

## Case Report

# Management of multiple intrusive luxative injuries: A case report with 7-year follow-up

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## ABSTRACT

This report presents a case of severe intrusive luxation of multiple anterior teeth in an 11-year-old girl. The teeth were repositioned successfully by endodontic and orthodontic management. The case was monitored for 7 years. Depending on the severity of the injury, different clinical approaches for treatment of intrusive luxation may be used. Despite the variety of treatment modalities, rehabilitation of intruded teeth is always a challenge and a multidisciplinary approach is important to achieve a successful result. In this case, intruded teeth were endodontically treated with multiple calcium hydroxide dressings and repositioned orthodontically. The follow-up of such cases is very important as the repair process after intrusion is complex. After 7 years, no clinical or radiographic pathology was detected.

**Key Words:** Intrusion, management, seven year follow-up

Received: September 2012  
Accepted: May 2013

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## INTRODUCTION

Tooth intrusion is defined as the displacement of a tooth farther into alveolar bone. Luxative intrusion is a serious kind of injury of maxillary incisors and generally affecting 1.9% of traumatic injuries involving permanent teeth.<sup>[1]</sup> Serious damage to the tooth pulp and supporting structures occurs because of the dislocation of tooth into the alveolar process. Thus, the repair process after intrusion is complex.<sup>[2]</sup> Pulp necrosis, external/internal root resorption, loss of marginal bone support, replacement resorption/ankylosis, disturbance in continued root development, partial/total pulp canal obliteration and gingival recession may occur as a consequence of intrusive luxation.<sup>[3]</sup>

The management of intruded permanent tooth may consist of (i) allowing spontaneous re-eruption, (ii) surgical repositioning and fixation, (iii) orthodontic repositioning, and (iv) a combination of surgical and orthodontic therapy.<sup>[1]</sup>

Despite the variety of treatment modalities, rehabilitation of intruded teeth is always a challenge. The present clinical report shows successful treatment of intruded 11, 21 and 22 with a follow-up record upon 7 years.

## CASE REPORT

An 11-year-old girl was referred to the Emergency Ward of Indira Gandhi Medical College, Shimla in the evening, following traumatic injuries to her teeth caused by a fall from the first floor of her house. Her medical history was unremarkable and all her vaccinations were up to date. On examination, there were no signs of neurological or extra oral injuries. Intra-orally, she presented severe intrusive luxation of 11, 21 and 22 (more than 6 mm) and laceration on the lower lip.

At the initial appointment, the intra-oral soft-tissues were cleaned with saline and hydrogen peroxide.

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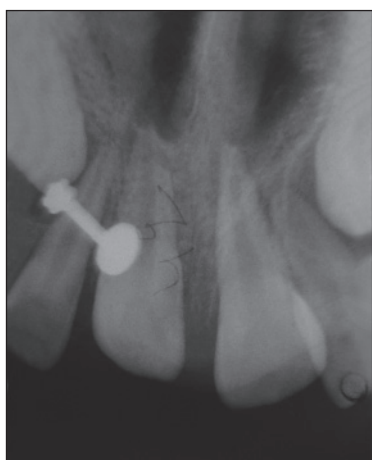
Patient was prescribed antibiotics and analgesics, chlorhexidine mouthwash, oral hygiene instructions were given and soft diet was advised. Sutures were placed on the lower lip laceration and patient was referred to the Department of Pediatric Dentistry.

The intruded teeth showed no mobility. There was no evidence of traumatic injury to any other teeth. The radiographic examination consisted of one panoramic view and two periapical views. Periapical view revealed closed apices of intruded incisors [Figure 1]. The periodontal space surrounding intruded incisors was diminished and no root or bone fracture was detected.

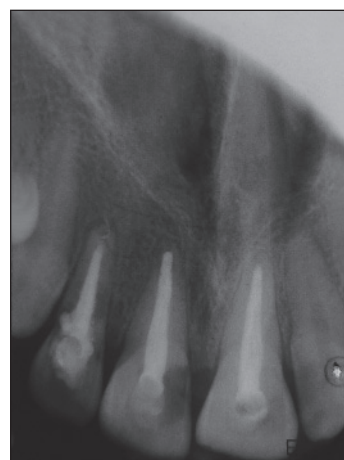
Since the teeth presented with mature apices, prophylactic endodontic treatment was planned. Hence, gingivectomy was performed to gain access to the root canal. The access opening was carried out neither bleeding nor consistent pulp was found during the root canal preparation; thus, the diagnosis of necrotic

pulp of teeth was confirmed. Then, the root canals were filled with calcium hydroxide ( $\text{Ca(OH)}_2$ ) mixed with normal saline and it was decided to allow teeth for spontaneous eruption. At 1 week follow-up, there was no evidence of re-eruption. Subsequent weekly examinations revealed no eruption of the intruded teeth.

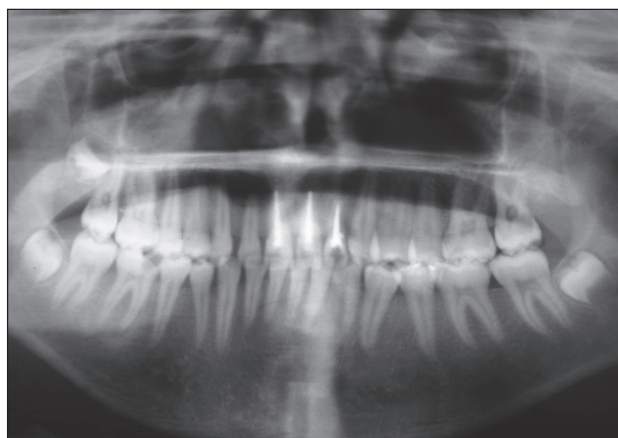
Ten weeks following dental injury, a decision was made to reposition the intruded teeth orthodontically. A fixed multi-bracketed appliance was bonded to the intruded teeth and adjacent teeth. The extrusion was carried out with elastic traction. Twenty six weeks after the start of treatment by orthodontic extrusion, the location of the intruded 11, 21 and 22 were restored to their original position.  $\text{Ca(OH)}_2$  dressing was changed initially after 4 weeks and subsequently after 12 weeks. The teeth were obturated with Gutta-percha after 1 year [Figure 2]. The case was monitored for 7 years and no clinical and radiographic pathology was detected [Figures 3-5].



**Figure 1:** Pre-operative periapical radiograph of intruded 11, 12 and 22 (Patient was unable to remove nose-pin seen in the X-ray)



**Figure 2:** Post-operative periapical radiograph of 11, 12 and 22



**Figure 3:** Panoramic radiograph taken 5 years after the initial trauma



**Figure 4:** Periapical radiograph of 11, 12 and 22 taken 5 years after the initial trauma



**Figure 5:** Periapical radiograph of the same teeth taken 7 years after the initial trauma

## DISCUSSION

The management of traumatically intruded incisors is challenging. Current management strategies range from conservative approach such as allowing for spontaneous re-eruption to invasive methods that include immediate surgical repositioning.

Spontaneous re-eruption may take place in intruded permanent incisors especially in instances where there is immature root formation.<sup>[2]</sup> This conservative approach spares the child from overtreatment and enables periodontal healing.<sup>[3]</sup> However, the treatment has two main disadvantages: periodontal surgery, e.g., gingivectomy may be needed in order to gain access to the root canal while waiting for spontaneous re-eruption to occur; and root resorption or ankylosis may occur during the observational period.<sup>[4]</sup>

Surgical repositioning is inexpensive and provides timely solutions for the management of the teeth that are deeply embedded in the bone.<sup>[5]</sup> However, this method has serious pulpal and periodontal consequences. A significantly large number of instances of marginal bone loss, ankylosis and pulpal inflammatory responses have been demonstrated following surgical repositioning of intruded teeth when compared with the number of these complications that arises from allowing spontaneous re-eruption to occur or performing orthodontic repositioning.<sup>[2]</sup>

Orthodontic extrusion is another option for treating intruded permanent teeth because it allows for remodeling of bone and the periodontal apparatus to occur.<sup>[6]</sup>

Of all the treatment options, it is now evident that both spontaneous re-eruption and orthodontic repositioning

cause the least damage to the surrounding tissues. However, there is no general agreement on when to select the allowance of spontaneous re-eruption or orthodontic repositioning as the treatment.

In this case, the traumatic intrusion of maxillary both central incisors and left lateral incisor was monitored for spontaneous re-eruption for 10 weeks and the position of the teeth remained unchanged. Thereafter, eruptive orthodontic force was applied.

The incidence of pulp necrosis for intruded teeth with open apices was shown to occur between 63% and 100% for teeth with closed apices.<sup>[7]</sup> Endodontic treatment should be carried out 2 weeks after the injury and  $\text{Ca}(\text{OH})_2$  should be placed in the root canal as an interim dressing to prevent the external root resorption. It also helps in periapical healing and when tooth completely re-erupts it should be obturated with Gutta-percha.<sup>[8]</sup>

In this case, prophylactic endodontic treatment was carried out and long-term interim  $\text{Ca}(\text{OH})_2$  dressing was given. A long-term dressing of densely packed  $\text{Ca}(\text{OH})_2$  provides an alkaline pH inside the dentinal tubules to kill the bacteria and neutralize the endotoxins, which are potent inflammatory stimulators, to prevent inflammatory root resorption.<sup>[9]</sup>

The long-term use of  $\text{Ca}(\text{OH})_2$  has some drawbacks. Because the treatment includes repeated clinical sessions to replace  $\text{Ca}(\text{OH})_2$ , it demands high cooperation and motivation from the patient. In addition, the long-term presence of  $\text{Ca}(\text{OH})_2$  in root canal space can increase the brittleness of the root dentin and the risk of future cervical root fractures especially in immature teeth.<sup>[10]</sup> In spite of these disadvantages, it is still the preferred treatment protocol due to its high success rate.

Obturation with Gutta-percha was done after complete eruption of these teeth.

The case was monitored for 7 years and follow-up records showed good results.

## CONCLUSION

Rehabilitation of traumatically intruded teeth is a challenge since the repair process is complex after intrusion. The present clinical report shows a successful multidisciplinary treatment of severe intrusive luxation of multiple anterior teeth of an 11-year-old child. Complete healing was noticed by means of follow-up radiographs throughout 7 years.

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**How to cite this article:** Thakur S, Thakur NS, Gupta R. Management of multiple intrusive luxative injuries: A case report with 7-year follow-up. *Dent Res J* 2014;11:129-32.

**Source of Support:** Nil. **Conflict of Interest:** None declared.