

## Endo-restorative Management of a Type II Dens Invaginatus in Mandibular Premolar Associated with a Large Cyst

### Abstract

We present the management of a case of Type II dens invaginatus in a mandibular premolar with a large invagination in the coronal third of the root on mesial aspect of the crown in proximity of cemento-enamel junction significantly compromising the strength of the crown structure. We describe in detail the various measures taken to assess the internal tooth structure destruction and enhance the fracture resistance of the involved premolar. The case has a long-term follow-up of 36 months showing clinical and radiographic signs of healing. We highlight use of a simple “foil coated fiber postblocker technique” for root reinforcement in the first premolar. Successful management of teeth with dens invaginatus can be effectively done using with careful treatment planning and selection of reinforcing adhesive restorative materials.

**Keywords:** Foil coated fiber postblocker, root reinforcement, Type II dens invaginatus

### Introduction

Dens invaginatus is a dental anomaly caused by in-folding of the inner enamel epithelium before the calcification stage during tooth formation. The occurrence of this anomaly in mandibular premolar has been reported in very few cases.<sup>[1-4]</sup> Dens invaginatus has been classified into three types:<sup>[5]</sup> Type I (a minor enamel lined invagination that is restricted within the crown of the tooth), Type II (invagination extending beyond the CEJ, it may or may not communicate with the pulp and does not communicate with the periradicular tissue), and Type III (invagination extending beyond the CEJ penetrating the root and exhibiting a second foramina in the apical third within the periradicular tissue). If the main pulp chamber is involved, endodontic treatment of both main chamber and invagination is indicated to close all portals of exit and allow healing.<sup>[6]</sup> We present a case of Type II dens Invaginatus in a mandibular premolar with open apex associated with a large cyst.

### Case Report

A 30-year-old female patient reported with the chief complaint of a painless swelling in her lower left jaw in the molar region. On external examination, a small, firm,

slightly tender swelling was noted on left side of the face. The mandibular first premolar had a slightly greater mesiodistal width, normal color, normal gingival tissues, and probing depth [Figure 1a]. Pulp testing revealed nonvital response in mandibular left first premolar, second premolar, and first molar. Radiographic examination [Figure 1c and d] showed an extensive multilocular radiolucency causing severe hollowing out and weakening of the body of the mandible. A Type II dens invaginatus was observed in 34 [Figure 1b]. Cone beam computed tomography (CBCT) examination [Figure 1e-g] revealed a complex invagination in coronal third of first premolar on mesiolingual aspect close to the external root surface. The incisional biopsy tissue and cystic fluid examination confirmed the diagnosis of an infected radicular cyst of endodontic origin.

Treatment plan consisted of endodontic treatment of the involved teeth and surgical excision of the cystic lesion. Cleaning and shaping of 35 and 36 was done with crown down technique 5.25% sodium hypochlorite (NaOCl) as irrigant and obturated with cold lateral condensation [Figure 3f].

Elimination of the dead pulp space in the invaginated mandibular premolar [Figure 3a] resulted in significant weakening of the remaining root. The apical

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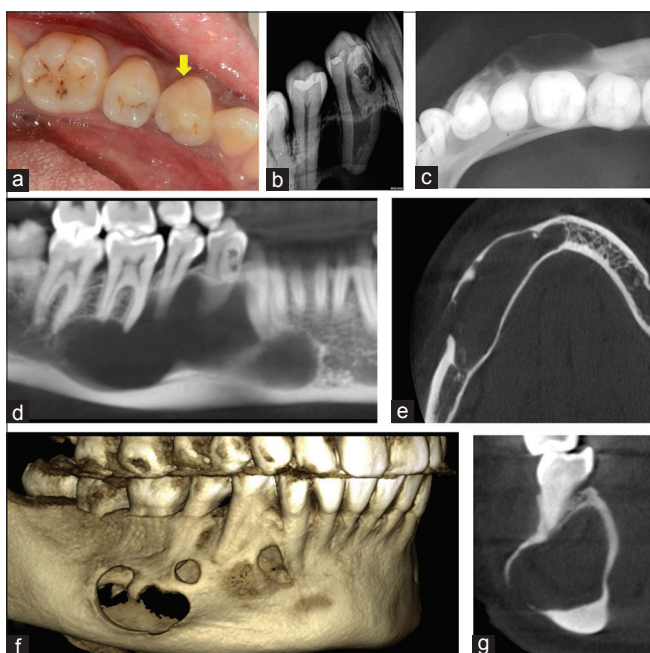
third was prepared with circumferential filing with 40 H file using 2% chlorhexidine (CHX-Plus, Inter-Med/Vista Dental Products, Racine, WI, USA) and saline as irrigant. Mineral trioxide aggregate was placed in the apical third using sonic activation (EndoActivator, Dentsply Maillefer, Switzerland) and temporized [Figure 3b]. At the subsequent visit, cleaning and shaping of the middle and coronal third of the canal was done with circumferential filing with H file using 5.25% NaOCl as an irrigant activated with an EndoActivator. The canal was flushed with distilled

water. Radix fiber post no. 5 (Radix Fiber Post, Dentsply Maillefer), covered with aluminum foil and held passively in the center of the canal with locking tweezers [Figure 3c]. The remainder of the canal was incrementally filled with fiber reinforced composite resin (EverX Posterior, Unitip, Member of GC, Turku, Finland), and cured for 60 s with a halogen curing light to prepare a custom postspace. The aluminum foil from the post was removed and post was cleaned with alcohol, a single coat of primer was applied and gently air dried for 5 s, and the post was light cured for 20 s outside the mouth. Post was luted with Calibra resin cement (Dentsply Caulk, Milford, DE, USA). The bonding agent and resin cement were light cured for 60 s through the post [Figure 3d and e].

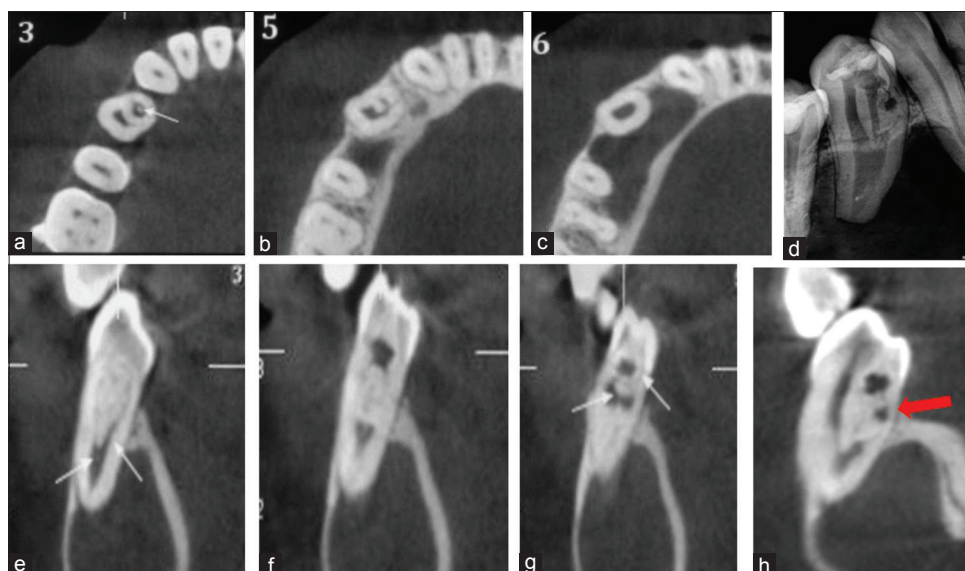
The cystic enucleation was carried out under general anesthesia. 20 ml blood was drawn for making platelet rich fibrin (PRF) in the laboratory. A full thickness mucogingival flap was raised, cyst was enucleated carefully, and the lining was sent for histopathologic examination. The large cystic cavity was filled with a mixture of NovaBone mixed with PRF and flap was repositioned with interrupted silk sutures. The patient was administered antibiotics and recalled after 1 month, 3 months, and 6 months. Six-month follow-up showed significant healing of the periapical lesion [Figure 3g and h]. The endodontically treated teeth were asymptomatic and restored with metal ceramic crowns [Figure 3i]. Recall at 3 years shows excellent healing of the periapical lesion and asymptomatic involved teeth with no evidence of any root fracture [Figure 3j].

## Discussion

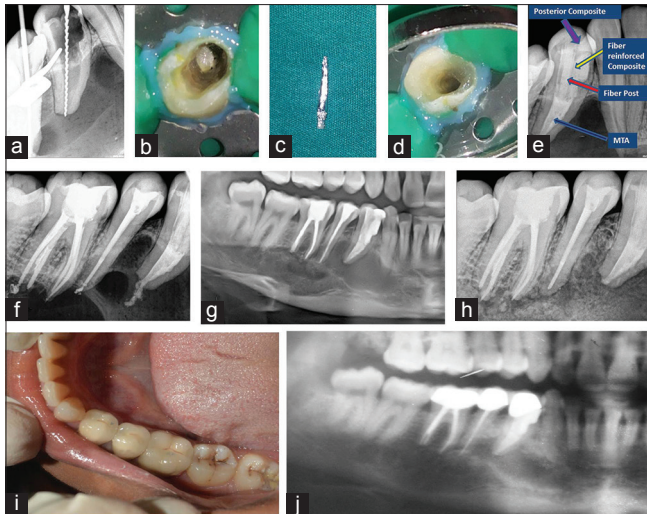
The endodontic treatment of teeth with dens invaginatus in this case was greatly assisted by the multi-planar CBCT examination of the tooth and cystic lesion. The main



**Figure 1:** Preoperative images: (a) Intraoral, (b) Type II dens invaginatus in 34, (c) occlusal radiograph showing (d) panoramic radiograph, (e) axial view in cone-beam computed tomography image, (f) three-dimensional reconstruction of mandible, and (g) coronal cone-beam computed tomography section



**Figure 2:** Cone-beam computed tomography imaging of 34 (a-c) serial axial views (d) radiograph shows initial access attempted to preserve mesial tooth structure (e-h) serial sagittal views. Red arrow shows thin root structure wall of root surface



**Figure 3:** (a) Working length, (b) mineral trioxide aggregate apical plug, (c) fiber postcoated with foil, (d) fiber reinforced composite build up, (e and f) postobturation intraoral periapical, (g and h) 6 months recall, (i) metal ceramic crowns placement, (j) 3 years recall radiograph

challenges in this case were (a) presence of invagination close to the external root surface compromising the strength of the tooth, (b) presence of large open apex which negated the use of high strength hypochlorite, and (c) large size of the cyst. Teeth with large pulp canals, thinner roots need to be reinforced to allow long-term retention of the tooth without fracture. This was achieved using a composite resin core with a fiber post of a large diameter to reduce stress in the remaining radicular tooth.<sup>[7,8]</sup> Fiber posts are anisotropic and have a modulus of elasticity similar to that of dentin which allows the post to flex slightly with the tooth, dissipate stress reducing likelihood of damage to root and prevention of crack propagation through the filling, and decreased polymerization shrinkage.<sup>[9-11]</sup>

For restoration of the cystic cavity, NovaBone graft particles provide a scaffolding base on which the PRF allows enhanced availability of growth factors for hard tissue regeneration providing a favorable physiologic structure to support healing.<sup>[12]</sup>

## Conclusion

Successful management of teeth with dens invaginatus weakened during endodontic treatment can be effectively

done using with careful treatment planning and selection of reinforcing adhesive restorative materials.

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## Conflicts of interest

There are no conflicts of interest.

## References

1. Er K, Kustarci A, Ozan U, Tasdemir T. Nonsurgical endodontic treatment of dens invaginatus in a mandibular premolar with large periradicular lesion: A case report. *J Endod* 2007;33:322-4.
2. Tavano SM, de Sousa SM, Bramante CM. Dens invaginatus in first mandibular premolar. *Endod Dent Traumatol* 1994;10:27-9.
3. Canger EM, Kayipmaz S, Celenk P. Bilateral dens invaginatus in the mandibular premolar region. *Indian J Dent Res* 2009;20:238-40.
4. Kharangate N, Figueiredo NR, Fernandes M, Lambor R. Bilateral dens invaginatus in the mandibular premolars – Diagnosis and treatment. *Contemp Clin Dent* 2015;6:428-31.
5. Oehlers FA. Dens invaginatus (dilated composite odontome). I. Variations of the invagination process and associated anterior crown forms. *Oral Surg Oral Med Oral Pathol* 1957;10:1204-18.
6. George R, Moule AJ, Walsh LJ. A rare case of dens invaginatus in a mandibular canine. *Aust Endod J* 2010;36:83-6.
7. Okamoto K, Ino T, Iwase N, Shimizu E, Suzuki M, Satoh G, *et al.* Three-dimensional finite element analysis of stress distribution in composite resin cores with fiber posts of varying diameters. *Dental Materials Journal* 2008;27:49-55.
8. Kumar P, Rao RN. Three-dimensional finite element analysis of stress distribution in a tooth restored with metal and fiber posts of varying diameters: An *in-vitro* study. *J Conserv Dent* 2015;18:100-4. doi:10.4103/0972-0707.153061.
9. Garoushi S, Vallittu PK, Lassila LV. Fracture toughness, compressive strength and load-bearing capacity of short glass fibre-reinforced composite resin. *Chin J Dent Res* 2011;14:15-9.
10. Garoushi S, Vallittu PK, Lassila LV. Fracture resistance of short, randomly oriented, glass fiber-reinforced composite premolar crowns. *Acta Biomater* 2007;3:779-84.
11. Garoushi S, Vallittu PK, Watts DC, Lassila LV. Polymerization shrinkage of experimental short glass fiber-reinforced composite with semi-inter penetrating polymer network matrix. *Dent Mater* 2008;24:211-5.
12. Sunitha Raja V, Munirathnam Naidu E. Platelet-rich fibrin: Evolution of a second-generation platelet concentrate. *Indian J Dent Res* 2008;19:42-6.