

# Hemisection- A Conservative Treatment Approach for a Compromised Tooth : A Clinical Report

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## Abstract

Advances in dentistry, as well as the increased desire of patients to maintain their dentition, have lead to treatment of teeth that once would have been removed. In order to carry out this present day mandate, diseased teeth with severe bone loss may well be retained by removal of one or more of their roots. This article describes a simple procedure for hemisection in mandibular molar and its subsequent restoration.

## Introduction

Modern advances in all phases of dentistry have provided the opportunity for patients to maintain a functional dentition for lifetime. Therapeutic measures performed to ensure retention of teeth vary in complexity. The treatment may involve combining restorative dentistry, endodontics and periodontics so that the teeth are retained in whole or in part. Such teeth can be useful as independent units of mastication or as abutments in simple fixed bridges. Continued periodontal breakdown may lead to total loss of tooth unless these defects can be repaired or eliminated and health of the tissues restored. Thus tooth resection procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth<sup>1</sup>. The term tooth resection denotes the excision and removal of any segment of the tooth or a root with or without its accompanying crown portion. Various resection procedures described are : root amputation, hemisection, radisection and bisection. Root amputation refers to removal of one or more roots of multirouted tooth while other roots are retained. Hemisection denotes removal or separation of root with its accompanying crown portion of mandibular molars. Radisection is a newer terminology for removal of roots of maxillary molars. Bisection / bicuspidization is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are then retained individually<sup>2</sup>Weine<sup>2</sup> has listed the following indications for tooth

resection

## Periodontal Indications

1. Severe vertical bone loss involving only one root of multi-rooted teeth.
2. Through and through furcation destruction.
3. Unfavourable proximity of roots of adjacent teeth, preventing adequate hygiene maintenance in proximal areas.
4. Severe root exposure due to dehiscence.

## Endodontic and Restorative Indications

1. Prosthetic failure of abutments within a splint: If a single or multirouted tooth is periodontally involved within a fixed bridge, instead of removing the entire bridge, if the remaining abutment support is sufficient, the root of the involved tooth is extracted.

2. Endodontic failure: Hemisection is useful in cases in which there is perforation through the floor of the pulp chamber, or pulp canal of one of the roots of an endodontically involved tooth which cannot be instrumented.

3. Vertical fracture of one root: The prognosis of vertical fracture is hopeless. If vertical fracture traverses one root while the other roots are unaffected, the offending root may be amputated.

4. Severe destructive process: This may occur as a result of furcation or sub-gingival caries, traumatic injury, and large root perforation during endodontic therapy.

## Contra Indications

A. Strong adjacent teeth available for bridge abutments as alternatives to hemisection.

B. Inoperable canals in root to be retained.

C. Root fusion-making separation impossible.

## Case Report

A 40 years old female reported with the complaint of difficulty in eating and chewing due to missing teeth. On radiographic examination, there is periapical pathology in relation to mesial root of 46. It was evident that in mesial root while undergoing endodontic treatment in

the tooth no 46 which was treated 4 years back, a file got broken in mesial canal. The bony support of distal root was completely intact. There is no mobility, no tenderness in the distal root. (Fig. 1). It was decided that the mesial root should be hemisected after completion of endodontic therapy of the tooth no 46. The working length was determined and the canals were biomechanically prepared using stepback technique. The canals were obturated with lateral condensation method and the chamber was filled with amalgam to maintain a good seal and allow interproximal area to be properly contoured during surgical separation. Under local anesthesia, full thickness flap was reflected after giving a crevicular incision from first premolar to second molar. Upon reflection of the flap, the vertical cut method was used to resect the crown. A long shank tapered fissure carbide bur was used to make vertical cut toward the bifurcation area. A fine probe was passed through the cut to ensure separation (Fig. 2). The mesial root was extracted and the socket was irrigated adequately with sterile saline to remove bony chips and amalgam debris (Fig. 3). The furcation area was trimmed to ensure that no spicules were present to cause further periodontal irritation. Scaling and root planning of the root surfaces, which became accessible on removal of distal root was done. The extraction site was irrigated and debrided and the flap was then repositioned and sutured with 3/0 black silk sutures. The occlusal table was minimized to redirect the forces along the long axis of the mesial root. Canine protected occlusion was established. Amalgam restoration in teeth no. 46, 48 is done. Tooth no. 45 is restored with glass ionomer cement (G.I.C). Carious teeth no 36, 27 (figure) are restored with amalgam. After healing of the tissues, fixed bridge involving retained distal half and mandibular second molar with sanitary pontic was given.

## Prosthetic Treatment Option:

- After Oral prophylaxis and restoration

of carious teeth etc hemisection of 46 tooth is achieved by the removal of mesial root. After healing and stabilization of the diseased tooth i.e. 46 The prosthetic treatment options left are-

- Fabrication of 2 unit F.P.D using tooth no. 45 and 46 (hemisected) as an abutment.
- Fabrication of 3 unit F.P.D using tooth no 45 and 46( hemisected) as an abutment and replacing mesial segment of tooth no 46 by a premolar pontic.

**Discussion**

Success of root resection procedures depend, to a large extent, on proper case selection. It is important to consider the following factors before deciding to undertake any of the resection procedures.

Advanced bone loss around one root with acceptable level of bone around the remaining roots.

Angulations and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, cannot be resected.

Divergence of the roots - teeth with divergent roots is easier to resect. Closely approximated or fused roots are poor candidates.

Length and curvature of roots - long and straight roots are more favorable for resection than short, conical roots.

Feasibility of endodontic and restorative dentistry in the root/roots to be retained.

Hemi-section has been used successfully to retain teeth with furcation involvement, instrument blockade etc. However, there are few disadvantages associated with it. As with any surgical

procedure, it can cause pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries. Often a favorable result may be negated by decay after treatment. Failure of endodontic therapy due to any reason will cause failure of the procedure.

In addition, when the tooth has lost part of its root support, it will require a restoration to permit it to function independently or to serve as an abutment for a splint or bridge. Unfortunately, a restoration can contribute to periodontal destruction, if the margins are defective or if non-occlusal surfaces do not have physiologic form. Also, an improper occlusal contact may convert acceptable forces into destructive forces and predispose the tooth to trauma from occlusion and ultimate failure of hemisection.

In the case reported, various aspects of occlusal function such as location and size of contacts and the steepness of cuspal inclines may have played a significant role in causing mobility before treatment. During treatment, occlusal contacts were reduced in size and repositioned more favorably. Lateral forces were reduced by making cuspal inclines less steep and eliminating balancing incline contacts.

**Conclusion**

The prognosis for hemisection is the same as for routine endodontic procedures provided that case selection has been correct, the endodontics has been performed adequately, and the restoration is of an acceptable design relative to the occlusal

and periodontal needs of the patient.

Root amputation and hemisection should be considered as another weapon in the arsenal of the dental surgeon, determined to retain and not remove the natural teeth. With recent refinements in endodontics, periodontics and restorative dentistry, hemisection has received acceptance as a conservative and dependable dental treatment and teeth so treated have endured the demands of function.

**References**

1. Basaraba N. Root Amputation and tooth hemisection. *Dent Clin of N Amer* 1969;13 : 121
2. Weine FS. *Endodontic Therapy*, 5th Edition.
3. Ingle JI and Bakland LK. *Endodontics*, 4th Edition.
4. Carranza and Newman. *Clinical Periodontology*, 8<sup>th</sup> edition WB. Saunders Co., Philadelphia.
5. Staffileno HJ. Surgical treatment of Furca Invasion, *Dent Clin of N Amer* 1969; 103-119.
6. Kost WJ, Stakiw JE. Root amputation and hemisection *J. Canad Dent Assoc* 1991; 57: 42-5.
7. Biesterfeld RC and Taintar JF : Endodontic considerations related to hemisection and root amputation. *NW Dent* 1978;157:142148.
8. Ross IF and Thompson RH. : A long term study of root retention in the treatment of maxillary molars with furcation involvement. *J Periodontol*; 49: 238-244

**Legends**

- Fig. 1 Intraoral view showing mandibular arch after oral prophylaxis and restored 45,46.
- Fig. 2 Pre-operative OPG showing resected mesial root of 46.
- Fig. 3 Introral periapical radiograph showing retained distal root of 46 splinted with 45.
- Fig. 4 Preoperative Mandibular Cast
- Fig. 5 Mock Preparation Of Tooth No 45 And 46
- Fig. 6 Three Unit Wax Pattern With Premolar Pontic
- Fig. 7 Two Unit Wax Pattern
- Fig. 8 Tooth Preparation of 45 And 46
- Fig. 9 Radiograph showing restoration post-root resection view
- Fig. 10 Intra oral view post restoration

