

Management of periodontally compromised mandibular molar with Hemisectioning: A case report

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ABSTRACT

Introduction: Hemisection involves sectioning of a periodontally involved mandibular molar so as to remove the involved root and save the remaining tooth. This procedure helps in saving a tooth which otherwise would have been deemed for extraction. Hemisection refers to removal or separation of root with its accompanying crown portion of two-rooted teeth, most commonly mandibular molars. **Method:** In this case report, an advanced Endo-Perio lesion on a left mandibular first molar was successfully treated by root-canal treatment and hemisection. This procedure helps preserve the tooth structure, alveolar bone and promote cost savings over other treatment options. **Conclusion:** Hemisection is a treatment option for saving a mandibular molar which is in advanced stage of periodontal disease of one root. Removal of the affected root will help in retaining the remaining tooth structure.

Key words: Endo-perio lesion, hemisection, mandibular molar

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INTRODUCTION

Recent advances in dentistry provide the opportunity for patients to maintain a functional dentition for decades. One of the indications of extraction of a tooth is loss of alveolar bone support. In case of mandibular molars, in some cases one of the roots will be in advanced state of periodontal disease while the other root may be salvageable. Hemisection refers to surgical separation of a multi-rooted tooth with the extraction of one root along with the overlying crown. Root resection or Radisectomy refers to removal of only affected root at the point where it joins the crown and Bicuspidization refers to sectioning of the crown, usually a mandibular molar, leaving the two halves and their roots so that oral hygiene can be maintained in the furcation area.^[1]

Once the tooth has been judged appropriate for this treatment, it must undergo endodontic therapy first. Selected root removal allows improved access for homecare and plaque control with resultant bone formation and reduced

pocket depth. The treatment may include endodontic therapy, periodontal therapy, tooth reconstruction and prosthetic coverage so that the teeth are retained in whole or in part for longer time. Continued periodontal breakdown may lead to total loss of tooth unless these defects are repaired or eliminated and health of the tissues restored. Post treatment, these teeth can be used as individual units or can be used as an abutment for fixed prostheses.^[2,3]

This case report describes a patient who presented with pain and mobility in relation to mandibular left first molar. The treatment plan involved initial endodontic therapy with hemisection of the distal half of the tooth planned due to severe vertical bone loss and furcation bone loss in relation to distal root. After a month when healing was found satisfactory a fixed prosthesis was given which served the dual purpose of acting as a splint as well as restoring the masticatory function of tooth. Thus prognosis of tooth improved and need for extraction was eliminated.

CASE REPORT

A 62 years old female reported with the complaint of pain and mobility of left mandibular first molar. On examination, the tooth was sensitive to percussion and revealed grade 2 mobility. On probing the area, there was a 13 mm deep

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periodontal pocket around the distal root of the tooth. On radiographic examination, severe vertical and horizontal bone loss was evident surrounding the distal root and involving the furcation area and deep proximal caries involving pulp evident with left mandibular second molar [Figure 1]. The probing pocket depth around the mesial root of tooth no. 19 was 3 mm. It was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth. The treatment plan was explained to the patient, prognosis of Hemisection against extraction of the tooth discussed and consent obtained.

The access cavity preparation was done and working length was estimated with apex locator (Propex II, Dentsply) and confirmed radiographically. The cleaning and shaping was done with rotary Protaper files upto F2 (Dentsply Maillefer, Switzerland) with 5.25% sodium hypochlorite being used for irrigation. Of the canals which were prepared, only the mesial canals were obturated with Gutta percha and zinc oxide eugenol based sealer (RC Fill, Prime Dental Products, Mumbai) by lateral condensation method. In the next appointment, the access cavity chamber was filled with silver amalgam to maintain a good coronal seal and allow interproximal area to be properly contoured during surgical separation.

Under local anesthesia and surgical exposure of the flap, the crater like bony defect along the distal root became quite evident. All granulation tissue was removed with Gracey curettes (Hu-Friedy, USA) to expose the bone. The vertical cut method was used to resect the crown with distal root. A long shank tapered fissure carbide bur (SS White, USA) was used to make vertical cut toward the bifurcation area [Figure 2a]. A fine probe was passed through the cut to ensure separation. The distal half was extracted atraumatically [Figure 2b and c] and the socket was irrigated adequately with sterile saline. Scaling and root planing of the root surfaces, which became accessible on removal of distal root was done. The occlusal table was minimized to redirect the forces along the long axis of the mesial root. Radiographs showed the well retained mesial root and extraction socket of the distal root. Endodontic therapy of tooth no. 18 was completed [Figure 3a]. After 1 month, healing of the tissues was evident. A fixed bridge involving retained mesial half of tooth nos. 19 and 18 with sanitary pontic was given [Figure 3b].

DISCUSSION

Hemisection is the splitting of a two-rooted tooth into two separate portions. This process has been called bicuspidization or separation.^[1] Many factors determine

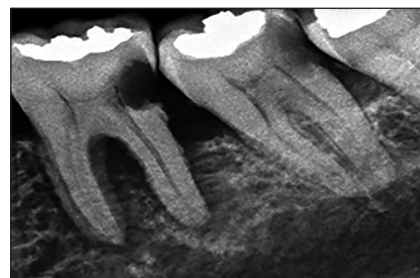


Figure 1: Pre operative radiograph Pre operative clinical view

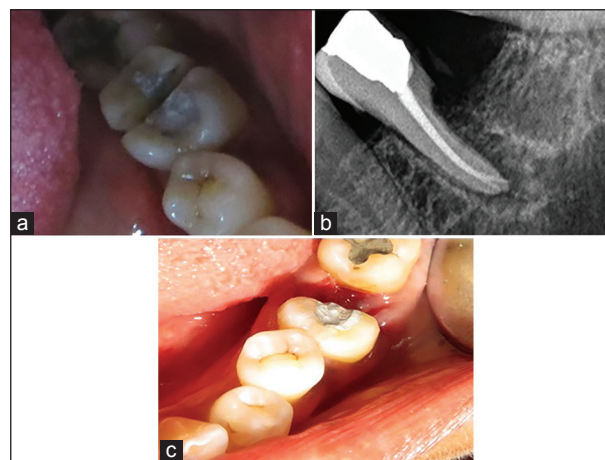


Figure 2: (a) Initial cut during sectioning procedure (b) Post sectioning radiograph (c) Clinical view of sectioned tooth

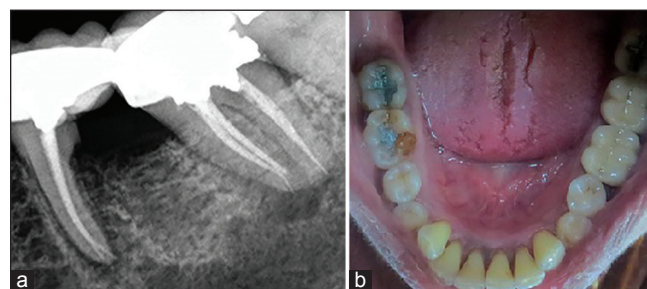


Figure 3: (a) Post operative radiograph (b) Bridge cementation

choosing one treatment plan over another when confronted with a furcation invasion of a mandibular molar. These may be enumerated in three areas.^[3]

- Local factors — tooth anatomy, tooth mobility, crown root ratio, severity of attachment loss, inter-arch and intra-arch occlusal relationship, strategic dental value for retention or removal.
- Patient factors — health of a patient, importance of the tooth to the patient, costs, and time factor.
- Clinician factors — a good case selection, diagnostic and treatment planning skills, awareness of therapeutic options and clinical insight or skill in providing service.

Tooth resection can be done in the following cases:

- Periodontal considerations:

1. Severe vertical bone loss involving only one root of a multi rooted tooth.
 2. Through and through furcation destruction.
 3. Proximity of roots of adjacent teeth preventing adequate maintenance of oral hygiene.
 4. Root exposure due to dehiscence.
- b. Restorative and endodontic considerations:
1. Periodontal failure of an abutment tooth in a fixed bridge.
 2. If one root cannot be completely instrumented due to anatomic reasons or due to iatrogenic causes.
 3. Vertical fracture of one root.
 4. Severe destruction of one root due to resorption, caries, trauma or perforation.^[2]

The decision concerning the final treatment to be performed should be made after the effects of the cause-related therapy have been evaluated. Carnevale^[4] suggested the sequence for the treatment of furcation involved tooth, namely endodontic treatment of the part to be retained followed by sectioning of the involved root and associated crown structure.

Hemisection has been used successfully to retain teeth with furcation involvement. However, it is not free from few disadvantages associated with it. As with any surgical procedure, it can lead to pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries.

The terms 'root amputation' and 'hemi-section' are known collectively as 'root resection'. According to Newell,^[5] the advantage of the amputation is the retention of some part or the entire tooth. However, the disadvantage is that the remaining root or roots must undergo endodontic therapy and the crown must undergo restorative management.

Newell^[6] examined 70 root resected molars in 62 patients for the quality of the resections. Twenty-one (30%) of the resections were considered faulty when subgingival, residual roots, furcal lips, and/or ledges were present. Failures were more frequent in maxillary molars (33.3%) than mandibular molars (22.7%). Often a favourable result may be negated by secondary decay after treatment. Failure of endodontic therapy due to any reason can lead to 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. Buhler^[7] reported a 32% failure rate at 10 years on 34 resected molars. Again, the main causes of failure were endodontic pathology and root fracture, while only one tooth was extracted due to periodontal breakdown. The same failure rate was found by Blomlof *et al.*,^[8] in a follow-up three to 10 years later.

Park *et al.*,^[3] have suggested molars that are having questionable prognosis can maintain the teeth without detectable bone loss for a long-term period by hemisection but patients should maintain good oral hygiene and report for regular follow up.

Park SY^[9] performed root resection therapy on 691 molars in 579 patients. The associated factors were examined from 342 of 402 molars that had been followed up for >1 year. They concluded root resection to treat periodontal problems had a better prognosis than for non-periodontal problems. To achieve a good result, it was important that the remaining roots had >50% bone support. This guideline may help to improve the predictability of root-resection therapy.

In a case report done by Jain^[10] on a case of excessive destruction of the mesial root due to the external root resorption and fair amount of the distal root remaining with adequate bone support, hemisection was carried out with the removal of the mesial root and crown. Remaining tooth structure was restored with composite and used as an abutment in crown and bridge after repositioning the occlusal contacts in favourable position.

Akki S^[11] reported a case with missing mandibular left first premolar and grade-I mobility of mandibular left first molar and 9mm deep periodontal pocket on the distal root. Distal root was extracted. The treated teeth were successfully used as abutments for small bridges. Various authors have published case reports with long term follow up which points to the success of hemisection as a viable treatment option.^[12-16]

CONCLUSION

Therapeutic strategies of teeth with furcation involvement should include the option of resective treatment. This case report shows the treatment of a periodontally compromised tooth by multidisciplinary treatment approach. The success of the hemisection procedure depends on the supporting bone, the restorative treatment plan, and the oral hygiene of the patient. Regular periodontal maintenance and sufficient coronal restoration of the root resected teeth are important preconditions for long term survival.

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