

CASE REPORT

Hemisection: A Treatment Option for an Endodontically treated Molar with Vertical Root Fracture

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ABSTRACT

Vertical root fractures (VRF) in endodontically treated teeth have long been reported and pose diagnostic difficulties. A hemisection/root resection procedures removes the fractured fragments completely, and retains a portion of the compromised tooth offers a predictable treatment option. The key to this rests in ideal case selection involving balancing all indications and contraindications. The success of the treatment depends on careful case selection based on a firm set of guidelines. This article presents a case with VRF in an endodontic treated molar. This article describes the case of a 65-year-old man with a VRF on the mesial root and a healthy periodontium supporting the distal root making it ideal for retention as well as restoration and support of the final prosthesis. Also, the patient was motivated to try and save as much of the tooth as possible. Postoperatively no untoward complication was reported making it an alternative treatment option in patients with VRF in a molar, willing to retain the remaining tooth portion. With all other factors balanced, it allows for retaining the remaining intact portion of the tooth structure.

Keywords: Hemisection, Periodontal abscess, Synthetic bone Grafts, Surgical therapy, Vertical root fractures.

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INTRODUCTION

Vertical root fractures (VRF) are fractures that are present on the root surfaces extending upto the periodontium and may involve only a section or both sides of the root. It is an adverse drawback in certain endodontically treated cases, indicating for an extraction.¹ It may be initiated either during restorative procedures or during later stages. Factors initiating such presentations would be abnormal masticatory stresses.¹ Based on the nature of

masticatory stress factors, VRF usually originates from apical end of the root and instigate coronally/ can originate from cervical portion of the root with extension in apical direction, or may progress horizontally.¹ VRF in an endodontically treated teeth is a demanding task for both dentists as well as patients as it is diagnosed years after all endodontic and prosthodontal procedures have been completed. Also since several etiologic factors may be involved, it may also have an unfavorable prognosis in certain cases. Such analogous representations pose a daunting task for the clinicians when VRF occurs, incomplete or complete, it may infringe on periodontal ligament tissues. Elucidation through the gingival sulcus into the oral cavity, wherein foreign substances, food debris and microbiota would obtain access into these fracture areas initiates an inflammatory process in the adjacent periodontal tissues results in a breakdown of periodontal tissues which would rapidly propagate apically as well as interproximally.⁵

The signs and symptoms are elusive in nature, difficult to diagnose during patient examination, often similar to nonhealing RCT (root canal treated tooth) including:

- Vague headache and ear pain (extraoral).
- Intraorally, signs and symptoms include mild pain presence of sinus tract, exacerbation of a chronic lesion, pressure on mastication, a periodontal type of abscess.¹
- Pockets adjacent to fracture site deep probing in one position around the circumference of the tooth in an otherwise normal attachment.²

The radiographic features include hair-like fracture-line radiolucency in the dentin/body accompanied with large losses surrounding the tooth/root¹ sometimes accompanied by a periapical/lateral periodontal radiolucency, with an angular bone loss,¹ widening of periodontal space.^{2,5}

Diagnosis is by the history, examination for pain on mastication prolonged discomfort, probing to detect osseous defect, intra oral periapical radiographs at two different angulations. An exploratory flap achieves a definitive diagnosis.

Predisposing factors include dental caries/trauma, narrow mesiodistal dimension compared to buccolingual dimension of the root, moisture loss in pulpal teeth, extensive use of rotary instruments to remove dentin,

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Fig. 1: Preoperative view— intraoral swelling observed

loss of alveolar bone, previous cracks in dentin, excessive lateral condensation of gutta-percha, over preparation of canals for dowels.¹

Clinical management includes use of CO₂ /NdYAG, use of glass ionomer cement/laser/cyanoacrylate² to fuse fractured roots, which has been proved to be ineffective. In posterior teeth hemisection/root amputation may be considered as the treatment of choice, followed by a new restoration of tooth.^{1,3}

CASE REPORT

A male patient aged 60 years, with history of pain swelling in a lower molar (Fig. 1). History of mild pain on chewing in relation to the same, with history of root canal treated tooth in relation to the same 10 years back. The patient indicated there was pain and was willing to retain the tooth. On intraoral examination, there was swelling in 46 in the buccal aspect (Fig. 1). Exudation was noted from the sulcular area. The distal root was in good condition with alveolar bone loss. There was no trauma from occlusion radiographically, the fracture line was not very clear. Antibiotics and analgesics were prescribed and the patient was explained the prognosis. The surgical procedure was explained and scheduled. Patient’s consent was obtained. For hemisectioning of the tooth,

a surgical approach to visualize the furcation area is the most predictable technique. After anesthetizing, a full thickness periodontal flap was elevated to visualize the defect. A vertical fracture line was extending from the CEJ (cervico enamel junction) to the apical 3rd An angular type of bone loss was present (Fig. 2). Hemisectioning of the tooth was performed and the fractured root fragments along with the crown portions were removed (Fig. 3). Hemisectioning of the tooth was performed and the fractured mesial root fragment was performed with a diamond bur. The tooth was carefully sectioned and the fractured mesial fragment was removed. Any defects on the sound distal root were smoothed. After the bioactive glass (perioglas) bone graft material was placed and sutured. Postoperative instructions were given. The patient was prescribed antibiotics and analgesics. Patient was recalled after a week for suture removal. The next phase of the treatment schedule involved the restoration of the hemisected tooth with a provisional crown. Final prosthesis was given after 3 months. A full metal prosthesis with extension on 45 was designed. A trial was done. With the patient’s consent, the prosthesis was cemented (Fig. 4). Patient was re-called for re-evaluation after 1, 3, 6 months, 1 and 3 years (Figs 5A and B). The patient did not report any complaints/ discomfort. The surgical area healed uneventfully. At each visit, the patient/s oral hygiene was evaluated. The patient reported once in 6 months after the first year. The patient’s oral hygiene was good and was able to maintain area well and did not report any untoward complications after placement of the final prosthesis.

DISCUSSION

Vertical root fracture has long been a dilemma to the clinician as it can occur at various stages of treatment (instrumentation, obturation/post-placement)/post-treatment. As there are more number of people wanting to keep their teeth for longer, clinicians put in efforts to provide a wide



Fig. 2: Surgical view— full thickness flap raised, vertical fracture line in the mesial root of 46 extending from CEJ to the apex, bone loss seen around the same

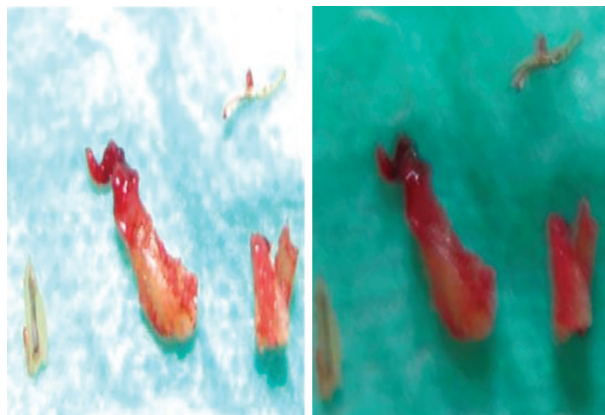


Fig. 3: Surgical—after removal of fractured segments with periapical granuloma at the apex of the mesial root



Fig. 4: Postsurgical. One-year follow-up. Fixed partial prosthesis in relation to 45, 46



Figs 5A and B: Comparison of presurgical and postsurgical (2 years follow-up)

range of treatment options based on the clinical situation age, economical considerations of the patient, and the best available clinical evidence of successful treatment modality. The loss of posterior molar can result in several undesirable sequelae including shifting of teeth, collapse of the vertical dimension of occlusion, super eruption of opposing teeth, loss of supporting alveolar bone and a decrease in chewing ability. Some unrestorable cases would require removable, fixed or implant substitutes as the only treatment outcomes. In teeth with restorable solutions retaining what is present is quite vital. Hemisection of the effected tooth allows the preservation of remaining tooth structure. The success of the treatment depends on careful case selection based on a firm set of guidelines making case selection a vital determinant in the long-term success of the procedure.⁵ Hemisection of mandibular molars may be a viable treatment option when VRF has occurred in an otherwise healthy tooth.^{4,5} This report demonstrates an alternative treatment to extraction of a whole tooth and salvation of healthy tooth structure in an elderly patient who was unwilling for extraction. In this case the tooth had a reasonably healthy periodontium supporting the distal root, having a sound root structure that was ideal to act as support for the FPD. The angulation of the remaining root was ideal

for the fabrication of the resulting final fixed restoration. There was no presence of TFO/bruxism added to the advantage. Eventually, the patient was motivated to retain as much of the tooth as possible. The patient was fully aware of the risks including the increased risk of caries in resected tooth. In this case, a 3 years follow-up revealed a good oral hygiene with no complaints from the patient suggesting that hemisectioning was a treatment substitute to extraction in certain cases of VRF in patients with an ideal oral environment, capability and willingness to carry out proper oral hygiene measures.

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