

A Sectioning Technique for Extraction of Impacted Third Molar by Using a Straight Handpiece and Carbide Bur: Case Report

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Abstract

Extraction of the lower third molar is one of the most common procedures performed in oral surgery. In general, impacted tooth extraction involves sectioning the tooth's crown and roots. In order to divide the impacted tooth so that it can be extracted, high-speed air turbine drills are frequently used. However, complications related to air turbine drills may occur. In this report, we propose an alternative tooth sectioning method that obviates the need for air turbine drill use by using a low-speed straight handpiece and carbide bur. A 21-year-old female patient presented to the institute's dental hospital complaining of symptoms localized to the left lower third molar tooth that were suggestive of impaction. After physical examination, tooth extraction of the impacted left lower third molar was proposed and the patient consented to the procedure. The crown was divided using a conventional straight low-speed handpiece and carbide bur. This carbide bur can easily cut through the enamel of crown. On post-operative day number five, suture was removed and the wound was extremely clear. This technique could minimise intra-operative time and reduce the morbidity associated with air turbine drill assisted lower third molar extraction.

Keywords

Carbide Bur, Low-Speed Straight Handpiece, Impacted Third Molar Extraction

1. Introduction

Extraction of the lower third molar is one of the most common procedures performed in oral and maxillofacial

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surgery [1]-[3]. Surgical procedures should be planned and executed according to scientific evidence. There is a highly significant correlation between the level of difficulty for surgical removal of lower third molars and postoperative complications [4]. In general, once the mucoperiosteal flap is raised, tooth sectioning is required. Historically, for cases in which tooth sectioning was considered difficult to execute, buccal bone removal would be necessary in order for the surgeon to visualize the impacted tooth's crown or roots; doing so would facilitate tooth sectioning in an upwards direction. Bone removal and tooth sectioning can delay post-operative healing following extraction of an impacted lower third molar and cause an increased risk of postoperative complications [4] [5]. The use of high-speed air turbine during this procedure can conduct intense heat to the bone resulting in serious complications, such as osteomyelitis [6]. Furthermore, because tooth sectioning can be a time consuming process, the intense heat generated by air turbine can cause thermal damage to tissues surrounding the impacted tooth as well. Additionally, the onset of post-procedural emphysema following the use of a high-speed airturbine dental drill has been reported [7]. Therefore, using air turbine can lead to, at least indirectly, significant postoperative complications. An alternative and more conservative approach is to forego the use of air turbine and instead use a fissure bur powered by a low-speed handpiece [8]. However, a fissure bur has lower cutting force than a carbide bur; in fact, the cutting force of a fissure bur is too low to cut through relatively hard tissue planes encountered in the impacted tooth, including enamel. To solve such problems, we propose a novel tooth sectioning method by using a low-speed straight hand piece and carbide bur.

2. Case Report

A 21-year-old female patient presented to the institute's dental hospital complaining of morbidity in the left third molar tooth. She was diagnosed with chronic pericoronitis and informed that her mandibular third molar was impacted. Thereafter, the treatment options were explained to the patient, including the risks versus the benefits of surgically removing her impacted tooth. Following this discussion, the patient consented to proceed with surgical extraction of the impacted tooth. Tooth angulation can be a precise indicator for the prophylactic removal of partially erupted mandibular third molars [5]; the greater the degree of angulation of the third molar, the more difficult it is to remove. A current best practice for the surgical extraction of an impacted wisdom tooth is to first remove the crown portion in order to subsequently section and remove the root portion. The vertical incision was made at the mesial aspect of the buccal second molar (**Figure 1**). This was followed by adequate elevation of the mucoperiosteal flap. The alveolar bone overlying the crown was shaved to a groove with a round bur ensuring only minimal bony loss. This groove served as a guide for the carbide bur used for sectioning the tooth. Then, the crown was divided using a conventional straight handpiece and carbide bur (E 0138 ISO 016 USA 702, 44.5 mm, Dentsplymailefer, Switzerland) (**Figure 2**). This carbide bur can easily cut through the enamel of crown (**Figure 3**). Where possible, the crown was cut in one direction; where not possible, sectioning was approached from the opposite direction in order to achieve crown removal. Following crown removal, the extraction socket required thorough irrigation and mechanical debridement with a curette in order to prevent debris such as chips of crown, other bony fragments, and granulation tissue including dental sac from persisting



Figure 1. The incision line. A three cornered flap is made.



Figure 2. Carbide fissure bur.



Figure 3. Crown division of impacted tooth by means of a conventional straight hand piece and carbide fissure bur.

within the extraction socket (**Figure 4**). The rationale for when to irrigate and mechanically debride the extraction socket in this case was twofold. First, younger patients like the one presented typically have only few granulation tissues around third molar roots; second, were the socket to be cleaned after extraction of the roots, the process would become complicated by apical bleeding. Once the extraction socket was cleaned, the roots were removed (**Figure 5**). Sutures were placed solely on the alveolar bone beside the second molar (**Figure 6**). On post-operative day number five, suture was removed and the wound was found to be extremely clear. Now in post-operative year number three, the patient complains of none of the pre-operative morbidity with which she originally presented.

3. Discussion

Tooth sectioning is a crucial step for successful extraction of a lower third molar. Estimating when the removal of a third molar may be more difficult than normal is a constant challenge for surgeons [5]. From the diagnostic point of view, cases that are estimated to be difficult in the pre-operative phase often go on to demonstrate tooth sectioning in the intra-operative phase that is more difficult than normal. The problems of sectioning are mainly rooted in the position or inclination of molars; therefore, the assessment of the amount of buccal bone required to be removed and the method of tooth sectioning are essential to the post-operative prognosis [9].

The present technique has several advantages over using high-speed air turbine drills. First, this procedure can divide the tooth in minimum time due to high torque; therefore, it minimises postoperative pain and swelling.



Figure 4. Extraction socket.



Figure 5. Removed tooth.

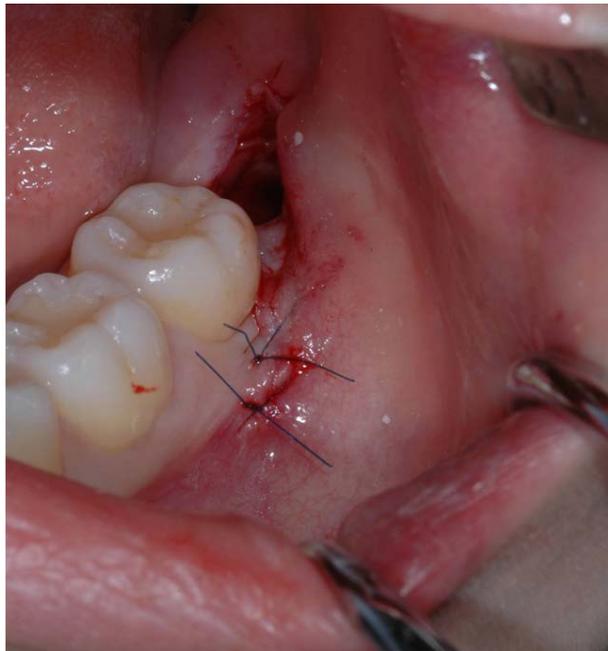


Figure 6. 5-0 nylon suture.

Second, complications associated with the turbine bur could be avoided. On the other hand, limitations of this procedure include an increased risk of overcutting the alveolar bone because of difficulty experienced in distinguishing bone from tooth, which is thought to be due to the high torque employed. This can lead to certain post-operative complications, such as neurological complications localized to the lingual and inferior alveolar nerves due to drilling injury. Therefore, when employing the present technique, the authors recommend sectioning the crown or roots into small pieces in order to reduce the risk of such complications. The recommended approach also allows for the amount of buccal bone removed to be less than that when approached via air turbine drill. Furthermore, unlike the air turbine approach, the present technique makes possible minimally invasive small tooth segment extraction. In contrast, the turbine bur is known to impose operability difficulties which limit its ability to achieve similar minimally invasive small tooth segment extraction. In the present case, the vertical incision was made at the mesial aspect of the buccal second molar. This is clinically significant because primary wound healing in the post-operative phase following lower third molar surgery is influenced considerably by intra-operative flapdesign [10]. The basic approach of third molar extraction is, initially, a distal mucoperiosteal incision on the alveolar bone over the third molar [10] [11]. The traditional rationale for flap design has been that the incision should be made over intact bone that will persist in the post-operative phase. The alveolar bone under the flap area in our technique, however, is removed for tooth sectioning. As a result, the need to realign bone under the flap post-operatively is obviated. Therefore, realignment of bone beneath the flap in the post-operative phase is unnecessary. Taken together, our procedure offers the following advantages: minimal flap healing; minimal buccal bone removal; and finally, minimal post-operative pain, swelling and complications.

4. Conclusion

We believe that this sectioning method is a quick and easy approach for the extraction of a lower third molar tooth. In conclusion, using a straight low-speed handpiece and carbide bur could minimise intra-operative time and reduce post-operative complications and morbidity.

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