

Midface deformities and their surgical management

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Abstract:

Background:

Midface deformities may be treated either by osteotomies that advance the maxilla or by osteotomies that retract the mandible. A transfacial technique is presented by which the cheekbones, the infraorbital rim, and the superior dental arch are advanced. The indications for this intervention are more widespread than those for Le Fort I osteotomies or mandibular osteotomies. Postoperative complications and risks of recidivism are reduced for this method because of the use of small screw-on plates for frontomalar osteosynthesis. Fifty-two cases of osteotomy by maxime champy et al is reviewed¹. This review deals with his special consideration of problems caused by bone grafting and postoperative occlusion and with a discussion of the factors responsible for relapse.

Keywords: Osteotomies, le fort1, maxillary deformities.

Introduction:

This discussion of the surgical treatment of midface malformations is not intended to review extensively all surgical procedures used at present or to cover the entire spectrum of malformations that are known to occur in the midface. In any extensive discussion, one would have to include lesions as diverse as the Treacher Collins syndrome, craniofacial stenoses, hypertelorisms, tumoral malformations, losses of cutaneous substance, as well as facial clefts. In fact, this presentation will be limited to the study of skeletal dysmorphoses of the midface². In an arbitrary way, with use of a topographic classification, the dysmorphoses could be categorized as follows: retrodisplaced maxilla and micromaxilla; extreme retrusion of the maxilla and combined anomalies, congenital malformations, deformities resulting from neglect or maltreatment of traumatic injuries, and deformities following surgical treatment of cleft lip or palate.

Considerable progress has been made in the treatment of these lesions during the last 20 years, and at present many bones can be cut, including the cranium, upper maxilla, and mandible, or a combination of these bones can be cut in a single operation³. As a result of the formation of well-trained maxillofacial surgery teams and improvements in surgical materials, it is possible today to displace almost any facial structure in any desired direction. Consequently, for a highly specialized surgeon, the difficulty in

correcting malformations does not lie in the execution of the operation, but rather in choosing the best approach for the desired correction.

Discussion:

The present consensus is that it is possible to move almost any facial structure in any desired direction, and the tendency is to correct the deformed bone structure by moving bones rather than by implanting bone transplants or by using prostheses⁴. The spaces between the bones may be filled with bone grafts, and postoperative fixation may be accomplished by wire osteosynthesis, by cranial fixation using frames, and almost always by intermaxillary wiring. We attempt to anticipate possible postoperative occlusion by studying models that give some idea of the degree of the necessary displacement and of the quality of the future intercuspation. Before the operation we also study the profile; the relative proportion of the cheeks, the nasal pyramid, and the chin; and the total facial appearance⁶. The preparation of the dental arches consists of simple interventions, for example, extraction of poorly aligned teeth if a premolar is in a palatine direction. We do not expand the palate preoperatively, we only make sure that the teeth are well aligned. As a general rule, before the intervention, one should consider all possible postoperative developments in order to be prepared with prostheses, such as cap splints, that might be needed. This is particularly difficult if one wants to consider unexpected osseous adaptations under the influence of the postoperative functional conditions.

Incisions.

Our approach is as discreet as possible, and if, simultaneously, a cranioplasty is necessary, we use a Cairns incision⁵. IZA Our approach to the orbital margin is via an incision in the lower lid Our approach to the external orbital margin is via the same incision as for an aesthetic blepharoplasty and consists of two parts: first, the incision is made horizontally along the canthus without exceeding a distance of 1.5 cm from the outer margin, and second, the incision is continued 2-4 mm below the lower lid (fig. 5). A median vestibular incision allows access to the nasal fossa, and a posterior vestibular incision allows access to the pterygomaxillary sutures and is performed bilaterally⁷. Osteotomy. The osteotomy is performed by cutting the frontal process of the zygomatic bone at different levels according to the correction desired. Then one cuts the orbital margin, just outside the lacrimal sac, the frontal process of the maxilla between the orbital margin and pyriform aperture, the posterior wall of the antrum, the zygomatic arch as far as possible posteriorly, and the lower border of the nasal septum (fig. 6). Thereafter, we carefully break the orbital floor behind the orbital margin using a very fine osteotome (Stryker, Kalamazoo, MI), and we accomplish the interpterygomaxillary separation with another special Obwegeser osteotome (Medicon, Tuttlingen, West Germany). We loosen the last osseous attachment with a Rowe and Killey forceps and thus are able to move the entire facial skeleton with the exception of the nose. This maneuver can be adjusted according to the results desired and it can be a horizontal sliding movement alternating with a rocking movement either upwards or downwards (fig. 7). Aesthetically, it is more advantageous to rock the midface somewhat upwards. By this method, one achieves an exaggerated movement forward together with an overcorrection at the level of the dental arch. Bone Graft. Spaces caused by moving the midface forward can be filled with bone transplants to avoid enophthalmos and the retraction which is necessarily exerted by scar formation on the advanced bone in the zygomatic bone cut and in the zone of the

pterygomaxillary osteotomy, where a voluminous graft has to play the role of support. However, we try to avoid bone transplants as often as possible. In the orbits, for example, we have attempted to fill the diastema with lyophilized dura. The interpterygomaxillary space often does not need any special treatment⁸. Thus, we circumvent the painful bone sampling of the iliac crest and, furthermore, we are not convinced that one can avoid relapse by interposition of bone supports (fig. 8). Fixation. Only in exceptional cases do we use methods of orthopedic fixation such as extraoral pin fixation, intermaxillary wiring, or cranial frame. Sometimes we are forced to use intermaxillary wiring because of unusual circumstances and we even use the Delaire apparatus figure 9. frontozygomatic osteosynthesis by small screw-on plates: (A) frontal view, (B) profile. (Nichrominox, Lyon, France) when we are not sure how well the displaced fragment holds. Our favorite method of fixation consists of an osteosynthesis using two small plates (Gebruder Martin, Tuttlingen) on the cheekbone.¹⁰ Its simplicity and its many advantages over all other methods of fixation bring us to this conclusion. We use small plates, 0.9 mm thick, with screws having a diameter of 2 mm. This material offers the advantages of allowing perfect insertion of the screws and easy adaptation of the plates to the shape of the bone because they are both pliable and strong⁹. These plates permit a perfect fixation in all three dimensions. They can be left for as long as 1 year, and they are a good preventive measure against displacement. Furthermore, the biologic compatibility of the material is good (figs. 9-12).

Variation of the Technique. 'transfacial osteotomy allows the correction of many facial malformations. Nevertheless, in some cases one must make minor technical changes. When the desired surgical movements of different parts of the midface are not equal (for example, when the hypoplasia of the orbital margin is clearly delineated), the correction of this part of the deformities by a forward translation of all the midface creates an extreme projection of the upper dental arch, i.e., a promaxilla. We have observed many times that it is not necessary to be too preoccupied with the postoperative occlusion. A postoperative modeling which is either spontaneous or carried out by simple orthodontic means generally establishes satisfactory conditions for occlusion in the following weeks. Otherwise, it might be necessary to perform a Le Fort type I osteotomy¹⁰⁻¹² or a sagittal osteotomy of the ramus according to the Obwegeser technique.⁹ When there is a very narrow dental arch, the forward displacement of the midface does not allow a good intercuspation. The possibility of an intermaxillary bone cut can then be considered. In this case the osteotomy leads to two independent bone parts which are from the orbital margin, the maxilla, and the cheekbone on each side. In this case, the fixation is achieved by osteosynthesis using the plates on the cheekbone. To avoid the formation of spaces between the incisors, one uses a monomaxillary ligature. Postoperatively, one maintains the frontal extension of the palate by an expansion cap splint. The use of midface osteotomy is particularly interesting in patients with cleft lip and palate sequelae. In these cases, the bone cut is the same, but the lower central bone cut which leads from the orbital margin to the pyriform aperture will extend to the cleft. In this way, one obtains bilaterally two bone parts which are composed of the maxillae, the cheekbones, and the orbital margins (fig. 13). The special malformations in cleft lips and palates can then be corrected by moving the individual fragments forward or outwards. Thus one obtains an opening of the cleft with separation of the mucous membranes, which necessitates a correction later. The fixation is achieved by osteosynthesis using two small plates on the cheekbones. To ensure the solidity of the fixation, it is best to use two plates bilaterally. A palatal cap splint is inserted as early as possible postoperatively. In fact, the postoperative risk of relapse is much

greater in such a patient than in patients with other malformations. A long-term fixation is recommended. The normal scar retraction takes place in the usual front-to-back direction, but one also has to anticipate a concentric scar retraction in the former cleft region and an additional collapse of the fragments. Therefore, relapse can best be avoided with an osteosynthesis using plates.

Conclusion:

In conclusion, the advantages of transfacial osteotomy in conjunction with fixation by plates on the cheekbone are such that this type of osteotomy should be chosen when there is any question about the best possible correction, except when there is a clear-cut indication or another method. The surgical treatment of skeletal deformity of the midface should be adapted to the nature of the anomalies, and the best aesthetic result possible should be attempted. If the deformity is situated high on the midface, it is most logical to proceed with an intermediary transfacial osteotomy rather than with a Le Fort I osteotomy or a sagittal osteotomy of the ramus¹⁰. Provided that a careful surgical technique is respected and that inconveniences and factors of relapses in the particular method are well known, transfacial osteotomies give aesthetic results that are at least as satisfying for the surgeon as for the patients in their environment.

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