Multidisciplinary approach of rehabilitation of intruded permanent central incisor: A case report

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Abstract
Intrusive luxation of permanent mature teeth is one of the most serious injuries to the periodontal ligament in dental traumatology. Intrusive luxation of permanent mature teeth is one of the most serious injuries to the periodontal ligament in dental traumatology.
Intrusive luxation of mature permanent teeth is one of the most serious injuries as it involves soft tissue as well as periodontium. Various treatment modalities are practiced depending on amount of intrusion and tooth response to treatment. The damage caused by trauma to the surrounding soft and hard tissue results in a multitude of complications during the treatment planning. This case report presents careful repositioning of the intruded tooth by removable orthodontic means, periodontal treatment including crown lengthening and prosthodontic rehabilitation including fixed prosthesis to provide the most acceptable aesthetic outcome. The present report emphasizes the importance of a multidisciplinary approach to provide complete rehabilitation of a traumatically intruded permanent tooth.

Keywords: Intruded, Rehabilitation, Luxation, Traumatology.

Introduction
According to Snawder et al intrusion is defined as the axial dislodgment of a tooth into its socket. It is considered as one of the most severe types of dental trauma, and leads to crushing of periodontal ligament (PDL) fibres, the neurovascular bundle and alveolar bone. Intrusive luxation is more common in primary dentition as compared to permanent dentition i.e 2%.[1] Intrusion causes multitude of complications because it damages soft and hard tissues. Large amount of impact force causes laceration to soft tissue and trauma to supporting structures. Intrusive luxation causes apical displacement of tooth in alveolar bone severing gingival fibres along with comminuted fracture of alveolar bone.[2] The International association of Dental Traumatology proposed certain guidelines for the treatment of traumatic dental injuries which is best current evidence based on literature and group discussions.[3] In a study by Bucher et al, it was found that cases treated without these guidelines show less favorable outcome and more failure rates.[4]

When treating dental trauma, the time lapse between starting the care is of prime importance. Proper understanding of diagnosis and treatment planning is critical in early phase of treatment. This type of injury requires multidisciplinary approach as it involves pathology of inflammatory root resorption, tooth ankylosis, pulp canal calcification etc. Proper management of dental trauma is most often a multidisciplinary approach with general dentists, oral surgeons on the front line of the emergency service, and endodontic specialists joining the effort to preserve the tooth with respect to the pulp, pulpal space and root. So, prior discussion with other specialities and combined efforts from other departments ensures that the patient receives the most efficient and effective care.

This case report describes the multidisciplinary approach of rehabilitation of mature permanent central incisor with intrusion.

Case Report
A 12-year-old male patient reported in the Department with chief complaint of intrusion and fracture of permanent central incisor. On clinical examination it was found that intrusion was severe and tooth length was non-restorable. Radiographic examination was also carried out to conclude the degree of intrusion. Based on clinical and radiographic examination treatment plan was decided as endodontic therapy as early as possible followed by repositioning of tooth by orthodontic extrusion with the help of removable appliance and then after follow up restoration of patient's smile by all ceramic fixed partial denture (FPD).

Patient was referred to the Department of Endodontics and Orthodontics for root canal treatment and orthodontic extrusion. Endodontic therapy was carried out in central incisor by debridement of root canal, biomechanical preparation and obturated with guttapercha points followed by composite build-up to increase in length of tooth. Follow up intraoral periapical views were taken to ensure periapical bone healing. After 3 months of endodontic treatment when sufficient healing was observed in periapical region orthodontic extrusion was started with the help of removable appliance. Anchorage was achieved with the help of buttons in mandibular central incisors. Approximately 3 months after the initiation of orthodontic treatment extrusion of the tooth was completed (Fig. 1).

After orthodontic treatment, periodontal crown lengthening procedure was done with the help of laser (Waterlase, Biolase) because laser is less invasive procedure (Fig. 2). Central incisor was then prepared for all-ceramic crown (Fig. 3) and temporization was done (Fig. 4). All-ceramic zirconia crown (Cercon, Dentsply) was then cemented with glass ionomer cement according to manufacturer instructions (Fig. 5). Patient was instructed for follow-up visits. Patient was satisfied with the esthetics.

Fig. 1: Central incisor after orthodontic extrusion

Fig. 2: Crown lengthening of central incisor with laser

Fig. 3: All-ceramic preparation of central incisor

Fig. 4: Temporization of central incisor after preparation

Fig. 5: All-ceramic zirconia fixed prosthesis cemented

Discussion

The necessity for an interdisciplinary approach as the treatment protocol of traumatic anterior tooth injury has been justified in the literature since along time. It is also clear from this case that without cooperation of each other the treatment of such cases is difficult. Finn stated that intruded tooth is firmly driven into the socket that can lead to pulpal death by severing the blood supply to the tooth which leads to cessation of root formation. In contrast Skiller[5] has found that teeth with incomplete closure of root apices have more chances to retain their vitality due to better reparative capacity of the pulp.

Treatment of choice includes passive re-eruption especially when apex of tooth is incomplete or when tooth is intruded in socket less than 3 mm. Re-eruption occurs frequently when dental pulp is vital and it is difficult when pulp is necrotic.[6] Many authors suggested orthodontic extrusion because it is considered to be a biological phenomenon and it also allows access for endodontic treatment[7,8] while others disagreed with orthodontic extrusion as it involves complications of increased risk of external root resorption. The choice between surgical repositioning and orthodontic repositioning remains a controversial topic. In presented case as described earlier, patient reported with coronal part fractured and severely intruded tooth. Andreasen et al[9] advocated use of surgical repositioning of moderate to severe intruded tooth with complete root formation while International Association of Dental Traumatology[10] recommended orthodontic repositioning for immature teeth in case passive eruption is not evident after 3 weeks.

Andreasen and Vestergaard[11] suggested that extrusion could be done by either fixed or removable appliance. Removable appliance causes extrusion slow as compared to fixed appliance. According to Evelyn K Mamber[12] major disadvantage of removable appliance includes poor patient compliance. Poor patient compliance leads to slow extrusion of tooth. Bracket placement was very difficult in presented case as tooth was fractured therefore we used removable appliance for orthodontic extrusion of teeth.

In this patient even after orthodontic extrusion and composite build up crown length was not sufficient to gain

retention for fixed prosthesis so crown lengthening procedure was carried out with laser. Laser was used instead of conventional scalpel technique because it is less invasive and fast healing is achieved. All-ceramic crown was prescribed for patient as it is more conservative and esthetically more pleasing. So a systematic approach should be employed to restore function and esthetics of intruded tooth.

Conflict of Interest: None.

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