A potential opportunity for treating hopeless tooth with hemisection and platelet rich fibrin as a regenerative tool: A case report

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Abstract

The therapeutic treatment and constant retainment of teeth with multiple roots advanced endo-perio lesion have been challenging in periodontal and endodontic therapy. Determination to preserve the natural dentition among the patients has been increased. Therefore, it's moral duty of the dentist to put efforts to preserve the natural tooth. Nowadays, hemisection has been widely used which refers to sectioning of multirooted tooth and removal of the that can be affected by the endodontic and periodontal means. It aims at retaining the natural tooth as much as possible. Regeneration by using Platelet Rich Fibrin is widely in use in dentistry due to numerous advantages. The present case report narrates the technique of hemisection of the mandibular first molar with placement of Platelet rich fibrin in the extraction socket. Long term success of the treatment modality depends entirely on proper diagnosis.

Keywords: Hemisection, Endo-Perio Lesion, Platelet Rich Fibrin, Hopeless Tooth.

Introduction

Nowadays, lifetime preservation of functional dentition can be achieved due to advanced treatment modalities in the field of dentistry. Natural tooth has its own advantage. Saving your own teeth reduces the cost of replacement either with a fixed prosthesis or dental implant and better masticatory efficiency. So, treating the tooth will be a better alternative of extraction. Hemisection denotes dividing the tooth into two halves – mesial half and distal half. Restoring the one half of the tooth serves for the function and esthetics. The therapeutic treatment modality which involves multidisciplinary approach including endodontics, periodontics and restorative dentistry aims at retaining the tooth and produce predictable results by proper case selection.[(1)] In previous studies, guided tissue regeneration has been considered for regeneration of bone as periodontal breakdown can lead to loss of the tooth. Many regenerative modalities have been implied for bone regeneration and those too with positive outcomes. Platelet rich fibrin is an autologous second-generation platelet concentrate and has various advantages such as better healing biomaterial, enriched with growth factors helpful in regeneration and hemostasis. Successful treatment of endo-perio lesions depend on timely and accurate diagnosis. There are few indications of resection of the tooth as recommended by Weine:[(2)]

Periodontal indications

1. Advanced loss of bone affecting only single root of tooth with multiple roots.
2. Grade III furcation involvement
3. Unable to maintain the adequate oral hygiene when the roots of adjacent teeth are closely adapted.
4. Dehiscence causing severe exposure of the root.

Endodontic and restorative indications

1. Prosthetic failure of abutments within a splint when single or multirooted tooth is periodontally involved within a fixed bridge, the root of the involved tooth is extracted, if the remaining bone support for the abutment is sufficient.
2. Endodontic failure including perforation of floor of the pulp chamber and in cases where pulp canal of one of the roots of an endodontically involved tooth cannot be instrumented.
3. Vertically fractured root.

Contraindications

1. If pulpal canals of the root which is to be retained are unable to operate.
2. Fused roots making the separation impossible

Case Report

A 27-year-old male patient came to the department of periodontics and oral implantology with the chief complain of bleeding gums in left lower back region of tooth since 2 months. Patient also complains of pain in the same region since 1 week. Pain described by the patient was dull and intermittent in nature and aggravated on application of masticatory forces and was relieved after the removal of stimulus. Patient was able to localize the pain. The tooth was slightly sensitive to percussion. Patient gave previous history of endodontic treatment of the same tooth 1 year back and had underwent fixed prosthesis. On examination, it was revealed to be faulty prosthesis associated with the tooth. Localized swelling was seen w.r.t offending tooth with pocket depth of 8mm. A diagnostic radiograph revealed that the tooth was not completely obturated. Bone loss was evident around the offensive tooth with grade III furcation involvement. Radiograph also revealed

fractured distal root. It was formulated to be a failed endodontic treatment with significant endo-perio lesion.

The case was considered for extraction but the patient wanted to save his natural tooth, therefore the operator planned conservative treatment involving root canal treatment of the mesial half of the tooth root and hemisection with removal of distal half of the tooth root and use of PRF as a material for bone regeneration in the extraction socket.

Treatment Procedure: The procedure was well explained to the patient. The endodontic therapy was completed. Thorough scaling and root planning were performed. Patient was recalled after 15 days for the revaluation of gingival and periodontal status (Fig. 1). Local anesthesia was given and full thickness mucoperiosteal flap was raised. Debridement was done with the removal of all granulation tissue. Tapered fissure carbide bur with long shank was used to make vertical cut towards bifurcation area. Division of the tooth was done into two halves. To ensure the separation, explorer was used through the cut. Distal root was removed using elevator (Fig. 2, 3). The area was irrigated with saline and was checked for presence of any tooth fragment and debris. Patient's own blood was taken for PRF (Platelet Rich Fibrin) preparation. PRF was made and placed into the extraction socket (Fig. 4). Flap was repositioned and sutures were placed using 3-0 Ethicon silk sutures (Fig. 5). Minimization of the occlusal table was done to redistribute the forces along the long axis of mesial half of tooth root. Patient was prescribed with antibiotics and analgesics for 5 days. Patient was recalled and suture removal was done after 1 week. Follow up was done at regular visits to check for oral hygiene maintenance (Fig. 6).

Fig. 1: Preoperative

Fig. 2: Flap reflection and hemisection

Fig. 3: Sectioned distal root

Fig. 4: Placement of PRF

Fig. 5: Flap Reposition and Suture

Fig. 6: Postoperative

Discussion

One should always try to delay inevitable extraction of the tooth, rather should focus on the conservative and less extensive approach. Newer techniques can lead to favorable prognosis, however, hemisection is considered to be a routine dental procedure which denotes removal of one half of the root with its accompanying portion of crown of multirooted teeth.[3] It is a useful alternative method to save one half of the multi-rooted teeth to restore function which have been previously advised for extraction. Some considerations should be made before the selection of tooth destined for hemisection such as patient's oral hygiene, caries index, bone support after sectioning, access of furcation area and medical history.[4] Various authors have published case reports

with long term follow up which points to the success of hemisection as a viable treatment option. Park et al. evaluated that multirooted teeth with questionable prognosis can be retained after hemisection, if the patient's oral hygiene maintenance is optimum. Saad et al. also evaluated that hemisection of a multirooted teeth can be considered as effective treatment option if the one root is decayed and the other one is healthy.[5] Tooth loss in the posterior region can lead to various uneviable sequelae; therefore, proper guiding principle must be kept in mind to try and preserve what is present.

The main objective of the regenerative therapy is rejuvenation of periodontal soft and hard tissues, also aiming at establishment of new attachment apparatus. Endo-perio defect can be managed with non-surgical debridement of root surfaces and canals, surgical debridement for the better access of root surfaces and apical lesions. Advanced periodontal disease usually leads to irreversible bone loss whereas bone loss due to pulpal disease is reversible.[6] Multirooted molars which are periodontally involved can be treated with hemisection to increase the lifespan of the tooth. Periodontal surgical therapy is required due to advanced bone loss which cannot be resolve by non-surgical therapy alone.

Platelet rich fibrin is a second-generation autologous concentrate, obtained from patient's own blood having enormous potential when used for different regenerative procedures. It also serves as a scaffold for the rejuvenation of bone cells. Platelet derived growth factors promotes rejuvination of bone and enhance the healing.[7]

This case report explains solution for the endo-perio lesion by hemisection, bone regeneration by PRF placement and fixed prosthesis for the remaining tooth structure to make it functionally sound.

Important factors that should be considered before going for any resection procedure are as follows:[6]

- Adequate quantity of bone surrounding the remaining roots after hemisection of root with advanced bone loss.
- Buccally, distally, mesially or lingually inclined teeth cannot be directed for resection.
- Roots which are fused and less divergent are considered poor.
- Short conical roots are less favorable than long and straight roots.

Regular periodontal maintenance and sufficient coronal restoration of the root resected teeth are important preconditions for long term survival.

Conclusion

Hemisection must be accounted as startling weapon in the field of dentistry, destined to preserve the natural tooth. With newer improvements, hemisection has been approved to be conservative and reliable dental treatment. The teeth treated are capable of maintaining the function and esthetics. It can be a worthy substitute for extraction. This case report demonstrates the management of the tooth that is periodontally compromised tooth through multidisciplinary approach. Hemisection exhibits the same prognosis as conventional endodontic procedures but that can only be possible if the case selection has been done accurately and treatment performed is adequate.

References

1. Yadav S, Agnihotari K and Vinayak V et al. Hemisection: Divide and Rule- A case report. Journal of dental sciences and oral rehabilitation 2012; 3:1-3.
2. Weine FS, Smulson MH, Herschman JB. Endodontic therapy. 5th ed. St. Louis: Mosby. 1996: 640-41.
3. Verma P, Srivastava R and Baranwal H et al. A ray of hope for the hopeless: Hemisection of mandibular molar with socket preservation. Dent Hypotheses. 2012: 3:159-63.
4. Singhi A and Somani P. Hemisection: An Endo–Perio Management of a Mandibular Molar Tooth in a Young Patient. International Journal of Science and Research. 2017; 6:1-3.
5. Akki S and Mahoorkar S. Tooth Hemisection and Restoration an Alternative to Extraction- A Case Report. International journal of dental clinics. 2011;3: 67-68.
6. Behl A. Hemisection of a Multirooted Tooth-A Case Report. Open access scientific reports. 2012; 1:1-3.
7. Omkar B, Sathish A and Lisa C et al. Management of an endodontically compromised multirooted tooth with hemisection and platelet rich fibrin: A case report. Scientific Journal of Dentistry. 2014: 1: 30-34.