Prevention of Mandibular Fractures Caused by Difficult Surgical Extractions: Report of a Borderline Case

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Intra- and postoperative mandibular fracture is one of the major complications associated with difficult surgical extractions in the lower arch.

Adult age, male gender, deep inclusion, tooth ankylosis, and associated cystic or other pathological lesions are usually considered predisposing factors of mandibular fracture related to surgery.

The aim of the present article was to report and discuss a case in which a miniplate was used to prevent such a serious complication.

Report of a Case

A 45-year-old man was seen in June 2006 at the Oral Surgery Unit in the Department of Odontostomatological Sciences of the “Sapienza” University of Rome because of pain of approximately 1 year’s duration in his left mandibular molar area.

The clinical inspection revealed a sinus tract located in keratinized gingiva mesially to the second molar, where a 15-mm pocket was probed.

The first molar was clinically absent, but the orthopantomographic examination revealed that it was impacted near the lower border of the mandible with a pericoronal osteolitic area that involved the second molar roots (Fig 1).

From the orthoradial scans of computed tomography (CT) with the Dentascan program (Siemens Rs Somaton Volume Zoom Kv 120 mA 140; Siemens, Erlangen, Germany), it was possible to reveal the following features (Fig 2): the lingual cortical plate was almost completely absent, the buccal cortical plate at the level of the first molar roots was extremely thin, and the inferior alveolar nerve occupied the lower border of the mandible running between and below the first molar roots.

The patient was not medically compromised because of allergies, medical pathologic conditions, or present drug therapies.

Surgery was performed under general anesthesia. A trapezium-shaped buccal full thickness flap was first carried out from the canine to the mandibular ramus to allow surgical access.

A straight titanium 2.0-mm miniplate with 8 holes (total length 4.5 cm; hole diameter 2 mm; profile thickness 1 mm; Biology of Metals Microfixation-Europe M: 01-9208) was then premodeled with an axial torsion to be adapted mesial to the buccal cortical bone in the canine area as well as distal to the anterior border of the mandibular ramus in the retromolar area.

The plate was adapted, 2 holes were created in the bone at the mesial end of the plate, in a buccal lingual direction, and 2 holes were created at the distal end of the plate, in a mesial-distal direction (Fig 3).

Once the mesial holes were made, the correct position of the posterior holes was achieved, stabilizing the anterior end of the plate with a screw inserted in the more mesial hole. The plate was then removed to allow the surgical extraction to be performed.

The second molar was then extracted after a careful inter-radicular separation, to limit pressure during luxative movements.

A complete exposure of the first molar crown was then performed to correctly divide the tooth. Sectioning allowed us to limit the breach width as well as the luxative movements to avoid nerve injuries. No follicular or cystic tissue was found and only a small amount of inflammatory tissue was found around the removed tooth, and it was therefore decided not to submit this to histological examination.

After the tooth was extracted, the premodeled miniplate was definitively fixed with four 11-mm screws, in the already-prepared holes (Fig 4), and the flap was finally sutured in its initial position.

An orthopantomography was suggested to the patient in the follow-up at 2 and 6 months (Figs 5-7). After another 6
months, the plate became recognizable by digital palpation, and it was therefore removed at the patient’s request. A radiograph was finally suggested to the patient at 1 year after plate removal, which was 2 years after the initial surgery (Fig 8).

**Discussion**

The use of miniplates to treat mandibular fractures is largely documented in the international literature.1-4 However, no cases are reported in which miniplates have been applied to prevent mandibular fracture in surgical extractions, although several cases of angle fracture are reported to appear during and after third molar surgery.5-11
No other teeth in addition to third molars are reported in the English literature to be involved in intra- and postoperative mandibular fractures. Mandibular fractures, however, can complicate other kinds of surgical interventions, such as cystectomy, in which pathological conditions have considerably reduced bone thickness.

In fact, pathological fractures have been reported to occur because of the presence of such conditions, mostly in the body of the mandible and during mastication.²

Although buccal and/or lingual corticals are involved early by inflammatory or cystic processes associated with impacted teeth, the lower border of the mandible is usually preserved; nevertheless, in such cases it can be involved because of the presence of the displaced impacted tooth as well as the inferior alveolar nerve, which is displaced downward by the impacted tooth or by the associated cyst.
When the lingual cortical is destroyed by the pathological process, as the buccal cortical has to be removed for surgical access, the risk of fracture is high during surgery, because of luxative movements, as well as after surgery, because of masticatory and other functional activities.

To limit the risk of intraoperative fractures, bone removal should be minimal, tooth sectioning should always be performed, and special attention should be paid when the surgeon operates on the opposite side of the mandible because of difficult visualization of the surgical area and worse surgeon position in applying luxative forces.10,11

To limit the risk of postoperative fractures, a miniplate can be applied near and alongside the alveolar crest on the buccal side of the mandible to avoid rotational movements of its mesial and distal portions.

Nevertheless a liquid diet for at least 3 weeks and a soft diet for at least 3 weeks after should be prescribed to the patient in the postoperative period.10,11

With respect to plate removal, it is usually not necessary; it is not performed on a routine basis but only when it is clinically indicated, primarily by infection or wound dehiscence and secondarily by patient request because of discomfort resulting from plate or screw superficialization.12-14

In conclusion, if a wide inflammatory or cystic mandibular bone destruction with lingual cortical involvement is associated with deep tooth impaction because of the necessary buccal ostectomy, the use of a miniplate is highly recommended to avoid postoperative fractures. Moreover, to allow the correct replacement of the fragments in cases of intraoperative fracture caused by the luxative movements for tooth removal, plate modeling and positioning should be made before the extraction is performed. Finally, preoperative informed consent from the patient must be obtained.

References
