

Management of Fractured Central Incisor with Immediate Intra-alveolar Repositioning- a Case Report

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ABSTRACT

This case report illustrates the management of deep vertically fractured maxillary central incisor with the fracture line extending sub-gingivally, exposing less than 2 mm of tooth structure to support the crown. Root canal therapy, splinting, Intra-alveolar repositioning, core build-up, and metal-ceramic crown restoration were sequentially carried out, in order to preserve the fractured tooth, preserve the biological width, maintain aesthetics, and have sound tooth structure for future crown placement.

Keywords- Crown-Root Fracture, Intra-alveolar repositioning, Aesthetics, Central Incisor, Rehabilitation, Traumatic Injuries.

INTRODUCTION

Traumatic injuries to dental tissues frequently result in damage to the teeth and soft tissues supporting them. Vertical fractures involving the crown-root are one

kind of such fractures. Rehabilitating a tooth with cementum involvement in the fracture line is extremely difficult and requires a multifaceted approach from the clinician. While planning a treatment modality for such fractures, a number of aspects need to be taken into account, such as the level of the fracture line, biological width invasion, root development stage, amount of tooth structure still present, and the clinician's expertise.^{1,2}

Due to the challenges encountered in restoring these factors, various methods

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have been developed for managing crown-root fractures after the coronal fragment is removed. These methods include: restoring tooth supra-gingivally, gingivectomy, and post-crown restorations; fragment reattachment; intra-alveolar repositioning, orthodontic extrusion, intentional replantation and extraction when the fracture extends beyond the gingival one third on root.

A growing number of people are choosing to save and restore their teeth rather than extracting them and using prosthetics. According to clinical researches, surgical methods could be helpful in extruding and preserving the tooth. Over time, the technique of trans-alveolar repositioning as a therapy for crown-root fractures has been refined and eventually made simpler.³

CASE REPORT

A 26 years old female reported to the Department of Conservative Dentistry & Endodontics, Teerthanker Mahaveer Dental College & Research Centre, Teerthanker Mahaveer University, Moradabad, with chief complaint of fractured tooth in her upper front tooth region. The lady met with an accident a day before and had her tooth cracked. She complaint of no pain and mobility in her tooth. Investigations and clinical

examination revealed, the tooth #21 was discoloured, fractured vertically from crown to root portion involving cementum on mesial portion which was attached through gingiva cervically. (Fig. 1,2) The pulp vitality tests and percussion tests were negative. After removal of mobile fragment, the extent of fracture was estimated and it was on the coronal one third of root area. (Fig.3)



Figure 1.
Radiographic
Presentation
Fractured tooth #21



Figure 2.
Clinical presentation
of fracture tooth #21



Figure 3. Fractured fragment removal #21

MANAGEMENT

Following the removal of fractured fragment and estimation of extent of fracture, a treatment modality was planned including root canal therapy, splinting, intra-alveolar repositioning, core build-up, followed by metal-ceramic crown

restoration. All the procedures were well explained to the patient and consent was signed.

Nonsurgical endodontic therapy was performed in a crown-down motion with Pro Taper Gold (Dentsply Maillefer, Ballaigues, Switzerland) system (Fig. 4) and canal was obturated with lateral compaction technique with gutta-percha (Dentsply-Maillefer, Ballaigues, Switzerland) and AH Plus sealer (Dentsply De Tray, Konstanz, Germany) i.r.t 21. (Fig. 5,6) Tooth was restored with permanent restoration using restorative composite (spectrum, Dentsply-Maillefer, Ballaigues, Switzerland). Immediate intra-alveolar repositioning of tooth was done using anterior extraction forceps. The tooth was extruded around 3 mm and was then splinted to the adjacent teeth using splinting wire engaged in composite buttons. (Fig. 7) Patient was asked not to chew or bite using these teeth for around 3 weeks and keep the area clean with light brushing technique and with regular use of mouthwash.

After 3 weeks, patient was recalled, wire was removed and with no evidence of mobility in tooth and evident healing in the radiograph (Fig. 8), crown preparation was done followed by placement of porcelain fused to metal crown was achieved. (Fig. 9,10)



Figure 4. Endodontic therapy performed



Figure 5. Radiographic presentation showing Working length and obturation



Figure 6
Picture following obturation #21



Figure 7.
Picture depicting Splinting #21



Figure 8. Radiographic presentation #21



Figure 9. Picture depicting porcelain fused to metal crown



Figure 10. Radiograph following 3 months

DISCUSSION

One of the most challenging situations in a dental practice might be dental trauma and the subsequent fracture of the permanent anterior teeth, necessitating a thorough treatment planning. Uncertainties about the prognosis and length of treatment endures complications, and long-term care might be difficult.^{4,5}

First and foremost, emergency care must be provided when a patient reports to the clinic in pain. As in the current report, patient reported with the mobile fragment with complicated fracture, the mobile fragment was removed and endodontic therapy was planned. As clinical and radiographic assessment revealed that the remaining tooth structure was inadequate in height to hold a restoration. Thus, in order to lengthen the crown, immediate intra-alveolar repositioning was taken into consideration.^{6,7}

Intra-alveolar repositioning or surgical extrusion was planned in treatment modality over surgical crown lengthening as surgical crown lengthening is an invasive procedure would require osteotomy to reach the desired length. It requires bone resection along with repositioning of flap according to the pocket depth. Resecting bone for single tooth and especially in anterior region is generally contraindicated due to poor results following the procedure. Disturbance of crown-root ratio, furcation exposure or pdl weakening of affected tooth and approximate teeth might result.⁸ However, orthodontic extrusion could prevent this bone resection but it would take longer duration to provide the desired results. Also, orthodontic extrusion may lead to untoward results like risk of

resorptive ankylosis or root resorption due to trauma to pdl, tipping of tooth in wrong direction, difficult to maintain good oral hygiene and vertical root fracture⁸

Conversely, intra-alveolar repositioning is a reliable and successful procedure that has been shown to promote good tissue healing, along with maintaining the height of marginal bone and healing of periapical radiolucency without any complications.⁸

In the present case, immediate intra-alveolar repositioning was done in order to create a 2mm circumferential ferrule with minimal trauma to adjacent bone and soft tissues.

In order to help keep the tooth in its newly acquired location and allow the formation of bone below the apex of extruded tooth, splinting was performed with adjacent teeth. After 3 weeks, splint was removed with no evidence of mobility and tooth was restored with porcelain fused to metal crown.

CONCLUSION

A successful treatment requires a good case assessment, a thorough review, analysis of the parameters weighing benefits to the losses and clinician's skills. As intra-alveolar repositioning has its own drawbacks including root resorption, ankylosis, failure of treatment due to periodontium and surrounding tissue

injury. So, it necessitates a regular follow-up visit for long term prognosis.

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