HEMISECTION - SURVIVAL OF THE FITTEST

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ABSTRACT
Every natural tooth must be given a chance to survive as long as possible. Teeth which are periodontally diseased with severe bone loss, vertical root fracture, therapeutic mishaps, decay, resorption, around one root may well be retained by removal of diseased root by hemisection. This article describes a procedure of hemisection in mandibular molar with periodontally compromised distal root and its subsequent prosthetic restoration, which yielded a satisfactory result.

KEYWORDS: Hemisection, Neo Endo, Extraction.

INTRODUCTION - Modern advances in 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 combination of restorative dentistry, endodontics and periodontics, so that the teeth are retained in whole or in part. Such teeth can be useful as an independent unit of mastication or as abutments in simple fixed bridges.

In cases where one root of a multi-rooted tooth are involved, 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. 1, 3, 6 Hemisection in one such procedure where removal or separation of root with its accompanying crown portion of mandibular molars. 2, 5, 6 Weine has listed the following indications for tooth resection: Periodontal Indications like, vertical bone loss involving only one root of multi-rooted teeth, through and through furcation destruction, unfavorable proximity of roots of adjacent teeth, preventing adequate hygiene maintenance in proximal areas, severe root exposure due to dehiscence. Endodontic and restorative indications like prosthetic failure of abutments within a splint: If a single or multi-rooted 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. In endodontic failure hemi-section is useful in cases with perforation through the floor of the pulp chamber or pulp canal of one of the roots of an endodontically involved tooth that cannot be instrumented. In vertical fracture of tooth where one root is involved while the other roots are unaffected, the offending root may be amputated. Severe destructive process may occur as a result of furcation or sub gingival caries, traumatic injury and large root
perforation during endodontic therapy. The treatment goal is preservation of remaining tooth structure and restoration of the function.

This case report describes hemisection procedure which was chosen to retain the endodontically treated mesial root of mandibular left first molar and extraction of periodontally involved distal root.

**CASE REPORT**

39 years old female patient reported with the chief complaint of pain in the lower left mandibular first molar. On examination, the tooth was sensitive to percussion. On probing, there was a proximal caries and deep periodontal pocket (13mm) around the distal root of the tooth with grade I mobility. (Figure 1)

On radiographic examination, extensive vertical bone loss was evident surrounding distal root involving the furcation area. The bony support of mesial root was completely intact. It was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth. The working length was determined; 1mm short of anatomic apex and the canals were cleaned and shaped using a standardize protocol to a size of 25/0.04 (Neo Endo). (Figure 2, Figure 3) The canals were obturated along with AH Plus sealer and the access cavity was restored with composite resin. (Figure 4)

Under local anesthesia, the vertical cut method was used to respect 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. The distal root was extracted and the socket was irrigated adequately with sterile saline to remove bony chips. (Figure 5, Figure 6) The reduced molar resembled premolar in shape. A temporary bridge was seated during healing and consolidation phase to prevent drifting of the remaining root. Definitive restoration therapy was accomplished 3 months after hemisection. Crown was given on retained mesial half of mandibular first molar followed by removable partial denture given int #37. (Figure 7, Figure 8, Figure 9)

**DISCUSSION**

Success of hemi-section/ resection procedures can be predictable, if case selection is done wisely. They being, tooth with advanced bone loss around one root with acceptable level of bone around the remaining roots. Angulation and position of the tooth in the arch, a molar that is buccally, lingually, mesially or distally titled, cannot be resected. 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 and finally feasibility of endodontics and restorative dentistry in the root/roots to be retained should be considered. Added on, patient’s oral hygiene, caries index and medical status should be considered. However, there are few disadvantages associated with it. As with any surgical procedure, it can cause pain, anxiety and 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. Present case, showed excessive bone destruction around distal half of distal root by vertical bone loss and grade I mobility. But the mesial root had adequate bone support and hence, hemisection was carried out with removal of the distal root and crown and preservation of mesial root of 36. Unfortunately, a restoration can contribute to periodontal destruction, if the margins are...
defective or 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. Here an occlusal table for retained mesial root of 36 was reduced by giving a premolar form, thus reducing trauma from occlusion and a removable partial denture was used for space closure. Lateral forces were reduced by making cuspal inclines less steep and eliminating balancing incline contacts. Park et al. have suggested that hemisection of molars with questionable prognosis can maintain the teeth without detectable bone loss for a long-term period, provided that the patient has optimal oral hygiene. Saad et al. have also concluded that hemisection of a mandibular molar may be a suitable treatment option when the decay is restricted to one root and the other root is healthy and remaining portion of tooth can very well act as an abutment. Also, Fugazzotto reported 15-year cumulative success rates of 96.8% for root resected molars and 97% for molar implants. The use of hemisection to retain a compromised tooth offers a prognosis comparable to any other tooth with endodontic treatment. This clinical report illustrates solution to the endo-perio problem by hemisection and fixed partial dentures. Although such involvement diminishes the long-term prognosis of the affected tooth, extraction is not always an option. Root resection therapy is one of the several treatment modalities that can be used in such cases.

**CONCLUSIONS**

The prognosis for hemisection is the same as for routine endodontic procedures provided that the case selection has been correct, the endodontic therapy has been performed adequately and the restoration is of an acceptable design relative to the occlusal and periodontal needs of the patient.
FIGURE 5: HEMISECTED ROOT

FIGURE 6: POST-OPERATIVE RADIO GRAPH

FIGURE 7: PERMANENT CROWN CEMENTED

FIGURE 8: REMOVABLE PARTIAL DENTURE
IRT 37

FIGURE 9: REMOVABLE PARTIAL DENTURE IRT 37
REFERENCES