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Conservative management of grossly mutilated teeth with hemisection approach: a case report

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Abstract

Proper diagnosis and treatment of endo-perio lesions differ from those other lesions which are caused by a single causative factor. Endo perio lesion has been one of the most common problems associated with the tooth in which a single causative agent cannot be accounted. A more detailed examination is required to plan out a definitive treatment plan. Previously, many therapeutic measures were followed to retain such teeth so that they can be used as an independent unit of mastication instead of its limitation to dental extraction and replacement by the prosthesis. Among all such procedures, hemisection is a wise viable option to retain such hopeless teeth and preserve the tooth structure and other associated tissues. An interdisciplinary approach is very useful in treating and saving the badly broken tooth. The present case report demonstrates the successful management of a mutilated

mandibular molar tooth by hemisection approach followed by prosthetic rehabilitation.

Keywords: Endo perio lesion, Alveolar bone loss, Nonsurgical Root canal treatment, Hemisection, Restoration, Prosthetic Rehabilitation.

Introduction

The human dental pulp and periodontium are closely connected because of their proximity and by the presence of apical and lateral foramina. They are also embryonically, anatomically and functionally related[1] Endo-perio lesions are complex in nature due to their varied pathogenesis. Proper diagnosis and treatment plan is very much essential for good prognosis of the affected tooth. For the best prognosis in case of an endo-perio lesion, the clinician must refer the case to the specialized area to perform endodontic, periodontal, restorative, and prosthetic therapy in combination.[2] Hemisection is one such treatment modality that is conservative and preserves tooth structure as much as possible rather than sacrificing it completely.[3]

Hemisection (removal/surgical separation of one root) involves removing significantly compromised root structure and the associated coronal structure through deliberate excision.

Weine has listed the following indications for tooth resection[4]

Periodontal Indications

1. Severe vertical bone loss which is involving only one root of multi-rooted teeth.

2. Through and through furcation destruction.

3. Unfavorable proximity of roots of adjacent teeth, preventing adequate hygiene maintenance in proximal areas.

4. Severe root exposure due to dehiscence.

Endodontic and Restorative Indications

1. In case of prosthetic failure of abutments within a splint: If a single or multi-rooted tooth is periodontally involved within a fixed bridge, instead of removing the entire bridge, if the remaining abutment support is sufficient, the root of the involved tooth is extracted.

2. Endodontic failure cases: Cases in which there is perforation through the floor of the pulp chamber or pulp canal of one of the roots of an endodontically involved tooth which cannot be instrumented.

3. In cases with vertical fracture traversing one root while the other roots are unaffected, the offending root may be imputed.

4. A severe destructive process as a result of furcation or sub gingival caries, traumatic injury, and large root perforation during endodontic therapy.

The treatment goal is preservation of the remaining tooth structure and restoration of the function. The present case report describes the hemisection procedure which was chosen to retain the mutilated mandibular first molar with the extraction of periodontally involved distal root and by restoring the missing tooth structure with a prosthesis.

Case Report

A 51 years old male patient reported to Department of Conservative Dentistry and Endodontics, Sri Hasanamba Dental College and Hospital with a chief complaint of pain in his lower right back tooth since past 2 months. Patient was systemically healthy.

Clinical examination

- Visual: Permanent Mandibular Right First Molar (46) was found to be grossly carious with supragingival calculus (Figure 1).
- Periodontal finding: On probing, deep periodontal pocket present in the distal aspect of 46 with grade 1 mobility.

- Radiographic Investigation: IOPAR of 46 revealed radiopacity in the occlusal surface, extending into the pulp. Distal angular bone loss evident with intact bony support of mesial root (Figure 2).

Figure 1 : Pre-Op

Figure 2: Pre-op IOPAR

Diagnosis: Primary endodontic lesion with secondary periodontal involvement w.r.t. 46. (According to Classification proposed by Simon *et al*, 1972).

Treatment plan : It was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth.

1. The following appointment included oral prophylaxis followed by endodontic access. After working length determination, chemomechanical preparation and obturation was completed irt 46 (Figure 3).
2. Patient was reviewed after 1 week for any symptoms regarding root canal treatment.
3. Under local anesthesia, the vertical cut method was used to resect the crown. A long shank tapered fissure carbide bur was used to make vertical cut toward the bifurcation area. A fine probe was passed through the cut to ensure separation. The distal root was extracted and the socket was irrigated adequately with sterile saline to remove bony chips. The resected molar resembled premolar in shape (Figure 4, 5 and 6).
4. Patient was reviewed after 1 week, 1 month and 3 months for any symptoms.
5. Tooth preparation was done after 3 months and definitive prosthetic rehablitation was accomplished with a 3 unit fixed partial denture including the mesial half of the tooth (Figure 7 and 8).
6. Six months follow up showed satisfactory healing with no signs of any symptoms (Figure 9 and 10).

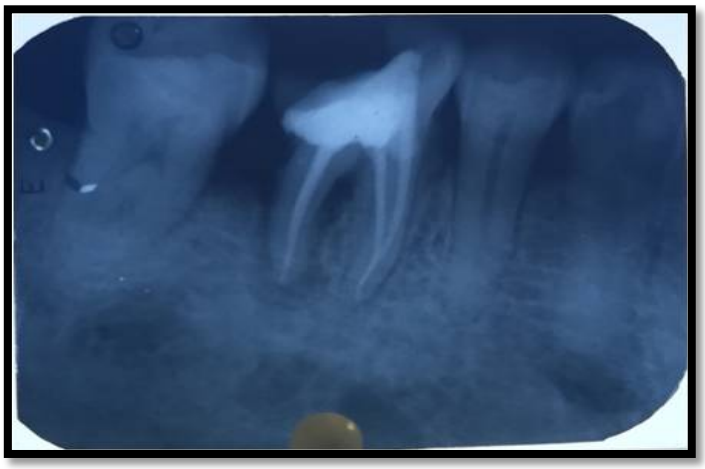

Figure 3: Post Obturation IOPAR

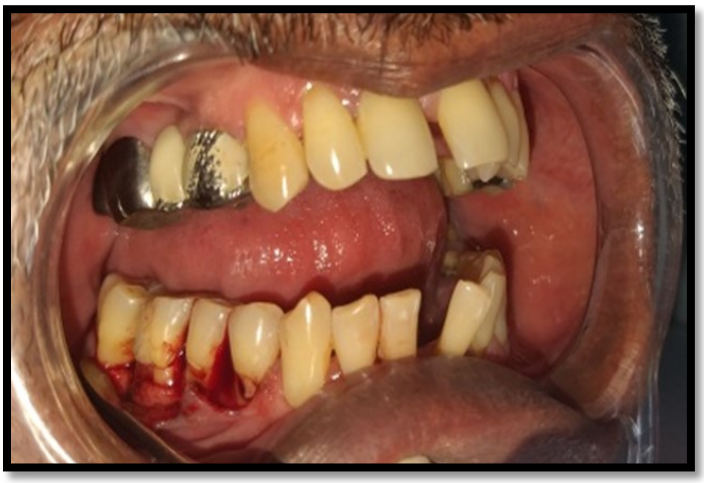

Figure 4: Mucoperiosteal Flap Reflection

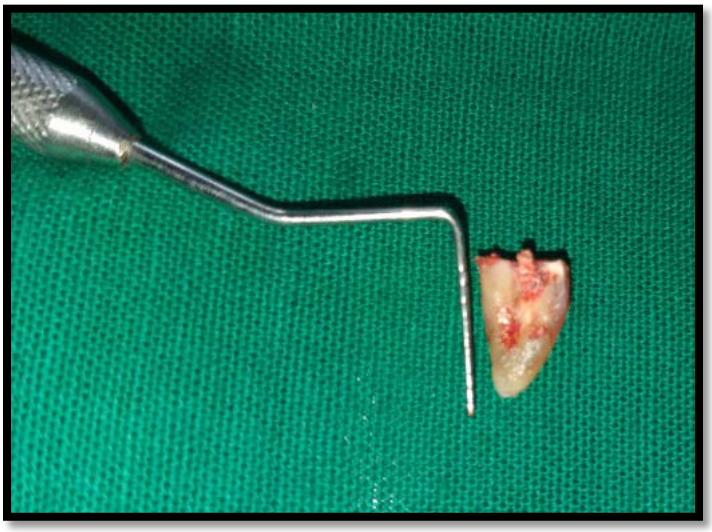

Figure 5: Hemisected distal root

Figure6: Radiograph shownig well-retained mesial root with hemisected distal half.

Figure7: Tooth preparation irt 46,47

Figure 8: Permanent crown cemented

Figure 9: Six month Follow up Clinical Image

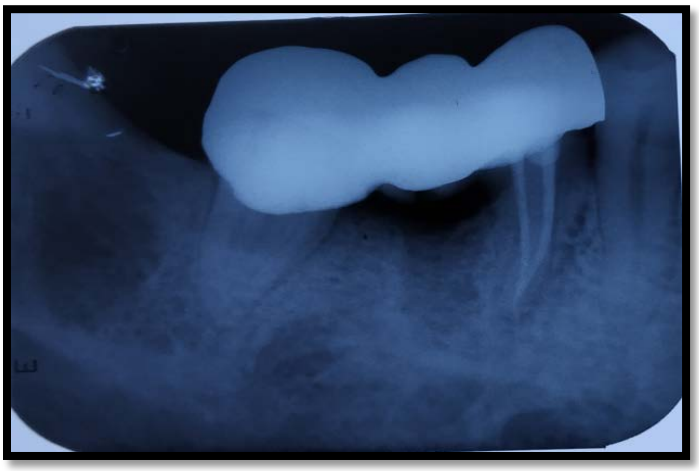

Figure 10: 6 month post-operative IOPAR

Discussion

Diagnosing endo-perio lesion is still a dilemma to clinicians. Proper history with sequential treatment planning is required by endodontist together with a periodontist for the success of therapy. Depending upon the clinical condition, hemisection is a useful alternative procedure to save multi-rooted teeth which have been indicated for extraction. Other alternative treatments for mutilated teeth include dental implants, extensive bridgework or custom-made tooth replacement.[3]

Several basic considerations have to be taken care for the success of hemisection. They are

•Extensive bone loss around one root with an acceptable level of bone around the remaining roots of a multirooted tooth.

•Angulated and the malpositioned teeth cannot be resected.

•Multirooted tooth with divergent roots are easier to resect.

•Fused roots or closed placed roots are poor candidates for hemisection.

•Long and straight roots are more favorable for resection than short, conical roots.

•Feasibility of endodontics and restorative dentistry in the root/roots to be retained.

•Patient's compliance in maintaining good oral hygiene.[5]

Limitations associated with hemisection are:

•It can cause pain, anxiety.

•Caries susceptibility is more in the site of hemisection.

•Decay after hemisection can cause failure of the therapy.

•Failed endodontic treatment due to any reason will have a negative effect on the procedure.[6]

Prosthetic rehabilitation plays a very important role in the success of hemisection. Defective margins can lead to periodontal destruction. Trauma from occlusion can be caused by an improperly shaped occlusal contact area which converts acceptable forces into destructive forces.[7]

The case selection criteria in the present case for performing hemisection was optimum as periodontal bone was seen in one root with good bone support in the other root and roots were not closely approximated or fused. Endodontic therapy was performed before hemisection to avoid intrapulpal dystrophic calcification and post operative tooth sensitivity. Occlusal modifications were done to prevent root fracture, which is a main reason for failure after hemisection.[8]

Park., et al.[9] from his research suggested that hemisection of molars with questionable prognosis can maintain the teeth without any detectable bone loss for a long-term period, suggested that the patient maintains good oral hygiene. In his study, Saad., et al.[4] have concluded that hemisection is a suitable treatment option rather than extraction in a multirooted molar teeth, when the decay is restricted to one root and the other root is healthy. The remaining portion of the tooth can be used as an abutment for the prosthetic rehabilitation. Buhler's[5] study showed that 32% failure rate in hemisection cases were mainly due to endodontic pathology and root fracture while long-term studies have shown greater success.[9,10]

In the present case, 6-month follow-up showed a good prognosis with the absence of mobility and a healthy

periodontal condition. Thus, the hemisection can be considered as an effective and conservative treatment against the extraction of the tooth with extensive caries.

Conclusion

For the successful treatment of a endo-perio lesion, an accurate diagnosis and proper treatment plan is mandatory. Hemisection is an conservative, effective and alternative treatment modality alternative to extraction or implant therapy. Interdisciplinary approach that includes endodontics, periodontics, and prosthodontics is required to treat endo-perio lesions effectively. The success rate and predictability are high in hemisection if certain basic considerations are taken into account.

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