CASE REPORT

# The influence of coronoradicular amputation on the shape of the subsequent prosthetic restoration

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**Abstract**

The patient's desire to preserve their natural dentition is increasing constantly; therefore, nowadays dentists have to treat teeth that once would have been extracted. Using endodontics, periodontics and restorative dentistry techniques, we can maintain these teeth on the arches in whole or in part and they can be used as independent units of mastication or as abutments in simple fixed bridges. This article describes a procedure of modifying the form and shape of the prosthetic restoration of a maxillar molar after a crown and root amputation.

***Keywords*:** coronoradicular amputation, modified shape, prosthetic restoration.

## Introduction

The term tooth resection represents the excision and removal of any segment of a pluriradicular tooth, usually a root with or without the accompanying crown part. This is a technique for maintaining a part of a diseased or injured molar by removing one or two of its roots. The surgical procedure is simple: the crown is sectioned, and then the root is separated and extracted for being removed. The necrotic and infected tissues must be eliminated by careful curettage. The surface of the section must be plain and smoothened. After the healing, the tooth is restored with an artificial crown, which must preserve the periodontal and biomechanical qualities.

## Patient, Methods and Results

Patient F.T., male, 26-year-old, came to the office accusing pain and discomfort in the 25–26 area. The clinical and X-ray examination showed a broken filling on 25 and an inappropriate endodontic treatment on 26, which leaded to an apical periodontal involvement displayed like a radiotransparent lesion in the mesio-buccal root area (Figure 1). On clinical examination, the molar was sensitive to percussion, without mobility. On probing the area, we found a 5 mm periodontal pocket around the mesio-buccal root. The other two roots of this molar were not affected. The furcation area was not involved.

The patient wanted to keep 26 if possible, but not with a hopeless prognosis. The most convenient solution seemed to be the tooth resection followed by keeping a part of the tooth using a modified prosthetic restoration that would improve the likelihood of long-term success.

Due to the major decay destruction, on 25 was performed an endodontic treatment and after that this tooth was restored with a post and a temporary crown. For 26, the root to be removed being clearly indicated, the endodontic re-treatment was performed for all three roots before amputation. After the working length was determined, the canals were mechanically prepared using step-back technique and rinsed with plenty of antiseptic substances. The canals were obturated with a material containing calcium hydroxide and with a gutta-percha cone. The endodontic re-treatment was made to be sure that the bacteria would not leak in and further contaminate the remaining roots.

Under local anesthesia, the crown was sectioned with a carbide bur, and then the mesio-buccal root was separated and extracted. Using curets, we removed all the chronic inflammatory tissue and we irrigated the socket with sterile saline solution. The extraction site was sutured with 3/0 black silk sutures.

Because the roots were not fused and the endodontic retreatment was successfully performed on the other two roots of this molar, the amputation of the compromised root did not present any problem. After the primary healing period, we expected four month and made a new X-ray examination, which showed the complete recovery of the bone in the mesio-buccal root area (Figure 2).

We began the prosthetic restoration of 26 by fabricating a post in order to restore the missing part of the tooth crown (Figure 3). The post must have a modified shape to accommodate the new contours of the collar perimeter (Figure 4). The two remaining roots were divergent, so the post was made from two pieces,

which matched perfectly on the tooth; after its cementation, 25 and 26 were filled with a special care for parallelism. For a better prognosis of 26, we decided to make the two porcelain-fused-to-metal crowns (on 25 and 26) united. This will prevent the food to reach the space between the teeth and also will assure a better resistance and force distribution on remaining roots of the molar.

**Figure 1 –** ***Initial X-ray showing a radiolucent lesion in the mesio-buccal root area of 26.***

**Figure 2–** ***Complete healing of the bone after a 4-month period.***

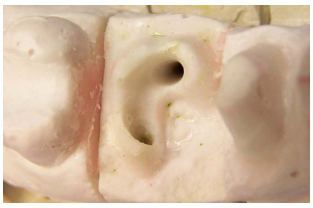

**Figure 3 –** ***Modified form of the remaining crown of the molar.***

**Figure 4 –** ***Modified shape of the post made on 26.***

After taking the final impression, we asked the technician to modify the shape of the molar's porcelain crown, on the gingival face, and make it look like a pontic in the missing mesio-buccal root area (Figure 5). This part was slightly inclined toward the center of the tooth to help self-cleaning and avoid food accumulation in the area. For a good long-term gingival adaptation, it is crucial to expect the complete healing and stabilization of the gingival and bony structures.

The margins of the crowns were carefully contoured to avoid further periodontal destruction. The patient was given detailed instructions on how to clean the modified restoration gingival area using the dental superfloss. All the other parts of the artificial crowns were completely restoring the physiological form and function of 25 and 26 (Figure 6). The occlusal forces are well directed and distributed to both of the teeth, the premolar and the molar. We accurately checked the static and dynamic occlusion in order to avoid any possibility of trauma which can cause the failure of the treatment. Making the two crowns together will assure one abutment on each side of the amputated root, which is the most reliable prosthetic solution for the long-term success of the restoration, considering that the two crowns united will function as a bridge.

After a 4-year period, the patient's new X-ray shows no sign of periodontal disease and the complete recovery of the bone (Figure 7). The patient was carefully maintaining a very good oral hygiene (Figure 8); therefore, the prognosis of the prosthetic restoration is still optimistic after this period of time.

**Figure 5 –** ***Modified form of the molar's porcelain crown, on the gingival face.***

**Figure 6 –** ***Final prosthetic restoration in the mouth.***

**Figure 7 –** ***Patient's X-ray after 4-year period shows the complete recovery of the bone.***

**Figure 8 –** ***After four years, the patient's hygiene is still perfect assuring a good prognosis for the prosthetic restoration.***

## Discussion

The tooth resection is a technique of removing a root of a pluriradicular tooth (with or without a part of its crown) that may be useful in many situations [1, 2]. The prosthetic restoration of this tooth must be done in a manner that respects its biomechanical function and its periodontal tissues [3, 4]. The endodontic treatment or re-treatment will be performed on all the roots before the amputation is done [5, 6]. During the endodontic treatment, it is important to rinse the canals with plenty of antiseptic substances [7, 8] in order to prevent the infection to contaminate the remaining roots and the periodontal space [9, 10]. The prosthetic treatment begins after the primary healing period with a post and a provisional acrylic crown [11, 12], but the final crown is made only after the bone and soft tissues contours are completely stabilized.

The amputation of a compromised root is a technique with restricted indications if the roots are fused and/or we are confronted with the inability to perform an accurate endodontic treatment on the remaining canals [13–15]. For the success of the final prosthetic treatment, the X-ray examination must show a complete recovery of the bone after a few month period [16–18] and the crown must respect the healed, stabilized contours of the gingival tissues [19–21]. The margins of the crown must be carefully evidenced on the final impression and the technician has to respect them in order to prevent further destruction. The gingival face of the crown will be contoured in such manner that will prevent the food accumulation. The patient has to respect the general oral hygiene and additionally clean this area.

The selection of such teeth depends on the status of the molar and its relationships with other teeth, also as

on the age of the patient and his desire to keep the natural dentition. The success of coronoradicular amputation depends much on proper case selection. There must be an acceptable level of bone around the remaining roots. The position of the tooth on the arch must be as normal as possible: the tooth should not be inclined or tilted. The roots must be divergent, not fused. The possibility to perform an endodontic re-treatment on the remaining roots is mandatory. The shape and design of the fixed prosthetic restoration must be modified keeping in mind the transmission of the occlusal pressures and the health of the periodontal tissues.

## Conclusions

The coronoradicular amputation is a good solution to maintain the natural teeth of the patient for a longer period of time, provided by patient's understanding and agreement to increase the oral hygiene at least in the sectioned tooth area. The procedure is used to preserve as much tooth structure as possible rather than sacrificing the whole tooth. This conservative treatment is to be considered as a viable alternative to tooth extraction and offers the patient a choice to keep the teeth longer on the arches.

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