A Case of Complex Facial Clefts Treated with Staged-tissue Expansion

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Summary: Craniofacial clefts involve all soft tissue and skeletal elements throughout the cleft. Usefulness of tissue expansion in craniofacial clefts is reported. Surgery for a complex type of facial clefts is more difficult and more extensive than for a simple one. We experienced a primary case of complex facial clefts (Tessier No. 2 and 12 on the right and 3, 11, and 5 on the left). Soft-tissue closure of all clefts could be completed by using 4 tissue expanders and 7 operations. Because multiple tissue deficiencies and abnormalities exist in craniofacial clefts, especially complex type, a planned, staged, sequential approach by tissue expansion is necessary to produce ideal results. (Plast Reconstr Surg Glob Open 2014;2:e264; doi: 10.1097/GOX.0000000000000233; Published online 9 December 2014).

Disclosure: The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.
bilateral cleft lip first. To treat the right Tessier no. 12 cleft and the wide left cleft lip, two 28-cm³ tissue expanders were placed under the skin of the right forehead and the left cheek at the age of 4 months (Table 1). The expanders were inflated with sterile saline, but the expander in the left cheek was exposed into the oral vestibule 2 months after operation, and the next operation was soon performed as the tissue expansion effect persisted. Lambda incisions were performed on the right expanded skin. The bilateral cleft lip was repaired, and the right upper cleft could be closed. A 28-cm³ tissue expander was placed in the forehead to reconstruct the nose. The patient was able to drink milk directly through the mouth after this operation.

At the third operation at the age of 10 months, 2 lambda incisions were performed on the expanded skin of the forehead (Fig. 3), the nose was advanced, and philtrum-like tissue was fixed to the upper lip. At the fourth operation at 1 year of age, the right malar flap was elevated and advanced to close the right cleft, and the left cleft was closed by an advancement flap. Unfortunately, the right cleft soon reopened postoperatively because of flap tension and nasal drainage due to atresia of the right posterior nasal choana. At the fifth operation at the age of 14 months, a 28-cm³ tissue expander was placed in the right cheek in front of the ear, and a right nostril was constructed.

At the sixth operation, the cheek flap was advanced again, and the right cleft could be closed. Soft-tissue coverage of the clefts was completed with the use of 4 tissue expanders.

Table 1. Operations

| Operation | Age     | Expander Size/Location of Expander | Reconstruction and Plasty                                                                 |
|-----------|---------|-----------------------------------|------------------------------------------------------------------------------------------|
| 1st       | 4 mo    | 28-cm² right forehead, 28-cm³ left cheek | Closure of right upper facial cleft                                                       |
| 2nd       | 6 mo    | 28-cm² forehead                   | Repair of bilateral cleft lip, Repair of bilateral cleft lip                              |
| 3rd       | 10 mo   |                                    | Reconstruction of nose and philtrum, Bilateral canthoplasty of right eye                  |
| 4th       | 1 y     |                                    | Closure of bilateral cheek facial clefts with right malar flap and left cheek flap         |
| 5th       | 1 y 2 mo| 28-cm³ right cheek                 | Right nostril plasty                                                                      |
| 6th       | 1 y 4 mo|                                    | Closure of right cheek cleft, Z-plasty of left canthal region                             |
| 7th       | 1 y 9 mo|                                    | Providing drainage of right nasal cavity                                                  |

Fig. 1. Case: A 4-month-old female infant with complex facial clefts (Tessier No. 2 and 12 on the right and 3, 11, and 5 on the left). Preoperative frontal (A) and basal (B) views.

Fig. 2. A 3D model of the patient’s facial bones.
At the seventh operation at the age of 1 year and 9 months, the otolaryngologist made drainage possible from the right nasal cavity to the left nasal cavity by opening the posterior nasal septum to bypass the atresia of the right posterior nasal choana.

At 25 months of age, her condition suddenly changed because of acute occlusion of the shunt valve for the hydrocephalus and she went into respiratory arrest. Unfortunately, she died 5 days later.

**DISCUSSION**

In the first case in 1990, for moving of the left elevated nasal ala in Tessier No. 3, a tissue expander was placed under the forehead skin of a 7-month-old infant. Bony remodeling of the underlying frontal bone was not reported. Remodeling of the bone is one problem of tissue expansion in infants. We also found no remodeling after removing tissue expanders. In the same year, Foley catheters used as tissue expanders were placed over the zygomatic bones of a 14-month-old infant with bilateral oblique facial clefts. After removal of the catheters, partial Le Fort II osteotomy and rotation and advance of the cheek flap were performed. In 1994, tissue expansion was used for nasal reconstruction in a patient with a median facial cleft. An intubation tube was used for soft-tissue expansion covering an iliac bone graft.

Menard et al reported tissue expansion in the reconstruction of a series of Tessier craniofa-
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**SUMMARY**

Craniofacial clefts involve all soft tissues and skeletal elements throughout the cleft. Tissue expansion was useful in the treatment of craniofacial clefts. Surgery for the complex type of facial clefts is more difficult and extensive than for the simple type. We treated an infant with complex facial clefts (Tessier No. 2 and 12 on the right and 3, 11, and 5 on the left). Soft-tissue closure of all clefts could be achieved by using 4 tissue expanders and 7 operations. Because multiple tissue deficiencies and abnormalities exist in craniofacial clefts, especially the complex type, a planned, staged, sequential approach by tissue expansion is necessary to produce ideal results.

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