

Combination of Intrusion and Lateral Displacement in a Young Permanent Tooth: A Case Report

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Abstract:- Intrusive luxation is the most severe type of Traumatic Dental Injuries (TDIs) irrespective of its rarity. Significant pulpal and periodontal problems are brought by axial stress. The primary determinants of therapeutic management of tooth includes severity of trauma and the child's age. Given the frequently poor prognosis and unavoidable comorbidities, the treatment is complicated. This paper report a case of intrusive luxation injury of young permanent central incisors in 6 year old patient treated with surgical repositioning, splinting and follow-up.

I. INTRODUCTION

Traumatic Dental Injuries (TDI) are the most severe luxation injuries faced by young children and adolescents with 5 % of all injuries requiring acute dental treatment¹. The various etiological factors for traumatic injuries include accidents, contact sports, falls, and violence².

Intrusion is a type of TDI that involves axial displacement of the tooth towards the alveolar bone. It accounts for 0.5%-2% of all TDIs with peak incidence for permanent dentition between 8 years and 10 years³. It usually affects the anterior teeth resulting in severe damage to periodontal ligament, root cementum, neurovascular bundle and surrounding alveolar bone compromising the long-term prognosis of the affected permanent dentition. These complications include pulp necrosis or obliteration, inflammatory and replacement root resorption and loss of marginal bone support⁴. Even with optimal immediate and long-term management, root resorption can occur in 51%–73% of cases, leaving affected teeth with a guarded long-term prognosis⁵. Therefore, treating the teeth with intrusive luxation injuries is more complex timely management affects the success rate. With this relatively rare injury in combination with other types of luxation injury makes it especially difficult, because of the severe complications accompanying by both types of injuries.

This paper reports a case of intrusive luxation injury highlighting the importance of prompt care and splinting and discussing the several treatments proposed to reposition the intruded tooth.

II. CASE REPORT

A 6 years old female child, accompanied by her mother, consulted at the pediatric dentistry department, with the complaint of severe pain and bleeding gums with loose tooth in upper front tooth region since 2 hours following a fall at home while playing. Patient was taken to the local Primary Healthcare Center where sutures were places in relation to upper labial mucosa and a dose of TT was given. No relevant medical history. On general examination, the patient was conscious without bleeding from nose or ears and well oriented to time, place and person. Extra oral examination revealed a edematous and lacerated wound on the upper lip (figure 1a & 1b). On mouth opening, no pain or deflection or deviation of mandible was noted. On intraoral examination, visual inspection revealed clinical shortening (>5mm from incisal tip of 11) & rotated tooth irt 21 with profuse bleeding from gingival sulcus of maxillary central incisors (fig 2) . On palpation, grade III mobility noted irt 21 and grade 1 mobility irt 11 without any signs of bone fracture (step deformity) or condylar displacement. On percussion of the 21 a metallic sound was found which is the pathognomonic sign of an intrusive luxation. On radiographic analysis revealed that the 11 and the 21 were immature (Nolla's stage 8 classification) with no associated root or bone fractures and absence of any foreign bodies in the upper/ lower lip. Rotated teeth can be observed irt 21 and CEJ was observed above crest of alveolar confirming the intrusive luxation injury (fig 3). Therefore, the diagnosis made was intrusive luxation injury with distolingual rotation irt 21 and lateral luxation injury irt 11.

➤ Treatment Objectives Include:

- Reassuring the child and patient
- Repositioning of central incisors (digital repositioning and splinting)
- Management of pre and post op infection (Antibiotics and analgesics)
- Advising home care and oral hygiene

The patient and the parents were reassured, the treatment procedure and possible complications were explained. The management of the case includes gentle clean of the wound with betadine dipped cotton to remove blood clots, dirt or debris on the affected and adjacent teeth and gentle irrigation with betanine to disinfect the injured soft and

hard tissues. Repositioning was done with gentle digital pressure irt 21 to a relative incisal position of 11 followed by splinting with ligature wire and composite from 53 to 63 (fig 4) and intraoral radiograph taken (fig 5a & 5b). Patient was prescribed antibiotics and analgesics, chlorhexidine mouthwash and home oral care and hygiene instructions were given.

At initial follow-up after 1 week, on extraoral examination there was reduction in swelling of upper lip (fig 6), reduced mobility of upper central incisors, splinting was stable in position and better compliance from the child during examination. Patient recalled after 4 weeks for splint removal and the teeth exhibited no mobility and complete soft tissue healing irt 11 & 21 (fig 7 & 8). Intraoral radiograph revealed no periapical lesion or resorption of roots or any pathological signs (fig 9).

III. DISCUSSION

Intrusive luxation is one of the most severe types of dental trauma that is often associated with significant damage to the periodontal ligament fibers, alveolar bone, and rupture of neurovascular supply to the pulp⁶. The healing and prognosis of intruded teeth depend on several factors. Currently, the severity of intrusion was reported as the most important factor in determining the survival of the pulp followed by the degree of root development. Andreassen observed 100.0% of pulp necrosis in intruded teeth with open apices and 62.5% in teeth with incomplete root formation².

Current management strategies vary from conservative approach such as allowing for spontaneous re-eruption to orthodontic and immediate surgical repositioning. The choice of treatment depends on the degree of intrusion and the degree of root development. For moderate intrusions between 3 and 6 mm, surgical or orthodontic re-positioning is recommended, and for severe intrusion (greater than 6 mm), surgical re-positioning is recommended⁷. To provide evidence-based treatment, certain pre-traumatic and trauma factors must be incorporated to choose treatment alternatives.

In the present case, >5 mm relative intrusion with malposition was seen irt 21. The ideal treatment option for a traumatically intruded immature incisor remains indeed controversial⁸. Tooth with immature root formation has potential to spontaneously re-erupt because of their high potential for eruption. This treatment appears to have the best prognosis in comparison to active repositioning (orthodontic and surgical repositioning) for marginal bone defects and pulpal changes⁹. Findings of a study by Kinirons and Sutcliffe Surgical extrusion of teeth has been strongly opposed by some authors because it may increase the risk of external root resorption, sequestration and loss of marginal bone support. On the contrary, other studies indicated that full surgical repositioning of severely intruded teeth was not associated with an increased experience of root resorption or marginal sequestration of bone.

However, considering the extension of intrusion and position of tooth IRT to alveolar socket, digital repositioning

of 21 with reference to 11. This will relieve the severed and stretched periodontal fibers caused by rotation and further reduce the need for future orthodontic treatment. According to Andreassen it is naturally assumed that correct repositioning of a displaced tooth may be a prerequisite to fast and optimal healing. good repositioning resulted in more favorable healing, with more hard tissue healing and less pulp necrosis. But slightly inaccurate repositioning resulted in approximately 1 week's delay of revascularize².

Various materials are available for splinting tooth which includes composite and wire splints/ finishing line splints, orthodontic wire and bracket splints, fibre splints, arch bar splints, wire ligature splints, composite splints and recently titanium trauma splints¹⁰. rigid splints reported with significant variable for loss of alveolar bone, high risk of cervical root fracture and replacement resorption. Traumatology (IADT) guidelines recommend splinting types that are flexible rather than rigid for traumatic tooth immobilization, many authors suggest semirigid or flexible splint for splinting traumatized teeth. According to IADT protocol 2020, the followup protocol for intruded teeth is 4 weeks¹¹. In a further study Berthold et al. found that the wire length influences rigidity and these authors recommended splinting only one uninjured tooth bilaterally. Therefore in the present case ligature wire and composite was used to splint from uninjured 53 to 63 bilaterally^{10,11}.

Role of antibiotics has been controversial. According to IADT guidelines (2020) there is little proof that antibiotics improve the prognosis for teeth with fractured roots along with little support for the use of systemic antibiotics in the emergency treatment of luxation injuries. Since TDIs frequently result in soft tissue and other related damage that may need for additional surgical intervention. Additionally, poor oral hygiene and plaque accumulation harbors bacteria which further complicates healing when seeded into the socket during TDIs. Antibiotic coverage may be warranted according to the patient's medical condition.

At the end of 4 weeks, patient reported with signs of healing clinically and radiographically and complete reduced mobility at the end of 1 month. Patient was also a case of anterior open bite with history of thumb sucking and mouth breathing, posterior crossbite and multiple carious teeth irt upper and lower posterior teeth which would be followed up for the further treatment.

IV. CONCLUSION

The complexity of the repair process following intrusion requires emergency treatment and timely management. Clinical approaches for the treatment of TDIs should be tailored individually depending on the severity and combination of injuries. Follow-up of immature tooth affected by dental injuries until the complete eruption and root completion is recommended to observe any signs of resorption or pulp necrosis which further needs prompt treatment to save the tooth. Regular follow-up and keen observation of dentist is important for long term success of teeth survived luxation injuries.



Fig 1: Pre OP Extraoral

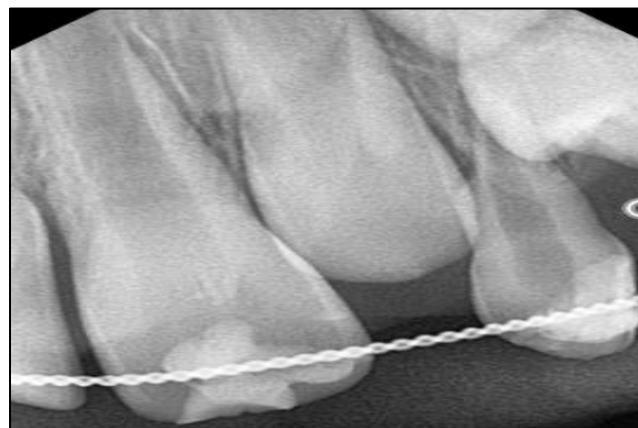


Fig 5(a): Radiograph Showing Splinting



Fig 2: Preop Extraoral



Fig 5(b): Radiograph Showing Splinting



Fig 3: Preop Radiograph



Fig 6: Post OP Extra Oral



Fig 4: Ligature Wire and Composite Splinting



Fig 7: Post OP Maxillary Arch



Fig 8: Post OP Maxillary Arch



Fig 9: Post OP Radiograph (Figure 9)

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