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reduction and fixation of the frontal bone, obliteration of the frontal sinus, and, consequently, reduction of the NOE complex, medial orbital wall, orbital roof, lateral orbital wall, and zygomatic arches by the same approach. The incidence of the most common complications is presented, and a therapeutic protocol and follow-up survey are proposed.

### **Middle- and high-energy midfacial fractures. Problems in the reconstruction of the outer facial frame**

J. C. Moreno Vázquez, A. Silván Glezz de Rivera, J. A. Ortiz Reina, G. Sánchez Aniceto, J. Montalvo

The current treatment of severe facial fractures, which is based on early anatomic open reduction and rigid fixation, does not always produce a perfect result in terms of adequate anteroposterior projection and increase in facial width. A retrospective study of the results obtained after surgical treatment during a 3-year period was made, and middle- and/or high-energy fractures in 133 patients were reviewed. The outcome assessment was made by clinical examination, plain films, and CT scans. The factors most common in poor results were association of orbital lateral wall comminution and zygomatic arch comminution, reduction with erroneous references as a result of preoperative misdiagnosis, association of mandibular condyle fractures and Le Fort-type fractures, delayed treatment, insufficient approach, and incorrect soft-tissue closure. In conclusion, current therapeutic principles in facial trauma require exact preoperative understanding of the fracture pattern, early wide exposure and mobilization of all fractures, anatomic reduction, and methodical fixation based on sound assessment.

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### **The coronal approach for treatment of craniomaxillofacial injuries and its morbidity**

A. Silván Glezz de Rivera, J. C. Moreno Vázquez, J. A. Ortiz Reina, M. Fernández Domínguez, G. Sánchez Aniceto

The coronal approach permits optimal access to the anterior part of the cranium, craniomaxillofacial skeleton, and orbit, in order to treat trauma and oncologic and reconstructive problems. This approach is based upon the fasciomyocutaneous flap, which relies on the anterior and parietal branches of the super-

facial temporal artery as well as the supra-orbital vessels. Motor innervation depends on the frontal branch of the facial nerve and sensory supply from the fifth nerve rami. This paper presents a clinicoepidemiologic study of the coronal approaches of the surgical procedures performed in our department, as well as of their indications and sequelae. A retrospective study of 38 patients was made over 3 years (1992-4) with a follow-up of 6 months to 3 years. Indications, scars, sensory and motor neurologic deficits, temporalis fossa depression, visual anomalies, and postoperative hematomas and infections were evaluated. We concluded that the coronal approach provides optimal exposure of the craniomaxillofacial skeleton. It is a safe technique with good cosmetic results, and, if applied with proper understanding of temporal and frontal anatomy, has few complications and sequelae.

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### **Post-traumatic orbitozygomatic deformities: a complex reconstructive problem** R. Monteverdi, E. Sesenna, M. Raffaini

The disfiguring enophthalmos caused by orbitozygomatic fractures poses a reconstructive challenge. The increased facial width, the loss of projection of the malar eminence, the ptosis of the soft tissues of the cheek and the paranasal area, and the scar contraction usually present in association with major trauma result in an unattractive face. Therefore, careful analysis of patients' bone and soft tissues and precise identification of all the problems are necessary for anatomic and aesthetic restoration of the face. By means of craniofacial surgical techniques, extended exposure, 360 periorbital degloving, autogenous bone grafting, and the concept of the "aging face", it is possible to correct these deformities. We review our experience and briefly discuss some cases and the surgical options for each problem.

### **The lacrimal pathways after naso-orbito-ethmoidal fractures**

M. A. W. Merckx, H. P. M. Freilhofer

Does the time interval between injury and treatment of naso-orbito-ethmoidal (NOE) fractures affect the post-traumatic functioning of the lacrimal pathways? In a retrospective study of 36 consecutive patients with NOE fractures, complaints about epiphora and/or dacryocystitis were assessed by clini-

cal evaluation and interviews more than 12 months after treatment of the fractures. No dacryocystorhinograms were performed. Such complaints were found for two sides in 24 patients (39 sides) (5.1%) who received primary treatment (0-14 days after trauma). Five sides in 12 patients (17 sides) (29.4%) receiving late primary treatment ( $\geq 14$  days after trauma) gave rise to the same complaints. Remarkably, the two patients of the primary treatment group with complaints showed insufficient reduction of bony fragments, resulting in total relapse of the traumatic telecanthus. Fisher's exact test demonstrated that a significantly higher ( $P < 0.05$ ) frequency of epiphora or dacryocystitis is seen after delayed or late primary treatment. We concluded that primary treatment of NOE fractures results in better post-traumatic functioning of the lacrimal drainage system.

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### **The outer table cranial bone graft in periorbital reconstruction**

J. C. Beirne, S. Kuriakose, G. Dhaif, F. A. Brady, M. Ekanayake, M. Gilbride

Cranial bone is preferred by many surgeons for reconstruction in the craniofacial region because its resorption is less<sup>1</sup>, it may be rigidly fixed, and its donor-site morbidity is relatively low. Sixty-nine consecutive patients aged 10-74 years with 71 outer-table cranial bone grafts were reviewed prospectively. The bilateral grafts were for midface reconstruction in Treacher Collins' syndrome, 16 for orbital floor reconstruction, six for zygomatic buttress grafts, six for grafting of nasoethmoid fractures, four for secondary enophthalmos correction, two for orbital floor reconstruction for tumor, three for malar bone augmentations, six for post-traumatic frontal bone reconstruction, two for postoncologic ablative procedures of the frontal area, and 14 for multiple sites. Donor-site morbidity included one minor local wound infection and