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Case Report

PRESERVATION OF MANDIBULAR MOLARS WITH HEMISECTION A SERIES OF INTERDISCIPLINARY CASE REPORTS

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ABSTRACT

Hemisection has been recognized as an effective procedure to retain tooth structure, while removing the unrestorable root and crown portion which may be affected by periodontal or endodontic disease. case reports are presented in this article, where hemisection was performed on mandibular molars for different etiologies, to preserve the tooth. The first case report details the management of a vertical root fracture while the second deals with furcal iatrogenic perforation during endodontic procedure. In both the cases, Endodontic therapy and prosthetic rehabilitation had a successful review due to the ameliorate interdisciplinary treatment approach.

INTRODUCTION

In certain clinical scenario, extractions were the only choice of treatment. We now live in an era where using advances is possible to maintain a functional dentition for a lifetime. One of the conservative ways of preserving a tooth is 'hemisection'. Synonymous with 'root amputation' or 'bisection', hemisection is a treatment modality which allows the preservation of tooth structure, alveolar bone and cost saving over the other treatment modalities.[1]In the process of hemisection, the involved crown and root is removed to preserve the remaining tooth rather than sacrificing it.

Indications

Following indications have been suggested by Weine for tooth resection: [2]

Periodontal indications

1. Severe vertical bone loss involving only one root of multi-rooted teeth
2. Through and through furcation destruction
3. Unfavourable 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. Prosthetic failure of abutments within a splint.
2. Endodontic failure:

Hemisection is useful in 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. Vertical fracture of one root:
4. Severe destructive process:

This may occur as a result of furcation or subgingival caries, traumatic injury, and large root perforation during endodontic therapy.

Contraindications

1. Poorly shaped roots or fused roots

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2. Poor endodontic candidates or inoperable endodontic roots
3. Patient unwilling to undergo surgical and endodontic treatments

Hemisected teeth can fail due to root fractures; therefore an extra- coronal restoration is of utmost importance. A Hemisection, thus calls for an interdisciplinary approach.

The present case reports discussed in this article shows how the in volvement of surgical, endodontic as well as prosthetic treatment, brought in sights a successful review. [3][4]

Case Report

A 45 year old male patient reported with a chief complaint of pain on mastication and swelling in the lower left back tooth region. He reported a history of root canal treatment in the concerned area five years back. On Intraoral examination, a sinus opening was detected on the buccal aspect of tooth 37, along with exudation from the same. There was a vertical root fracture extending through the floor of the tooth more towards the mesial orifice. Further examination showed a good condition of the distal root with no pocket formation or alveolar bone loss, but a periodontal pocket of probing depth 6mm was detected with respect to the mesial root [Figure 1]. Radiographic examination in relation to 37 revealed:

- A coronal radiolucency involving the pulp chamber
- A radiolucent line in the furcation region – suggestive of incomplete obturation of the mesial root during past root canal treatment [Figure 2].
- A periapical radiolucency involving the mesial root. Thus, it was diagnosed as:
- Vertical root fracture involving mesial root of 37
- Chronic periapical abscess in relation to the mesial root.

The treatment decided for the patient was hemisection in relation to 37 in which the amputation of ,mesial root of 37 was to be followed by obturation and prosthetic rehabilitation of the said tooth.

The first Phase of Treatment was the Periodontal phase.

Following administration of local anaesthesia, mesial root was removed using the PRF- Choukron's Technique. The extraction socket was then filled with PRF and bone graft. Coepack was placed following suturing in the site [Figure 3- 6].

This was Followed by an Endodontic phase

It involved re- root canal treatment for the distal root. Obturation was done using 2% Gutta percha by the lateral condensation technique. Composite was used as post endodontic restorative material.

Regular follow- up visits were scheduled for the patient for monitoring the healing of the socket. There were no post-operative complications noted during these visits, and radiographic examination revealed that the site was satisfactorily healed by the end of 3 months [Figure 7].

After 3 Months of Healing, the Prosthetic Phase was Planned

It was decided to give a three unit fixed partial denture involving 36, 37 and 38 [Figure 8, 9].

The overall treatment resulted in the patient regaining his masticatory efficiency and was extremely satisfied with the same.

Figure 1 Preoperative Clinical view

Figure 2 Preoperative Radiographic view

Figure 3 Hemisectioning of Tooth

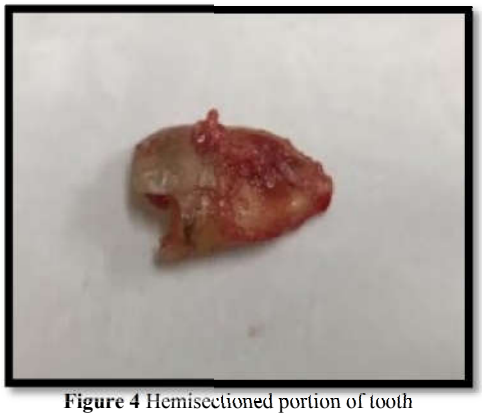

Figure 4 Hemisectioned portion of tooth

Figure 5 Sutures placed

Figure 6 Periodontal dressing (CoePack)

Figure 7 Post- operative radiograph after 3 months, showing healed socket, with root canal done for the distal root

Figure 8 Post- operative view with fixed prosthesis

Figure 9 Post – operative radiograph after 4months

Case Report

A 46 year old male patient reported with a chief complaint of pain in the right back tooth region since 5 days. History of root canal treatment initiation reported one month back. On clinical examination, temporized access cavity in relation to 46 and deep cervical abrasion in relation to 44 and 43 with gingival recession was seen. [Figure 1o]. An intra oral periapical radiograph[3] revealed a case of instrument separation associated with the mesial root of 46and perforation in the floor of pulp chamber. [Figure 11]. After all investigations, treatment plan was decided. According to the plan, hemisection of the root canal treated tooth followed by prosthetic rehabilitation was the forethought. Conservation of tooth structure was better possible through this treatment plan.[Figure 10- 17].

Figure 10 Pre-operative tooth- Clinical view

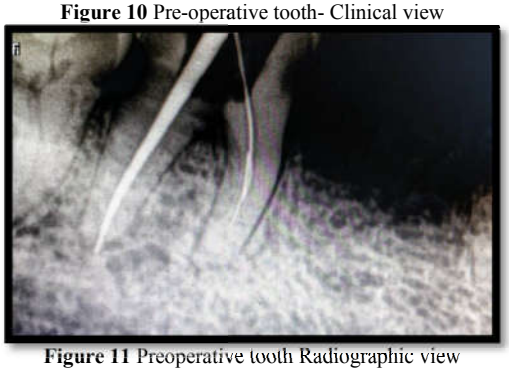

Figure 11 Preoperative tooth Radiographic view

Figure 12 Hemisectioning of tooth portion

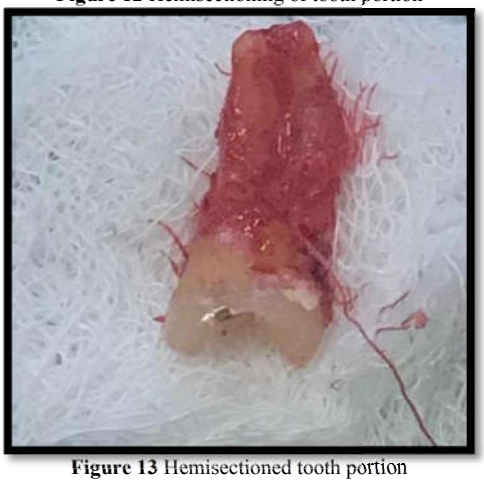

Figure 13 Hemisectioned tooth portion

Figure 14 Sutures placed

Figure 15 Post- operative view

Figure 15 Post operative IOPA after 3 mths of Hemisection prior to prosthetic rehabilitation

Figure 16 Post operative IOPA after 4mths of prosthetic rehabilitation

DISCUSSION

Hemisection is apredictable procedure for preservation of multi-rooted tooth as an alternative to extraction. The patient's oral hygiene status, caries index and medical status should be considered before procedure. Root furcation must be accessible for easy separation and good bone support for remaining root is essential.[5] Endodontic evaluation and proper prosthetic designing increases the longevity of the tooth preserved. Thus, a multi-disciplinary approach enhances the prognosis of hemisectioned tooth.

Both the cases were ideal, necessitating hemisection as a treatment alternative to extraction. Also, the patients were motivated to try and save as much of the tooth as possible.
In case report 1, there was a vertical root fracture involving the mesial root of 37 associated with a non-healing sinus,necessitating extraction. Endodontic re treatment was planned for the distal root since the fracture line was involving the mesial root. So hemisection was preferred over bicuspidization. Fixed partial denture in relation to 36, 37 and 38 was done.

In case report 2, in relation to 47, the mesiobuccal canal could be negotiated to bypass the separated instrument but since the mesiolingual canal was calcified and perforation was more mesiobuccally located, hemisection was opted for the preservation of the tooth. Root canal treatment was also done for the deep cervical lesion in relation to 45, 44. Fixed partial denture in relation to 44, 45, 46, 47, 48 was done with narrow occlusal table and shallow cusps. Gingival porcelain was given in relation to 44 and 45 for esthetics.

Buhler has stated that hemisection should be considered before every molar extraction, given its advantages such as provision of a good, absolute and biological cost saving alternative with good long- term success. 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 hemisection [6]

It has been concluded by Saad *et al*[7], that hemisection of a mandibular molar may be a suitable treatment option when the decay is restricted to one root and the other root is healthy and remaining portion of tooth can very well act as an abutment, as in the presented cases.

Successful restoration of periodontally weakened teeth is aided by creating an occlusal scheme with canine protected occlusion, decreased vertical overlap and flattened posterior cusps.[8]

CONCLUSION

In the era of conservative dentistry, dental practitioners should be encouraged to work together in an interdisciplinary approach for the preservation and maintenance of tooth structure that can be retained. For this, timely intervention with hemisection and endodontic therapy followed by planned prosthetic rehabilitation should be adopted as one of the routine procedures.

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