

**Research Article**

## **MANAGEMENT OF HORIZONTAL RADICULAR FRACTURE – AN INTERDISCIPLINARY APPROACH**

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### **ABSTRACT**

Fenestration and dehiscence are usually accompanied with long standing traumatized teeth which can complicate the outcome of endodontic treatment. Hence dehiscence should be detected at an early stage. If undetected, it can lead to the failure of endodontic treatment as projected in this case which led to the surgical intervention. The routinely followed protocol for the management of dehiscence consists of raising the flap to expose the dehiscence followed by curettage, placing a bone graft and GTR membrane and repositioning the flap. In this case, after stabilizing the fractured segments intra-radicularly using stainless steel K-file, dehiscence management was done by root conditioning with 1% tetracycline HCl which gave a good result.

**Key Words:** Fenestration and Dehiscence, K-file, 1% tetracycline HCl

### **INTRODUCTION**

Compared to other dental traumas, root fractures are relatively uncommon. The frequency of root fractures in permanent teeth is only 0.5% to 7%, and in deciduous teeth, just 2% to 4% (Flores *et al.*, 2007). Root fractures occur mainly in the central (68%) and lateral (27%) maxillary incisors; in contrast, only 5% of root fractures are found in mandibular incisors (Majorana *et al.*, 2002).

Dehiscence refers to the bursting through the bone of a root as the tooth erupts. Management of dehiscence is important as it can complicate the outcome of both endodontic and periodontal treatment. Communication between the gingival sulcus and the fracture line can additionally negatively influence the prognosis (Walter, 2003).

Dehiscence is rarely detected in radiographs. Various tests to detect it are the finger tip test, probing and sounding (Miranda *et al.*, 2006). In spite of this many a times dehiscence goes undetected. The most accurate method of correctly determining the extent of dehiscence is surgical exposure (Walter, 2003).

This case is about the management of maxillary central incisor that sustained root fracture at the middle third. The poor response of the tooth to the endodontic treatment led to the surgical intervention which revealed dehiscence to be the cause which was managed successfully by root conditioning using 1% tetracycline.

### **CASES**

A 15 year old male patient reported to the OPD of JSS Dental College, Mysore with the complaint of pain in the upper front tooth since 2 weeks. Patient gave a history of direct trauma to the same tooth 2 months ago following a self-fall from his bike. He consulted a general dentist for the same who did composite splinting of the tooth.

Clinical examination revealed Ellis Class III fracture in relation to the maxillary right central incisor, tenderness on palpation of the underlying tissues, tenderness on vertical and lateral percussion. A draining sinus on the labial attached gingiva of the same was noted. Radiographic examination revealed a horizontal root fracture at the middle third of the root with mild coronal displacement of the fragment (fig. A). Also, the tooth gave a negative response to vitality test. Patient was otherwise systemically healthy.

The treatment plan consisted of an emergency access opening and a closed formocresol dressing. This was followed by working length determination and biomechanical preparation after 1 week. Calcium

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hydroxide dressing was placed in the canal. The dressing was changed at intervals for a period of 3 months. The canal was enlarged till 80 size K- file and splinted intra-radically using the same size file followed by temporary build up of the crown using cold cure resin.

Periodontal probing revealed a moderately deep pocket on the labial aspect and a persistence of sinus opening (fig. B), even after a thorough disinfection of the root canal suggested the contamination of the root canal extra-radically. Hence a surgical intervention was planned. Following phase-I therapy, flap was reflected in relation to upper incisors. This revealed dehiscence of the labial cortical plate till the apical third of the root with a horizontal fracture line in the middle third. After a thorough debridement, etchant (37%  $H_3PO_4$ ) was applied to the fracture line and sealed with glass ionomer cemen. The exposed root surface was then subjected to root conditioning using 1% tetracycline HCl for 5 minutes (fig. C). The flap was then closed using interrupted sutures. Patient was given post operative instructions and put on suitable antibiotic and analgesics. Patient was recalled for suture and pack removal after a week and satisfactory healing was observed. A permanent restoration with composite was done after 3 months. Patient was put on regular recall visits.

## DISCUSSION

Radicular fractures in permanent teeth are uncommon injuries among dental traumas, being only 0.5-7% of the cases (Flores *et al.*, 2007). Mid-root fractures occur most frequently in the upper anterior teeth due to their position in the arch. Immobilization of fragments can be done with a rigid splint intraradically or extraradically. In this case, a horizontal fracture at the middle third was seen which was treated endodontically followed by immobilization with a rigid K-file. Intraradicular splinting was attempted to approximate the fragments (screw action) for a better healing of the fracture.



**Figure 1: Successful management of horizontal root fracture** A- pre-operative radiograph showing fracture line and periradicular radiolucency, fractured segments stabilized with K-file B- persistent sinus

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opening after endodontic treatment C- root conditioning with 1% tetracycline HCl D- post operative radiograph showing adequate healing

Pulpal infection may cause a tissue destructive process that proceeds from the apical region of a tooth toward the gingival margin. The relationship between periodontal and pulpal disease was first described by Simring and Goldberg in 1964.

Pulpal infection has the potential to initiate inflammatory changes in the alveolus at both apical and non-apical locations. It has been suggested that intrapulpal infection tends to promote marginal epithelial downgrowth along a denuded dentin surface, which can lead to dehiscence.

In this case dehiscence was seen till the apical third of the root. Dehiscence is normally managed using the GTR technique. The presence of active inflammation even after thorough disinfection of the root canal after 3 months period persuaded us to make an alternative treatment plan for the management of dehiscence. Hence an attempt towards regeneration by root conditioning using 1% tetracycline was considered.

1% Tetracycline HCl, owing to its demineralising potential, substantivity, antimicrobial activity and enhanced binding of fibronectin and subsequently facilitating fibroblast attachment and growth was used (Periodontal regeneration, 1993).

GIC, owing to its biocompatibility, good bonding strength to the radicular dentin and ability to prevent epithelial migration and promote new connective tissue attachment was used to seal the fracture line extra-radicularly (Periodontal regeneration, 1993).

Follow-up of the patient till 6 months shows promising results (fig. D).

## CONCLUSION

Depending on the extent of dehiscence various treatment options exists. Root demineralization is a simple procedure that can be attempted for treatment of such cases. The use of MTA and PRF is another treatment modality for the management of trauma related dehiscence that needs to be researched.

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