CASE REPORT

Management Of Furcation Defect In Mandibular Molar With Bicuspidization: A Case Report

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Abstract: Introduction: The management and long-term retention of molars exhibiting furcation invasion have always been a challenge in dentistry. Latest innovations in dental sciences and higher patient’s expectations have led to more conservative treatment approaches in saving the teeth with hopeless periodontal prognosis. When periodontal disease affects the furcation area of tooth, the chance of its exfoliation increase considerably. Here, authors have sought to discuss the case report for the management of mandibular first molar (with furcation invasion) using bicuspidization procedure. Case Report: Here is case report of 54 years old male patient reported with the complaint of pain and mobility of right mandibular first molar. On examination, the tooth was sensitive to percussion and revealed grade 1 mobility. On radiographic examination, bone loss was evident involving the furcation area. This case report aims at highlighting the conservative management of a grade III furcation-involved molar by bicuspidisation procedure and use of the treated tooth as an abutment for fixed prosthesis. Discussion: The treatment of furcations affected by periodontal disease is one of the most difficult problems for the general dentist and periodontist. An increase in the exposed root surface, anatomical peculiarities and irregularities of the furcation surface all favor the growth of bacteria. These problems make it harder for the patient to maintain hygiene, and impede adequate treatment. Bisection/bicuspidization is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are then retained individually. This separation eliminates the existence of a furcation and facilitates effective oral hygiene practice.

Keywords: Bicuspid, bicuspidization, furcation defect

INTRODUCTION

The dentistry being practiced in the present twenty first century has provided multiple prospects to the patients for preservation and maintenance of a functional dentition all over life. Any deprivation in the maintenance may lead to serious problem like furcation involvement. The glossary of periodontal terms defines furcation as “the anatomic area of a multi-rooted tooth where the roots diverge” and furcation invasion refers to the “pathologic resorption of bone within a furcation.”¹ Furcation invasion is the most commonly seen phenomenon in relation to mandibular molars. The furcation defects vary from a subtle loss of attachment in the buccal furcation area, forming a shallow pocket, to advanced pathology with deep pockets > 10 mm, advanced bone loss and clinical exposure of the furcation.²,³ Maintaining the health of these teeth with an exposed bifurcation/trifurcation area can be a major problem. This is due to the difficulty of plaque control and the danger of root caries incident to inadequate oral hygiene procedures. An open furcation is subject to rapid plaque accumulation and calculus formation and is an ideal local environment for the multiplication of microorganisms. Various treatment procedures have been discussed in the literature viz; root amputation, hemisection, radisection, and bisection. In the mandibular molars, grade III defects are managed by tunnelling procedures,
hemisection and bicuspidisation along with open flap debridement. Bicuspidization is a surgical procedure carried out exclusively on the mandibular molars, where the mesial and distal roots are separated with their respective crown portions; this separation eliminates the existence of a furcation and makes it easy for the patient to use an interdental brush for hygiene maintenance. A multidisciplinary treatment procedure for such clinical situations that includes restorative dentistry, endodontics, periodontics, and prosthodontics is necessary to preserve the teeth in whole or in part.

Several authors have listed the following indications and contraindications for bicuspidization:

**Periodontal indications**
- Severe bone loss affecting one or more roots untreatable with regenerative procedures
- Class II or III furcation invasions or involvements
- Severe recession or dehiscence of a root

**Endodontic or conservative indications**
- Inability to successfully treat and fill a canal
- Root fracture or root perforation
- Root caries of the furcation area

**Prosthetic indications**
- Severe root proximity inadequate for a proper embrasure space

**General contraindications to periodontal surgery**
- Systemic factors
- Poor oral hygiene

**Factors associated with local anatomy**
- Fused roots
- Unfavorable tissue architecture

**Endodontic factors**
- Retained roots endodontically untreatable
- Excessive endodontic instrumentation of retained roots
- Excessive deepening of pulp chamber floor
- Severe root resorption

**Restorative factors**
- Internal root decay
- Presence of a cemented post in the remaining root

**Strategic considerations**
- Consider adjacent teeth available for conventional prosthetic restoration
- Consider removable prosthesis
- Consider implants

This clinical report has sought to systematically review with multidisciplinary treatment procedure for periodontically severed mandibular molar with grade III furcation involvement by bicuspidization and total
rehabilitation using the double crowns technique. Bicuspidization of affected molars and their consecutive prosthetic rehabilitation yielded a satisfactory result.

**CASE REPORT**

A 54 year old male patient with chief complained of constant dull pain in left lower 1st molar for last 7 days reported in OPD of Department. His history was suggestive of root canal treatment and post-operative restoration in mandibular in the same tooth a month ago(Fig 1). 1st molar was highly sensitive to percussion and showed Grade I mobility. Probing confirmed 7 mm deep periodontal pocket in root furcation area with a Class III furcation involvement. Clinical examination revealed healthy gingiva, oral hygiene status to be fair and with no evidence of caries. However periapical roentgenograph showed involvement of furcation area with Class III furcation involvement. It shows no bony defects and properly angulated roots. Obturation of root canals was satisfactorily done with apical seal, with sufficient remaining thickness of enamel and dentin. Medical history was non-contributing to suggestive any underline pathology. A routine blood haemogram was advised, and after ascertaining, it was within normal limits treatment plan was formulated. Multidisciplinary approach using hemisection of tooth with separation of roots and restoration of tooth with crowns was planned. At foremost, periodontal prophylactic therapy was carried out with scaling. Under local anesthesia, full thickness flap was reflected after giving a crevicular incision from first premolar to second molar(Fig 2).

Bicuspidization procedure was performed to separate the crown by vertical cut method using...
along shank tapered fissure carbide bur (Fig 3). A fine probe was passed through the cut to ensure separation. The working area was irrigated adequately with sterile saline. The flap was repositioned and sutured with 3/0 silk sutures. Postoperative radiograph was taken to confirm the procedure. Patient responded well to the treatment. Soon after satisfactory tissue healing, restoration of molar bicuspids and definitive prosthodontic treatment were started. Each dissected part of the tooth was crowned as a premolar tooth (Fig 5). Different treatment modalities for restoring the tooth were thought including temporary acrylic crowns, all metal crowns, porcelain fused to metal crown, and all ceramic crowns. Porcelain fused to metal crown and all ceramic crowns were ruled out because of economic factors. The patient desired a fixed prosthesis therefore all metal double crowns were finalized considering overall patient’s needs. Instructions was given for the maintenance and follow up visits. The patient was followed at 3, 6, 12 and 24 months after surgery, and clinical measurements and radiographies were recorded.

**FIGURE 4. 7 DAYS POST OPERATIVE**

**DISCUSSION**

Management of grade III furcation involvement always presents a challenge to the periodontist. Non-surgical management alone leads to failure due to inaccessibility of the furcation region, leading to incomplete removal of the plaque and plaque retentive factors.\(^{12,13,14}\) Farshchian and Kaiser\(^ {15}\) have reported the success of a molar bisection with subsequent bicuspidization. They stated that the success of bicuspidization depends on three factors: 1. Stability of, and adequate bone support for, the individual tooth sections 2. Absence of severe root fluting of the distal aspect of the mesial root or mesial aspect of the distal root 3. Adequate separation of the mesial and distal roots, to enable the creation of an acceptable embrasure for effective oral hygiene. However, there are few disadvantages associated with bicuspidization. As with any surgical procedure, it can cause pain and anxiety. An endodontic therapy failure can also cause the failure of this procedure. If the tooth is not relieved from lateral excursive forces or proper marginal adaptation is not there, the
restoration may lead to periodontal destruction\textsuperscript{16,17} Due to the fact that the anatomy of the furcation impedes accessibility for professional debridement\textsuperscript{18,19}, management of furcal defect is one of the complex challenges in periodontal treatment.\textsuperscript{20,21} Nevertheless, a good healing can be attained in the treatment of such lesions.\textsuperscript{22} Root amputation, hemisectioning and bicuspidization (bisectioning) fall within the scope of endodontic and periodontal surgery, and aim to manage and retain the teeth in the dental arch.\textsuperscript{22,23} Bicuspidization technique is indicated in Class II and III furcation involvements In this case, the roots of the involved tooth were adequate in length and periapically healthy, and therefore bicuspidization technique was preferred. Clinical periodontal scores and radiographies were recorded at 3, 6, 12 and 24 months after surgery, and the treatment procedure was found to be successful. Today, many of the practitioners prefer extracting the involved tooth and replacing it with fixed prostheses or dental implants to avoid the complexity of the treatment procedures.\textsuperscript{24} Although dental implants demonstrate a very high success rate, additional cost for the patient is still required. Therefore, tooth extraction must be the last treatment alternative with the recent developments in periodontics, endodontics and restorative dentistry. Although there are few case reports about bicuspidization in the literature, this technique is a successful alternative on such furcal defects which are nonrepairable with coronal approaches.

**CONCLUSION**

This case report presents the successful treatment of a periodontally compromised tooth by multidisciplinary. The prognosis of the tooth with hemisection/bicuspidisation depends on the supporting bone, the restorative treatment plan, and the oral hygiene of the patient. Knowledge of anatomy of furcation is necessary to which is involved in furcation approach. Bicuspidization may be a suitable alternative to extraction and implant and should be discussed with patients during consideration of treatment options. With recent refinements in endodontics, periodontics and restorative dentistry, root separation and resection have received acceptance as a conservative and dependable dental treatment and teeth so treated have endured the demands of function.

**REFERENCES**