

## HEMISECTION AS AN ALTERNATIVE TREATMENT FOR THE VERTICALLY FRACTURED MANDIBULAR MOLAR



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Hemisection of mandibular molars may be a viable treatment option when Vertical root fracture has occurred in one of the roots and the other root is healthy. A case will be presented discussing the techniques involved in hemisection and restoration of the remaining tooth.

**KEYWORDS:** Hemisection, vertical root fracture, post and core.

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### INTRODUCTION

The treatment of severe furcal bone loss may require the removal of a portion of the anatomic crown and its associated root or resection of only one root from a multirouted tooth.<sup>1</sup> This resection type of surgical therapy is a definitive treatment because it predictably enables clinicians to better access the remaining tooth structure for periodontal and subsequent prosthetic therapy. However, adherence to guidelines for necessary tooth preparation for root resection, in this case hemisection, is paramount to facilitate the patient's ability to accomplish optimal long term maintenance of this affected area.<sup>2</sup> Prosthetic therapy and restorative sequencing is often complicated when periodontal attachment loss, caries or tooth fracture involves the furcation area of the multirouted molar. Although such involvement invariably diminishes the long-term prognosis of the affected teeth, extraction is not necessarily an option. Hemisection, which involves removal of the involved root and its associated crown portion, is one of several treatment modalities that can be used in such cases. Therefore, it is important for dentists to know the necessary indications/contraindications, surgical techniques, and prosthetic management for successful hemisection. This predicative treatment modality has a high degree of success if some basic

considerations are followed.<sup>3,4</sup> For example in the case presented, fracture of the root of a mandibular molar may not doom the remaining unaffected portion of the tooth to extraction. When the health of the other root is sound it may be utilized to provide a premolar shaped restoration.

### Case Presentation:

A 40 year old male presented with the complaint of a rough area on the lower right first molar. Examination revealed a vertical fracture of the distal root. The tooth had undergone prior Endodontic therapy and was asymptomatic. Radiographically, it was evident that the distal root had a fracture separating the root into two independent portions. (Figure 1)



**Figure No 1:**

A radiolucent lesion was noted extending from the

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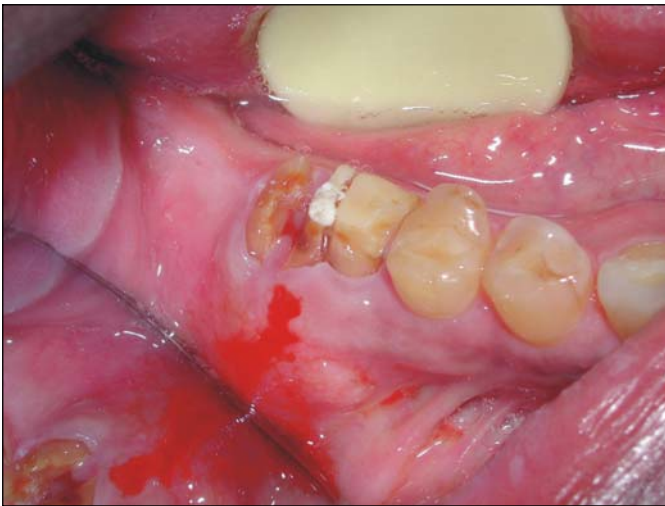
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apical tip coronally to the furcation. Surprisingly, neither tooth portion demonstrated any mobility. (Figure 2) The mesial root lacked pathology and tested negative for percussion. The only other mandibular teeth missing were the right second molar and third molars bilaterally. Periodontal health was normal and no other restorations or decay was present on the remaining teeth.



**Figure No 2:**



**Figure No 3:**

Treatment options were discussed and due to financial considerations it was decided to save and restore the mesial root of tooth 30. Future treatment when finances allow will include placement of an implant distal to the restored mesial root and restoration with a fixed single crown.

The patient returned eight months after the initial consultation to initiate treatment as finances had improved and he now had insurance benefits. Clinically

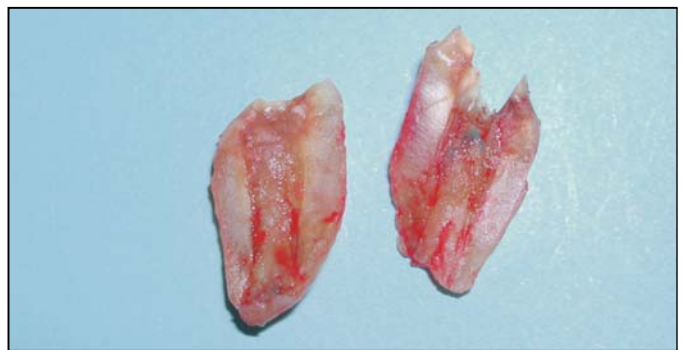
and radiographically no changes had occurred and the patient indicated the area remained symptom free.

Local anesthetic was applied via a mental block and PDL injection with 4% Septocaine with 1:100,000 epinephrine (Septodont, New Castle, DE). A coarse tapered diamond was utilized in a highspeed handpiece with water to place a cut from the buccal to the lingual thru the furcation. (Figure 3) Periostomes (Zoll Dental, Chicago, IL) were used to luxate the most distal root fragment by gently apical directed force into the periodontal ligament space.

The segment was then removed with a rongeur. The periostomes were then introduced into the cut placed at the furcation, the remaining root moved distally and removed with the rongeur. (Figure 4 & 5)



**Figure No 4:**



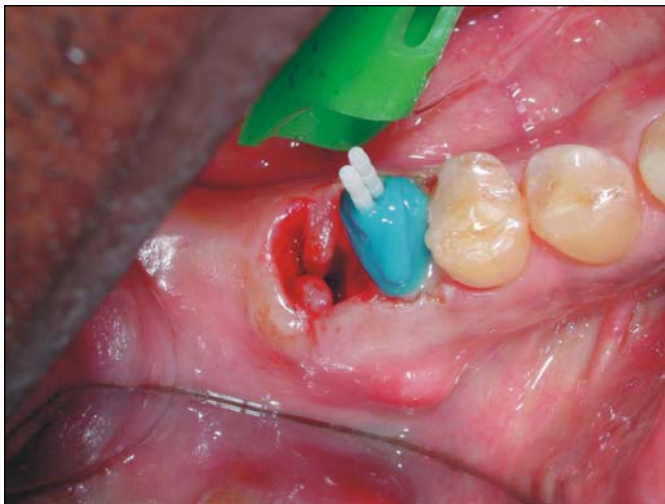
**Figure No 5:**

The diamond was utilized to remove the lip at the furcation on the mesial root and eliminate any undercut that might trap plaque. The old composite core was removed and the orifices for the mesial buccal and mesial lingual canals identified. A Bident bipolar (Bident,

Philadelphia, PA) unit was used to trough the sulcus around the remaining root to expose more root structure and improve the ferrule affect for the future crown. Bleeding on the mesial papilla was additionally controlled with the Bident unit. (Figure 6)



**Figure No 6:**



**Figure No 7:**

Peeso burs were used to prepare a post space in both canals to a diameter of 1.25mm and a depth of 10mm. An adhesive (Bond1, Pentron Clinical Technologies, Wallingsford, CT) was applied into each post preparation and all exposed dentin. Excess adhesive was removed with paper points. Cement-it Universal C&B (Pentron Clinical Technologies, Wallingsford, CT) was injected into the post spaces and a Fibrekor post (Pentron Clinical

Technologies, Wallingsford, CT) was inserted to length. Excess luting agent was removed from around the posts by application of air with the air/water syringe. A contrasting color dual cure resin core material (Build-it FR, Pentron Clinical Technologies, Wallingsford, CT) was injected around the posts and built up coronally. (Figure 7) Following set of the materials, the excess length of fiber post was reduced and the core shaped keeping the restoration out of occlusion. (Figure 8 & 9)



**Figure No 8:**



**Figure No 9:**

The patient returned after four weeks post surgical healing. The soft tissue had healed at the distal root and the mesial root remained asymptomatic. Preparation of the mesial root was made to accept a porcelain fused to metal

crowns. The contrasting color of the core material assisted in ensuring adequate ferrule in the preparation. Retrac (Centrix, Shelton, CT) was injected into the sulcus and a cotton Comprecap (Coltène/Whaledent Inc., Cuyahoga Falls, OH) placed over the preparation. The patient was instructed to bite into the Comprecap and occlusion was maintained for 5 minutes to provide better capture of the margins. A light body polyvinyl siloxane was subsequently injected around the preparation and a full arch impression tray filled with medium body polyvinyl siloxane (Correct Quick, Pentron Clinical Technologies, Wallingford, CT) was inserted. An opposing full arch impression and bite were taken. A temporary crown was fabricated using Revotec (GC America, Alsip, IL) and temporarily luted with Tempcem (Pentron Clinical Technologies, Wallingford, CT).

The patient returned several weeks later for completion of treatment on tooth 30. The temporary crown was removed and the final restoration tried in. Occlusion was checked and the porcelain fused to metal crown luted with Cement-it Universal C&B.(figure 10& 11)



**Figure No 10:**



**Figure No 11:**

## DISCUSSION

In situations where resective endodontic surgery is planned, prior initiation of conventional endodontic treatment simplifies the surgical procedure. This is often the case because tooth preparation can invade the pulp chamber and jeopardize control of the coronal seal of the endodontic access opening, thereby complicating the completion of endodontic therapy. When choosing to perform a hemisection procedure consideration should be given to the morphology, clinical length and shape of the roots of a multirouted tooth. The divergence of the roots is indeed an important indication. Those affected teeth with roots spread apart facilitate the clinician's ability to perform a root resection, whereas teeth with closely approximated or fused roots should not receive hemisection therapy. Conversely the contraindications to performing hemisection include a "non-physiologic" post surgical architecture that would preclude good home care, or an inadequate amount of alveolar bone remaining to support the existing root structure. Also, if cleaning and shaping cannot be adequately performed in the canal system of the roots to be retained or this segment of the tooth is nonrestorable.<sup>5</sup> Following resection therapy is the post resection restorative rehabilitation. The present prosthetic guidelines for rehabilitation include a confluence of the root and the prosthetic crown contours. In addition, the axial tooth contours of the restored resected teeth should have a physiologic contour, which implies that the restoration emerges from the root with a zero degree emergence profile. These transgingival areas should therefore exhibit a flat prosthetic contour at the gingival margin, producing a more hygienic, less plaque retentive region when compared to a tooth restored with a cervical bulge at the gingival portion of the prosthesis.<sup>6</sup>

## SUMMARY

The removal of a root and the overlying anatomic crown is referred to as a hemisection. Hemisection of either a maxillary or mandibular molar is often a means of retaining teeth needed for restorative abutments or occlusal support. This treatment can produce predictable results as long as proper diagnostic, endodontic, surgical and prosthetic procedures are performed.

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