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# Intraradicular Splinting of a Coronal Horizontal Root Fracture with Surgical Repositioning of the Fractured Crown in a Permanent Maxillary Lateral Incisor: A Case Report

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**Abstract:** ***Background: Root fractures in permanent teeth are uncommon injuries and represent complex healing patterns. Prognosis of fracture in the coronal third of a root is considered as poor. Case Description: This case report presents the endodontic management of a coronal horizontally fractured Maxillary right lateral incisor by intraradicular splinting using a fiber post and dual cure resin cement by Repositioning of fractured crown fragment back to its original position. Conclusion: natural tooth crown can be a good alternative to prosthetic crowns if placed in time because it maintains the natural aesthetic appearance.***

**Keywords:** Intraradicular Splinting, Repositioning of fractured crown

## 1. Introduction

Radicular fractures in permanent teeth are uncommon injuries among dental traumas, being only 0.5-7% of the cases.Fracture occurs often in the middle-apical third of the root and rarely at the coronal third[1]and the proposed treatment modalities for such fractures include: (i) disinfection and obturation of the coronal segment only (ii) surgical removal of the apical segment or (iii) intraradicular splinting to unite the fracture[2]. In case of the Coronal third fractures, the prognosis is considered as poor and often they are advised for extraction followed by implant or a bridge prosthesis[3.] This case report describes the management of coronal third root fracture in the Maxillary right lateral incisor by intraradicular splinting followed by surgical repositioning of the natural crown fragment.

## 2. Case Presentation

A 45 year old male visited the department of Conservative Dentistry & Endodontics with the complaint of loose tooth in the upper front region. He had suffered a dental injury in the upper anterior teeth biting on a hard object the previous night. He had no other major injuries and his medical history was uneventful.The clinical examination revealed Ellis Type III fracture of the upper right lateral incisor. Discomfort was noted during percussion and palpation. Tooth had grade III mobility. The crown was simply attached with the help of the gingival fibers (fig.1a & 1b). The Radiographic examination revealed crown fracture of the horizontal fracture in the coronal third of the root on the upper right lateral incisor, separating the Coronal and Radicular fragments from each other (fig.2)

## 3. Diagnosis

The diagnosis made was horizontal fracture of the root at the coronal third and at the level of alveolar bone in relation to maxillary permanent left central incisor.

## 4. Treatment Plan

In this presented case two types of treatment modalities could have been carried out; either extraction followed by Implant/bridge prosthesis or immediate surgical repositioning of the fractured crown fragment with intraradicular splinting. We decided to go for immediate intraradicular splinting followed by repositioning the natural crown fragment. Interdisciplinary approach was taken with department of periodontics because the fracture involved the biologic width, hence to reposition the fractured crown; a mucoperiosteal flap had to be raised to expose the margins of fracture under the supervision of a periodontist.

## 5. Treatment Procedure

The crown was gently extracted with forceps under local anesthesia 2% lignocaine hydrochloride with 1:80000 adrenaline (fig.3a & 3b).It was stored in saline to prevent dehydration. Working length was established by radiographic method(fig.4) and the radicular part of the tooth was cleaned and shaped using Protaper rotary NiTi files while 3% sodium hypochlorite was used as an irrigant (fig.5).Lateral condensation technique with AH plus sealer was used for obturation. Post space was prepared using G.G. drill no.5 and confirmed with a radiograph (fig. 6a & 6b). An appropriate size fiber reinforced composite post (*Rebuilda post* with diameter1.2 mm) was selected. It was checked for its fitting by taking an intraoral periapical radiograph and was cut to the desired length with the help of a diamond cutting disc (fig.7a & 7b).Now the Mucoperiosteal flap was raised using the crestal incision with vertical releasing incisions (fig. 8). The margins of the radicular part of the tooth were exposed (fig.9). The canal was dried using paper points.A Dual cure resin cement (*RelyX unicemTM, 3M* ) carried into the canal and the post was inserted and cured for 40 seconds (fig.10). The fiber post was pre-treated with 24% hydrogen peroxide for better bonding with the resin cement. An “Anti rotational groove” wasprepared on the palatal side of the crown (fig.11). Now the crown fragment was checked for its fitting by inserting it on the post in the canal passively (fig.12). Once confirmed,

the crown was repositioned on the post using the same dual cure resin (*RelyX unicem, 3M*) and light cured (fig.13).Flap was repositioned and sutures were given (fig.14a, 14b & 14c). Patient was recalled one week later for sutures removal. Marginal gingival showed proper healing .After 12 months follow up the tooth and the associated gingiva were healthy asymptomatic clinically (fig.15a & 15b) as well as radiographically (fig.16).

## 6. Figures

Figure 1 (a)

Figure 1 (b)

Figure 2

Figure 3 (a)

Figure 3 (b)

Figure 4

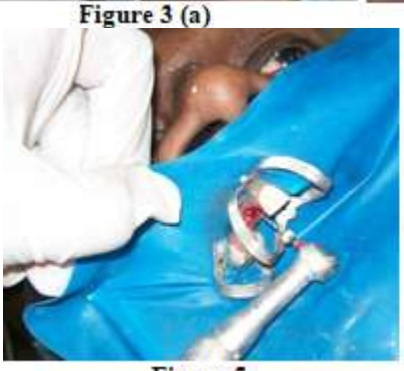

Figure 5

Figure 6 (a)

Figure 6 (b)

Figure 7 (a)

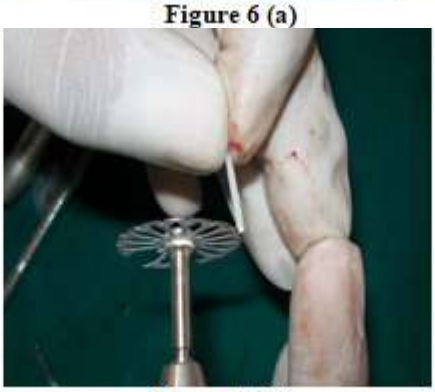

Figure 7 (b)

Figure 8


Figure 9


Figure 10


Figure 11


Figure 12


Figure 13


Figure 14 (a)


Figure 14 (b)


Figure 14 (c)


Figure 15 (a)


Figure 15 (b)


Figure 16

## 7. Discussion

Root fracture is one of the consequences of dental trauma. The treatment principles for horizontally fractured teeth involve maintaining pulp vitality by immobilizing the coronal segment, but this can be applicable in conditions like when there is a fracture in the apical or middle third of the root.Here in our case the fracture was at the coronal third of

the root and at the level of the alveolar bone. These fractures are often advised for extraction because of their poor prognosis.Since the location of the fracture was at the level of alveolar bone, healing was not a matter of concern in this case.The treatment plan was to be decided considering some very important factors:

1) Cost effectiveness: Compared with an implant prosthesis the treatment carried out in this mentioned case is far more cost effective.
2) To avoid the unnecessary tooth preparation of adjacent teeth in case bridge prosthesis is planned.
3) Aesthetics: The most important factor. 'Choosing the natural over artificial' was the driving factor for carrying out this 'repositioning of the natural fragment' treatment procedure.

Repositioning of the fractured crown fragment was decided using the intraradicular splinting.For the intraradicular splinting, a fiber reinforced composite post *(Rebuilda post system)*& dual cure resin cement *(RelyX unicem, 3M)* were used. The reason for choosing fiber post instead of a metal post is that the earlier studies have shown that fiber post has better stress distribution over root surface; the modulus of elasticity of these posts is close to that of dentin thus reducing the incidence of root fracture[4]**.** The reason for using *RelyX, (unicem, 3M)* dual cure cement is that previous studies have shown that the adhesive properties of this dual cure cement, when compared with the other conventional resin cements, show the highest bond strength to the "Radicular Dentin**"** in particular[5].

## 8. Conclusion

This case demonstrates that intraradicular splinting with surgical repositioning can be a successful technique for managing horizontal root fracture at the Coronal third. We are following up the case and we are expecting a long-term success. Still, further in vitro as well as in vivo studies are required for the exploration on different aspects of such treatment modality.

## References

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