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Salvaging a Tooth with Poor Prognosis Through Hemisection: An Interdisciplinary Approach

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Abstract **Case Report**

By preserving the healthy root and its supporting structures while removing the problematic root and its related coronal area, hemisection allows for the preservation of a multirooted tooth. It is a conservative treatment approach. When only one root is affected by periodontal disease, root resorption, or endodontic issues, this surgery becomes even more effective. This case study details the multidisciplinary approach taken to treat a primary endodontic lesion with secondary periodontal involvement in a first molar on the mandible. Tooth 46-related pain and pus discharge were reported by a 37-year-old female patient. During the clinical examination, we found periodontal pocketing, furcation involvement, and suppuration. On the other hand, radiographic assessment showed periapical radiolucency and distal root external root resorption. Hemisection of the distal root was executed after the initial periodontal therapy and root canal treatment. Using a bioresorbable collagen membrane produced from fish (Periocol®) and demineralised freeze-dried bone allograft (DFDBA), the remaining osseous defect was treated. Upon successful recovery, a fixed prosthesis made of porcelain fused to metal was used to reconstruct the remaining mesial root. Healing was favourable, functional stability was maintained, and periodontal support was confirmed during the 8-month follow-up through clinical and radiographic evaluation. This instance demonstrates the advantages of hemisection as a predictable, conservative, and economical method of saving strategically essential molars that could be extracted if not preserved.

Keywords: Hemisection, Furcation involvement, Endo-perio lesion, DFDBA, Guided tissue regeneration, Mandibular molar.

INTRODUCTION

One of the key objectives of modern dentistry is the preservation of the patient's natural teeth. Recent developments in endodontic, periodontal, and restorative treatments have greatly increased the likelihood of saving teeth that were hitherto thought to have little chance of survival [1]. The altered periodontal support and intricate root architecture of furcation-involved mandibular molars make them a common treatment obstacle. Hemisection is a conservative treatment option that protects the healthy root and its supporting structures while removing the diseased root and its associated coronal region in carefully chosen patients [2]. This method is designed to keep function intact while preserving alveolar bone and preventing extractions that aren't essential. The anatomical closeness of the pulp and periodontal tissues makes collaborative approaches necessary for the treatment of endodontic-periodontal diseases. In order to determine the long-term prognosis and formulate an appropriate treatment plan, an accurate diagnosis is crucial [3]. This case study details the effective treatment of an affected mandibular first molar involving hemisection, regenerative periodontal therapy, prosthetic rehabilitation, and external root resorption as

well as a primary endodontic lesion with subsequent periodontal involvement.

CASE REPORT

The periodontology department had a visit from a 37-year-old female patient who had been experiencing pain and pus discharge in her lower right posterior region for two days prior to her visit. I experienced constant agony that intensified when I chewed. There was no relevant information in the patient's medical or family history.

On clinical examination, we found calculus deposits, plaque, and irritation of the gingiva. In regard to 46, a purulent effusion was visible (Figure 1A). Upon examination, it was found that there was Grade II furcation involvement and a probing pocket depth of 6 mm on the mid-buccal aspect. Pulpal necrosis was confirmed by the lack of reaction to vitality testing with Endo-Frost®. Upon radiographic evaluation (Figure 1B), it was shown that there is periapical radiolucency associated with 46, and the distal root complex is affected by external root resorption. Localised periodontal damage and involvement of furcation were also noted.

Figure 1A: Preoperative clinical photograph showing suppuration and periodontal involvement in relation to 46
Figure 1B: Preoperative IOPA showing furcation involvement, periapical radiolucency, and distal root resorption

A diagnosis of chronic generalised gingivitis with a primary endodontic lesion and secondary periodontal disease in relation to 46 was made based on vitality testing, radiographic evidence, and clinical examination. Phase I periodontal therapy, endodontic treatment, hemisection, regenerative periodontal surgery, definitive prosthesis rehabilitation, and emergency management were all components of the treatment strategy. Various treatment alternatives, including a multidisciplinary approach, were discussed with the patient, along with the tooth's impaired prognosis. Treatment could not begin until written informed consent had been acquired.

The periodontal abscess had to be drained as part of the emergency management. Three tablets of Metronidazole 400 mg three times daily for five days, two tablets of Diclomol after meals for three days, and one tablet of Cap Amoxicillin 500 mg three times daily for five days were given to the patient. The patient was also instructed to rinse their mouth twice a day with a 0.2% chlorhexidine mouthwash for a week. Instructions on proper oral hygiene, a full mouth scraping, and root planing were carried out once the acute symptoms had subsided. Following this, the root canal treatment for 46 was finished.

Under local anaesthesia, surgical intervention was performed after reevaluation three weeks after first therapy and endodontic treatment were finished. Figure 2A shows the furcation defect that was exposed through the reflection of a full-thickness mucoperiosteal flap. Figure 2B shows the tooth being vertically sectioned across the furcation area using a long straight fissure carbide bur attached to a straight handpiece. With great care, the mesial root was preserved while the distal root and its related crown portion were taken (Figure 3A). Figures 3B and 3C show the radiographic and clinical images taken immediately after the operation.

Figure 2A: Full-thickness mucoperiosteal flap reflected to expose the furcation defect
Figure 2B: Sectioning of 46 using a long straight fissure carbide bur

Figure 3A: Extracted distal root segment following hemisection
Figure 3B, 3C: Immediate Clinical and Radiographic Picture after Hemisection

Every piece of granulation tissue was carefully removed from the extraction site and the furcation area. Odontoplasty was done to make it easier to clean your teeth and remove plaque-retentive areas. The Tata Memorial Tissue Bank in Mumbai, India, supplied the demineralised freeze-dried bone allograft (DFDBA) used to fill the osseous lesion (Figure 4A). Over the transplanted area, a bioresorbable collagen membrane (Periocol®) made of fish was applied (Figure 4B). A periodontal dressing (Coe-Pak®) was applied to safeguard the surgical site after the flap was adjusted and fixed with interrupted sutures. Analgesics and antibiotics were provided for the postoperative period.

Figure 4A: Placement of DFDBA graft within the osseous defect
Figure 4B: Adaptation of Periocol® collagen membrane over the grafted site and Surgical site after flap closure

The recovery went smoothly. The patient was asked to return one week later to have the sutures removed, and then again two weeks later to assess how well the wound had healed. The results of the clinical examination showed that the soft tissues had healed satisfactorily, and there was no sign of infection or pain (Figure 5).

Rehabilitating the patient with prosthetics was begun after they had sufficiently healed. The retained mesial half of 46 underwent tooth preparation, and a shoulder finish line was marked. A self-cure acrylic resin was used for the temporisation process. A week later, a fixed prosthesis made of porcelain fused to metal using a modified ridge lap pontic design was prepared and tested in a clinical setting. Prior to final cementation, patients underwent assessments of marginal adaptation, occlusion, and pontic shape using glass ionomer luting cement.

Figure 5. Post operative healing picture after 21 days

The patient underwent periodic reviews while participating in a supportive program for periodontal maintenance. Figures 6A and 6B show that at the 8-month follow-up, the patient had healed well, there was no pain or suppuration, the periodontal tissues were healthy, and function had been maintained. On

radiographs, the bone fill is acceptable, and the periodontal support surrounding the mesial root that was retained is stable.

Figure 6A: Clinical view at 8-month follow-up

Figure 6B: Radiographic view at 8-month follow-up demonstrating satisfactory bone fill and periodontal support

DISCUSSION

For teeth with multiple roots that have been compromised by localised periodontal or endodontic involvement, hemisexcision is a conservative treatment option [2]. This method offers an alternative to extraction that keeps the alveolar bone, its function, and the stability of the occlusal joint intact while retaining the healthy root and its supporting tissues [4].

Here, periodontal disease and external root resorption mostly affected the distal root, while the mesial root showed sufficient periodontal support. Based on these results, a cautious strategy is preferable to extraction. The patient underwent endodontic treatment to alleviate infection and improve the retained root's prognosis before surgical operation [3].

The treatment of endodontic-periodontal lesions relies on a correct diagnosis. According to Rotstein and Simon, when periodontal and endodontic therapy are done properly, primary endodontic lesions that have secondary periodontal involvement usually heal well. In this instance, the diagnosis was solidified by radiographic evaluation, pulp vitality testing, and clinical observations.

To facilitate periodontal healing and osseous defect regeneration, regenerative therapy was administered using DFDBA in conjunction with a Periocol® collagen membrane generated from fish. Research conducted by Carnevale *et al.,* showed that molars that had their roots removed and are now receiving supportive periodontal therapy have good long-term results [5].

CONCLUSION

Hemisection can be considered a predictable and conservative treatment option for selected furcation-involved mandibular molars with localized endodontic-periodontal pathology and external root resorption. Careful diagnosis, appropriate case selection, and supportive periodontal maintenance are essential for long-term success.

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Conflict of Interest: The authors declare no conflict of interest.

Patient Consent

Written informed consent was obtained from the patient for treatment and publication of clinical and radiographic findings.

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