



## Hemisection: A Case Report

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### Abstract

This study presents a comprehensive case involving a 21-year-old woman seeking dental care for pain and swelling around her lower left first molar. The examination revealed a large radiolucent area with bone loss suggestive of periapical lesion present at the apex of mesial root canal. Following a radiographic evaluation, a treatment plan was devised, incorporating a hemisection procedure focused on the healthy distal root with furcation involvement. The root canal treatment involved meticulous shaping using PROTAPER GOLD files, irrigation with sodium hypochlorite and ethylene diaminetetraacetic acid, and canal obturation with gutta-percha/Sealapex. Hemisection at the mesial root was performed, and subsequent prosthodontic restoration addressed the distal root space. The integrated approach successfully managed the endo-perio lesion and grade III furcation involvement, highlighting the effectiveness of hemisection in intricate dental cases. The study emphasizes the importance of case-specific considerations in choosing treatment plans, showcasing a tailored strategy for optimal oral health and function

### 1. INTRODUCTION

Thanks to dental advancements, people may now keep a healthy dentition for the rest of their lives.[1] Losing the posterior teeth is a painful and unwanted event that frequently results in teeth drifting, loss of masticatory function, and shortening of the arch. Preventive and maintenance treatments are thus necessary.[2] At least 600 distinct bacterial species are thought to be present in the oral cavity, and more than 150 species may be present in any particular patient.[3,4] Numerous oral health concerns, including periodontal disease and tooth cavities, are caused by these microorganisms. The only option for treating extensively decayed molars that are engaged in the periodontal system is to take the tooth and replace it with an implant.[5] However, in order to preserve such teeth, a treatment plan that allows for stronger survival must include periodontal, prosthodontic, and endodontic evaluation for suitable selection.[1] A cautious method of tooth preservation is hemisected extraction. The terms "root sectioning" and

"bisection" are interchangeable with "hemi section" or "root amputation." This type of therapy preserves tooth structure and alveolar bone while being less expensive than alternative approaches.[6] In a tooth with a furcation implicated, hemisection entails removing the coronal component that is related to the periodontally impaired root tissue. The purpose of therapy is to preserve the remaining tooth structure and restore function. [7]. If treatment for progressive inflammatory periodontal disease is not received, attachment loss and tooth loss will eventually occur. It is difficult to treat periodontally affected molars; the only option is to remove the teeth and replace them with implants. [8]. Thanks to developments in dentistry, maintaining a functioning dentition for life can now be achieved with a conservative treatment plan that includes periodontal, prosthodontic, and endodontic evaluation [9]. When a multirooted tooth only has one damaged root and the remaining root is physically competent to sustain a dowel and core repair, a hemisection surgery is



performed. This paper is a case study of a patient who had progressive and widespread periodontal damage.

### CASE REPORT

A 20-year-old lady in this case sought dental care because she was experiencing discomfort and edoema around her lower left first molar. An assessment carried out in the Department of conservative dentistry and Endodontics at the school of dental sciences, Sharda University, exposed a difficult scenario. The problem stemmed from the apical portion of the mesial root canal with large periapical lesion.

In the context of oral health, the large periapical lesion is present at the root apex of distal root of lower first permanent molar suggestive of periapical pathology and furcation involvement was also present.

### Treatment

In this instance, a radiographic assessment was decided upon. In dentistry, radiography, often known as X-ray imaging, is a useful diagnostic technique. It helps in the detection of any problems by enabling professionals to see the inside structures of teeth, including the roots and surrounding bone.

The caption mentions Figure 1-a, which most likely relates to a radiographic picture and intraoral view before surgery. To determine the periapical pathology with the root canal system, this picture would be essential. The fact that the apical area of the mesial root canal cannot be identified indicates that lesion is obstructing the vision. This may make the process of evaluation and treatment planning more difficult.



Figure 1-a. radiographic picture and Intra-oral view before surgery

A thorough treatment plan was developed at the Department of conservative dentistry and endodontics, school of dental sciences, Sharda University, in response to the patient's dental problems. In order to tackle the problems caused by periapical lesion with furcation involvement, a hemisection method was chosen, with the healthy distal root with furcation involvement receiving special attention. The canal length type K files (#15) were expertly formed with a PROTAPER GOLD rotary file after being carefully selected based on the features of the canal cavity opening. A thorough irrigation using 2.5% sodium hypochlorite and 17% ethylenediaminetetraacetic acid was required for the root canal therapy. Sterile paper points were then used to dry the area. After that, bigger canal input cavities were sealed with zinc phosphate cement and canal obturation was performed using a typical gutta-percha/Sealapex (Kerr) combination. One week later, hemisection at the mesial root was carried out using dental fissure burs, as shown in Figure 1-b.





Figure 1-b. hemisection

After a month of careful assessment of the distal root area and the results of root canal therapy. A distal extension ridge design, and an evaluation of the distal root space were all part of the total prosthetic restoration plan that was carried out. The next phases involved digital scanning, creating a model using CAM (LAVA Form), and taking impressions using a two-step putty-wash method. The completed repair, as shown in Figure 1-c, was cemented with resin (Variolink, Ivoclar Vivadent, Schaan, Liechtenstein) after the proper centric, lateral, and protrusive contacts were made.

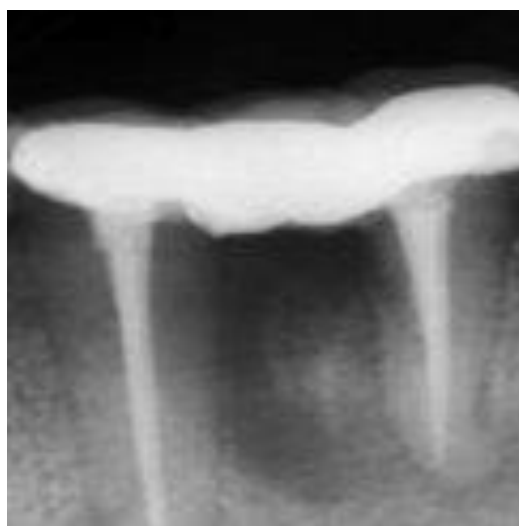


Figure 1-c. completed repair

This integrated approach aimed at resolving the patient's dental issues, encompassing endodontic intervention and prosthetic restoration for optimal oral health and function.

## Discussion

Regenerative therapy's fundamental component is the regeneration of both hard and soft tissues, including the creation of new attachment housing. A periodontal-endodontic defect is treated with root canal debridement and, as an adjunct, surgical techniques that provide improved access for cleaning the root surfaces and apical diseases. Advanced bone loss brought on by periodontal disease is typically permanent, whereas bone loss from pulpal disease is reversible. [10] Depending on the degree of bone loss and amount of bone remaining, multirooted, periodontally involved molars can be maintained with hemisection for extended periods of time. Because the periodontal bone loss around the mesial root was more than 50% and was unlikely to improve with non-surgical treatment alone, this patient was an excellent candidate for hemisection [11]. Hemisection is a delicate surgical operation.

[12] When a mandibular molar furcation invades, a variety of criteria influence the clinician's decision to select one treatment approach over another [6]. For example, the patient's overall health, the tooth's strategic dental value, its mobility, the crown-root ratio, the degree of attachment loss, the inter- and intra-arch occlusal connection, and the cost considerations are examples of local variables. Tooth resection is recommended in cases of severe vertical bone loss involving only one root of a multi-rooted tooth, furcation destruction, root exposure due to dehiscence, periodontal failure of an abutment tooth in a fixed bridge, if one root cannot be fully instrumented for anatomical or iatrogenic reasons, vertical fracture of one root, and/or severe destruction of one root as a result of resorption, caries, trauma, or perforation. Hemisection aims to eliminate furcation flaws as a periodontal care issue, ease maintenance, and stop more attachment loss. Root excision treatment was applied to 691 molars in 579 individuals by Park SY [13]. After analysing the contributing variables from 342 out of 402 molars that had been monitored for more than a year, it was determined that the prognosis for periodontal disease was better with root excision than it was for non-periodontal disease. It was crucial that the remaining roots had more than 50% bone support in order to get the desired outcome. This guiding principle might enhance the therapy's predictability for root resection.



Hemicsection was used to remove the mesial root and crown from a molar in a case report by Jain et al. [14] that showed a decent quantity of the distal root still having sufficient bone support and an excessive amount of mesial root destruction from external root resorption. After repositioning the occlusal contacts in a suitable position, the remaining tooth structure was rebuilt with composite and employed as an abutment in crown and bridge, where they highlighted the efficacy of hemisection as a feasible treatment option. Given that the roots in this instance were not fused or closely approached, and the remaining root was structurally capable of supporting a dowel and core repair, the case selection criteria for conducting a hemisection were ideal. The right endodontic therapy was performed before the hemisection in order to prevent intrapulpal dystrophic calcification and tooth discomfort following the procedure. Hemiscutting the mesial half of the tooth shows that a tooth with an endo-perio lesion and grade III furcation involvement can be successfully managed.

### Conclusion

The presented case underscores the intricate interplay between endodontic and periodontal considerations in managing a challenging dental scenario. The successful execution of the hemisection procedure, coupled with meticulous endodontic and prosthodontic interventions, resulted in effective resolution of the patient's endo-perio lesion and grade III furcation involvement. This case emphasizes the significance of individualized treatment approaches, considering factors such as root anatomy, bone support, and overall oral health. The collaborative efforts between endodontics and prosthodontics played a pivotal role in achieving a favorable outcome. The use of advanced techniques, including radiographic evaluation and precise instrumentation, contributed to the success of the treatment plan.

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