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

Yitzhak Woldenberg 1, Inbar Gatot 2, Lipa Bodner 3

(1) Senior staff member
(2) Resident
(3) Associate Professor and Head. Department of Oral and Maxillofacial Surgery, Soroka University Medical Center and Ben Gurion University of the Negev, Beer-Sheva, Israel

Correspondence:
Prof. Lipa Bodner,
Department of Oral and Maxillofacial Surgery,
Soroka University Medical Center,
P.O. Box 151,
Beer-Sheva 84101, Israel.
E-mail: lbodner@bgu.ac.il

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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. The immediate mandibular angle fracture during third molar extraction in 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.

<table>
<thead>
<tr>
<th>Author</th>
<th>Incidence (%)</th>
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<tbody>
<tr>
<td>Alling &amp; Alling</td>
<td>0.0075</td>
</tr>
<tr>
<td>Libersa et al</td>
<td>0.0049</td>
</tr>
<tr>
<td>Perry &amp; Goldberg</td>
<td>0.0046</td>
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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. Ortho-
dontic 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 treat-
ment was provided. Normal sensation of the left inferior
alveolar nerve was reported two weeks post surgery. The
intermaxillary fixation was released 6 weeks postoperative-
ly, 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.

**DISCUSSION**

Fracture of the angle of the mandible associated with third
tooth extraction is a rare complication. The incidence is re-
ported 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 inci-
dence 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 sever 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 recommen-
ded 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 fac-
tor. 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, weake-
ning 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


