

Cheek Advancement Flap for Upper Lip Reconstruction While Preserving Aesthetic Units: Experience With 7 Pediatric Cases

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Introduction: Reconstruction of the upper lip in pediatric patients is challenging due to the need to restore function, symmetry, and aesthetic harmony within facial subunits. Descriptions of techniques that respect the aesthetic units of the face are limited. This study evaluates the outcomes of a cheek advancement flap designed according to facial aesthetic subunits for reconstruction of the lateral cutaneous upper lip in pediatric patients.

Material and Methods: A retrospective analysis was conducted on 7 pediatric patients who underwent reconstruction of isolated lateral upper lip skin defects using a cheek advancement flap between 2005 and 2025. Demographic variables, etiology, laterality, follow-up, and complications were recorded. Postoperative aesthetic outcomes were objectively assessed by 4 independent plastic surgeons using the Strasser Scale.

Results: Three females and 4 males were included. The most common etiology was congenital nevus (57%). Six patients underwent unilateral flap advancement and one required bilateral reconstruction. The mean follow-up was 3.5 years (range: 6 months–10 years). No intraoperative or postoperative complications were observed. Aesthetic evaluation demonstrated excellent results in 5 patients, good results in one patient, and a mediocre result in one patient who presented with extensive sequelae from upper lip necrosis secondary to mucormycosis.

Discussion: The perialar semilunar cheek advancement flap is a safe and reproducible technique that provides reliable aesthetic outcomes for reconstruction of the lateral upper lip. By ad-

hering to facial aesthetic subunit principles, this approach achieves harmonious results, discreet scars, and avoids secondary deformities, making it an excellent option for localized upper lip skin defects.

Key Words: Aesthetic units of the face, cheek flap, upper lip reconstruction

(*J Craniofac Surg* 2026;00: 000–000)

Upper lip reconstruction in pediatric patients is a surgical challenge due to the functional and aesthetic importance of this anatomic area, which is essential for facial expression and self-image in children and adolescents. Facial deformities can affect self-esteem and social integration in these patients.

The first lip reconstruction techniques using advancement flaps were described by the Frenchman Claude Bernard in 1852.¹ These were intended for lower lip defects, but the principles established were applicable to upper lip reconstruction as well. In 1955, Webster modified this technique using a semilunar perialar advancement flap to achieve better aesthetic results.²

The concept of regional “aesthetic units” of the face introduced by Miguel González-Ulloa in 1956,³ emphasizes that reconstruction achieves better results if these units are completely preserved or, at least, if the scars are located in natural folds and creases of the face.

Three aesthetic units converge in the upper lip and perialar region: the philtrum and the 2 lateral cutaneous lips. The boundaries between these 3 structures are formed by the nasolabial fold, the 2 philtral columns, and the white line of the lip (Fig. 1).

There is little literature on lip reconstruction that strictly matches the location of scars within the boundaries of aesthetic subunits. The application of this technique and its modifications in pediatric upper lip reconstruction is even more limited; most reports come from the adult population and address transmural defects secondary to oncological resections.^{4–6}

This study proposes a technique for reconstructing the lateral subunit of the upper lip using a cheek advancement flap, designed to be in line with the principles of facial aesthetic subunits and optimize both functional and aesthetic results.

METHODS

We performed a retrospective analysis of a series of 7 pediatric cases with lesions exclusively affecting the lateral upper lip skin subunit, operated on with a cheek advancement flap. Patients underwent surgery at the Plastic Surgery Department of *Clinica*

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Received January 3, 2026.

Accepted for publication February 15, 2026.

The authors report no conflicts of interest.

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Supplemental Digital Content is available for this article. Direct URL citations are provided in the HTML and PDF versions of this article on the journal's website, www.jcraniofacialsurgery.com.

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ISSN: 1536-3732

DOI: 10.1097/SCS.00000000000012630

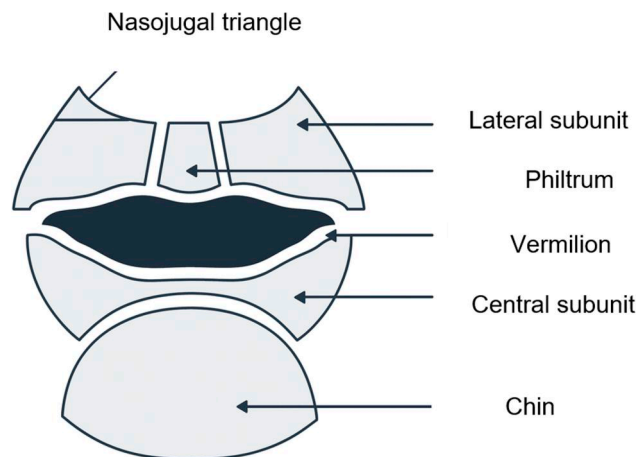


FIGURE 1. Aesthetic subunits of the face.

Aleman in Santiago by the same surgeon (first author) between 2005 and 2025. The following variables were analyzed: gender, age, etiology, laterality of the surgical technique, follow-up, complications, and results, which are described in Supplemental Table 1, Supplemental Digital Content 1, <http://links.lww.com/SCS/J237>.

Eligibility criteria were patients with surgical indication for exclusive reconstruction of the lateral cutaneous lip, with tissue loss as a result of surgical or traumatic resection. Patients with simultaneous involvement of the vermilion border, philtrum, or beyond the upper lip subunit were excluded.

The surgical procedures were performed under general anesthesia with orotracheal or nasotracheal intubation, in order to avoid any anatomic deformation of the lip. The reconstruction of the affected upper lip skin unit was planned according to the size and location of the lesion, as well as the dimensions of the lip in relation to its height and width (Figs. 2–4).

In case 4 of Supplemental Table 1, Supplemental Digital Content 1, <http://links.lww.com/SCS/J237>, the patient had a secondary lip sequelae following mucormycosis, with extensive skin loss involving both lateral subunits of the upper lip. In the first stage of surgery, augmentation of the oral vestibule was performed using mucosal grafts indicated due to severe microstomia. In a second procedure, 2 simultaneous bilateral cheek advancement flaps were designed, incorporating crescent-shaped skin resections in the bilateral perialar sulci. The aim was to comprehensively reconstruct both lateral subunits of the upper lip. Finally, in a third surgical stage, an additional Abbe flap was created to reconstruct the missing philtrum. This was followed by a tongue flap to restore the vermilion border (Supplemental Fig. 5, Supplemental Digital Content 2, <http://links.lww.com/SCS/J238>).

The aesthetic results of the lip reconstruction of the patients in the series were evaluated objectively by 4 plastic surgeons who were not the authors. This evaluation was carried out through the assessment of postoperative photographs using the Strasser Scale.⁷ The evaluation of results considers distortion, correct positioning, symmetry, and residual scarring within the limits of aesthetic subunits.⁷

RESULTS

A total of seven (7) patients underwent surgery to repair their upper lips. Three (3) of them were female and four (4) were male. The average age was 12 years old (range: 5–17 years old).

The most common cause was a nevus, which was observed in 57% of the cases. The other causes were trauma, lip necrosis due to mucormycosis, and a high-flow AVM.

All cases corresponded to defects of the upper cutaneous lip subunit. Six (6) patients underwent a unilateral flap procedure, while one (1) patient (case 4, Supplemental Table 1, Supplemental Digital Content 1, <http://links.lww.com/SCS/J237>) required reconstruction with bilateral flaps.

The average follow-up was 3.5 years (range: 6 months–10 years).

There were no complications in any of the cases.

Seven (7) patients were evaluated using the Strasser objective scales to assess the postoperative aesthetic outcome. Of these, five (5/7) obtained an excellent result, one (1/7) a good result, and the other one (1/7) a mediocre result, with no cases classified as poor (Supplemental Strasser Scale, Supplemental Digital Content 3, <http://links.lww.com/SCS/J239>).

DISCUSSION

Reconstructing the upper lip is a particularly complex surgical challenge in pediatric patients, as it requires simultaneous restoration of lip function, facial symmetry, and aesthetic harmony within the facial anatomic subunits. Most of the available literature on upper lip reconstruction focuses on adult patients and is primarily related to oncological or transmurular tumor resection series. The techniques described in these series do not strictly consider the limits of aesthetic lip subunits. To the best of our knowledge, no previous publications have described the systematic use of a semilunar perialar cheek advancement flap in the pediatric population. This technique positions the scars precisely at the boundaries of the lateral subunit of the upper lip as can be seen in supplemental Figure 6, Supplemental Digital Content 4, <http://links.lww.com/SCS/J240>, and supplemental Figure 7, Supplemental Digital Content 5, <http://links.lww.com/SCS/J241>.

In the literature review, the classic works of Webster² and Bernard¹ established the basic principles of cheek advancement in lower and upper lip defects, although without incorporating the concepts of aesthetic subunits later defined by González-Ulloa.³ More recently, Ferrer et al⁵ and Malard et al⁸ described a semilunar perialar flap for reconstructing vermilion lesions. This technique is conceptually similar to those in our series, but it does not meet the anatomic boundaries of the complete labial subunit because the defect involves mucosal tissue as well as skin. On the other hand, Mayor Arenal et al⁹ reported a variant of the perialar flap in which a semilunar skin resection of the perialar sulcus was performed to avoid nasal wing deformation. However, they did not position the lower edge of the flap on the mucocutaneous line (white skin roll), which we consider to be essential for maintaining an imperceptible scar. None of these reports include pediatric patients. Nor do they include objective aesthetic follow-up.

In our series of 7 pediatric cases treated with this technique, the results were objectively evaluated using the Strasser Scale,⁷ which assesses scar distortion, symmetry, position, and visibility.

The results obtained were as follows: 5 patients achieved an excellent aesthetic outcome, one had a good result, and the other one had a mediocre final appearance. The latter corresponded to a patient with a history of mucormycosis who was admitted at 8 years of age with a complete loss of the upper lip and the after-effects of extensive invasive disease (Supplemental Fig. 5, Supplemental Digital Content 2, <http://links.lww.com/SCS/J238>). The patient underwent a number of reconstructive

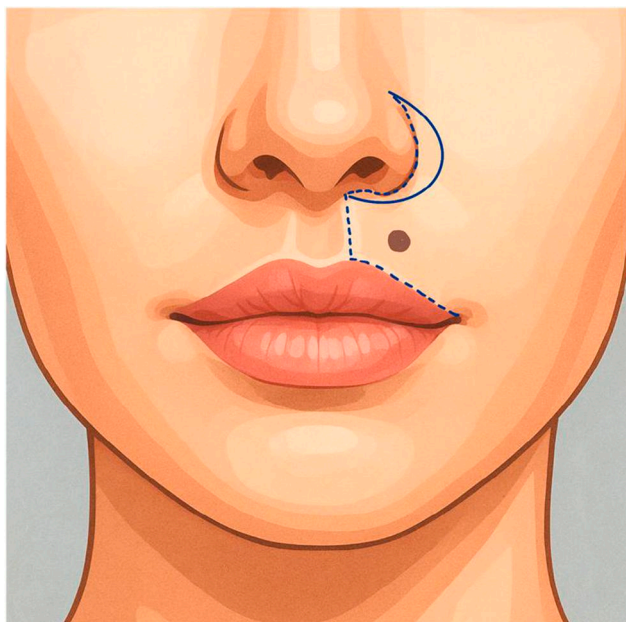


FIGURE 2. A cheek advancement flap was designed in the nasolabial area, considering a crescent-shaped skin resection in the perialar sulcus to avoid collapse of the nasal wing and secondary deformity of the nostril when mobilizing the flap. The edges of the flap are defined at the boundaries of the aesthetic subunits: philtrum, mucocutaneous line of the lip, and subnasal area.

procedures in sequence, including vestibule augmentation with microstomy graft, Webster flap, Abbe flap, and tongue flap.

In this context, the poor final aesthetic outcome cannot be attributed to limitations inherent to the Webster flap technique. Rather, it is due to the complexity of the underlying condition and the complete absence of lip tissue, which inevitably leads to some residual distortion. Nevertheless, given the patient's extreme reconstructive conditions, the result obtained was considered functionally and aesthetically satisfactory by the treating team.

In the remaining 6 patients, all with partial defects confined to the lateral skin subunit, a harmonious aesthetic result was obtained, without surgical complications or functional alterations. This finding contrasts with published series in adults, where complication rates—particularly dehiscence, retraction, or nasal distortion—are higher. This is probably due to the type

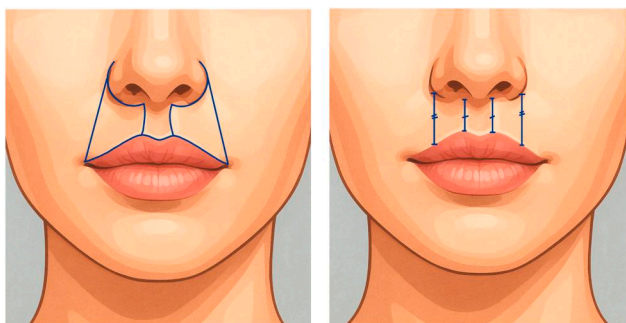


FIGURE 3. The height of the lateral cutaneous lip on the healthy side is measured to achieve symmetry of both cutaneous subunits of the upper lip when advancing the flap.

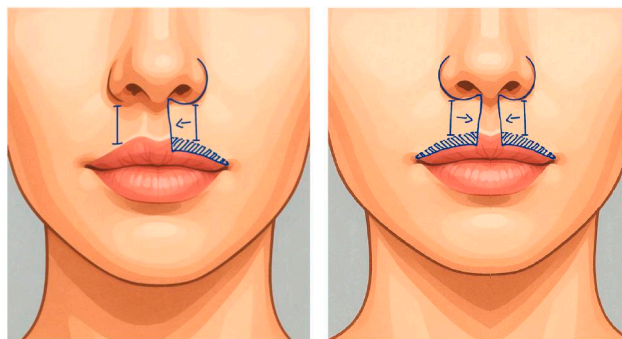


FIGURE 4. Finally, the excess skin at the bottom of the flap is removed to achieve a harmonious lip height on both sides.

of defect (transmural or oncological) and the lower tissue elasticity of adult patients.

A distinctive feature of our series is the average follow-up period of 3.5 years (range: 6 months–10 years), which demonstrates the stability of long-term aesthetic results. There has been no recurrence of deformity or lip asymmetry, and no patients have required reoperation. We found no previous reports in the literature with an equivalent follow-up period for partial lip reconstruction in children using similar techniques. All patients received postoperative scar management, which probably contributed to the harmonious final result and the reconstructed lip's adequate functional integration.

From a technical standpoint, the success of the flap depends on precise planning and absolute respect for the limits of the aesthetic subunits. The incisions must be made exactly at the natural margins—the white line, the nasolabial fold, and the subnasal border—to camouflage the scar and preserve visual continuity between the lip and cheek units. Similarly, calibrating the height of the lip in relation to the contralateral hemilip requires controlled resection of the lower edge of the redundant flap to ensure vertical symmetry. Wide dissection is necessary to allow tension-free advancement, and perialar crescent resection prevents collapse of the nasal wing and distortion of the nostril (Supplemental Fig. 8, Supplemental Digital Content 6, <http://links.lww.com/SCS/J242>).

In our experience, this technique has proven highly versatile and can be applied to different congenital and/or acquired causes, as shown in Supplemental Table 1, Supplemental Digital Content 1, <http://links.lww.com/SCS/J237>. Its reproducibility means it can be adapted to unilateral or bilateral defects, as in Case 4, or even combined with other reconstructive procedures, such as the Abbe flap to repair extensive lesions involving the philtrum. This versatility makes it a valuable addition to the reconstructive toolkit for treating the lateral subunit of the upper lip in patients of all ages.

The main limitations of this study are the small sample size, which is typical of pediatric studies, and the low incidence of partial upper lip defects in this population. Nevertheless, this is the first study to provide a systematic description of the technique in pediatric patients, with objectively evaluated results and prolonged follow-up. In the future, incorporating a larger number of cases and making direct comparisons with other reconstructive techniques will enable us to validate its advantages in terms of aesthetic results, morbidity, and patient satisfaction.

In summary, based on our experience, the perialar semi-lunar cheek advancement flap is a safe and reproducible alternative that produces good aesthetic results for reconstructing the lateral upper lip. Based on the principles of

aesthetic subunits, its design allows for harmonious results, discreet scars, and an absence of secondary deformities, making it an excellent option for localized skin defects of the upper lip.

REFERENCES

1. Bernard C. De la suture du bec-de-lièvre et des pertes de substance de la lèvre supérieure. *Gaz Méd Paris* 1852;7:145–147
2. Webster JP. Crescentic peri-alar cheek excision for upper lip flap advancement with a short history of upper lip repair. *Plast Reconstr Surg (1946)* 1955;15:416–422
3. González-Ulloa M. Restoration of the face covering by means of regional aesthetic units. *Plast Reconstr Surg (1946)* 1956;17:135–150
4. Wechselberger G, Gurunluoglu R, Bauer T, et al. Functional lower lip reconstruction with bilateral cheek advancement flaps: revisitation of the Webster method with a minor modification in the technique. *Aesthetic Plast Surg* 2002;26:423–428
5. Dean Ferrer A, Alamillos Granados F, Vélez García-Nieto A. Colgajo de avance perialar semilunar para reconstrucción del labio superior. *Actas Dermosifiliogr* 2009;100:925–927
6. Denadai R, Raposo-Amaral CE, Buzzo CL, et al. Functional lower lip reconstruction with the modified Bernard–Webster flap. *J Plast Reconstr Aesthet Surg* 2015;68:1522–1528
7. Strasser EJ. An objective grading system for the evaluation of cosmetic surgical results. *Plast Reconstr Surg* 1999;104:2282–2285
8. Malard O, Correa P, Jégoux F, et al. Surgical repair of labial defect. *Eur Ann Otorhinolaryngol Head Neck Dis* 2010;127:123–128
9. Mayor Arenal M, Corral de la Calle M, Quesada Cortés A. La versatilidad del colgajo perialar en semiluna en cirugía reconstructiva facial. *Piel* 2007;22:146–150

Images:

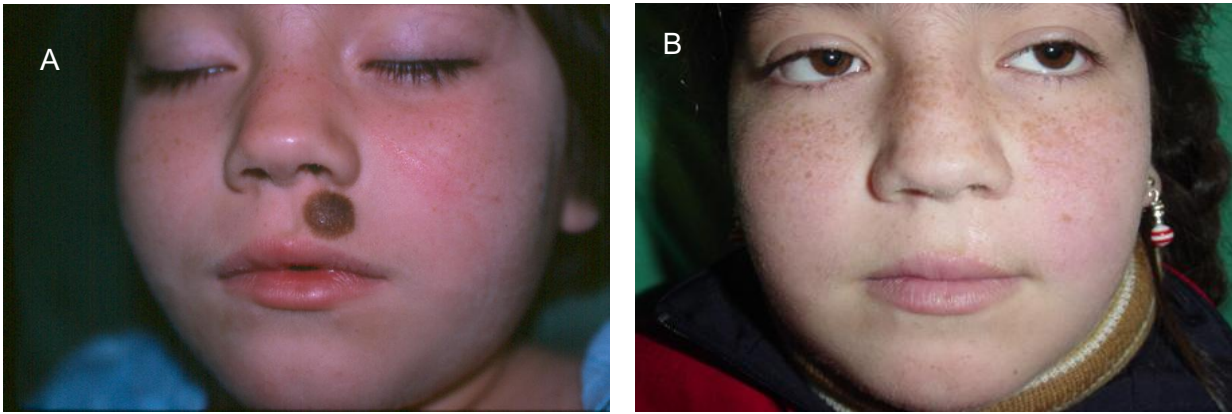


Figure 5: (Patient 1 in Table 1). Congenital nevus; A. Preoperative photo; B. Postoperative photo, 7-year follow-up.



Figure 6: (Patient 4 in Table 1) Mucormycosis; A. Total necrosis of the upper lip secondary to mucormycosis in a newborn; B. Cosmetic sequelae of the lesion at 8 years; C. Intraoperative design of bilateral Webster flap; D. Result of Webster flap; E. Design of Abbe flap; F. Final result after complete reconstruction of the upper lip; G. Long term follow up



Figure 7: (Patient 5 in Table 1). High-flow vascular malformation; A. Preoperative photo; B. Intraoperative photo showing extensive dissection for cheek advancement; C. Postoperative photo at 3 months of follow-up.

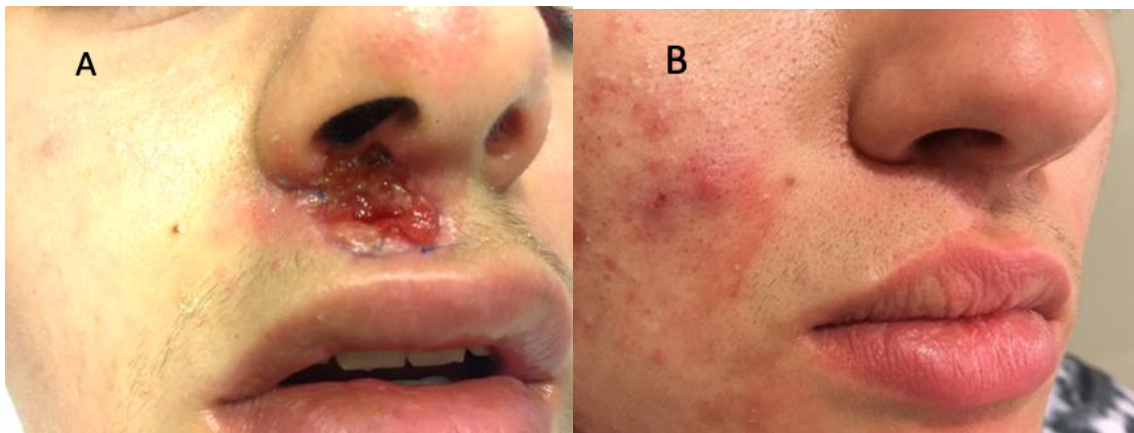


Figure 8: (Patient 6 in Table 1). Dog bite wound. A. Preoperative photo; B. Postoperative photo at two years of follow-up.

APPENDIX: Strasser Scale

Patient 1: Congenital nevus

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect		X		X	
Noticeable	X		X		X
Obvious					
Deforming					
Final score	1	0	1	0	1
Total score: 3 → Good					

Patient 2: Congenital nevus

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect	X	X	X	X	X
Noticeable					
Obvious					
Deforming					
Final score	0	0	0	0	0
Total score: 0 → Excellent					

Patient 3: Congenital nevus

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect	X	X	X	X	X
Noticeable					
Obvious					
Deforming					
Final score	0	0	0	0	0
Total score: 0 → Excellent result					

Patient 4: Mucormycosis

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect					
Noticeable	X	X	X		X
Obvious				X	
Deforming					
Final score	1	1	1	5	1
Total score: 9 → Mediocre result					

Patient 5: High-flow AVM

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect	X	X	X	X	X
Noticeable					
Obvious					
Deforming					
Final score	0	0	0	0	0
Total score: 0 → Excellent result					

Patient 6: Traumatic injury

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect	X	X	X	X	X
Noticeable					
Obvious					
Deforming					
Final score	0	0	0	0	0
Total score: 0 → Excellent result					

Patient 7: Nevus

	Position	Distortion	Symmetry	Contour deformity	Scar
Perfect	X	X	X	X	X
Noticeable					
Obvious					
Deforming					
Final score	0	0	0	0	0
Total score: 0 → Excellent result					

Total Strasser:

- 5 excellent results
- 1 good result
- 1 mediocre result