

## Hemisection: Split To Benefit - A Case Report

Jayati Jaykumar Shah<sup>1</sup>, Mala Dixit Baburaj<sup>2</sup>, Sandeep Pimpale<sup>3</sup>

<sup>1</sup>Post-graduate Student, Department of Periodontics, Nair Hospital Dental College, Mumbai, Maharashtra, India, <sup>2</sup>Head, Department of Periodontics, Nair Hospital Dental College, Mumbai, Maharashtra, India, <sup>3</sup>Assistant Professor, Department of Periodontics, Nair Hospital Dental College, Mumbai, Maharashtra India

Infections of periodontal or endodontic origin may result in increased periodontal probing depths with attachment loss adjacent to the root surface, bleeding on probing, suppuration, swelling, tooth mobility, angular bone loss, and pain on percussion. These signs and symptoms may be caused by plaque-associated periodontitis which begins at the margin of the gingiva and proceeds apically or by endodontic infections that enter the periodontal ligament at the apical foramen or through lateral or accessory canals and proceed coronally. The loss of posterior molars as a result of periodontal or endodontic infection leads to migration of teeth, supra-eruption of opposing teeth, loss of supporting alveolar bone and a decrease in masticatory efficiency. The unrestorable teeth can be replaced by removable partial dentures or fixed partial dentures or the recent treatment modality, dental implants. This case report presents one treatment option available to save the molars affected by extensive periodontal lesions, and thereby prevent the undesirable consequences of tooth loss. Hemisection refers to the sectioning of a molar tooth with the removal of an unrestorable root which may be affected by periodontal or endodontic infection or carious lesion. Careful case selection is necessary for long-term success.

**Keywords:** Bicuspidization, Furcation, Hemisection, Mandibular molar, Sectioning

### INTRODUCTION

Periodontitis in the marginal area with the loss of its attachment can lead to bone loss especially in the case of teeth that are having multiple roots. These areas are difficult to reach by the routine oral hygiene procedures and prove to be a restorative challenge as it leads to a slow progression of the disease process further resulting in a vicious circle of periodontal damage. Thus, the aim of dealing with the furcation area should be to destroy the areas where the plaque is retained, and see to it that this area remains easily approachable for routine cleaning. But whether this could be achieved, depends on the level of the furcation involvement.

1. In the initial stages of furcation defect, the involved diseased periodontal tissues may be excised, and the local factors responsible for the disease process like enamel projections or overhanging restorations should be removed to provide easy accessibility for maintenance of oral hygiene.
2. In the most advanced stages with significant bone loss, resection of the root or hemisection of the tooth may be required to be done. The regenerative technique such

as of bone grafting or guided tissue regeneration using biological mediators could also be performed.

Hemisection means the division of mandibular molar into two halves followed by removal of the diseased root with its accompanying crown portion.<sup>1</sup> The procedure of hemisection represents a form of conservative management to retain maximum tooth structure as possible.<sup>2</sup>

The retention of maxillary or mandibular molars by means of hemisection could later be used as an occlusal support or for restorative abutments.

Hemisection of either a maxillary or mandibular molar is often retaining teeth which can later be useful for restorative abutments or occlusal support. For this procedure to be a long-standing success, it is of prime importance that the case selection should be proper and combined with endodontic, surgical and prosthetic assessment and procedures as and when required.<sup>3</sup>

In periodontics, this procedure is indicated if there is considerable bone available to one root.<sup>4</sup>

Indications for tooth resection.<sup>5</sup>

#### Periodontal Indications

1. Severe angular bone loss involving only one root of multi-rooted teeth

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#### Corresponding Author:

Dr. Jayati Jaykumar Shah, Department of Periodontics, Nair Hospital Dental College, Room No. 201, 2<sup>nd</sup> Floor, Opposite Maratha Mandir, Dr. A L Nair Road, Mumbai Central, Mumbai - 400 008, Maharashtra, India. E-mail: shah\_jayati@yahoo.com

2. Grade III or Grade IV furcation involvement
3. The unfavorable proximity of roots of adjacent teeth
4. Dehiscence leading to severe root exposure.

#### Endodontic and Restorative Indications

1. Prosthetic failure of abutments within a splint
2. In cases with perforation through the floor of the pulp chamber or pulp canal of one of the roots of an endodontically involved tooth which could not be instrumented
3. Root with a vertical fracture
4. Furcation involvement or subgingival caries and traumatic injury causing severe destruction.

Hemisection aims to retain as much of the original tooth structure as possible.<sup>6</sup> It involves deliberate excision of the significantly compromised root structure and the associated coronal structure.<sup>7</sup>

Indications for Hemisection include:

1. When only one root of a multirouted tooth is affected by caries, vertical root fracture or periodontal disease
2. Endodontically treatable and accessible surviving root
3. It should be structurally possible to place a post and core restoration in the surviving root
4. The surviving root should be aligned such that it does not interfere with the path of insertion of the fixed prosthetic restoration.<sup>8-13</sup>

Contra- indications include:

1. Poorly shaped roots or fused roots
2. Cases where endodontic therapy is not possible
3. Non-compliant patient.<sup>10-12</sup>

### CASE REPORT

A 40-year-old male patient reported to the Department of Periodontics with the chief complaints of pain and loosening of left mandibular first molar. On examination, the tooth was Grade II mobile and sensitive to percussion.

On clinical examination, the probing pocket depth around the distal root was found to be 9 mm (Figure 1).

Radiographic examination revealed a severe vertical bone loss surrounding the distal root and involving the furcation area (Figure 2).

The periodontal prognosis of the mesial root was fair with good bone support. After completion of the endodontic treatment, hemisection of the distal root was planned.

Root canal treatment was carried out in 36 and post root canal filling with silver amalgam restoration was done (Figure 3).



Figure 1: 9 mm deep periodontal pocket

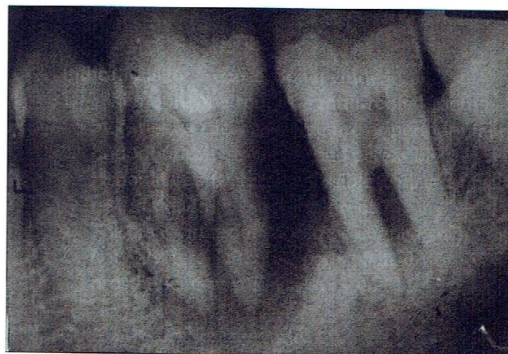


Figure 2: Vertical bone loss around distal root of 36



Figure 3: Root canal treatment with silver amalgam restoration in 36

Removal of the distal root was planned after a recall period of 4-week.

A full thickness flap was reflected post infiltration with local anesthesia (2% lignocaine + adrenaline) giving a crevicular incision from the distal surface of the first premolar to the second molar. After the reflection of the flap, an angular

defect was seen along the distal root of 36 with bone loss involving the apical third of the root (Figure 4).

Debridement was done, and the granulation tissue was removed using Gracey curettes.

A straight fissure carbide bur, directed toward the bifurcation area was used to transect the crown with distal root giving a vertical cut (Figures 5 and 6).

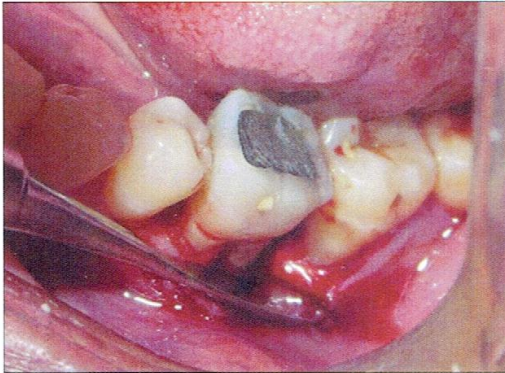


Figure 4: Angular defect around distal root of 36



Figure 5: Transection of crown with distal root



Figure 6: Extracted distal half of the tooth

By passing a fine probe, separation between the tooth was ensured and the distal portion was extracted. The root surfaces were visualized clearly after irrigation of the socket with saline. Thorough debridement and planning of the mesial root was carried out after removal of the distal root.

The occlusal margins of the mesial root were rounded off, and occlusal clearance of 2 mm was checked.

After repositioning of the flap, it was sutured with 3/0 black silk sutures (Figure 7) and the periodontal pack was placed (Figure 8).

After 1 month of healing of the tissues, fixed prosthesis involving retained mesial half and mandibular second molar with sanitary pontic were placed (Figures 9 and 10).

## DISCUSSION

Hemisection is the process of bisecting the tooth into two separate portions also called as bicuspidization or separation.<sup>14</sup>



Figure 7: Suturing with 3/0 black silk sutures

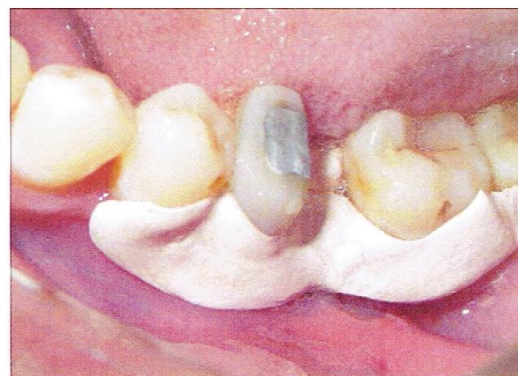


Figure 8: Periodontal pack placed



Figure 9: Fixed bridge with sanitary pontic



Figure 10: Fixed bridge - buccal view

It is a good alternative treatment option for extraction or implants.

In cases with the furcation invasion of a mandibular molar, many factors determine the clinician's decision to choose one treatment plan over another. These include:

- a. 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
- b. Patient factors - Health of a patient, importance of the tooth to the patient, costs, and time factor
- c. Clinician factors - A good case selection, diagnostic and treatment planning skills, awareness of therapeutic options and clinical insight, or skill in providing service.

A proper case selection is a must for long-term success with adequate access and visibility to the root furcation and good bony support of the root to be retained.<sup>15</sup>

Saad *et al.*, have also concluded that when only one root is decayed, and the other half is healthy,

hemisection of a mandibular molar may be a suitable treatment option.

The advantage of the hemisection is the retention of tooth and avoiding extraction, but the remaining root or roots must be restored following endodontic therapy.<sup>16</sup>

Park<sup>15</sup> have suggested that oral hygiene maintenance by the patient is a must for long-term success of molars treated by hemisection.

The various factors responsible for the failure of the procedure include unfavorable restoration with defective margins, improperly shaped occlusal contact area that may convert acceptable forces into destructive forces and predispose the tooth to trauma from occlusion. To avoid this, occlusal contacts were reduced in size and occlusal clearance with the opposing tooth was ensured to minimize the forces along the long axis of the mesial root.

## CONCLUSION

Hemisection is thus a good treatment option for periodontally compromised teeth, and a proper case selection is necessary for long-term success of the procedure. With recent refinements in endodontics, periodontics, and restorative dentistry, hemisection is a ray of hope for a hopeless tooth. Thus, the present case report shows the successful management of a periodontally compromised left mandibular the first molar with hemisection and occlusal rehabilitation with fixed partial denture.

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