

Root Amputation: Practical Way to Salvage Compromise Tooth - A Case ReportDr. Hambire Ashwini¹, Dr. Mashalkar Shailendra¹, Dr. Kulkarni Sangeeta¹, Dr. Janavathi¹, Dr. Kiran¹, Dr. D. Pawan¹, Dr. Indi Shreeshail¹, Dr. W. Jyothi¹, Dr. Khan Ahmed Omar¹

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Abstract: Advances in dentistry, as well as the increased desire of patients to maintain their dentition, have led to treatment of teeth that once would have been extracted. The treatment may involve combining restorative dentistry, endodontics and periodontics so that the teeth are retained in whole or in part. The term tooth resection denotes the excision and removal of any segment of the tooth or a root with or without its accompanying crown portion. Various resection procedures described are: root amputation, hemisection, radisection and bisection. Root amputation refers to removal of one or more roots of multirooted tooth while other roots are retained. This case report illustrates determination of prognosis and immediate resection carried out, after completing the endodontic therapy, during the surgery employed for managing a non periodontal problem. This case report demonstrates root amputation procedure, carried out on maxillary right first molar for eliminating the cause for root caries on mesio buccal root to salvage the remaining portion of a strategically important tooth structure.

Keywords: Mesio buccal root, root caries, root resection, root amputation

INTRODUCTION

In modern era of dentistry emphasis is placed on maintain & preservation the nature dentition & the main goal of dentistry being prevention, preservation & restoration of defects. According to *De Van* "perpetual preservation of what remains is more important than meticulous replacement of what is lost [1]."

Thus tooth resection procedures are used to preserve as much tooth structure as possible rather than sacrificing the whole tooth [2]. The treatment may involve combining restorative dentistry, endodontics and periodontics so that the teeth are retained in whole or in part. Such teeth can be useful as independent units of mastication or as abutments in simple fixed bridges [3].

Root amputation procedures are a logical way to eliminate a weak, diseased root to allow the stronger to survive, whereas if retained together, they would collectively fail. Selected root removal allows improved access for home care and plaque control with resultant bone formation and reduced pocket depth.² Root amputation—once a common surgical procedure aimed at eliminating furcation invasion in multirooted teeth was first described by Farrar in 1884. It was reintroduced into periodontics by Messinger and Orban in 1954 [4].

The indications for root amputation were given by Basaraba [5] and Staffileno [6]. They include Class III furcation involvement; deep Class II furcation; cases of isolated severe bone loss involving one of the roots;

vertical root fracture; subgingival root caries; and endodontic indications, such as a persisting periapical pathologic lesion, root resorption or iatrogenic root perforation [3].

A long-term successful outcome of root amputation depends upon four variables, including meticulous endodontic, periodontic and restorative procedures, and a highly motivated patient [3]. As always, case selection is an important factor in success. Proper diagnosis, treatment planning, case presentation & good restorative procedures are all critical factors equally important to the resective procedure itself. The strategic value of the tooth involved must be convincing.

This case report demonstrates root amputation procedure, carried out after the completion of endodontic therapy on maxillary right 1st molar (16), for eliminating the cause for root caries, to salvage the remaining portion of a strategically important tooth structure.

CASE REPORT

A 30- years old female patient reported to our Department of conservative Dentistry and Endodontics, Al-Badar Dental College & Hospital, Gulbarga, Karnataka, with a chief complaint of pain in upper right back tooth region since past one week. Patient was relatively asymptomatic before then. She developed continuous and throbbing pain in this region, which got aggravated during mastication and sleep. Patient gave past dental history of extraction of maxillary right 2nd

premolar (15), approximately 2 years back. Patient's medical and family history was not contributory.

On intra-oral examination, 16 were found to be normal on Inspection & palpation. On percussion 16 was found to be non tenderness. On heat pulp vitality test gave Positive response in relation to 16. On Radiographic examination, proximal caries with 16 was evident along with the root caries of mesiobuccal root. Radiographs had shown no peri radicular changes(Figure 1).



Fig-1: Radiograph of tooth 16

Following diagnosis of Acute irreversible pulpitis with 16. In the view of above findings, it was decided to first carry out root canal treatment of 16 followed by the root amputation of the mesiobuccal root of 16 while retaining- the distobuccal & palatal root and fabrication of crown and bridge over 14 and 16 as an abutment tooth.

The treatment modality was explained to the patients who include removal of the whole mesiobuccal root (MB root amputation) and keeping the palatal and the distobuccal roots of 16.

After taking consent from the patient the following procedures were carried out. Access cavity preparation & working length was determined. Cleaning and shaping was carried out using step back technique with K-files (Maillefer Dentsply), followed by obturation done with lateral condensation technique.

On next appointment the amputation procedure was initiated with local anesthesia administered (Xylocaine 2% with 1:80,000 adrenaline). During the surgical procedure triangular incision was given on 16. A vertical incision was made distal of tooth #14 with

no.15 scalpel blade then an intrasulcular incision from tooth #15 to tooth #17. A distal vertical relaxing incision was given over tooth # 17 used to relieve tension on soft tissues during flap reflection & increases visibility for a maxillary first molar. The mucoperiosteal flap was elevated and mesiobuccal root of 16 was noticed. Based on this finding, the diagnosis of root caries was confirmed and the mesiobuccal root of tooth #16 was resected at the level of the crown margin with a straight diamond bur under saline irrigation coolant. A radiograph was taken to ensure that the entire root was resected. The furcation area was trimmed to ensure that no spicules were present. The flap was then repositioned & then interrupted with 4-0 Vicryl double sutures (Johnson and Johnson Health Care Systems Inc) were placed to close the flap tightly with the crown margins. Post-surgical instructions were given to the patient. Amoxicillin 500 mg t.i.d for five days and Diclofenac sodium 50 mg for three days were prescribed. Chlorhexidine gluconate mouthwash 0.2% 10 ml b.d was prescribed for one month. Sutures were removed 7 days later. 2months later after complete healing of the socket an impression was taken and 3 unit bridges was fabricated and since then the patient has no complaint.



Fig-2: After root canal treatment



Fig-3: Permanent composite restoration with 16



Fig-4: During the surgical procedure triangular incision was given on 16. Full thickness mucoperiosteal flap was reflected



Fig-5: Resected part of the mesiobuccal root of 16



Fig-6: Suture placement



Fig-7: Postoperative view of the surgical site



Fig-8: After 6 month's postoperative view

DISCUSSION S

Root amputation—a common surgical procedure refers to removal of any segment of the tooth

or a root with or without its accompanying crown portion in multirooted teeth— *Farrar* (1884). Since then, the procedure has been modified, and its clinical

outcomes evaluated longitudinally by several researchers. There is a great deal of controversy about the treatment of teeth with bone loss in the furcation [3].

Corn and their co-workers described that root resections should be performed at the incipient stage of furcation invasion, whereas *Ross et al* discussed that resection is not necessary for a favorable tooth survival rate [7].

The main aim of root resection therapy is to maintain a diseased tooth as an alternative to extraction and replacement. Dental implants, extensive bridge work and custom-made tooth replacement can be expensive and time-consuming. Generally, root resection and the necessary crown work are less expensive and can be completed in 1-3 short visits [8].

Successful root-resection therapy requires a careful multidisciplinary approach including periodontal, endodontic treatment, prosthetic reconstruction & oral hygiene maintenance. Before selecting a tooth for root resection, patient's oral hygiene status, caries index and medical status should be considered. Also, accessibility of root furcation for easy separation as well as good bone support for the remaining root should be assessed [3].

Most maxillary molars have at least two roots remaining after resection, one of which is usually a large palatal root. This root, which helps the tooth to withstand occlusal forces, is definitely less susceptible to root fracture. In addition, the remaining tooth structure in a maxillary molar has a large enough surface area to provide retention for an overlying casting [7].

Similarly, the reasons for failure are equally well-known. The primary causes for failure after root resections are root fracture, caries, endodontic complications, cement washout, restorative failures and periodontal attachment loss [1].

Root resection therapy outcome was investigated in a few studies showing a variable "success rate" or survival of resected teeth depending on the study. A long-term successful outcome of root amputation depends upon four variables, including meticulous endodontic, periodontic and restorative procedures and a highly motivated patient.

Using the teeth after root resection as abutment teeth has been well documented in the studies of Jamal Aqrabawi with favorable success rate [8]. Langer *et al.* concluded that at least a 10 year recall should be implemented to get a meaningful outcome, as failure tended to happen between the 5th or 7th yrs postoperatively. About 38% of these teeth failed during the 10 yrs observation period [7]. Blomlof L *et al.* &

Carnevale *et al.* 68% & 93% success rate at 10 yrs recall time respectively [9,10].

In this case report, due to excessive destruction of the mesiobuccal root & root caries -16 and fair amount of the distobuccal & palatal root remaining with adequate bone supports, Hence root amputation was carried out with the removal of the mesiobuccal root.

CONCLUSION

The rule of nature is to conserve as much of tooth structure as possible. Preservation of the remaining natural and healthy tooth structure will have positive psychological impact on the patients. Root amputation can be good alternative to tooth extraction for compromised teeth with favorable prognosis.

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