Naso-orbitoethmoid fractures: 37-year experience of the Craniofacial Surgery Service of the Hospital de Cajuru and Hospital do Trabalhador

ABSTRACT

Fractures of the naso-orbitoethmoid complex (NOE) remain one of the most challenging tasks in facial reconstruction and account for 2.1% of facial trauma cases. Clinical analyses of NOE fractures showed that they usually affect the telecanthus and cause deformities that would then require retropositioning of the nasal pyramid. Therefore, computed tomography is an essential technique for further assessment and to identify bone dislocations and fistulas. Treatment involves reconstruction of the intercanthal distance, nasal projection, and internal orbital structures.


RESUMO

A fratura do complexo nasoetmoideorbital (NEO) permanece como uma das tarefas mais desafiadoras no trauma facial. Corresponde a 2,1% dos casos de trauma de face. Achados clínicos clássicos das fraturas NEOs são telecanto e deformidade com retropositionamento da pirâmide nasal. O estudo com tomografia computadorizada é imprescindível para determinar detalhes e procurar localizar deslocamentos ósseos e fistulas. O tratamento é direcionado à reconstrução da relação intercantal, da projeção nasal e das estruturas internas da órbita.

INTRODUCTION

The diagnosis and treatment of fractures that affect the naso-orbitoethmoid complex (NOE) are challenging tasks in facial reconstruction and may lead to visible sequelae on the patient’s face if they are not appropriately performed.1-7. Figure 1 illustrates the experience of our institution based on 8,240 patients with facial fractures submitted to reconstruction surgery between January 1974 and December 2010 carried out by the first author. Of these patients, 416 (5%) presented with NOE fractures; however, only 170 (2.1%) had pure NOE. A total of 117 (1.4%) patients presented with frontobasal and naso-orbitoethmoid fractures, whereas 129 (1.6%) had complex facial fractures in which all the bones of the face were simultaneously fractured. Of the 170 patients with NOE fractures, 14.6% were women and 85.4% were men with an average age of 27.9 years (range, 16-85 years). No deaths due to the reconstruction of facial fractures were observed during the study.

Clinical analyses of the NOE fractures showed that they usually affected the telecanthus and caused deformities that required retropositioning of the nasal pyramid. In adults, the intercanthal distance is normally 30 mm (Figure 2). Due to displacement of the medial canthal ligament, the upper and lower eyelids in the telecanthus are laterally diverted - an effect that is then reflected in an increased intercanthal distance. NOE fractures include lesions of the nasal dorsum and may affect one or both jaws at the insertion site of the medial canthal ligament. A pseudohyperteloric appearance of the orbits is accentuated by flattening and widening of...
the bony dorsum of the nose. As a result, the eyes appear far apart (Figures 3 to 5)\(^1\)\(^9\).

**SURGICAL PROCEDURE**

The treatment of NOE fractures consists of the reconstruction of the displaced anatomical structures and may involve the use of bone grafts, cartilage, and/or alloplastic implants to fill the ethmoid bone displacements that cannot be properly reduced due to technical issues. Transnasal canthopexy facilitates the achievement of a balance between the canthal medial ligaments and an appropriate intercanthal distance. The bone attached to the medial canthal tendon or the tendon itself needs to be immobilized in its anatomical position using a transnasal wire according to the procedure described by Raveh, or with small titanium anchors if the bone is able to support it. The use of bone grafts obtained from the iliac crest, external skull, or rib is a routine procedure that is used to replace the orbital contents and recover the ocular projection and nasal pyramid (Figures 6 to 8)\(^10\)\(^11\).

Direct approaches (coronal, transpalpebral, superomedial, and transconjunctival) are preferred for ethmoid wall reconstruction, although the approach involving access through the wound is also used. The transnasal-orbital approach, wherein nasal endoscopy facilitates the extension of the access to the medial orbital wall, is difficult to perform due to the high incidence of iatrogenic injuries. Such injuries result from the difficult nature of accessing the lateral nasal wall to reach the compromised orbital region. Therefore, these surgical procedures may be used only in special cases. Cerebrospinal fluid fistulae at the cribriform plate are preferably treated with an endonasal technique, which has shown good results thus far.

Nasal pyramid fractures are normally reduced by digital manipulation with the occasional use of Asch forceps. It may be necessary to use microplates and screws to immobilize this type of fracture. Disjunction of the ethmoid and nasal septal cartilage is repaired using transnasal Kirschner wires.
supported by the anterior edge of the frontal process of the maxilla\textsuperscript{1,2,12,13} (Figure 9).

When inefficiently operated, nasal fractures may present with a higher incidence of late post-surgical deformities, which may be approximately 50%. According to the literature, this may be primarily due to deformities as well as septal fractures that were not identified before the reduction\textsuperscript{3}.

The sequelae are difficult to resolve. Orbital dystopias, nasal deformities, and sinusopathy are frequently observed\textsuperscript{1,2}.

REFERENCES


Correspondence to: Ivan Maluf Junior
Av. Silva Jardim, 2.833 – Água Verde – Curitiba, PR, Brazil – CEP 80240-040
E-mail: ivanmalufjr@yahoo.com.br