

## Treatment of Intruded Maxillary Central Tooth with Surgical Extrusion:Case Report

Mesut Kaygusuz<sup>1\*</sup>, Mehmet Sinan Doğan<sup>1</sup>

1. Harran University, Faculty of Dentistry, Department of Pediatric Dentistry, Sanliurfa, Turkey

\*Corresponding author: Kaygusuz M., MSc., Department of Pedodontics, Faculty of Dentistry, Harran University Sanliurfa, Turkey.  
E-mail : mesutkaygusuz99@gmail.com

### Abstract

Intrusion injury, defined as displacement of the tooth into the alveolar bone due to dental trauma; It is considered one of the most serious luxation injuries of primary and permanent teeth. Intrusion injury damages the pulp, periodontal ligament, and alveolar bone. The treatment of these teeth is decided by evaluating many factors such as the degree of intrusion, pulp vitality, age of the patient and root development status of the tooth. Treatment of intrusion injuries includes surgical or orthodontic repositioning of traumatized teeth. In this case report, the treatment of a 9-year-old patient who applied to our clinic 24 hours after the trauma, with a maxillary central tooth intruded towards the base of the nose, with a multidisciplinary approach is discussed.

Case Report (HRU IJDOR 2021; 1(2): 45-48)

**Keywords:** Dental trauma, surgical extrusion, intrusion injury.

### Introduction

Intrusive injury is defined as the impaction of the tooth in the socket and clinically appearing shorter than normal occlusion with bleeding in the gingiva. This type of injury; causes functional, aesthetic and orthodontic complications. (1,2) Intrusion injuries have been reported as 0.5-2% of all dental traumas. Consequently, damage to the periodontal ligament, cementum, neurovascular bundle, and surrounding alveolar bone can seriously compromise the long-term prognosis of the affected permanent dentition. 97.2% of these cases occur in the maxilla (3). In particular, the upper jaw anterior group teeth with an increased overjet size are the most traumatized teeth. According to the damage caused by trauma to the tooth in this dental group, the type of damage to the tooth affects the patient not only functionally but also aesthetically. As a result of this situation, the patient suffers psychologically. Clinically; It is observed that the crown length of the tooth is reduced and sometimes there is bleeding in the soft tissues surrounding the tooth. Radiographs have an important place in the diagnosis. Regardless of the severity of the trauma, radiological evaluation must be performed. (4)

Diagnosis and treatment of intrusive injury; it varies depending on the age of the patient, the type of dentition, the root development of the tooth, the severity and time of the trauma (2,5). In permanent dentition, pulp necrosis can occur in 88-98% of intrusive teeth that have completed root development (6). Root resorption may occur in 51-73% of these cases, resulting in premature tooth loss (7). In permanent teeth with incomplete root development, researchers suggest that spontaneous eruption of intruded teeth should be expected (2,8). In permanent teeth with closed apex, researchers recommend that the intruded tooth be surgically repositioned or orthodontically maintained (9,10).

Splinting and antibiotic prescription may be required in patients suffering from intrusion injury. The final guideline recommended splinting repositioned teeth using a non-rigid, flexible splint. (12) Splinting is recommended for a period of 6-8 weeks. Andreasen et al. However, 10 days of splinting has also been shown to reduce mobility sufficiently to allow function. (13)

Complications may occur after treatment in intrusion injuries. These; pulp necrosis, dental ankylosis, internal-external root resorption, marginal bone resorption, partial or total pulp obliteration, root development arrest and gingival recession in teeth with open apex. (4,11)

The aim of this study is to reposition the intruded maxillary central tooth with surgical extrusion and to follow the patient clinically and radiologically after splint.

### Case Report

A 9-year-old male patient applied to the Department of Pedodontics, Faculty of Dentistry, Harran University, due to dental trauma in the maxillary anterior region. In the anamnesis, it was learned that the patient fell on an iron piece on the ground from a height of approximately 2.5 meters 24 hours before coming to our clinic. After the trauma, the patient first applied to the emergency outpatient clinic of the district state hospital and after the necessary interventions were made in the emergency polyclinic, the patient was referred to our clinic.

When the patient applied to our clinic 24 hours later, in the clinical examination, contusion wounds and redness were observed around the lips, under the chin and cheek. A slight bruising was noticed in the lower part of the right upper eye. In the intraoral examination, an uncomplicated crown fracture was detected in the maxillary right central tooth of the patient. With the effect of trauma, less than the incisal 1/3 of the left upper central tooth was seen intraorally. It was observed that the left upper central tooth was intruded more than 7 mm and the tooth was rotated at the same time. In this tooth, swelling and redness were detected around the tooth intruded in the intraoral soft tissue, with an uncomplicated crown fracture with intrusion and rotation. No abnormality was observed in other soft tissues. (Figure 1) The treatments to be administered to the patient were explained to him and his parents, and their consent was obtained.

Panoramic radiography (PCH-2500 VATECH) taken during the radiological examination showed that the maxillary left central tooth moved apically from the tooth socket and the periodontal ligament gap disappeared (Figure 2). Considering the inadequacy of panoramic radiographs, it was decided that a computed tomographic (CT) examination is needed to investigate root fracture and also to detect the presence of fracture in the alveolar bone. Multislice Tomography General Electric 64 detector 3D (USA) CT device was used and 3D reconstruction images were prepared with axial and coronal sections with 1 mm intervals and 0.6 mm section thickness from CT images taken with 0.15 mm<sup>3</sup> voxel size and 80.0 kV, 255mA irradiation parameters. (Figure 3) In the coronal sections taken from the patient with computerized tomography, it was observed that tooth 21 was intruded into the nasal floor. (Figure 4) In

the axial section, it was noticed that the tooth was luxated in the vestibule. (Figure 5) No fracture was observed in the alveolar bone or tooth root.

The intruded central tooth was surgically repositioned with the help of an upper incisor plate. (Figure 6) The maxillary central and lateral teeth were supported and the traumatized tooth was splinted to the semi-rigid trauma wire with the help of composite (3M ESPE Filtek TMSupreme XT, St Paul, USA). (Figure 7) Following the normal occlusion of the tooth, an interpapillary suture was placed on the soft tissue. (Steriheat 3/0 metric surgical silk thread)

After the procedure, the patient was prescribed a broad-spectrum antibiotic, pain reliever, and mouthwash with chlorhexidine, and it was recommended to keep a soft diet and oral hygiene at the maximum level. The patient was given an appointment 2 weeks later.

It was observed that the patient, who was exposed to intrusive injury 2 weeks later, had pain in the left upper central tooth and also responded to percussion. Root canal treatment was started in the dental pedodontic clinic. The vitality of the right upper central tooth was positive and was followed up. After the endodontic access cavity was opened, the root canal preparation was expanded with K-type files (Golden Star K-Files, China) using the step-back technique with apical end file #40. After each file change, 5.25% sodium hypochlorite (NaOCl) was used, and in the last irrigation, 5 ml of 5.25% NaOCl and 5 ml of saline were used. The canal was dried with paper cones. Calcium hydroxide paste was then placed in the root canal and sealed with glass ionomer (Nova Glass F).

Due to the poor oral hygiene of the patient, oral hygiene training was given to the patient. He was directed to periodontal treatment because of the redness of the gums and the accumulation of plaque on the teeth. The patient was called for a control appointment 2 weeks later.

### Discussion

Traumas in the teeth; It causes fractures, discoloration, mobility, tooth loss. Aesthetic and functional disorders are seen in traumatized people. In many studies conducted in recent years, oral disorders; It has been reported to cause biological, emotional and psychological consequences. Especially teeth lost as a result of anterior tooth trauma cause social, psychological and functional problems. (2)

In the literature, different treatment protocols have been suggested for cases of intrusive luxation, such as waiting for spontaneous eruption, surgical reposition or

orthodontic reposition followed by splinting.(14)According to the International Association of Dental Traumatology (IADT) Guidelines for the Treatment of Traumatic Dental Injuries, surgical extrusion was preferred because the treatment option was reported as surgical extrusion if the tooth had an intrusion of more than 7 mm, as in this case, in intrusive luxation injuries.Orthodontically extruding the tooth may be somewhat safer than surgically repositioning it. However, this small difference has caused surgical reposition to be a more preferable treatment method due to the fact that surgical reposition allows endodontic treatment to be performed easily, economic reasons, and the decrease in the frequency of the patient's visit to the clinic.In the study of Andreasen et al. in which they evaluated the treatment of 140 teeth after intrusion in permanent teeth, it was reported that the splint type used to fix a surgically extruded tooth did not cause a difference in terms of healing (pulp necrosis, root resorption, marginal periodontal bone healing). (6)In this case, a semi-rigid splint was used. We thought that in this method, the patient could perform oral hygiene more easily and the formation of ankylosis in the tooth would be prevented.The success of the cases treated with the surgical extrusion method depends on the pulp extirpation time, filling the root canals and splint time. The splint should be applied in such a method that it does not interfere with the physiological movement of the teeth. Splint duration should be kept short so that the teeth do not become ankylosed.(2)

In this case, endodontic treatment was completed in 2 weeks, and splint removal was delayed after 4 weeks.As a result, in this case report, the tooth with an intrusive injury was surgically extruded, and the teeth were restored to their aesthetic and function by applying endodontic treatment.It was observed in this case report that CT device can be used as an aid to periapical and panoramic radiographs in the diagnosis of intrusive permanent teeth. With early endodontic treatment, the formation of ankylosis can be prevented and the patient's psychological, aesthetic and functional effects can be prevented.

### Consent

Informed consent was obtained from the patient. Written informed consent was obtained from the patient before the study.

### Conflicts of Interest

No conflicts of interest related to this paper.



Figure 1. Intraoral view.

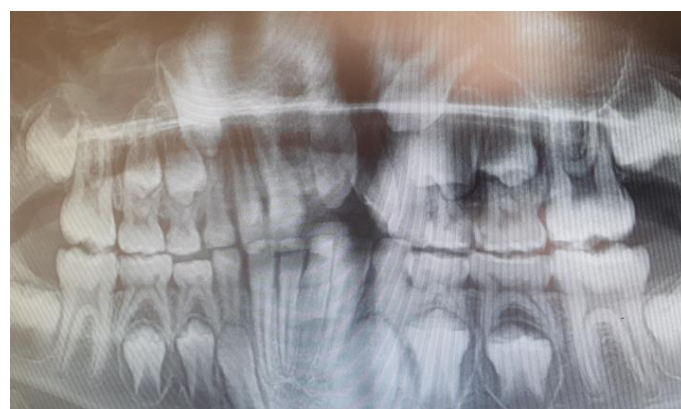


Figure 2. Radiographic Image.

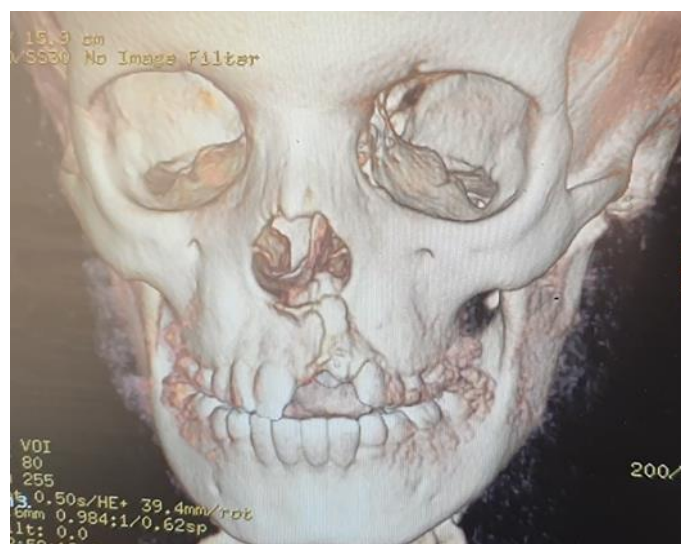


Figure 3.CT Image.



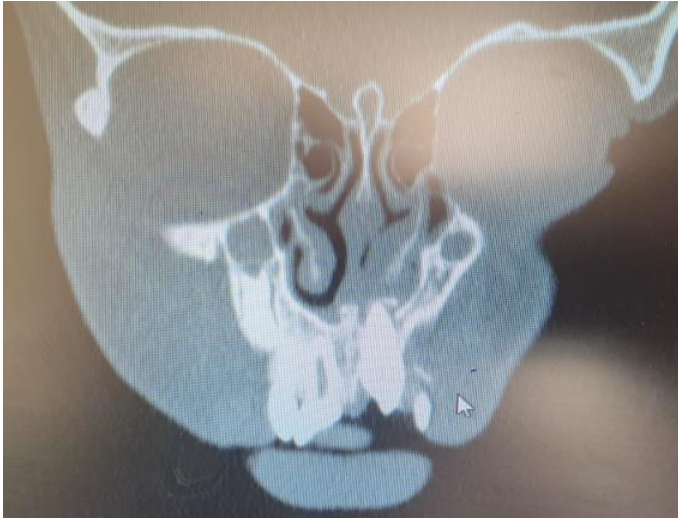


Figure 4. CT Coronal Image.



Figure 5. CT Axial View.



Figure 6. Intraoral view.



Figure 7. Post-treatment image (splint).

### References

1. Diangelis AJ, Bakland LK. Traumatic dental injuries: current treatment concepts. *J Am Dent Assoc.* 1998;129:1401-1414.
2. Çelikten B, Çelikten ZK, Namazoğlu B, Bilici Ö, Maviş AO. İntrüze olmuş daimi kesici dişlerin cerrahi ekstrüzyon ile tedavisi: bir olgu sunumu. *Atatürk Üniversitesi Diş Hekimliği Fakültesi Dergisi*, 2012; 6: 24-29.
3. Andreasen JO, Bakland LK, Matras RC, Andreasen FM. Traumatic intrusion of permanent teeth. Part 1. An epidemiological study of 216 intruded permanent teeth. *Dent Traumatol.* 2006;22(2):83-89.
4. Tüfenkçi P, KurtP, ÇeliktenB, Akkaya N, ÖZDİLER O. İntrüze Olmuş Maksiller Lateral Dişin Ortodontik Ekstrüzyon ile Tedavisi: Olgu Sunumu. *Uluslararası Diş Hekimliği Bilimleri Dergisi*, (1), 35-41.
5. Calasans-Maia, JDA., Calasans-Maia MD, Matta, ENRD, Ruellas ACDO. Orthodontic movement in traumatically intruded teeth: a casereport. *Dental Traumatology*, 2003;19(5), 292-295.
6. Andreasen JO, Bakland LK, Andreasen FM. Traumatic intrusion of permanent teeth. Part 3. A clinical study of the effect of treatment variables such as treatment delay, method of repositioning, type of splint, length of splinting and antibiotics on 140 teeth. *Dent Traumatol* 2006;22:99-111.
7. Rovira-Wilde A, Longridge N, McKernon, S. Management of severe traumatic intrusion in the permanent dentition. *BMJ Case Reports CP*, 2021;14(3), e235676.
8. Faria G, Silva RAB, Júnior MF, Nelson-Filho P. Re-eruption of traumatically intruded mature permanent incisor: case report. *Dental Traumatology*, 2004;20(4), 229-232.
9. Çalışkan MK, Türkün M, Gomel M. Surgical extrusion of crown-root-fractured teeth: a clinical review. *International Endodontic Journal*, 1999;32(2), 146-151.
10. Andreasen FM, Pedersen BV. Prognosis of luxated permanent teeth—the development of pulp necrosis. *Dental Traumatology*, 1985; 1(6), 207-220.
11. Sapir S, Mamber E, Slutzky-Goldberg, I, Fuks ABA novel multidisciplinary approach for the treatment of an intruded immature permanent incisor. *Pediatric Dentistry*, 2004; 26(5), 421-425.
12. DiAngelis AJ, Andreasen JO, Ebeleseder KA, Kenny DJ, Trope M, Sigurdsson A, Tsukiboshi M. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dental Traumatology*, 2012; 28(1), 2-12.
13. Andreasen JO, Andreasen FM, Andersson L. Textbook and color atlas of traumatic injuries to the teeth. 4th edn. Copenhagen: Blackwell, 2007.
14. Yetkiner AA, Dindaroğlu FÇ, Ertuğrul F, Ersin N. Tamamen İntrüze Olmuş Maksiller Lateral Kesici Dişin Cerrahi Yaklaşım ile Yeniden Konumlandırılması: 9 Aylık Takip. *European Annals of Dental Sciences*, 2016; 43, 169-174.