International Journal of Enhanced Research in Medicines & Dental Care (IJERMDC),
ISSN: 2349-1590, Vol. 6 Issue 5, May -2019, Impact Factor: 3.015

Bicuspidization: A Conservative Approach for Management of Split Molar

Natasha Saini[1], Bindu Kadian[2], Nishant Chauhan[3], Ritika[4], Heena Sarangal[5], Ritu Namdev[6]

[1,2]Post Graduate Student at Pedodontics and Preventive Dentistry PGIDS, Rohtak
[3,4] Post Graduate Student at, Department of Conservative Dentistry and Endodontics, PGIDS, Rohtak
[5]Post Graduate Student at Pedodontics and Preventive Dentistry PGIDS, Rohtak
[6]Sr. Prof. and Head of the Department of Pedodontics and Preventive Dentistry, PGIDS, Rohtak

ABSTRACT

Recent advances in modern dentistry and the increased awareness among the patients to maintain their dentition have led to conservative treatment approaches, which once would have been opted for removal. Vertically fractured tooth through furcation may be well retained by separation of their roots. This clinical report describes a case of bicuspidization of split endodontically treated mandibular first permanent molar with subsequent rehabilitation with double crowns, in an 13-year-old young male patient.

INTRODUCTION

The mandibular molars are first permanent teeth to erupt in oral cavity and therefore are having high caries susceptibility index. In younger age, molars are usually the only permanent tooth which has to be endodontically treated. One of the most detrimental consequence of root canal treated tooth, if not rehabilitated with crown, is vertical root fracture. Management of vertical root fracture through furcation can be done by the bicuspidization. Bisection or bicuspidization is the separation of mesial and distal roots of mandibular molars along with their coronal portion, where both segments are then retained individually.[1]In literal meaning, bicuspidization or molar bisection is splitting of the mandibular molar vertically through the furcation without removing both half and leaving two separate roots that are then treated as bicuspids.[2]Through bicuspidization, a single molar is converted into two bicuspids which can be useful as independent units of mastication or as abutments in simple fixed bridges.[3] This article describes a simple procedure for bicuspidization in first mandibular molar and its subsequent restoration in a young patient.

CASE REPORT

An 13-year-old male patient reported to the department of Pedodontics and preventive dentistry with the chief complaint of broken tooth in the lower right back region of the jaw for the past 15 days. His medical history was non-contributory. But, dental history revealed root canal treatment of the affected tooth 1 month ago. On intra- oral examination, split running in bucco- lingual direction in the middle portion of lower left mandibular first permanent molar was seen (figure 1). IOPA radiograph showed endodontically treated root canals and vertical radiolucent line running from the occlusal surface up to furcation area. Bony support was adequate figure 2). Based on the clinical assessment and investigations, diagnosis of vertical tooth fracture in bucco-lingual direction was made. After that,a systematic treatment planning was framed to achieve total rehabilitation step-by-step.

Figure 1:-Pre-operative clinical view

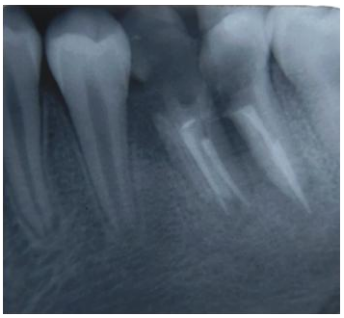

Figure 2:-Intraoral periapical radiograph confirming vertical tooth fracture

Under local anesthesia, the vertical cut method was used to separate the crown. A long shank tapered fissure carbide bur was used to make vertical cut toward the bifurcation area. Single molar is now separated in two crowns. The furcation area was trimmed to ensure that no residual debris were present that could cause further periodontal irritation. Damaged tooth structure was reconstructed with glass fibre post and core (figure 3). The occlusal table was minimized to redirect the forces along the long axis of each root. All metal double crowns were finalized considering overall patient's needs. Tooth preparation was completed and a supra gingival chamfer finish line was placed to assist in oral hygiene procedures (figure 4). Final impressions were made using the heavy and low viscosity elastomeric impression materials and two separate all metal crowns were permanently cemented using luting Glass Ionomer Cement on mesial & distal half of the tooth (figure 5).

Figure 3:- Core build up after bicuspidization

Figure 4:- Tooth Preparation

Fgure 5:-Occlusal view illustrating double metal crowns on bisected mandibular molar

DISCUSSION

The first permanent molar (FPM) has been quoted as being the most endodontically treated molar which undergo vertical fracture probably as a result of its anatomy and bearing heavy occlusal load. Although, it is believed vertical

root fracture is not treatable and extraction is usually planned. But, the ideal age for lower FPM extraction has been reported to be approximately 8–9 years of age. If FPMs are extracted during or after eruption of the second permanent molars, space closure is usually unsatisfactory and consequences may include tilting of adjacent teeth, over-eruption of opposing molar and atrophy of alveolar bone etc.[4]

As modern dentistry aims to maintain the dentition in a healthy and functional state, many procedures and treatment options are now available.[5]Root separation or resection has been used successfully to retain teeth with vertical tooth fracture. The clinician splits the mandibular molar vertically through the furcation, without removing either half, leaving two separate roots that then are treated as bicuspids (a procedure termed "bicuspidization"). Farshchian and Kaiser have reported the success of a molar bisection with subsequent bicuspidization.[6]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.

According to Newell, the advantage of the amputation, hemisection or bisection is the retention of some or the entire tooth.[7] Success of root resection and separation procedures depends, to a large extent, on proper case selection. It is important to consider the following factors before deciding to undertake any of the root separation and resection procedures. 1) Advanced bone loss around furcation area acceptable level of bone around the remaining roots.2) Angulations and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally titled, cannot be separated and resected.3) Divergence of the roots - teeth with divergent roots is easier to resect. Closely approximated or fused roots are poor candidates.4) Length and curvature of roots - long and straight roots are more favorable for root separation and resection than short, conical roots. 5) Feasibility of endodontics and restorative dentistry in the root/roots to be retained.[3]

However, there are few disadvantages associated with it. As with any surgical procedure, it can cause pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries. Failure of endodontic therapy due to any reason will cause failure of the procedure. In addition, when the tooth has lost part of its root support, it will require a restoration to permit it to function independently or to serve as an abutment for a splint or bridge. Unfortunately, a restoration can contribute to periodontal destruction, if the margins are defective or if non-occlusal surfaces do not have physiologic form. Also, an improperly shaped occlusal contact area may convert acceptable forces into destructive forces and predispose the tooth to trauma from occlusion and ultimate failure of root separation and resection.[8]

The prognosis for root separation or resection is the same as for routine endodontic procedures provided that case selection has been performed correctly and the restoration is of an acceptable design relative to the occlusal and periodontal needs of the patient.

All the above-mentioned factors were favourable in the case reported. Therefore, bicuspidization was performed to avoid extraction in this 13-year-old young patient. Subsequent follow up showed a good bone healing response.

CONCLUSION

Bicuspidization with definitive prosthetic rehabilitation have received acceptance as a traditional and reliable dental treatment. These cost-effective, minimally invasive restorations not only improve masticatory function, but enhance esthetics and self-confidence, allowing patients to develop socially. Bicuspidization is a procedure which represents a form of conservative dentistry which aims to retain as much of the original tooth structure as possible. In conclusion, bicuspidization may be a suitable alternative to extraction and implant therapy especially for FPM in young children and should be discussed with patients during consideration of treatment options.

REFERENCES

[1] Vandersall DC, Detamore RJ. The mandibular molar class III furcation invasion: a review of treatment options and a case report of tunneling. J Am Dent Assoc 2002; 133:55-60.
[2] Augsburger RA. Root amputations, and hemisections. Gen Dent1976; 24:35-8.
[3] Dalkiz M, Cilingir A, Beydemir B. Bicuspidization: a case report. Gülhane Tip Dergisi 2008;50: 42-5.
[4] Ong DC, Bleakley JE. Compromised first permanent molars: An orthodontic perspective. Aust Dent J 2010;55:2-14.
[5] Parmar G, Vashi P. Hemisection: A case-report and review. Endodontology 2003; 15:26-9.
[6] Farshchian F, Kaiser DA. Restoration of the split molar: bicuspidization. Am J Dent 1988; 1: 21-22.
[7] Newell DH. The role of the prosthodontist in restoring root resected molars: a study of 70 molar root resections. J Prosthet Dent 1991; 65: 7-15.
[8] Detamore RJ. Ten-year report of a bifurcated mandibular first molar. J Ind Dent Assoc 1983; 62: 17-18.