

MAXILLOFACIAL RADIOLOGY

Dens Invaginatus

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CASES

Case 1: A 21-year-old female presented with a main complaint of pain and swelling associated with the anterior teeth in the second quadrant. Clinically, the patient had a draining sinus in the region of the 22. To identify the specific tooth responsible for the swelling and assess the overall condition of the dentition, a panoramic radiograph was deemed necessary. Additionally, the patient expressed concerns about missing teeth, which necessitates an evaluation for potential crown and bridge treatment options. A periapical radiograph was taken of the offending tooth.

Case 2: A 39-year-old male first presented with a main complaint of pain on the over-erupted 18. Two years later he presented with a main complaint of pain on the 46. Both cases highlight the findings of dens invaginatus. Panoramic radiographs together with a periapical radiograph were taken to assess the patient's main complaint.



Fig. 1



Fig. 2

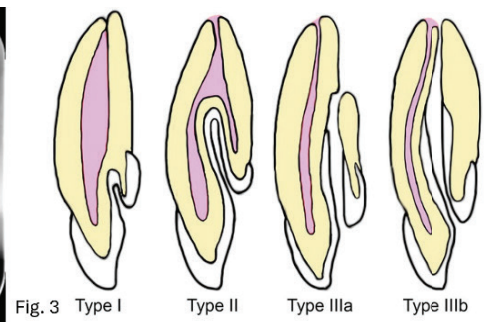


Fig. 3 Type I

Type II

Type IIIa

Type IIIb

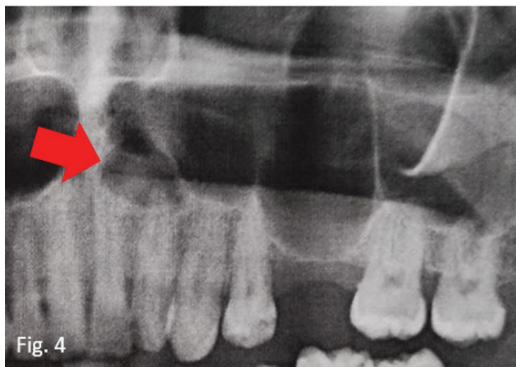


Fig. 4

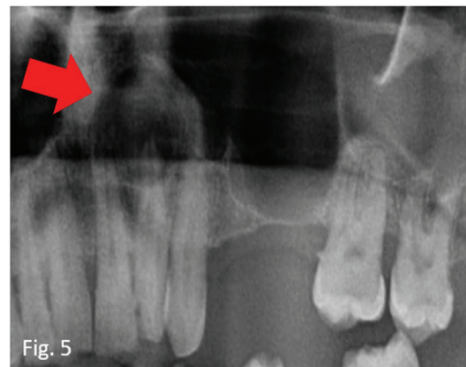


Fig. 5



Fig. 6

INTERPRETATION

The panoramic radiograph (Fig. 1) shows interproximal caries on the 21 and 22, with a periapical radiolucency associated with the 22. A periapical radiograph (Fig. 2) of the

region of interest was taken and a well-defined infolding of the enamel organ is visible, extending beyond the cemento-enamel junction (CEJ). A panoramic radiograph and periapical radiograph of patient two (Fig. 4-6) were taken. Fig. 4 shows an incidental finding of a well-defined, round, corticated, unilocular radiolucency at the apex of the 22. As seen on Fig. 5, this lesion enlarged over a period of two years. On the periapical radiograph (Fig. 6), a well-defined irregular enamel invagination that extends beyond the CEJ about midway down the root was noted. Additionally, there is a well-defined partially corticated, unilocular and circular radiolucency at the apex of 22 with mild external root resorption noted. A diagnosis of dens invaginatus or dens in dente can be made.

Dens invaginatus is a developmental anomaly which was first described by Tomes in 1859.¹ It results in an infolding of enamel and dentine. This thin layer of enamel and dentine, separating an often hypoplastic pulp, predisposes the entry of pathogens causing pulpal necrosis leading to infection.¹

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Author's contribution

Naazia Dawray – primary author (60%)
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There are various aetiologies associated with dens invaginatus including focal growth retardation, infection, genetics, rapid proliferation of a part of the inner enamel epithelium into the dental papilla, increased localised external pressure and trauma.^{3,4}

This anomaly occurs most frequently in the permanent maxillary lateral incisors, followed by the maxillary central incisors, premolars and canines.⁴ Dens invaginatus is rarely found on the mandibular and primary teeth. In 50% of cases, this anomaly occurs symmetrically and involvement of both the central and lateral incisors may occur.³

Dental anomalies that have been reported along with dens invaginatus include supernumerary teeth, microdontia, macrodontia, hypodontia, taurodontism, fusion and gemination.⁴ Syndromes associated with dens invaginatus include Ekman-Westborg-Julin syndrome, Williams syndrome and Nance Huran syndrome.⁴

Clinical and radiological presentation vary according to the location and extent of invagination. In 1957, Oehler described a classification with three types.² Type I (Fig. 3A) indicates an invagination, which is enamel lined. It is confined within the crown of the tooth and does not extend beyond the CEJ. In Type II (Fig. 3B) the enamel-lined invagination extends into the pulp chamber, but there is no communication to the periodontal ligament. Type III is subdivided into Type III A (Fig. 3C) and Type III B (Fig. 3D). Type III A is an invagination seen extending into the root, communicating laterally with the periodontal ligament with no pulpal involvement. Type III B folds into the root, communicating with the periodontal ligament at the apical foramen and is usually lined by enamel. Type III dens invaginatus is relatively rare constituting (5%) in comparison to Type I (79%) and Type II (15%).⁴

On conventional radiographs, there could be a simple radiolucent line or fissure outlined by enamel, or an enamel-lined fissure extending variable lengths towards the periodontal ligament, giving an appearance of a

“pseudocanal”.⁴ Cone beam computed tomography (CBCT) allows for superior assessment of the invagination due to its multiplanar functionality, enabling in-depth assessment of the type and extent of the enamel invagination.⁵

Management varies from minor invasive procedures and sealing of the defect with restorative materials to root canal therapy depending on the type of dens invaginatus. In teeth with open apices, the use of calcium hydroxide, mineral trioxide aggregate and gutta percha have been suggested.⁴ The use of CBCT imaging during endodontic treatment of complex dens invaginatus cases is advised as it may aid in ensuring adequate three-dimensional sealing.⁵ In Type III and cases with severe periapical infection, surgical treatments are recommended.⁴ A tooth with dens invaginatus, having severe mobility and periapical infection, may need to be extracted.³

AUTHORS' DECLARATION

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Conflict of interest

The authors declare that they have no conflict of interest.

Ethics approval

In accordance with University of the Western Cape Ethics committee, ethical clearance is not required for this case report.

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CPD questionnaire on page 400

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.

