

## A MULTI-DISCIPLINARY APPROACH TO THE TREATMENT OF DILACERATED LOWER INCISOR TEETH WITH PERIAPICAL LESION: 2 YEARS FOLLOW-UP

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### Abstract

Periapical lesions are frequently encountered in dentistry and are a condition which can cause loss of teeth. Diagnosis is made on the basis of the anamnesis, radiographic findings and by the examination of percussion and the vitality of related teeth. Histopathological findings generally conform with radiographic findings.

The case is here presented where, following endodontic treatment of the right mandibular first incisor with dilaceration and periapical lesion, and the left mandibular first incisor with periapical lesion, root tip resection was applied. At the end of 6 months observation, as there was improvement in the lesion root tip surgery was applied. During a 2-year follow-up period, the lesion has diminished and recovery has been observed in the bone.

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### Introduction

In the development of apical periodontitis in the periapical tissue the most significant agent is the presence of infected pulp. Other etiologies include toxins of microorganisms, chemical agents, mechanical irritations, foreign substances, trauma and host defence.<sup>1</sup> Physical trauma which results in fluid loss in the dentine, and increased heat created by the operative trauma during dental processes may cause damage to the pulp, which may then result in inflammation. Apart from sudden trauma, another form of trauma which affects the pulp and periapex is occlusal trauma. While the primary type of occlusal trauma causes resorption in the periapex, in the second type it causes additional stress to existing diseases in the periapex.<sup>2</sup>

One of the frequently seen etiological factors of periapical inflammations is traumatic occlusion. The reason for inflammation in traumatic occlusion is due to the agent continuing and not changing. These types of long-term irritations may cause resorption in the bone of the apical area of the related teeth.<sup>3,4</sup>

Traumatic injuries affecting the primary teeth at an early age can negatively affect the development of the underlying permanent tooth germ. Following traumatic injury to the primary teeth incisors, the possibility of developmental anomalies in the permanent incisors has been reported as 12%-74%.<sup>5</sup> Defects which could occur in the permanent teeth associated with primary teeth trauma were classified into 6 groups by Andreasen.<sup>6</sup> 1) white or yellow-brown colour of the enamel, 2) white or yellow-brown colour of the enamel together with hypoplasia, 3) dilaceration of the crown, 4) odontoma-type malformations 5) root dilaceration 6) germination defects.

Dilaceration is defined as deviation in the linear relationship of crown and root, either as angulation or curving. While angulation at the coronal level can be determined by clinical examination, radiography is necessary to

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diagnose angulation in the root.<sup>7</sup> The case is here presented where, following endodontic treatment of the right mandibular first incisor with coronal dilaceration and periapical lesion, and the left mandibular first incisor with periapical lesion associated with primary teeth trauma, root tip resection was applied.

### Case Report

A 26-year old female presented at the Dental Diseases and Treatment Department of the Dental Faculty of Dicle University with aesthetic complaints and pain in the front teeth of the mandibula. In the clinical and radiographic examinations there were seen to be areas of radiolucence in the apical region, hypoplasia and coronal dilaceration on the mandibular right side first incisor and apical radiolucence in the mandibular left side first incisor together with a negative response to the electric pulp test (Figures 1, 2).



Figure 1. Preoperative intraoral image.

From the patient anamnesis, it was learned that there were no systemic problems. The patient had a history of a fall at a very young age but was unable to recall any details. Informed consent was obtained from the patient, then under local anaesthesia, endodontic treatment procedures were started. Entrance cavities were opened then with a no. 15 nickel titanium file, the working dimensions were determined 1mm forward from the radiological apex. The canals were shaped using the step-back technique up to a no.40 file. During the

cleaning and shaping procedure, a 2.5% sodium hypochloride solution was used for irrigation at each change of instrument.

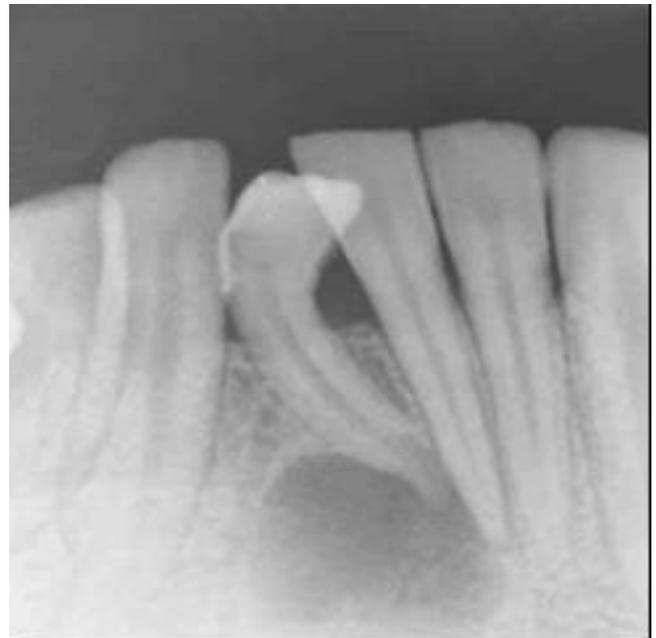
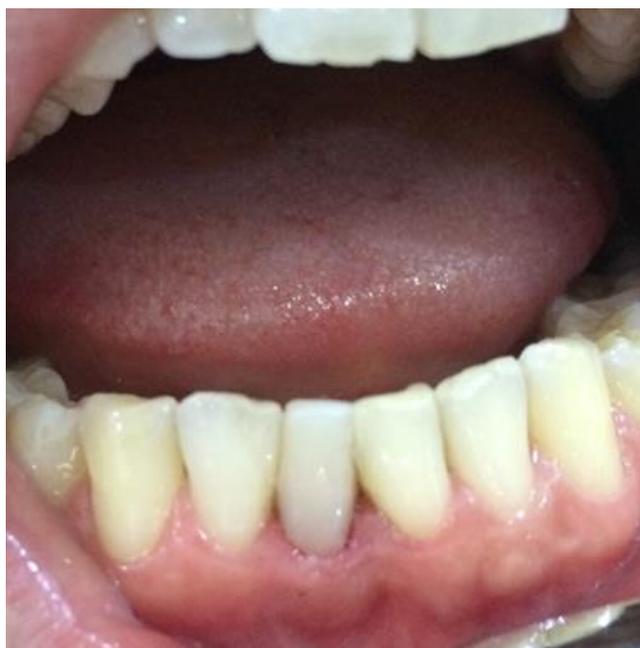


Figure 2. Preoperative radiography.

Following the necessary root canal shaping, a dressing with  $\text{Ca}(\text{OH})_2$  was applied for 3 weeks. When the symptoms had disappeared, the treatment was completed by making a canal filling with a latex and AH Plus pad (Figure 3). Then the aesthetic restoration procedures started.



Figure 3. Postoperative radiography.



**Figure 4.** Postoperative intraoral image.

An appropriate colour was selected for the resin (Ceram X nano ceramic restorative, Dentsply, UK). Before the restoration, all the enamel with defects was removed with diamond burrs. The 2-step self-etch system Clearfil SE Primer (Clearfil SE Bond, Kuraray, Japan) was applied for 20 seconds to the prepared tooth surface and the mandibular left incisor tooth, was made airtight with solvents then after application of Clearfil SE bond (Clearfil SE Bond, Kuraray, Japan), was lightly air-dried then polymerised for 10 seconds with light. Using the appropriate colour and layering technique the composite was positioned and each layer was polymerised for 40 seconds under the light source. After the necessary shape and form corrections, the finishing and polishing procedures were completed using Sof-Lex (3M, ESPE, ABD) abrasives and composite finishing rubbers (Figure 4).

As the complaints of the patient were still ongoing at the 6-month follow-up examination, it was decided to apply apical resection procedures to the relevant teeth. A full thickness mucoperiosteal flap was raised, the bone cavity was prepared with a round burr and under water cooling, a 3mm apical section of the teeth was resected. The patient was called for follow-up examination after 6 months. At 2 years after the first treatment, the lesion had reduced and recovery was observed in the bone. The patient continues to have routine follow-up examinations.

## Discussion

After traumatic injuries to the primary teeth, developmental anomalies may occur in the permanent teeth. In a study of 213 children with a history of primary teeth trauma by Andreasen and Raven,<sup>8</sup> it was reported that there were developmental anomalies in the permanent teeth in 41%. After intrusion injuries in the primary teeth, the rate of developmental anomalies in permanent teeth was determined as 69%.<sup>8</sup>

One of the most commonly seen anomalies following primary teeth trauma is enamel hypoplasia in the incisors.<sup>9</sup> Dental anomalies associated with general factors usually occur symmetrically and affect more than 1 tooth at the same time.<sup>10</sup> Coronal dilaceration in the central teeth is a developmental anomaly which often occurs in the underlying permanent teeth following primary teeth intrusion.<sup>10, 11</sup> In the case presented here, there was a history of trauma to the primary teeth and the symmetrical nature of the defects of the enamel hypoplasia, coronal dilaceration and periapical lesion showed that they could have been associated with a local agent such as trauma to the primary teeth.

Significant factors in the failure of endodontic treatments are anatomical difficulties in the root canal system and microbial agents. In previous studies, gram-positive and negative bacteria, primarily anaerobic, have been reported to be observed in teeth with necrotic pulp, whereas facultative and obligate anaerobic species have been reported in canal fillings and apical periodontitis, particularly *Enterococcus faecalis* which is gram-positive, *Actinomyces* and *Propionibacterium* species and fungal species such as *Candida albicans*. These bacteria and fungi are highly resistant strains, even though they can only continue living in a very restricted environment.<sup>12</sup> The reason that no response was obtained to the endodontic treatment in the current case is thought to be due to the endotoxins expressed by resistant microorganisms in the root canal system and/or in the periapical lesion.

It was suggested by Matsumoto et al<sup>13</sup> that the recovery rate was low in the treatment of periradicular lesions with a diameter >5mm. In a study by Sjogren et al,<sup>14</sup> no significant difference was found in the percentage of recovery of lesions >5mm (87%) and <5mm (83%).

If it is decided that the endodontic

treatment has not been successful, surgical methods such as apical resection or apical curettage can be applied to be able to retain the teeth in the mouth.<sup>15</sup> In the current case, the endodontic treatment was finished after 3 weeks of a Ca(OH)<sub>2</sub> dressing. As the complaints of the patient continued, at the 6-month follow-up examination it was decided to apply the procedure of apical resection.

Anterior enamel hypoplasia can lead to severe aesthetic problems causing physical and social problems for the patient. Different methods are applied in the treatment of enamel hypoplasia. Tooth whitening and micro-abrasion should be selected for the treatment of minor defects, and if there is loss of material in the tooth, restorative procedures should be applied. Composite resins are successfully used in the treatment of enamel hypoplasia. The application of direct composite restorations is simple, and they can be repaired or renewed when necessary. Other reasons for their selection can include that an immediate aesthetic result is achieved, there is no requirement for any laboratory procedure and the costs are relatively low.<sup>16</sup> In the current case, enamel hypoplasia and dilaceration were restored with direct composite resin. With the restoration, the aesthetic expectations were met and the traumatic occlusion was removed.

## Conclusion

Trauma to the primary teeth can create unwanted anomalies in the permanent teeth years later. The first choice should be conservative treatment for these kinds of cases. If success can not be achieved, then invasive procedures should be applied. The patient must certainly be followed up at regular intervals.

## Declaration of Interest

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