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Tarsoconjunctival-Skin Flap as Another Option in Correcting Ectropion for Oro-Ocular Cleft Reconstruction: Report of 2 Cases

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Abstract

Facial clefts are rare facial anomalies. Among them, oro-ocular cleft remains a challenging malformation due to ectropion of the inferior palpebra which can constitute an emergency when the patient's globe is exposed leading to exposure keratitis and blindness. Here we report surgical procedures to correct lower eyelid ectropion using tarsoconjunctival-skin flap performed on 2 cases. In conclusion, tarsoconjunctival-skin flap can be provided to effectively correct lower eyelid ectropion and is a better option when nose correction is not involved simultaneously.

Keywords

oro-ocular cleft, ectropion, facial cleft, innovation

Introduction

Facial clefts are congenital anomalies of the face caused by failure of unification of the divisions in the maxillofacial region, with an incidence of 1.5 to 5/100 000 live births (Bradley et al., 2006; Bradley and Kawamoto, 2007; van der Meulen and Zeeman, 2011). Facial clefts constitute the most challenging malformation since each case is unique (Miller, 1996). In 1962, the American Association of Cleft Palate Rehabilitation and Tessier described a new classification for facial clefts and syndromes, dividing them into oro-nasal clefts (Tessier 0, 1, 2, 3), oro-ocular clefts (Tessier 4, 5, 6), lateral-facial clefts (Tessier 7, 8, 9), and orbital cranial clefts (Tessier 10, 11, 12, 13, 14). Oro-ocular cleft is one of the rarest, with 33 unilateral and bilateral clefts reported in the literature (van der Meulen and Zeeman, 2011). The disorders found in this group are ectropion, absence of the medial conjunctiva, absence of medial tarsus, and telecanthus until loss of vision with or without injury to the lacrimal system (Miller, 1996). The cause is uncertain, but failure of prosencephalon (forebrain) differentiation may be a contributing factor (Tokioka et al., 2005). The surgeon must be skillful in craniomaxillofacial surgery and have a solid background to lead the multidisciplinary management of craniofacial clefts (Monasterio, 2000). If the malformation is severe with functional problems, like ocular exposure, surgery is performed early to prevent exposure keratitis (Miller, 1996; Bradley and Kawamoto, 2007). If the malformation is mild, according to protocol, surgery can be delayed (Bradley and Kawamoto, 2007).

This report presents a surgical procedure to correct lower eyelid ectropion using tarsoconjunctival-skin flap in 2 cases.

Case Reports

The 2 cases with oro-ocular cleft are presented with before and after images which were corrected by tarsoconjunctival skin flap procedure. This technique for the first time was introduced by Professor David John David, but he never published a description of the procedure.

Case 1

A 3-month-old male presented with Right Tessier cleft no. 4 and Left Tessier clefts no. 3, 4, and 5 with skin tags (Figure 1A). Computed tomography was not done because the surgery was done as a charity. He underwent lateral tarsoconjunctival-skin flap, lateral cantholysis, and medial canthopexy in February 2013 (Figure 1B). For this patient, we also performed nose correction. There were no complications during or after the surgeries. After 8 years of the procedures, the patient was

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Figure 1. (A) Preoperative view of case #1. (B) Postoperative view of case #1 after lateral tarsoconjunctival-skin flap and medial canthopexy. (C) The 8 years follow-up appearance of case #1.

examined, and the findings are presented in Figure 1C. The patient's reconstruction was successful, but there was remaining ectropion on his left eye. This condition could be caused by scarring and tension formed after repairing the left nostril.

Case 2

A 5-month-old female presented with Left Tessier clefts no. 4 and 5 (Figure 2A). Computed tomography was not done because the surgery was done as a charity. She underwent several operations consisting of cleft lip repair and lateral tarsoconjunctival-skin flap, lateral cantholysis, and medial canthopexy in January 2013 (Figure 2B). There were no complications before or after the operations. The patient was examined 8 years after surgeries, and the findings are presented in Figure 2C. The patient's reconstruction was successful and her family was happy with the outcome.

Operative techniques are described in Figure 3 as follows:

The patient had been intubated under general anesthesia. An incision design (Figure 3A) was made in the conjunctival area beneath the tarsus and lengthened laterally into the lateral cantus and temporal area right above the arcus (Figure 3B).

Figure 2. (A) Preoperative view of case 2, A 5-month-old female with L Tessier clefts 5 and unilateral complete left side cleft lip, alveolar and palate (CLP/SHAL). (B) Postoperative view of case 2 with cleft lip repair, lateral tarsoconjunctival-skin flap, and medial canthopexy. (C) The 8 years follow-up appearance of case #2.

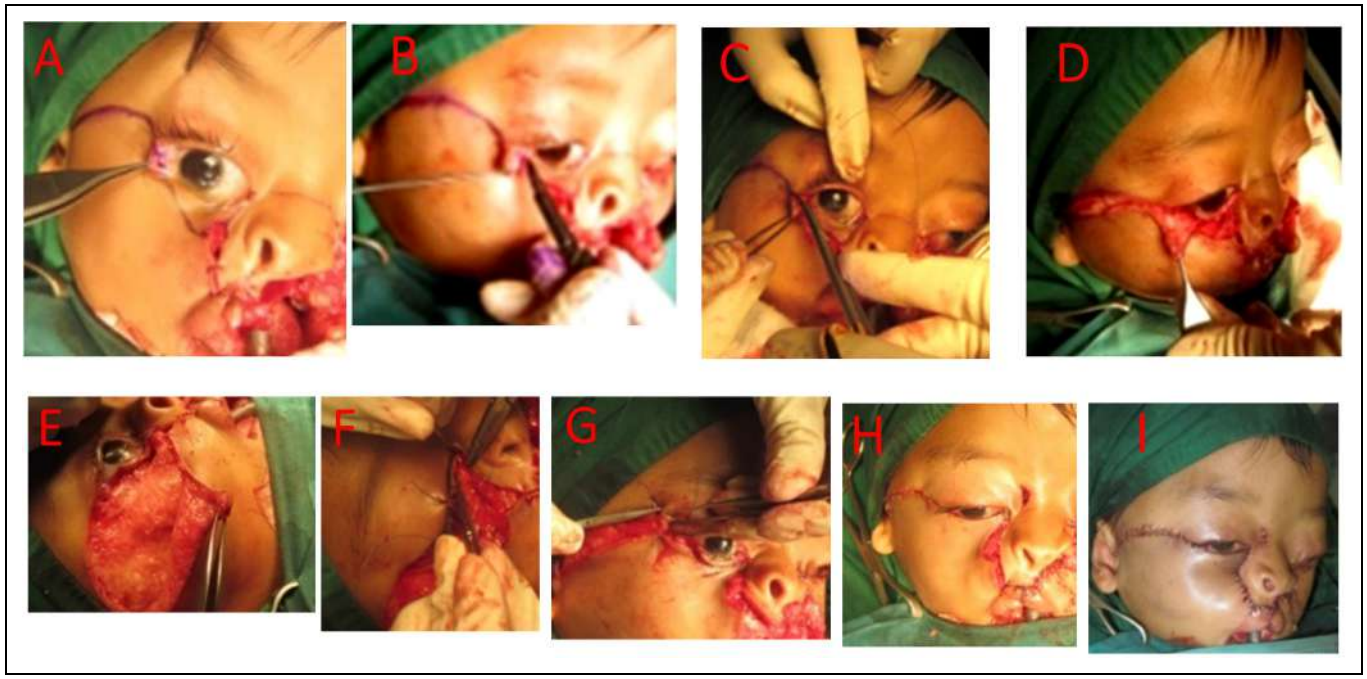

Figure 3. Operative technique. Above: Left to Right: (A) incision design beneath tarsus, (B) conjunctival incision beneath tarsus, (C) lateral cantholysis, and (D) dissection of tarsoconjunctival skin flap of orbicularis oculi muscle. Below: Left to right: (E) extension into cheek flap, (F) reconstruction of conjunctival layer in ectropion region using turn up palpebral flap, (G) lateral canthopexy, (H) medial canthopexy, and (I) postoperative view of the patient.

Then, we made the back-cut line inferiorly right in front of the hairline, and lengthened the line medially into the medial canthus. Lidocaine plus epinephrine were injected into the design of the incision. A transconjunctival incision was made behind the tarsus with blade no.15 and continued in the preseptal plane, then the incision was lengthened into the lateral canthus and continued into the temporal area following the line of the design and then the back cut. Lateral cantholysis was made (Figure 3C) with scissors followed by dissection of tarsoconjunctival skin flap by separating off the orbicularis oculi muscle (Figure 3D), then the incision was deepened into cheek flap (Figure 3E). Next, the palpebral flap was made for reconstructing the conjunctival layer in the ectropion part (Figure 3F), followed by lateral (Figure 3G), and medial canthopexy (Figure 3H) with nylon 4.0 to affix the flap. The orbicularis muscle was stitched with vicryl 6.0 using interrupted suture followed by the mucosal part and also the dermis in the temporal area. Then, the skin was stitched with nylon 6.0. using interrupted suture (Figure 3I). Finally, we applied the eye ointment over the stitches, cleaned it and reapplied ointment every day for 7 days postoperatively. Paracetamol and amoxicillin were administered to the patient for 5 days postoperatively. The stitches were removed on postoperative day 5.

Discussion

Surgical techniques for soft tissue reconstruction of craniofacial clefts depend on the anatomic regions involved. According to Tessier, the immediate outcomes of facial cleft surgery are often less than optimal, not only because of the procedure used, but also because of the lack of growth of facial structures and other related abnormalities (da Silva Freitas et al., 2009).

Since the defects of skin and skeleton are often overlooked, an effort to repair a facial cleft can easily end in surgical disaster. For example, scar tissue does not mature at the same rate as regular tissue. Secondary bone abnormalities may be caused by skin and mucosa tension and what seems to be an impressive outcome can quickly deteriorate into a horrible deformity (van der Meulen, 1985) .

Repair of the lower eyelid and nose necessitates a substantial quantity of tissue, which can be contained in 1 or more of the usable donor regions, which are the upper eyelid, the forehead, and the cheek (van der Meulen, 1985).

Common oblique facial cleft techniques include those developed by Tessier and Kawamoto using z-plasty (Persing, 2005; Bradley and Kawamoto, 2007), however, the skin scarcity can be so severe that the outcome is far from ideal.

Another technique includes transposition of musculocutaneous flap with a lateral pedicle from upper to lower lid (David, 2006; da Silva Freitas et al., 2009), however, only tiny flaps may be transposed at a time.

The forehead flap (van der Meulen, 1985; David, 2006) may be used to repair the lower eyelid and medial canthal area, but it is preferred for nasal correction to achieve sufficient nasal dorsum lengthening.

Cheek skin can be used in many situations and its shape and color are ideal. The main concern is how to better use these characteristics (van der Meulen, 1985). van der Meulen invented the rotation and advancement of the cheek technique for oblique facial clefts and stated that his technique allows for maximum correction at the cost of limited scarring and thus could be recommended as the treatment of choice in the oblique facial cleft cases (van der Meulen, 1985). Stricker et al. (1990) opted for a cheek rotation flap including the lower eyelid in the flap in patients with extreme skin shortage. The van Der Meulen rotation and advancement flap of the cheek are safe procedures that can have acceptable outcomes in the treatment of craniofacial clefts (Giglio et al., 2008).

The van der Meulen technique is a breakthrough in oblique facial cleft surgery. However, the complexity and surgical challenges remain the same, since all the techniques mentioned above may result in recurrence of the ectropion. Tokioka et al. (2005) claimed that the soft tissue defect of the lower eyelid was not satisfactorily reconstructed utilizing the van der Meulen technique.

It is not always straightforward to have the inferior eyelid margin in the right place (da Silva Freitas et al., 2009), hence canthopexy is needed in oblique facial cleft reconstruction. Canthopexy must be done when the medial canthus is affected (Monasterio and Taylor, 2000). Both medial or lateral canthopexy can be done in either primary or secondary approach. Menard et al. (1999) also mentioned the use of tissue expanders under the cheek skin to facilitate tension-free closure.

We described a combined technique consisting of lateral cantholysis, lateral tarsoconjunctival-skin flap, and medial canthopexy to provide correction of lower eyelid ectropion. This technique is based on the rotation advancement of the cheek flap. The difference is that the flap is not only limited to the skin and subcutaneous tissue structures, but also the conjunctiva, tarsus and muscles at the tarsus level. Including the tarsus and conjunctiva while raising the flap makes the flap strong enough to support the lower eyelid structure so to prevent ectropion.

Standardized treatment plans are not possible because of the variety of craniofacial clefts and levels of severity. However, guiding principles are helpful in determining the proper timing and stages for corrective surgery. During infancy (3-12 months of age), typically cranial defects and soft-tissue clefts are corrected. Function-enhancing and function-preserving maneuvers usually focus on the eyes, which are often unsupported inferiorly and inadequately covered by the eyelids, giving rise to the serious dangers of exposure keratitis and corneal damage (Monasterio and Taylor, 2000; Persing, 2005; Bradley and Kawamoto, 2007). Midface reconstruction and bone grafting are performed in older children (6-9 years of age). Orthognathic procedures are delayed until skeletal maturity (14 years of age or older). When needed, bone grafts to restore the orbital rim and the maxilla must be done simultaneously (Bradley and Kawamoto, 2007)

A technique using lateral cantholysis, lateral tarsoconjunctival-skin flap, and medial canthopexy may help prevent ectropion and achieve the long-term stability of its surgical outcome in patients with oro-ocular Tessier clefts who had previously underwent other techniques with persisting ectropion. However, this technique had a shortage, the ectropion persisted in the Case #1, which might be caused by the scarring and tension formed after left nostril correction. Compared with Case #2, the ectropion on her eyes did not occur, because we did not correct her nostril. Accordingly, this technique might be best used for surgical correction that does not involve nose correction in a single-stage surgery.

While the number of subjects in our report are small and only involved a single-centered study, we were able to analyze the long-term results of this technique. In order to confirm and clarify our findings, a larger multicenter study is necessary.

Conclusions

This combined technique of lateral cantholysis, lateral tarsoconjunctival-skin flap and medial canthopexy for the treatment of lower eyelid ectropion within the oro-ocular cleft reconstruction can provide remarkable results for a complex issue and is a better option when nose correction is not involved simultaneously.

Declaration of Conflicting Interests

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Informed Consent

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