

Philtrum reconstruction in unilateral cleft lip repair

S. Naidoo^{1,2,*} & K.-W. Bütow^{1,3}

¹Facial Cleft Deformity Clinic, Department of Maxillofacial and Oral Surgery, University of Pretoria, Pretoria, South Africa

²Mediclinic Midstream Hospital, Pretoria, South Africa

³Life Wilgers Hospital, Pretoria, South Africa

*Correspondence to: Address: Sharan Naidoo, Facial Cleft Deformity Clinic, Department of Maxillofacial and Oral Surgery, University of Pretoria, South Africa. Tel: +27 12 319 2232. Fax: +27 86 274 8883.

Abstract

The philtrum is an important aesthetic structure in the midface. A number of philtrum reconstruction techniques have been advocated for secondary cleft lip revision procedures. Conventional surgical management involves end-to-end orbicularis oris muscle approximation during primary cleft lip repair, often resulting in a flat lip appearance that requires secondary revision surgery at a later stage. A novel modification of the approximation of the orbicularis oris muscle is described that may be implemented with any cleft lip technique in order to create an accentuated philtrum column for a natural looking philtrum. The muscle roll technique results in eversion of the orbicularis oris muscle, successfully recapturing the philtrum column topography. This is achieved by utilizing two inverted horizontal sutures, with an additional philtrum takedown suture placed in the region of the dimple to accentuate the philtrum anatomy and three-dimensional profile. This novel technique in unilateral cleft lip repair addresses philtrum architecture during primary surgery, which may reduce the requirement for secondary surgical intervention. Its application may be particularly suitable in outreach programmes where postoperative follow-up may be compromised.

Keywords: cleft lip repair; cleft lip; primary cleft reconstruction; unilateral cleft lip

The philtrum, with its accentuated dimple and ridge, is a distinct aesthetic structure of the midface that forms a delicate central component of the upper lip facial aesthetic unit. Repair of this structure in cleft patients presents a significant challenge to the reconstructive surgeon.

Traditional end-to-end orbicularis oris muscle approximation techniques result in a flattened appearance, often requiring revision surgery at a later stage. It has been suggested by Randall that the most ideal time to address the philtrum in cleft lip patients would be during the primary lip repair phase, although this would be deemed technically challenging due to the limited muscle bulk and tissue fragility^{1, 2}.

A multitude of philtrum reconstruction techniques have been advocated for implementation during secondary lip revision procedures. The literature is replete with surgical techniques and modifications thereof to address this issue³. However, a secondary reconstruction procedure has its own setbacks, such as added exposure to general anaesthesia, accentuation of previously scarred tissue, and excessive tissue tension⁴.

A novel technique of orbicularis oris muscle approximation that may be incorporated into conventional primary cleft lip techniques is described here. This technique results in an accentuated philtrum topography, creating a natural appearance.

Surgical technique

The medial and lateral orbicularis oris muscle stumps are approximated by means of two inverted horizontal mattress sutures. Vicryl 4–0 suture material on a C3 needle or PDS 4–0 suture material (Ethicon, Jacksonville, FL, USA) is utilized for this procedure.

The suture enters at the undersurface of the lateral muscle stump, approximately 1.0 mm from the muscle edge (at the inferior end or lip red area). The needle is re-entered on the outer surface of the lateral muscle stump, approximately 2 mm above the previous point, and is passed to the undersurface of the medial orbicularis stump, in alignment with the point on the medial stump, and 1.0 mm away from the muscle edge. The suture penetrates the outer surface of the medial stump 2 mm inferiorly and 1.0 mm away from the muscle edge, to be knotted on the undersurface of the approximated muscle ends. This process is repeated on the superior aspect of the orbicularis muscle. The net effect is eversion of the muscle edges to create a favourable platform for simulation of a philtrum ridge. Skin suturing follows the muscle approximation (Fig. 1).

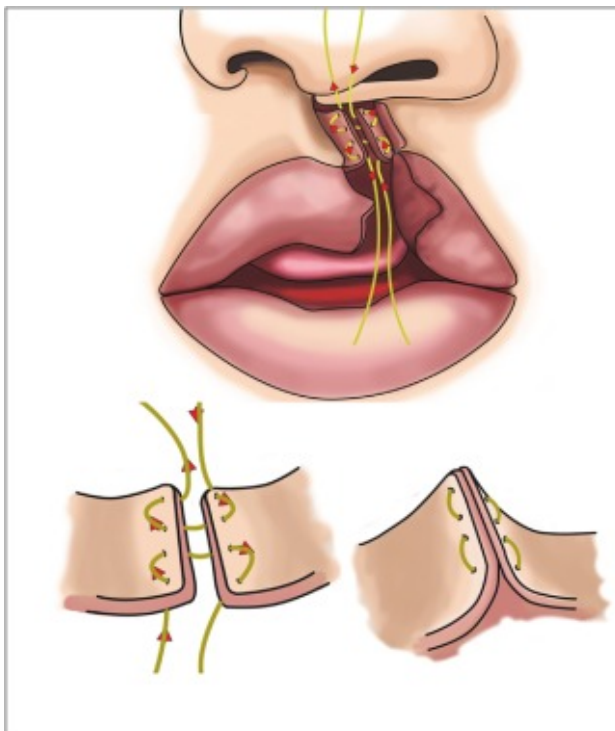


Fig. 1. Orbicularis oris muscle eversion.

Once this is completed, the takedown stitch is placed for creation of depth in the region of the philtrum dimple area. PS2 Vicryl 3–0 suture material or PDS 4–0 suture material (Ethicon, Jacksonville, FL, USA) is utilized for this purpose.

The suture enters the maxillary vestibule at a point adjacent to the maxillary frenulum and passes through the overlying aspect of the orbicularis oris muscle and exits through the skin overlying the philtrum dimple region approximately 2–2.5 mm inferior to the base of the columella. The needle is re-inserted into the same puncture point and directed inferiorly in the subdermal tissue, to exit approximately 1–1.5 mm inferior to the previous point. The needle is then re-inserted into the lower skin puncture point and is directed towards the vestibule to be tied (Fig. 2).

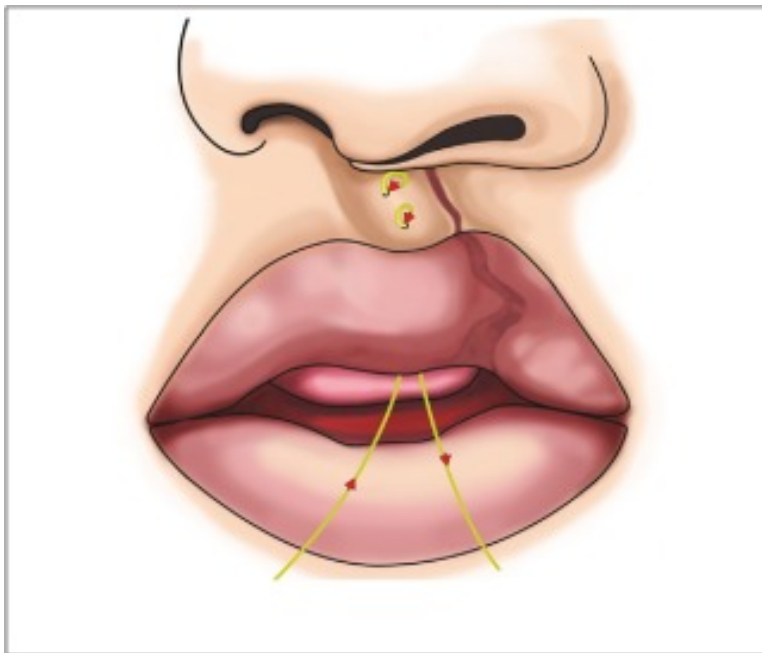


Fig. 2. Takedown suture.

Discussion

The philtrum is an important distinct aesthetic structure in the midface. It is a delicate central component of the upper lip facial aesthetic unit that needs special attention during cleft lip reconstruction. Cleft lip results in a significant defect in both the lip and nasal architecture and presents the surgeon with an enormous aesthetic challenge.

In primary cleft lip surgery, most authors emphasize the surgical flap design without giving much attention to the orbicularis muscle approximation and associated philtrum reconstruction. According to the literature, the current trend is to perform mostly an end-to-end muscle closure during primary cleft lip surgery and to address the philtrum aesthetic unit at a secondary procedure. Various techniques have been advocated for application during secondary revision surgery to enhance the philtrum architecture. These range from muscle overlapping, basket weaving of the orbicularis muscle slips, orbicularis muscle interdigitation, and rotation of adjacent tissue to augment the philtrum column, to tendon

and cartilaginous grafts and injection of dermal fillers to plump up the subcutaneous tissue in the philtrum region ^{3, 4, 5, 6, 7}.

In unilateral cases, the suture technique described results in subtle outward rotation of the approximated muscle stumps, which supports the overlying skin and results in simulation of the philtrum column. The sutures are placed in an inverted manner that results in the knots being buried. The muscle roll technique together with the philtrum takedown stitch recaptures the three-dimensional philtrum topography, leading to improved aesthetic outcomes in primary cleft lip repair (Fig. 3, Fig. 4, Fig. 5, Fig. 6).

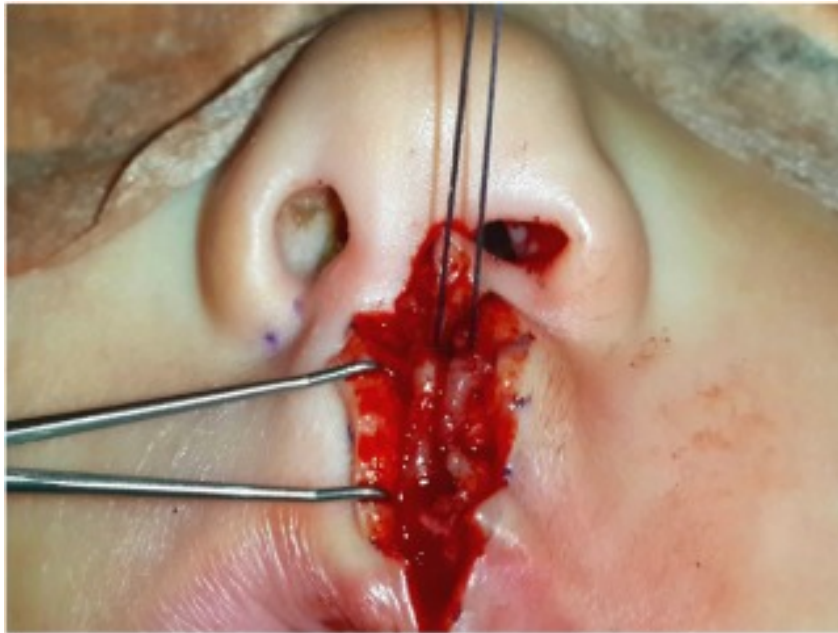


Fig. 3. Muscle eversion.



Fig. 4. Immediate postoperative result.



Fig. 5. One week postoperative.



Fig. 6. Six months postoperative.

In conclusion, the novel technique described in this article produces aesthetically pleasing philtrum architecture, and may be implemented in routine unilateral cleft lip repair. This may reduce the need for secondary revision surgery. The application of the muscle eversion and takedown suture will be particularly beneficial in situations where there is poor patient compliance, or where reduced follow-up is a reality, such as in mission or outreach cleft surgery programmes.

Funding

No funding.

Competing interests

None.

Ethical approval

Exempted.

Patient consent

Not required.

References

1. Randall PA. A nasolabial adhesion operation in cleft lip surgery. *Plast Reconstr Surg* 1965;35: 371–6.
2. Randall P, Whitaker LA, LaRossa D. The importance of muscle reconstruction in primary and secondary cleft lip repair. *Plast Reconstr Surg* 1974;54:316–23.
3. Rogers CR, Meara JG, Mulliken JB. The philtrum in cleft lip: review of the anatomy and techniques for construction. *J Craniofac Surg* 2014;25:9–13.
4. Lim AA, Allam KA, Taneja R, Kawamoto HK. Construction of the philtral column using palmaris longus tendon. *Plast Reconstr Surg* 2012;129:374e–375e.
5. Seagle MB, Furlow Jr LT. Muscle reconstruction in cleft lip repair. *Plast Reconstr Surg* 2004;113:1537–47.
6. Youn DY, Yun SH, Oh JW, Kim DI. Formation of the philtral column with palmaris longus tendon in the correction of unilateral cleft lip nose deformity. *J Korean Soc Plast Reconstr* 1997;24:495–502.
7. Schmid E. *The use of auricular cartilage and composite grafts in reconstruction of the upper lip, with special reference to construction of the philtrum Transactions of the Third International Congress on Plastic Surgery*. Amsterdam, New York: Excerpta Medica Foundation; 1964: 306–13.