

Root Resection : Saving By Slicing - A Report Of 2 Cases

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ABSTRACT

One of the difficult task that any present-day general dentist encounters is the decision between extracting a tooth and replacing it with a dental implant or by preserving the natural tooth with a multidisciplinary approach. With increasing awareness among patients, the awareness to retain the teeth has also increased. Root resection is one such solution of retaining the periodontally compromised teeth by eliminating the diseased portion of the root and retaining the healthy portion of the root. This article describes a report of 2 cases, where root resection was employed successfully to treat a mandibular molar tooth and a maxillary molar tooth.

Key words: root resection, mandibular molar, maxillary molar.

INTRODUCTION

The greatest objective of periodontal treatment is to retain the natural teeth so that it can function optimally and make life easier for the patient.[1] As the awareness increases among patients, the interest to preserve their natural teeth has also increased rather than extracting them. The endodontic and periodontal issues concerning the tooth must be evaluated before selecting the case. On the other hand, the preservation of a critically diseased tooth and its supporting structures, necessitates a detailed and well-phased treatment plan involving a multidisciplinary team. Many techniques, including root resection, trisection and bicuspidization, have been employed to restore such affected teeth.[2]

The American Academy of Periodontology defined root amputation as a process by which one or more of the roots of a tooth are removed at the level of furcation while leaving the crown and remaining roots in function. Radisection or root resection are other terms for root amputation.[3] This procedure was first introduced by Farrar, 1884.[4] Root amputation is indeed a viable choice for the treating molars with periodontal, prosthetic, or endodontic concerns.[5]

Indications include isolated severe bone loss affecting one or more roots where regeneration cannot be intended, class II or class III furcation involvements, undesirable proximity of root with neighbouring teeth, fracture of the root, root perforations, root cavities, advanced soft tissue recession, gradual root resorption involving one or more roots, when root canal therapy of a specific root cannot be efficiently carried out due to some limitations, or for restorative abutments that have one severely diseased root. Contraindications include inadequate residual bone supporting the remaining root(s), undesirable anatomical circumstances (e.g., lengthy root trunks, converged or merged roots), noticeable disparities in neighbouring proximal bone levels, root canal treatment on the remaining root(s) is not possible, the remaining root(s) are not restorable, the patient's poor oral hygiene, disease recurrence is anticipated, cost-benefit

ratio, medical reasons that preclude extensive treatment, when implant placement is possible.[6]

This article presents a report of 2 cases with severe vertical bone loss and hence root resection was done for its management.

Case report – 1

A 32-year-old male patient who was systemically healthy presented to the Department of Periodontology, SRM Kattankulathur Dental College and Hospital, Potheri, with a chief complaint of dull, intermittent discomfort in the left lower back tooth for the past two months. On clinical examination, deep periodontal pockets were observed in all the mandibular and maxillary teeth. A deep periodontal pocket of 10mm was observed between 35 and 36 with grade-III furcation invasion (Glickman 1953)[Figure 1]. Also grade 1 mobility was observed in

36. Generalized vertical bone loss was evident on the OPG. [Figure 2]. The IOPA revealed severe vertical bone loss extending upto apical third in relation to the mesial root of 36. Hence, a diagnosis of generalized aggressive periodontitis was confirmed. An electric pulp tester was used to perform the vitality test on 36, which indicated that the concerned tooth was non-vital. The patient insisted on preserving the tooth and refused to have it extracted. Phase 1 therapy, root canal treatment, flap surgery and root resection was therefore planned and recommended to the patient. The patient was apprised about the benefits and drawbacks of the treatment, and a written informed consent was acquired.

Scaling and root planing was performed followed by endodontic therapy [Figure 3]. Prior to flap surgery, routine blood tests were performed. After adequate local anesthesia, full - thickness

flaps were elevated in relation to 35, 36 and 37. The root was resected using a surgical length straight fissure carbide bur (no: HP 704) and micromotor with copious saline irrigation.

Following resection, a periosteal elevator was used to elevate and remove the root from its socket [Figure 4]. Access to the root was gained from the buccal side. After the debridement of the socket, complete root planing of the distal root was done. A black 3-0 braided silk suture was then used to approximate the flaps [Figure 5]. Post operative antibiotics and analgesics were given for 5 days [Amoxicillin 500 mg thrice a day; Ibuprofen 400 mg thrice daily].

Suture removal was done after seven days. There were no post-operative complications, and the healing was considered to be satisfactory. After three months, the patient was re-evaluated, and no inflammatory signs were seen in the surgical site. Also, no mobility was seen in the resected tooth and thus the tooth was

ready for a fixed crown prosthesis. Tooth preparations were done and all ceramic crowns were given from 33 to 36 [Figure 6].

The patient reported back again after 6 months for review. The resected tooth showed remarkable healing with no evidence of gingival irritation. The intraoral periapical radiograph clearly demonstrated the regenerated bone in relation to the distal root of 36 [Figure 7].



Figure 1: clinical picture showing a 10mm-deep periodontal pocket



Figure 2: Diagnostic OPG

Figure 3 : After endodontic treatment

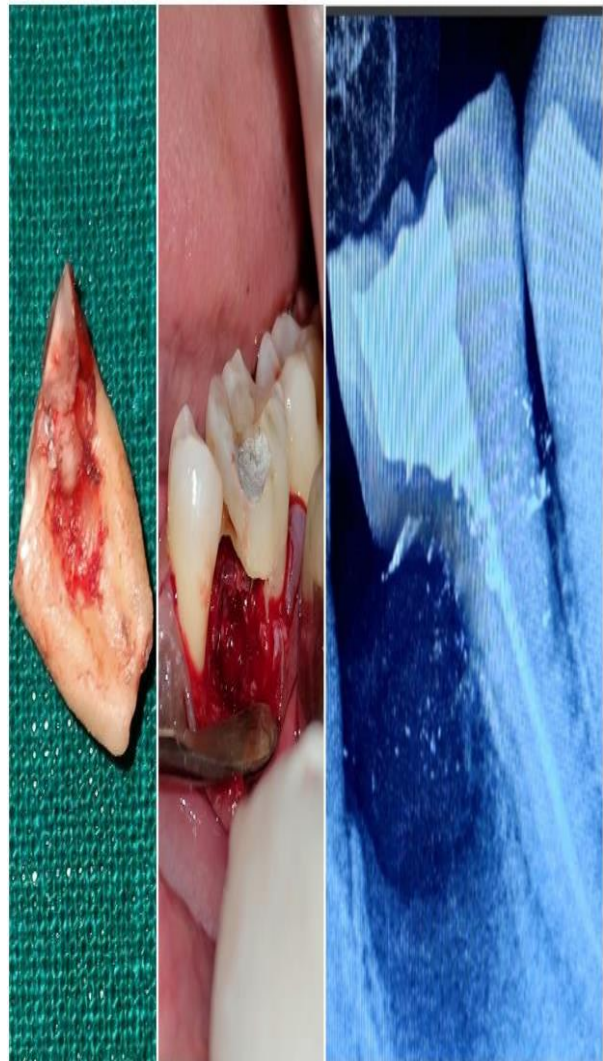


Figure 4: Resected mesial root



Figure 5: Sutures placed



Figure 6: All ceramic crowns placed



Figure 7: 6 months post-op radiograph

Case report – 2

A 26 – year- old male patient visited the Department of Periodontology, SRM Kattankulathur Dental College and Hospital, Potheri with a chief complaint of dull intermittent pain in relation to upper right back tooth. The patient had no medical history. On clinical examination, deep periodontal pockets were observed in all the mandibular and maxillary teeth. A deep periodontal pocket of 10mm was observed on the distobuccal aspect of 16 with grade-III furcation invasion.

An electric pulp tester was used to determine the tooth's vitality, and the results showed that the tooth

was non-vital. On radiographic assessment, the OPG showed generalized vertical bone loss [Figure 8] and IOPA revealed extensive vertical bone loss extending upto the apical one- third in the distobuccal aspect of the root [Figure 9]. A diagnosis of generalized aggressive periodontitis was confirmed. The patient was informed of the treatment plan and the outcomes of the procedure.

Phase 1 therapy was followed by the endodontic treatment. The patient was reviewed after 1 week. After adequate local anesthesia, Full thickness flap was elevated in relation to 14,15,16 and 17. Curettes and a cumine scaler were used for complete debridement. [Figure 10].

Following debridement, the defect was evaluated, and the distobuccal root was sectioned just apical to the tooth's cemento-enamel junction. [Figure 11]. This cut was made with a high-speed tapered fissure carbide bur. After resection, the periosteal elevator was used to elevate and remove the root. 10 mL whole blood were collected and centrifuged at 700 rpm for 3 min (according to Miron RJ) at room temperature. The i-PRF formed at the top layer, was immediately collected into a 2 mL syringe. Sticky bone was prepared by mixing i-PRF and bone graft (DBBM, Osseograft) [Figure 12]. The extracted socket of the distobuccal root of 16 was now filled with the prepared sticky bone [Figure 13]. GTR membrane was placed in the buccal aspect of 16. Flaps were approximated using 5-0 vicryl sutures [Figure 14] and coe-pak was placed.

Post operative antibiotics and analgesics were prescribed for 5 days.

7 days later, the patient was reviewed. No post-operative complications were observed, and the healing was found to be satisfactory. The patient is under follow up and will be re-evaluated again after 6 months for crown placement.



Figure 8: Diagnostic OPG



Figure 9: IOPA revealing complete bone loss in the distobuccal root



Figure 10: Complete debridement done

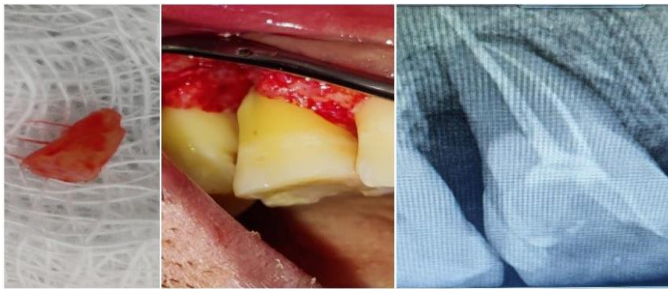


Figure 11: Clinical and radiographic image of resected distobuccal root



Figure 12: Preparation of i-PRF and sticky bone

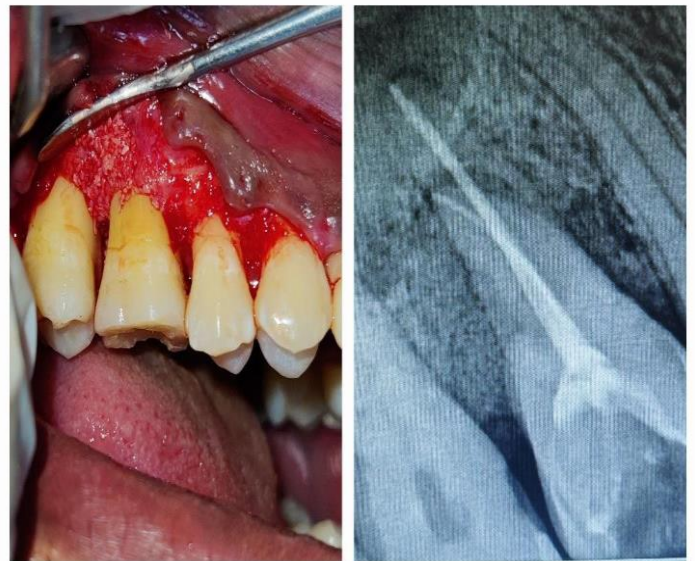


Figure 13 : Clinical and radiographic image showing sticky bone placed in the extraction socket of the distobuccal root in 16



Figure 14: Sutures placed

Discussion

Clinicians have always found it challenging to manage teeth with furcation involvements. Maxillary molars have been reported to develop furcation involvements three times more commonly than that of mandibular molars. While discussing about the hopeless roots of molar teeth at the American Medical Association conference in 1894, Dr. W. J. Younger stated: "My treatment in these cases has been to open into these roots, remove their pulps, fill them and amputate (the involved root), then grind away enough of the articulating surface of the crown, immediately over the removal root, in order to bring the pressure in the effort of mastication upon the (solid) roots. By these means, these teeth can be made comfortable and serviceable for years". Coolidge highlighted the significance of a completely sealed root canal before root resection in 1930. In 2002, Sommer provided further information on the requirements of an effective root resection procedure and reported that a good root canal therapy plays an important role in reducing bacteria and infection before root resection. [3] But nevertheless, if properly treated, teeth with furcation involvement can be preserved for a very long period of time. [4]

Root resection, a periodontal surgical treatment is used to eliminate the diseased portion of the molar root and retain the healthy part of the root. When a root gets affected, it also affects the gingival tissues surrounding the root leading to pocket formation promoting plaque build-up and growth of the bacteria.

The effectiveness of root resection procedure is still debatable. Some researchers asserted that root-resected molars had a survival rate of over 90%,

while others claimed that over a ten-year period, 30% of resected molars failed. Hence, an appropriate treatment plan should be made and explained to the patient before commencing such treatment. [7]

In the present 2 case reports, root resection of the mesial root of 36 in the 1st case report and the distobuccal root of 16 in the 2nd case report was planned as the vertical bone loss extended upto the apical one-third along with the furcation involvement. After removing the affected roots, the remaining teeth structure appeared clinically sound and more than 50% of bone structure was radiographically evident. An appropriate prosthetic rehabilitation was therefore planned and all ceramic crowns were given in the 1st case. Sticky bone, a homogeneous substance that comprises the mineral scaffold for bone cells required for bone growth, was placed in the socket of the distobuccal root of 16. Also, it includes growth factors that are essential for promoting cell migration or differentiation. [10] As indicated by its strong osteoblastic activity and maturation, the bone graft when combined with platelets, fibrin, and leucocytes has revealed greater histological evidence of hard bone development when compared to employing PRF as the only extraction socket filling material after four months. [11] The 2nd case is still under follow up and the prosthetic rehabilitation will be done after 6 months.

Success of the root resection depends on the appropriate case choice which in turn depends on an array of considerations including: access of root furcation, sufficient bone to sustain the remaining root, tooth related factors such as anatomical tooth structure, mobility of the tooth, gingival recession, crown-root ratio, and occlusion of the patient, patient - related elements such as oral hygiene status, presence of caries, medical conditions, time and expense and lastly operators's factors such as appropriate case selection, diagnosis, treatment plan and clinical skill.[8] The disadvantages of this procedure includes discomfort, apprehension of the surgical procedure and vulnerability of the root caries. Failure of the root canal procedure for any reason will result in the failure of the procedure; trauma from occlusion might result from faulty

prosthesis design and gradual periodontal destruction.[6] The most frequent reason for failure following root amputation treatments is reported to be root fracture, and adequate rehabilitation with indirect coronal restoration has been shown to improve the fracture resistance of such root-resected teeth.[9] With employing them as abutments or splinting them to the neighbouring teeth, it may be possible to

improve the rate of survival of these resected teeth.[2]

Root resection though being a better choice than extraction, oral hygiene is ought be practiced post operatively by the patient, particularly in the area of root amputation for a better prognosis in future.

Conclusion

This procedure's success is comparable to implant therapy. For patients who decline implant therapy owing to financial restrictions, it may be a financially viable treatment choice. According to the current case reports, root resection can be considered as a potential therapeutic option to remove the diseased root and allowing the remaining healthy tooth to survive.

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