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**HEMISECTION TREATMENT AT VERTICAL ROOT FRACTURE: A CASE REPORT**

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**ABSTRACT**

*Background: Dentistry science and technology, especially in the field of endodontics has experienced rapid development. The advancement of dentistry has been able to keep the teeth in order to function as long as possible in the mouth. Patient awareness to maintain current teeth is higher and prefer to be treated root canal on her teeth rather than revocation action. This is supported by the presence of advanced dental care techniques and satisfactory results for the long term.*

*Case: This case report aims at reporting that hemisection treatment is a treatment with considerable success.*

*Case management: A 40-year-old female patient, coming to PPDGS RSGMP Dental Conservancy University of Airlangga with complaints of perforated lower left molars, has often been patched but always loose and sick when used to chew food. Clinical features appear to be cavities in the left lower left occiput. On the objective examination obtained negative vitality test, positive percussion. On the radiographic appearance radiolucency appears to all distal roots extending to bifurcation, deep carious lesions, vertical fracture lines at distal roots. Treatment options are the hemisection and restoration of the metal fusion porcelain crown with cantilever on the lower left second mesial tooth.*

*Conclusion: 4 weeks post-hemisection control is not found subjective or objective symptoms, it is expected that hemisection treatment with enough success rate to maintain the remaining tooth structure and functioning for as long as possible in the oral cavity.*

Keywords: hemisection, vertical root fracture, metal fusion porcelain crown.

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**INTRODUCTION**

Dentistry science and technology, especially in the field of endodontics has experienced very rapid growth. The advancement of dentistry has provided an opportunity to maintain the teeth in order to function as long as possible in the mouth. Patients prefer root canal treatment on their teeth rather than revocation, as their thinking patterns have changed, that pain can be overcome during root canal treatment. This is supported by the presence of advanced dental care techniques, and the results are quite satisfactory for the long term.<sup>1</sup>

Treatment in endodontics is divided into two conventional treatments and surgical treatment.

Endodontic surgical treatment is the development of a wider treatment to avoid tooth extraction. Endodontic surgery includes incisions for drainage, apex resection, hemisection, root amputation, hemisection, bicuspidization and replantation.<sup>1</sup> Hemisection is the removal of a root and half a double-rooted crown. In the mandibular molars of the teeth are separated in the buccal-lingual direction through bifurcation. The pathological root or periodontal tissue has been damaged and the crown is removed.<sup>1,2</sup>

Treatment for hemisection is indicated as follows: 1) severe bone or periodontium damage to one root that can not be cured with conventional endodontic treatment; 2) root that can not be treated

due to the existence of broken instruments, root caries, resorption, vertical fractures, calcified root canals.<sup>1,2</sup> This case report aims at reporting that hemisection treatment is a treatment with considerable success.

**CASE REPORT**

A 40-year-old female patient, who came to the PPDGS RSGMP Dental Conservation clinic at Airlangga University with complaints of perforated lower left molars, has often been patched but always loose and sick when used to chew food. Clinical features appear to be cavities in the left lower left occiput. On the objective examination obtained negative vitality test and positive percussion. On the radiographic appearance radiolucency appears to all distal roots extending to bifurcation, deep carious lesions, vertical fracture lines at distal roots. The diagnosis of the tooth is a pulp necrosis with a distal vertical root fracture. The treatment plan is the hemisection and restoration of a metal fusion porcelain crown with cantilever on the lower left second mesial tooth mesh (figure 1)



Figure 1: A. Caries from the occlusal direction; B. Clinically visible buccal; C. visible radiolucency of the entire distal root extends to bifurcation

The first visit, at dental 36, opened the access to a mesial root canal orifice with a diamond bur end, the cavity was irrigated with 2% NaOCL, and dried with a cotton pellet. Determination of working length using K-File # 8 and apex locator, got the working length of mesiobukal and mesiolingual root channel 17 mm and confirmed with x-ray. Furthermore, root canal preparation was

done with single length technique using reciprocal system, during preparation using EDTA lubricant, channel irrigation with NaOCl 2%. After preparation reaches the length of work performed gutta percha trial photographs and the results of gutta percha hermentis in the root canal. Teeth are given a dressing using a calcium hydroxide paste and are temporarily slaughtered. Patients were instructed to come back again one week later. (Figure 2)

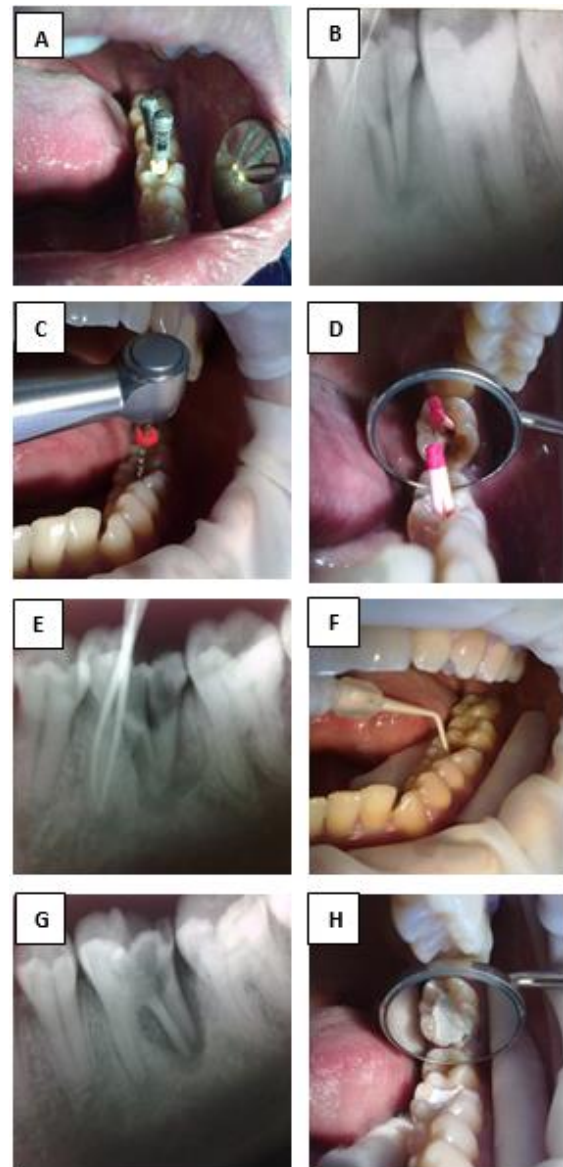


Figure 2: A: working length; B: confirmation of length of work; C: Root canal preparation; D: install try gutta percha; E: Rontgen trial gutta percha; F: Ca (OH) 2 dressing; G: Temporary casing

Second visit, one week later the patient comes back for dressing control, the patient does not feel pain, good temporary condition, good surrounding tissue, negative percussion test and

negative mobility test. Temporary cleansing opened, dressing material cleaned with 2% sterile NaOCl irrigation, root canal dried with sterile paper point. Root canal filling with single cone technique using gutta percha point suitable with file size and sealer plus, gutta percha cut to orifice with heated excavator condensed with plugger and then temporary tump, then photo filling of root canal (Figure 3)

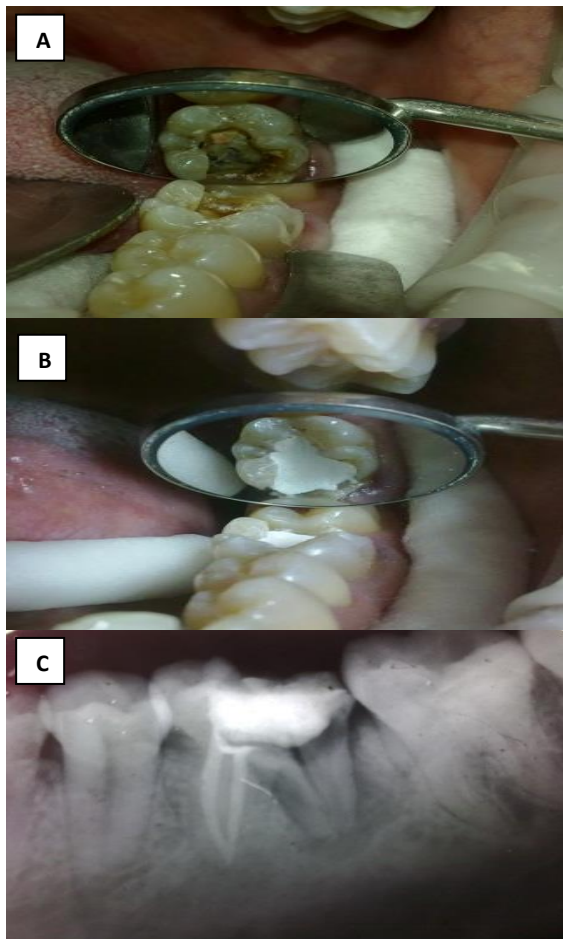
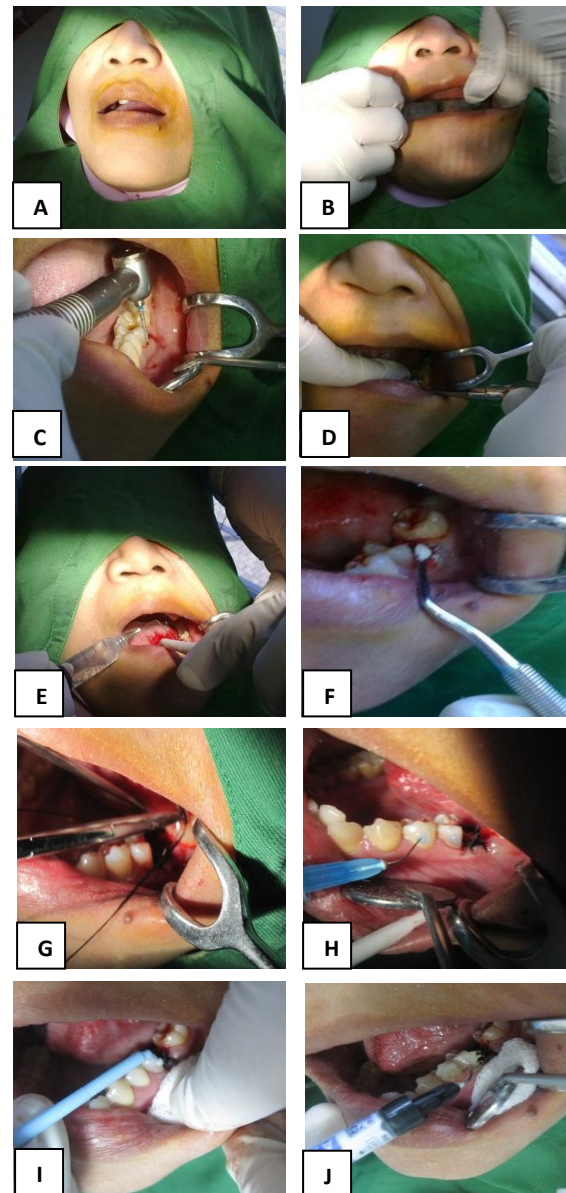


Figure 3: A: root canal filling; B: temporary cessation; C: Chest X-ray filling

The third visit is the stage of hemisection, firstly done post-treatment control of the root canal at mesial roots, the patient does not feel any complaints, good temporary condition, negative percussion and negative tooth mobility. The patient performed a blood pressure measurement and the result was 120/80 mmHg. Asepsis in the operative area, block anesthesia on left mandibular nerve and infiltration anesthesia on vestibulum 36. Teeth 36 is disposable on the buko-lingual direction using a high speed handpiece with long tapered diamond bur, distal root fragments are raised using an elevator and then taken with root forceps, sockets distal root dikuret then irrigated with sterile saline.

The distal root socket is applied bone graft then stitched with silk thread. Splinting on the mesial crown of the tooth with a tooth 35 using fiber splint. The area of operation is cleaned and then done post-hemisection x-ray images. Patient instructions to clear the surgical area using a soft toothbrush and patients prescribed clindamycin 300 mg and mefenamic acid 500 mg. Patients were instructed again one week later. (Figure 4)





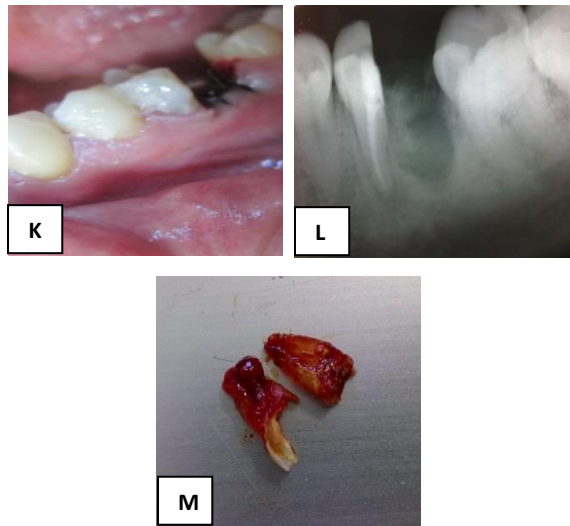


Figure 4: A: Asepsis; B: Anesthesia; C: Separation; D: Distal teaching distal; E: Irrigation; F: Application of bone graft; G: Suturing; H: etching; I: Bonding; A: The laying of fiber splint; K: Post hemisection; L: X-ray after hemisection; M: The root is distal

The fourth visit, post-hemisection control, negative subjective symptoms, good stitching conditions, good splinting conditions, negative percussion. The next step is mounting prefabricated pegs, matching peg size with template, gutta percha taking with penetration drill and root canal adjustment with calibration drill, post stitch, insertion peg using luting cement. Performed built up cores, gingival management and crown preparations for metal fusion porcelain. Print for DIE using elastomeric printing material with double impression technique and antagonistic printing using irreversible hydrocolloid printing material. Making dental records and color matching, pre-prepared teeth are installed temporary crowns. Patients were instructed again one week later. (Figure 5)

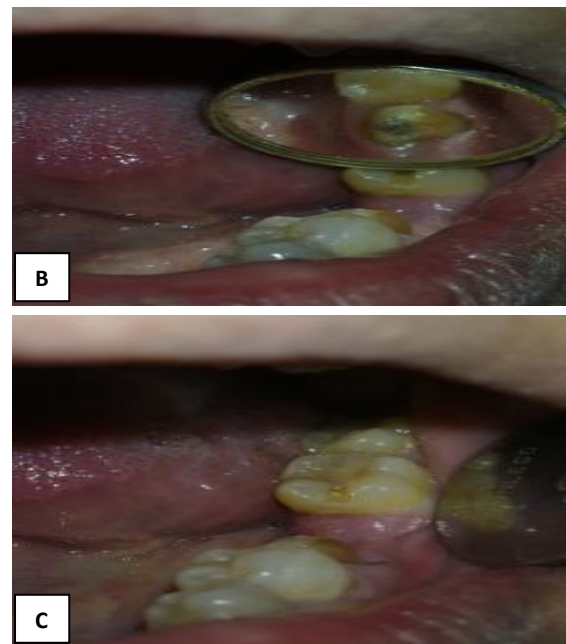


Figure 5: A: Rontgen peg and core built up; B: crown preparation; C: mesial rest preparation 37

The fifth visit was made a try of crown metal porcelain crown, check articulation, anatomical adjustment and color similarity. The fusion metal porcelain crown is inserted using luting cement (Figure 6)

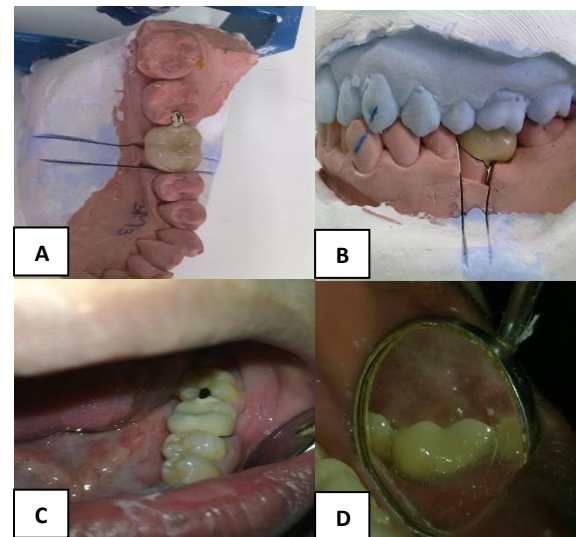


Figure 6: A & B: PFM crown on the model; C & D: PFM crown insertion appears to be occlusal and buccal

## DISCUSSION

Hemisection or separation of a root gear into two parts followed by the removal of a root and a half crown, is a simple surgery, especially if there is a root that is open up to bifurcation. Indications of hemisection treatment include loss of support tissue due to periodontal disease involving the roots and furcation, the presence of broken tools, perforation, caries, resorption and root canal calcification on one of the conventionally unconventional roots and the presence of vertical root fractures. The contra indication is that the remaining root of the tooth that is maintained does not have enough bone support, the roots are fused, so that it is difficult to separate and root canal treatment can not be thoroughly carried out on the rest of the roots maintained. In this treatment it is not necessary to make the mucoperiosteal flap. After anesthesia, the crown is separated by bur, here it is noted that the separation is done on the half of the part to be removed. Therefore, in the maintained tooth segment there should be enough dental substance to support the dental crown. 1,2

The prognosis varies depending on the diagnosis, case selection, indication accuracy and contraindications, the results of cuttings without causing other damage, poor restoration, caries, excessive occlusal stress, difficulty of root canal treatment, or periodontium disease. The main factors that cause the failure is the oral hygiene of the patient, especially the presence of plaque on the furcation area and result in the occurrence of caries and disease periodonsium. All endodontic surgical procedures require training, experience and higher skills. Possible and anticipated possibilities include paresthesia due to nerve injury, sinus perforation, soft tissue opening, bleeding and infection. 3,4,5

The hemisection treatment is chosen to avoid the extraction action on the tooth 36 and with consideration of one of the root of the tooth 36 in good periodontal conditions while the distal root has undergone vertical fracture. Treatment begins with root canal treatment on mesial roots, the mesial root is then used as a core of metal fusion porcelain with additional retention of mesial tooth 37, this occlusal rest also serves as a chewing agent of the antagonist gear. Four weeks post-casting of porcelain metal fusion crowns showed no subjective or objective symptoms. The final design of the preparation should support the health of the periodontal tissue from the rest of the tooth, since the rest of this tooth will support the fusion metal porcelain crown. Adequate plaque control is one of

the biggest deciding factor in ensuring long-term success of this prosthetic design.

## CONCLUSION

Endodontic surgery is performed if conventional treatments do not help in healing. In this case one of the roots of a patient's tooth experiences a vertical fracture which is impossible to maintain, while the mesial root and crown are in good condition. 4 weeks post-hemisection control is not found subjective or objective symptoms, it is expected that hemisection treatment with a high enough success rate to maintain the rest of the tooth structure and functioning for as long as possible in the oral cavity. Conclusion

Endodontic surgery is performed if conventional treatments do not help in achieving the heal. In this case one of the roots of a patient's tooth experiences a vertical fracture which is impossible to maintain, while the mesial root and crown are in good condition. 4 weeks post-hemisection control is not found subjective or objective symptoms, it is expected that hemisection treatment will turn into treatment with a high enough success rate to maintain the rest of the tooth structure and functioning for as long as possible in the oral cavity.

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