Hemisection : A Case-Report and Review

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ABSTRACT

Many people would prefer to keep their natural teeth and advances in dentistry have lead to treatment of teeth that once would have been removed. In order to carry out this present day mandate, hemisection is the procedure of cutting a tooth that has two roots in half. This will create a front half and a back half. This procedure can be done by a periodontist, an experienced dentist, an endodontist, or an oral surgeon. This article describes a simple procedure for hemisection in mandibular molar and its subsequent restoration.

Keywords: *Hemisection, radisection, bisection, bicuspidization*

INTRODUCTION

Modern advances in all phases of dentistry have provided the opportunity for patients to maintain a functional dentition for lifetime. . Many people would prefer to keep their natural teeth and this is a good thing for several reasons. First off it is your natural tooth. Secondly, the cost of replacing a tooth either with a bridge or dental implant can be expensive and they run the chance of failure. Treating a tooth can be a great alternative. A hemisection can only be done on the molars, the wider flatter teeth at the back of your mouth; the other teeth in your mouth simply wouldn't have the stability needed after the procedure. A hemisection cannot be done on an upper molar for it has three roots. But an expert/specialist dentist still could divide an upper molar into three parts (sometimes referred to as trisection), or could remove one or two roots (root resection).

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. Once the roots have been separated, your dentist will evaluate each half of the tooth and its root separately and determine whether they can be restored with crowns. Alternatively, the two halves of the tooth can be restored as individual teeth by placing two separate crowns, one on each root. It is even possible to use individual tooth roots to help support bridges. In some situations, this may require crown lengthening of one or both parts of the tooth and roots. In certain instances, guided tissue regeneration can be used for the bone to grow again in the bifurcation area so a dental implant can be placed at a later date. 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 tooth¹. 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 multirooted 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 individually².

Weine² 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 multirooted 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.

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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.

Contraindications

- 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.
- d. When bony support for remaining root is insufficient for restoration

CASE REPORT

A 35 years old man reported with the complaint of pain and mobility of left mandibular second molar. On examination, the tooth was sensitive to percussion. On probing the area, there was a 12 mm deep periodontal pocket around the distal root of the tooth. On radiographic examination, severe vertical bone loss was evident surrounding the distal root and involving the furcation area. The bony support of mesial root was completely intact (Fig. 1). It was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth³. The working length was determined and the canals were biomechanically prepared using step back technique. The canals were obturated with lateral condensation method and the chamber was filled with posterior restorative high strength GIC to maintain a good seal and allow interproximal area to be properly contoured during surgical separation. Under local anesthesia, full thickness flap was reflected.(fig2) Upon reflection of the flap, the bony defect along the distal root became quite evident. All chronic inflammatory tissue was removed with curettes to expose the bone. 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. The distal root was extracted (fig3) and the socket was irrigated adequately with sterile saline to remove bony chips and amalgam debris (fig4). 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. (fig5) The occlusal table was minimized to redirect the forces along the long axis of the mesial root .After healing of the tissues, fixed bridge involving retained mesial half and mandibular second molar with sanitary pontic was given.(fig6)

Fig.1

Fig.2

Fig.3

Fig.4

Fig.5

Fig.6

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.

1. Advanced bone loss around one root with acceptable level of bone around the remaining roots.
2. Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, can not be resected.
3. Divergence of the roots - teeth with divergent roots are 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.
4. Feasibility of endodontics and restorative dentistry in the root/roots to be retained.

Hemisection has been used successfully to retain teeth with furcation involvement. 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 improperly shaped occlusal contact area 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.

What are the follow-up procedures after the hemisection?

Some discomfort and swelling for the first two days. There can be some light bleeding for the first two days. Avoid chewing with your tooth until all the stitches are removed. Prescribe mouthwash so that your mouth is kept clean afterwards.

After a week or two, remove stitches. After a few more months, the tooth should be healed enough to place a crown. You may get one crown that will fit on both halves which will leave space between the roots and allow easy access for hygiene. The two halves of the teeth can also be restored as individual teeth with two separate crowns. The individual tooth roots may be used to support the bridges. For instance, if you have two adjacent teeth hemisected and the two middle halves removed then your dentist may be able to place a bridge that will support the two remaining halves.

What are the risks of a hemisection?

A tooth that has been hemisected will be harder to clean. It will also be weaker than the average tooth. It will be more susceptible to breakage and fracture. If the tooth has further problems then it may have to be extracted.

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