European Review for Medical and Pharmacological Sciences 2012; 16(4 Suppl): 121-124

Le Fort III osteotomic variants

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Abstract. – INTRODUCTION: Midface hypoplasia is a skeletal defect involving all three space planes, hence needing a three-dimensional repositioning. This research study shows two cases of cranio-facial dysostosis, on which two Le Fort III variants were performed.

CASE REPORT: In the first case we report the performing the two types of osteotomy simultaneously. Le Fort I, however, has been performed without any pterygomaxillary disjunctions, thus accomplishing a complete midface mibilization without any variation of the occlusal ratios. In the second case a modified Le Fort III osteotomy has been performed with median disjunction; reduction of the transverse interdacryal diameters and of the pyriform opening.

DISCUSSION: Among all osteotomic variants we would like to mention the one introduced by Obwegeser in 1969 where, in patients with acceptable dental occlusal ratios, Le Fort III and Le Fort I have been performed in conjunction. This technique allows a different midface and dental occlusion repositioning.

CONCLUSIONS: In adult patients with permanent dentition and normal occlusal ratios – this technique may be chosen for a midface advancement without compromising the dento-skeletal relations, in order to achieve the best functional and aestetical results.

Key Words:
Le Fort III osteotomy, Facial cleft, Craniofacial syndrom.

Introduction

Midface hypoplasia is a skeletal defect involving all three space planes, hence needing a three-dimensional repositioning.

In order to correct such severe midface hypodevelopment, Gillies and Harrison[1] proposed in 1951 a midface mobilization using Le Fort III on patients affected by cranio-facial dysostosis such as Crouzon's syndrome, Apert's disease, Pfeiffer's, etc.

In 1967, Tessier[2] resumed and evolved this technique in five different variants, according to the type of osteotomy performed on the obital cavity lateral wall.

As of today, many studies in Literature describe this surgical procedure - which can be performed by using either the traditional technique or the aid of osteogenic distraction - as well as any possible intra- and post-surgical complications and short- and long-term outcomes of such treatment.

At the same time, all medical, surgical and anaesthesiological innovations and improvements have led up to the evolution of several osteotomic variants, all of which imply midface advancement but allow to perform customized surgery according to both extent and severity of the deformity to treat.

This research study shows two cases of craniofacial dysostosis, on which two Le Fort III variants were performed.

Case Report

Case 1

Male, 25 yr, affected by Crouzon's Syndrome (Figure 1). The patient has been evaluated during the pre-surgical period using photographical images, a cephalometric study performed after telecranial, latero-lateral and posteroanterior x-Ray, facial CT scan with 3-D rendering and models of the dental arches casted in plaster.

After a thorough pre-surgical evaluation, the need to correct the midface hypodevelopment but, at the same time, to keep the proportionalities of the maxillo-mandibular complex unchanged has been pointed out.

The patient, therefore, underwent a Le Fort III advancement – accomplished by performing, in sequence, an osteotomy of the fronto-nasal suture, the zygomatic arch, the lateral, inferior and medial orbit wall – followed by a Le Fort I but with no

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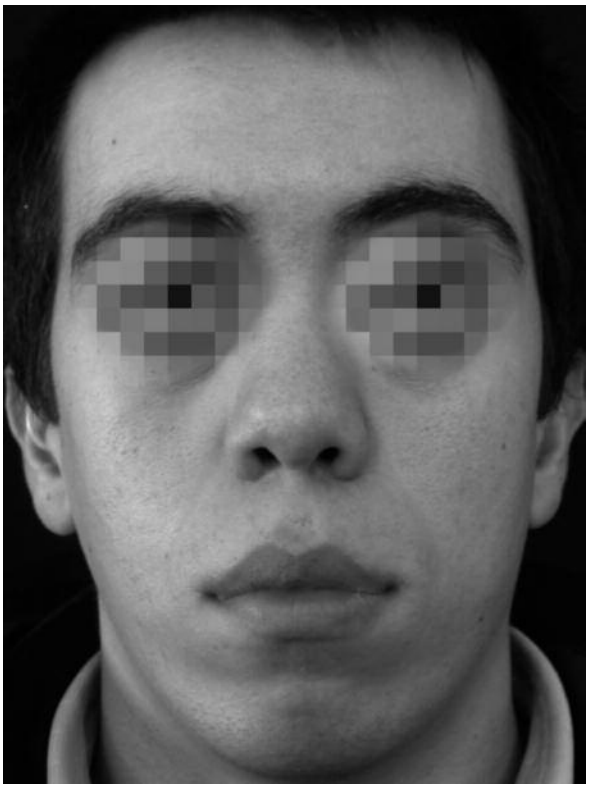

Figure 1. Male, 25 yr, affected by Crouzon's syndrome.

pterygo-maxillary disjunction (Figure 2), in order to achieve the complete midface mobilization without any changes in the occlusal ratios.

Post-surgical checkups, tests and photographical examinations showed a correct consolidation of all surgical fractures as well as the restoration of the facial eurhythmy (Figure 3) with first class occlusal ratio.

Case 2

Female, 15 yr (Figure 4), affected by median schisis. Before being treated by our Unit, the patient had undergone cheiloplasty, rhinoplasty, plus other upper-maxillary surgery in order to regain cross-sectional proportions. Pre-surgical evaluation – using the same techniques as the above described patient – highlighted the need to reduce the transverse interdacryal diameters as well as the pyriform aperture.

Therefore, a modified Le Fort III osteotomy has been performed, in order to include lateral pillar, floor and medial wall of the orbital cavity as well as the upper branch of the maxilla; median disjunction; reduction of the transverse interdacryal diameters and of the pyriform opening

Figure 2. Post-operative CT show a Le Fort III advancement followed by a Le Fort I but with no pterygo-maxillary disjunction.

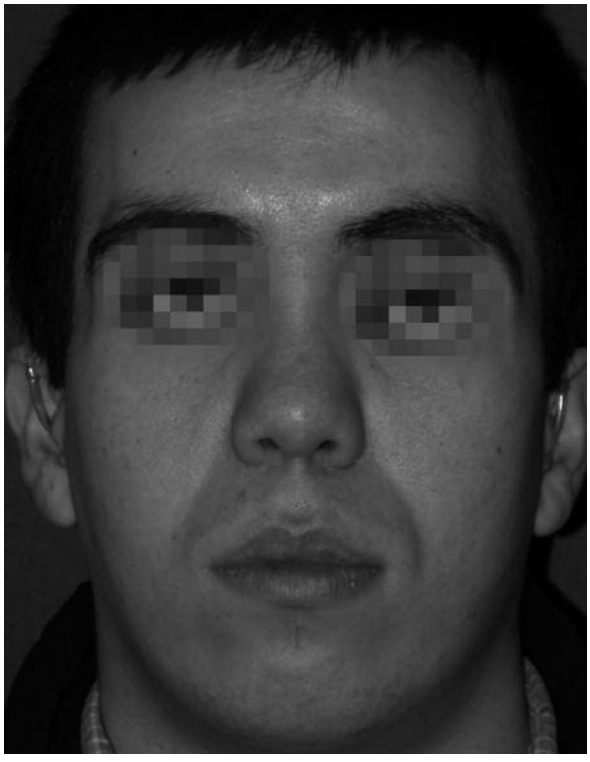

Figure 3. Post-surgical picture show a correct consolidation of all surgical fractures as well as the restoration of the facial eurhythmy.

Figure 4. Female, 15 yr, affected by median schisis.

Figure 5. Pre-operative CT.

(Figure 5), in conjunction with a bi-lateral medial canthopexy and an osteo-cartilaginous implant on the bridge of the nose.

Post-surgical checkups, tests and photographical examinations showed a correct consolidation of all surgical fractures as well as a partial restoration of the facial eurhythmy (Figure 6), with first class occlusal ratios.

Discussion

Gillies and Harrison[1], in 1951, were the fist to write about a high maxillary osteotomy (Le Fort III modification) on a patient with cranio-facial dysostosis. A remarkable improvement was given by some studies by Tessier[2] in 1967, which showed many cases treated using a different technique from Gillies', where the osteotomy line crossed the orbital cavities.

Since Tessier's works, many innovations and improvements in the medical, surgical and anaesthesiological fields have occurred, leading to a different approach in terms of surgical timing (surgery is now advised for patients aged between 5 and 8), methods of fracture consolida-

Figure 6. Post-surgical CT show a modified Le Fort III osteotomy perform with median disjunction and reduction of the transverse interdacryal diameters and of the pyriform opening.

tion (from stabilization using wires of osteosynthesis to stiff inner fixation using self-resorbing or non-resorbing plates), plus the evolution of combined cranio-maxillo-facial osteotomies which made personalization of the surgery possible, according to the severity of the deformations. The last innovation, chronologically speaking, is osteogenetic distraction, recently used for treating midfacial defects[3-4] by impressing important movements to articular tips highly reducing relapses and allowing a gradual and adjustable three-dimensional mobilization.

The need of using and developing different osteotomic lines has been determined by both features and extent of the deformities to treat. In literature it is possible to find, in fact, different variants to Le Fort III advancement[5,6], sometimes in conjunction with frontal bone repositioning[7].

Among all osteotomic variants we would like to mention the one introduced by Obwegeser[8] in 1969 where, in patients with acceptable dental occlusal ratios, Le Fort III and Le Fort I have been performed in conjunction. This technique allows a different midface and dental occlusion repositioning.

In the first case we reported, a first class dento-skeletal occlusion and the correct sagittal projection of the maxillo-mandibular compound determined the necessity of performing the two types of osteotomy simultaneously. Le Fort I, however, has been performed without any pterygomaxillary disjunctions, thus accomplishing a complete midface mibilization without any variation of the occlusal ratios.

In the second case, instead, the need of correcting the remaining hypertelorism as well as the hyperdevelopment of the pyriform aperture cross-sectional diameter led to perform a modified Le Fort III in order to include lateral pillar, floor and medial wall of the orbital cavity as well as the upper branch of the maxilla, in conjunction with a median disjunction, in order to achieve the reduction of the transverse interdacryal diameters and of the pyriform aperture, thus restoring an accurate skeletal seat to the nasal pyramid.

Conclusions

Le Fort III osteotomy is today the surgical technique of choice in the treatment of severe midface hypoplasias on patients affected by cranio-facial dysostoses.

In some cases – in particular: adult patients with permanent dentition and normal occlusal ratios – this technique may be chosen for a midface advancement without compromising the dento-skeletal relations, in order to achieve the best functional and aestetical results.

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