New Technique for Correction of the Microform Cleft Lip Using Trans/Intraoral Approach

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Received: 8 October 2012 / Accepted: 6 February 2013 / Published online: 21 February 2013
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Abstract The traditional method of treating microform cleft lip with nose deformity uses upper lip external incision, finally leading to a small scar on the upper lip. Hereafter, we present a new method for the correction of microform cleft lip using trans/intraoral approach. The new surgical technique is characterized as (1) using trans/intraoral approach and no incisions on the skin of the upper lip, (2) reconstruction of the “cross” muscular structure using the abnormal muscular insertions at the base of nasal columella and the nasal alar to restore nose deformity, and (3) repair of the lip deformity using two small Z-plasties to get the aesthetic and functional outcome. Thirty patients with microform cleft lip were repaired with our technique, and good functional and aesthetic results of repaired noses and upper lips were obtained in most cases.

Keywords Microform cleft lip · Nose deformity · Trans/intraoral approach · Surgical technique

Introduction

Cleft lip is a common disease caused by the non-fusion of the frontonasal process and the two maxillary swellings, finally leading to abnormal facial development before birth.

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Cleft lip has variations of congenital deformity. Moderate and severe forms of cleft lip are usually treated with a traditional surgical technique such as Millard's technique, cutting from the floor of the nose to the vermilion border, to repair lip and nose deformity. A traditional technique can give the patients a relatively satisfactory repair effect, although scar will be left on the skin of the affected upper lip [1]. A mild form of cleft lip is microform cleft lip, which appears as small as a little dent in the vermilion or looks like a “scar” from the lip up to the nostril [2]. Owing to aesthetic and functional need, most microform cleft lip cases need reconstructive surgery. However, it is difficult to get a satisfactory effect if microform cleft lip is treated with a traditional surgical technique, because the deformity of microform cleft lip is mild and a traditional technique would leave a real scar on the skin of the affected upper lip. For this reason, we developed a new technique only for microform cleft lip using trans/intraoral approach. The new approach can reconstruct the upper lip and nasal structures with good functional and aesthetic results and without leaving a scar on the skin of the upper lip. Our technique is described below.

Patients and Methods

Between January 2012 and April 2012, 30 patients were treated with microform cleft lip deformities using trans/intraoral approach. All the patients had various certain upper lip and nose deformity.

Surgical Techniques

The orbicularis oris muscle is a complete sphincter of the opening of the oral cavity in the normal human

being. In the unilateral microform cleft deformity, muscle fibers of orbicularis oris have both an abnormal direction and insertion although the majority of the orbicularis oris muscle is intact and forms a sphincter with only the small portion of the orbicularis oris muscle divided at the cleft margins. The abnormal direction and insertion of muscle fibers result in the lip and nose deformity. Considering that the primary goal of lip repair is to reconstruct a functional lip and nose with a normal appearance, surgical design should be based on this principle as well as the severity of the cleft and the shape of the nasal philtrum.

Surgical Design for Trans/Intraoral Approach

The intraoral incision has two components: the first component is the vermilion incision, which starts at the highest point “a” at the mucocutaneous junction of the unaffected vermilion border, through the lowest point “b” of the affected vermilion border; then, the incision goes inside the oral cavity towards the maxillary vestibular groove along with the natural dent on the mucosal side of the upper lip. This is the trans/intraoral full-thickness incision except the skin of the affected upper lip. The extension of this second component contains two small Z-plasties, which depends on the severity of the cleft lip. One is located at the vermilion border, which is in charge of restoration of the appearance of the upper lip. The other is located at the mucosal side of the upper lip, which is in charge of adjusting the length of the mucosal flaps (Fig. 1a, b).

Nasal Reconstruction

Along with intraoral incision, the mucosa is subcutaneously exfoliated with sharp scissors until the abnormal muscle insertions are exposed and fully relaxed, the attachment of abnormal muscle insertions at the base of nasal columella and the nasal alar, and the connection between the affected nostril and the skin and between the affected nostril and greater alar cartilage. Then, the orbicularis oris muscle at the unaffected side is turned toward the affected nasal alar and fixed with the alar part of nasal muscle. The orbicularis oris muscle at the affected side is turned toward the affected nasal alar and connected with the alar part of nasal muscle. The reconstructed “cross” muscle structure can provide the enough strength for restoring the deformity of the nose base, nasal nolumella, and nostril and make the reconstructed nose with good functional and aesthetic outcome. Meanwhile, the cross muscle structure makes more muscle under the skin of a previous cleft, which changes the previous “dent” appearance skin to a philtrum ridge-like aesthetic appearance (Fig. 1c–e).

Fig. 1 Our trans/intraoral approach for unilateral microform cleft lip repair. Abnormal muscle insertions in the microform cleft lip patients are shown in **a**. The trans/intraoral incision starts at the highest point “a” at the mucocutaneous junction of the unaffected vermilion border, through the lowest point “b” of the affected vermilion border (**a**); then, the incision goes inside the oral cavity towards the maxillary vestibular groove along with the natural dent on the mucosal side of the upper lip (**b**). Black lines show the incisions in the vermilion of the affected upper lip (**a**), intraoral incision (**b**), and its corresponding incision among the abnormal muscle insertions (**c**). Along with intraoral incision, the mucosa is subcutaneously exfoliated with sharp scissors until the abnormal muscles insertions are exposed and fully relaxed (**c**); then, the “cross” muscular structure is reconstructed to repair the nose deformity (**d**). The orbicularis oris muscle underneath the vermilion of the upper lip is adjusted through side-to-side closure using absorbable sutures of 5/0 catgut. Finally, two small Z-plasties are used to repair the lip deformity for getting the aesthetic and functional outcome. The muscular structures before and after operation were shown in **e** and **f**, respectively. Note: ① orbicularis oris muscle at the unaffected side, ② orbicularis oris muscle at the affected side, ③ nasolabialis, ④ alar part of nasal muscle

Orbicularis Oris Muscle Reconstruction

After reconstruction of the cross muscle structure at the nasal base, the orbicularis oris muscle underneath the vermilion of the upper lip is adjusted through side-to-

side closure using absorbable sutures of 5/0 catgut. Meanwhile, the first Z-plasty is performed as described in Fig. 1, starting at points a and b, respectively, and making a mucosal incision at the mucocutaneous junction of the cleft margin. The length of the two incisions is dependent on the severity of the cleft lip. Then, the two lobes are exchanged in location, and points a and b will be at the same point after operation, forming the Z-plasty to restore the aesthetic appearance of the upper lip (Fig. 1a).

Design of Mucosal Z Flap and Suturing

After muscle reconstruction, the closure of the mucosa and vermilion of the lip is performed with 2-octyl cyanoacrylate (Dermabond). The mucosal Z flap (the second Z-plasty) for elongation is designed to avoid contracture of the scar (Fig. 1a, b).

Case Report

A 19-year-old female patient presented with microform cleft lip with nasal deformity. Physical examination revealed a depressed deformation from the vermilion to the nasal base on the left upper lip. Her left nostril was bigger and more flat than her right one (unaffected nostril). The trans/intraoral approach was performed in April 2012. A 1-month follow-up showed a well-maintained symmetric lip and nose base, nasal columella, and nostril (Fig. 2).

Discussion

Owing to the existence of nasal deformity, skin of the affected lip must be incised in order to repair the deformity in the traditional surgery for microform cleft lip [3]. This surgical method inevitably results in skin incision scar on the upper lip, which is difficult to be eliminated. Because the defect and displacement of tissues in the microform cleft lip patients are relatively slight, once scar hyperplasia or contracture occurs, patients would feel “aggravated abnormality” and thus would not accept the treatment effect [4, 5]. According to a questionnaire survey on traditional treatment effect among the postoperative patients in our hospital, the results showed that the satisfactory rate in patients with microform cleft lip was far less than that in patients with a third-degree cleft lip.

The key aim of surgery for microform cleft lip is to repair nasal deformity, reconstruct philtrum ridge, and restore the aesthetic appearance of the upper lip. For considering functional and aesthetic need, the best way is to avoid the skin of incision. This is the reason that

we develop the trans/intraoral approach for repairing the deformity of microform cleft lip.

As for the repair of microform cleft lip deformity by using the trans/intraoral approach, it will be necessary to design a lower white-lip triangular skin flap, which aims at resolving the issue of reduced height of the affected lip peak. The side length of the triangular skin flap should not be too long so as to avoid the issue of excessively reduced height of lip peak and excessively tight lower part of the upper lip. Vermilion border triangular skin flap aims at correcting depressed incisura at the affected vermilion border, which will be conducive in forming the vermilion tubercle as well as avoiding postoperative straight-line depression caused by a straight-line scar of the vermilion border.

The trans/intraoral surgical approach was well fitted for patients suffering from microform cleft lip with nose deformity. Our technique has several advantages compared with the traditional method mentioned above. First, this technique is easy to be performed and little tissue is wasted, which cannot only restore subcutaneous bulk and mucosal surface at the same time but also leave no scar on the skin of the upper lip. Second, since the tissue flaps used in this method are well vascularized, it usually heals with no risk of infection. Third, the trans/intraoral technique can simultaneously repair the lip and nose deformity, which provides satisfactory functional and aesthetic outcome after operation and lowers the risk of reoperation for unrepaired deformity, especially for restoration of nasal deformity.

Fig. 2 A female patient with microform cleft lip and nose deformity which was restored by using our trans/intraoral approach. **a** Microform cleft lip appearance before operation, **b** operation by using the trans/intraoral approach, **c** lip appearance on 1 month postoperation, **d** deformity found in the left nose base, nasal columella, and nostril before operation, and **f** nose deformity was restored 1 month postoperation

Acknowledgments We thank Dr. Yongqian Wang, Dr. Hengyuan Ma, Dr. Di Wu, Dr. Bo Chen, Dr. Quwen Jing, Dr. Haizhou Tong, and Dr. Li Jia for their help in this project.

Conflict of interest None.

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