

## Root Amputation “A ray of hope” for decayed mandibular molar: A Case series

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### Abstract

**Introduction:** A patient is more concern about his teeth and wants to preserve their teeth. Patient wants to preserve teeth by latest treatment option and method available. There are so many treatments available but our treatment option based on the clinical condition, an age of the patient, economical condition of the patient. Hemisection of a compromised mandibular molar is a suitable treatment option. Sectioning of the molar teeth with the removal of an unrestorable root which may be affected by periodontal, endodontic, crack root or caries is called hemisection.

**Case report:** This article describes three cases in which the severely decayed molars are preserved by hemisection and can be used as an abutment which is the part was part of a fixed prosthesis.

**Discussion:** Molar tooth plays a very important role in our day to day life, its loss can result in several undesirable sequelae including tilting of adjacent teeth, a collapse of the vertical dimension of occlusion, supra-eruption of opposing dentition, loss of supporting alveolar bone and a decrease in chewing ability.<sup>[18]</sup>

**Conclusion:** Hemisection is the alternative, effective and conservative treatment procedure. Long term success depends upon correct diagnosis, selection of patient with good oral hygiene and careful surgical and restorative management. It was show that this treatment procedure is ray of hope for hopeless mandibular molar.

**Key World** -hemisection, prosthesis root canal treatment, furcation involvement.

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### I. Introduction

Modern dentistry is based on conservation and preserves the natural teeth structure as possible <sup>1</sup>. Assessment of endodontic and periodontic problem is important for case selection. In root resection a portion of molar is removed which is involving periapical pathology. Resection can be done by a various method. Hemisection involves removing root structure which is compromise endodontically or periodontically and preserves the healthy part of the tooth. Grossman referred to root amputation as preserve natural teeth as a gift of the old adage that half a better than none.<sup>2</sup> amputation and hemisection procedures are reported in the literature over 100 years ago. Early in the 1960's, the therapy involving root amputation was right on the cutting edge in periodontics and endodontics. 'Hiat' and 'Amen' contributed in the quest for salvaging teeth by comprehensively describing the indications and techniques for root amputation. The same methods is describe by G V Black in the nineteenth century and by 'Sharp' in 1920.<sup>3,4</sup>

Weine<sup>5</sup> has suggested the following indication for tooth resection were

#### Endodontic and Restorative Indications

1. Prosthetic failure of abutments within a splint: If a single or multirouted 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 pulp chamber or pulp canal of one of the roots or 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 forces.

**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.

**CONTRA INDICATIONS**

1. Strong adjacent teeth available for bridge abutments as alternatives to hemisection.
2. Inoperable canals in root to be retained.
3. Root fusion-making separation impossible.

## **II. Case Reports**

### **Case 1**

A 41-year-old male reported to the Department of Conservative Dentistry and Endodontics, with a chief complaint of pain in the lower left back teeth region for 20 days. Pain was mild and intermittent in nature, which aggravated on mastication. Clinical examination revealed deep caries with no other detectable abnormality. On clinical examination caries seen in 35,36 .and revealed grade 1 mobility.

On radiographic examination [FIG-1], a vertical bone loss was evident surrounding the mesial root molar and involving the furcation area. Periapical radiolucency seen in 36. Choice of treatment was extraction patient did not want to extraction so conservative approach was selected, which include hemisection. So that access opening done by endo access bur. The working length was determined by x ray and the distal canal was biomechanically prepared using stepback technique. Master cone was confirmed by radiograph[FIG-2]. The distal canals were obturated with lateral condensation method and the chamber was filled with amalgam to maintain a good seal.

After local anesthesia, a mucoperiosteal flap was reflected to expose the area of hemisection. Hemisection was carried out in mesial root in 36 [FIG-3,4]. Antibiotics and analgesics were prescribed for one week. After few day PMF crown was given [FIG-5]. The patient was recall weekly, to ensure good hygiene and radiograph was taken after 6 month which show healing in this area[FIG-6].

### **Case 2**

A 26-year-old female reported to the department of Conservative dentistry and Endodontics, with a chief complaint of pain in the lower right back teeth region since 6 month. On radiographic examination, distal root of right mandibular molar show periapical radiolucency.[fig -7]. On intra oral examination right mandibular molar was grossly caries[fig-8] and show tender on percussion. access opening done by endo access bur. The working length was determined by x ray and the mesial canals were biomechanically prepared using stepback technique. The mesial canals were obturated with lateral condensation method and the chamber was filled with Glass ionomer cement to maintain a good seal. Hemisection was done of distal root of mandibular molar[FIG-9, 10, 11] and after healing metal ceramic crown was given[FIG-12]. The patient was recall after 6 month and radiograph which show good bone healing[fig-13].

## **III. Discussion**

Molar tooth plays a very important role in our day to day life, its loss can result in several undesirable sequelae including tilting of adjacent teeth, a collapse of the vertical dimension of occlusion, supra-eruption of opposing dentition, loss of supporting alveolar bone and a decrease in chewing ability.<sup>[18]</sup>

Hemisection have been use for preserve some portion of teeth successfully with perforation involving furcation. Various resection procedures described are:

- a) Root amputation
- b) Hemisection
- c) Radisection
- d) Bisection

The main aim of regeneration is a formation of new periodontal attachment and hard and soft tissue formation. Bone loss mainly caused by reversible pulp disease and periodontal disease caused advanced bone loss which is irreversible.<sup>[6]</sup>

The success of hemisection depend upon the extent of bone loss and proper case selection.some factor is undertaken before hemisection<sup>[7]</sup>

1. Bone loss near the furcation area,
2. Angulations tooth in the arch.
3. Length and Divergence of roots

Hemisection preserves remaining root and helps as a suitable abutment for fixed partial dentures than an osseointegrated counterpart. The hemisection is a technique sensitive procedure.<sup>[8]</sup> so care should be taken during case selection and during a procedure. Bühler stated that hemisection should be considered before every molar extraction because this procedure can provide a good absolute biological cost saving with good long-term success<sup>(10)</sup> Teeth with fused roots are not good choices for hemisection. The main disadvantage of hemisection is pain and anxiety. Root surface is prone to caries that are exposed by hemisection. Hemisection causes small occlusal table so that maintain the occlusal force. Improperly occlusal contact area are converted acceptable forces into destructive forces and ultimate cause failure of hemisection. According to Shin-Young Park, resected molars used as intermediate abutments of a fixed bridge had a higher survival rate.[9]

Some investigators<sup>(11, 12)</sup> reported a >90% survival rate in hemisected molars, whereas with other investigators<sup>(13,14,15,16)</sup>, reported a 30% failed cases of resected molars over a 10-year-period.

Root fracture is the main cause of failure after hemisection procedure, so occlusal force is maintained in a remaining root. For a successful procedure, equal distribution of occlusal forces to the retain a compromised tooth offers a favorable prognosis and adequate support are necessary for long-term success.

Park J et al suggested by maintaining oral hygiene and proper follow up molars with questionable prognosis can be maintained for a long time by hemisection without further bone loss.<sup>(17)</sup>

#### IV. Conclusion

With recent advancement in restorative dentistry, endodontics and periodontics, hemisection is a ray of hope for compromised tooth. Proper diagnosis selection of patient with good oral hygiene, careful surgery and restorative management is a the key of long term success. This article presents the various technique and prosthetic management to maintain the tooth structure of a compromised tooth.

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#### Conflicts of interest

There are no conflicts of interest

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**Case 1**

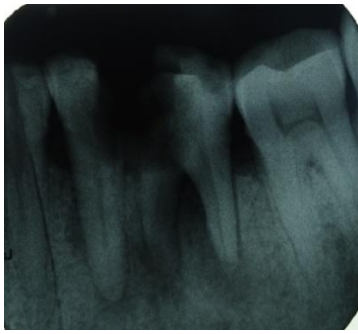


FIG-1 Pre operative Radiograph



FIG 2 master cone



FIG 3 mesial root extracted from socket



FIG -4 Radiograph with mesial root extracted



FIG-5 Final fitted PFM crown

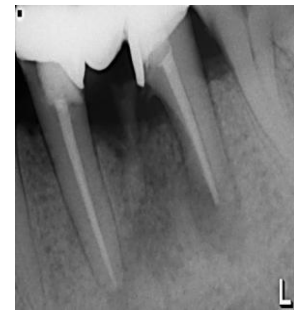


FIG-6 radiograph after 6 month

**Case 2**



FIG -7 Pre operative Radiograph



FIG -8 Pre operative photo graph



Figure -9: Sectioned tooth RCT



FIG-10 Distal root extracted from socket



FIG 11 Radiograph with distal root extracted



FIG-12 Final fitted PFM crown

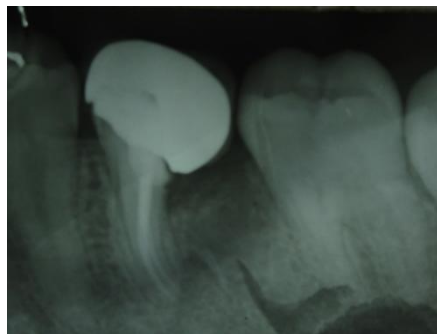


FIG-13 radiograph after 6 month

Dr. Neeraj Kumar. "Root Amputation "A ray of hope" for decayed mandibular molar: A Case series." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 2, 2019, pp 13-17