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## Abstract

The injuries to the dentofacial region are one of the most common concerns which brings a patient to the dentist. Intrusive luxation is the form of traumatic injury in which the affected tooth is forced to be displaced deeper into the alveolus. As a consequence, maximum damage occurs to the pulp and all the supporting structures. This is a case report of an intrusive luxation injury in a 35 year old patient and the diagnosis, prognosis and treatment modalities associated with the same.

**Key Words:** Traumatic injury, intrusion, endodontic treatment, orthodontic guided eruption

## INTRODUCTION

Trauma to the oral region comprises of 5% of all injuries for which people seek treatment. In preschool children the figure is as high as 18% of all injuries<sup>1</sup>. Common causes of traumatic injuries to the teeth include the following:

- Direct or indirect trauma.
- Sports accident.
- Automobile accidents.
- Fights and assaults.
- Domestic violence.
- Inappropriate use of teeth.
- Biting hard substances.

Amongst all facial injuries, dental injuries are the most common of which crown fractures and luxations occur most frequently<sup>1</sup>. Trauma to the teeth may result in fracture of the tooth involving the crown or root with/without injury to the pulp or in displacement of the tooth from its socket. When the tooth is displaced into the alveolar bone it is known as intrusive luxation which is seen in 84% cases of all the luxation injuries of the teeth<sup>2</sup>. Common sequelae to the traumatic intrusion are ankylosis (replacement resorption), external root resorption, pulpal necrosis, inflammatory resorption<sup>1,3</sup>.

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**Clinical examination**



**Intraoral Periapical Radiograph**



**Oral Pantamogram**



**Working length determination**



**Master cone insertion**



**Post obturation radiograph**

Historically, suggested treatment methods of intruded Treatment of intruded teeth have been spontaneous re-eruption, immediate surgical repositioning and fixation, orthodontic repositioning, and a combination of surgical and orthodontic therapy<sup>3</sup>.

Andreasen<sup>4,5</sup> and Hollan<sup>6</sup> reported that spontaneous re-eruption was common in the primary dentition and the spontaneous re-eruption of permanent teeth occurred mostly in immature teeth and rarely in teeth with closed apices.

Skieller<sup>7</sup> advocated immediate surgical repositioning, but Andreasen<sup>5</sup> recommended immediate orthodontic traction, because immediate surgical repositioning may increase the possibility of root resorption and ankylosis. Taintor<sup>8</sup>. however, suggested leaving the tooth alone to allow for spontaneous re-eruption. If that failed, eruptive orthodontic force would then be applied.

Endodontic treatment can prevent the necrotic pulp from initiating infection-related root resorption. This treatment should be considered in all cases with completed root formation where the chance of pulp revascularization is unlikely. Endodontic therapy should preferably be initiated within 3-4 weeks post-trauma. According to Proffit et al<sup>9</sup> the ideal timing for orthodontic treatment following endodontic treatment, most recommend waiting 3-6 months for inflammation to subside So, here we shall discuss a case report of intrusive luxation and its management by endodontic therapy followed by orthodontic treatment.

## CASE REPORT

On October 2014, a 45 year old male patient had reported to the Dept. of Conservative Dentistry and Endodontics, Guru Nanak Institute of Dental Sciences and Research with the history of trauma to the anterior region of the mouth due to an automobile accident 2 months back. At present, he complains of pain in the anterior segment of upper arch.

### ON CLINICAL EXAMINATION:

On clinical examination, it was seen that the right maxillary central incisor 11 was present at a higher level than the adjacent left maxillary central incisor. No mobility or tenderness on percussion was observed. On palpating the nasal floor slight elevation was observed on the right side. Vitality test was performed and the result was negative. Patient was advised an Ortho Pantamogram and an Intraoral Periapical Radiograph of 11.

### RADIOGRAPHIC EXAMINATION:

On radiographic examination it was seen that 11 is intruded into the tooth socket (approximately 2mm) and almost touching the floor of the nose. Radiolucency was present in the periapical region of 11. No fracture or any other abnormalities observed in the radiograph.



CBCT pictures of anterior region of mouth



During Orthodontic Treatment



Post Treatment Photograph

### TREATMENT PLANNING:

Root canal treatment of the intruded tooth followed by orthodontic extrusion was advised.

### PROCEDURE:

Rubber dam was placed and conventional access cavity preparation was done. This was followed by working length determination using 15 no K file. Biomechanical preparation till 80 no K file with constant irrigation using sodium hypochlorite (5%). Then canal was dried using sterile paper points followed by radiological evaluation of the master Gutta Percha point. Obturation was done by lateral condensation method followed by post obturation restoration with Light Cure Composite Resin. Patient was advised to come for follow up and CBCT was done which showed an obturated root canal in 11 with no abnormalities associated with the same and adjacent structures. Therefore, patient was referred to department of Orthodontics for continuation of the treatment. The correction of intrusion was done using fixed orthodontic therapy.

### DISCUSSION:

Luxative intrusion is a serious kind of injury of maxillary incisors and such an occurrence is found to be most frequent between 6 and 12 years of age and in 1.9% of traumatic injuries involving permanent teeth<sup>5</sup>. Throughout a 20-year-study period (from 1983 to 2003), no general agreement existed concerning the best treatment for intruded permanent teeth. The strategies for treatments must be planned according to the degree of severity of the injury<sup>5</sup>. The present clinical case showed minor intrusive luxation with 11 (<3mm) with the root tilted distally and intruded into the socket almost touching the floor of the nose and the crown tilted more mesially towards 21. In this case the tooth had a closed apex, non vital and periapical involvement is seen. Endodontic treatment should be considered in all cases with completed root formation where the chance of pulp revascularization is unlikely.

Treatment of a vital tooth before initiation of orthodontic treatment also can be an option where pulp vascularity is questionable. A root canal dressing with a material based on Calcium Hydroxide (Calen) between sessions can be used for alkalinizing the

	<b>Incomplete root development v</b>	<b>Complete root development</b>
Mild (<3mm)	PR	PR after 2- 3 weeks OR
Moderate (3-6mm)	PR	SR or OR
Severe (>6mm)	PR	SR

environment preventing inflammatory root resorption<sup>6</sup>. Cvek reported that its alkaline pH and physical presence inside the root canal represent an effective antibacterial effect by inhibiting osteoclastic activity, avoiding the penetration of granulation tissue and exudate and by forming a hard tissue barrier<sup>6</sup>.

Continuation of treatment in order to bring the tooth back to its pre trauma position was started after one month. Considering the degree of severity of the injury, different clinical modalities for intrusive luxation treatment may be used: passive repositioning, surgical management, and active repositioning by means of orthodontic traction.

▶ If Passive repositioning (PR) not working within 2 - 3 weeks start Orthodontic repositioning (OR).

▶ PR in preference to OR, i.e. not personal preference. If PR not working within 3 weeks start OR.

▶ OR and surgical repositioning (SR) both appropriate, however SR often involves fewer visits<sup>7</sup>.

In teeth with mature root development spontaneous eruption is only recommended for minor intrusion. This treatment seems to lead to fewer healing complications than orthodontic and surgical repositioning. If no movement within a few weeks, initiate orthodontic or surgical repositioning before ankylosis can develop. In this case patient has reported 2 months after the injury and since the tooth has not regained its previous position within this period of time orthodontic treatment is advised.

The main goal of these modalities of treatment is to achieve a guided repositioning of the tooth without the complications related to this injury. In the majority of the cases, the treatment of choice for traumatically intruded permanent teeth with complete root formation should be the orthodontic repositioning rather than the surgical repositioning<sup>4</sup>. This approach will lead to force magnitude (light and continuous) and direction control allowing the desired and precise movement<sup>4</sup>. In this case, orthodontic treatment by the use of fixed orthodontic appliance is being done in order to extrude the tooth.

## CONCLUSION

From this case report it can be concluded that a case of an intrusive luxation with 11 is managed initially with endodontic treatment followed by

orthodontic repositioning of the tooth and kept under long term follow up in order to rule out any complications in future. Knowledge of the type of traumatic injury, its location, clinical and radiographic extent, and post trauma sequelae is extremely important to determine the prognosis for the primary and permanent dentitions. A proper follow up should be maintained to prevent complications like root resorption and ankylosis. It is also suggested that further studies should be conducted over a longer period of time, involving a follow-up of the development and course of sequelae to assess the possible importance of the time elapsed after the trauma in their severity. Such studies should evaluate the sequelae resulting from dental trauma both in the primary and permanent dentitions, so that a better treatment planning and aesthetic enhancement can be ensured.

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