

Case Report
Dentistry

Bicuspidization: Hope for a Hopeless Tooth

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Abstract

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. 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. These teeth can act as independent single units of mastication or as abutments in simple fixed bridges. In this case report in contrast to the common option of extracting the natural tooth, an alternative treatment option is selected for molars with extensive decay that threatens tooth loss. Therefore, this option should be discussed with patients when deciding on a course of treatment, and it may be a good substitute for extraction and implant therapy, particularly in cases of advanced endo-perio lesions.

Keywords: endodontic surgery, appropriate case selection, mandibular molar, root caries, hemisection.

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INTRODUCTION

Preservation of natural dentition is the ultimate goal of modern dentistry. Retaining the original tooth structure through surgical and nonsurgical procedures remains the best option, considering the high cost and potential risks associated with replacing a tooth using a bridge or dental implant. Bicuspidization and hemisection are dental procedures performed on mandibular molars, but they differ in their approach to tooth preservation. Hemisection involves separating a tooth into two halves, removing one half (root and crown portion), and preserving the other half. Bicuspidization also separates a molar into two halves, but it retains both halves, treating them as individual bicuspid (premolars) [1].

It is frequently used concerning mandibular molar teeth. Mandibular molars are considered suitable candidates for Bicuspidization, as long as there is proper opposing occlusion and sufficient bone support [1]. The ultimate aim of this procedure is to preserve as much of the original tooth structure as possible while addressing issues like furcation involvement or root fractures. The effectiveness of Bicuspidization greatly depends on the careful selection of cases and adherence to interdisciplinary approaches including endodontic, surgical, restorative, and prosthodontic protocols [2].

The case report aimed to show how Bicuspidization of tooth number 36 can be successfully managed with occlusal rehabilitation. This conservative treatment approach aimed to preserve as much of the original tooth structure as possible.

CASE PRESENTATION

A 34-year-old healthy male patient from Edappal reported to the Department of Conservative Dentistry and Endodontics, Malabar dental college and research centre, Edappal with a chief complaint of pain, discomfort, and food lodgment in his lower left back tooth region. Informed consent was obtained. On clinical examination, Class I deep dentinal caries was seen in 36, which was tender on percussion. The patient's medical history was noncontributory.

Lymph nodes in the head and neck region were not palpable. The chair-side examination was conducted. Electric pulp testing gave a negative response for both 36. An intraoral periapical radiograph (IOPA) revealed extensive radiolucency in the crown involving enamel, dentin, and pulp suggestive of gross carious lesion (Fig.1). The radiolucency extended to the radicular area of the distal root extending towards the furcation. An ill-defined radiolucency was seen in the periapical area of mesial roots with widening of PDL space in 36. Teeth were diagnosed as symptomatic apical periodontitis.

The treatment plan was explained to the patient and his informed consent was obtained. Oral prophylaxis was done out before commencement of the root canal procedure

Routine endodontic treatment was started with access opening, working length determination done with the root ZX-J Morita apex locator, and shaping and cleaning was done up to F3 Protaper-Gold (Dentsply) Irrigation was performed with 2 mL/min of 3% NaOCl after the use of each file. The final irrigation before root canal filling was performed with 2 mL/min 3% NaOCl, 2 mL/min 17% EDTA, and 2 mL/min 3% NaOCl, and root canals were dried by using paper points. Obturation was done with single cone compaction with bioceramic sealer for mesial canals, lateral compaction with bioceramic sealer in distal canal followed by the application of a temporary pack (Fig.2). After a week, the patient was symptom-free, prompting us to start the surgical approach with local anesthesia administration (lignocaine with 1:100000 epinephrine). since there is no mobility, periodontal pocket or attachment loss regarding both mesial and distal segments attempts were made to retain both the segments

Incisions were placed, and a triangular flap was reflected with a periosteal elevator. Upon reflection of the flap, the bony defect along the furcation became quite evident. All chronic inflammatory tissue was removed with curettes to expose the bone. A horizontal indentation was given in the central groove (buccolingually). A long shank tapered fissure carbide bur was used to make a vertical cut toward the bifurcation area (Fig. 3). The tooth was sectioned into two. The margins of the preserved mesial and distal portion were trimmed and smoothed to ensure that no sharp edges were present to cause further periodontal pathology

Sutures were placed between mesial, distal and mid-portion of the separated tooth. Periodontal dressing was placed. Systemic antibiotics and analgesics were prescribed and post operative instructions were given. A week later, sutures were removed and copious betadine irrigation with saline was done. A 3-month follow-up was done (Fig. 4). the patient was clinically asymptomatic (no signs or symptoms), and radiographically, the furcation defect was completely healed and monthly follow-ups should be done accordingly for the further prosthetic rehabilitation.

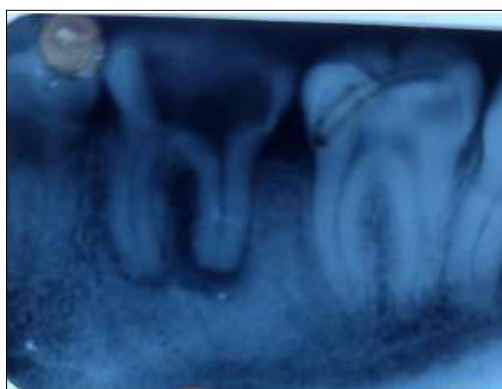


Fig1- Pre-op irt 36



Fig 2-Obturation done irt 36



Fig 3: Bicuspidization donei.r.t 36



Fig4-3 month follow up

DISCUSSION

The absence of posterior teeth may result in several undesirable sequelae which requires prevention and maintenance measures. The treatment options for an extensively decayed or unrestorable molar are limited. The most common treatment for such tooth include extraction followed by prosthetic rehabilitation. However, with appropriate case selection,

Bicuspidization can be a relatively simple, conservative, inexpensive treatment with good chances of success [3].

Continued periodontal breakdown may lead to total loss of tooth unless these defects can be repaired or eliminated and health of the tissues restored. Term furcation involvement refers to the invasion of the bifurcation and trifurcation of the multirooted teeth by the periodontal disease. Though, furcation involvement is the most common phenomenon in mandibular molars it requires immediate attention [3] with respective management. Advances in dentistry, as well as the increased desire of patients to maintain their dentition, have led to treatment of teeth that once would have been removed. Bicuspidization is a valuable treatment option to save multirooted teeth having a hopeless prognosis. Bisection/bicuspidization technique is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are then retained individually. It is usually performed in Grade II or III furcation defects of mandibular molars, to remove the irritants under the fornix and to obtain two single-rooted teeth for crowning as premolar.

Diagnosis and treatment of furcation involvement is a challenge. Management of molars with furcation involvement represents one of the major problems in clinical periodontology. Both prognosis and choice of therapy depend on the degree of furcation involvement. Root surfaces facing the furcation area of mandibular molars are concave, resulting in a wider

mesiodistal osseous chamber than either the buccal or lingual furcation opening. Farshchian and Kaiser were the first to depict the successful implementation of bicuspidization or molar bisection procedures in the management of severe furcation involvements. They stated that the success of bicuspidization depends on three factors: (i) stability of, and adequate bone support for, the individual tooth sections; (ii) absence of severe root fluting of the distal aspect of the mesial root or mesial aspect of the distal root; (iii) adequate separation of the mesial and distal roots, to enable the creation of an acceptable embrasure for effective oral hygiene

Indications of bicuspidization includes 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, Root caries of the furcation area, Severe root proximity inadequate for a proper embrasure space, Root trunk fracture or decay with invasion of the biological width. Contraindications of bicuspidization are Poor oral hygiene status, Systemic factors, Unfavorable tissue architecture, Retained roots endodontically untreatable, Excessive deepening of pulp chamber floor, Severe root resorption, Presence of a cemented post in the remaining root. Advantage of the amputation, hemisection or bisection is the retention of some or the entire tooth. However, the disadvantage is that the remaining root or roots must undergo endodontic therapy and the crown must undergo restorative management. Bicuspidization procedures can result two separate entities it can be considered as a suitable alternative to extraction in multirooted teeth with hopeless prognosis. The clinical outcome and long-term performance of bicuspidization and double crowns are predictable with high success rates. Studies have shown that Bicuspidization with definitive prosthetic rehabilitation have received long term survival rates.

The prognosis of the tooth with hemisection / bicuspidization depends on the conditions of the supporting bone, the restorative treatment plan, and the oral hygiene of the patient. Thus tooth separation / bicuspidization procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth. Therefore, the conservative treatment of a severely decayed molar in young patients can not only save the tooth but also alleviate financial costs, emotional distress, and issues with biting and occlusal dysfunctions.

CONCLUSION

The long-term outlook for teeth with Bicuspidization will be influenced by factors such as the quality of root canal therapy in the remaining roots or root, the contouring and quality of the final restoration, and the ability to maintain the health of the supporting periodontal soft and hard tissues. It is important to note that any of these factors could potentially impact the prognosis of the retained portion of the tooth

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