

Root Amputation as an Alternative Treatment for Decayed Multi-Rooted Tooth: A Review of 3 Case Reports

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ABSTRACT

Background: With the advances in dentistry and patient education, patient's desire to retain natural teeth has increased. Teeth with extensive decay or loss of periodontal support that were earlier removed can now be effectively retained using an interdisciplinary approach. This case report describes 3 cases of root amputation procedures that have been successfully restored to its function.

Keywords: Root amputation, Hemisection, Radisection, Bicuspidization.

INTRODUCTION

Root amputation refers to the removal of any segment of a root in a multi-rooted tooth with or without its accompanying crown portion. The various root amputation procedures include hemisection, radisection, root amputation and bicuspidization. Root amputation is the selective removal of one or more root in a multi-rooted tooth while retaining the non-diseased portion of the root. Hemisection refers to the selective removal of the diseased portion of the root along with its crown portion. Radisection is a newer terminology that is used for root amputation in a maxillary molar tooth. Bicuspidization is a clinical procedure done in mandibular teeth where the roots are separated into two halves along with its crown portion and retained separately (1).

Root amputation therapy has been described in endodontic literature over 100 years (2). According to Weine (3) these procedures are

mainly indicated when there is a severe bone loss that is limited to a single root in a multi-rooted tooth, root exposure due to dehiscence, untreatable endodontic failures such as perforations, instrument separations or vertical root fractures that are limited to a single root in a multi-rooted tooth. Extensive carious lesions that involve the furcation areas and single root in multi-rooted teeth are also indicated for root amputation procedures.

The success rates of these root amputation procedures have shown variable results with some authors reporting a success rate over 90% (4) and others reporting it to be as low as 30% (5). In a retrospective study, Shin-Young Park et al reported that root resection for correction of periodontal problems had better outcomes as compared to non-periodontal reasons. They also stated that the survival rate of resected teeth was higher when the remaining bone support was more than 50% (6). Thus, accurate case selection becomes the foremost criteria for success in root amputation procedures.

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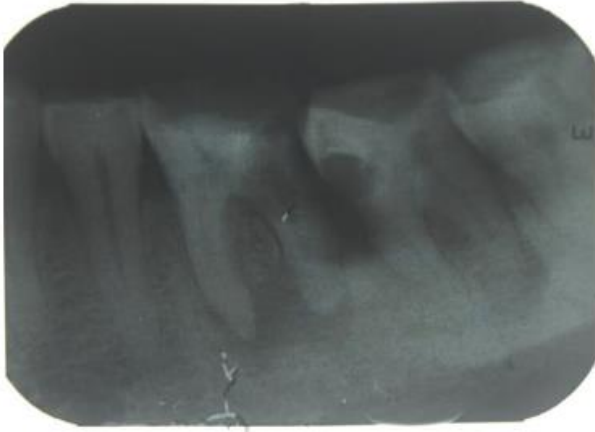


Figure 1a



Figure 1b



Figure 2a



Figure 2b



Figure 3a



Figure 3b

This case report describes three successful cases of root amputation and the clinical procedures involved in its management.

CASE REPORT

All procedures for the patients were carried out in the Department of Conservative Dentistry and Endodontics, Institute of Dental Sciences, Siksha 'O' Anusandhan University, Bhubaneswar .

Case 1: A 61 year old male patient reported with chief complaint of food impaction in the right lower back tooth region of the jaw. On examination, deep proximal carious lesions were seen in tooth no. 46 (DO) and 47 (MO). IOPA radiograph (Figure 1a) revealed proximal radiolucency involving the pulp in 46 and 47 with associated periapical radiolucency and angular bone loss in relation to the distal root of 46. Additionally, it was observed that the coronal radiolucency in 46 approximated the furcation area. Clinical sensitivity tests (cold) was found to be negative.

Case 2: A 41 year old male patient reported with chief complaint of food lodgment and sensitivity in the left lower back tooth region of the jaw. During clinical examination Class II caries in 36 with deep periodontal pocket was observed. Radiographic examination revealed severe vertical bone loss in relation to the distal root of 36 (Figure 2a).

Case 3: A 54 year old male patient reported with chief complaint of pain in the right upper back tooth region of the jaw for the past 3 months. Clinical and radiographic examination revealed root canal treated 27 with unobturated distobuccal root canal with extensive decay (Figure 3a).

Management:

Case 1 and 2: After rubber dam isolation access opening was done using no. 2 round endo-access-bur (Dentsply). Conventional non-surgical root canal therapy was done following which access restoration was done using Light Cure composite resin (Filtek Z-250, 3M ESPE). A full thickness mucoperiosteal flap was raised (buccal and lingual). The tooth was sectioned using a tapered fissure bur (TF 11, Mani, Japan) into two halves. The diseased, untreated portion of the root was then extracted and the remaining root segment along with its

crown was reshaped and finished as that of a premolar tooth (Figure 2 b). After complete healing of the extraction wound, definitive prosthodontic treatment was done (Figure 1 b).

Case 3: After rubber dam isolation access was re-established using a no. 2 round endo access bur (Dentsply). Guttapercha from the mesiobuccal and palatal roots were removed using retreatment files (Protaper, Dentsply) using a GP solvent (Carvene, Prevest DenPro). Working length was reestablished and cleaning and shaping was done using Protaper universal files (Dentsply) in the mesiobuccal and palatal canals till size F2 (mesiobuccal canal) and F3 (Palatal canal). An interim Calcium hydroxide (Avue Cal,Param Enterprise) was placed as an intracanal medicament for one week. Subsequently the calcium hydroxide dressing was removed and canals were obturated using corresponding gutta percha size (Diadent, Korea) and resin based sealer (AH Plus, Dentsply). After access restoration with Light Cure composite resin (Filtek Z-250, 3M ESPE) a full thickness mucoperiosteal flap was raised in relation to the distobuccal root and radisectomy was done using a tapered fissure bur (TF 11, Mani, Japan) and the distobuccal root was extracted. The remaining crown and root portions were smoothed to facilitate adequate oral hygiene procedures (Figure 3 b). After complete healing of extraction wound tooth preparation was done and a crown was placed.

DISCUSSION

Root amputation procedures are a viable and predictable alternative treatment available to save extensively decayed multi-rooted teeth that are otherwise indicated for extraction. Factors that should be considered before undertaking any root amputation procedures include angulation and position of the tooth in the arch, root divergence, length and root curvature and feasibility of endodontic and prosthodontic rehabilitation on the remaining root structure (7).

In Case 1 and 2 hemisection was done as it perfectly fits the criteria as cited by Weine (3). The extensive decay of distal root along the pulpal floor (Case 1) and extensive bone loss around the distal root (Case 2). In case 3 a more conservative approach was done by only removing the

distobuccal root and reshaping of the remaining tooth structure.

Healing after root amputation procedures is facilitated due to improved oral hygiene and removal of irritants that lie in the root canals. The advantage of retaining natural teeth includes, less traumatic as compared to extraction or implant prosthesis and serves as an abutment in partial dentures. Studies have proven that early loss of teeth may psychologically affect the patient, hence every effort should be made to retain natural teeth (8). Additional care should be taken during the fabrication of crown to create favourable occlusal forces (7).

CONCLUSION

In conclusion, root amputation procedures have high success rates. Proper case selection and treatment planning forms an integral part for the success of such procedures. These 3 case reports describe successful root amputation procedures.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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