Hemisection of the upper right first molar with a grade-2 furcation lesion: case report

Agatha Ristyawati[1*]
Yustika Chrysandra[2]
Tri Endra Untara[3]
Tunjung Nugraheni[3]
Raras Ajeng Enggardipta[4]

[1]Specialist Study Program of Conservative Dentistry, Faculty of Dentistry, Universitas Gadjah Mada, Indonesia
[2]Endodontist, Abdoel Moeis Hospital, Samarinda, Kalimantan Timur, Indonesia
[3]Departement of Conservative Dentistry, Faculty of Dentistry, Universitas Gadjah Mada, Yogyakarta, Indonesia
4Departement of Periodontology and Endodontology, Graduate School of Oral Sciences, Tokushima University, Tokushima, Japan

***Correspondence**
Email |
agatharistyawati@mail.ugm.ac.id

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ABSTRACT

Introduction: Hemisection is the separation procedure of multiple root teeth from the crown to the furcation and removing one damaged root with periodontium abnormalities, followed by a fixed denture treatment for retaining partially damaged posterior teeth. This case report aims to demonstrate the clinical management of a maxillary first molar with grade-2 furcation involvement using a multidisciplinary approach consisting of endodontic treatment, surgical hemisection, and prosthodontic rehabilitation, and to highlight hemisection as a conservative tooth-preserving treatment option compared with extraction and implant therapy. **Case report:** A female patient, 56 years old, visited the Dental Conservation Clinic of Prof. Soedomo RSGM with discomfort in the right upper molars when chewing. Based on the dental and radiograph examination, the diagnosis was pulp necrosis with asymptomatic apical periodontitis. Beginning with root canal treatment, the damaged mesial root of tooth 16 was hemisected; triangular flap was prepared in the buccal region of the maxillary right first molar; the tooth was divided mesial-distally; mesial root was removed; socket was debrided; the flap was sutured with interrupted technique and the surgical wound was closed. A modified ridge lap pontics denture design was discussed with the Prosthodontia specialist. **Conclusion**: A root canal-treated abutment tooth followed by hemisection was confirmed to be a better treatment choice in this case over extraction, with the goal of retaining the tooth with the damaged root in the mouth and restoring dental function.

Keywords

Hemisection, first molar, furcation, lesion

Hemiseksi gigi molar pertama kanan atas dengan lesi furkasi derajat-2: laporan kasus

ABSTRAK

***Pendahuluan**: Hemiseksi adalah prosedur pemisahan beberapa akar gigi dari mahkota sampai ke furkasi dan pencabutan satu akar yang rusak dengan kelainan periodontal, dilanjutkan dengan perawatan fixed bridge untuk mempertahankan gigi. Laporan kasus ini bertujuan untuk menunjukkan pengelolaan klinis gigi molar pertama rahang atas dengan keterlibatan furkasi derajat 2 menggunakan pendekatan multidisiplin yang meliputi perawatan endodontik, hemiseksion bedah, dan rehabilitasi prostodontik, serta menyoroti hemiseksion sebagai opsi perawatan konservatif yang mempertahankan gigi dibandingkan dengan ekstraksi dan terapi implan. **Laporan kasus**: Seorang pasien wanita, 56 tahun, datang ke Klinik Konservasi Gigi RSGM Prof. Soedomo dengan keluhan rasa tidak nyaman pada gigi geraham kanan atas saat mengunyah. Diagnosis berdasarkan pemeriksaan gigi dan radiografi adalah nekrosis pulpa dengan periodontitis apikal asimptomatik. Dilakukan perawatan saluran akar, hemiseksi akar mesial gigi 16 yang mengalami kerusakan dilakukan pada kunjungan berikutnya, insisi dengan triangular flap dilakukan pada daerah bukal gigi molar pertama kanan atas, gigi diseparasi mesial dan distal, akar mesial diekstraksi, debridemen soket mesial, flap dijahit dengan teknik interrupted. Desain fixed bridge berupa modified ridge lap pontics yang telah didiskusikan dengan spesialis Prostodonsia. **Kesimpulan**: Perawatan saluran akar gigi penyangga yang diikuti dengan hemiseksi dipastikan menjadi pilihan perawatan yang lebih baik dalam kasus ini daripada pencabutan gigi dengan tujuan mempertahankan gigi dengan salah satu akar yang rusak di dalam mulut dan mengembalikan fungsi gigi.*

Kata kunci

Hemiseksi, molar pertama, lesi furkasi

INTRODUCTION

Recent developments in dentistry, where clinicians consider both the art and science of the field, strongly advocate for extractions of teeth with severe caries.[1] Teeth that are left untreated can lead to drifting, loss of masticatory function, and a decrease in arch length, especially if posterior teeth are lost. Molars, when compared to other teeth, are more susceptible to the risk of losing periodontal tissue attachment, making them more prone to extraction.[2]

Pulp and periodontium are related to the diagnosis, prognosis, treatment and progression of periodontal disease. Interaction between the pulp and the periodontium occurs through the dentin tubules, the lateral and accessory canals and the apical foramen. If the pulp becomes infected and the infection progresses, the periodontium will be damaged. The furcation is a complicated anatomy and can be difficult to clean or treat.[3]

The classification often used to assess damage to periodontal tissue is the Glickman classification with 4 classifications. Grade 1: pocket suprabony involving soft tissue and slight bone loss. Grade 2: bone destroyed on one or more aspects of the furcation. Grade 3: intraradicular bone is completely absent but the tissue covers the furcations. Grade 4: through and through furcation defect is present.[4]

The etiology of furcation lesions can be due to anatomical factors, inflammatory disease of the periodontal tissues, occlusion injury, periodontal pulp disease, and root fractures involving the furcation. Early or new grade 1 furcation lesions can be managed with non-surgical therapy and effective plaque control. Grade 2 and 3 furcation lesions in the furcation area are difficult to access and clean, so alternative treatments are required to preserve the tooth, namely root amputation and hemisection. A Grade 4 furcation lesion, with a visible furcation area, complete loss of bone support, and extensive recession of the gums, requires complex treatment to preserve the tooth. The treatment approach may include root canal therapy, periodontal surgery, or tooth extraction if the lesion is too severe.[5–7]

Root canal treatment has an impressive success rate, but there can be a risk of failure due to persistent bacterial infection in the root canal and supporting tissues.[2] To overcome such failures a non-surgical root canal retreatment is essential to begin with, but in case this cannot be conceivable, surgical endodontic treatment can be performed to retain the tooth within the oral cavity. Endodontic surgery is required when retreatment has not been successful and the tooth needs to be retained rather than extracted.[8,9]

Hemisection is the procedure of separating the tooth from the crown to the furcation and removing one damaged root with periodontium abnormalities in multi-rooted teeth, where the root cannot be preserved due to loss of periodontal tissue attachment and alveolar bone structure, fractured tooth structure, and caries at the root.[8,10,11] Hemisection aims to preserve the tooth structure followed by prosthetic treatment of a fixed denture so that the tooth can stay longer in the oral cavity while still functioning properly.[12]

Indications for hemisection endodontic surgical treatment are alveolar bone loss on one root, extensive subgingival caries on only one root, root perforation due to resorption or instrumentation error, and root canal treatment that cannot be performed due to blocked root canals, crooked root canals, or root fractures to maintain a functional tooth for life.[13,14] Contraindications to hemisection endodontic surgical treatment are loss of supporting tissues of more than one tooth root, fused roots, residual root canals that are not amenable to root canal treatment, and uncooperative patients.[15,16]

In some studies, it has been stated that to save molar teeth with large caries and periodontal lesions involving furcation, case selection and endodontic surgical procedures and specific restorations need to be considered. The treatment should be discussed with the patient before it is carried out so that the best and most conservative treatment can

be chosen and the patient can be more cooperative in the treatment process.[17–19] With good case selection, appropriate endodontic treatment and restorations that can withstand occlusal pressure and maintain periodontal health is the same as that achieved using conventional endodontic treatment.[19,20] Hemisection is considered an alternative treatment to extractions and implants, which always require good restorations and prosthetics.[18,21,22]

This case report describes a hemisection procedure that is indicated in cases of roots that have lost attachment to the periodontal tissues, large alveolar boneloss, and involves a furcation. This case describes a hemisection surgical treatment of the mesial root right first molar maxilla in order to preserve the distal and palatal root. Hemisection of maxillary molars is relatively rare due to their complex root anatomy, and this report demonstrates its viability as a conservative alternative to extraction and implant therapy.

The novelty of this case lies in the multidisciplinary approach combining endodontic therapy, surgical hemisection, bone grafting of the mesial socket, and the use of a fiber-reinforced post for core buildup to preserve a multirooted maxillary molar with furcation involvement which is needed to provide a conservative alternative to extraction and implant placement. This case report aims to present the successful management of a maxillary first molar with a grade-2 furcation lesion through hemisection of the mesial root, followed by prosthetic rehabilitation using a fixed dental prosthesis.

CASE REPORT

A-56-year old female patient visited the Dental Conservation Clinic of RSGM Prof. Soedomo on referral from a prosthodontist with complaints of discomfort for chewing in her upper right molar. The patient had a denture that was made 4 years ago following upper right second premolar removal. The complained tooth was used as an abutment for the dental bridge. The patient explained that the area between the complained tooth was often slipped by food and the patient usually cleaned the tooth using a toothpick. The tooth had a history of spontaneous pain and the patient took painkillers to relieve the pain. There was no history of swelling in the tooth and at the time the tooth was no longer painful. The patient was in favor of tooth retention and denture replacement. The patient admitted to taking no systemic medication and had no systemic medical history.

Clinical examination revealed the presence of malocclusion Angle Class I, overjet 2.1 mm and overbite 2.0 mm. Teeth 14 and 16 which were used as abutments for the fixed denture (Figure 1A). The fixed partial denture used was an inlay fixed partial denture, chosen by applying the principles of minimally invasive dentistry. It utilized the mesial surface of tooth 16 with an inlay design and tooth 14 with a full crown design.

Dental bridge removed before treatment (Figure 1B). There was a large, deep cavity on the mesio-occlusal surface of tooth 16, negative percussion, negative palpation, negative vitality test, and normal mobility. There was a PFM abutment tooth 14 which was part of a fixed denture, negative percussion, negative palpation, positive vitality test, and normal mobility. Preoperative periapical radiograph examination revealed a radiolucent area from the occlusal direction to the mesial root and involving the furcation area. There were mesial, distal, and palatal roots in tooth 16. The edentulous area of tooth 15 showed alveolar resorption. The periodontal ligament appeared dilated around the mesial root 16 (Figure 1C).

A B C

Figure 1. (A) Tooth 16 before dental bridge removal; (B) Tooth 16 after dental bridge removal; (C) The preoperative periapical radiograph revealed a radiolucent area at the mesial root 16 involving furcation area.

The AAE diagnosis for tooth 16 was pulp necrosis with asymptomatic apical periodontitis involving the mesial root bifurcation based on clinical and radiographic findings. The differential diagnosis for tooth 16 was primary periodontal lesion with secondary endodontic involvement. The treatment plan for the case included root canal treatment, hemisection of the damaged mesial root of tooth 16 with a triangular flap, and a dental bridge with a modified ridge lap pontic design restoration. The hemisection and dental bridge procedure involved several meticulous steps to ensure the successful restoration of extensively carious teeth with furcation involvement. The prognosis of the hemisected maxillary first molar in this case is favorable.

The careful case selection ensured that the remaining distal and palatal roots were supported with adequate periodontal tissue and root length to function as reliable abutments for the fixed dental prosthesis. The successful completion of root canal treatment, atraumatic hemisection with proper debridement, and the use of bone grafting in the mesial socket contributed to optimal healing and preservation of alveolar bone. Application of a fiber-reinforced post and composite core build-up enhanced the structural integrity of the remaining tooth. Modified ridge lap pontic design distributed occlusal forces effectively, minimizing risk of overloading hemisected tooth.

At the first visit, the denture was removed (Figure 1B) and periapical radiographs were taken after the patient had been informed about the condition of the teeth, the treatment plan, the treatment procedure, and the cost and time of the treatment and had signed an informed consent form. The cavity was sterilized and then sealed with a temporary restoration. At the second visit after one week, the tooth was isolated using a rubber dam. Caries and enamel that were not supported by dentin were cleaned using a metal round bur (Figure 2). An access opening was made to the root canal using Endo access bur and then widened using a non-cutting round-ended fissure bur (Diamendo, Dentsply).

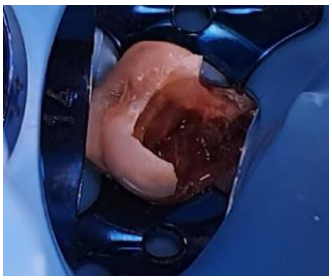


Figure 2. Tooth 16 after removal of caries lesions

Root canal preparation was performed to remove residual necrotic pulp tissue and bacteria from the infected distal and palatal root canal. The root canal was irrigated with 2.5% NaOCl and saline. The working length was confirmed with an electronic apex locator (Motopex, Woodpecker). M3 ProGold rotary files (United) were used for root canal

preparation, starting with coronal flaring using a file opener with the crown-down technique stopping preparation in file 25.06. During file preparation, the files were lubricated with EDTA 15% gel. After each file change, root canal was irrigated with 2.5% NaOCl solution and 2 ml saline solution. At the end of the preparation of the root canal, the root canal was irrigated with 2 ml of 2.5% NaOCl solution, and 17% EDTA solution for 1 minute and then with 2% chlorhexidine digluconate for 30 seconds. Each irrigation solution was also activated with an ultrasonic endodontic activator (EndoOne, Woodpecker). This step was imperative to eradicate microbial contaminants and prevent reinfection. Root canal drying was performed using paper points. Intracanal medicament was applied with calcium hydroxide paste (Calcipex II) (Figure 3). The cavities were placed with cotton pellets and temporarily filled with a temporary filling material (Caviton, GC).

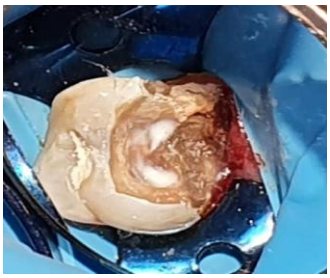
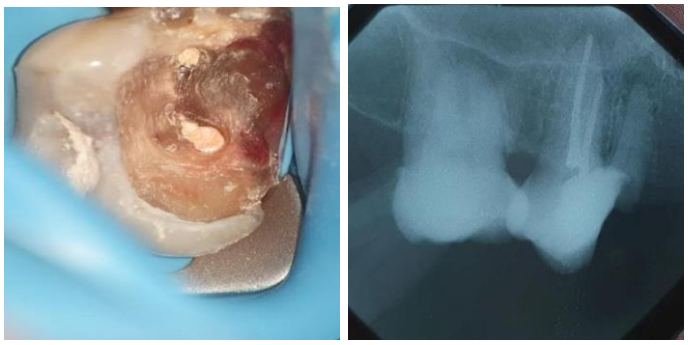


Figure 3. Tooth 16 after application of intracanal medicament in palatal and distal root canals.

At the third visit, after 8 days, the patient did not feel any discomfort, root canal obturation was performed using M3 ProGold gutta-percha 25.06 (United) and an epoxy-based sealer (AH Plus, Dentsply). Guttapercha was cut 2 mm below orifice using a rapid heating plugger (Fi-P, Woodpecker) and then lightly condensed using a hand plugger (Dentsply), cleaned of residual sealer with alcohol swabs, covered with a dry sterile cotton roll and a temporary filling (Figure 4).



A **B**

Figure 4. (A) Clinical tooth 16 after obturation; (B) Radiograph of tooth 16 after obturation

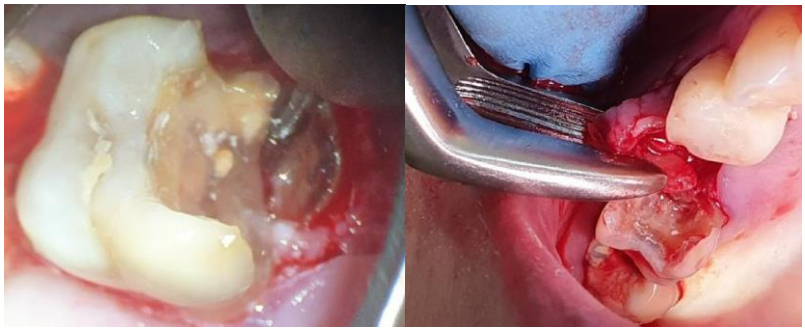
At the fourth visit, after two months, the patient's general condition was assessed and the surgical procedure was explained. The patient signed informed consent form. The surgical site was sterilized, infiltration anesthesia was applied to the mucobuccal fold at the apex of tooth 16 and in the palatal area with pehacaine (lidocaine 20 mg, epinephrine 0.0125 mg/ml), and the biological width (BW) of tooth 16 was measured. The triangular flap was started with a sulcus incision along the buccal aspect of tooth 16, continued to the distal aspect of tooth 14 and then vertically incised along the distal aspect of tooth 16 to the mucogingival junction. A periosteal elevator (rasparatorium) was used to elevate the full-thickness flap. The granulation tissue around the mesial root was curetted to

expose the alveolar bone. Temporary filling was removed with an excavator under saline irrigation (Figure 5).

A B C

Figure 5. (A) Elevation of the flap; (B) Removal of granulation tissue to expose the alveolar bone; (C) Seen at 16x magnification using a microscope, planned mesial root cutting of tooth 16

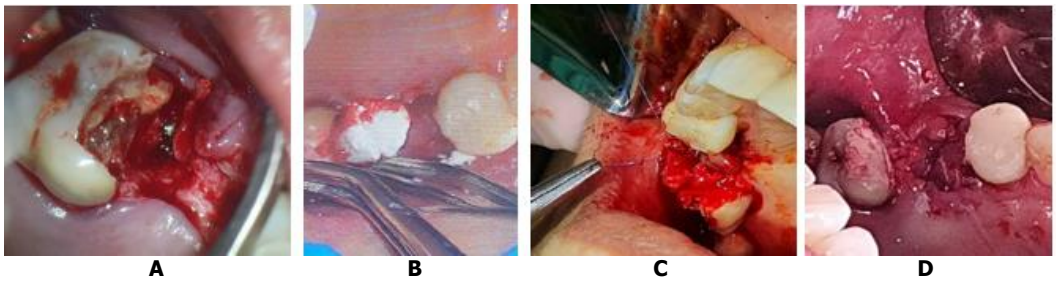
A vertical split was made towards the bifurcation using a small low-speed straight handpiece fissure bur, followed by irrigation with saline (Figure 6). The mesial root was carefully removed using bone and bayonet forceps (atraumatic).



A B

Figure 6. (A) Mesial root cutting or separation using a fissure bur; (B) Mesial root removed using bayonet forceps

The mesial root was then removed with the help of bein and bayonet forceps carefully (atraumatic). The mesial socket was debrided and irrigated with saline. Bonegraft treatment was performed and sutured (Figure 7).



A B C D

Figure 7. (A) Socket after debridement; (B) Apply bone graft to mesial socket (C) Suturing; (D) Result of flap closure after suturing.

A B C

Figure 8. (A) Buccal post-surgery condition; (B) Occlusal post-surgery condition; (C) Periapical X-ray a month post-surgery.

After two months the soft tissues had healed (Figure 8), a fixed prosthesis would be placed that included the distal half of the mandibular first molar and the mandibular second premolar. The design of the denture was discussed with a prosthodontist to take various measurements to obtain the ideal design. A short bevel was made on the cavosurface margin using a diamond tapered micropreparation bur forming an angle of 450.

The pulp chamber was protected with polytetrafluoroethylene (PTFE) tape that was rounded and condensed into the pulp chamber. Rewalling of the mesial wall was then performed using a greater curve matrix and packable composite resin (Z350 XT, 3M ESPE), finishing using a yellow ribbon flame bur on the inner surface and Coarse Soflex Disc for the outer layer and polishing using a polishing disc (eve diacomp occluflex); post canal length measurement and gutta percha reduction.

Prefabricated fiber post (MatchPost, RTD) was used. The size of the post was determined to be approximately equal to one third of the root diameter at the apical third of the root. Gutta percha in the palatal root canal was removed using a Peeso reamer, after softening the gutta percha with a rapid heating plugger (Fi-P, Woodpecker) to facilitate removal.

Fiber post was cemented and core was made using composite dual-cure resin cement and then prepared. The core preparation of tooth 14 was performed by a prosthodontist (Figure 9 and 10).

Figure 9. Tooth 16 after insertion of prefabricated fiber post.

A B C D

Figure 10. (A) Buccal core preparation; (B) Occlusal core preparation, (C) Buccal GTC design, (D) Occlusal GTC design with modified ridge lap pontics.

Finally, the next visit was a try of bridge porcelain fused metal, checking articulation, anatomical adjustment and color similarity. The porcelain fused-to-metal crown was

cemented with type I glass ionomer cement (GC Lining & Luting Fuji 1), and after the rubbery phase, the remaining cement was cleaned and allowed to set completely and occlusion was re-checked. Follow up examinations were scheduled for one year post treatment. After one year of follow up, the patient reported no pain or discomfort, gingival tissue was healing well, and there were no signs of infections or inflammation (Figure 11). Radiograph examination showed complete healing of the periodontal ligament space and no signs of apical pathology (Figure 12).

A B

Figure 11. Clinical picture following one year of tooth 14 – 16 Porcelain fused to metal crown and bridge insertion showing good marginal adaptation (a) Buccal view, (b) Occlusal view.

Figure 12. Radiograph of teeth 14 and 16 one year after crown and bridge PFM insertion.

DISCUSSION

In cases where posterior teeth are lost and not replaced by dentures, several unfavorable conditions such as extrusion of the antagonist tooth, alveolar bone loss, temporomandibular joint disorders and loss of masticatory function will occur, so it is necessary to keep these teeth in the oral cavity as much as possible.[23] Keeping the teeth in the oral cavity requires several measures such as hemisection.

Hemisection therapy is a sensitive and complex treatment which is performed as an alternative to complete extraction by removing severely weakened roots with the crown affected, when the patient's molar prognosis can be improved by removing a weak root so that the tooth can be retained. The tooth is divided into two parts from the root to the coronal. It is indicated for teeth with periodontal disease involving the root and the bifurcation. The amount of bone loss in one or more roots, the amount of remaining bone tissue, the inclination and position of the tooth in the arch, the divergence of the root, the length and curvature of the root, and the ability of the remaining root to undergo endodontic treatment and restoration on the remaining root are all factors that must be considered when deciding the hemisection procedures. Consideration should also be given to the oral hygiene status, caries index and medical status of the patient.[5,24]

In this case, the abutment tooth, tooth 16, had been restored previously with a partial restoration rather than a full-coverage crown, causing high risk of food impaction. The

interproximal prosthetic design and contact loss increase the risk of food impaction, which may negatively affect periodontal tissues.[25] There is a tendency for food to become trapped in the mesial proximal area of tooth 16 and cause caries in this area. Untreated caries will progress to the dentin and penetrate the pulp, causing inflammation and necrose of the pulp. Necrotic teeth without root treatment may extend to the furcation, in which case caries extend to the mesial root furcation. The periodontal condition in the pontic to proximal area of tooth 16 also appears to be compromised, due to food impaction causing inflammation in this area.

The present case demonstrates the successful management of a maxillary first molar with pulp necrosis and grade-2 furcation involvement through a multidisciplinary approach consisting of root canal treatment, hemisection of the mesial root, and prosthetic rehabilitation. In this case, clinical and radiographic examination revealed extensive caries extending from the mesial proximal area toward the furcation region, resulting in pulpal necrosis and localized periodontal destruction at the mesial root. Hemisection is a technique-sensitive procedure requiring careful case selection, conservative treatment, and robust maintenance. Furcation involvement represents bone loss in the root bifurcation area of multirooted teeth and requires careful treatment planning depending on the severity of the defect. Treatment aims to eliminate plaque, facilitate self-maintenance, and include non-surgical therapy, open flap debridement, furcation-plasty, regenerative procedures, root resection, hemisection, or extraction.[26]

In this case, the distal and palatal roots, however, showed adequate periodontal support and root length, allowing them to be preserved as functional abutments after removal of the compromised root. The decision to perform hemisection in this case was primarily based on the localized damage limited to one root, while the remaining roots maintained sufficient periodontal support. This finding is consistent with previous reports stating that hemisection is indicated when only one root of a multirooted tooth is severely compromised and the remaining roots can still provide adequate support for restoration. This finding is consistent with previous studies indicating that hemisection is a conservative treatment modality for multirooted teeth in which one root is severely compromised while the remaining roots retain adequate periodontal support and bone attachment. Recent literature suggests that appropriate case selection is a key determinant of success in root resection procedures.[26]

Another important aspect observed in this case was the successful endodontic treatment of the distal and palatal root canals prior to the surgical procedure. Root canal therapy was performed to eliminate intracanal infection and prevent further spread of microorganisms into the periapical tissues. Adequate cleaning, shaping, and obturation of the remaining canals ensured that the preserved roots could function as stable abutments following hemisection. Previous studies have emphasized that successful endodontic treatment is a critical prerequisite for the long-term prognosis of hemisected teeth.[16]

The surgical phase of the treatment involved removal of the mesial root, debridement of the socket, and placement of bone graft material, followed by flap closure. This procedure allowed elimination of the infected root and removal of granulation tissue associated with the furcation lesion. Post-operative radiographic evaluation showed satisfactory healing and preservation of the surrounding alveolar bone around the remaining roots.

These findings suggest that hemisection can improve periodontal conditions by removing plaque-retentive anatomical structures and facilitating better oral hygiene in the treated area. Prosthetic rehabilitation also played an essential role in the long-term success of the treatment. In this case, a fiber-reinforced post and composite core build-up were used to reinforce the remaining tooth structure before placement of a porcelain-fused-to-metal fixed dental prosthesis with a modified ridge lap pontic design.

This restorative design helped distribute occlusal forces effectively and minimized excessive loading on the hemisected tooth. Proper prosthetic planning is essential to ensure that occlusal forces are directed along the long axis of the remaining roots, thereby reducing the risk of fracture or periodontal breakdown. In hemisection cases, the design of the final prosthesis plays a crucial role in maintaining biomechanical stability and long-term prognosis of the treated tooth. Prosthetic rehabilitation of hemisected molars must be carefully designed to ensure favorable occlusal load distribution and to prevent excessive stress concentration on the remaining roots. Directing occlusal forces along the long axis of the preserved roots significantly improves the survival of hemisected teeth and minimizes the risk of root fracture or periodontal deterioration.[16]

For teeth with multiple roots, hemisection is the removal of one root and part of the crown. In order to keep the tooth in the oral cavity and restore its function, hemisection is performed to remove the infected part of the tooth, leaving the healthy root and crown part of the tooth.[24] This finding allowed the remaining roots to function as abutments after removal of the compromised root. Similar conditions have been reported in previous studies, where hemisection is recommended when one root of a multirooted tooth is severely compromised while the remaining roots have sufficient bone support and favorable morphology for restoration.

In this case, root canal treatment was first performed on the distal and palatal canals to eliminate intracanal infection. Successful obturation of these canals ensured that the remaining roots could function as a stable foundation for further restorative procedures. Previous studies have emphasized that endodontic treatment is an essential prerequisite before hemisection to prevent persistent infection and ensure long-term success of the remaining root. A previous study also indicated that the hemisection procedure creates a more favorable environment for maintaining oral hygiene.[7] The treatment decision to perform hemisection was based on the clinical findings of localized damage to the mesial root while the distal and palatal roots retained adequate periodontal support. Treatment with hemisection provides many advantages, that the teeth can still be preserved and the periodontal tissues that function as shock absorbers and proprioception can be maintained. Dentists should discuss these options with patients so that they can determine the most appropriate and conservative treatment for their teeth.[22]

Hemisection is a viable, long-term option with survival rates exceeding 90% over 5–23 years, comparable to implant success.[27] The successful outcome of this case demonstrates successful prosthetic rehabilitation using a fixed dental prosthesis with a modified ridge lap pontic design.[28] The use of fiber post and resin cement provides adequate strength and retention for teeth used as abutments for fixed dentures, while root canal therapy ensures elimination of infection and long-term viability of the tooth. Radiographic success at the subsequent recall visit demonstrated the absence of periodontal ligament spreading and bone development at the time of extraction (Figure 12). Hemisection reduces psychological trauma, preserves natural tooth structure, and maintains occlusal harmony, making it a viable option in suitable cases.[29-31]

Patient compliance with post-operative instructions and regular dental check-ups contribute to the overall success of the treatment. Having good case selection and following specific guidelines for endodontic, surgical, and restorative procedures, performing hemisection can serve as a dependable treatment choice for preserving molar teeth that were previously deemed non-restorable. It has also been proposed that hemisection should be considered prior to any molar extraction, as it provides successful long-term outcomes. Multidisciplinary collaboration enhances outcomes, and further research is needed to refine these techniques and expand their indications for better patient care.[30,32]

The limitation of this case report is that it presents a single clinical case with a relatively short follow-up period of one year, which may not adequately reflect the long-term prognosis of hemisected maxillary molars. Additionally, anatomical variations of maxillary molars and patient-specific factors limit the generalizability of this treatment approach to broader populations. The absence of a comparative analysis with alternative treatments such as extraction and implant placement further restricts the ability to assess its relative effectiveness. Future studies with larger sample sizes, longer follow-up durations, and comparative designs are recommended to establish the predictability and long-term success of hemisection procedures.

CONCLUSION

Root canal treated abutment tooth followed by hemisection was confirmed to be a better treatment choice in this case over extracting the tooth with the goal of retaining the tooth with the compromised root in the mouth and restore dental function. The implication of this case report is that hemisection may be considered a viable and conservative treatment option for preserving multi-rooted maxillary molars with localized periodontal and endodontic involvement, rather than choosing the option of complete extraction and implant placement. This case emphasizes the value of a multidisciplinary approach involving endodontic, surgical, and prosthodontic interventions to achieve functional and esthetic rehabilitation. It also highlights the importance of thorough case selection and long-term follow-up to ensure the success and longevity of such treatment.

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