

STRENGTHENING BY DIVIDING: TREATMENT OF GRADE III FURCATION INVOLVEMENT WITH PLATELET RICH FIBRIN

Dr Vasundhara V

Dr Jeevanandam S

Dr Harshitha

Dr Arka Das

KEYWORDS :

INTRODUCTION

The modern dentistry has provided opportunity to the patient to increase the longevity of functional dentition. Therapeutic measures may vary in the complexity of the teeth. The treatment may involve combination of restorative dentistry, endodontics, and periodontics¹.

Continued periodontal breakdown may lead to total loss of tooth unless these defects can be repaired or eliminated and health of the tissues restored. Thus, tooth separation and resection procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth².

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 individually².

Indications for bicuspidization are following:

1. Root fracture severe bone loss affecting one or more roots untreatable with regenerative procedures
2. Class II or III furcation invasions or involvements
3. Inability to successfully treat and fill a canal
4. Severe root proximity inadequate for a proper embrasure space
5. Root trunk fracture or decay with invasion of the biological width

Contraindications include:

1. Poor oral hygiene
2. Fused roots
3. Unfavourable tissue architecture
4. Retained roots endodontically

CASE REPORT

A 45 year old male patient presented with pain in his right lower back teeth region for over 2 weeks (Figure 1). IOPA revealed Glickman's class III furcation involvement in relation to right mandibular molar (46) with a horizontal component of greater than 5mm (figure 2). A provisional diagnosis of pulpal necrosis with symptomatic apical periodontitis was made in relation to tooth #46. Bicuspidization was planned since the divergence of roots and the pattern of bone loss was more conducive for resective surgery. The patient was advised for blood tests before extraction, including total leukocyte count, differential leukocyte count, computed tomography (CT), blood transfusion, Hepatitis B surface antigen, HIV, hemoglobin%, and blood sugar. The treatment was commenced as the values were in normal range and the patient was medically fit. Oral prophylaxis was performed and oral hygiene instructions with an emphasis on periodontal maintenance were elaborated to the patient. After administration of 2% lignocaine (1:1,00,000 adrenaline), full thickness mucoperiosteal flap was raised in relation to 46 (figure 3). Complete debridement was carried out and the bony defect was visualized. Since the defect was not conducive for regeneration, diamond burs in high speed

hand-piece was utilized to section the tooth. Care was taken to section the tooth into two equal halves till the radicular portion (Figure 4). Osseous surgery was done in order to obtain a positive architecture

Preparation of the platelet-rich fibrin

A volume of 10 mL of the patient's blood was collected by puncturing the antecubital vein. The blood sample obtained was transferred in a test tube and was centrifuged (REMI model R-8C with 12 mL × 15 mL swing out head) at 3000 revolutions per minute for 10 min. After centrifugation, three layers were naturally formed in the tube: platelet-poor plasma at the surface, PRF clot in the middle, and red blood cells at the bottom (figure 5). Sterile tweezers were used to gently grab and remove the fibrin clot out of the test tube. Using a pair of sterile scissors, the clot was cut to an appropriate size and placed into the extraction socket such that the cavity is completely filled with it. (Figure 6)

The flap was approximated and direct loop sutures were placed. Occlusal reduction was carried out and temporary acrylic crowns were placed (Figure 7). After 3 months, the patient was recalled and assessed for pain and mobility. Since there were no complications, the two halves were restored using metal crowns (Figure 8). Periodic recalls and constant motivation to follow the oral hygiene instructions were performed. At 18 months follow up, a fully functional prosthesis with stable bone levels were observed.



figure 1

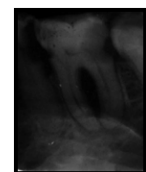


figure 2



figure 3



figure 4

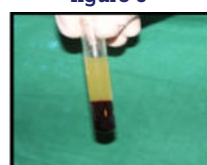


figure 5



figure 6



figure 7





figure 8



DISCUSSION

The cases of furcal caries and large perforations were considered untreatable in the olden days. Hemisection can be used if there is a severe bone loss involving either of the surfaces of the root.^(3, 4) Farshchian and Kaiser have reported the success of a molar bisection with subsequent bicuspidization.⁽⁵⁾ They stated that the success of bicuspidization depends on three factors

1. Stability and adequacy of 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.

Root separation or resection has been used successfully to retain teeth with furcation involvement. However, there are few disadvantages associated with it. As with any surgical procedure, it can cause pain and anxiety.^(6, 7) Root surfaces that are reshaped by grinding in the furcation or at the site hemisection are more susceptible to caries often a favourable result may be negated by decay after treatment. Failure of endodontic therapy due to any reason will cause failure of the procedure.^(8, 9) 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. In this case bicuspidization was performed to avoid extraction of tooth. Subsequent follow up showed a good bone healing response. PRF-filled sockets showed enhanced soft-tissue healing, increased rate with better quality of bone formation owing to its good osteogenic ability. Socket preservation with autologous PRF was chosen over other biomaterial as PRF contains a high concentration of nonactivated, functional, intact platelets enmeshed in a fibrin matrix, a key component affecting the initial phases of regeneration, especially during hemostasis and fibrin clot formation, it stimulates human osteoblastic proliferation and neoangiogenesis.[10] It releases a vast number of growth factors to the surrounding microenvironment favouring soft- and hard-tissue healing, including platelet-derived growth factors (PDGF-AA, PDGF-AB, and PDGF-BB), transforming growth factor-beta, vascular endothelial growth factor, and matrix glycoproteins (such as thrombospondin-1), having specific roles in tissue regeneration.

This suggested that the procedure, occlusal adjustments made and the angulation of the root was perfect to aid in the recovery of the tooth. The prognosis for bicuspidization 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.

CONCLUSION

Long term retention of endodontically treated mandibular molars with Grade III furcation is a clinically challenging dilemma but with an interdisciplinary approach of Periodontics, Endodontics and Prosthodontics promising results can be achieved. We can conservatively restore masticatory function of mandibular molars without sacrificing the whole or a part of tooth by performing Bicuspidization. Long term success of the procedure depends on appropriate

case selection, diagnosis and correct treatment planning by joint interdisciplinary approach.

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