# MULTIDISCIPLINARY MANAGEMENT OF FURCATION INVOLVEMENT IN MANDIBULAR FIRST MOLARS- A CASE REPORT

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**Abstract**
Advancements in dental science and greater patient's expectations have led to more conservative treatment approaches in saving the Mandibular molars with hopeless prognosis. The incidence of furcation involvement ranges from 31.4% to 57%. Bicuspidization or hemisection of the Bilaterally Involved Mandibular first molars can be one of the feasible treatment options when there is bone loss involving multiple roots with furcation defect. Treatment involves the separation of mesial and distal roots of mandibular molars along with its crown portion of tooth, and both segments are then retained individually. The present clinical report describes a multidisciplinary treatment approach for Glickman's Class II and Class III furcation Involved Mandibular first molars that includes bicuspidization followed by prosthetic rehabilitation using metal crowns prosthesis showing a satisfactory result over a 16 month follow-up.
**Key words**: Bicuspidization, Endo-Perio involvement, Furcation involvement, Prosthetic Rehabilitation.

## Introduction

Modern dentistry is being practiced worldwide in present decades, which has provided myriad options to the patients for prevention and maintenance of an esthetic and functional dentition in their life. The mandibular molars are of prime importance as they are the first permanent molar teeth to erupt.[1] They have a high dental caries susceptibility index and Periodontal Involvement that necessitates careful implementation of oral hygiene therapy, failing which leads to complications like pulpal and periodontal involvement, furcation involvement, bone loss and eventually tooth loss. Furcation involvement is the most commonly seen in mandibular molars. This requires immediate treatment, followed by proper prosthetic management.

In literature, the treatments described are resection procedures like bisection or bicuspidisation, hemisection, root amputation, and radisection based on degree of destruction of bone. Root amputation is described as removal of one or more roots of multi-rooted teeth, while other root or roots of same tooth are retained. Hemisection of molars is removal or separation of root followed by crown portion of mandibular molars. Hemisection is considered a conservative treatment option for mandibular molars that would otherwise require extraction. A hemisection of an affected tooth helps to preserve the tooth structure and alveolar bone around the retained root and is more economical than other treatment options. Therefore, hemisection may be a suitable alternative to extraction and implant therapy and should be discussed with patients during their consideration of treatment options.

Radisection denotes a more recent term for removal of roots of maxillary molars. Bicuspidization or bisection is the separation of distal and mesial roots of mandibular molars and its crown portion. Finally both segments are individually retained.[2] A multidisciplinary treatment restorative dentistry, endodontic treatment, periodontics approach for such clinical situations that includes and prosthodontics is mandatory to preserve the teeth as same or in part. These teeth can be use for fabrication of individual crown or as abutments for fixed bridges.[3] These tooth resection procedures are useful to preserve tooth structure and function, rather than losing the whole tooth. [4]

The present clinical report describes a multidisciplinary treatment approach for a Bilaterally Involved Mandibular first Molar with Class II and Class III furcation Involvement that includes bicuspidization. This was followed by prosthetic rehabilitation using two crown technique. Bicuspidization and prosthetic rehabilitation showed a beneficiary result.

## Case Report

A young 34 year old male patient reported in the department of Periodontology with a chief complaint of pain and swelling in the lower right and left back region of mouth since past two weeks. Patient was asymptomatic previously. Then he developed continuous, throbbing pain in same region, which got aggravated during mastication and upon lying down. No significant medical history was noted in the patient. Upon intraoral examination both the mandibular first molars were found to be primary Periodontally involved and secondary endodontic involvement was seen. They were sensitive to percussion and showed Grade I mobility. Probing of the tooth with help of Hu Friedy probe revealed 11 mm deep periodontal pocket in furcation area, along with Class II and Class III furcation involvement of 36 and 46 respectively. Electronic pulp vitality testing produced negative response in both the molars. Mandibular third and second molars of both arches were sound upon Clinical and radiographic examination, intraoral perapical radiographs (IOPA) confirmed Class II and Class III furcation involvement. There was evidence of bone loss surrounding the roots (Figure 1A&B).

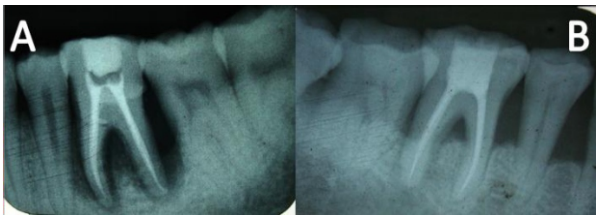


*Figure 1: Class II & Class III furcation involvement*

With the above noted findings,

- A detailed case history with periodontal findings were recorded and phase I therapy was performed . (Figure 2A&B)
- Endodontic treatment of 36& 46 was done.
- Mucoperiostal flap were reflected following debridement of the affected area, bicuspidization of 36 & 46 was done procedure to separate the crown under local anesthesia by vertical splitting method with a long shank tapered fissure carbide bur was done as shown in (Figure 3A,B,C&D) sutures and pack was given.


*Figure 2- Examination for furcation involvement*


*Figure 3: Mucoperiosteal flap raised followed by bicuspitization of molars*

The patient responded satisfactory to the treatment. Uneventful tissue healing was noted and definitive prosthodontic treatment was started after achieving favourable response, commencing with restoration of molars. A number of treatment modalities exist for restoring the tooth, which included porcelain fused to metal crowns, full metal crowns, temporary acrylic crowns and full ceramic crowns and were offered to the patient. The patient was unable to bear the expenses of porcelain fused to metal crown and all ceramic crowns and he desired a fixed prosthesis, therefore all metal crowns were the most viable treatment option. The preparation of the tooth was performed and chamfers finish line, supra-gingival, was prepared to aid in oral hygiene (Figure 4A). This treatment option would also aid in maintenance of adequate plaque control and oral hygiene.


*Figure 4: Tooth preparation done followed by temporary acrylic crown*

Gingival retraction was done using No. 2 retraction cord (Coltene-Whaledent, Switzerland) and custom acrylic trays were used to make final impressions using heavy and low viscosity elastomeric impression materials (Dentsply, India). Acrylic temporary crown was cemented and same procedure was performed on right mandibular first molar roots (Figure 4B). All metal crowns were checked for occlusal interference correction on master cast and in patient's mouth. (Figure 5)

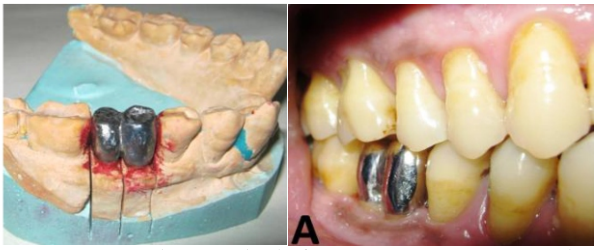


*Figure 5: Metal crown checked on cast & in Patient's mouth*

They were permanently cemented using luting Glass ionomer cement (GC Gold Label 1, GC India). Good prognosis was observed with proper occlusion, absence of mobility and healthy periodontal condition up to 16 months of follow-up.

**Discussion**

Preservation of furcation involved multi-rooted teeth having questionable prognosis requires bicuspidization. This is a useful treatment option for such teeth. Thorough investigation and appropriate case selection is important prior to the procedure. Equally important are oral hygiene status and its maintenance. Proper medical and drug history should also be taken into consideration. [3]

Gantes and Lindhe have listed the following indications and contraindications for bicuspidization.[4,5] The indications are severe bone loss affecting one or multiple roots untreatable with regenerative procedures, Class II and Class III furcation involvements, severe dehiscence or recession of the roots, root caries in the furcation area, severe root proximity, which is inadequate for a proper

embrasure space and fracture of root trunk or decay with invasion of the biological width.[5] Contraindications include poor oral hygiene status of patient, presence of any systemic conditions, unfavorable tissue architecture, endodontically untreatable retained roots, excessive deepening at floor of pulp chamber, severe root resorption, and presence of a cemented post or any materials in the remaining root.[6]

Farshchian states that bisection with subsequent bicuspidization is a successful treatment modality of a Endo-Perio involved mandibular molars.[7] Newell has described the advantage of bisection in the retention of some or the entire tooth. The main disadvantage of this procedure is that the remaining root or roots must undergo endodontic therapy.[8] Also; the crown must undergo prosthodontic rehabilitation and management. Endodontic treatment prior to bicuspidization procedure has a long history.[2,9] Till the present times, it has remained mandatory in treating mandibular molars with furcation involvement.[2,10]

Garrett states that if the tooth has lost part of its root support, it essentially requires restoration to permit it to serve as an abutment for a splint, crown or bridge, or function independently as a tooth.[11] But, such a restoration may lead to extensive periodontal destruction, if the margins are not properly placed.[12] Moreover, if non-occlusal surfaces do not have anatomic and physiologic form, it may lead to aggravation of this destruction.[13] Kurtzman states that accurate marginal adaptation of the final restoration is of prime importance in such restorations.[14]

The location and size of centric and eccentric contacts and the steepness of cuspal inclines that play a significant role in causing tooth mobility were considered during wax pattern fabrication for double crown. In the present case, a variety of other occlusal factors were also taken into consideration while rehabilitation. At metal trial stage, the occlusal contacts were reduced in height and repositioned more favorably. Also, lateral excursive forces were reduced by eliminating balancing cuspal inclinations and making cuspal inclines less steep. This resulted in a prosthetic rehabilitation that has been functioning properly till the present date.

Buhler observed 32% failure rate in hemisection cases attributed to endodontic pathology and root fracture.[15] Other authors have shown a greater success in hemisection cases in the long-term studies with a failure rate ranging from 0% to 9%.[16,17,18] In the present case, good prognosis was observed with proper occlusion, absence of mobility and healthy periodontal condition up to 6 months of follow-up. Concurring with previous reports, hemisection is a valid treatment option for the molar teeth, which otherwise have to be extracted due to extensive caries.[19] Thus, conservative management of extensive carious molar teeth in patients can not only preserve the tooth but also reduce their financial burden, psychological trauma and occlusal dysfunction.

**Conclusion**

Bisectioning of mandibular molars, followed by Prosthodontic rehabilitation with double crowns may be considered as a suitable alternative treatment instead of extraction of multi-rooted teeth having hopeless prognosis. With long term follow-ups, the clinical outcome of bicuspidization and double crowns is predictable with excellent success rates. This treatment has received a much greater acceptance as a traditional and reliable dental treatment. The teeth so treated have also endured the demands of function. It is a minimally invasive restorative treatment, which is also cost effective, improves masticatory function, and enhances esthetics and self confidence which allows patients to carry forward their life socially and professionally.

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