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LE FORT-III OSTEOTOMY VERSUS LE FORT-III AND SIMULTANEOUS LE FORT-I OSTEOTOMY IN PATIENTS WITH CLEFTS AND CRANIOFACIAL DEFORMITIES

HF Sailer, MD, DDS, PhD

Professor, Department of Cranio-Maxillofacial Surgery, University Hospital Zurich, Zurich, Switzerland

Abstract

The study comprises 67 patients with craniofacial deformities like Morbus Crouzon (26 cases), Morbus Apert (9 cases), cleft lip and palate patients with severe growth impairment of the midface (12 cases) and others where midface advancement was indicated. In 26 patients a simple Le Fort-III osteotomy was performed and in 41 cases a Le Fort-III osteotomy in combination with a Le Fort-I osteotomy. The results clearly show that especially the aesthetic outcome is highly superior in those cases where a combined Le Fort-III plus Le Fort-I operation was performed. This double-step midface osteotomy allows the independent correction of the upper facial part (nasal structures, infraorbital and lateral orbital rims and cygomatic complex) from the lower midface (tooth-bearing part of the jaw); it allows especially the division of the upper jaw or movement of the maxillary segments in cleft patients in any direction.

Introduction

The variety of growth patterns in patients with craniofacial deformities is very wide. During the last 30 years standardised surgical procedures and treatment concepts[1-5] were developed to cope with growth-impaired structures of the craniofacial skeleton. These include individual surgical segmentation of the different bony structures of the forehead, the orbital region and the upper and lower part of the midface. One of the most important segmentations is the separation between the upper and lower part of the midface.[5] This paper discusses the indications and contraindications of the pure Le Fort-III osteotomy versus the Le Fort-III + Le Fort-I osteotomy based on the results achieved with both methods.

Material and Methods

This study comprises 67 patients. A pure Le Fort-III osteotomy was performed in 26 cases and a Le Fort-III plus simultaneous Le Fort-I osteotomy in 41 cases. The pathology to be corrected comprised Morbus Crouzon (26 cases), Morbus Apert (9 cases), cleft lip and palate patients with severe growth impairment of the midface (12 cases), dysostosis cleido-cranialis (1 case), Binder syndrome (2 cases) and 4 cases of extreme midface hypoplasia of unknown origin. The retrospective investigation comprised the aesthetic outcome, the cephalometric pre- and postoperative analysis, and segmental and occlusal stability.

Results

The 26 cases of pure Le Fort-III osteotomy (Fig. 1) were all operated between 1967 and 1981. The aesthetic outcome in 7 of them was compromised by infraorbital scars (in 2 patients well visible), in 4 of them by slight enophthalmus, in another 6 by a flat frontonasal angle. In 6 patients an occlusional relapse was seen which was especially pronounced in 2 cases of cleft lip and palate. In 4 cases a lip incompetence was seen.

From 1982 onwards, all adult patients requiring midface advancement were treated by Le Fort-III

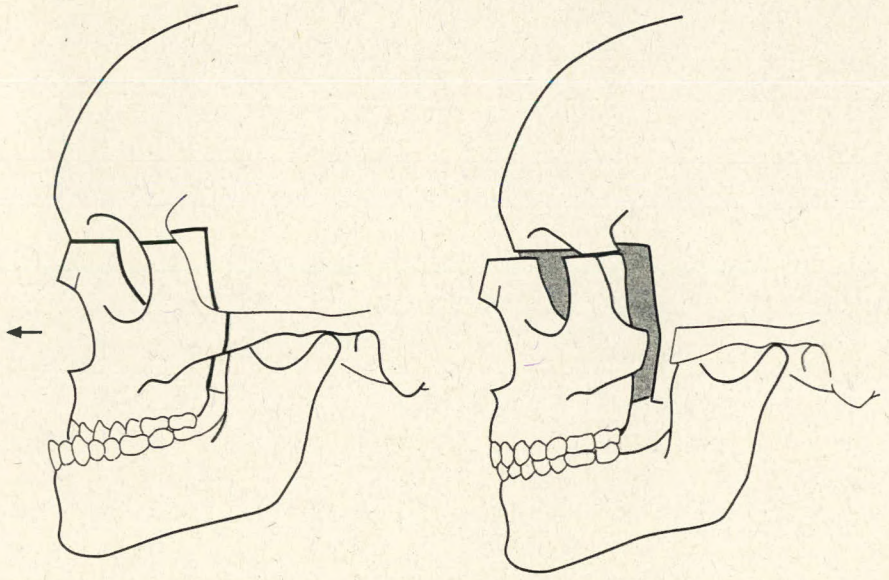


Fig. 1. Indication for a pure Le Fort-III osteotomy: The amount of the advancement of the upper and lower part of the midface is identical; the amount of the forward movement of the maxillary dentition into the proper occlusion dictates the amount of advancement in the orbital and cygomatic area.

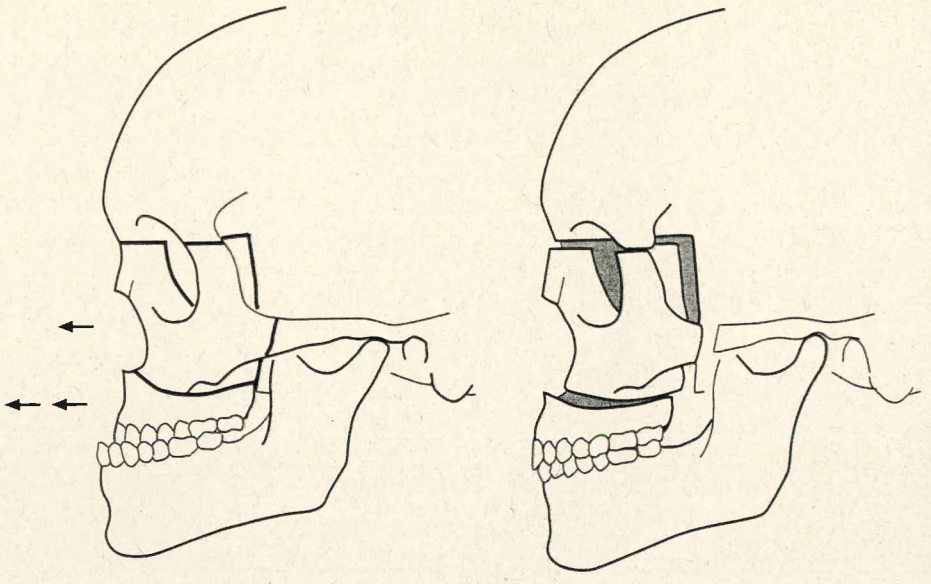


Fig. 2. Indication for a Le Fort-III + simultaneous Le Fort-I osteotomy: The upper part of the midface, i.e. the nasal bones, the infraorbital and the lateral orbital rims as well as the cygomatic complex require different three-dimensional movements than the lower part of the midface lying beneath the Le Fort-I osteotomy level. The positioning of the maxillary dentition is independent on the positioning of the upper midface.

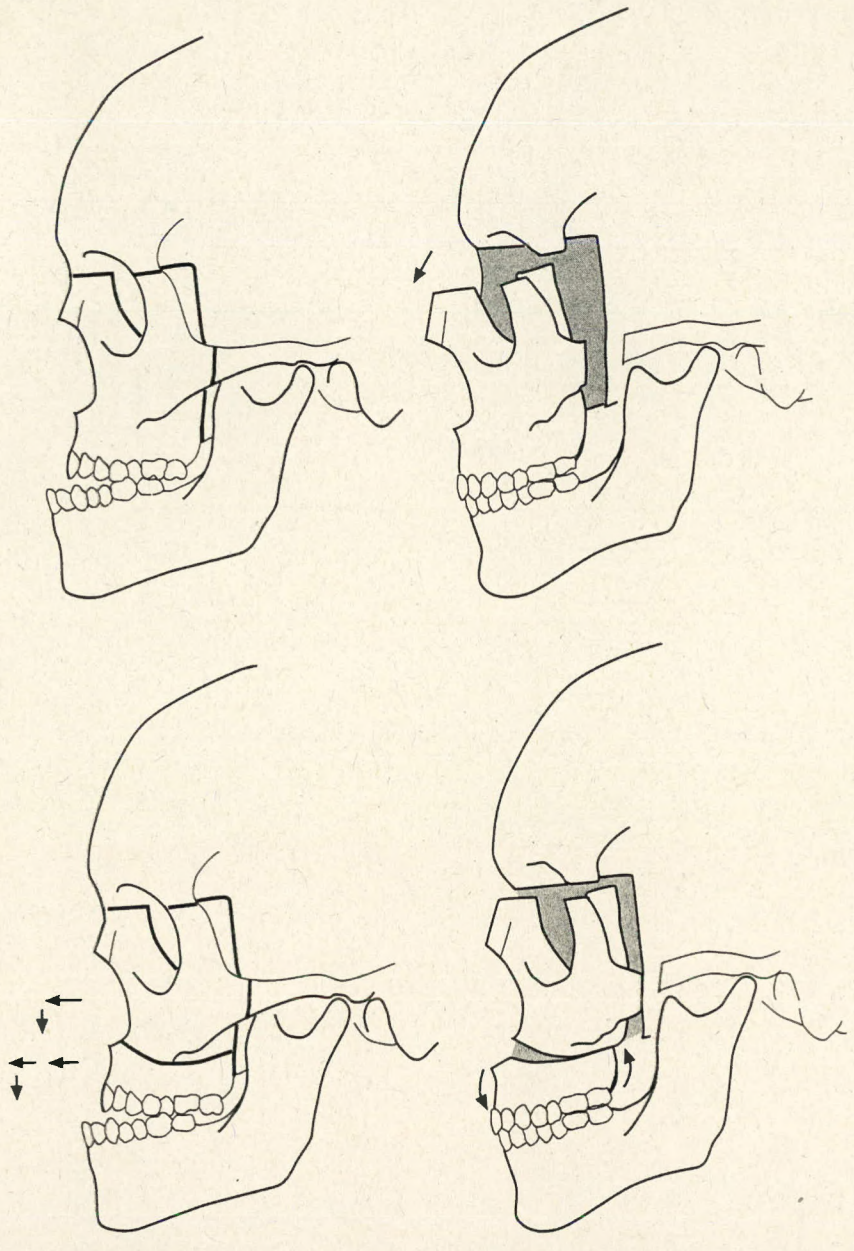


Fig. 3. Le Fort-III osteotomy and open bite deformity: Midface retrusion combined with an open bite deformity should not be corrected by a pure Le Fort-III osteotomy because the downward tilting of the whole midface is causing protrusion of the nasal bones, enlargement of the orbits (enophthalmus) and a very long midface as well as lip incompetence; in contrast (Fig. 3 below), the combination of a Le Fort-III and a Le Fort-I osteotomy allows the closure by advancement, slight downward tilting in the front area and upward positioning of the tooth-bearing part in the posterior part and in addition the absolute independent positioning of the structures of the upper midface.

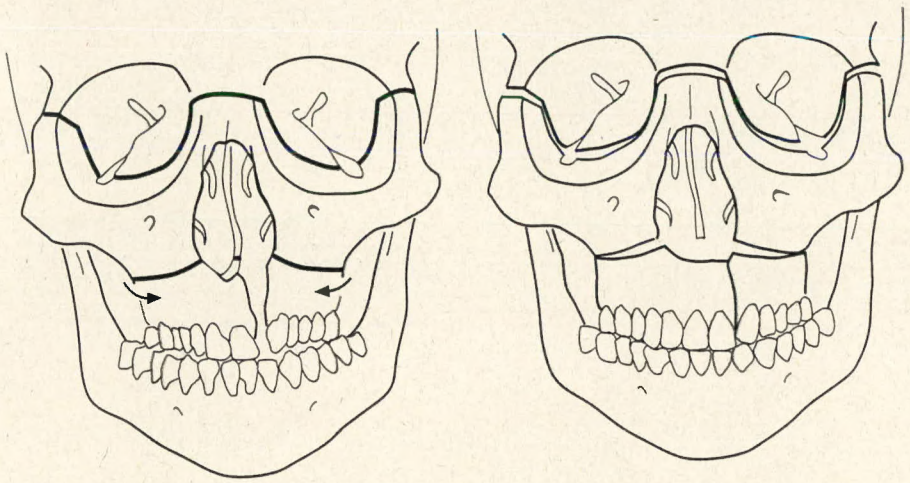


Fig. 4. Le Fort-III + Le Fort-I osteotomy in cleft lip and palate patients with severe growth impairment of the midface: The combination method allows the proper positioning of the upper part of the midface and the correct occlusional positioning of the maxillary segments in uni- and bilateral cleft patients; the gap within the alveolar cleft and the gap within the dentition can easily be closed or a collapsed upper jaw widened by reopening the palatal cleft. This is also routinely done in non-cleft patients with narrow upper jaws by midline splitting of the palate for widening the maxillary arch.

and simultaneous Le Fort-I operation (Fig. 2). In 21 of these 41 patients the Le Fort-I osteotomy was performed in 2 or 3 parts, depending whether the tooth-bearing parts of the upper jaw had to be expanded, to be separately advanced, rotated outwards or downwards, or in cleft patients, had to be approximated for eliminating the gap within the dentition (Figs. 1-4).

Fifteen of these 41 patients treated by Le Fort-III + Le Fort-I osteotomies presented preoperatively with open bite which could easily be corrected within the Le Fort-I osteotomy level by raising the posterior part of the maxilla (Fig. 3 below). Twenty-eight of these 41 patients had preoperatively also orthodontic treatment. In 4 of them there was a slight occlusional relapse, not a skeletal one, and in another 4 there was a skeletal relapse probably caused by wire fixation as it was done at that time. In 24 of these 41 patients the fixation of the segment was performed by miniplates in the residual one by wires. The aesthetic outcome of these 41 patients was far superior to that of the patients with a pure Le Fort-I osteotomy, because the position of the orbital regions and the nasal bones was harmonious, there was no enophthalmus and the height of the whole midface was adequate. There were especially no prominent nasal structures, no lip incompetence and no enophthalmus.

Discussion

The combined method of the Le Fort-III osteotomy and simultaneous Le Fort-I osteotomy is highly superior to the Le Fort-I osteotomy in most cases with retropositioned midfaces. When a pure Le Fort-III osteotomy is performed, the dentition determines the movements of the midface. It is not possible to advance the orbital rims further forward or less forward than the upper dentition. The only solution in such a situation is the osteotomy of the mandible in order to adapt the lower dentition to the maxillary dentition after the whole midface is fixed into position. But this deteriorates the whole outcome. The only indication for a pure Le Fort-III osteotomy without performing simultaneously a Le Fort-I osteotomy is given in children, where a Le Fort-I osteotomy cannot be performed because of the position of the tooth germs and in those conditions where the orbital walls and the nasal structures have to be



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advanced exactly the same amount as the upper dentition (Fig. 1). A strict contraindication for a pure Le Fort-III osteotomy exists in cases with an open bite and very short midfaces because of the high risk of enophthalmus, too long noses and lip incompetence (Fig. 3 above). In all patients where the upper part of the face including nasal bones, infraorbital and lateral orbital rims and the tooth-bearing part of the maxilla have to be moved in different three-dimensional directions and for different amounts of these directions, the combination of a Le Fort-III plus a Le Fort-I operation is indicated (Fig. 2). Especially in cleft patients with severe growth impairment the combination with a Le Fort-I operation in two or three parts is necessary (Fig. 4).

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