



HEMISECTION : A LAST LINE OF DEFENCE FOR PERIODONTALLY COMPROMISED MULTI ROOTED TOOTH

Prosthodontics

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ABSTRACT

Recent advances in dentistry provide the opportunity for patients to maintain a functional dentition for decades, that led to treatment of teeth that once would have been considered for extraction. (1) Root canal treatment usually fails when treatment falls short of acceptable standards. The explanation that many teeth do not respond to root canal care is due to clinical errors preventing intracanal endodontic infection from being managed and prevented. In truth, a procedural error sometimes impedes or prevents acceptable intracanal procedures from being carried out. Therefore, root canal therapy can fail if a procedural accident occurs in the treatment of infected teeth. Throughout dental practice, perforations are seen as significant complications and present a variety of diagnostic and management concerns. (2) Conversely, a hemi section technique may be necessary if the decay is limited to one root. This procedure represents a type of conservative dentistry, which aims to preserve as much as possible of the original tooth structure. The results are predictable, and success rates are high if certain basic considerations are taken into account. (3) The word resection of the tooth signifies the excision and removal of any part of the tooth or root with or without the corresponding crown. Various resection procedures described are : root amputation, hemisection, radisection and bisection. (4)

KEYWORDS

Hemisection, Root resection, Furcation, mandibular molar

INTRODUCTION

Hemisection refers to the division into two halves of a mandibular molar followed by the removal of the diseased root and its coronal part. The retained root is handled endodontically, and the furcation region is self-cleanable by carefully extracting the root lip. Since hemisect teeth fail due to root fractures, an extracoronal restoration is necessary to restore them adequately. (5)

Weine has listed the following indications for tooth resection

Periodontal indications

1. Severe vertical loss of bone affecting only one root of multi-rooted teeth
2. Through and through furcation destruction
3. Unfavorable proximity of neighboring teeth roots, preventing sufficient hygienic maintenance in the vicinity
4. Severe root exposure due to dehiscence

Endodontic and restorative indications

1. Prosthetic abutment failure in a splint: If a single or multirooted tooth is periodontally involved inside a fixed bridge, instead of removing the entire bridge, if the remaining abutment support is adequate, the root of the damaged tooth is removed.
2. Endodontic failure: Hemisection is useful in cases of perforation through the pulp chamber floor or pulp channel of one of the endodontic roots of a tooth that can not be instrumented.
3. Vertical fracture of one root: Vertical fracture prognosis is hopeless. If vertical fracture passes through one root while the other roots are unaffected, it can amputate the offending root.
4. Extreme damaging process: This may occur during endodontic therapy as a result of furcation or subgingival caries, traumatic injury, and severe root perforation. (6)

Contraindications

1. Poorly shaped roots or fused roots
2. Poor endodontic candidates or inoperable endodontic roots
3. Patient not able to undergo surgical and endodontic procedures A case of hemisection is described in this article as a treatment choice for a tooth in which only the distal root of a mandibular molar has been affected. The decision to hemisect the distal root was made because the mesial bone and furcation bone were largely unaffected. This procedure represents a form of

conservative dentistry, aiming to preserve as much tooth structure as possible rather than sacrificing the whole tooth. (7)

CASE REPORT

A 25 year old male patient reported to the department of prosthodontics, S.D.D.C.H. dental college parbhani with the chief complaint of pain in the lower left posterior tooth previously treated by glass ionomer cement in private clinic 6 months back. On examination, the tooth was sensitive to percussion. Pain was dull aching and intermittent in nature, which aggravated on mastication. mobility seen with distal root. On radiographic examination, severe vertical and horizontal bone loss was evident. Furcation involvement was evident, and there was a periapical radiolucency associated with the mesial & distal root. horizontal fracture seen with distal root. On probing the area, there was a deep periodontal pocket around the distal root of the tooth.

patient did not give any significant medical and previous dental history. Extra oral examination revealed no abnormality. Final diagnosis of horizontal fracture with distal root & intra radicular bone loss with #46 was made. Extraction followed by implant therapy or fixed or removed partial denture were advised. but patient was not ready for extraction hence later it was decided that the distal root should be hemisected after completion of endodontic therapy of the tooth.

The length of research was calculated, and the canals were designed biomechanically using stepback technique. The canals were obturated using a lateral method of condensation, and the chamber was filled with amalgam to maintain a good seal and allow the proper contouring of the interproximal region during surgical separation.

A crevicular incision from the first premolar to the second molar area was made after sufficient local anaesthesia. A full thickness mucoperiosteal flap has been elevated to provide appropriate visibility and instrumentation access and reduce surgical trauma. Bony defect was evident after flap contemplation, and curettage and debridement were completed. To make vertical cut facio-lingually towards the bifurcation field, a long shank tapered fissure carbide bur was used, and mesial root was removed. Caution was taken in not traumatizing the bone and adjacent tooth during removal of the mesial root. Debridement and irrigation of the socket was carried out along with detailed distal root preparation. Odontoplastics were performed to

eliminate the developmental ridges, and the distal part of the mesial root was contoured to promote oral hygiene steps. The flap was replaced and simple interrupted sutures were placed. Patient recalled after 2 months for prosthetic treatment part.

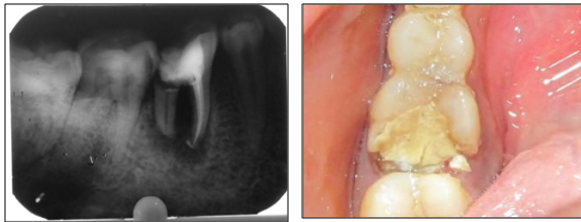


FIG.1 Pre operative IOPAR view of tooth 46 showing radiolucency apices of both roots **FIG.** Pre operative occlusal view of tooth 46



Fig.3a) crevicular incision for hemisection **b)** exposure of roots of #46. **c)** Sectioned distal root. **d)** extracted distal root of #46.

In prosthetic phase, Diagnostic cast was mounted on semi adjustable articulator by using face bow and inter occlusal record. Tooth preparation was done with 46, 47 for metal margin. Metal margin were placed 2mm above furcation area for maintenance of gingival health. Final impression with putty were taken & master cast was poured.

Wax pattern fabricated over mandibular cast for metal casting. occlusal corrections were done & fabricated final prosthesis were cemented using Glass ionomer cement.



Fig. 4 a) post operative IOPAR showing #46 after removal of distal

root by hemisection b) 7 days post operative clinical view c) 1 month post operative clinical view d) Occlusion before receiving final prosthesis e) Extra coronal preparation done with #46 & #47. f) Buccal view of prepared #46 & #47.

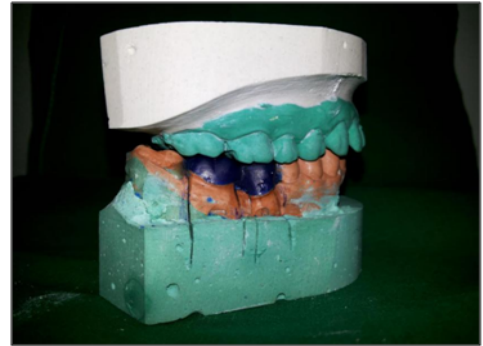


FIG.5 Wax pattern in occlusion on master cast



FIG.6 Buccal view of finished bridge with #46 & #47.



FIG.7 Buccal view of Final PFM bridge with #46 & #47

DISCUSSION

claimed that hemisection should be considered before any molar extraction, as it offers a simple, total, and biological cost-saving solution with good long-term performance. The treatment choices to replace significantly damaged and potentially unrestorable teeth include removable partial denture, fixed partial denture, and dental implant. A guiding principle should be to try and maintain what is present. (5) Saad et al. concluded that hemisection of a mandibular molar can be an effective treatment choice when the decay is restricted to one root and the other root is stable, and the remaining portion of the tooth may serve as an abutment as well. (2)

Before deciding to take any of the resection procedures it is necessary to consider the following factors.

- i) Advanced bone loss around one root with acceptable level of bone around the remaining roots.
- ii) Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, cannot be resected.
- iii) Divergence of the roots - teeth with divergent roots is easier to resect. Closely approximated or fused roots are poor candidates.
- iv) Length and curvature of roots - long and straight roots are more

favourable for resection than short, conical roots.

- v) Feasibility of endodontics and restorative dentistry in the root/roots to be retained.

Tooth resection can be done in the following cases:

a. Periodontal considerations:

1. Severe vertical bone loss involving only one root of a multi rooted tooth.
2. Through and through furcation destruction.
3. Proximity of roots of adjacent teeth preventing adequate maintenance of oral hygiene.
4. Root exposure due to dehiscence.

b. Restorative and endodontic considerations:

1. Periodontal failure of an abutment tooth in a fixed bridge.
2. If one root cannot be completely instrumented due to anatomic reasons or due to iatrogenic causes.
3. Vertical fracture of one root.
4. Severe destruction of one root due to resorption, caries, trauma or perforation.(1)

Objectives of hemisection:

1. To facilitate maintenance
2. To prevent further attachment loss
3. To obliterate furcation defects as a periodontal maintenance problem(6)

Park et al. indicated that hemisection of molars with questionable prognosis may maintain the teeth for a long period of time without noticeable bone loss, provided the patient has proper oral hygiene. Fugazzotto reported 15-year cumulative success rates of 96.8% for root resected molars and 97% for molar implants. The use of hemisection to retain a compromised tooth offers a prognosis comparable to any other tooth with endodontic treatment(9)

Hemisection enables the physiological tooth mobility of the remaining root and is thus a more suitable abutment for fixed partial dentures than an osseointegrated counterpart.² The smaller size of the occlusal tables, the under-contouring of the embrasure spaces and ensuring that the crown margin covers the furcation are all factors in the high success rates found with hemisection therapy.(10)

CONCLUSION

As there are many advances in Endodontics , periodontics & prosthodontics were made in recent years ,still hemisection serves as effective, and conservative treatment over conventional procedure or extraction of periodontally and endodontic compromised teeth. The results of hemisection are predictable, long term survival and success rates are high & supporting bone, the restorative treatment plan, and the oral hygiene of the patient. Thus proper case selection enhances the therapeutic success.

The given case report presents a novel technique to maintain periodontally compromised ,horizontal fractured tooth by hemisection technique.

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