

# Root Resection of Maxillary First Molar: A Case Report.

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## Abstract

The increased desire of patients to maintain their dentition has forced dental specialist to conserve the teeth in the mouth which are planned to be removed. In the light of this finding it is known that periodontally compromised teeth with severe bone loss at furcation area or endodontically compromised teeth may well be retained of their roots. This type of surgical therapy enables clinicians to better access the remaining tooth structure for periodontal and subsequent prosthetic therapy. In this case report distobuccal root resection of the right first maxillary molar with a simple procedure is presented along with brief review of root resection as a treatment modality.

**Key Words:** Root resection; furcation defects; endodontic therapy; Periodontitis;

## Introduction

The treatment, management and long-term retention of multirooted teeth exhibiting furcation invasions, severe periodontal destruction or endodontically compromised have always been a challenge to the discerning general dentist or dental specialist. 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. Continued periodontal breakdown may lead to total loss of tooth unless these defects can be repaired or eliminated and health of the tissues restored. Thus tooth separation and resection procedures are used to preserve as much tooth structure as possible rather than

sacrificing the whole tooth<sup>1</sup>.

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. Bisection or bicuspidization is the separation of mesial and distal roots of mandibular molars along with their coronal portion, where both segments are then retained individually<sup>2</sup>.

The indications and contraindications for root resection as summarized by Bassaraba<sup>3</sup>.

## Which Root to Remove and Why?<sup>2</sup>

1. Remove the root that will eliminate the furcation and allow the production of a maintainable architecture on the remaining roots.
2. Remove the root with the greatest amount of bone and attachment loss. It is obvious that sufficient periodontal attachment must remain after surgery for the tooth to withstand the functional demands placed on it.
3. Remove the root that best contributes to the elimination of periodontal problems on adjacent teeth. For example, removal of the distobuccal root of the first molar allows the elimination of the furcation and management of the two-walled intrabony lesion and also facilitates access for instrumentation and maintenance of the second molar.
4. Remove the root with the greatest number of anatomic problems such as severe curvature, developmental grooves, root flutings, or accessory and multiple root canals.

5. Remove the root that least complicates future periodontal maintenance.

## Case Report

A 46 year old female patient reported to Dental clinic with complaint of food lodgement and pain on chewing. Past dental history revealed patient had undergone extraction. Intra oral examination showed generalized moderate periodontal pockets, gingival recession and mobility. On radiographic examination, the OPG and periapical X rays showed generalized bone loss and severe bone loss with distobuccal root of maxillary first molar with furcation involvement (Fig 1). Since mesiobuccal and palatal root showed adequate bone support it was decided to retain these roots and remove the distobuccal root. To begin, a through phase I therapy was performed and surrounding tissue was assessed (Fig 2). Access opening was done and the endodontic treatment was completed in frequent visits.

After appropriate local anesthesia, a full-thickness mucoperiosteal flap was elevated. A removal of a small amount of facial bone was done to provide access for elevation and facilitate root removal. A cut was then directed just apical to the cemento-enamel junction of the tooth. This cut was made with a high-speed tapered fissure carbide bur. A curved periodontal explorer was used to aid in orienting the angle of the resection. The sectioned area was evaluated using a fine explorer. The distobuccal root was extracted from the socket (Fig 3,4), furcation area was trimmed for bony specules and area was inspected for any periodontal irritation (Fig 5). The socket was irrigated with saline and the tooth was checked for occlusion to

Indications for Root Resection	Contraindications to Root Resection
<ul style="list-style-type: none"> <li>• Severe vertical bone loss on one root of a multirooted tooth not amenable to regeneration/reattachment.</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced bone loss with an unfavorable crown-to-root ratio.</li> </ul>
<ul style="list-style-type: none"> <li>• Furcation invasion not correctable by odontoplasty.</li> </ul>	<ul style="list-style-type: none"> <li>• Fused roots that cannot be separated.</li> </ul>
<ul style="list-style-type: none"> <li>• Proximal furcation invasion in combination with root approximation.</li> </ul>	<ul style="list-style-type: none"> <li>• If an endodontically inoperable canal would be retained.</li> </ul>
<ul style="list-style-type: none"> <li>• Furcation invasion that is not maintainable.</li> </ul>	<ul style="list-style-type: none"> <li>• If the remaining root(s) would be inadequate to serve as a prosthetic abutment.</li> </ul>
<ul style="list-style-type: none"> <li>• Periodontally involved abutment teeth with a hopeless prognosis associated with one root.</li> </ul>	<ul style="list-style-type: none"> <li>• If indicated splinting cannot be performed.</li> </ul>
<ul style="list-style-type: none"> <li>• Vertical or horizontal root fracture.</li> </ul>	<ul style="list-style-type: none"> <li>• When periodontal support after resection is inadequate to withstand normal occlusal forces.</li> </ul>
<ul style="list-style-type: none"> <li>• Uncorrectable root dehiscence.</li> </ul>	<ul style="list-style-type: none"> <li>• Inability to create a good postsurgical gingival environment.</li> </ul>
<ul style="list-style-type: none"> <li>• When endodontic therapy is impossible on one root of a multirooted tooth.</li> </ul>	<ul style="list-style-type: none"> <li>• If socioeconomic conditions preclude necessary treatment procedures.</li> <li>• In the presence of inadequate oral hygiene and high caries activity.</li> </ul>

facilitate healing. Patient was recalled after a week and sutures were removed. Patient was periodically evaluated for prognosis.

**Discussion**

Root resections have been performed in dentistry since the late 1800s<sup>4</sup>. With proper long-term monitoring and maintenance, a root resection is accepted as a valid treatment with reasonable long-term effectiveness<sup>5</sup>. Root resection involves the sectioning and the removal of one or two roots of a multirooted tooth. The distobuccal root of maxillary molar is the shortest root and has comparatively large root trunk. Thus, distobuccal root is therefore, often removed as part of root resection in maxillary molars<sup>6</sup>. Radiographs and clinical examinations are used to assess the extent of the furcation involvement, the amount of attachment loss, the morphology and proximity of the roots, the ability to perform endodontic therapy, the proximity of anatomical structures, and the existence of caries or root resorption.

However, there are few disadvantages associated with it. As with any surgical procedure, it can cause pain and anxiety. Root surfaces that are reshaped by odontoplasty are more susceptible to caries. Failure of endodontic therapy due to any reason will cause failure of the procedure<sup>7</sup>. In addition, when the tooth has lost part of its root support, it will require a restoration to permit it to function independently or to serve as an abutment for a restoration or prosthesis. Unfortunately, a restoration can contribute to periodontal destruction, if the

margins are defective or if non-occlusal surfaces do not have physiologic form.

Root resection may be performed on vital or endodontically treated teeth. It is preferable, however, to have pulp extirpation precede the resection. This facilitates the performance of the endodontic obturation, allows the endodontist to determine whether the canals can be adequately instrumented and also ensures clinical feasibility for the procedure<sup>8</sup>. If this is not possible, then the pulp should be removed, the patency of the canals determined, and the pulp chamber medicated before resection therefore, contamination of the pulp chamber by oral fluids does not occur. In addition, performing endodontic treatment before a root resection may minimize the potential for postoperative pain<sup>9</sup>. It is quite distressing to perform a vital root resection and to subsequently have an untoward event occur such as perforation, fracture of the root, or an inability to instrument the canal. In these situations, endodontic treatment should be completed soon after the root resection to avoid pulpal complications<sup>9,10</sup>. The only potential contraindication to completing endodontics before root resection may be a possible adverse effect on regeneration of the periodontal attachment. Currently, there are no evidence-based studies that preclude regeneration attempts on devitalized teeth.

The prognosis for root separation or resection is the same as for routine dental procedures provided that case selection has been performed correctly and the restoration

is of an acceptable design relative to the occlusal and periodontal needs of the patient. Root separation and resection should be considered as other treatment options by the dental surgeons, determined to retain and not remove the natural teeth. Also, medically compromised patients may benefit from the maintenance of existing roots, avoiding multiple reconstructive surgical procedures.

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**Legends**

1. Pre-operative radiograph.
2. Sectioning of the distobuccal root.
3. After resection of root.
4. Resected root segment
5. Post-operative radiograph.





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