

Surgical endodontic treatment of a maxillary molar with sinus lift : A case report

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Abstract

The relation between the roots of the maxillary molars and premolars and the sinus has been studied by different authors. The roots of the maxillary first and second molars are in intimate relation to the floor of the maxillary sinus in 40% of cases. During periapical surgery of the maxillary molars and premolars, it is possible to find the same complications as in any apicoectomy, including, for example, damage to a neighbouring tooth. The specific considerations applicable to these teeth are: Careful aperture of the maxillary sinus wall or floor, avoidance of sinus membrane perforation and care in preventing the introduction of foreign bodies within the maxillary sinus. Surgical endodontic success rates have dramatically improved over the years with the development of newer retrofilling materials and the use of the ultrasonic preparation. A clinical case of apical surgery on a maxillary molar through the maxillary sinus is presented.

Key words: Maxillary first molar, Periapical surgery, Maxillary sinus

Introduction

Apicoectomy is a well known surgical procedure used when conservative endodontic treatment has failed to retain natural teeth. Endodontic surgery in anterior teeth is usually carried out without hesitation, whereas in posterior regions, endodontic surgery is not preferred because of the extremely close relationship between the apices of the premolar and especially the molar teeth and the floor of the maxillary sinus in the maxilla and inferior alveolar nerve in the mandible[1,2]. Pathological exposure of the sinus floor predisposes many surgical endodontic procedures to maxillary sinus communication [3].

A clinical case of apical surgery using a sinus lift procedure and retrofilling with MTA (Mineral Trioxide Aggregate) on a maxillary molar through the maxillary sinus is presented.

Case report

A 30 year old male patient with sporadic swelling in the right maxillary region (Figure 1-a) and tenderness to



Figure 1(a): Preoperative clinical picture of 16 with intraoral swelling



Figure 1(b): Pre-operative radiograph of 16.

percussion of the maxillary first molar was referred to an Advanced Dental Care Center. Past dental history revealed discontinued endodontic treatment 1 year back. The intraoral radiograph revealed radiolucent periapical lesion involving the three roots of the maxillary first molar and the proximity of the mesiobuccal root apex to the sinus membrane (Figure 1-b).

The temporary restoration was removed, the canals were cleaned and shaped. Calcium hydroxide was placed in to the canals and the tooth was sealed with temporary filling material.

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One month after the initial visit, he still complained of intermittent sensitivity on biting, for which endodontic surgery was undertaken.

After the removal of calcium hydroxide by copious irrigation with 5% sodium hypochlorite and normal saline, all the canals were filled with guttapercha and zinc oxide eugenol sealer by lateral condensation. The tooth was temporarily restored with zinc oxide eugenol.

Anesthesia was performed with buccal and palatal infiltration of 2% lidocaine and 1:80,000 adrenaline over the apices of the maxillary first molar and adjacent teeth involving the surgical site. A full thickness flap was raised with a scalpel blade to create a triangular flap. After retraction of the flap, the buccal bone was assessed. No perforation of the cortical plate was seen. The position of the apices was estimated and the bone was removed with an ISO size 18 sterile bur (in a straight handpiece) with copious sterile saline using light brush strokes. The granulation tissue was curetted and osteotomy was prepared (Figure 1-c) and 3 mm of root apex was resected for mesiobuccal and distobuccal roots. During the granulation tissue removal of the mesiobuccal root the schneiderian membrane was revealed and sinus lift was performed to avoid penetration in the surgical steps to follow (Figure 1-d). The exposed tissues were moistened with sterile saline throughout the surgical procedure to avoid dehydration of the bone and soft tissues.



Figure 1(c): Clinical picture of osteotomy.

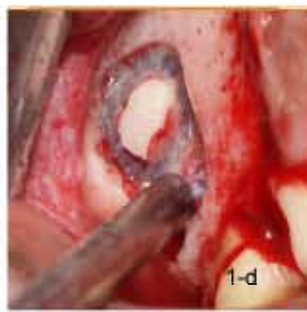


Figure 1(d): Clinical picture showing lining of maxillary sinus

Later full thickness flap was raised on the palatal aspect and secured with a sling suture. The root end of the palatal root was resected. The root end preparation of all the three roots was carried out with ultrasonic powered tips in a P5 unit to a depth of 3 mm. All three preparations were undertaken using copious amounts of coolant of sterile saline. The root end was dried and MTA was placed with a flat plastic instrument and packed into place

with microplugger. The flap was repositioned and sutured with 5-0 silk suture (Figure 2-a). A postoperative radiograph was taken (Figure 2-b). The patient returned one week later for suture removal with no post operative pain. Healing was uneventful. The patient was examined



Figure 2(a): Clinical picture after suturing



Figure 2(b): Immediate post operative radiograph showing MTA retrofilling.

clinically and radiographically at 3 and 9 month recall visits. Periapical healing around roots was observed radiographically at the 9 month recall (Figure 2-c). The tooth was restored with full metal crown (Figure 2-d).

Discussion



Figure 2(c): Periapical radiograph showing healing at 9 month recall visit.



Figure 2(d): Clinical picture of 16 restored with full metal crown.

Periradicular surgery might be the treatment of choice in cases with an unsuccessful outcome of the primary root canal therapy of non surgical retreatment[4]. Periradicular surgery aims at removal of disease in periapical tissues and sealing of apical root canal system in order to facilitate the regeneration of hard and soft tissues including the formation of a new attachment apparatus[5].

Periapical surgery of maxillary molar is technically more difficult to perform than on other teeth, because of anatomical reasons. Complications are potentially more serious in comparison to surgery in other regions. In view

of these complications, surgical endodontics for maxillary molars should be performed by experts.

After apicoectomy there will often be sinus mucosal thickening and signs of sinusitis that may either be attributed to the introduction of foreign material in the sinus at the time of endodontic surgery of a maxillary molar[6]. It is thus of great importance that a meticulous technique be used to ensure that foreign material or the resected root apex does not enter the sinus[7]. Barnes suggested cutting through the bone and approaching the root from the front and below and never from above[8].

The palatal roots of maxilla molar pose a special problem during endodontic surgical procedures. These roots are 50% closer to the sinus than they are to the palate, show apical communication with the sinus, 20% of the time and are less than 0.5 mm from the sinus, 40% of the time[9, 10].

A major concern with any palatal flap is its reapproximation and reattachment following surgery. The pooling of blood between the flap tissue and the bone may cause gravitational sag with ischemia and sloughing[11].

An advantage of surgical techniques utilizing ultrasonics is that the size of the osteotomy can be reduced to about 3-4 mm in diameter. A smaller osteotomy results in faster healing and less postoperative pain and swelling[12,13]. This ultrasonic technique eliminates the large bevel that is required with traditional techniques for areas with rotary burs.

The complex root canal morphology of the mesiobuccal root is an important consideration for apical surgery of the maxillary molar tooth. Degerness and Bowles examined the anatomic determination of the mesiobuccal root resection level in maxillary molars and found that 80% of lateral canals were eliminated when a 3.64 mm resection was performed[14].

MTA has been suggested as the more appropriate root end filling material as *in vivo* studies have shown that MTA has bio-inductive properties in relation to bone, dentin and cementum regeneration[15-17]. Chong et al reported a success rate of 92% in a prospective study using MTA as a root end filling material[18].

If apicoectomy of posterior teeth is performed adequately, the operative procedure on molars can offer the result and prognosis which is similar to procedures on anterior teeth. It is reported that the success rates vary between 75% and 90%[19].

Conclusion

For successful surgical management, an astute knowledge of the regional anatomy and surgical technique is mandatory.

Ultrasonic retropreparation and MTA as a root end filling material are associated with improved outcome which is almost similar to orthograde treatment. Endodontic surgery cannot replace nonsurgical root canal treatment, however, when indicated, it is a treatment modality that can enhance the outcome.

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