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Hemi Section of mandibular molar – A case report

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Abstract

Introduction

Root amputation dates back to Farrar in 1884 as treatment for multirooted teeth with furcation involve Ment, Gottlieb and Orbán in 1933, and Messinger and Orbán in 1954. Today, a distinction is made between root resection (RR) and crown resection (CR) procedures. RR includes root amputation or any RR at the level of the cementoenamel junction without removal of portions of the crown. CR addresses hemi section, trisection, and premolarization (bicuspid ization). This includes all procedures in which a dissection transvers through the furcation and the crown of a multi rooted tooth in such a way that a root and the associated portion of the crown may be removed (hemi section or trisection)[1]

Indications

The primary indication for resective the rapies is

- Class III furcation involvement. Other reasons may include deep class II furcation involvement, localized severe bone loss involving 1 individual root,
- Vertical root fractures, subgingival root caries, persisting periapical pathology, root resorptions,
- Iatrogenic root perforations as well as the presser vation of teeth with a high strategic value or when anato mic situations preclude implant placement[2]

Contraindications

1. Calcified canals in root to be retained.
2. Root fusion, making separation impossible. Among the teeth in which a fusion exists with some frequency are mandibular second molars "cow horn root" and maxillary second molars. Amputation in such cases results in so much of bone removal that the remaining segment is weakly supported.
3. Strong adjacent teeth available for bridge abutments as alternatives to root amputation.

4. Lack of optimal bone support for remaining root/ roots.

5. Uncooperative patient [2]

General rules for root amputation

1. Importance of root anatomy – just as the dentist must know the typical position of canal orifices prior to preparing an access cavity, so must the practitioner performing root amputation be familiar with the most common configurations for the roots of the tooth to be so treated.

2. Endodontic therapy prior to root amputation – whenever possible, canal fillings should be placed in the roots prior to the amputation.

3. This may be accomplished either at a preceding appointment or at the Same appointment but before surgery.

4. Root amputation on periodontally involved teeth- as a general rule, when amputation is performed with severe periodontal lesion, there is no need to raise a flap.

5. By placing a straight elevator into the furca and giving it a slight rotatory movement- separation can be determined.

6. Root amputation on teeth having normal Perio dontal support- flap is raised and the objective is to produce a periodontal lesion by removing bone around the root to be amputated extending up to the furcation area using tapered fissure carbide bur.[2]

Root amputation procedure of man dibular molar

1.Root amputation procedures on mandibular molars are usually referred to as hemi sections.

Vertical -cut method

1. It utilizes a long shank, tapered fissure carbide bur in the airotor to section through the entire crown and root to the furca in gaining separation (cut is carried only approx. three fourths of distance towards the furcation).

2. It must always be remembered that both bifurcations and trifurcations are some distance from the occlusal surface of the tooth.

3. Therefore a deep preparation is required before an elevator is used to see if the separation is gained.

Advantages of vertical cut method are as follows

1. Direct visualization of the bur penetration to ensure that preparation will be in the correct position.

2. Removal of that portion of the crown that is over the root to prevent undesirable postoperative occlusal forces.

3. Position of each cut, based on the anatomy of the furca, to allow the root to cleave along desirable angles.

4. Excellent visualization of the furca after amputation to allow for any needed trimming or smoothing with long shank, tapered fissure diamond stones.

Presurgical crown – contouring method

1.Crown over root to be amputated is reduced with a fissure bur until entire root is visible, marked by the root canal filling. It is then a simple matter to elevate the root.

2.This technique is useful in treating maxillary molars as described by Kirch off and Gerstein.

Causes of failure

1. Each of the molar teeth possess a specific reason why root amputation procedure fails even assuming that the indications and treatment are correct.

2. In case of maxillary molars, amputation of the distobuccal root has by far the most favourable outlook. Because it occupies much less area in the furcation that do the other two roots.

3. The natural curvatures of the mesiobuccal and palatal roots will give resistance to all direction of stress without the distobuccal root.

4. In case of mandibular molars, for many years few operators realized that the mesial root was larger, with

deeper depressions and hence more retentive than the distal root.

5. If it could be saved, the mesial root could be very valuable.

6. According to Weine, mesial root was more difficult to treat endodontically so periapical failures occurred and distal root was easier to treat endodontically and to restore but was not as retentive.[2]

Case report

A37 year old male patient reported with a chief complaint of decayed tooth and severe pain in lower right back tooth region since 15 days. Patient gave a history of decayed tooth in lower right back tooth region. There was severe pain in the same region and no relevant medical history was present.

On Inspection there was a deep caries wrt 46, on soft tissue examination tooth was tender. On Cold test there was delayed response wrt 46.

Diagnosis

Symptomatic irreversible pulpitis with apical Perio dontitis wrt 46 and the treatment advised was to undergo RCT wrt 46 followed by hemi section of distal root.

Methodoloy

In the present case it was observed radiographically that there was a vertical bone loss and the margins were sub gin gingival extending onto the middle third of the distal root wrt 46, which was beyond the scope of restoration.

As the bone height was adequate near the mesial root and mesial root was restorable therefore patient was advised for removal of distal root. Access opening and apical preparation up to #20k file (Dentsply) followed by irrigation with 3% NAOCL was done wrt 46 in the first visit followed by calcium hydroxide dressing for a week.BMP using rotary file up to size F1(Super endo pro-old) was done in the second visit using resin-based sealer AH plus (Dentsply) followed by post and core as there was only one wall was present.

Root canal wrt 47 was done as this tooth would act as an abutment tooth. As the tooth was vital it was completed in single visit. Pain wrt 46 subsided, there was decrease in the size of radiolucency and there was no pain on palpation/percussion.

After the endodontic treatment was completed, hemi section was performed by giving a vertical cut up to the furcation area using long shank, tapered fissure carbide bur. Distal root was luxated and removed with the help of straight elevator. Remaining root was evaluated for any bony ledges or irregularity that were rounded off to maintain proper oral hygiene. Patient was advised for bridge after the healing was complete.

Discussion

The main aim of hemi section surgery is to preserve as much viable part of tooth as possible to be used as a prosthetic abutment. The factors that favour a favourable prognosis in hemi section surgery include; adequate bone support, high furcation levels and achieving a supra gingival restoration margin[3].

Before resection procedure is begun, the clinician must determine whether the resected tooth or root is restorable. In minimal clinical crown, crown lengthening at the time of root removal should be considered. Secondly, the adjacent teeth should also be considered in the treatment plan. It must be decided at the outset whether or not tooth resection and full coverage would be superior to extraction of the involved tooth and placement of a fixed prosthesis. If the tooth requiring root removal has not previously been treated endo dontically then it is usually more convenient to perform the root canal treatment before surgery for two important reasons[4]

First, it is much more difficult to complete root canal treatment on the retained root post surgically. Dental dam placement, leakage control, and canal management are much easier with an intact crown[4].

Second, difficulty of root canal treatment cannot be determined pre operatively in some cases.[4] According to recent studies in maxilla with 397 of 406 teeth showed survival rate of (97.8%), and in mandible with 355 of 367 teeth showed (96.7%) after hemi section/ root amputation although there was no statistically significant difference. Carnevale et al. reported a survival rate of about 93% over a 10-year follow-up among patients who had undergone hemi section as the management of furcated molars instead of extraction[1].

Conclusion

Hemi section is a reliable procedure and should always be considered before every extraction. High survival rates with very few complications can be obtained over a long period of time if roper case selection endodontic treatment, restorative design and good maintenance program are achieved.

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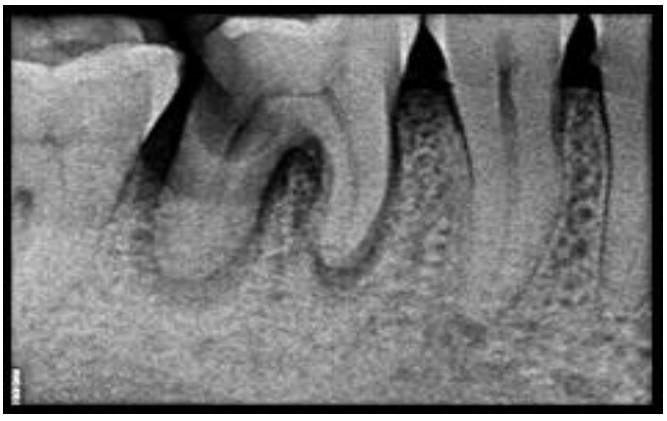

Figure 1: Pre operative radio grapghwrt 46 showing periapical radiolucency and vertical bone loss wrt distal root

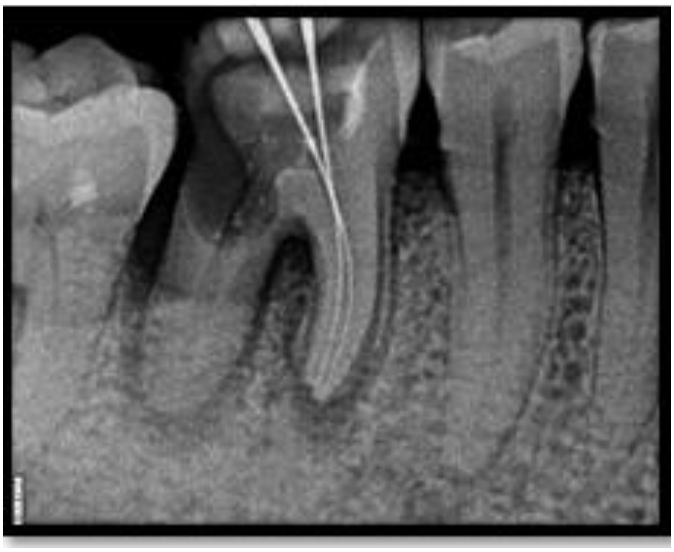

Figure 2: Working length r/g wrt 46

Figure 3: Master cone r/g wrt 46

Figure 4: Obturation r/g wrt 46

Figure 5: Post and core r/g wrt 46

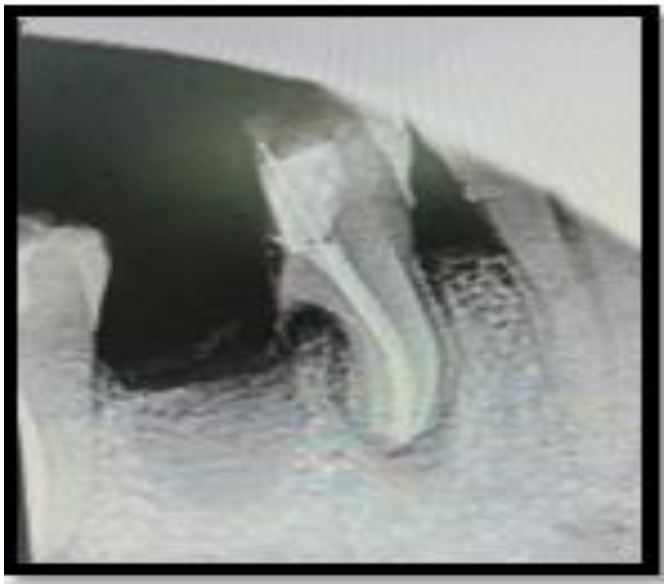

Figure 6: Mesial root wrt 46 after removal of distal root followed by bridge Follow up period of 3 months

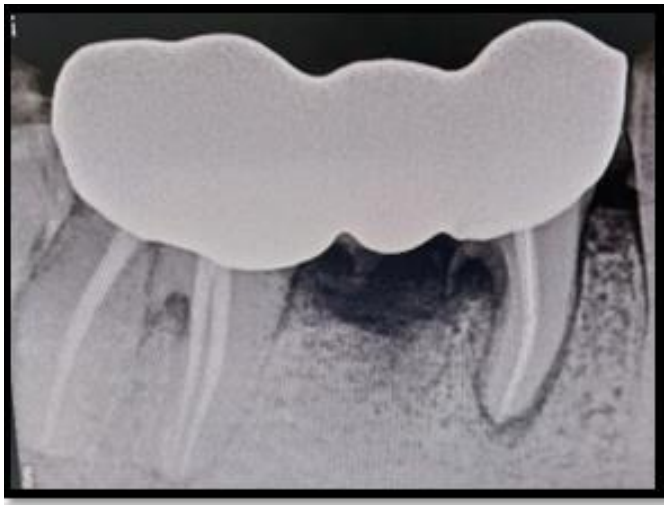

Figure 7