



Dens Invaginatus Dens Evaginatus

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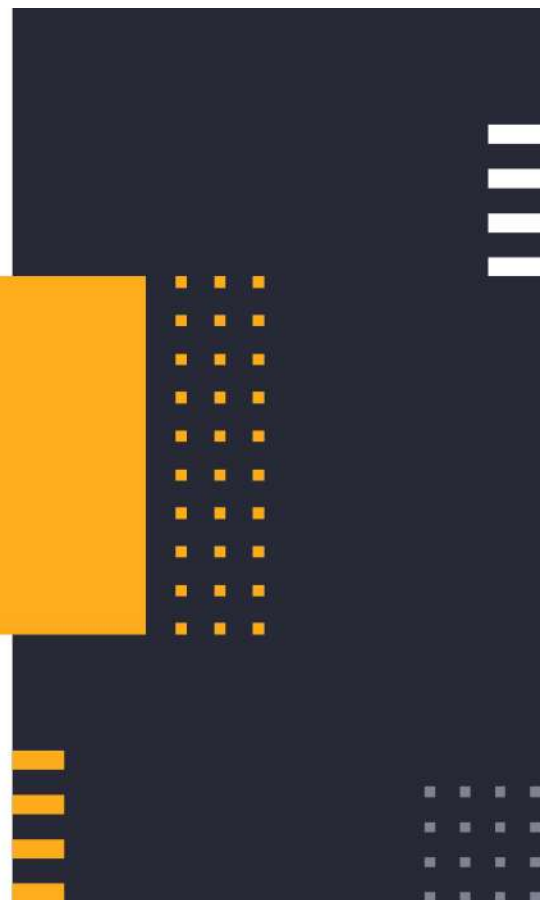


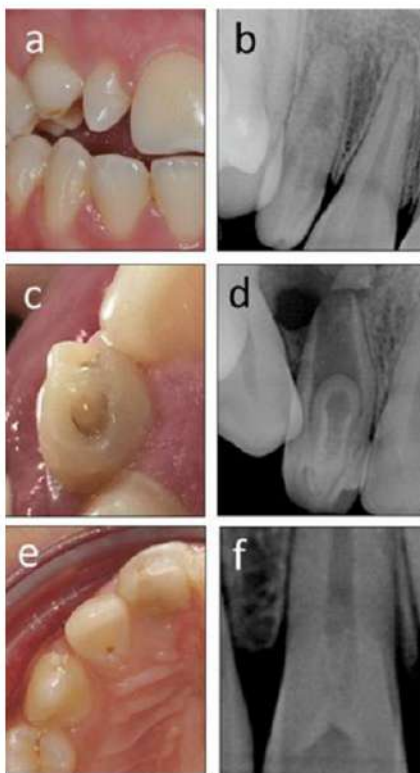
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1. Dens Invaginatus





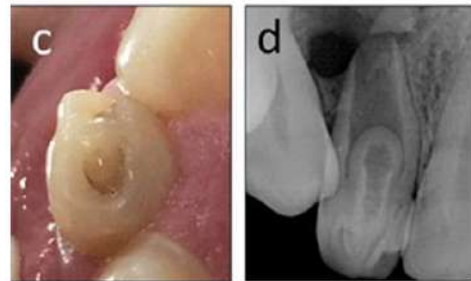
Dens Invaginatus (DI)

- **Dens in dente, Invaginated odontoma, Dilated composite odontoma, Dentoid in dente.**
- Dens invaginatus (DI) is a developmental anomaly where there is an **invagination of the enamel organ into the dental papilla** before calcification is completed.
- An infolding of the enamel into dentin occurs which creates a **pocket of organic material** underneath the enamel surface.
- These lesion are clinically relevant as bacteria from oral cavity can contaminate and propagate within the malformation.

Hulsmann et al. 1997, Alani et al. 2008

- The altered tooth morphology and concurrent pulp necrosis (in immature tooth) can disturb root formation.
- Teeth with DI may present with wide open or blunderbuss open apex, complicating endodontic management be needed.

Gallacher et al. 2016



Etiology

- Infection
- Trauma
- Growth pressure on the dental arches during odontogenesis
- Genetic factors (Familial tendency)

Sprawsom EC. 1937, Gustafson et al. 1950,
Atkinson SR. 1943, Rushton MA. 1937, Grahnen et al. 1959

Prevalence

- Dens invaginatus lesions have been reported to affect **0.3-10%** of the population. **In 43% of cases, DI can be bilateral.**

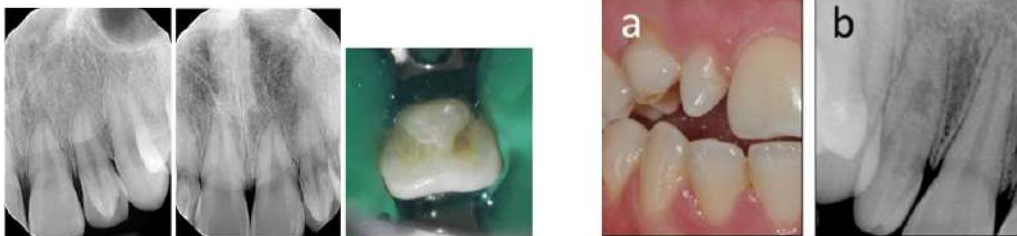
Hulsmann et al. 1997, Grahnen et al. 1959

- The teeth most commonly affected by DI are **lateral incisor**.
(*lateral incisor > central incisor > premolar and canine*)
- Although rare, case reports have detailed DI lesions in mandibular teeth.

Hamasha et al. 2004, Conklin 2015, Kharangate et al. 2015

Clinical Features

- DI are often asymptomatic and the crowns may show little external deformity.
- An abnormal tooth shape which may be wider mesio-distally, wider labio-lingually, associated with talon cusp, incisal notch or bifid cingulum.



Khabbaz et al. 1995, Girsch et al. 2002, Ridell et al. 2001, Bishop et al. 2008

Radiographic Features

- The **radiolucent pockets underneath the cingulum** and incisal edge of affected tooth. These pockets be surrounded by radiopaque enamel and may either be confined to the crown or involve the pulp.



Goncalves et al. 2002

Radiographic Features

- More extensive lesions may appear as fissures, with or without radiopaque borders. These fissures may involve pulp and root canal anatomy may appear complex.

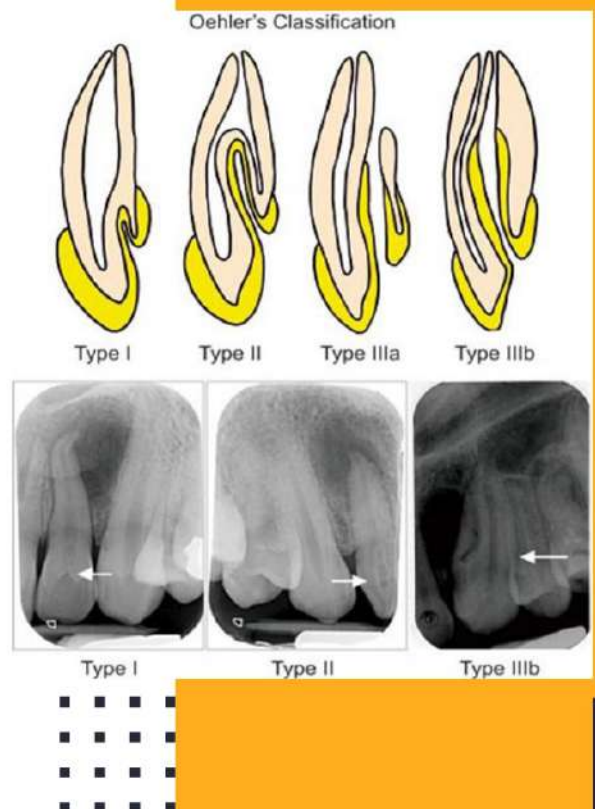


Goncalves et al. 2002

Classification

- **Type I:** Partial invagination that is **confined to the crown of the tooth**. These lesions involve dentin and enamel but **do not extend past the cement-enamel junction or involve pulp**.
- **Type II:** This partial invagination extend beyond the crown of the tooth and into the root, **beyond the CEJ**. These lesion **may or may not involve pulp**, but remain within the root. There is **no communication with the periodontal ligament**.

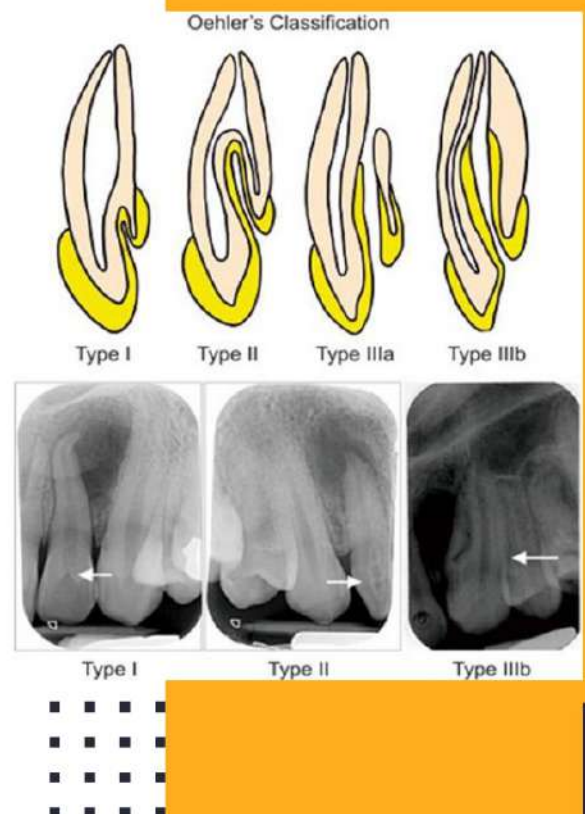
Oehlers 1957



Classification

- **Type IIIa:** This complete invagination extends through the root. It **communicates with the periodontal ligament through a second foramen on the lateral aspect**. There is usually no involvement of the pulp itself.
- **Type IIIb:** This communication extends through the root, and **communicates with the periodontal ligament at the apical foramen**. There is no direct involvement of the pulp but the lesion causes significant disruption to the dental anatomy.

Oehlers 1957



Radiographic Features

- **Periapical radiographs** are usually the image of choice for identifying DI lesions, however two images would be required at different horizontal angulations to ensure the lesion.

Bishop et al. 2008

- **The cone beam computed tomography (CBCT)** help the clinician diagnose the type of dens affecting the tooth and assess the feasibility endodontic treatment, especially proximity of adjacent anatomical structures if apical surgery is being planned.

Patel S. 2010



Management Strategies



Treatment of Oehler's Type I Lesions

- **Preventive treatment** with acid-etched flowable resin composite.

Hulsmann M. 1997

- **If pulp necrosis, root canal treatment should be performed.** The entire invagination should be incorporated into the access cavity.
- Instrumentation of the invagination can be achieved with ultrasonic tips together with an operating microscope in ensuring that the invagination is completely eradicated.

Bishop et al. 2008

Treatment of Oehler's Type II Lesions

- The invagination should be assessed and removed caries with long shank burs, then debrided with using ultrasonic instrument and hypochlorite.
- As type II lesions may be in close proximity with pulp tissue, the invagination can be dressed with a material that will promote hard tissue formation. The remaining defect can be restored with resin composite.
- If the invagination and resultant caries has caused pulpal disease. Root canal therapy is indicated as with class I defect.

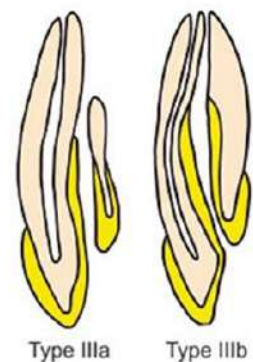
Bishop et al. 2008, Gallacher et al. 2016

Treatment of Oehler's type III Lesions

- **If the tooth asymptomatic and does not exhibit sign of pulpal disease, the tooth should be sealed only.**
- Due to closed proximity of the invagination to root canal system, prophylactically assessing and debriding Type III invagination would likely result in pulpal involvement.

Treatment of Oehler's type III Lesions

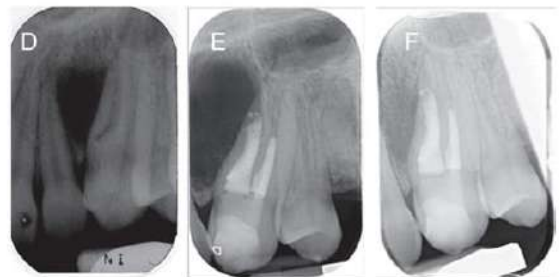
- **Peri-invaginated periodontitis** is a condition in which the tissue within an invagination becomes infected. The pulp itself may still remain vital and healthy, with tooth responding to pulp testing .
- Treatment of these lesions involves attempting to endodontically treat the infected invagination.
- Endodontic therapy of both system is not unwise and will allow the tooth treated in its entirety.



Chen et al. 1998

Treatment of Oehler's Type III Lesions

- Ultrasonic alloy tips can be used to debride the lesion, and irrigants should be ultrasonically activated to maximize their efficacy.
- The invagination will communicate with the periodontal ligament space and will need obturating with MTA to promote healing of the peri-radicular tissue.
- The pulpal should be treated conventionally and obturated with thermoplastic gutta percha.
- The tooth should be long term followed up, if symptoms do not improve, microsurgery can be considered.



Chen et al. 1998



Case Reports

