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Case Report

Prevention of Iatrogenic Mandibular Fracture Associated with Deeply Impacted Tooth Removal–Report of Two Borderline Cases

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Abstract

Iatrogenic fracture of the mandible occurring either immediately or after the removal of impacted teeth is a rare condition but it can occur as a severe complication of oral surgery. Most reports regarding these fractures connect it to the removal of third molars; however mandibular fracture can occur in association with any impacted tooth. The clinician should be aware of the predisposing factors and should take preventive measures to reduce the risk for this serious complication.

This case report presents the prevention of mandibular fracture in two cases of deeply impacted tooth removal and their follow up after the surgery. The first case presents the removal of deeply impacted infected third molar and the second case presents the removal of complex odontoma in the right mandibular angle region involving the impacted second molar. In both cases miniplates were used to prevent mandibular fracture.

Keywords: Iatrogenic fracture; Tooth removal; Prevention

Introduction

Removal of impacted tooth is the most common procedure in oral surgery and this procedure can be accompanied by variety of complications [1]. Immediate or late fracture of mandible are among the severe and also the major complication associated with difficult surgical extractions in the lower arch with a reported incidence ranging from 0.0034% to 0.0075%. Mandibular fracture after the removal of deeply impacted tooth is reported to be highly associated with the removal of third molar [1-6]. In many cases it was advocated that surgeon's role and surgical approach is primarily important. Before surgery, clinician has to inform the patient about the possible risks of the procedure. Moreover, potential complications of surgical removal must be weighed against the potential benefits before surgery therefore, it was recommended for surgeons to consider all preventive measures carefully [2,7].

The presented cases report the importance of prophylactic plating to avoid iatrogenic mandibular fracture in patients with deeply impacted tooth.

Case Presentation

Case I

A 43 year old female was referred to the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry. She complained of a recurrent "toothache" of the right lower molar area. She was healthy with no history of any systemic disorders. Presence of deeply impacted third molar that was surrounded by a well-circumscribed radiolucency was observed during radiographic examination (Figure 1).

The patient was informed about the treatment options and the possible complications of the surgical treatment. An informed consent form was signed to the patient and removal of the impacted teeth and prophylactic plating was planned owing to the insufficient distance between the apex of the tooth and inferior border of the mandible. Surgery was performed under local anesthesia. A trapezium-shaped buccal full thickness flap was first carried out from the canine

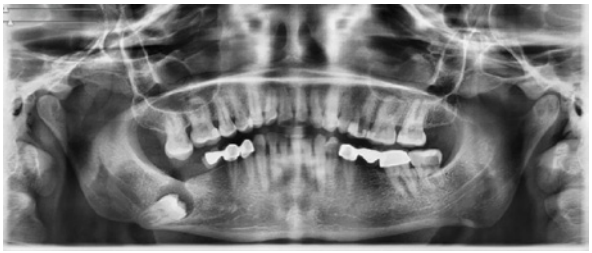

Figure 1: Preoperative radiograph of deeply impacted third molar that was surrounded by a well- circumscribed radiolucency.

Figure 2: Impacted third molar was exposed and removed carefully.

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Figure 3: Final plate stabilization after removal of the tooth .

Figure 4: Postoperative radiograph of the patient to check the location of the miniplates.

Figure 5: Postoperative panoramic radiograph after 6 months revealed successful osseous healing.

to the mandibular ramus to allow surgical accession. Following buccal osteotomy, impacted third molar was extracted carefully with enucleation of the lesion (Figure 2). A straight titanium 2-0 mm miniplate (Synthes GmbH, Switzerland) with 6 holes was pre-modeled and adapted to the buccal cortical bone. After adaptation of the plate, 4 holes were created in the bone in the mesiodistal direction. Miniplate was then fixed with four 10 mm screws in the prepared holes (Figure 3). Postoperative panaromic radiograph was taken to check the location of the miniplate (Figure 4). The enucleated material was sent for histopathologic examination which later confirmed to be a dentigerous cyst. The patient was recalled for postoperative clinical examination with frequent intervals. Postoperative panoramic radiograph after 6 months revealed successful osseous healing (Figure 5).

Case II

A 21 year old healthy female patient presented with a complaint of swelling in the right lower jaw region was referred to the Department of Oral and Maxillofacial Surgery, Faculty of Dentistry. A panoramic radiograph revealed the presence of a radiopaque mass surrounded by a thin radiolucent line that involves a deeply impacted second molar tooth (Figure 6).

Figure 6: Preoperative radiograph of the second case revealed the presence of a radioopaque mass surrounded by a thin radiolucent line that involves a deeply impacted second molar.

Figure 7: The pathological mass was sectioned to minimize the bone removal.

Figure 8: The mass was completely enucleated with extraction of impacted second molar.

After the patient signed an informed consent form, removal of the lesion and impacted molar was planned. The mass was completely enucleated by sectioning to minimize the bone removal and impacted second molar was extracted (Figure 7, Figure 8). A straight titanium 2-0 mm miniplate (Synthes GmbH, Switzerland) with 6 holes was pre-modeled and adapted to the buccal cortical bone. After adaptation of the plate, 4 holes were created in the bone (2 holes at the mesial and 2 holes at the distal end of the plate) in the mesio-distal direction. Miniplate was then fixed with four 10 mm screws in the prepared holes (Figure 9). Immediate postoperative panoramic radiograph was taken to check the location of the miniplate (Figure 10). Following the surgery, enucleated cyst material was sent for histopathologic examination and the examination confirmed the diagnosis of complex odontoma. Patient was scheduled for routine controls frequently.

Figure 9: Intraorally view of the adaptation of the miniplates.

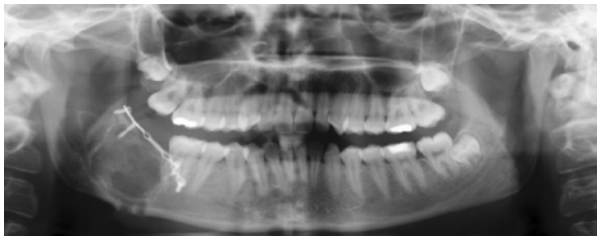

Figure 10: Immediate postoperative panoramic radiograph of the second case to check the location of the miniplates.

Figure 11: Postoperative panoramic radiograph after 6 months showed no complication.

After 6 months, the radiologic examination showed no complication (Figure 11).

Discussion

Fracture of mandible related with the removal of impacted tooth is a rare condition but it can occur as a severe complication during or after the surgery [1,2]. The reasons for this undesirable complication are multi-factorial that can be associated with age, gender, deep inclusion, tooth ankylosis, anatomic abnormalities, pathologic processes, systemic diseases related to bone metabolism and iatrogenic factors [1-3,8].

In older age group, reduced bone elasticity, bone atrophy, risk of osteoporosis and potential of tooth ankylosis weakens the mandible so higher rate of fracture might be expected. Another factor affecting the occurrence of fractures was reported to be the sex of the patient. Men are reported to have a greater risk of mandibular fracture due to increased masticatory forces and increased risk of trauma [1,3]. Accordingly; pathologic processes such as a large cyst or a tumor may easily diminish the strength of bone [2].

Deep inclusion is one of the major factors that identify the difficulty of the surgery [2,7]. Surgical removal of deeply impacted tooth in the lower arch may impair the strength of mandible because of the volume of bone that needs to be removed in order to extract the tooth [1,9]. Although factors causing postoperative fractures were clearly documented, there are many contradictory opinions. Such as, Al-Belasy et al. claimed that masticatory forces do not affect late mandibular fracture [10]. Fuselier et al. advocated that the degree of impaction is also not related to an increase in the risk of mandibular fracture [11]. Despite all the different opinions, if there is a predisposing factor for mandibular fracture, all preventive measures should be considered before the surgery.

To prevent intra-operative mandibular fractures caused by difficult surgical extractions; bone removal should be minimized by sectioning the tooth, correct instrumentation should be used and the clinician should avoid uncontrolled excessive force [1,4]. In the second case reported here, the mass was sectioned to minimize bone removal. Additionally, prophylactic use of miniplates during the surgery was recommended to be a good method to prevent postoperative fractures. The use of miniplates to treat the fracture of jaws is largely documented but there are few case reports about its use in prevention of fractures [4,12,13].

When preoperative radiograph of the impacted tooth showed that the tooth was deeply impacted and there was an insufficient distance between the apex of the tooth and inferior border of the mandible; preventive measures should be considered before the surgery [2,9]. In the both cases presented in this report; there was an insufficient distance between the impacted tooth and the inferior border of the mandible. Accordingly, both cases had a higher possibility of mandibular fracture due to greater volume of bone removal and weaking of the mandible. Therefore; prophylactic plating was preferred to prevent possible complication.

Sencimen et al. recommended sagittal split osteotomy technique in a deeply positioned lower third molar as a safe treatment procedure. This technique provides wide access to the operative field and decreases bone loss thus prevents a possible jaw fracture [7]. On the contarary, Pippi et al. reported a case in which deeply impacted third molar extraction was performed and a titanium miniplate was used to prevent possible mandibular fracture. They propose that; if wide inflammatory or cystic mandibular bone destruction with lingual cortical involvement was associated with deep tooth impaction due to the necessity of buccal ostectomy, the use of a miniplate is highly recommended to avoid postoperative fractures [4]. Further with the use of miniplates a rigid internal fixation was obtained and all forces like tension, compression, torsion and shearing can be neutralized. Accordingly immediate function of mandible can be utilized without any complications [14].

Conclusion

The cases presented in this report describe the prevention of mandibular fracture by using titanium miniplates. Radiographic examination of the both cases revealed deep impaction associated with pathological lesions. In both cases pathological lesions had weakened the alveolar bone and extensive bone removal was done during surgery. In both cases, titanium miniplates were preferred after

surgical removal of the teeth to prevent late mandibular fractures. Besides the advantages; the need for a second operation to remove the miniplates is a disadvantage of this procedure. Filling the bone cavities by using bone graft materials is not considered as a preventive treatment so no graft material used as filler in the presented cases. The patients were followed up for 6 months and no complications were encountered either during or after the surgery.

The role of surgeon is very important for the planning and implementation of surgical treatment of deeply impacted teeth. Clinical and radiological evaluation should be done meticulously and preventive measures must be taken in patients identified as having high risk of mandibular fracture.

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