

Case Report

Management of endo-perio compromised tooth by retreatment and hemisection

Padma Chandra¹, Rajesh Prasad², Jagdish Chandra³, Surendra Kumar Mishra⁴

¹Senior Resident Jawahar Lal Nehru Medical College and Hospital, Bihar,

²Oral and Maxillofacial Surgeon, Jharkhand,

³Associate professor, Department of general surgery, DMCH, BIHAR

⁴Professor, Department of Conservative Dentistry and Endodontics Dr. Z.A. Dental College, AMU, Aligarh, UP,

ABSTRACT:

When untreated, the preceding endodontally and periodontal disease inevitably leads to loss of tooth. The patients' growing desire to retain their dentition has led to the development of the hemisection procedure. It is a useful alternative to extraction, removal or fixed partial denture to save the multi-rooted tooth with periodontal, endodontic, restorative, or prosthetic complications. Hemisection refers to removal or separation of root with its associated crown portion of two-rooted teeth, most commonly mandibular molars. This article reports case of a retreatment of tooth followed by hemisection and prosthesis.

Keywords: Endo-perio lesion, hemisection, mandibular molar.

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Corresponding Author: Dr. Padma Chandra, Senior Resident Jawahar Lal Nehru Medical College and Hospital, Bihar, India.

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INTRODUCTION

Where there is a will there is a way. With the increasing demand of the patients to retain their natural tooth, recent dentistry has made it possible to sustain a lifetime functional dentition.¹ There are often undesirable consequences of losing the posterior tooth, such as drifting of teeth, loss of arch length and masticatory function.² The multi-rooted tooth with periodontal, endodontic, restorative, or prosthetic problems the treatment options are limited and may include extraction, a removable partial denture or a dental implant to replace the missing tooth.³ Hemisection of multi-rooted tooth is best option when severe bone loss is limited to one root or class III furcations involvement and the other root is healthy. It is a useful alternative treatment to save the multirooted tooth.⁴ Careful case selection is very important for the success of hemisection. Hemisection refers to the division into two halves of a molar followed by the removal of the diseased root and its coronal part.¹

According to weine,⁵ some indications for tooth hemisection are (1) severe vertical bone loss involving only one root of multi-rooted teeth, (2) through and through furcation destruction, (3) severe root exposure due to dehiscence, (4) where a single or multi-rooted tooth is periodontally involved within a fixed bridge, instead of removing the entire bridge, where the remaining abutment support is sufficient, the root of the involved tooth is extracted, (5) periodontal failure of an abutment tooth in a fixed bridge, (6) if one root cannot be completely instrumented due to anatomic reasons or due to iatrogenic causes, (7) vertical fracture of one root. Some contraindications are: poorly shaped roots or fused roots, patient unwilling to undergo surgical and endodontic treatments.

The present case report demonstrates the successful management of endodontically and periodontally involved multirooted molars with advanced bone loss and furcation involvement through hemisection and rehabilitation with fixed prosthesis.

CASE REPORT

A male patient of 30 years of age was reported with the complaint of pain in the lower left back tooth region. His medical history was non-contributory. Clinical examination revealed that the tooth no.36 was sensitive to percussion and revealed grade 2 mobility and the tooth was covered by porcelain crown. On probing the area, there was a 13 mm deep periodontal pocket around the mesial root of the tooth. On radiographic examination, tooth was found to be deficient in endodontic treatment and significant vertical and horizontal bone loss was evident surrounding the mesial root involving the furcation. The bony support of distal root was intact (Fig. 1). Distal bone support of tooth no.35 was also compromised so it was decided to perform vitality testing of same tooth. The tooth was then found to be nonvital. It was therefore decided that the mesial root should be hemisected after completion of reendodontic treatment of the tooth no.36 and root canal treatment of tooth no.35 followed by prosthesis. The patient was presented with the treatment plan and the prognosis and consent was received.

Under local anesthesia, after removal of porcelain crown of tooth no.36 access cavity was refined. Existing gutta-percha was removed using H-file (Dentsply Maillefer), and chloroform. The canals were explored using a #10 K-file. Working length was determined and radiographically confirmed. Complete biomechanical preparation was performed, and thorough irrigation was done with 2.5% sodium hypochlorite during the preparation. After intracanal medicament placement temporary restoration was given. In the next appointment the tooth was found to be asymptomatic, and the canals were obturated with a cold lateral condensation technique. The tooth was temporarily sealed using cavite. Root canal treatment of tooth no.35 was also performed.

In the next appointment, hemisection was carried out in relation to tooth no.36 with the vertical cut method. Under local anesthesia, full thickness mucoperiosteal flap was reflected after giving a crevicular incision from first premolar to second molar. Using long-tapered fissure diamond, the vertical cut was made from occlusal surface towards the furcation area of tooth no.36, and the mesial root along with crown portion, was separated (Fig. 2). Then mesial root was atraumatically extracted (Fig. 3). Using normal saline, socket was thoroughly irrigated. Bone was then filed to remove any bony chips and irregularities. After flap replacement, interrupted sutures were given (Fig. 4). The occlusal table was reduced to redirect the forces along the long axis of the distal root. The surgical site was covered with a periodontal dressing (Coe-Pak™ GC America Inc., Alsip, IL, USA), and postoperative instructions were given to the patient. After one week, patient was recalled for removal of suture (Fig. 5,6).

After healing of the tissue, permanent restoration was carried out. It was followed by a fixed bridge with a preserved distal half of the first mandibular molar and

a second premolar with sanitary pontic (Fig. 7, 8). At the 1year follow up, the tooth was clinically and radiographically healthy and satisfactory bone healing in relation to mesial root and probing pocket depth was reduced with no mobility (Fig. 9).



Fig 1: Preoperative Radiograph



Figure 2: Hemisection of mesial root.



Figure 3: Hemisected tooth portion



Figure 4: Sutures placed



Figure 5: Postoperative Photograph After 1 week



Figure 6: Postoperative Radiograph After 1 week



Figure 7: Post-operative Radiograph with fixed prosthesis



Figure 8: Post-operative Photograph with fixed prosthesis



Figure 9: 1 year follow-up with satisfactory bone healing.

DISCUSSION

The goal of endodontic treatment is to eliminate root canal infections and prevent their re-infection.⁶ Untreated root canal spaces act as a nest for bacterial growth and lead to root canal treatment failure.⁷ Endodontically treated teeth may fail due to intra-radicular or extra-radicular infection.⁸ Causes of failure may include iatrogenic procedural errors such as poor access cavity design, untreated canal, canal that are poorly cleaned and obturated, coronal leakage etc. The intercommunication of infection between pulpal and periodontal tissues may result in bone loss, tooth mobility, furcation involvement. The treatment options to replace severely damaged and possibly unrestorable teeth include extraction, removable partial denture, fixed partial denture, dental implant and hemisection.

In the present case report, tooth was found to be deficient in endodontic treatment with deep periodontal pocket, severe bone loss and furcation involvement. The patient wanted to preserve as much tooth structure as possible so extraction and prosthetic replacement were not selected. Another option was to implant⁹, but the patient was not ready due to financial problem. This present case is an endodontic-periodontal lesion. Periodontal surgery is essential in this case as periodontal bone loss was more advanced and less likely to be healed following non-surgical treatment alone.¹⁰ So it was decided to do reendodontic therapy first to avoid intrapulpal dystrophic calcification and postoperative tooth sensitivity and then hemisection of the tooth.¹¹ Selected root removal allows improved access for homecare and plaque control with resultant bone formation and reduced pocket depth.

Saad et al.¹² concluded that hemisection of the mandibular molar may be an appropriate treatment option when the decay is confined to one root and the other root is healthy and the remaining portion of the tooth may act as an abutment. It allows physiologic tooth mobility of the remaining root, which is thus a more suitable abutment for fixed partial dentures than an implant.¹³ It also preserve socket, helps retain the available bone and soft tissue for better function and aesthetics. It provides a good, absolute and biological cost-saving alternative with good long-term success.¹⁴ Morphology, clinical length and shape of roots of the multirouted tooth should be considered when deciding to perform a hemisection procedure. Preferably the resected root should have large root divergence, as close root proximity would make surgery difficult, with roots spread apart.¹⁵

Hemisection as a treatment option was perfectly suited to this present case, as severe bone loss was limited to mesial root of tooth no.36 and class III furcations was also present and the distal root was healthy. The roots were straight widely separated from each other. In this case, the mesial root was resected as the significant bone loss was confined to the mesial root. The distal root was wider and

straighter so it makes the remaining tooth structure more appropriate as an abutment.¹⁶ The remaining tooth structure was restored with amalgam restoration and used as an abutment for crown and bridge. Bollineni and Karunakar¹⁷ concluded that the hemisection process has made it a successful treatment option to increase the life of the tooth. Park et al.¹⁸ indicated that molar hemisection with questionable prognosis could retain the teeth for a long time without noticeable bone loss, provided the patient has good oral hygiene. In this case, the patient had good oral hygiene. The second premolar also indicated endodontic involvement, so before molar hemisection, teeth were treated with RC therapy.

Root fracture is the main reason for failure after hemisection, so in order to limit the forces on the retained hemisected root occlusal table was reduced in dimension. Retained root is restored as premolar which helped to reduce the masticatory load. Stein noted that the best design for the posterior region is the sanitary pontic. It allows adequate space for cleaning.¹⁹ In the present case, three-unit bridge was provided to restore occlusal function that involved adjacent second premolar and retained distal root of mandibular first molar. Hemisection has also disadvantages like it can lead to anxiety and pain. In the furcation or at the hemisection site, root surfaces that are reshaped are more vulnerable to caries.

The keys to long-term success of hemisection include a proper diagnosis, a selection of patients with good oral hygiene, careful endodontic, surgical, prosthetic procedures patient cooperation.

CONCLUSION

Hemisection is presented as an alternative, effective and conservative treatment option over conventional treatment or extraction of endodontally and periodontally compromised teeth. The success of the hemisection procedure depends on the careful case selection, surgical, restorative and prosthetic management.

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