

Hemisection And Socket Preservation in Endo-Failed Mandibular Molar- A Case Report

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Abstract: This case report describes hemisection in a mandibular molar with socket preservation with help of an alloplastic bone graft and subsequent restoration of the tooth with fixed prosthesis. Hemisection represents a form of conservative procedure, which aims at retaining as much of the original tooth structure as possible. It may be a suitable alternative to extraction. Hemisection of the affected tooth allows the preservation of tooth structure, alveolar bone and cost savings (time and money) over other treatment options. The keys to long term success appear to be thorough diagnosis followed by interdisciplinary approach with endodontic, surgical and prosthetic procedures. Preservation of a hopeless tooth is possible by selecting patients with good oral hygiene, and careful surgical and restorative management.

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I. Introduction

Failure of endodontic treatment usually occurs when treatment falls short of acceptable standards. The main reason for this is the procedural errors that prevent the control of intracanal endodontic infection. Failures are considered as serious complications in dentistry and possess a number of diagnostic and management problems¹. Advances in dentistry have made it possible to maintain a functional dentition for a lifetime. The terms 'hemi-section' and 'root amputation' are known collectively as 'root resection'. Hemisections have been used in cases of advanced bone loss in furcation involvements. Hemisection refers to sectioning of a molar into two halves followed by removal of the diseased root and its coronal portion. The retained root is endodontically treated and the furcation area is made self-cleansable. The success rate of this type of endo-perio furcation lesions is most likely related to the anatomical characteristics of furcation area interfering with adequate instrumentation. Since hemisected teeth fail by root fractures, it is important to restore them adequately by an extra-coronal restoration. This treatment can produce predictable results as long as proper case selection is followed by interdisciplinary approach with endodontic, surgical and prosthetic procedures. The results of hemisection are predictable, and success rate is high if certain basic considerations are carefully taken into account².

The extraction socket has a specific pattern of wound healing cascades. Generally to preserve the height and width of alveolar bone, guided tissue regeneration (GTR) procedures are done. Techniques such as grafting autogenous bone and bone substitute material i.e., allogenic, xenogenic or alloplastic have also been used. Among these popular are non resorbable hydroxyapatite, demineralised freeze dried bone, calcium phosphate, HTR polymeric composite, recombinant human osteogenic protein etc³. The present case demonstrates the successful management of distal root of 46 by hemisection and socket preservation with hydroxyapatite crystals (SybografTM) and GTR membrane (CologuideTM).

II. Case Report

A 48 year old man with chief complaint of pain on the lower right back tooth since 2 months was reported to the department of periodontology, yepoya dental college mangalore, with the past history of root canal treatment done 2 years back. On examination, tooth was sensitive to percussion. Probing depth was more than 10mm around the distal root of 46. Exudation/pus discharge and mobility were absent (Fig 1). On radiographic examination, severe vertical bone loss was seen surrounding the distal root involving furcation area and root resorption on the apical end of the distal root. It was noticed that the root canal filling was inadequate on the mesial root (Fig 2). Re endodontic treatment followed by the hemisection of the distal root of 46 was planned. Re-endodontic treatment was done using crown down technique. Canals were completely obturated with gutta purcha points and sealed with AH plus sealer. Post endodontic restoration was done with composite to maintain a good seal and allow interproximal area to be properly contoured during surgical separation (Fig 3).

Under local anesthesia, a full thickness flap was reflected after giving crevicular incision from first premolar to second molar followed by an oblique releasing incision distal to the distal root keeping the mesial gingival margin of second molar intact. Upon reflection of the flap, the bony defect along the distal root became more evident. All inflammatory tissue were removed with curettes to expose the bone. A long shank tapered fissure carbide bur was used to make vertical cut towards the bifurcation area (Fig 4). A probe was passed through the cut to ensure separation. Distal root was extracted (Fig 5) and the socket was irrigated adequately with sterile saline to remove any bony chips. Bony defect was grafted with hydroxyapatite bone graft (Sybograf™) and guided tissue regeneration collagen membrane (Cologuide™) (Fig 6, Fig 7). Then, the flap was repositioned and sutured using 3.0 black silk sutures. The occlusion was minimized to redirect the forces along the long axis of the mesial root during tooth preparation. Radiograph showed the well retained mesial root and extraction socket of the distal root filled with bone graft (Fig 8). One week later, sutures were removed. Healing was uneventful. Seven month follow up radiograph showed a good bone fill, (Fig 9) indicative of good healing and probing pocket depth was reduced with no mobility. A fixed bridge was fabricated involving retained mesial half and root canal treated 45 (Fig 10)



Fig 1 : Deep pocket on the distal root



Fig 2: Preoperative radiograph



Fig 3 : After re-endodontic treatment



Fig 4: Vertical cuts made along the furcation



Fig 5 : Distal root is extracted



Fig 6: Bone graft placed



Fig 7:GTR membrane placed



Fig 8: Immediate postoperative radiograph

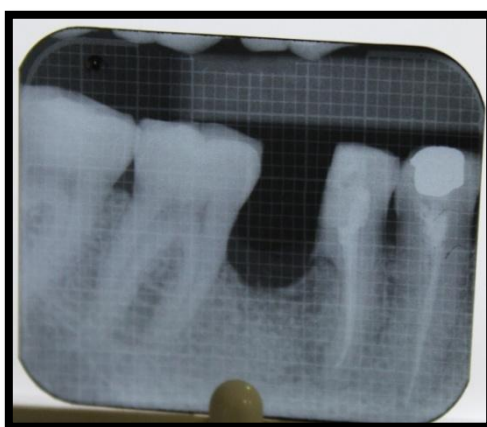


Fig 9 : 7 months postoperative radiograph



Fig 10: After prosthetic replacement

III. Discussion

The success of a clinical procedure is based on thorough clinical knowledge, diagnosis and a multi disciplinary treatment plan. In the present case, hemisection was the treatment of choice. The indication for hemisection was optimum as the roots were not approximated or fused. The distal root which had a questionable prognosis was resected. In this particular case, the hemisected tooth was observed for 7 months for bone support and a fixed prosthesis involving 45,46,47 was given only after that. Shin-Young Park reported a higher survival rate in resected molars which were used as intermediate abutments of a fixed bridge⁴. This might be because the occlusal loads on the intermediate abutment are smaller than on terminal abutments and single abutments. Amount of occlusal forces is significant for the long term success of the fixed bridge, and root fractures were frequently reported in resected molars with higher occlusal loads.

Socket preservation was the one of the therapeutic modality which was done in this case. A greater amount of socket fill was observed 7 months postoperatively. This would indicate that in patients where ridge maintainance is desired, a regenerative approach has some therapeutic value as suggested by V.Lekovic et al⁵. The changes in the horizontal dimension have been the ones benefited most by the socket preservation techniques evaluated in systematic reviews. Precisely bone loss in a horizontal dimension is the most important consequence of tooth extraction during the first 3–6 months of healing. The positive influence of the socket preservation therapy may be attributed more to achieving enhanced restorative and aesthetic outcomes, as well as better maintenance of healthy soft tissues⁶.

To prevent early tissue changes after tooth extraction, different socket preservation therapies have been proposed, ranging from a careful flapless tooth extraction aiming for an undisturbed socket healing, to the immediate placement of dental implants, to filling the resulting alveolar socket with different grafting materials, with and without barrier membranes. Application of nano hydroxyapatite, resulted in a significant horizontal and vertical probing depth reduction and clinical attachment level gain. Studies suggest that collagen membrane revealed superior results compared to sites treated with bone graft alone. The clinical and radiographic results of

hydroxyapatite alone and in combination with bioabsorbable collagen membrane in the treatment of periodontal intra-bony defects were evaluated by Singh et al⁷.

The success of the root resection procedure depends to a large extent on proper case selection. Hemisection of mandibular molar may be viable a treatment modality when one root has poor treatment prognosis, and the other root is healthy and that portion of tooth can be act as abutment. One important factor for successful regeneration is the amount of bone that remains apical and lateral to the defect. Coronal migration of cells originating from periodontal ligament and bone marrow spaces is particularly critical to the healing outcome following periodontal regenerative procedures in furcation defects. Here; the role of the bone graft is socket preservation and also inducing bone formation. Periodontal regeneration is a technique sensitive procedure. A poor operative technique in membrane placement or surgical soft tissue management and failure to cover membrane adequately can cause gingival recession and membrane exposure.

This case demonstrates successful management of tooth with endo perio lesion and furcation involvement by hemisecting the distal root. In the above case use of the GTR membrane combined with a bone graft, resulted in successful healing after a 7-month follow up period. The clinical and radiographic findings demonstrated a significant reduction of probing depth and bone fill.

IV. Conclusion

The prognosis for hemisection is the same as for routine endodontic procedures provided that case selection has been correct, the endodontics has been performed adequately, and the restoration is of an acceptable design relative to the occlusal and periodontal needs of the patient. This case report showed successfully managed furcation defect by combined treatment modalities like the use of the GTR membrane with bone graft.

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