A New Technique Using Modified Dehaan's Method for Median Cleft Lip Closure: A Case Report

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(Received April 24, 2019; Accepted May 28, 2019)

Objective: Median cleft lip is an extremely rare congenital abnormality that can be classified into "true" (characterized by true tissue separation) and "false" (caused by holoprosencephaly). We report a patient with true median cleft lip who underwent cheiloplasty using the surgical procedure for bilateral cleft lip.
Methods: The subject was a girl, who presented with mild orbital hypertelorism. Alveolar cleft with midline cleft lip extending slightly to the white lip, and anterior basal meningocele was observed. The patient was in good general condition and had undergone cheiloplasty using modified DeHaan's method at 5 months of age.
Results: In many reports to date, surgical procedures for median cleft lip could not avoid leaving a scar on the midline; however, in the present case, we were able to achieve a clear Cupid's bow with an unremarkable scar consistent with the philtral columns. Furthermore, a nostril sill had formed in the flat base of the nasal cavity. The morphology of the opened nostril base also improved.
Conclusion: This procedure is only indicated for patients with mild cleft. However, better esthetic surgical outcomes are generally requested for milder original deformations. This surgical procedure was effective in esthetically improving the median cleft lip.

Key words: true median cleft lip, cheiloplasty, surgical procedure, bilateral cleft lip, esthetic outcomes

INTRODUCTION

Median cleft lip is an extremely rare congenital abnormality with an incidence accounting for 0.43%–0.73% of lip alveolus and palate cleft [1]. Median cleft lip malformations are classified into "true" and "false." False median cleft lip is one type of holoprosencephaly (DeMyer classification type IV), characterized by median tissue defect. It is reported to be accompanied by orbital hypotelorism, encephalopathy, considerable mental retardation, and extremely poor prognosis, wherein most cases die within 1 year [2]. Conversely, true median cleft lip presents tissue separation caused by the cleft, with orbital hypertelorism, and mild or absent encephalopathy arising in normal psychomotor development, and prognosis is considered to be good. Therefore, surgery is performed to treat most patients with true median cleft lip. True median cleft lip ranges from severe cases with bifid nose to mild cases limited to only part of the lips [3]; however, surgical procedures reported to date have mostly been designed for midline suture closure [1, 4–9]. Although scarring cannot be avoided in patients with severe lip and nose deformation, in mild cases, it is preferable to not scar the midline of the white lip. Furthermore, with midline suture closure, it is sometimes impossible to completely repair the Cupid's bow and the wide nose form. We report successful treatment of a patient with mild true median cleft lip by cheiloplasty using the procedure for bilateral cleft lip, with good esthetic outcomes.

PATIENT AND METHOD (CASE REPORT)

Clinical findings

The case subject was a Japanese girl born at 39 weeks and 2 days of gestation. No clear abnormalities were noted during the perinatal period. The subject had median cleft of the upper lip and was thus referred to the department of plastic surgery at 10 days of age. Her family history revealed that her maternal grandmother also had cleft lip. At the initial consultation, the patient presented mild orbital hypertelorism. Median cleft lip was observed extending slightly from the red lip to the white lip. The intra-alar distance and nostril base width were slightly enlarged, whereas the philtrum was severely concave and extended to alveolar cleft. Median alveolar cleft with bifid upper labial frenum were observed (Fig. 1). The subject had a normal 46XX karyotype. Computed tomography of the head revealed a bone defect in the median portion of the anterior skull base, from which meningoceles protruding into the nasal cavity was confirmed (Fig. 2). The cerebral parenchyma was normal. Based on these findings, true median cleft lip was diagnosed. The patient was in good general condition and was developing well. Therefore, cheiloplasty was planned to be performed at 5 months of age. The investigation conforms with the principles outlined in the Declaration of Helsinki.

Intraoperative findings

Cheiloplasty was performed under general anesthe-

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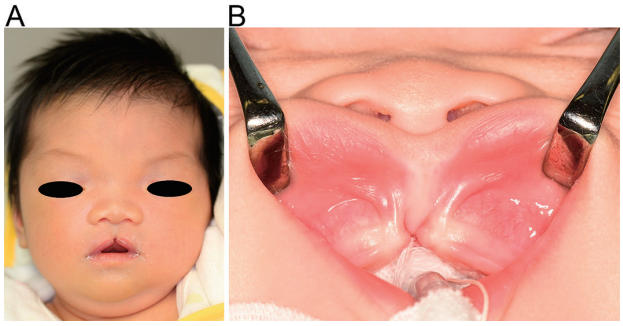

Fig. 1 Patient's facial appearance
A. Mild orbital hypertelorism with median cleft lip extending slightly to the white lip, and a wide spread nose were observed.
B. The skin of the white lip continued into the oral cavity, and bifid upper labial frenum with median alveolar cleft were observed.

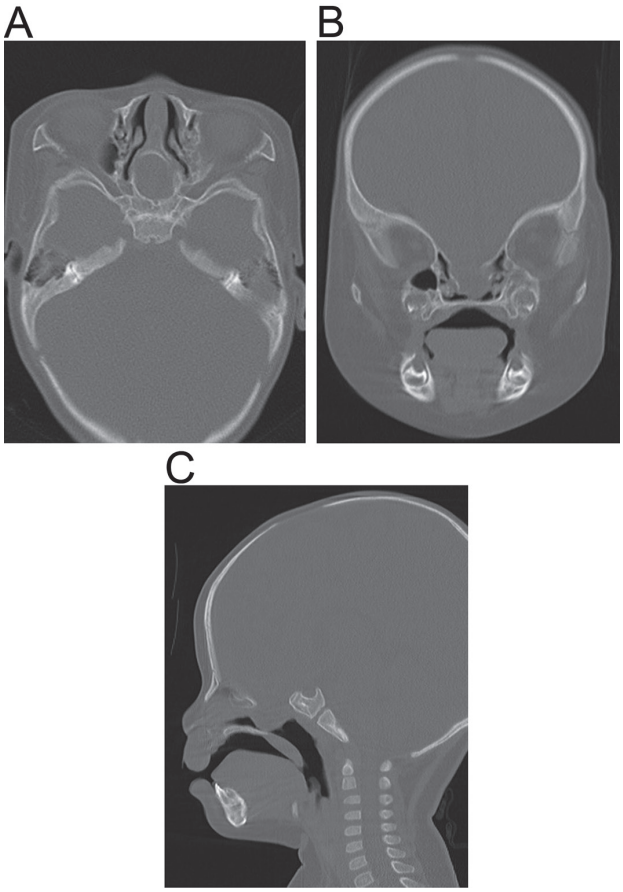

Fig. 2 Computed tomography findings of the head and face
A. An area of bone defect can be seen in the front midline of the axial sphenoid.
B. Coronal, and C. Sagittal plane: meningocele is protruding into the nasal cavity.

sia (Fig. 3). The philtrum was treated as a prolabium of the bilateral cleft lip using the modified DeHaan's method [10]. The distance from the trough to the apex of the Cupid's bow was 4 mm, and the tip of the philtrum skin flap was designed in a V-shape. For consistency with the philtral columns, an incision was made in a straight line from the columellar base to the apex of the Cupid's bow. The nostril base incision was made in an L-shape along the nostril sill. The orbicularis oris muscle continued along the midline

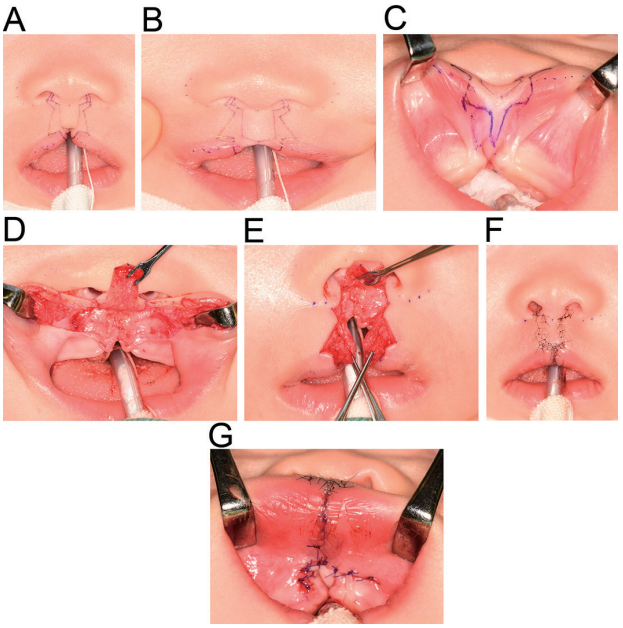

Fig. 3 Intraoperative findings
A. Preoperative design. Considering the philtrum as the prolabium in bilateral cleft lip and to match the philtral columns, we decided to adopt a straight line design from the columellar base to the apex of the Cupid's bow. An L-shaped incision was made into the nostril base along the nostril sill.
B. The distance from the trough to the apex of the Cupid's bow was 4 mm, and the tip of the philtrum skin flap was designed to open in a V-shape.
C. The bifid upper labial frenums were sectioned, and a deep oral vestibule was formed by advancement of mucosal flaps from the left and right sides to the midline.
D. When the philtrum skin flap was raised, dissection under the orbicularis oris muscle was performed.
E. The orbicularis oris muscle continued along the midline, but was thin; therefore, dissection was made to the lateral commissure, and upon sufficiently adjusting at the midline, the muscle was closed with sutures.
F. and G. At surgery completion.

but was thin. Therefore, dissection was made to the lateral commissure. Upon sufficiently adjusting at the midline, the muscle was closed with absorbable sutures. At this point, the alar base, which had spread laterally, was pulled medially. The wide nostril base width was corrected by trimming the skin of the nostril base. Both bifid upper labial frenum were sectioned, and a deep oral vestibule was formed by advancement of mucosal flaps from the left and right sides to the midline. There were no intraoperative complications.

RESULTS

Following surgery, the patient's general condition was good. On postoperative day 4, the sutures were removed, and the patient was discharged from hospital the following day. The white lip was taped for 3 months. At present, 6 months after surgery, the white lip scar is consistent with the philtral columns and unremarkable. The form of the Cupid's bow is good and clear. A nostril sill has formed at the flat nostril base that had been spread open. The alar base pulled

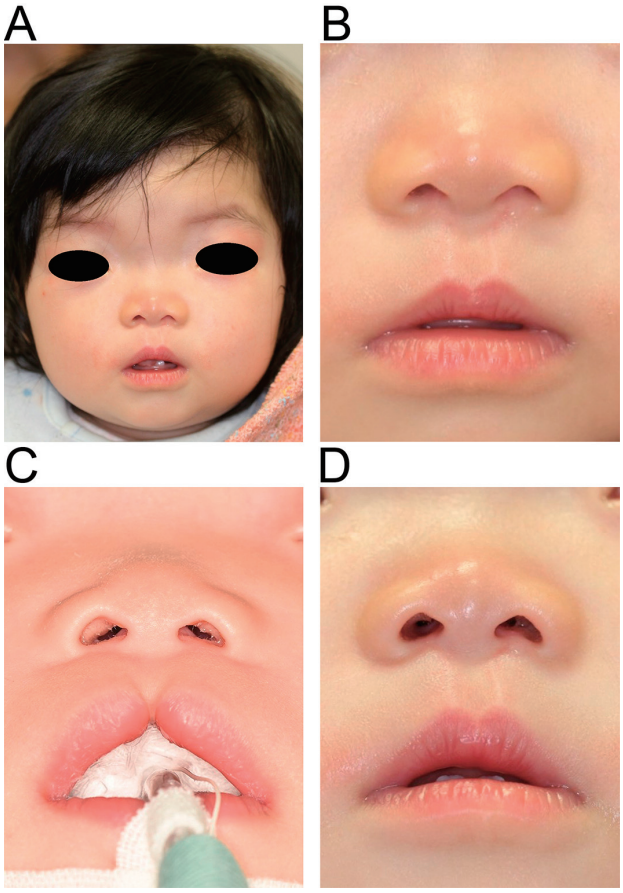

Fig. 4 Findings at 6 months after surgery
A. The nasal width had improved, and a good balance in the lip and nose shape had formed.
B. The scar coincides with the philtral columns and is unremarkable. The shape of the Cupid's bow is clear.
C. Preoperative and D. Postoperative comparison. A nostril sill had formed at the flat nostril base that had been wide. The alar base that extended wide laterally was pulled closer to form a three-dimensional shape.

medially had resulted in an appropriate width, and its form has become three-dimensional (Fig. 4). To treat the meningocele, surgery is scheduled to be performed at a later date at the department of neurosurgery.

DISCUSSION

The surgical method

Several reports can be found on surgical procedures for true median cleft lip. In 1968, Millard [4] reported an inverted V excision for mild to moderate cases. Later, Millard reported that making an incision at a 90° angle, 2 mm above the mucocutaneous white roll lengthens the central skin of the Cupid's bow, forming a natural shape, and enabling protrusion of the upper labial tubercle [5]. By contrast, Springer [6] performed cheiloplasty by wedge excision alone based on the assertion that if there is sufficient tissue in both halves of the midsection of the vermillion, then there is no need for a 90° angle in the design. For incomplete cases, Wiemer [7] conducted rhomboid sectioning and suture of the skin and mucous membrane. In doing so, it was reported that the orbicularis oris muscle was sutured after sectioning the atrophic fibrotic band in the center of the orbicularis oris muscle. Topkara [8] reported a method for patients with cleft lip extending to the lower half of the philtrum, whereby the columella is extended using a V-Y advancement flap without tissue excision, and the upper lip is lengthened upon matching triangular flaps from cleft margin of the bilateral red lips. Koh [9] conducted inverted U excision in four patients and reported that the midline scar was unremarkable. All of these surgical procedures leave a midline suture line, and there are no reports wherein the bilateral cleft lip design has been applied.

The method that we used for the present case is a modified version of the procedure for bilateral cleft lip reported by DeHaan in 1968 [10]. The original design uses a wide skin flap, and the lower margin of the prolabium skin flap is arc-shaped, including the vermillion border. However, in our method, to match the philtral columns, we narrowed the flap width and made the lower margin of the flap as a slightly curved V-shape to be able to form a clear Cupid's bow. The advantages of our method are that the scar is consistent with the philtral columns and unremarkable, a clear Cupid's bow can be formed, the enlarged nose width and form of the alar base can be corrected so as to adequately match the orbicularis oris muscle, and a nostril sill can be formed. However, the indication of this procedure is limited to patients with mild median cleft lip, patients in whom the philtrum is approximately half the height of the white lip, and patients without a mass that requires midline resection. Even if the philtrum skin flap is short, its length will extend to match the length of the bilateral white lip as the patient grows.

Looking at case reports of bilateral cleft lip associated with holoprosencephaly, there is a case in which a rudimentary short skin flap created in the stunted prolabium was extended sufficiently after 3 years [11].

The relationship between anterior basal meningocele and true median cleft lip

Basal meningocele is said to occur in 1 out of 35,000 births [12]. Meningoceles are classified into subtypes according to the site of bone defect through which they protrude. Among these, it has been reported that transethmoidal type, sphenoethmoidal type, and transsphenoidal type are anterior basal meningoceles and are related to true median cleft lip [12–14]. Our patient presented sphenoethmoidal type protruding from between the ethmoid and sphenoid into the nasal cavity, but did not present nasal obstruction and respiratory distress, which are considered primary symptoms. In patients with cleft palate, it appears as a mass from within the oral cavity into the nasal cavity; however, in the event of patients without cleft palate who are asymptomatic, such as our patient, it cannot be detected without performing diagnostic imaging. Therefore, in pediatric patients with true median cleft lip, diagnostic imaging should be performed considering the possibility of concurrent basal meningocele.

CONCLUSION

We obtained good lip and nose morphology using the bilateral cleft lip surgical procedure for a patient with true median cleft lip.

Following surgery, a natural scar formed coinciding with the philtral columns, and the procedure was

effective for forming a clear Cupid's bow while also improving the wide alar base shape.

ACKNOWLEDGEMENTS

The authors would like to thank ulatus(www.ulatus.jp) for the English language review.

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