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Management of Fractured Lateral Incisor by Surgical Extrusion and its Prosthetic Rehabilitation- A Case Report

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Abstract:- The aim of this case report is to describe a treatment option for the fractured anterior teeth by surgical extrusion. A 22 year male reported to the department with trauma to his anterior teeth for esthetics and functional rehabilitation. Surgical extrusion followed by root canal treatment followed by prosthetic rehabilitation was planned for the patient. No complication were recorded for 6 months follow up.

Keywords:- *Trauma, Extrusion, Rehabilitation, Fracture.*

I. INTRODUCTION

Dental traumas are on rise in adolescents, athelets, children or in young active individuals due to involvement in contact sports, increased accidents, domestic fights and falls.[1] Anterior teeth fractures are the most common type of dental trauma due to its position and prominence in the arch. [2, 3]. 89% fractures occur in maxilla and 75% occur in maxillary central incisors.[4] .Incidence of fracture in enamel and dentin involving pulp is 4.6%.[1] The common causes of traumatic injuries to the teeth include the following-Sports accidents, automobile accidents, fights and assaults, Domestic violence, Biting hard items.[1]

Various treatment modalities are available depending on the location of fracture.[5] Teeth fractured at or below the gingival level are often diagnosed as unrestorable. Dentist should aim not only at meticulous replacement of what is missing but also perpetual preservation of what is present. One must try to retain the natural teeth in the era of dental implants. [2]

The clinical crown lengthening procedure is performed to increase sufficient sound tooth structure for a subsequent prosthetic rehabilitation.[6] The goal of the procedure is not only to improve the retention of restorations but also to place the margin of restorations without violating the biologic width and to improve aesthetics in patients with an uneven gingival margin and excessive gingival display.[7] The techniques to accomplish crown lengthening include the apically positioned flap procedure with bone resection and forced tooth eruption with or without fibrotomy.[8] A conventional crown lengthening procedure includes resective osseous surgery and removes a large amount of supportive periodontal tissue, including gingiva and underlying bone, around the injured teeth to obtain a biologic width, which compromises aesthetics and function.[9] When osseous surgery is performed to reconstruct the positive architecture around a single-rooted anterior tooth, the stability of treated dentition may be affected and interdental papillae is mostly lost.[10] Orthodontic forced eruption is one of the treatment of cervical root fractures.[2] When applied orthodontic force is moderate, the entire attachment apparatus will follow the fractured tooth as it is moved coronally, so that it does not lead to elongation of the clinical crown or loss of supportive tissues.[11] However, this procedure is complicated, with the time for treatment varying from 4 to 8 months and an additional surgical correction of both the gingival and the bone margin to complete the treatment in most cases .[12] Treated teeth always require a period of stabilization to prevent them from relapsing to the original position.[10]

II. CASE DESCRIPTION

A 22 year old male patient reported to the department with history of trauma a year back. Patient presented with fractured upper left central and lateral incisor due to trauma. On Clinical examination the supragingival tooth structure required for long lasting restoration was minimal for maxillary upper left lateral incisor and adequate for central incisor (Fig No. 1). Radiographically presence of healthy periodontium with pulpal exposure was seen with 22 (Fig No. 2).

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Fig No. 1 Clinical scenario before treatment

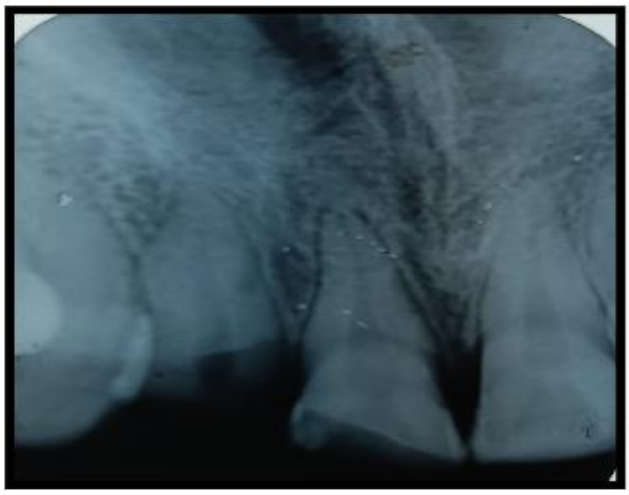

Fig No. 2 Preoperative radiograph

Electronic pulp testing and cold test was done to evaluate the vitality of the teeth, no response was recorded suggestive of nonvital teeth with 21 and 22. Surgical tooth extrusion was performed to maintain healthy supracrestal healthy tissue thus offering a long term outcome to the patient. Under all aseptic conditions local anesthesia was administered and surgical extrusion with fine elevator was used for luxation. It was placed in periodontal space and manipulated in a walking motion all around tooth without causing surgical trauma. Minimal traumatic luxative forces were applied at 3-4 mm of the root structure by using root forceps to avoid periodontal ligament damage. The tooth was extruded to the desired position with root forceps such that the fracture margin will be situated atleast 3mm above the alveolar crest. The extrusion should not hamper crown root ratio that is it should be less than 1.[13] .Pressure was applied in bucco-palatal direction to obtain haemostasis with gauze and to maintain tooth in its correct position simple interrupted sutures were placed to stabilize the tooth. After that semi-rigid was place using flowable composite on adjacent teeth (Fig No. 4).

Fig No. 3 Clinical height after surgical extrusion

Fig No. 4 Composite splinting to maintain extrusion and healing

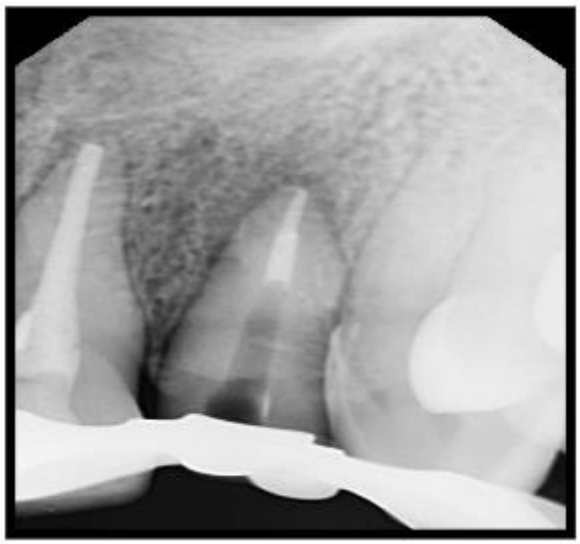

Fig No. 5 Radiograph showing extrusion and post space preparation

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Fig No. 6 Post and core build up

Fig No. 7 Gingivoplasty to maintain gingival zenith

Fig No. 8 Temproray crown cemented after gingivoplasty

The patient was instructed to use mouthwash 0.12% of chlorhexidine daily for 1 week and prescribed with analgesics. The sutures were deposed after 7 days, splinting was removed after 21 days and evaluated for mobility. Root canal treatment was carried out with 21 and 22 followed by fiber post and core build up with 22. Fiber post was cemented with dual core composite cement which was also used as core build up material (Fig No. 6). Tooth preparation was done followed by gingivoplasty to maintain gingival zeniths followed by temporary crowns to develop soft tissue architecture (Fig No. 7, 8). After 21 days gingival retraction and final impression was made in addition silicone and final prosthesis was cemented using glass ionomer cement (Fig No. 9).

Fig No. 9 Final prothesis

After 3 months follow up showed complete periapical bone formation with periodontal tissue repair (Fig No. 10).

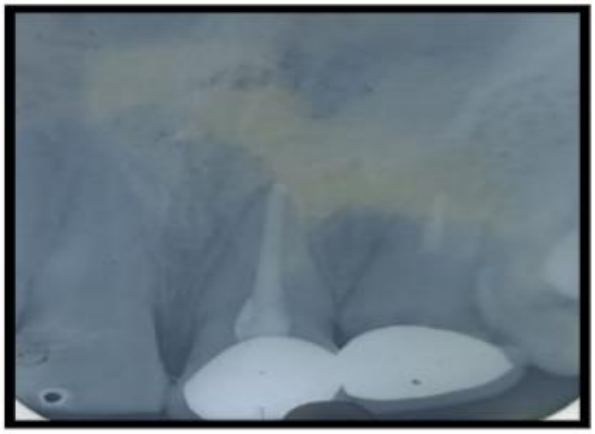

Fig No. 10 Three months follow up radiograph

III. DISCUSSION

Crown–root and cervical root fractures are common in children, amongst all the age groups. In a systematic review, [14] the mean age of the treated patients was 24 years old. There are various treatment options for complicated CRFs such as gingivectomy, apically positioned flap and orthodontic extrusion. These conventional crown lengthening procedures need some anatomical and biological considerations to be undertaken. During the restorative procedures and to prevent the periodontal damage, 3 mm of tooth structure between the bone and the margin of the final restoration should be maintained.[15] Furthermore, while dealing with the anterior region, the final cosmetic outcome is the major goal for any restorative approach. It is crucial to protect the interdental

papillae and gingival margin.[16] The treatment suggested in the current case report was straightforward. Without surgical exposure of the apex or bone transplants for stabilisation, it was carried out utilising luxation and partial tooth extraction. The immediate effect of the surgery is increased periodontal ligament space both apically and laterally. As a result, periapical bone growth was visible on radiographs as soon as two months after surgery. The quality of the newly produced bone beneath the surgically ejected tooth hasn't actually been properly assessed by any research.[14] This procedure resembles an extrusive luxation, in accordance with the 2020 guidelines of the International Association of Dental Traumatology.[17] For that reason, stabilisation of the tooth was achieved using a passive and flexible splint for 2 weeks.[17] In addition, the endodontic treatment timing of the extruded tooth has been discussed in several clinical studies.[14,18] In the present case report, endodontic treatment was performed before surgical extrusion. Isolation of the tooth from contamination by saliva and blood was accomplished using a liquid-dam. Clinicians are advised to use surgical extrusion because it doesn't call for specialised clinical knowledge. It is a one-step technique, making it easier and faster.[19] It is indicated in CRFs, subgingival caries, cervical root resorption, large radicular perforations of the coronal third of the root and incongruous prosthetic preparations violating the supracrestal insertion tissue.[16, 20] An atraumatic extraction system (AES), known as Benex®, was proposed for use in a clinical study of surgical extrusion as it reduces trauma to the alveolar socket. The vitality of the periodontal ligament cells is essential for a successful reattachment, which is more affected by the viable cells on the root surface than on the alveolar socket wall.[21] However, the AES screw needed for retention in the post space and the axial force applied during extrusion may cause microcracks to the dentin, potentially leading to vertical root fracture and possibly affecting the outcome.[2] Surgical extrusion has such advantages on recovery, however inflammatory or replacement root resorption is frequent in any dental replantation.[2] In the present case report, a follow-up appointment after 6 months revealed satisfactory outcomes with clinical and radiographic signs of healed periodontium. According to statistical study, the most frequent adverse event following surgical extrusion has a 30% event rate of non-progressive root resorption. However, Tegsjo et al. considered it as a “healed” root resorption and a reparative event rather than a harmful one.[14, 22] Surgical tooth extrusion is recommended as a reliable treatment in the management of crown–root-fractured permanent anterior teeth.[18] It can be successfully applied with minimal chairside procedures and it does not require special surgical skills. It often leads to good esthetics and has a low incidence of failure. Moreover, recovery is easy and is accepted by the patient.[18, 16]

IV. CONCLUSION

Surgical extrusion is simple and easy to perform. It can be suggested as a suitable treatment option in the management of highly damaged anterior teeth. In the present case report, a minimally traumatic controlled surgical extrusion technique provided highly successful outcomes in both function and esthetics, especially in the anterior region where the latter is of great concern.

REFERENCES

[1]. Bhargava M, Pandit IK, Srivastava N, Gugnani N, Gupta M. An evaluation of various materials and tooth preparation designs used for reattachment of fractured incisors. Dental Traumatology. 2010 Oct;26(5):409-12.
[2]. Lee JH, Yoon SM. Surgical extrusion of multiple teeth with crown-root fractures: a case report with 18-months follow up. Dental Traumatology. 2015 Apr;31(2):150-5.
[3]. Grira I, Mahjoubi B, Belkacem Chebil R, Amor A, Douki N. Surgical extrusion: A reliable alternative for saving fractured anterior teeth. SAGE Open Medical Case Reports. 2021 Jul;9:2050313X211036780.
[4]. Eid H, White G. Class IV preparations for fractured anterior teeth restored with composite resin restorations. Journal of Clinical Pediatric Dentistry. 2003 Apr 1;27(3):201-11.
[5]. Andreasen JO. Traumatic injuries of the teeth. WB Saunders Compagny.; 1981.
[6]. Hempton TJ, Dominici JT. Contemporary crown-lengthening therapy: a review. The Journal of the American Dental Association. 2010 Jun 1;141(6):647-55.
[7]. Lang NP, Lindhe J, editors. Clinical periodontology and implant dentistry, 2 Volume Set. John Wiley & Sons; 2015 Mar 25.
[8]. Nemcovsky CE, Artzi Z, Moses O. Preprosthetic clinical crown lengthening procedures in the anterior maxilla. Practical procedures & aesthetic dentistry: PPAD. 2001 Sep 1;13(7):581-8.
[9]. Yeh S, Andreana S. Crown lengthening: basic principles, indications, techniques and clinical case reports. New York State Dental Journal. 2004 Nov 1;70(8):30.
[10]. Mandel RC, Binzer WC, Withers JA. Forced eruption in restoring severely fractured teeth using removable orthodontic appliances. The Journal of Prosthetic Dentistry. 1982 Mar 1;47(3):269-74.
[11]. STERN N, BECKER A. Forced eruption: biological and clinical considerations. Journal of oral rehabilitation. 1980 Sep;7(5):395-402.
[12]. Bach N, Baylard JF, Voyer R. Orthodontic extrusion: periodontal considerations and applications. Journal (Canadian Dental Association). 2004 Dec 1;70(11):775-80.

[13]. Kim CS, Choi SH, Chai JK, Kim CK, Cho KS. Surgical extrusion technique for clinical crown lengthening: report of three cases. International Journal of Periodontics & Restorative Dentistry. 2004 Oct 1;24(5).
[14]. Elkhadem A, Mickan S, Richards D. Adverse events of surgical extrusion in treatment for crown–root and cervical root fractures: a systematic review of case series/reports. Dental Traumatology. 2014 Feb;30(1):1-4.
[15]. Bajaj P, Chordiya R, Rudagi K, Patil N. Multidisciplinary approach to the management of complicated crown-root fracture: a case report. Journal of international oral health: JIOH. 2015 Apr;7(4):88.
[16]. Argueta J, Orellana A, Plotino G. Surgical extrusion: A reliable technique for saving compromised teeth. A 5-years follow-up case report. Giornale italiano di endodonzia. 2018 Jun 1;32(1):25-30.
[17]. Bourguignon C, Cohenca N, Lauridsen E, et al. International association of dental traumatology guidelines for the management of traumatic dental injuries: 1. Fractures and luxations.
[18]. Dent Traumatol 2020; 36(4): 314–330.
[19]. Das B, Muthu MS. Surgical extrusion as a treatment option for crown–root fracture in permanent anterior teeth: a systematic review. Dental Traumatology. 2013 Dec;29(6):423-31.
[20]. Özer SY and Uysal Bahşi İE. Case report surgical extrusion of a complete crown fractured tooth: a case report 2011; 1(2):70–75.
[21]. Becciani R, Faganello D and Fradeani M. Surgical extrusion: simplified esthetic method of treating non-restorable teeth. Int J Esthet Dent 2018; 13(2): 240–273
[22]. Dietrich T, Krug R, Krastl G, et al. Restoring the unrestorable! Developing coronal tooth tissue with a minimally invasive surgical extrusion technique. Br Dent J 2019(226): 789–793.
[23]. Tegsjo U. Intra-alveolar transplantation of teeth with cervical root fractures. *Swed Dent J* 1978(2): 73–82.