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Le Fort II osteotomy for treating facial fractures: case report

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Abstract

Treatment of sequelae in oral and maxillofacial surgery, especially surgery involving the midface, is considered difficult. In this context, some surgical procedures may be helpful in obtaining better aesthetic and functional results. The present report documents the sequelae of a cheekbone fracture caused by a motorcycle accident, whose treatment involved a surgical strategy based on Le Fort II osteotomy. The objective of this case report was to discuss the use of Le Fort II osteotomy for the treatment of facial fracture sequelae.

Key words: *Bucomaxilofacial surgery; Le Fort II osteotomy; Facial fractures.*

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Introduction

The first clinical examination of a jaw fracture was documented in 2500 B.C. The first osteotomies for the treatment of maxillary disorders were described by Langenbeck in 1859. Subsequently, Le Fort published his classic study on the natural planes of jaw fracture in 1901. Le Fort I osteotomy to correct deformities in the midface was first performed in 1927, and this was followed by the improvement of various techniques in order to obtain better results [1].

Le Fort type II fractures are the ones involving the nasal bones, maxilla, palatine bones, lower two-third of the nasal septum, dentoalveolar region, and pterygoid plates. These have a pyramidal shape, continuing along the zygomaticomaxillary suture [1].

According to Manganello-Souza, Silva & Pacheco [2], zygoma fractures lead to a series of aesthetic and functional disorders. The zygoma has four processes that are weak points: temporal, orbital, maxillary, and frontal. Fractures occurred more than 30 days are considered sequelae and usually need bone osteotomies and grafts. It is important to investigate the presence of ocular dysfunction after total regression of edema. Enophthalmos, dystopia, or diplopia indicates open surgical treatment with orbital wall exploration [2]. Zygomaticomaxillary complex fractures are considered difficult to treat, and surgical failures are difficult to correct [3].

Case Report

The patient was a 42-year-old man who visited the Maxillofacial Surgery Service of the Dental School of the Federal University of Bahia in July 2013 with the chief complaints of inability to chew and numbness of the nose. The patient had a motorcycle accident on January 13, 2013, underwent neurologic surgery on January 16, 2013, and received two units of red blood cell transfusions. The patient denied having systemic disorders, drug allergies, and chronic use of medications.

A physical examination revealed facial asymmetry caused by the loss of the left malar projection, normal visual acuity, preserved eye and facial movements, a scar on the left eyebrow, saddle nose, bilateral nasal obstruction, crepitation on nasal bone manipulation, and occlusal dystopia (Figures 1 and 2). Imaging studies (computed tomography of the face) revealed signs suggestive of fractures in the nasal bone, nasal septum, bilateral zygomatic arch, bilateral orbital sidewalls, naso-orbital-ethmoid region, and bilateral zygomaticomaxillary pillars (Figure 3).

Fig. 1- Preoperative frontal view.

Fig. 2- Preoperative intraoral view.

Fig. 3- Preoperative imaging examination.

Therefore, we opted to perform surgery under general anesthesia with tracheal intubation, initially performing the fixation of the fracture in the frontozygomatic region by using a six-hole plate

of the 2.0 system via the superciliary access (Figure 4). We then used the intraoral maxillary approach and performed Le Fort II osteotomy with subsequent Erich arch bar installation and maxillomandibular blocking for ensuring adequate occlusion; fixation was performed using two L-shaped five-hole plates of the 2.0 system (Figure 5).

Figure 4: Extraoral trans-operative picture.

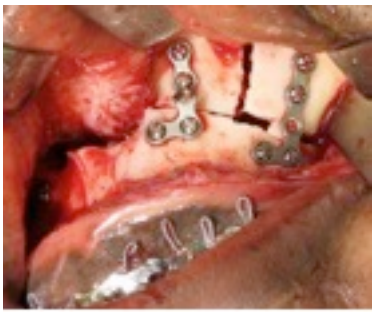

Figure 5: Intraoral trans-operative picture.

Forty-five days after the surgery, the patient showed stable occlusion, improved facial bone contours, and improved mouth opening (Figure 6 and 7). The postoperative images revealed that the material used for synthesis was in adequate position (Figure 8 and 9).

Figure 6- Postoperative frontal view.

Figure 7- Postoperative intraoral view.

Figure 8- Postoperative imaging examination.

Figure 9: Postoperative imaging examination.

Discussion

In the literature, there is controversy regarding the decision to use open or closed treatment for zygomatic fractures. Open reduction with rigid internal fixation provides greater security and stability, decreases the postoperative complication rate, and enables rapid resumption of daily living functions [2]. Semi-rigid fixation with steel wires is already indicated in cases with little displacement, those lacking comminuting or intermediate fragments, and those having bone instability and subsequent infection [4]. However, there is no consensus in the literature about the best technique for the treatment of zygomatic bone fractures [3]. In the present case, open treatment was indicated because the patient had a facial middle-third fracture sequela, requiring osteotomy and bone repositioning.

Some complications can occur because of the absence and/or inappropriate treatment of such facial fractures, e.g., facial asymmetry, occlusal dystopia, enophthalmos, hypophthalmos, persistent diplopia, deficits in visual acuity, and eye movement restrictions [5]. In this case, the patient sought our service 5 months after trauma. Facial asymmetry caused by the loss of projection of the fractured cheekbone, visual acuity, and ocular motility were preserved; good position of the eyeball was present; and occlusal dystopia was observed in the patient.

The time to the treatment of the lesion plays an important role in the choice of the treatment technique [6]. Fractures occurring up to 20 days show fibrosis formation. Lesions occurring more than 30 days later are considered sequelae, and these make the ideal correction difficult and require osteotomy, re-fracture, and the use of bone grafts [2, 3, 6, 7]. According to Carr and Mathog [8], fractures occurring between 21 days and 4 months should be treated with osteotomy, bone-fracture, and repositioning. Those occurring over 4 months later are best treated by masking with a graft. In the present case, because the patient had malocclusion, we chose to perform osteotomy to reposition the cheekbone and jaw despite the sequelae occurring 4 months after the initial injury. Although a graft would have solved the aesthetic zygoma defect, it could not have restored ideal jaw function.

Nowadays, with the evolution of reconstructive camouflage techniques (e.g., bone graft and/or alloplastic graft, fat grafting, or soft tissue flaps), repositioning of the facial skeleton through osteotomies is becoming a standard procedure. Much is known about Le Fort I and III osteotomies in the treatment of patients with dental and craniofacial deformities, but little is known about Le Fort II osteotomy. The latter is principally indicated in cases of three-dimensional movement of the maxillary-nasal-zygomatic complex in patients with syndromic nasomaxillary hypoplasia [9, 10].

Le Fort II osteotomy helps correct with both occlusal and middle-third facial deformities, while restoring oral function and facial aesthetics [9,11]. Lakin and Sawamoto [11] studied the indications for Le Fort II osteotomy over a 30-year period in Los Angeles, California, and found 8 syndromic patients (3 with Romberg's disease, 2 with hemifacial microsomy, 1 with unilateral coronal synostosis, and 2 with nasomaxillary hypoplasia). In the present case, the patient had a sequela of naso-maxillary-zygomatic fracture. It was necessary to perform a modified Le Fort II osteotomy to separate the zygoma from the jaw. The maxilla was ideally occluded via the installation of Erich bars and locks, and the jaw was not fractured. Then, the zygoma was repositioned and fixed.

According to some authors [9, 11, 12], the fixation for Le Fort II osteotomy can be performed on the canine and zygomatic pillars by using miniplates of the 1.5 and 2.0 system. The case reported here contributes much to the literature, because it involved fixation on the canine and zygomatic pillars, in addition to fronto-malar suture fixation.

Final considerations

Sequelae in oral and maxillofacial traumatology still constitute a challenge for the surgeon. Some factors must be taken into consideration when selecting the best technique for the treatment of these deformities. Le Fort II osteotomy was a clear indication in the clinical case in question, because it was necessary to simultaneously correct the patient's middle-third facial defect and occlusal dysfunction. The importance of this report lies in the fact that Le Fort II osteotomies have previously only been used for performing corrections in syndromic patients.

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