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Hemisection – A Case Report

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ABSTRACT
Advances in dentistry, as well as the increased desire of patients to maintain their dentition, have lead to treatment of teeth that once would have been removed. In order to carry out this present day mandate, periodontally diseased teeth with severe bone loss may well be retained by removal of one or more of their roots. This article describes a simple procedure for hemisection in mandibular molar and its subsequent restoration
Keywords: *Hemisection, Root Resection, Root Amputation, Furcation Involvement.*

INTRODUCTION

The term tooth resection denotes the excision and removal of any segment of the tooth or a root with or without its accompanying crown portion[1]. Various resection procedures described are: root amputation, hemisection, radisection and bisection. Root amputation refers to removal of one or more roots of multi-rooted tooth while other roots are retained. Hemisection denotes removal or separation of root with its accompanying crown portion of mandibular molars. Radisection is a newer terminology employed exclusively for removal of roots of maxillary molars. Bisection or bicuspidization is the separation of mesial and distal roots of mandibular molars along with its crown portion, where both segments are retained individually[2].

Bühler stated that hemisection should be considered before every molar extraction, because this procedure can provide a good, absolute and biological cost saving alternative with good long-term success. In addition, he reported that the failure rates of single-tooth all plastic (titanium) implants and hemisections are not substantially different.

Weine[2] has listed the following indications for tooth resection under endodontic and periodontal indications, as both factors may be responsible either individually or together for the condition.

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.
4. Severe root exposure due to dehiscence.

Endodontic and Restorative Indications

1. Prosthetic failure of abutments within a splint: If a single or multirooted 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: Hemisection is useful when there is perforation of the pulpal floor or in the canal system in one of the roots which is inoperable.
3. Vertical fracture of one root in a multirooted tooth. The offending root in this case may be amputated
4. Severe destructive process: which may occur either due to furcation, sub gingival caries or may result from trauma from occlusion.

Farshchian and Kaiser illustrated the success of a molar bisection with subsequent bicuspidization. They stated that the success of bicuspidization depends on three factors:

1. Stability of, and adequate bone support for, the individual tooth sections.
2. Absence of severe root fluting of the distal aspect of the mesial root or mesial aspect of the distal root.
3. Adequate separation of the mesial and distal roots, to enable the creation of an acceptable embrasure for effective oral hygiene.

At the same time it must be kept in mind that hemisection like any other restorative procedure has its limitations. The contraindications to hemisection include

1. Inoperable canal systems in the root to be retained.
2. Strong adjacent teeth available as abutme-nts to serve as alternatives to hemisection.
3. Root fusion making hemisection impossible.

It is nicely summed up by Newell according to whom the advantage of the amputation, hemisection or bisection is the retention of some or the entire tooth. However, the disadvantage is that the remaining root must undergo endodontic therapy and the crown must undergo restorative management

CASE REPORT

A 42 year old female patient, reported in private clinic, Sangli, Maharashtra, India with the chief complaint of pain and sensitivity in left, lower, posterior region, since 3 months. The pain occurred on mastication and was relieved, once the stimulus was removed. Past dental history suggested an uneventful extraction of 26, which was carious. The patient did not give any significant medical history. On intraoral examination, the probing depth of 13 mm was found on distal surfaces. [Figure 1]. Also, the tooth showed grade I mobility and was sensitive to percussion and was extruded as 26 was missing. IOPA radiograph revealed periodontal bone loss of the distal root as compared with mesial root and periapical rarefaction with both the roots [Figure 2]. Periodontal support of mesial root of 36 was good. Periodontal prognosis with 36 was good and the vitality test was positive. Thus, it was diagnosed as ‘chronic generalized gingivitis and localized periodontitis, associated with lower left mandibular 1st molar'. Treatment options included extraction of 36, followed by placement of implant, a fixed partial denture or a removable partial denture. The patient did not wish to have the tooth removed, so conservative treatment was selected, which included hemisection of the distal root of 36, followed by prosthetic replacement.

The whole procedure was explained to the patient and a thorough scaling and root planing was done. Gingival and periodontal status was reevaluated after 2 weeks. Intentional root canal treatment was done in 36. After local anesthesia, a mucoperiosteal flap was reflected to expose the area of hemisection. Once the flap was raised the area of bone loss became apparent. The granulation tissue was then removed using curettes to expose the bone. To separate the crown the vertical cut method was applied, with a contrangled hand piece & cross cut bur, the cut was placed in an apical direction up to the approximate position of the bifurcation area [Figure 3]. A fine probe was passed through the cut to ensure separation[3, 4]. Now the distal half of the tooth was removed and defect was packed with bone graft (alloplastic graft) [Figure 4]. Remaining surface was shaped to provide a self-cleansable margin for the crown that would follow. Subsequently the area was cleaned by using saline irrigation. Any sharp bony prominences were trimmed to prevent further periodontal destruction . After the replacement of the flap, 3-0 silk sutures were used to hold it in place. It was then covered with a periodontal pack. Antibiotics and analgesics were prescribed for one week. The sutures were removed 10 days later. The patient was monitored on a weekly schedule, postoperatively, to ensure good oral hygiene in the surgerized area [Figure 5]. The tooth had good bone support after 8 months and it was decided to give him a fixed prosthesis involving 36,37. Occlusally, the tooth 36 was contoured as a molar on hemisected tooth, which provided more surface area for occlusal table [Figure 6]. Patient was followed up by regular recall visits and oral prophylaxis. She had good masticatory efficiency with the prosthesis and was very satisfied with the treatment outcome.

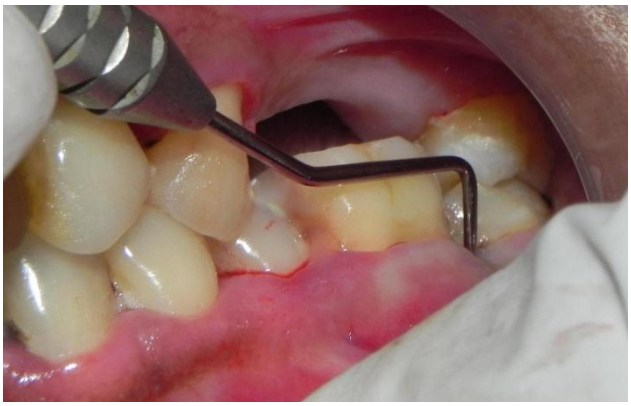

Fig 1: Pre operative

Fig 2: Pre operative IOPA

Fig 3: Vertical cut for separation

Fig 4: Separated root

Fig 5: Postoperative after 2 weeks

Fig 6: Prosthesis

DISCUSSION

Success of root resection procedures depend, to a large extent, on proper case selection. It is important to consider the following factors before deciding to undertake any of the resection procedures.

- Advanced bone loss around one root with acceptable level of bone around the remaining roots.
- Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally titled, cannot be resected.
- Divergence of the roots - teeth with divergent roots is easier to resect. Closely approximated or fused roots are poor candidates.
- Length and curvature of roots - long and straight roots are more favourable for resection than short, conical roots.
- Feasibility of endodontics and restorative dentistry in the root/roots to be retained.

Hemisection has been used successfully to retain teeth with furcation involvement. However, there are few disadvantages associated with it. As with any surgical procedure, it can cause pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries. Often a favorable result may be negated by decay after treatment. Failure of endodontic therapy due to any reason will cause failure of the procedure.

In addition, when the tooth has lost part of its root support, it will require a restoration to permit it to function independently or to serve as an abutment for a splint or bridge. Unfortunately, a restoration can contribute to periodontal destruction, if the margins are defective or if non-occlusal surfaces do not have physiologic form. Also, 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.

CONCLUSION

If performed correctly and in judiciously selected cases hemisection can be expected to have a prognosis as good as any conventional endodontic or restorative procedure. With its wide acceptance in the field of general practice hemisection has emerged as a suitable alternative to extraction in case of grade II and grade III furcation involved teeth which otherwise would have had a hopeless prognosis. Teeth so treated have been known to maintain their position in the oral cavity over extended periods of time while serving all the functional requirements asked of it.

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