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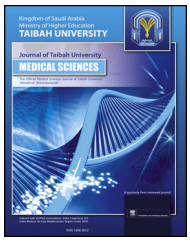

Case Report

Radicular variant of dens in dente (RDinD) in a patient undergoing radioisotope therapy

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الملخص

السن المستبطنة هو شذوذ نمائي يصادف بشكل متكرر في القواطع العلوية الدائمة بمعدل انتشار 0.25 - 10٪. أثناء مراجعة الأدبيات العلمية المتعلقة بالمتفاوت الجذري للسن المستبطنة في الطواحن الدائمة، صادفنا حالتين فقط تم الإبلاغ عنها بتشخيص مؤكد. نصف هنا الحالة الثالثة للمتفاوت الجذري للسن المستبطنة في أنثى تبلغ من العمر 37 عاما تظهر بألم ليلي في الضرس الثاني للفك العلوي الأيسر لمدة أسبوع. كان لدى المريضة تاريخ طبي لعملية جراحية لسرطان الغدة الدرقية الحليمي متبوعا بالعلاج باليود المشع. أكدنا تشخيص "المتفاوت الجذري للسن المستبطنة" مصحوبا بآفة انحلال للعظم وخط كسر عرضي على طول الجذر الحنكي السن باستخدام التصوير المقطعي المحوسب. كان الاستخراج هو العلاج المفضل متبوعا بكشط ذروي للآفة، واستمر المريض في المتابعة. في هذه المقالة، لاحظنا العرض السريري النادر للمتفاوت الجذري للسن المستبطنة في الضرس الثاني للفك العلوي الأيسر لمريضة في منتصف العمر.

الكلمات المفتاحية: التصوير المقطعي المحوسب؛ السن المستبطنة؛ طب لب الأسنان؛ الآفات العظمية؛ المتفاوت الجذري للسن المستبطنة

Abstract

Dense in dente is a developmental anomaly frequently encountered in permanent maxillary incisors, with a prevalence rate of 0.25–10%. Our review of the scientific literature on a radicular variant of dens in dente (RDinD) in permanent molar teeth identified only two reported cases with a confirmed diagnosis. Here, we report the third case of RDinD, in a 37-year-old woman presenting with nocturnal pain in the left maxillary second molar for 1 week. The patient had a medical history of surgery for papillary thyroid carcinoma followed by radioactive iodine therapy. We established a diagnosis of RDinD with an osteolytic lesion and transverse fracture line along the palatal root of the tooth by using cone beam computed tomography (CBCT). Extraction and periapical curettage of the lesion were performed, and the patient was followed up. In summary, we observed a rare clinical presentation of RDinD in the left maxillary second molar of a 37-year-old female patient.

Keywords: CBCT; Dens in dente; Endodontic; Osteolytic lesions; Radicular dens in dente

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Introduction

Dense in dente is a developmental anomaly with a prevalence rate of 0.25–10%. It is most frequently observed in permanent maxillary lateral incisors followed by maxillary central incisors.[1] The development of three-dimensional imaging methods using relatively low radiation doses, such as cone beam computed tomography (CBCT) has enabled analysis of the inner structure of a tooth and adjoining structures, thus aiding in diagnosing dens in dente. Two variants of dens in dente have been established: coronal dens in dente and radicular dens in dente (RDinD).[2]

A comprehensive literature search of PubMed and Google Scholar electronic database until February 2022 with the

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keywords "radicular dens invaginatus," "type IIIB dens invaginatus" and "type IIIb dens invaginatus" was performed (Table 1). RDinD diagnosis was reported in 86 case reports, only two of which were in permanent molar teeth.[3,4] Our case is the third case report of RDinD in the left maxillary second molar—a rare location not previously reported. The reason for the prevalence of RDinD presentation in India is unknown but may be associated with environmental and genetic factors.[5] The genesis of a tooth is a multifactorial process, so identifying a single cause is inevitable.

Case report

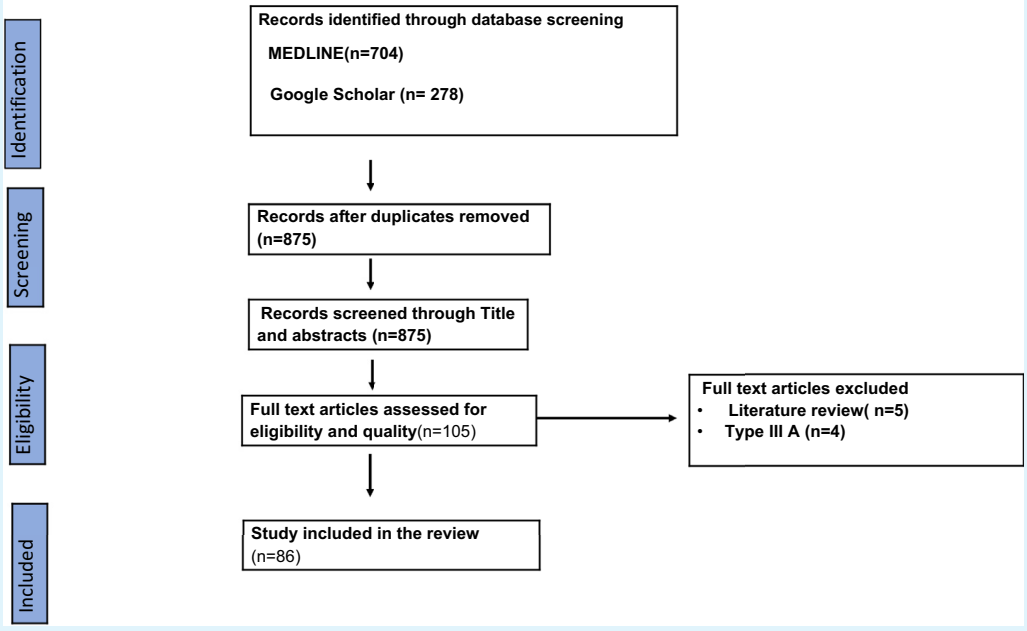
Case presentation

A 37-year-old woman visited our outpatient department with a chief complaint of spontaneous nocturnal pain in the upper left back tooth region for 1 week. There was no history of swelling or pus discharge in the same area, and no records associated with trauma were identified. The only relevant medical history was that she had been operated on for papillary carcinoma of the thyroid and was currently undergoing a 3-month treatment with radioactive iodine (I^{131}) to abate remnant carcinogenic thyroid tissue. On intraoral examination, no caries or mobility of teeth were detected, whereas the left maxillary second molar presented with positive tenderness on percussion. Bleeding on probing was negative, and there was no evidence of generalized or localized periodontitis. The tooth did not respond to the cold vitality test.

Investigations

Intraoral periapical (IOPA) and panoramic radiographs confirmed the absence of all third molars, thus ruling out referred pain due to impacted third molars. IOPA ruled out the possibility of any pathology associated with the tooth of interest. No evidence of proximal caries was found on any surface, whereas the tooth of concern presented a suspicious anomaly and radiolucency in the apical region. CBCT with a small field of view was performed to assess the existence of the pathology. Axial and sagittal cross-sectional views (Figure 1) revealed an enamel-lined invagination within the

Table 1: PRISMA Chart for systematic review pertaining to Dens in Dente in Molars.



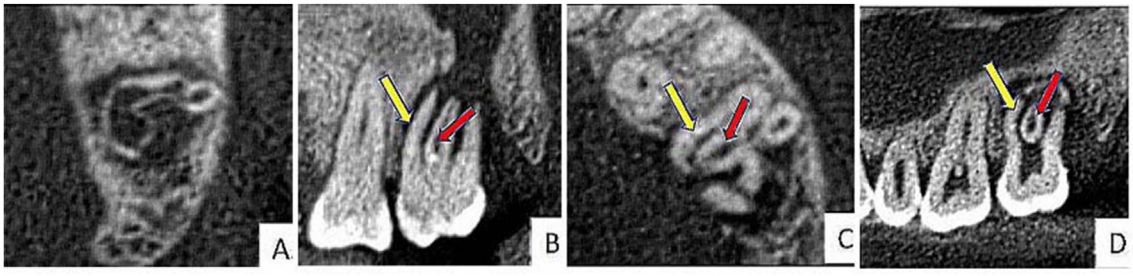


Figure 1: CBCT images of type III B radicular variant of dens in dente. (A, B) Axial and sagittal cross-sectional images at the apex, respectively. (C, D) Axial and sagittal cross-sectional images 5 mm from the apex. Yellow arrows show the main canal, and red arrows indicate the invagination.

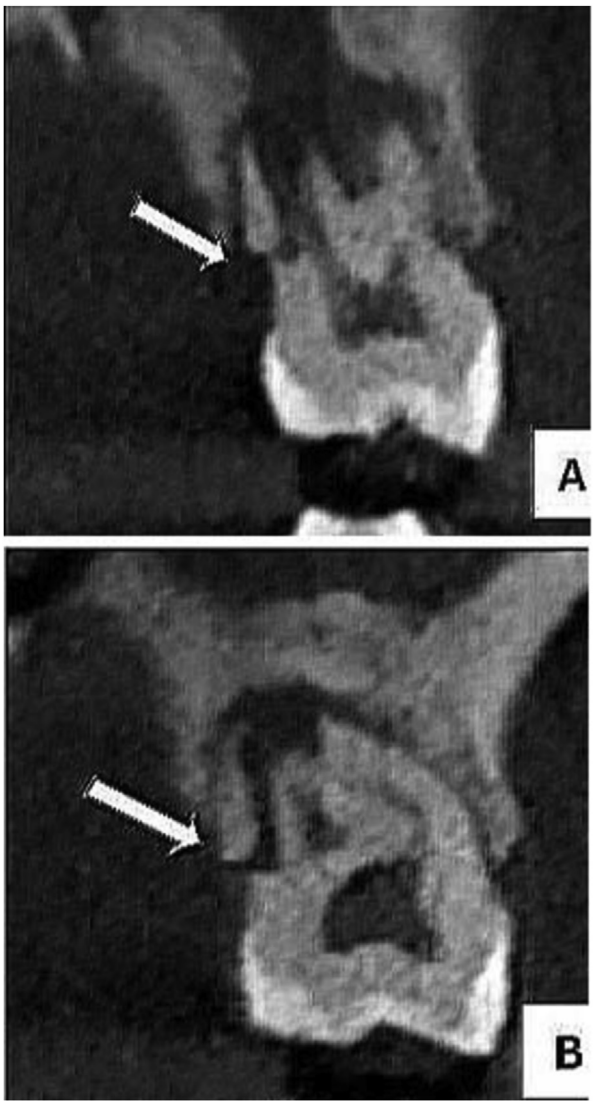


Figure 2: (A, B) Coronal sections at the apex and at 5 mm from the apex, respectively. White arrows show the fracture line.

mesiobuccal root, originating at an opening on the root itself. The CBCT images also showed widened periodontal ligament and osteolytic lesion around the root apex of 27 without any related etiology. The osteolytic area was approximately 4.5 × 5 mm. The horizontal fracture line was visible along the palatal root of 27 (Figure 2). Histopathological evaluation was performed on the extracted whole tooth. After decalcification and processing, the section was stained with hematoxylin and eosin, thus indicating the presence of the RDinD variant in the specimen (Figure 3). We followed a systematic path to attain a confirmatory diagnosis and treatment of RDinD, as illustrated in Figure 4.

Treatment

In the present case, because osteolytic lesion and the transverse fracture were noticeable along the palatal root of 27, we performed extraction followed by curettage rather than providing endodontic treatment. Because the patient had a history of recent radioactive iodine as an adjuvant therapy to treat papillary thyroid carcinoma, analgesic and 0.2% chlorhexidine mouth rinse were advised to avoid any condition leading to osteochemonecrosis of the jaw. The patient was followed up in subsequent visits and provided signed informed consent to describe her case details for scientific purposes.

Discussion

Dens invaginatus (DI), commonly termed dens in dente, is a developmental malformation due to an invagination of enamel organs into dental papilla during the odontogenesis of the tooth crown before calcification occurs.[6] The diagnosis of DI is usually made on the basis of incidental findings via radiographs. The risk of pulpal necrosis and pulpitis is elevated in patients with DI.[6] The standard feature in radiographs is a periapical area showing widening of the periodontal ligament and periapical lesion.[5] The coronal and radicular versions of dens in dente vary in their

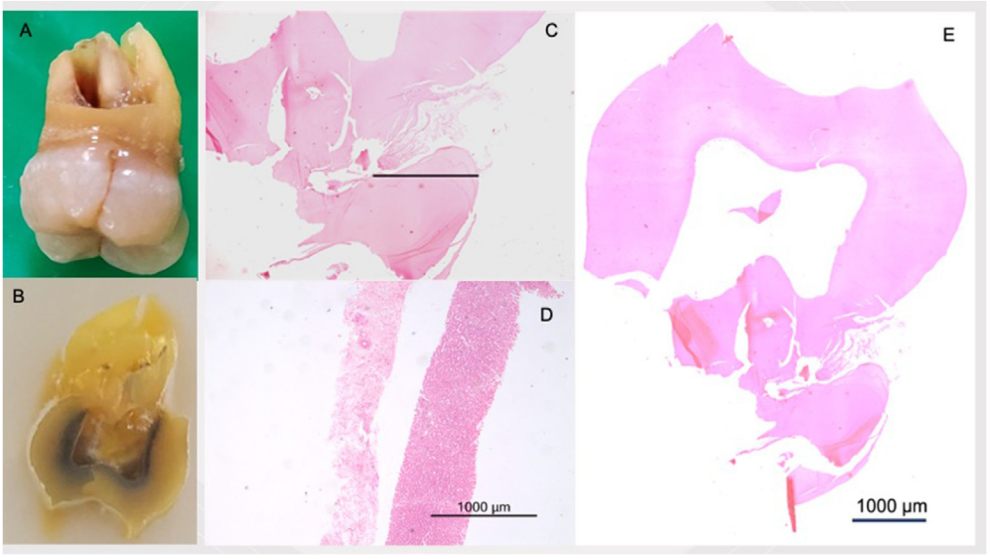


Figure 3: Gross specimen, decalcified section and H&E stained section showing radicular variant of dens in dente.

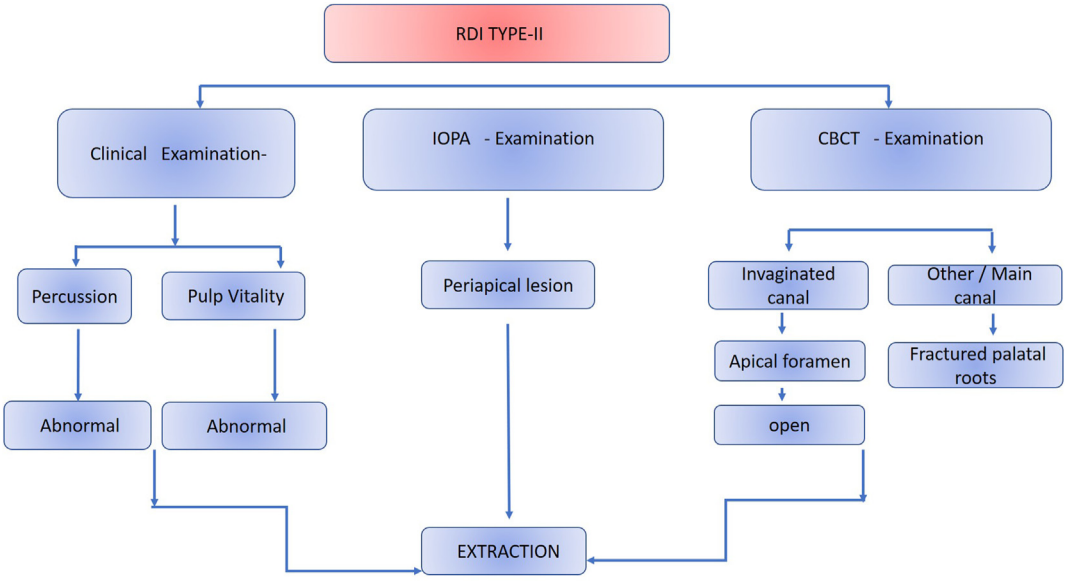


Figure 4: Systematic pathway for confirmatory diagnosis of RDinD.

pathogenesis, according to the origin of invagination. Radicular dens invaginatus or RDinD originates from infolding of Hertwig's root sheath into the root after crown development. RDinD is divided into two subtypes; the first subtype, the invagination, is cementum lined and associated with an axial root groove. The second subtype of RDinD consists of an enamel-lined invagination within the root. The present case illustrates the second type of RDinD in molar teeth, which has rarely been reported in the literature.

RDinD has recently been referred to as a radicular groove representing the shape and location of an anomaly.[5] In our case, we established a diagnosis of RDinD in the maxillary left second permanent molar with an osteolytic lesion in the periapical region, as substantiated by clinical and radiological parameters. To date, only two cases of a radicular variant of invaginated molar teeth have been reported in the literature, one each in maxillary and mandibular third molars, thus suggesting the rarity of its occurrence. Because the fundamental nature of DI cannot be evaluated with conventional radiographs, we advocate the use of CBCT for exact diagnosis, on the basis of our experience from this case.[7,8] The perplexity was the osteolytic lesion present in the periapical area and the history of radioactive iodine therapy for remnant tissue ablation after papillary thyroid carcinoma surgery.[9,10] Although the literature search did not reveal osteolysis as a relevant adverse effect of radioactive iodine therapy, follow-up of the patient was conducted to assess the progression/regression of the osteolytic region. The clinical presentation of RDinD can be similar to those of phoenix abscess and irreversible pulpitis, owing to the pain symptoms. Radiologically, RDinD may be confused with coronal dens invaginatus (CDI) Type III and enamel pearl (Table 2). RDinD shows radiographic findings of a swollen root resembling the coronal variant of DI type III. The literature has indicated both crown and root involvement in the case of CDI type III; however, only roots are involved in RDinD.

Various treatment modalities have been suggested for RDinD, including non-surgical and surgical endodontic treatment, intentional replantation, and extraction.[3,6] Treatment of molars with RDinD with RCT has rarely been reported. However, because the procedure is complex, and the prognosis is uncertain, extraction is often considered the treatment of choice, particularly in molar teeth. Thus, we performed extraction in the present case, considering our patient's prognosis, socioeconomic status, and autonomy.

Conclusion

This case report presents a rare radicular variety of dens in dente, in the maxillary left second permanent molar tooth. Diagnosis of such cases must be accurate to ensure effective

Table 2: Differential diagnosis of radicular variant of dens in dente.

Differential diagnosis of RDinD			
Clinical presentation	RDI: most cases associated with abnormal percussion and vitality test	Phoenix abscess: spontaneous nocturnal pain and tenderness on percussion	Irreversible pulpitis or spontaneous nocturnal pain and tenderness on percussion
Radiographic presentation	RDI: only root involvement	CDI type III: both crown and root involvement	Enamel pearl: a smooth, radiopaque structure on the root of a multirooted tooth

prevention protocols, when possible, or prevent consequences. CBCT provides a detailed 3D view of complex developmental anomalies such as DI and helps dental surgeons accurately diagnose pathologies and classify types of DI. The choice of treatment for RDinD depends on the tooth involved, periradicular pathology, status of root apical closure, and medical condition of the patient. Follow-up is crucial to assess the osteolytic region.

Source of funding

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Conflict of interest

We have no conflicts of interest to declare.

Ethical approval

Ethical approval was not needed.

Authors contributions

SV, SD, MNS and SR wrote the initial and final draft of the article, and collected and organized data for the case report. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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