

CASE REPORT

Management of Mandibular Molar having Sub-Gingival Caries by Hemisection and Post & Core: A Case Report

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ABSTRACT:

Now a day's patients are more concerned about oral health. They want to preserve their teeth by latest treatment option and methods available. There are so many treatments but treatment option based on the clinical condition, an age of the patient and economical condition of the patient. Root amputation or hemisection of mandibular molar is a suitable treatment options for decayed tooth rather than extraction. Tooth resection procedures preserve as much tooth structure as possible without extracting the whole tooth. Sectioning of the molar tooth with the removal of an unrestorable root which may be affected by periodontal, endodontic, cracked root or caries is called hemisection. This article describes a case report, in which decayed terminal abutment was part of a fixed prosthesis.

Key word: Root amputation, hemisection, root canal treatment, cast post and core prosthesis.

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INTRODUCTION

A terminal abutment decay molar is unsuitable for restoration. For such cases, the treatment options are limited and may include a removable partial denture or a dental implant to replace the missing tooth.¹ But, if the decay is limited to one root then a hemisection procedure may be possible to preserve rest of the tooth structure. This procedure is conservative, aiming to retain as much of the original tooth structure as possible.² The results are predictable, and success rates are high if certain basic considerations are taken into account.³

Assessment of endodontic and periodontic problem is very important for selection of each case. In root resection a portion of multirooted root is removed which involve subgingival caries or periapical pathology. Root amputation can be done by a various method, in this article hemisection was used, in which molar tooth was cut into two half and unrestorable half is removed. Due to these, the healthy part of the tooth gets preserved. Grossman referred to root

amputation as preserve natural teeth as a gift of the old adage that half a better than none⁴. amputation and hemisection procedures are reported in the literature over 100 years ago. Early in 1960's, the treatment involving root amputation was right on the cutting edge in periodontics and endodontics.

Weine⁵ has listed the following indications for tooth resection.

Periodontal indications

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

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.

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 one root fracture: The prognosis is hopeless of vertical fracture. 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 subgingival caries, traumatic injury, and large root perforation during endodontic therapy.

Contraindication for hemisection includes fused roots where separation is impossible, roots where endodontic therapy is not feasible and patient unwillingness. This case reports presents retention of a mandibular molar with subgingival caries on the distal root by hemisectioning that root followed by a full coverage restoration with the fabrication of cast post and core.

CASE REPORT

An 18 years old male patient reported to the Department of Conservative Dentistry and Endodontics with the chief complaint of pain in lower, left, posterior region, since 3 months. On clinical examination, there was distal caries on the first molar that extends subgingivally and tooth had mild tenderness on percussion. The tooth had grade 1 mobility and furcation involvement. On probing the area, there was a 10 mm deep periodontal pocket around the distal root of the tooth. On radiographic examination (Fig-1), vertical bone loss was seen that surrounding the distal root and involving the furcation area. The bony support of mesial root was completely intact but radiolucency was

seen in apical area. So, the diagnosis was primary endodontic lesions with secondary periodontal involvement. The treatment options were extraction of the tooth or hemisectioning of the distal root followed by prosthetic rehabilitation. It was decided that the distal root should be hemisected after taken the consent of the patient.

After local anaesthesia, a mucoperiosteal flap was reflected to expose the area of hemisection. For sectioning of the distal root, vertical cut method using a long shank tapered fissure bur was done towards the bifurcation area. The separation was confirmed by passing a fine probe. A straight elevator was used to luxate and remove the distal root from the socket (Fig-2). The exposed root surface was scaled and root planned. The socket was debrided and irrigated with plenty of normal saline and the defect was sealed with GIC (ivoclar vivadent) (Fig-3). The flap was repositioned and sutured with 3-0 silk non-resorbable interrupted sutures. Antibiotics and analgesics were prescribed for one week. After seven days, root canal treatment was done in a mesiobuccal, mesiolingual canal of first molar (Fig 4-6). The sutures were removed 10 days later. The patient was recalled on a weekly schedule for postoperative to ensure good oral hygiene in the surgerized area. It was noted that sufficient tooth structure remained for fabrication of a post and core restoration. Gutta-percha (10 mm) was removed from the orifice to prepare the post space (Fig-7). A polyvinyl siloxane (PVS) impression was obtained with a sterilized metal post a stock tray (Fig-8). A cotton pellet and temporary restorative material were placed in the tooth. Now, model was prepared from the impression (Fig-9), Casting was completed (Fig-10) and a post was tried in. Once the seating had been confirmed radiographically, the post was then cemented using luting GIC (ivoclar vicadent) (Fig.11-12). Crown preparation was done in second molar for support. The margin was modified, and a final impression was made using PVS in a full-arch stock tray. Shade matching was done that was A₂ (Fig-13). Temporization was done. After few days, PFM crown was given (Fig-14) and recalled the patient after six month for follow-up (Fig-15)

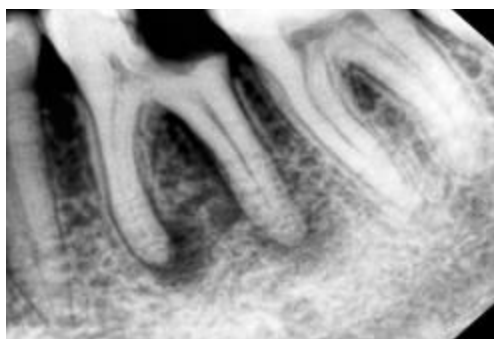


Figure 1. Pre-operative radiograph



Figure 2. Distal root extracted from socket



Figure 3. Defect was sealed with GIC

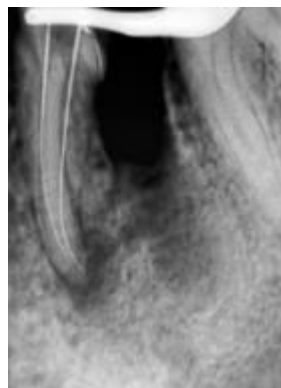


Figure 4. Working length

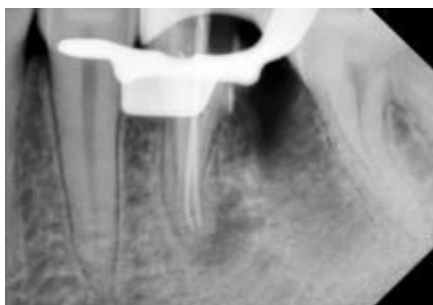


Figure 5. Master cone was taken

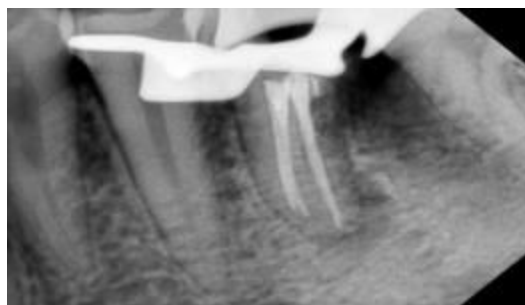


Figure 6. Obturation was done

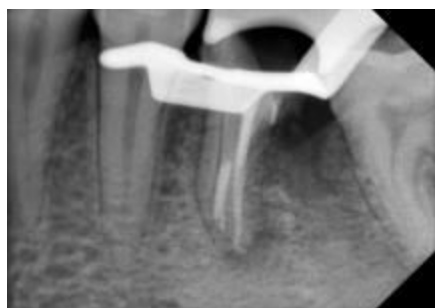


Figure 7. Post space was prepared



Figure 8. PVS impression



Figure 9. Model prepared from impression



Figure 10. Casting was done



Figure 11. Post & core was fabricated



Figure 12. Occlusal view of cemented post.



Figure 13. Shade matching



Figure 14 . Final PFM crown



Figure 15. After 6 months follow-up

DISCUSSION

Root amputation/hemisection is a useful alternative procedure to save those multi-rooted teeth which have been indicated for extraction. The successes of the root amputation procedures are solely dependent on proper case selection as the procedure is technique sensitive.⁶ Patient's oral hygiene status, caries index and medical status of patient should be considered, before selecting a tooth for hemisection,. Also, accessibility of root furcation for easy separation as well as good bone support for the remaining

root should be assessed. Besides these there are various factors have to be considered by the clinician before arriving to the final decision of hemisection procedures.^{7,8} Local factors that related with tooth are tooth anatomy, crown-root ratio, tooth mobility, severity of attachment loss, and occlusal relationships. For example bone loss near the furcation area, angulations tooth in the arch, Length and Divergence of roots.⁷ Patient factors include health of the patient, importance of the tooth, cost and time. Lastly are the clinician factors which involve a good case selection,

diagnostic, treatment planning and clinical skill. The present case is an indication for hemisection as the subgingival caries that involves the distal root and furcation involvement is present. The patient is also willing to save his tooth.

Carnevale⁹ suggested the sequence of treatment to be endodontic therapy of the part to be retained followed by surgical sectioning of the involved root and crown part. Then the retained part has to be prosthetically rehabilitated and maintenance of the hygienic measures. Even though hemisection is a successful treatment option in furcation involvement cases it is associated with some disadvantages. The main disadvantage of hemisection is pain and anxiety. Root surface that are grinded in the furcation area are more susceptible to caries that are exposed by hemisection.

Prosthetic part is also very important in these procedures. The tooth has already lost a part of its root support, so it requires a restoration with post and core to function independently or as an abutment. The occlusal part of the prosthesis should be deoccluded to reduce the masticatory forces especially the lateral component. The cuspal inclines should be less steep and balancing incline contacts should be eliminated to reduce lateral forces. The margins should be proper without any overhangs or plaque retentive features to prevent further periodontal destruction. Shin-Young Park reported that resected molars used as intermediate abutments of a fixed bridge had a higher survival rate.¹⁰ This may be due to small occlusal table so that maintain the occlusal force. Improperly occlusal contact areas are converted acceptable forces into destructive forces and ultimate cause failure of hemisection. For a successful procedure, equal distribution of occlusal forces to retain a compromised tooth offers with the favorable prognosis and adequate support which is necessary for long-term success.

Root fracture is the main cause of failure after hemisection procedure. After 10 years study on 34 resected molars Buhler's reported that 32 % failure with main causes as endodontic failure and root fracture.¹¹ So, occlusal force is very necessary to maintained in a remaining root.

Park J et al suggested that, maintaining oral hygiene and proper follow up molars with questionable prognosis can be maintained for a long time by hemisection without further bone loss⁷. Shin-Young Park concluded that root resections to treat periodontal problems have a good prognosis than for non periodontal problems and remaining roots should have more than 50 % support for better results¹⁰.

CONCLUSION

Hemisection is a treatment option to preserve the compromised tooth for long time that solely depends on proper case selection. The prognosis of the case is good if endodontic therapy is adequately performed and the prosthetic rehabilitation favours the occlusal and periodontal needs of the patient. It was show that this technique is very effective.

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