

Hemisection- A Window of Hope for a Perishing Tooth

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Abstract

Mandibular first molars are the most commonly extracted teeth due to dental caries and periodontal disease. These teeth are the major standpoint for occlusion, and also have a wide peri-cemental area. Hence, any defect in the root either mesial or distal, extraction is the most common treatment planned. Under specific conditions, only the diseased part of the tooth can be extracted after an endodontic treatment. A modified fixed partial denture design is fabricated to splint the remaining portion of the tooth to adjacent teeth. This procedure though daunting can be easily achieved and maintained successfully.

KEYWORDS: Hemisection, periodontal disease, modified fixed partial denture

Introduction

Advances in dentistry have provided the opportunity to maintain a functional dentition for a lifetime. Hemisection (removal of one root) involves removing significantly compromised root structure and the associated coronal structure through deliberate excision.¹ Patients are becoming more educated with the available treatment with time. Hemisection of the affected tooth allows the preservation of tooth structure, alveolar bone and cost savings over other treatment options.²

Case report

A 29 yr old male patient, reported to the department of Periodontics, with the chief complaint of loose tooth and pain in lower left back tooth region. Pain was dull aching and intermittent in nature, which aggravated on mastication. On further enquiry, patient did not give any significant medical and previous dental history, but he was tobacco chewer since 10 years. Extra oral examination revealed no abnormality.

On intraoral examination, it was found that patient had fair oral hygiene. On probing lower left mandibular 1st molar, a periodontal pocket of 8-10 mm was found on buccal and distal surfaces along with grade III furcation involvement. Also the tooth showed grade II mobility and was sensitive to percussion. IOPA showed grade III furcation defect with periodontal bone loss more along the distal root as compared with mesial root and periapical rarefaction with both the roots. Periodontal support of mesial root of 36 was good. Interproximal bone loss was seen between 36 and 37. Periodontal prognosis with 36 was good and vitality test was positive. Thus, it was diagnosed as "Chronic generalised gingivitis and Localized periodontitis associated with lower left mandibular 1st molar. Treatment options included extraction of 36 followed by placement of implant, fixed partial denture or removable partial denture. Patient did not wish to have the tooth removed, so a conservative treatment option was opted which included hemisection of the distal root of 36 followed by prosthetic replacement.

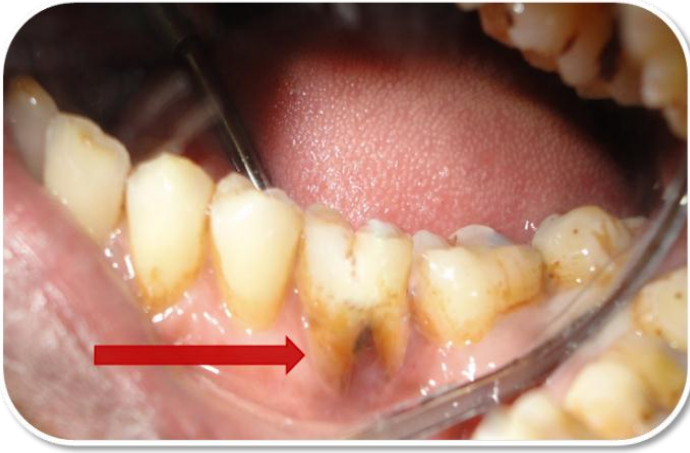


Figure 1:-pre operative view of the patient.

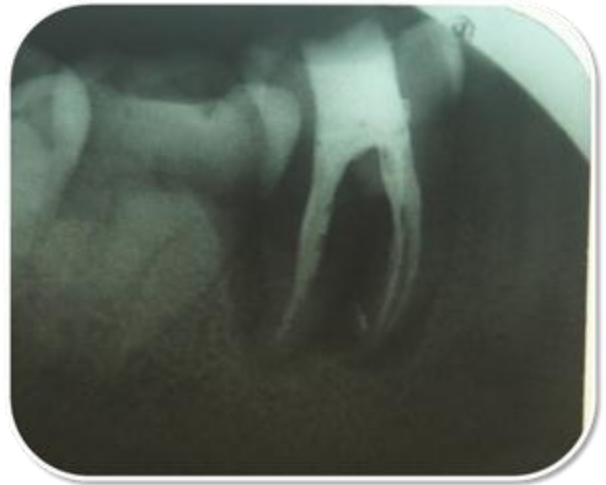


Figure 2:- intentional root canal treatment done.



Figure 3:- hemisection of the distal root carried out.



Figure 4:- bone formation after three months of the placement of graft



Figure 5:- Tooth preparation done.



Figure 6:- post operative view.

TREATMENT PROCEDURE

Diagnostic impressions were made with irreversible hydrocolloid impression material.

ENDODONTIC PHASE:

Endodontic phase involved intentional root canal treatment of 36 in a conventional manner. After 15 days of obturation, Hemisection was carried out.

PERIODONTIC PHASE:

After appropriate local anaesthesia, a crevicular incision was made from 1st premolar to 2nd molar region. A full thickness mucoperiosteal flap was elevated to provide adequate access for visualization and instrumentation and minimize surgical trauma. After reflection of flap, bony defect was evident and curettage and debridement was done. A long shank tapered fissure carbide bur was used to make vertical cut facio-lingually towards the bifurcation area and distal root was extracted. Care was taken not to traumatize bone & adjacent tooth while removing the distal root. Debridement and irrigation of the socket along with thorough root planning of mesial root was performed. Odontoplasty was performed to remove the developmental ridges and distal aspect of mesial root was contoured in such a way so as to facilitate oral hygiene measures. Socket preservation was done by grafting the extraction site with "Fisiograft." Then buccal and lingual flaps were approximated to cover the graft. Sutures were placed and COE pack surgical dressing was done. The surgical site was then allowed to heal with no occlusal stress on mesial root for 4 weeks. Patient was recalled after 3 months. IOPA revealed good bone regeneration which indicates good uptake of the graft. Then, the restoration of hemisected tooth was planned with fixed partial denture in relation to 35, mesial root of 36 and 37.

PROSTHODONTIC PHASE (Restoration of hemisected tooth):

Diagnostic impressions were made with irreversible hydrocolloid impression material and diagnostic casts were obtained. Face bow record was made and transferred to a semi adjustable articulator and maxillary cast was mounted. Mandibular diagnostic cast was mounted using interocclusal record, to check for any occlusal prematurities and interferences and necessary occlusal corrections were carried out. Tooth preparation was done in relation to 35 and mesial root of 36 to receive a metal restoration with ceramic facing and 37 was prepared to receive an all metal restoration. The margin on mesial surface of 37 was placed approximately 3-4 mm above the gingival margin as the tooth was mesially tilted or else excessive tooth structure would have been lost in order to create a favourable path of insertion. This will also help in maintenance of gingiva by making it self-cleansable. Final impression was made using putty-reline technique and master cast

was obtained. Mandibular master cast was mounted using interocclusal record. Wax pattern was fabricated, sprued and invested. Casting procedure was carried out using standard techniques. Metal framework was tried in the patient's mouth followed by ceramic build up and bisque try in. Final prosthesis was cemented using Glass ionomer cement. Post cementation instructions regarding periodontal maintenance were given. Recall was done periodically to assure the healing and success of the restoration.

DISCUSSION

Periodontal, prosthodontic and endodontic assessment for appropriate selection of cases is important. Buhler stated that hemisection should be considered before every molar extraction³, because it provides a good, absolute and biological cost saving alternative with good long term success. The treatment options to replace severely damaged and possibly unrestorable teeth include removable partial denture, fixed partial denture, and dental implant. A guiding principle should be to try and maintain what is present.² The use of hemisection to retain a compromised tooth offers a prognosis comparable to any other tooth with endodontic treatment.

Endodontic phase:

Endodontic treatment was performed first because in case, if the tooth cannot be treated endodontically or if there is an endodontic failure, the case will be contraindicated for hemisection.

Periodontic phase:

4 critical factors in selecting molar for hemisection are:⁶

- 1) Root divergence- Ideally the resected root should have generous root divergence, as close root proximity will make surgery difficult.
- 2) Root form- Roots of mandibular molars show concavity, mostly on mesial root. Therefore, odontoplasty should be performed to provide a proper contour.
- 3) Location of furcation- Closer the furcation opening to the cemento-enamel junction, better the prognosis for retained root.
- 4) Remaining root attachment- is critical to evaluate; as cylindrical, ovoid, long root serves as an excellent abutment.

Objectives:

- 1) To facilitate maintenance.
- 2) To prevent further attachment loss.

3) To obliterate furcation defects as a periodontal maintenance problem.

Prosthodontic phase:

When the tooth has lost part of its root support, it will require a restoration to permit it to function independently or serve as an abutment for Fixed Partial Denture or Splint.

Thus, restoration is required for function and stabilization of occlusion.

Points to consider while fabricating the prosthesis: Restoration can contribute to periodontal destruction, if margins are defective or if non-occlusal surfaces do not have physiologic form. An improperly shaped occlusal contact area converts acceptable forces into destructive forces leading to ultimate failure of hemisection. Hemisected abutment are given a taper greater than 6-10 degree to have a path of insertion compatible with the anterior abutment and to compensate for this buccal and lingual grooves are placed in the abutment. Occlusal table is reduced in size in order to decrease the forces on the retained hemisected root. Cuspal inclines are made less steep to reduce laterally directed forces and eliminate the non-working contacts. Retained root is restored as premolar which helped to reduce the masticatory load. Stein noted that "esthetic permitting, the sanitary pontic is the best design for posterior region".⁵

The keys to long term success include thorough diagnosis, selection of patients with good oral hygiene, careful surgical and restorative management. Hemisection may be a suitable alternative to extraction and implant therapy and should be discussed with patients during consideration of treatment options.

CONCLUSION

Therapeutic planning, operative sequence and pluridisciplinarity exerted in this case illustrate the importance of specialized knowledge and professional communication. Hemisection is a baton for the extracting teeth. Careful case selection determines the long term success of the procedure.

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