Hemisection with crown splinter in perforation mesial canal wall first molar mandible: a case report

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ABSTRACT

Background: Untreated progressive inflammatory periodontal disease can affect attachment loss until bifurcation or trifurcation of multirooted teeth. Hemisection in multirooted is removal of compromised root preserve the good one then restorative coronal part with a fixed prosthesis. It is the treatment option for preserving the remaining part of healthy root who having sound periodontium. The study aimed to describe a case of a hemisection is presented for a tooth where only the mesial root of a mandibular molar was affected.

Case presentation: A 22 years old female comes to RSGM Prof. Soedomo with moderate pain and gum swelling. Perforation in mesial root canal wall in the objective examination. In radiograph, there were radiolucent in mesial root, bifurcation and fracture instrument left in mesial apical root canal. The conditions that can’t approach in non-surgical treatment such as fracture instrument, severe vertical bone loss, caries, internal or external resorption in furcation or one root, and furcation lesion, can be treated with surgical approach hemisection as alternative before extraction teeth. Hemisection treatment includes root canal treatment of the remaining roots, intracanal retention with fiber post then restorative the coronal part use restorative material and splinting with the adjacent tooth to decrease the risk of displacement. Fixed prosthodontic prosthesis to maintain the occlusal balance.

Conclusion: hemisection is a feasible treatment option because more practical and conservative for periodontal-endodontic lesions rather than extraction teeth.

Keywords: Crown splinter, Fracture instrument, Hemisection, Perforation.


INTRODUCTION

Teeth have several functions, such as mastication, breathing, phonation, and are essential for the vertical dimension of the face. Modern advance in dentistry has emphasized that patients maintain the functions of teeth for a lifetime. A mandibular or maxillary molar with endodontic and periodontal problems presenting with furcation and root involvement may be inappropriate for a restorative procedure. The most common treatment in such cases may recommend extraction followed by the removable or fixed denture. However, with appropriate case selection, endodontic surgery such as hemisection can be an alternative treatment with inexpensive, simple, conservative with good chances of success.

Hemisection is the surgical treatment of multirooted teeth into two segments and removes the compromised teeth, then associated crown with fixed prosthesis. The indications for hemisection include the presence of severe bone loss involved root or furcation not compliant to other surgical treatment options, root proximity unfavorable for other periodontal treatment options, untreatable roots with the broken instrument, perforations, caries, calcified canals in multirooted teeth, resorption and vertical root fracture. The contraindications for hemisection are insufficient bony support for the remaining root or roots. The remaining root may be inoperable for root canal treatment, fused roots, a favorable postoperative restorative margin and poor patient home care.

The procedure in hemisection is usually carried out by making a vertical cut through the crown into the furcation. In mandibular molars, the tooth is divided buccolingually through the bifurcation. In maxillary molars, the amount is made mesiodistally, also through the furcation. This action results in a complete split of the root into two segments. The initial cut should be made close to the unsalvageable root and then removed. The goal of this treatment is to preserve the remaining part of the molar by having good periodontium. The success of this treatment needs proper case selection followed by an interdisciplinary approach.

In this article, a study aimed to describe a hemisection is presented for a tooth where the only mesial root of a mandibular molar was affected.

CASE PRESENTATION

A 22 years old female who comes to RSGM Prof. Soedomo reported moderate pain and gum swelling. Past dental history revealed that she had root canal treatment in the left mandibular first molar two weeks ago.
CASE REPORT

Intraoral examination revealed polyph and perforation in the mesial root canal wall (36) (Figure 1). Tooth 36 had no mobility, tender to percussion and palpation. Intraoral radiograph of 36 revealed radiolucency in the periapical region in the mesial root, bifurcation, and fracture instrument left in the mesial apical root canal (Figure 2). The patient wants to save his tooth.

Based on clinical and radiographic examination, the treatment that resection of the mesial root with the associated crown splinter (hemisection) and retaining the distal half of 36 was planned before the resection, root canal treatment in the distal root canal done first. The patient was informed about the procedure.

The tooth was isolated with a rubber dam then get access to the root canal. Working length distal root canal was determined using an electronic apex locator and confirmed using a radiograph. The final working length obtained was 17.5 mm for distobuccal and 17 mm for distolingual (Figure 3A). Biomechanical preparation was done in the crown down methods till F3 with rotary ProTaper gold files (Maillefer, Dentsply, Ballaigues, Switzerland) under irrigation with 2.5% sodium hypochlorite solution, saline, and EDTA 17% for lubricant and disinfection with chlorhexidine gluconate 2%. The preparation was checked by K-file #30, and the master apical cone was evaluated clinically and radiographically (Figure 3B). The patient was then recalled after a week. The patient came with asymptomatic, no pain on percussion and palpation. The main gutta-percha was sterilized with 2.5% NaOCl solution, then rinsed using 70% alcohol and dried. The root canals were then dried with sterile paper points and obturated with continuous-wave compactions and AH Plus resin base sealer (Figure 3C). The tooth was then temporized. Radiographic examination of root canal obturation revealed hermetic root canal filling (Figure 3D).

Figure 1. Pre-operative clinical picture showing polyp and perforation in the mesial root.

Figure 2. Intraoral periapical showing radiolucency and broken file in the one-third apical mesial root canal.

Figure 3. (A) Radiographic view working length (B) Radiographic view try in gutta-percha (C) Clinical view after obturation (D) Radiographic showing hermetic root canal filling in distal 36 teeth.

Figure 4. (A) Radiograph view try in refabricated fiber post; (B) Radiographic view after cementing prefabricated fiber post and making core build-up.
The patient was then recalled after a week. Tooth evaluation after obturation was asymptomatic. Gutta-percha removed and left 4mm apical using hot plugger then peeso reamer. Prefabricated fiber post tried to the root canal and radiographically checked (Figure 4A). Disinfectant root canal used chlorhexidine digluconate 2% and dried using paper point-prefabricated fiber post number 2 placed in the root canal with resin cement self-adhesive. The next step made core build-up with bulk-fill composite and radiographically checked (Figure 4B).

A week later, the hemisection procedure was initiated by local anesthesia for the inferior alveolar nerve and lingual nerve with 2 ml pethacain. The triangular flap was elevated with full-thickness mucoperiosteal to expose the furcation area (Figure 5A). The vertical cut method was used to respect the crown from the buccal aspect towards the lingual aspect furthermore divided the coronal tooth into mesial and distal. A long Shank tapered fissure bur was used to section the bifurcation in the buccolingual and apical the tooth turn to separated (Figure 5B). The mesial part of the tooth was extracted (Figure 5C), and the socket was irrigated adequately with sterile saline. The sharp-edged of the remaining tooth structure was rounded. Bone graft was applied in the socket (Figure 5D) and then covered with a pericardial membrane (Figure 5E). Tissue repositioning, then suturing (Figure 5F), and covering with periodontal pack (Coe-Pak™ GC America Inc., Alsip, IL, USA) was done to protect the lesion. Postoperative instructions were given to the patient and prescribed antibiotic amoxicillin 500mg every 8 hours a day for 5 days and analgesic mefenamic acid 500mg three times a day when painful.

One week following surgery patient recalled no pain, tenderness on percussion and mobility (Figure 6A). The suture is removed, and a splint of stainless-steel wire with composite is attached to the buccal surfaces of teeth 34, 36 and 37 (Figure 6B). After adequate tissue healing around 40 days, the prosthetic phase by porcelain fused to metal fixed partial denture involving mesial extension ridge in the mandibular premolar and retained distal half of mandibular first molar. The teeth
involved were prepared using diamond burs, then retraction using retraction cord (Figure 6C). A double impression was made with a putty-light body using polyvinyl siloxane impression material. The shade was determined with a shade guide. A temporary crown was cemented with polyvinyl siloxane impression material. The cast was sent to the dental laboratory. Provisional restoration was fabricated using indirect technique and cemented with resin cement one week later (Figure 6E). The patient recalled after one week with no pain and no mobility. The radiograph shows no periapical lesion and bone formation at the extraction socket which is all the bone destructions and lesion cured perfectly (Figure 6F). Patient felt so satisfied with the result because she can bite properly with right and left side.

DISCUSSION

Nowadays, many cases of endodontic and periodontal lesions. The management of a periodontal-endodontic lesion depends on the primary lesion. Root canal treatment and surgical approaches can provide better access to clean the bifurcation, root surface and apical lesions as an alternative. Hemisection is one of the treatment options to be considered before extraction, especially in the conditions which can't approach in non-surgical treatment such as untreated roots with a broken instrument, resorption, caries or perforation involving one root, fracture of one root, which does not include other roots, and furcation destruction because of severe vertical bone loss. Hemisection in mandibular molar may be a feasible treatment modality when one root has a poor treatment prognosis. Another root is healthy so that the healthy root can act as an abutment. Teeth with adjacent roots or fused roots, insufficient bone support for the remaining root, and bad oral hygiene are not options to do hemisection treatment.

The prognosis of teeth with hemisection varies, with several studies reporting a success rate of the hemisection procedure approximately 88% with follow-up periods up to 23 years. Significant factors affecting the long-term success of these procedures include case selection depending on roots remaining after this procedure and failure rates increased when molars have less than 50% bony support. The prognosis for a tooth with hemisection depends on the quality of the root canal treatment in the remaining root or roots and the quality of the final restoration. Maintenance protocols, the health of the supporting periodontal soft and hard tissues and the patient’s oral hygiene are critical in achieving a high long-term success rate.

CONCLUSION

Hemisection is a feasible treatment option because more practical and conservative for periodontal-endodontic lesions rather than extraction teeth.

CONFLICT OF INTEREST

There is no conflict of interest.

FUNDING

Not Applicable.

ETHICS APPROVAL

Informed consent was obtained from the patient before the case report was written.

AUTHOR CONTRIBUTION

FAF contributed the concept, definition of intellectual content, analyzed the case, writing the manuscript and literature research. CC performed the clinical case, the photograph. TN and EM supervised the clinical case, editor and reviewer of the manuscript.

REFERENCES

