Mandibular Fracture After Third Molar Removal

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Purpose: Mandibular fracture after impacted lower third molar removal is a rare, but major, complication. The factors leading to a mandibular fracture secondary to third molar removal are analyzed retrospectively.

Patients and Methods: Six patients who suffered from a mandibular fracture as a complication after third molar removal were examined clinically and radiographically.

Results: All fractures occurred an average of 14 days postoperatively. The patients were 42 to 50 years old and were all fully dentulous. All grades of tooth impaction were included.

Conclusions: The major risk factor for this complication seems to be advanced age in combination with a full dentition. The degree of tooth impaction is less important. Preexisting bone lesions weaken the mandible and further predispose to a fracture.

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Mandibular impacted third molar removal is associated with a variety of possible risks. Fracture of the tooth during surgical removal is common, and inferior alveolar or lingual nerve dysfunction can also occur. Mandibular fracture during or after surgical third molar removal, although a rare event, is a major complication.

Fracture of the mandible occurs when the strength of the bone and the forces acting on it do not match. The reduction of bony strength may be caused by physiologic atrophy, osteoporosis, pathologic processes (ie, cystic lesion, malignant lesion, inflammatory condition), or be secondary to surgical intervention. Acting forces leading to the fracture may consist of trauma or surgical tooth elevation with excessive power. The time of fracture can be intraoperative or postoperative.

There are only a few reports on the occurrence of fractures after third molar removal.¹⁻⁴ No valid data are available on the incidence of such fractures, and the risk factors are not clearly understood. This study analyzed the incidence and the predisposing factors for a fracture of the mandible secondary to lower third molar removal.

Patients and Methods

A total of 339 patients with a mandibular fracture were treated in the Department of Oral and Maxillofacial Surgery, University of Tübingen, Germany, from 1995 to 1998. The patients with a fracture secondary to lower third molar removal were selected, and their history, physical examination findings, radiologic evaluation, and course of treatment were assessed. In the same period, 917 lower third molars were surgically removed in the department. Six patients with mandibular fracture following impacted third molar removal were treated in the Department of Oral and Maxillofacial Surgery, University of Tübingen, between 1995 and 1998 (Table 1). Five were male and one was female, with a mean age of 45 years (range, 42 to 50 years).

Results

The left lower third molar was removed in 4 patients, the right lower third molar was removed in 1 patient, and in 1 patient the second and third molars on the right side were removed simultaneously. In 2 cases, the impacted tooth was removed at our institution. All third molars were fully impacted. Preoperatively, a follicular cyst surrounding the tooth was seen in one patient. In 2 cases, the adjoining second molar had a radicular cyst (Fig 1). All patients were fully dentulous.

According to the classification of Pell and Gregory,⁵ one third molar was completely out of the ascending ramus (Class I); the crown of the other 5 molars was partly in the ramus (Class II). The vertical impaction was Class B in 2 cases and Class C in 4 cases. Three teeth were in a mesioangular position, one was horizontal, and two were vertical.

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0278-2391/00/5810-0005\$3.00/0

doi:10.1053/joms.2000.9566

Table 1. CLINICAL AND RADIOLOGIC FINDING IN PATIENTS SUFFERING FROM MANDIBULAR FRACTURE SECONDARY TO IMPACTED LOWER THIRD MOLAR REMOVAL

Patient	Age/ Sex	Tooth	Dentition	Pathologic Bone Lesion	Tooth Location (Pell & Gregory ⁵)		Angulation	Impaction	Interval From Removal to Fracture	Symptoms	Displacement	
					AP	Vertical						
1	50/M	17	31 miss.	Radicular cyst	18	II	C	Mesioangular	Full bony	21 days	Crack, swelling	None
2	43/M	17	Full	Follicular cyst		II	C	Mesioangular	Full bony	10 days	Crack	None
3	42/M	17	Full	None		I	C	Mesioangular	Full bony	5 days	Pain	None
4	42/M	32	Full	None		II	B	Vertical	Full bony	5 days	Crack, pain	None
5	49/F	17	Full	None		II	C	Mesio-horizontal	Full bony	14 days	Crack	None
6	44/M	31/32	Full	Radicular cyst	31	II	B	Vertical	Full bony	28 days	Crack	None

None of the fractures occurred intraoperatively. Initial wound healing was undisturbed. None of the patients received maxillomandibular fixation for prophylactic immobilization. The mean interval from tooth removal to the fracture was 14 days (range, 5 to 28 days). All but 1 patient reported a cracking sound indicating the fracture episode. The remaining patient only noticed renewed pain. Radiologically, none of the fractures was displaced.

All fractures were reduced by intraoral open reduction and stabilized with rigid internal fixation. In 4 cases, the Champy principle was used, and in 2 cases the osteosynthesis involved use of bicortical screws. One patient treated according to the Champy principle suffered from a pseudarthrosis.

Discussion

The mandibular angle region with an impacted third molar is an area of lowered resistance to external forces. A high percentage of mandibular fractures are located there. Nevertheless, the incidence of mandibular fracture as a complication after third molar removal is low. Härtel et al² reported 1 fracture in 513 cases. Intraoperative jaw fractures are considered to happen as a result of improper instrumentation and application of undue force to the bone during tooth

removal. In contrast to previous reports,^{2,3} none of the fractures in this series occurred intraoperatively. Therefore, this complication cannot be explained on the basis of improper surgical force. All events happened postsurgically at home during normal life.

The age distribution in the 6 patients is surprising; they were all aged between 42 and 50 years. Considering that young adults normally undergo this procedure, it is even more notable. This observation has also been reported by other investigators.^{1,4} In this age-group, demineralization secondary to osteoporosis starts and weakens the skeletal system. At the same time, narrowing of the periodontal ligament increases with age. In comparison to young patients, the impacted tooth must be freed more extensively from the surrounding bone, and the jaw is further weakened. This knowledge should influence the decision to remove impacted third molars in the elderly patient. The elderly patient also should be informed about the increased risk of a mandibular fracture. Other factors that contribute to weakening of the mandible also may be present. In half of the patients, the mandible was already weakened preoperatively by cystic lesions.

Despite their age, all affected patients had a full dentition. It can be assumed that they applied maximal occlusal forces after initial wound healing and reduction in pain and swelling. Consequently, 5 of the 6 patients

FIGURE 1. Panoramic radiograph of patient 6, showing a nondisplaced mandibular fracture after lower third molar removal on the right side (arrow). Note the bone defect originating from a radicular cyst in the area of the right lower second molar.

reported hearing a characteristic cracking sound while eating. The minor trauma is probably responsible for the lack of displacement of the fragments in all cases.

The severity of anteroposterior tooth location did not seem to influence the predisposition for a fracture. None of the teeth were categorized as Class III according to the Pell and Gregory classification.⁵ However, the deeper the tooth was impacted vertically, the more likely that a fracture can occur. This is demonstrated by the 4 cases classified as Class C and the 2 cases classified as Class B.

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