert to the potential presence and existence of dens in dente. This involves considering and acknowledging the wide array of diverse and varied presentations and manifestations that this anomaly can exhibit. It is also important to recognize and address the unique challenges and obstacles associated with its diagnosis and treatment, as demonstrated and exemplified in our particular case study.

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