Case Report

Surgical Treatment of a Dens Invagination Type (I) in a Maxillary Lateral Incisor: 6 Year Follow Up

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KEY WORDS
Dens in Dente;
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ABSTRACT
Dens invagination is a developmental anomaly that required specific treatment approaches. The invagination is truly negligible and enamel-lined for which the crown of the tooth is the only range and there is no extension on the level of the external amelo-cemental junction. A well ending surgical root canal treatment of an invaginated tooth applied a retrograde filling with MTA is concluded by this study. Periapical radiographic examination after 3 month and 6 year follow-up showed periapical healing with osseous formation.

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Introduction
Dens invaginatus (DI) is a growing anomaly which eventuates in an enamel-lined cavity intruding into the crown or root prior to the mineralization phase [1]. The most acceptable etiologic theory is that DI results from an enfolding of the enamel organ (outer portion) into the dental papilla (inner portion) during tooth growth while forming a pocket.

The frequency of DI is reported to be 0.04-10% [2]. Its prevalence is the highest in permanent lateral incisors, central incisors, premolars, canines and molars in a descending order [3]. It commonly occurs in maxilla rather than mandible, and in permanent instead of deciduous teeth [3]. Bilateral appearance is common in maxillary lateral incisors [4].

The very first taxonomy of invaginated teeth was propagated by Hallet. The most popular taxonomy was suggested by Oehlers [5]. He depicted the anomaly in three categories:

Type I: A negligible form of enamel-lined which does not enlarge over the amelo-cemental junction but arises within the limits of the crown [6].

Type II: An enamel-lined form attacking the root which stands restricted as a blind sac. Being linked to the dental pulp is possible for this form.

Type III: This form is the one which form which in terpenetrates into the root perforating at the apical area showing a ‘second foramen’ in the apical or in the peri-dental area. It does not have an instant link with pulp. The invagination might be completely lined by enamel, but frequently cementum is found lining the invagination [6]. Teeth with DI are prone to early caries and pulp necrosis. Several treatments related to this anomaly are recommended: endodontic therapy or surgery, combined treatment or extraction [7-8]. Calcium hydroxide has been taken advantage in some cases to induce apical closure and promote repair. Sporadically, the presence of immature roots necessitates apexification [9-10]. Surgical operations can be essential for some cases [11].

Case Report
A 25 Y/O female patient with a history of swelling in the upper left anterior palatal region (teeth #9 to #11) referred to Endodontics clinic affiliated to Shiraz University of Medical Sciences. Medical history was unremarkable (Figure 1). The radiograph showed unilocular well defined radiolucency to be extended from mesial of #9 to the distal of #11. No root resorption was evident. However, root displacement was detected (Figure 2). The tooth did not respond to thermal and electrical tests. There was no mobility, no pain on palpation, and tenderness to percussion was mild.
A clinical diagnosis of DI (Oehlers’ Type 1), necrotic pulp and chronic apical abscess was confirmed. The treatment plan was root canal therapy, incision and drainage, follow-up, and if necessary apical surgery.

The complexity of the tooth anatomy and prognosis was explained to the patient and a written consent form was obtained before each phase of the treatment.

In total, 2% lidocaine with 1:80000 epinephrine (Darupakhsh, Tehran, Iran) was used to anesthetize via injection into the buccal vestibule and applied clamp and rubber dam. Access cavity preparation was done with high speed turbine and diamond fissure bur (Dentsply, Maillefer, Baillaigues, Switzerland). The working length was measured with radiography (Figure 2).

Root canal was shaped with the protaper rotary file (DENTSPLY, Maillefer, Switzerland) and irrigated by sodium hypo chloride (5.25%). Due to active discharge; 2 times Calcium hydroxide (Pulpdent Corp, Watertown, MA, USA) paste was used and the access cavity sealed with Cavit (3M, ESPE, Seefeld, Germany) between appointments (every 2 weeks). Canal obdurated with lateral condensation of gutta-percha cones and AH-26 sealer after 4 weeks (DENTSPLY, Tulsa Dental, and Tulsa, OK, USA) (Figure 2).

Due to persistent swelling after the 2nd month of follow-up and no change in cervical discharge, apical surgery was selected as the treatment plan.

Surgical procedure was performed under surgical microscope. Treatment was initiated using 2% lidocaine with 1:8000 epinephrine (Darupakhsh, Tehran, Iran). A full-thickness muco-periosteal triangular flap was raised following an intrasulcular incision and distal relieving incision. The lesion had perforated the cortical bone. The margins were smoothed using a round bur in a slow speed hand piece with physiological saline irrigation. Granulation tissue was removed and sent to pathologist laboratory (Figure 3).

Three mm root end resection was performed with high speed fissure bur. Cavity preparation was done, using ultrasonic, mechanical retention and retrograde ProRoot- MTA (Maillefer, DENTSPLY, Baillaigues, Switzerland) inserted. The flap was repositioned and sutured. Clinical examination showed healthy clinical appearance and function after the 3rd month. Radiographs showed partially healing of the radicular cyst, and the 6-year follow-up revealed complete healing.
Discussion
DI must be recognized and diagnosed and treated at the soonest time, in order not to produce radicular and periapical pathosis. Usually, a patient cannot detect an anomaly such as DI, until clinical signs appear, i.e., an acute dentoalveolar abscess or sinus tract [11]. In this case report, an Oehler’s Type 1 invagination on a maxillary lateral incisor, the minor form of DI was not extended beyond the amelocemental junction. The radiograph showed unilocular well defined radiolucency.

Interappointment medicament was considered to compensate for the shortcomings of canal preparation. Calcium hydroxide was used for its antimicrobial action and to control exudation from the canal. Then canal aburred with lateral condensation of gutta-percha cones and AH-26 sealer after 4 weeks.

A complex procedure is required to treat invaginated teeth. A complicated root canal formation is presented by these teeth which mostly cannot be instrument entirely. Therefore, they need to be opted for a combination of orthograde and surgical treatment [7, 12]. Due to persistent swelling after the 2nd month of follow-up, apical surgery was performed. The surgery provided an additional retrograde seal with ProRoot MTA to the root canal.

Many hypotheses were suggested about the expansion of an invaginated tooth. Following to the deterioration of the dental lamina, a new theory claims, that it can be led to fusion, germination or agenesis. This is also supported by the fact that invagination is most common in maxillary lateral incisors and premolars, the most popular sites of agenesis, and that it occurs in supernumerary teeth [13-14].

Figure 3: Surgical retreatment. b: Follow-up image after 6 years; the periapical lucency has disappeared

Conclusion
The three-month radiograph follow-up showed partial healing of the radicular cyst and the six-year follow-up revealed complete healing.

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Conflict of Interest
There was no conflict of interest in present research.

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