

## Restoration of a grossly carious tooth with furcation involvement: A case report

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### Abstract

This case report describes successful management of a grossly mutilated mandibular molar tooth. A 25 year old male patient came complaining of continuous pain with sensitivity to hot and cold and also food impaction in relation to lower back tooth since 1 year. IOPA revealed a grossly mutilated mandibular right second molar with furcation involvement. Endodontic treatment was performed with proper isolation using rubber dam. After complete removal of carious lesion, biomechanical preparation and obturation, core build up was done using coremax. Hemisection was then carried out where the mesial and the distal roots were separated leaving the furcation area open as it was not possible to seal the furcation area and keep it self cleansing without separating the two roots. A cast post (custom made post) was planned and placed over the distal root then individual crowns were fabricated on both the roots in the shape of premolars. Proper oral hygiene maintenance instructions were explained to the patient. The patient was observed at 3 months and 6 months intervals. Radiographically no pathology nor any signs of resorption were observed and clinically the gingival tissues were healthy.

**Key words:** Grossly mutilated mandibular molar tooth, Post endodontic restoration, Cast post, Core max

### Introduction

All the teeth that have undergone root canal therapy will require some form of restoration to enable them to function again. Because endodontic treatment removes the vital contents of the canal, it subsequently leads to reduction in elasticity, dessication and increases brittleness of remaining tooth structure. The objective is to return them to full occlusal and cosmetic function<sup>1,2,3</sup>.

It is the manipulation of the pulp chamber that leads to the greatest weakness of a treated tooth. The roof of the pulp chamber has the configuration of an arch, which extremely resists pressure and stress. When the roof of the pulp chamber is removed for endodontic access, the inherent resistance of the treated tooth is greatly reduced. This weakening leads to the need for strong interior as well as exterior support that is achieved by post core system. Often due to mechanical reasons, the prepared tooth is reinforced by post core systems<sup>4,5</sup>.

A post is a dental material placed in the root of a structurally insufficient tooth when additional retention is needed to retain the core and coronal restoration<sup>6</sup>.

The post should provide this support without increasing the risk of root fracture. The core itself is a dental restoration commonly made of composite resin used to build up missing tooth structure, usually for future restoration with a crown. It is worth noting that the post itself does not strengthen or reinforce the tooth; the inherent strength of the tooth and its resistance to fracture comes from the remaining tooth structure and the surrounding alveolar bone<sup>7</sup>.

Custom cast tapered post and core procedure has been the traditional way to restore endodontically treated teeth, however the use of prefabricated post has become increasingly popular and easy to manipulate<sup>8,9</sup>.

Current researchers recommend consideration of necessity of post placement before reconstruction of an endodontically treated teeth. Several in vitro studies support the opinion that preservation of tooth structure is one of the most important variables in successful restoration of endodontically treated teeth<sup>10</sup>.

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Previously a preferable treatment for the badly broken down endodontically treated tooth was the removal of the offending tooth but now with recent advances and improved techniques it has become possible to preserve a tooth which is structurally compromised.

The predominant opinion today is that a post & core should be used to increase the retention for the fixed prosthetic reconstruction and not for reinforcement<sup>11</sup>.

This article presents a case report on the prosthetic treatment outcome of structurally compromised tooth.

### Case report

A 25 year old male patient came to the department of Endodontics complaining of continuous pain with sensitivity to hot and cold and also food impaction in relation to mandibular right molar region since 1 year. IOPA revealed a grossly mutilated mandibular right second molar with furcation involvement.

Clinically the crown was grossly decayed. Radiographically the root portion of the tooth seemed healthy with no signs of resorption. After complete examination, it was planned to save the tooth. The whole procedure was thoroughly explained to the patient and with the patient consent, the restorative treatment was started.

The carious lesion was removed and with proper isolation using rubber dam complete biomechanical preparation and obturation was done. The core build up was then

done using core max as a core building material.

Following the root canal treatment the tooth was sectioned into two halves through the furcation area splitting the mesial and the distal roots. The furcation area was thoroughly cleaned and subgingival curettage was performed. A periodontal dressing was placed and the patient was recalled after one week.

After the gingival tissues were healthy, restorative treatment was carried out. The mesial root had sufficient tooth structure for the placement of a crown however the distal root did not have sufficient tooth structure to retain the cast crown, therefore a cast post in the distal root was planned. Once the fabricated cast post was cemented onto the distal canal, crown preparation was performed on both the roots. Two separate porcelain fused to metal premolar shaped crowns were fabricated, and proper contact in centric and eccentric occlusion was achieved for proper function.

The patient was properly informed about the oral hygiene measures like the use of interdental tooth brushes and a dental floss to keep the treated area clean.

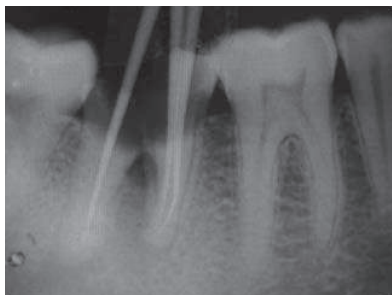
The patient was recalled after 1 month for follow up. No signs of inflammation or any periapical changes were evident and the teeth was working fine. The patient was then observed at 3 months and 6 months intervals. Radiographic evaluation showed that there were no signs of periapical changes and the tooth and the surroundings tissues were healthy.



Preoperative Radiograph



Preoperative Photograph



Master cone X-Ray



Core build up done



Splitting of roots



Subgingival curettage



Cast post cemented



Crowns cemented

### Discussion

Success of root resection procedures depend, to a large extent, on proper case selection. It is important to consider the following factors before deciding to undertake any of the resection procedures.

- Advanced bone loss around one root with acceptable level of bone around the remaining roots.
- Angulation and position of the tooth in the arch. A molar that is buccally, lingually, mesially or distally tilted, can not be resected.
- Divergence of the roots - teeth with divergent roots are easier to resect. Closely approximated or fused roots are poor candidates.

Hemisection has been used successfully to retain teeth with furcation involvement. However, there are few disadvantages associated with it. As with any surgical procedure, such procedures can cause pain and anxiety. Root surfaces that are reshaped by grinding in the furcation or at the site of hemisection are more susceptible to caries. Often a favorable result may be negated by decay after treatment. Failure of endodontic therapy due to any reason will cause failure of the procedure. 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 splint or bridge.

Unfortunately, a restoration can contribute to periodontal destruction, if the margins are defective or if non-occlusal surfaces do not have physiologic form. Also, an improperly shaped occlusal contact area may convert acceptable forces into destructive forces and predispose the tooth to trauma from occlusion and ultimate failure of hemisection.

Post-treated teeth show periapical infections more frequently than just endodontically treated teeth. Avoiding microleakage during post canal preparation, provisional restoration, and post cementation has a positive effect on the life of both the post-treated tooth and prosthetic reconstruction.

Bacteria and endotoxins from the saliva can penetrate unsealed full-sized root canal fillings. The longer the exposure time to saliva, the greater is the risk of microleakage. The shorter the root filling, the greater also is the risk of microleakage. The seal is thus markedly compromised by a post preparation, after which only a small volume of obturating material remains as a barrier against penetration of microorganisms and toxins. This causes a dilemma for the operator, who often needs a long retentive post. An absolute minimum of 3 mm remaining gutta percha has been suggested, but the less remaining obturating material, the more the post space should be regarded as an unsealed root canal.

Technical failures on fixed prosthodontics are often caused by fatigue fractures. The abutments, cement, and reconstruction are all subject to fluctuating stress/strain caused by occlusal loads. Cyclic deformation during function may cause formation and propagation of a crack at the weakest point or where the maximum stress occurs. Horizontal occlusal forces accelerate the process, and occlusal design of the prosthesis is a decisive factor in avoiding technical failures on abutments and reconstructions. Favorable occlusal prosthesis design is probably far more important for survival of structurally compromised endodontically treated teeth than is the type of post used.

With recent refinements in endodontics, periodontics and restorative dentistry, hemisection has received acceptance as a conservative and dependable dental treatment and teeth so treated have endured the demands of function.

The literature points to nonaxial forces as a risk for fatigue fracture of teeth, cement, and restorative material. Favorable occlusal prosthesis design is probably more important for survival of structurally compromised endodontically treated teeth than is the type of post used.

## Conclusion

It can be stated that though the prognosis of restoration of badly broken down endodontically treated tooth/teeth is not so good and a lot depends initially on the amount of tooth structure available and the extent of the lesion, however with recent advances in techniques and materials it is possible to bring a tooth in normal working condition, thus preventing unwanted loss of tooth/teeth.

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