

# Mandibular Fracture During Mandibular Third Molar Extraction

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## Abstract

Pre-operative planning for the extraction of mandibular third molars is of fundamental importance, particularly in patients over the age of 40 years, in whom osteotomies and odontotomies procedures must be included to prevent mandibular fractures. Conservative treatment of the mandibular fracture has advantages and disadvantages, and can present excellent results when well indicated and performed. The main aim of this article is to relate a case of fracture of the mandibular angle in a 40-year old patient, as a result of third molar extraction on the right side. The patient had two fracture lines favourable to reduction, reported feeling a difference in dental occlusion and was treated with intermaxillary fixation with an Erich bar for 45 days. The follow-up shows complete bone consolidation of the fracture traces after four years.

Authors contributed equally.

## INTRODUCTION

Surgeries for third molar extractions are common procedures in dental offices and are the most frequent procedures in oral surgery.<sup>1</sup> The prophylactic removal of third molars is based on the concept of minimizing future risks of disease and surgical morbidity in older patients; this concept is questionable.<sup>2,3,4</sup>

There are various indications for extraction, such as: prevention of pericoronaritis, this being the most frequent indication; prevention of caries in the third molar or in the distal region of the second molar; prevention of second molar root reabsorption; prevention of odontogenic cyst and tumour formation; and prevention of mandibular fractures.

5,6,7,8,9

Pell and Gregory's classification helps to evidence possible difficulties in the procedures, and is used by the majority of surgeons, although there is little predictability of the difficulty of extraction by using this classification.<sup>10</sup>

Analyzing the predictability of the degree of difficulty in the extraction of mandibular third molars by the Pedersen scale, the authors did not obtain results of the true difficulty, perhaps because the classification of Pell and Gregory and the Pedersen scale do not take the radicular anatomy into account.<sup>11</sup> Another classification of the degree of surgical

difficulty was proposed taking into account the depth, relationship with the mandibular ramus and radicular anatomy, with the result of having better predictability with this new index than with the Pedersen scale. Even with good planning for the extraction procedure, the dental surgeon must be prepared for the accidents and complications that could occur.<sup>12</sup>

Although it is considered minor oral surgery, the ideal is to perform the procedure with the patient lightly sedated and with local anaesthesia, and in some cases with general anaesthesia. Third molar surgeries generally have some type of post-operative morbidity such as pain and oedema. Some complications that may occur are lesions to nerves, particularly to the inferior alveolar and lingual nerves, which could be permanent.<sup>13,14</sup>

Other accidents and complications that could occur are periodontal pocket formations in the distal region of the second molar,<sup>15,16</sup> mandibular fractures,<sup>17,18,19</sup> oroantral communication, displacement of the third molar into the maxillary sinus,<sup>4,20</sup> and infra-temporal fossa.<sup>21</sup> Reports of mandibular third molar displacements into other areas are rare, but they could cause serious complications.<sup>20,22,23,24</sup> Other precautions that should be taken are to avoid swallowing and aspiration of teeth.<sup>25</sup> Clinicians generally underestimate the health, economic and social implications that could cause these complications and accidents.<sup>5</sup>

A study with 3.760 patients aged 25 years or over, in which 8.333 third molars were removed, alveolar osteitis was the most frequent post-operative problem found (up to 12.7%). Anaesthesia/paresthesia of the inferior alveolar nerve occurred at a frequency of up to 1.7%, while frequency of anaesthesia/paresthesia of the lingual nerve was 0.3%. All the other complications occurred with a frequency of less than 1%.<sup>26</sup>

The factors associated with the complications include the following: age; gender; medications being used, such as antibiotics, corticosteroids, or oral contraceptives; smoking; previous infections; periodontitis; precarious oral hygiene; the surgeon's experience; difficulty of the extraction; time of surgery; inadequate irrigation; number of teeth extracted; and the aesthetic technique.<sup>27,28</sup>

### CASE REPORT

The patient, a white man, aged 40 years and 8 months, had the right mandibular third molar extracted, and reported hearing a snapping sound during the procedure for removing the impacted tooth. According to the dentist's report, the surgical procedure for extraction was performed with the aid of levers, and no osteotomy and odontotomy procedures were performed. After the tooth extraction procedure, the patient reported feeling a difference in dental occlusion. The dentist referred the patient to the Oral Surgeon, on 08/16/04, with suspected mandibular fracture. When evaluating the initial radiograph, the tooth was in position 2B of the Pell and Gregory's classification (Figure 1).

#### Figure 1

Figure 1: Position 2B of tooth 48, according to the Pell & Gregory Classification.



The panoramic radiograph after the tooth extraction confirmed the fracture. There were two fracture lines favourable to reduction, with small displacement anterior to the right mandibular angle (Figure 2).

#### Figure 2

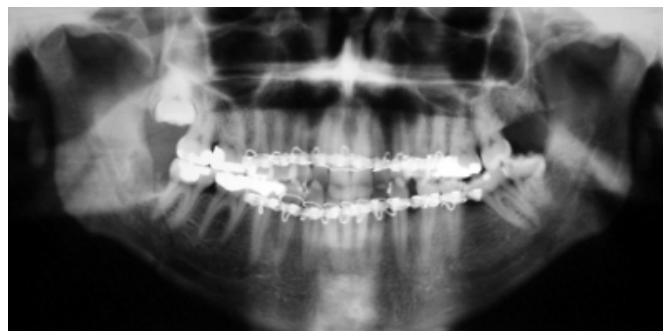
Figure 2: Favourable traces of the fracture in the region of the right mandibular angle.



After clinical and radiographic evaluation, the option was for conservative treatment by means of intermaxillary fixation with ties and Erich bars for 45 days (Figure 3). The procedure was performed with light sedation with 7.5 mg midazolam taken orally and local blocking anaesthesia with 2% mepivacaine and epinephrine 1:100.000. Figure 4 shows complete bone consolidation of the fracture traces after four years.

#### Figure 3

Figure 3: Intermaxillary fixation after 45 days one notes the development of bone repair.



#### Figure 4

Figure 4: Complete consolidation of the fracture traces after four years post-operatively.



### DISCUSSION

The presence of the mandibular third molar increases the risk of fracture of the mandibular angle and facial traumatism. It also depends on the position of the third molar and the space it occupies.<sup>29</sup> A study composed of 1210 patients, demonstrated that in patients with the presence of the mandibular third molar, the chance of fractures occurring in the mandibular angle increases over 2 fold in comparison with patients that do not present third molars. This is an indication for preventing this type of fracture, although the surgical procedure for the removal of the third molar could cause fracture if it were not well planned and excessive force were used.<sup>30</sup> In a study the authors found results of an increase in the risk of fractures of the mandibular angle when third molars were present, however, they found no relationship with deeper impactions (IIC and IIIC) and increase in the risk of fractures.<sup>9</sup> In the related case, the right mandibular third molar (48) was in position 2B.

A rate of 43% of fractures was found in the mandibular angle, and in these fractures, 97% were associated with the presence of third mandibular molars.<sup>31</sup>

A study analyzed 17 cases of mandibular fracture caused by mandibular third molar extractions. The data demonstrated a more significant number of fractures that required bone removal for extraction, in men over the age of 40 years. Fourteen fractures occurred in the post-operative period and 6 were not radiographically visible in the primary investigations, which is why the noise of fracture related by the patient is the most important indication of fracture. The authors recommended a light diet for 4 weeks in cases in which the patients fit in with the factors of great risk.<sup>19</sup> In the present case report, the patient was 40 years old at the time of the accident, and patients over the age of 25 years presented greater risks of complication in the removal of third molars.<sup>32</sup>

Six patients who had suffered fractures of the mandible after third molar extractions were evaluated. The fractures occurred within a mean period of 14 days post-operatively, and the patients were aged between 42 and 50 years and had complete dentition. The factors of more advanced age and complete dentition appear to be more important than the degree of impaction.<sup>18</sup>

Previously, in a similar report, 12 patients were treated for 13 mandibular fractures that occurred as a result of removing third molars. Only one fracture occurred during surgery, and

the authors emphasized that the noise of fracture observed by the patient is important in the diagnosis, and normally occurs in the post-operative period while the patient is eating. Sometimes several radiographs are required for defining the diagnosis.<sup>17</sup>

A research that included 84 oral and maxillofacial surgeons, observed that in an estimated number of 611.000 impacted third molar extractions, 28 late fractures of the mandible occurred; the incidence was 0.0046%. Of these patients, 6 were women and 22 were men. No fractures occurred in patients under the age of 20 years; from 20 to 25 years of age, 6 fractures; from 26 to 35 years of age, 8 fractures; from 36 to 45 years of age 7 fractures; and from 45 to 60 years 7 fractures occurred. Eighteen out of the total number of fractures had a previous history of infection. Nineteen of the 28 fractures occurred between days 8 and 21 after surgery. Therefore, they concluded that mainly men over the age of 25 years should be informed about the possibility of mandibular fractures after the extraction of third molars, and also that they must follow a light diet in the first post-operative weeks.<sup>33</sup>

One hundred and fifty oral and maxillofacial surgeons observed that of an estimated number of 750.000 impacted third molar extractions, 37 fractures of the mandible occurred, and only 27 fractures were included in the study due to the loss of information about 10 cases. Seventeen fractures occurred in the transoperative and 10 in the post-operative period (between 13 and 21 days). Fifteen fractures occurred in men. In patients under the age of 20 years, two fractures occurred in the transoperative period; in patients from 20 to 25 years of age, two fractures occurred in the transoperative period; in patients from 26 to 35 years of age, 5 fractures occurred in the transoperative and 3 in the post-operative period; in patients from 36 to 45 years of age, 5 fractures occurred in the transoperative and 3 in the post-operative period; and in patients over 45 years of age, 3 fractures occurred in the transoperative and 4 in the post-operative period. The authors believed that one should encourage removal of the third molars before the age of 20 years, to avoid these accidents and complications.<sup>34</sup>

In an investigation of 100 patients, those who were hospitalized due to complications with third molars were 40 years of age or older. Out of the total number of complications, 80 were infections, 11 mandibular fractures, 3 nerve injuries, 5 tooth luxations, and 1 post-operative haemorrhage. One 77-year-old patient, in whom an attempt

to remove the mandibular left third molar with an infected pericoronal cyst under local anaesthesia, failed due to insufficient pain control. The surgical procedure was then performed under general anaesthesia. On the morning after surgery, the patient presented symptomatology of myocardial infarction. Suitable procedures for coronal revascularization were performed. On the twelfth post-operative day the patient presented collapse and vertigo, and fractured the mandible in the area of the osteotomy. Further surgery was performed under general anaesthesia for mandibular osteosynthesis. However, on the 20th day, the patient presented acute myocardial infarction due to secondary thrombosis in the stents, which was fatal.<sup>35</sup>

The majority of fractures occur in the groups over the age of 40 years, as has been shown in various studies.<sup>17,18,19</sup> This is probably due to factors such as, the onset of demineralization secondary to osteoporosis, debilitating the skeletal system, and the reduction in the size of the periodontal ligament with age. In the young, removal is facilitated by bone elasticity, in the majority of cases requiring smaller osteotomies.

In this case, one cannot fail to stress the importance of a well planned treatment, including osteotomies and odontosections. Lack of this treatment plan was evident, leading to the mandibular fracture.

In patients over the age of 25 years, and particularly over the age of 40 years, precautionary measures must be taken to avoid mandibular fractures. They must also be instructed to keep to a light diet in the first post-operative weeks.

In spite of the great technological advances in rigid internal fixation systems, conservative treatment performed by maxillomandibular blockage with Erich bars provides excellent results when well indicated.

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