Case Report

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Treatment of Complicated Crown Root Fracture by Means of Surgical Extrusion – A Case Report.

Abstract:

This report is about a case involving surgical extrusion technique as a possible strategy of action for a fracturedupper incisor. A 13 year old male patient reported to our department with fractured right maxillary central incisor. As a result of a traumatic injury, the tooth was fractured. Root canal treatment was donebefore the surgically extruding the tooth.Atraumatic surgical extrusion of the tooth was performed by gently luxating and extruding to the desired position, minimizing damage to the marginal alveolar bone. A semi-rigid splinting was done for 2 weeks and final restoration placed after 6 weeks. On three months follow up, no postoperative issues were noted.

Key-words: Surgical extrusion, Biological width, Crown lengthening, Crown-root ratio, Crown root fracture

Introduction:

Anteriorteeth fractures are the most common type of traumatic injury to dental tissuedue to the position and prominence of the dental arch[1]. The majority of dental injuries affects the maxillary incisors and often happens during the first two decades of life. Enamel, dentine, and pulp are all affected by complicated crown fractures, which account for 2% to 13% of all dental injuries[2].Crown–root fractures (CRFs) are commonly encountered in the dentist's daily practice. It involves the enamel, dentin and cementum. CRFs are divided into simple and complicated ones based on the degree of pulpal involvement. These fractures account for 5% of all damage to permanent teeth[1].

Young patients who suffer from trauma and an incisor fracture may endure an awful scenario and experience psychological consequences. Periodontal and restorative issues arise when a tooth fractures or extensive caries develops at or below the level of the crestal bone. Such broken teeth were often ruled beyond repair and removed. When a tooth is extracted, the alveolar bone eventually resorbs, making it challenging to restore aesthetically with an artificial replacement. Because the ultimate goal is to preserve the tooth, alternative treatment methods including surgical or orthodontic crown lengthening should be taken into consideration before extraction [3].

Although various methods are proposed for increasing clinical crown length to offer favourable conditions for restoration of severely mutilated teeth, all of them have significant esthetic drawbacks[4].

According to the definition of surgical extrusion (SE), it is the process in which the remaining tooth structure is moved to a more coronal/supra-gingival location within the same socket

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in which the tooth was initially situated.In order to achieve the restoration of healthy coronal tooth structure and to be able to do a successful restoration that will keep a healthy biologic width, the damaged tooth should be moved into a more coronal position. Thus, severely mutilated teeth can be successfully treated with this procedure, especially those in the anterior aesthetic zone [4].

In this case report, surgical extrusion was used to treat a crown-root fracture of a maxillary anterior tooth.

Case report:

A 13 year old, healthy, male patient came with a complaint of fractured upper front tooth. The patient fell down the ground while playing with his friends and had fractured his upper front teeth one day before. The fractured part of the tooth was mobile and was painful while touching the mobile portion. There was no history of unconsciousness and vomiting following the injury. On clinical examination, there was oblique fracture of 11 involving pulp. The fracture line on 11 was visible labially and palatally, which runs obliquely from distal to mesial direction extending subgingivally. Radiographic examination showed no signs of periapica pathology and it revealed a fully formed apex of the teeth concerned.

After clinical examination, treatment plan included endodontic treatment of 11, surgical extrusion, followed by splinting for 2 weeks, followed by fibre post and core build up and full coverage restoration.

Root canal treatment (RCT) was performed before surgical extrusion. The root canal was obturated with gutta-percha by lateral condensation method and sealed the coronal portion. After 1 week, the surgical extrusion procedure was initiated.

Initially, area of operation was disinfected using betadine, after which, administration of local anesthesia with 2% of lignocaine. Tooth luxation was carried out by elevator. To prevent harm to the periodontal ligament, luxation pressures were only applied to the first 4 mm of the root structure. Extrusion of the tooth to the required position was carried out carefully using root forceps. The fractured margin is situated 3 mm from the alveolar crest, and adequate crown root ratio is preserved. A semi-rigid splinting done using ligature wire stabilized with composite for 2 weeks. The patient was instructed to mouth rinse with 0.2% of chlorhexidine for 2 weeks. After 2 weeks, splinting was removed. The mobility of the extruded tooth was clinically acceptable six weeks later.. A fiber post was placed and was cemented in place with a dual core composite resin and core build-up material to rebuild the lost coronal tooth structure.

Discussion:

The position of the fracture line, the projected crown-root ratio, the patient's age, personal preferences, and overall health should all be taken into consideration while evaluating the various treatment modalities for complicated CRF.

According to the fundamental rule of biologic width, there should be 2–3 millimetres (mm) or more of tooth between the margin of the final restoration and the bone. Restorative techniques that invade biologic width may cause periodontal loss [4]. For clinical crown lengthening procedures, various approaches have been suggested, including gingivectomy, an apically positioned flap, and orthodontic extrusion, notably in anterior aesthetic regions [1]. To get a desirable final aesthetic result, the gingival margin and interdental papilla must be preserved [4].

SE is the separation of the bone-root periodontal attachment using surgical tools such as elevators, forceps, scalpels and periotomes in order to move the tooth into a more coronal position and obtain supragingival sound structure so that a proper, long-term final restoration can be performed without endangering the periodontal tissues or encroaching biologic width. [4]. Crown-root fractures, cervical root resorption, significant radicular perforations in the cervical third of the root, subgingival caries and incompatible prosthetic preparations that violate the supracrestal insertion tissue are all indications for this procedure. The method suggested in the current case report was straightforward. It was performed utilisingluxation and partial tooth extraction, without exposing the apex of the tooth or bone transplants for stabilization [1,5].

This procedure resembles an extrusive luxation. The International Association of Dental Traumatology's 2020 recommendations state that a passive, flexible splint should be retained for two weeks to stabilise the tooth. [6].

Due to dehydration and eventual necrosis of the PDL cells, there is a risk of inflammatory or replacement root resorption. The viable cells on the root surface have a more significant effect on PDL reattachment than the alveolar socket wall does. The roots in the current case never got out of the alveolar sockets [7].

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Compared to orthodontic extrusion, the surgical extrusion technique has fewer steps and a shorter overall treatment time. It is also less expensive and easier to perform than traditional crown lengthening techniques. Patient recovery is also not difficult, and long-term patient cooperation is not important. Root fracture during the extrusion operation, marginal bone loss, tooth loss due to poor periodontal attachment, an insufficient crown-root ratio or superficial root resorptions are all potential adverse effects linked to the method described in the current case report. Patient acceptability, difficulty in temporising the tooth, poor dental hygiene on the part of the patient, and control of hemorrhage when an adhesive splint is used are some additional drawbacks of this method [4,8,9].

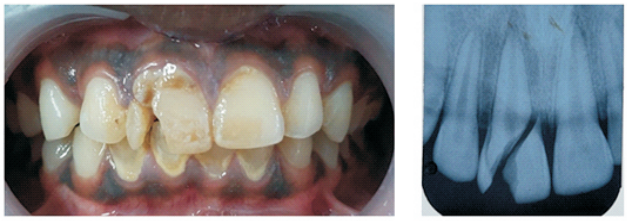

Fig 1: Preoperative clinical photograph and periapical radiograph showing crown root fracture of 11

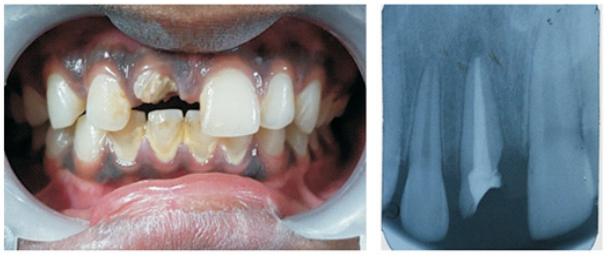

Fig 2: Clinical photograph and radiograph before extrusion

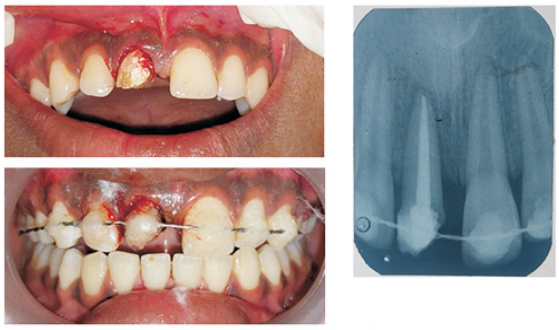

Fig 3: Photographs and radiograph after extrusion

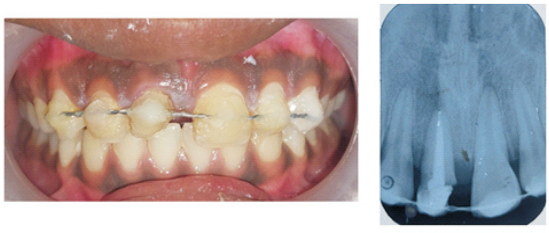

Fig 4: Photograph and radiograph 2 weeks after splinting

Conclusion:

The restoration of a tooth with a gingival or subgingival fracture is possible with a variety of approaches. The upholding of the biologic width is a crucial factor that the practitioner must consider. The clinician's preference and a number of tooth-related factors, however, influence the treatment option. The technique of surgical extrusion is one of the best choices when the crown lengthening is necessary in the esthetic areasfor a single tooth, provided the tooth has favorable root length and taper. A minimally traumatic, controlled surgical extrusion technique is easy and simple to perform and also produces excellent results in both esthetics and functions, particularly in the anterior region.

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