

Iatrogenic mandibular fracture associated with third molar removal. Can it be prevented ?

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ABSTRACT

Removal of third molars is the most common procedure in oral surgery. It may be associated with complications, such as sensory damage , dry socket, infection and iatrogenic damage.

A case of mandibular angle fracture during third molar extraction in a 37-year-old female is reported. Literature review on the possible etiologies and ways of prevention were recorded. The reason is believed to be multifactorial and include: age, gender, degree of impaction, relative volume of the tooth in the jaw, preexisting infection or bone lesions, failure to maintain a soft diet in the early postoperative period and the surgical technique. It is possible to reduce the risk of this complication by adoption of preventive measures.

Key words: Dental extraction, complication, mandible, iatrogenic fracture

INTRODUCTION

The removal of third molars is one of the most common oral surgery procedures and it may be associated with several complications (1-4). The more common complications following mandibular third molar surgery include : sensory nerve damage, dry socket, infection, hemorrhage and pain. Less common complications are : severe trismus, iatrogenic damage to the adjacent second molar and iatrogenic mandibular fracture. The rate of iatrogenic mandibular fractures following lower third molar surgery has been shown to be about 0.0046% - 0.0075% (Table 1). Male patients over 40 years of age with a full dentition are considered to be at a higher risk for mandibular fracture (5-9). The immediate mandibular fracture is very uncommon and is about 1/3 of the total extraction related mandibular fractures. A case of mandibular angle fracture during third molar extraction in a 37 year old female is reported. The possible risk indicators and ways of prevention are discussed.

Table 1 . Reported incidence of pathological fracture of the mandible following third molar extraction.

Author	Incidence (%)
Alling & Alling	0.0075
Libersa et al	0.0049
Perry & Goldberg	0.0046

CASE REPORT

A 37-year-old female was referred to the Soroka University Medical Center following extraction of a wisdom tooth in a public dental clinic. She reported undergoing a difficult surgery to remove the left mandibular third molar under local anesthesia , by a general dental practitioner with low

level of surgical experience (Fig 1). At the end of three hours of "torture", that included mild osteotomy and the use of an elevator, a crack sound was heard and the tooth was released. Panoramic radiograph (Fig 2) demonstrated a radiolucent line from the bottom of the socket toward the lower border of the mandible, compatible with a fracture line. Paresthesia of the left lower lip was noticed. Orthodontic brackets on the molars and premolars had been placed for intermaxillary fixation, in normal occlusion, using elastic bands. Immediate postoperative panoramic radiograph and CT scan (Not shown) demonstrated fairly good approximation of the fracture line and no further treatment was provided. Normal sensation of the left inferior alveolar nerve was reported two weeks post surgery. The intermaxillary fixation was released 6 weeks postoperatively, and the patient was restricted to soft diet for another 4 weeks. Panoramic radiograph taken 2,3 and 6 months post surgery revealed continuous bone formation at the socket and the fracture line.



Fig. 1. Preoperative panoramic radiograph. The left mandibular third molar is a fully impacted, vertical, with two curved roots, with close proximity to mandibular canal and with a mild enlargement of the follicular space.



Fig. 2. Immediate postoperative panoramic radiograph. Two radiolucent lines can be seen going from the socket toward the inferior border of the left mandible, compatible with a fracture of the angle of the mandible.

DISCUSSION

Fracture of the angle of the mandible associated with third molar removal is a rare complication. The incidence is reported to range from 0.0046% to 0.0075% (7,9,10). It may occur, either operatively, as an immediate complication during surgery or postoperatively as a late complication, usually within the first 4 weeks post surgery. The true incidence of postoperative mandibular fractures as a result of the extraction is difficult to establish, as there are reports on postoperative traumatic mandibular fractures that could have happened with an intact mandible, and the occurrence of the two conditions may be just a coincidence (11,12).

The reason for this severe complication is believed to be multifactorial and include: age, gender, degree of impaction, relative volume of the tooth in the jaw, preexisting infection or bone lesions, failure to maintain a soft diet in the early postoperative period and the surgical technique.

Weakening of the mandible as a result of decrease in its bone elasticity during aging may be the cause of the higher incidence of fractures reported among patients over 40 years of age at the time of surgery. Also, ankylosis of the impacted tooth among older patients, may complicate tooth removal and weaken the mandible, as more extensive osteotomy may be needed (6). Sectioning of the tooth is highly recommended in order to reduce the amount of bone removal.

The effect of gender may be related to biting force. Patients having full dentition, are able to produce peak levels of biting forces, that are transmitted to the weak mandible during mastication and consequently the risk of fracture is high, regardless of gender. Males, usually show higher levels of biting force as compared to females (13), therefore males are more prone to mandibular fractures, following surgical extraction.

The degree of tooth impaction is also an important factor. Fully impacted teeth will have higher incidence of mandibular fracture, presumably due to the greater volume of bone necessary to be removed during the surgery, weakening the mandible.

The relative space occupied by the third molar out of the bucco-lingual area of the mandible is also an important factor. This ratio can be assessed on a preoperative CT with bucco-lingual reconstruction program. This technique is routinely used for evaluation of the proximity between an impacted tooth and the adjacent anatomic structure, such as mandibular canal, maxillary sinus, prior to the extraction (14). It is recommended to extend it to evaluate the relative tooth volume. If the ratio is 50% and above, the risk is high and special care is recommended during the surgical procedure.

Preexisting bone lesions, such as periodontal disease, cysts or recurrent pericoronitis, may also weaken the mandible and further predispose to fracture. All of these were more frequently found among patients 40 years of age or older. (15).

The immediate operative iatrogenic fracture, may occur with improper instrumentation and uncontrolled excessive force transmission to the mandibular bone. It is more likely

to occur with young or less experienced professionals, as in the present case.

The postoperative or late fractures usually occur during the second or third postoperative week, and are probably as a result of high level of biting forces during mastication, when the patient was feeling better. A cracking noise reported by the patient should alert to a possible fracture, even if initially the fracture is radiologically undetectable.

The side of the mandibular fracture, either right or left, is not mentioned in most of the reports. Wagner et al (9) noticed a significant prevalence of fractures on the left side of the patient (70%) over the right side. This was explained by better visualization and control of the applied force by the surgeon on the right side of the patient as compared to the left side.

CONCLUSION

There is a higher rate of late pathologic mandibular fractures in males over 40 years of age, having full dentition, following removal of a bony impacted wisdom tooth, that necessitates extensive bone removal. The left side of the patient is at higher risk for immediate fracture. It is possible to reduce the risk of this complication by adoption of preventive measures.

The following preventive measures are recommended:

- Informing the patient at risk about the possibility of fracture.
- Preoperative assessment of the relative volume of the mandible occupied by the tooth, using a CT of the mandible with a bucco-lingual reconstruction program.
- Necessary bone removal should be conservative during removal of a mandibular wisdom tooth. Tooth sectioning is highly recommended.
- A cracking noise reported by the patient should alert to a possible fracture, even if initially the fracture is radiologically undetectable.
- Special care should be given when surgery is on the left side regarding visualization and force application.
- Restriction of the patient to soft diet up to 4 weeks postoperatively.

REFERENCES

1. Renton T, Smeeton N, McGurk M. Factors predictive of difficulty of mandibular third molar surgery. *Brit Dent J* 2001;190:607-10
2. Benediktsdottir IS, Wenzel A, Peterson JK, Hintze H. Mandibular third molar removal: Risk indicators for extended operation time, postoperative pain and complication. *Oral Surg Oral Med Oral Pathol Oral Radiol Endodod* 2004;97:438-46
3. Chaparro-Avendano AV, Perez-Garcia S, Valmaseda-Castellon E, Berini-Aytes L, Gay-Escoda C. Morbidity of third molar extraction in patients between 12 and 18 years of age. *Med Oral Pathol Oral Cir Bucal* 2005;10:422-31
4. Vascoceles BC, Bessa-Nogueira RV, Maurette PE, Carneiro SC. Facial nerve paralysis after impacted lower third molar surgery: a literature review and case report. *Med Oral Pathol Oral Cir Bucal* 2006;11:E175-8
5. Iizuka T, Tanner S, Berthold H. Mandibular fractures following third molar extraction. A retrospective clinical and radiological study. *Int J Oral Maxillofac Surg* 1997;26:338-43.
6. Krimmel M, Reinert S. Mandibular fracture after third molar removal. *J Oral Maxillofac Surg* 2000;58:1110-2.

7. Perry PA, Goldberg MH. Late mandibular fracture after third molar surgery: a survey of connecticut oral and maxillofacial surgeons. *J Oral Maxillofac Surg* 2000;58:858-61.
8. Libersa P, Roze D, Cachart T, Libersa JC. Immediate and late mandibular fractures after third molar removal. *J Oral Maxillofac Surg* 2002;60:163-5.
9. Wagner KW, Otten JE, Schoen R, Schmelzeisen R. Pathological mandibular fractures following third molar removal. *Int J Oral Maxillofac Surg* 2005;34:722-6.
10. Alling CC, Alling RD. Indications for management of impacted teeth. In: Alling CC, Helfrick JF, Alling RD, eds: *Impacted Teeth*. Philadelphia: W.S. Saunders; 1993. p. 46-64.
11. De Carvalho AC, Sanches MG, Saad Neto M, deCarvalho PS. Mandibular fracture during tooth extraction. *Rev Assoc Paul Cir Dent* 1977;31:91-4.
12. Dunstan SP, Sugar AW. Fractures after removal of wisdom teeth. *Brit J Oral Maxillofac Surg* 1997;35:396-7.
13. Miyaura K, Matsuka Y, Morita M, Yamashita A, Watanabe T. Comparison of biting forces in different age and sex groups: a study of biting efficiency with mobile and non-mobile teeth. *J Oral Rehabil* 1999;26:223-7.
14. Bodner L, Sarnat H, Bar-Ziv J, Kaffe I. Computed tomography in the management of impacted teeth in children. *J Dent Child* 1994;61:370-7.
15. Lysell L, Rohlin M. A study of indications used for removal of the mandibular third molar. *Int J Oral Maxillofac Surg* 1988;17:161-4.