

Treatment approach to a traumatically intruded maxillary central tooth: a case report

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Abstract

This case report presents the treatment of a 10-year-old boy with a traumatic maxillary right central tooth. Radiologic examination of the patient revealed an uncomplicated traumatic dental injury with an intrusion of more than 7 mm in the right maxillary lateral incisor. Following flap lifting, the intruded tooth was luxated to the desired position. After the tooth was positioned, the soft tissue was sutured and the teeth were splinted with a semirigid wire for four weeks. At the next appointment after three weeks the pulp was extirpated and calcium hydroxide was sent to inserted the canals and root canal treatment was finished 1 week later. No marginal bone loss, resorption of the periapical tissues, or pathology was detected in the clinical and radiologic examinations and at the end of the 6-month follow-up. Routine clinical and radiologic follow-up of our case continues. Treatment planning of fully intruded permanent teeth requires a multidisciplinary approach. The collaboration of specialists such as pedodontists, maxillofacial surgeons and orthodontists is important in the treatment process.

Key words: Dental Trauma, splint, surgical extrusion.

INTRODUCTION

Dentoalveolar trauma is prevalent in children (1). Most of these cases occur in childhood as a result of bicycle accidents, during sports activities or falls (2). Dental trauma, especially in the anterior teeth of children, may require emergency treatment (3). Intrusion is a condition in which the tooth is pushed downward and takes up more space in the jaw. This condition usually occurs as a result of trauma (2,4). In cases of intrusion, the teeth may be partially or completely embedded in the jaw bone (5). The current treatment method in permanent teeth can be listed as waiting for the tooth to return to its former position if the amount of intrusion is less than 3 mm in teeth with a closed apex, orthodontic/surgical repositioning if the amount of intrusion is between 3-7 mm, and surgical repositioning if it is more than 7 mm (6). According to the International Association of Dental Traumatology (IADT) guidelines for the treatment of traumatic dental injuries, surgical extrusion is reported as the treatment option for intrusive luxation injuries with more than 7 mm intrusion (7). The treatment and prognosis of teeth intruded as a result of trauma may vary depending on many factors such as the type of dentition,

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age of the patient, severity of trauma and development of the roots (3). In the case of permanent teeth with an occluded apex, researchers recommend surgical repositioning of the intruded tooth or maintenance with orthodontic treatment (8).

In this case report, we present the treatment approaches applied to a 10-year-old boy whose right maxillary permanent central tooth was completely intruded as a result of trauma.

CASE REPORT

In our case, the right maxillary central tooth of a 10-year-old boy who fell while running was intruded and an uncomplicated traumatic dental injury occurred at the same time. The patient applied to our clinic one week later with pain and aesthetic complaints due to the complete embedding of the right central apex closed tooth into the gum (Figure 1). When the patient came to our clinic, it was found that the tooth was 7 mm intruded (Figure 2). The impacted tooth was incised, slightly luxated, brought to occlusion and sutured (ALKASILK round 3/0 silk suture, Turkey) (Figure 3). Immediately afterwards, the teeth were first etched, bond (3M ESPE Simple Bond Universal, Germany) was applied, and

then splinted and reposed with the help of resin composite (3M ESPE filtek, USA) and dental light device (Guilin Woodpecker, 3.6V, LED C, Germany) using 0.4 mm full round flexible steel wire (AYSET 2ml, hollow round 0.4 mm, Turkey) (Figure 4-5).



Figure 1: Preoperative photograph



Figure 2: Preoperative panoramic radiograph



Figure 3: Reposed image of the intruded tooth



Figure 4: Splinting treatment of the intruded tooth



Figure 5: Radiographic examination with splint treatment

After the procedure, the patient was prescribed a broad-spectrum antibiotic, analgesic and chlorhexidine mouthwash, and was advised to eat soft food and maintain maximum oral hygiene. Parents were recommended to clean the affected area superficially with a soft brush or cotton swab twice daily for one week with an alcohol-free 0.1-0.2% chlorhexidine gluconate mouthwash. When the patient came for appointment 2 weeks later, the sutures were removed and the patient was called for a follow-up appointment. 4 weeks later, the root canal was started, calcium hydroxide was applied to the canals via pulp extirpation, and the root canal treatment was completed 1 week later (Figure 6).

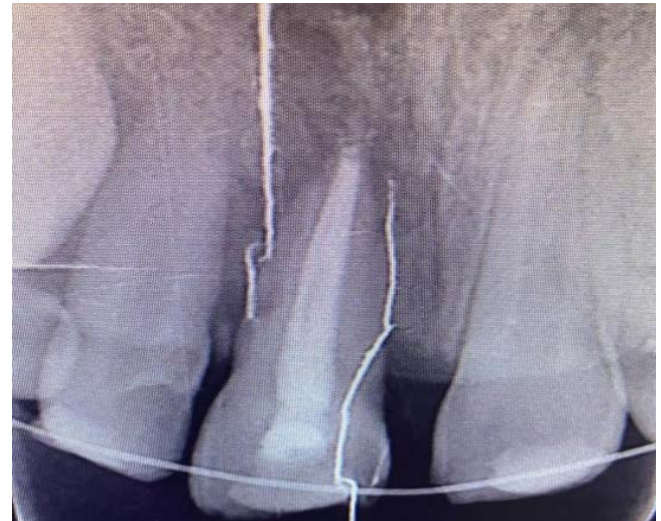


Figure 6: After root canal treatment

After root canal treatment, splinting was removed because no mobility was observed in the patient's central incisor. (Figure 7-8). The fractured tooth was polymerized with a light device using bond (3M ESPE Simple Bond Universal, Germany) and composite (3M ESPE filtek, USA) restoration was completed (Figure 9). The patient was followed up with 2-weekly follow-up visits for 2 months, and then recommended for 6-month, 1-year and 5-year follow-up visits. At the end of the 6-month follow-up period, clinical and radiographic examinations revealed no resorption, marginal bone loss or pathology in the periapical tissues (Figure 10).



Figure 7-8: Intraoral examination after repositioning and splinting treatment



Figure 9: Clinical image after composite restoration



Figure 10: 6 month follow up

DISCUSSION

Intrusion is a severe dental injury with significant implications for the periodontal ligament, pulp, and alveolar bone (9). Intrusion is considered to have the worst prognosis because it causes significant damage to the periodontal ligament (PDL), pulp or alveolar bone (10). There are three ways to treat intruded teeth; spontaneous eruption, surgical extrusion and orthodontic extrusion (8). When spontaneous repositioning was not attempted, no significant difference was observed between orthodontic treatment and surgical repositioning. Since the surgical repositioning approach is a much less time-consuming process, this should be the preferred treatment option (11). Recently, it has also been documented that emergency surgical repositioning is the treatment of choice for completely intruded teeth (12). Emergency surgical repositioning is advocated for completely intruded teeth to displace the contaminated crown surface and reduce osteoclastic activity (10).

Dias et al. followed 20 central teeth treated with surgical extrusion for 3 years and 2 months and did not observe any clinical or radiographic findings at the end of this follow-up. Similarly, Kırzioğlu and Karayılmaz did not observe any marginal bone loss, root resorption or periapical lesions after 48 months in teeth treated with surgical extrusion (8).

The idea that orthodontic extrusion of a tooth may be somewhat safer than surgical repositioning, but this small difference does not create an advantage due to reasons such as the ease of endodontic treatment, economic reasons, and the decrease in the frequency of the patient visiting the clinic, has made surgical repositioning a more preferable treatment method (13).

Orthodontic and surgical repositioning: available evidence comparing orthodontic extrusion and surgical repositioning of intruded teeth suggests no significant difference in the development of pulp necrosis, root resorption or marginal bone loss. However, surgical repositioning has been recommended in cases of severe intrusion of mature teeth to allow extirpation of the pulp canal (14).

According to the latest updated 2020 guideline of the Dental Traumatology Association Guidelines; spontaneous re-eruption in open apex, orthodontic extrusion if not occurring within 4 weeks, in closed apex if intrusion level is less than 3 mm, waiting for re-eruption if there is intrusion, if not occurring within 8 weeks, root canal treatment is performed in the 2nd week and splint is applied for 4 weeks, if 3-7 mm, orthodontic extrusion or surgical extrusion, root canal treatment is performed in the 2nd week,

splint is applied for 4 weeks, if more than 7 mm, surgical extrusion, splint is applied for 4 weeks, root canal treatment is applied in the 2nd week (15). As in our case, since surgical extrusion is stated as a treatment option in cases where tooth intrusion exceeds 7 mm, surgical extrusion was preferred instead of orthodontic extrusion.

CONCLUSION

The treatment of an intruded tooth can be adapted depending on the condition of the tooth and complications. In our case, we performed surgical extrusion because the tooth was completely intruded. Effective management and adherence to follow-up protocols are crucial for favorable recovery outcomes. In addition, the patient's sensitivity to control examinations and home care positively supports recovery after traumatic dental injury. This clinical case report demonstrates that careful and continuous evaluation is necessary to follow the progression of the favourable healing outcome of a traumatically intruded permanent maxillary incisor and to determine the prognosis.

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