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Original Research Paper

Replacement Resorption, An Unavoidable Complication Even if Properly Managed – A Case Report

Dental Science

KEYWORDS :

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ABSTRACT

This case report presents a case of multiple luxation and fracture injuries of anterior teeth in a 10 year old girl. The teeth were endodontically treated and orthodontically repositioned successfully using a two-by-four appliance. The case was followed-up for a period of 4 years. By the end of 4 years, replacement resorption was noticed in relation to 21. The crown structure which was left out was extracted and a temporary removable partial denture was fabricated. In future after cessation of growth it can be replaced with a fixed partial denture or an implant. Until then the patient is satisfied with the esthetic result.

Introduction

Traumatic injuries of the maxillary anterior teeth, especially the permanent dentition, have a psychological impact on both the parents and the child as untreated fractured teeth has been directly related to the emotional state and appearance.[1,2] Dental trauma can result in a number of injuries involving the tooth and the supporting structures. Six types of luxation and seven types of tooth fracture have been described and are used to classify traumatic dental injuries.[3]

Luxation injuries are very complex wounds involving disruption of the marginal gingival seal, alveolar bone, periodontal ligament fibers, cementum, and the neurovascular supply to the pulp leading to damage of alveolar structures.[4,5] If severe, the complicating sequelae may result in root resorption.[6] Although the exact mechanisms responsible for root resorption are not fully understood, dental trauma is considered as the major potential predisposing factor.[7,8,9] Replacement resorption develops depending on both the degree of damage to the periodontium at the time of injury, and the extent to which the viability of the periodontal ligament cells remaining on the root surface are maintained.[10] In children, replacement resorption leads to loss of ankylosed teeth usually within 1-5 years. In adults, replacement resorption occurs more slowly, often allowing the tooth to function for many years.[6]

This is such a case report where even though we managed multiple luxation injuries following traumatic accident by endodontic and orthodontic measures, the prognosis remained to be poor.

Case report

A 10-year old girl reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of pain and irregularly placed upper front teeth. Patient also gave a history of road traffic accident one day back which has been managed for that time by a nearby general dentist by interdental splinting. Clinical examination revealed multiple traumatic injuries involving the 4 maxillary anterior teeth and were found to be severely luxated. 11 and 21 were laterally luxated and intrusion was severe in 22 and mild in 12. Intra-oral examination revealed Ellis class III fracture in 21 and Ellis class II fracture in 11 and 22. Gingival and supporting tissues were all severed and found to be swollen due to accidental trauma during splinting. Grade II mobility was noticed in relation to 11 and 21 and Grade III mobility in 22.

An interdisciplinary approach was planned considering all the complex injuries and prognosis. The phases of treatment are as follows:

- Endodontic phase (root canal treatment (RCT) of 11, 12)
- Orthodontic phase (repositioning of misaligned teeth)

In the first visit, all interdental wiring were removed and were thoroughly debrided. A flexible composite splint was fabricated to stabilize the teeth. Since 11 and 21 showed negative response for pulp vitality testing using an electric pulp tester, we proceeded with endodontic phase of treatment where RCT was carried out in 11, 21. This was followed by several phases of orthodontic treatment with a two-by-four appliance where 0-12 NiTi (Nickel-Titanium) wire was used. After attaining proper alignment of all teeth, the NiTi wire was replaced with 0-14 stainless steel round wire for 2 months. During the maintenance phase, a palatal retainer was placed to prevent relapse and was followed up every 6months. Radiographs were taken after the completion of orthodontic phase which showed no pathological changes in any of the treated teeth. During the 1st follow-up after 6months there were signs of root resorption in relation to 21. By the end of 2 year follow-up, marked resorptive changes were appreciated suggesting the progression of replacement resorption. During the 4th year follow-up, entire root was found to be resorbed and replaced with alveolar bone, whereas only crown structure was found to be hanging on to the gingiva. Hence a removable partial denture was planned until skeletal maturation gets completed.

Discussion:

Dental trauma is relatively common and can occur secondary to falls, fights, sporting injuries, or motor vehicle accidents.[11] A review of the literature shows that 25% of all schoolchildren experience dental trauma and 33% of adults have experienced trauma to the permanent dentition with the majority of injuries occurring before the age of 19 years. [12]

Splinting of teeth, with the most desirable flexible splint, is often necessary for teeth with luxation injuries to stabilize them in position, and to assist in periodontal and pulpal healing.[13,14] This is the reason for replacing interdental wire splinting with flexible composite splint thereby reducing trauma to the periodontium.

Luxation injuries result in a much higher incidence of pulp necrosis than injuries involving fracture of the teeth. The

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risk of pulp necrosis increased with the extent of the injury and teeth with completed root formation demonstrate a greater risk of pulp necrosis than teeth with incomplete root formation.[15] As the teeth showed negative response to pulp vitality test we proceeded with endodontic management of these teeth.

Manual repositioning of luxated teeth involves a great force producing a secondary trauma to the already traumatized tooth, causing further damage jeopardizing the vitality of the teeth. Gradual repositioning with fixed orthodontic appliance is a less traumatic alternative that may safeguard tooth vitality, prevent ankylosis and encourage periodontal healing, especially in a healthy growing child.[16] Hence the teeth were realigned using two-by-four appliance.

Bonded retainers are commonly used after orthodontic repositioning. Patients with fixed retention show consistently better alignment at 5 and 10 years post-treatment than those patients without fixed retention.[17] Hence to maintain alignment a fixed palatal retainer was placed.

When extensive damage occurs to the innermost layer of the periodontal ligament, competitive healing events take place. Healing from the socket wall and from adjacent periodontal ligament occurs simultaneously. While appropriate endodontic therapy is effective in the treatment of external inflammatory resorption, replacement resorption cannot be arrested or repaired.[18] Since the damage to the periodontium was extensive due to trauma replacement resorption was appreciated by the end of 2 years which further progressed without a definitive treatment.

Though a removable partial denture was a temporary solution for the esthetic concern, later this could be replaced by an implant or fixed partial denture. Currently the child is satisfied with her temporary aesthetic appearance.

References:

1. Taiwo, O. O. and Jalo, H. P. (2011), Dental Injuries in 12-year Old Nigerian students. Dent Traumatol 2011;27: 230–234.
2. Jain V, Gupta R, Duggal R, Parkash H. Restoration of traumatized anterior teeth by interdisciplinary approach: Report of three cases. J Indian Soc Pedod Prev Dent 2005;23:193-7.
3. Ülkü Sermet Elbay,Mesut Elbay,Emine Kaya,Alper Sinanoglu. Management of an Intruded Tooth and Adjacent Tooth Showing External Resorption as a Late Complication of Dental Injury: Three-Year Follow-Up. Case Reports in Dentistry 2015;2015(6)1.
4. J. O. Andreasen, F. M. Andreasen, and L. Andersson, Textbook and Color Atlas of Traumatic Injuries to the Teeth, Blackwell, Oxford, UK, 4th edition, 2007.
5. A.W. K. Chan, G. S. P. Cheung, and M. W. M. Ho. Different treatment outcomes of two intruded permanent incisors—a case report. Dent Traumatol 2001;17(6):275–280.
6. Finucane D, KinironsMJ. External in£ammatory and replacement resorption of luxated, and avulsed replanted permanent incisors: a review and case presentation. DentTraumatol 2003;19:170-4.
7. Gold SI, Hasselgren G. Peripheral inflammatory root resorption. A review of the literature with case reports. J Clin Periodontol 1992;19:523-534.
8. Heithersay GS. Invasive cervical resorption: an analysis of potential predisposing factors. Quintessence Int 1999;30:83-95.
9. Adriana J. Soares, Gustavo A. Souza, Andrea C. Pereira, Julio Vargas-Neto, Alexandre A. Zaia, and Emmanuel J. N. L. Silva. Frequency of root resorption following trauma to permanent teeth. Journal of Oral Science 2015;57:73-78.
10. Trope M, Yesiloy C, Koren L, Moshonov J, Friedman S. Effect of different endodontic treatment protocols on periodontal repair and root resorption of replanted dog teeth. J Endod 1992;18:492-6.
11. Wolff, J., Sándor, G. K., Forouzanfar, T., Schulten, E. A. J. M. and Oikarinen, K. S. A 22-year follow-up of an endodontic implant. Dent Traumatol 2015;31:409–412.
12. Glendor U. Epidemiology of traumatic dental injuries – a 12 year review of the literature. Dent Traumatol 2008;24:603–11.
13. Oikarinen K, Andreasen JO, Andreasen FM. Rigidity of various fixation methods used as dental splints. Endod Dent Traumatol 1992;8:113-119.
14. McDonald N, Strassler HE. Evaluation for tooth stabilization and treatment of traumatized teeth. Dent Clin North Am 1999;43:135-149.
15. Moule, A. and Moule, C. The endodontic management of traumatized permanent anterior teeth: a review. Aust Dent J 2007;52: S122–S137.
16. Fouad-Hassan Ebrahim, Gajanan Kulkarni. Fixed Orthodontic Appliances in the Management of Severe Dental Trauma in Mixed Dentition: A Case Report. J Can Dent Assoc 2013;79:d131
17. Asli Baysala, Tancan Uysala, Nisa Gula, Melike Busra Alana, Sabri Ilhan Ramoglu. Comparison of three different orthodontic wires for bonded lingual retainer fabrication. Korean J Orthod 2012;42(1):39-46.
18. Finucane, D. and Kinirons, M. J. External inflammatory and replacement resorption of luxated, and avulsed replanted permanent incisors: a review and case presentation. Dent Traumatol 2003;19:170–174.