ORIGINAL RESEARCH PAPER
Volume - 14 | Issue - 01 | January - 2025 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AN INTERVENTIONAL STUDY ON HEMISECTION OF MANDIBULAR FURCATION DEFECT AND PROSTHETIC MANAGEMENT WITH 6 MONTHS FOLLOW-UP

Dentistry

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ABSTRACT

Background: Innovations in the field of dentistry, as well as patients' growing desire to save their dentition, have resulted in the treatment of teeth that would otherwise have been extracted. Due to dental cavities and periodontal disease, mandibular first molars are the most usually removed teeth. These teeth are the most important for occlusion and have a large pericemental surface. Hemisection is the sectioning of multi-rooted teeth with their crown portions, with the loss of periodontal attachment, to preserve the original tooth structure and achieve the fixed prosthodontic prosthesis. The current interventional study describes the preservation of a severely deteriorated tooth using hemisection with 6-months follow-up of the clinical outcomes. The results of the study suggests that hemisection is a reliable technique with outcome stable for over 6 months.

KEYWORDS

Dental Caries, Furcation Involvement, Hemisection, Root Amputation.

INTRODUCTION:

A furcation defect that could result in a stable root after hemisection or substantial bone loss restricted to a single root are indications for this operation from a periodontal standpoint. Alternately, a hemisection operation might be feasible if the deterioration is contained to just one root.[1] Hemisection is the surgical separation of a tooth with several roots, entailing the removal of one root and the overhanging crown. The terms “hemisection” and “root amputation,” which are synonyms for “root sectioning” or “bisection,” refer to a type of therapy that preserves tooth structure, alveolar bone, and costs less than alternative approaches. Hemisection is the process of cutting a mandibular molar in half, then extracting the damaged root and its coronal piece. By gently removing the root's lip, the retained root is endodontically treated, and the area around the furcations is made self-cleansable. It's crucial to properly restore hemisected teeth using an extracoronal restoration since they break down due to root fractures.[2]

Other indications include a single-root vertical root fracture in a multirooted tooth or any severe degenerative disease, such as trauma, caries, or external root resorption, that is restricted to a single root. Consequently, it is a cautious choice with a favourable prognosis. A robust abutment tooth beside the intended hemisection that could serve as an abutment for a prosthesis is a contraindication. The residual root might not be amenable to perform the root canal procedure.[3] The present interventional study describes the case of hemisection in 10 patients with caries that was endodontically unrestorable and periodontally stable.

MATERIALS AND METHOD:

A total number of 10 patients that presented to the conservative dentistry and endodontics department with the chief complaint of pain in the lower back tooth region were included in the present study. One such case details have been elaborated in the here. A 20-year-old female patient that reported had pain that was moderate, intermittent, and increased with mastication and reclining down. There was no relevant medical or dental history for the patient. Intraoral examination revealed that tooth #46 had a profound carious lesion involving the mesial and occlusal surfaces. On percussion, the affected tooth was extremely painful. Sinus tract was noted in the mesial aspect of #46, i.e., between #45 and #46 (Figure 1). No periodontal pockets or mobility were found in regard to #46 during the periodontal evaluation. A radiographic examination indicated a carious lesion that reached the cervical third of the mesial root.

Figure 1: The image shows grossly decayed #46 with a sinus opening in the mesial aspect of the tooth

With regard to tooth #46, a diagnosis of symptomatic apical periodontitis was reached based on the clinical, and radiographical evaluation. Because the extent of caries rendered the tooth unrestorable, the patient was informed of the state and prognosis of the tooth, as well as viable treatment options such as extraction and dental implant placement. However, the patient chose to save the remaining tooth segment by hemisecting the affected root followed by a fixed dental prosthesis over other treatment choices.

The mesial root's periodontal prognosis was fair, with excellent bone support. Following the completion of endodontic treatment, which included the removal of all carious dental structures (Figure 2), the distal root was hemisectioned under local anaesthesia.

Figure 2: Radiograph of the root canal treated #46 before performing hemisection

Mucoperiosteal flaps were raised on the buccal and lingual aspects, extending from the distal aspect of #45 to the mesial aspect of #47. To reveal the bone, debridement was accomplished with surgical curettes. Under saline irrigation, a surgical length fissure carbide bur was used at low speed to separate the mesial and distal segments. To ensure separation, a straight probe was inserted till the furcation region through the cut. The mesial root was retrieved using premolar forceps when the sectioning was completed (Figure 3). Using a surgical and a periodontal curette, the mesial socket and distal root were thoroughly curetted. 4-0 braided silk suture material was used to approximate and suture the buccal and lingual flaps. To divert forces along the long axis of the distal root, the occlusal table was minimized. The well-retained distal root and extraction socket of the mesial root are shown on the immediate postoperative radiograph (Figure 4)

RESULTS:

Similarly, all the other 9 cases where performed and the post-operative findings where documented. During the 10-day follow-up visit, healing was uneventful. Soft and hard tissue healing (assessed clinically & radiographically) were reported to be good at the 1-month follow- up visit, however mobility was absent. One-months after extraction, all the teeth underwent prosthodontic re-habilitation. The statistical analysis of preoperative and post-operative outcomes

showed that the values where significant with p-value<0.05. Radiographs taken at 3 and 6 months indicated that bone was gradually forming in the extraction socket (Figure 5). The patient was also informed that a fixed partial denture was required for the best prognosis of the tooth.

Figure 3: Mucoperiosteal flap reflection, hemisection of the tooth, and extraction of mesial segment of #46

Figure 4: Immediate post-operative radiograph of #46 showing the extraction socket of mesial root and intact distal root

Figure 5: Radiograph at 6-months follow-up visit shows complete healing of the mesial socket, and the unwavering distal root with crown

DISCUSSION:

Hemisection is the division of a two-rooted tooth into two distinct parts. This is referred to as bicuspidization or separation. Hemisection is an effective alternative method for saving multi- rooted teeth that have been recommended for extraction. Many factors influence a clinician's decision to pick one treatment strategy over another when faced with a circumstance in which the prognosis is at stake. Before deciding on a tooth for hemisection, evaluate the patient's oral hygiene, caries index, and medical history. In addition, the accessibility of the root furcation for easy removal and good bone support for the remaining root should be evaluated.

Talking about the overall survival of the hemisected tooth, Carnevale et al. reported a 10-year survival rate of around 93% among patients who undergone hemisection for furcated molars.[4] Nevertheless, hemisection and root resection are now well-established therapeutic methods. Yuh et al. retrospectively investigated the survival rates of a large number of root-resected molars and reported intriguing findings regarding demographic characteristics. For root-resected molars, the total survival percentage was determined to be 91.1%.[5]

Jain A et al performed hemisection with the removal of the mesial root and crown in a case of severe destruction of the mesial root due to external root resorption and a decent quantity of the distal root remaining with acceptable bone support. After repositioning the occlusal contacts in a desirable position, the remaining tooth structure was repaired with composite and employed as an abutment in crown and bridge. When caries, resorption, perforation, or periodontal damage is limited to one root while the other root is relatively healthy, this treatment approach is appropriate.[6]

Saad et al in 2009 also stated that hemisection of a mandibular molar may be an appropriate therapeutic choice when decay is limited to one root and the other root is healthy, and the remaining portion of the tooth can very well operate as an abutment.[7] In 2011, Akki S published a clinical report demonstrating hemisection and fixed partial dentures as a remedy to the endo-perio issue.[8] Although such involvement reduces the damaged tooth's long- term prognosis, extraction is not always a possibility. Root excision therapy is one of the treatment options available in such instances.

The clinical outcome of the present study is also in accordance with the above-mentioned studies, where the hemisected tooth underwent prosthetic rehabilitation and had shown functional stability for over 6 months.

CONCLUSION:

Hemisection furcation cases is a conservative option to preserve the tooth and prevent extracting the same. The present study described 10 cases of hemisection and preservation of the root segments. The six months follow-up showed that the remaining root was functionally stable and healthy. Though there are evidences suggesting that hemisected teeth have a better survival, long-term randomized clinical studies are required to validate the results obtained.

Acknowledgement: Nil
Conflict of Interest: Nil

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