ORIGINAL RESEARCH

The Clinical Observation of Stage I Unilateral Cleft Lip Operation was Performed According to the Contour of the Mouth and Nose

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ABSTRACT

Objective • To evaluate the clinical efficacy and aesthetic outcomes of first repair surgery designed along the lip-nasal contour lines for unilateral cleft lip.

Methods • According to the characteristics of cleft lip deformity, 54 patients with stage I unilateral cleft lip were treated by operation, and the nasal and oral contours were used as surgical incisions. The surgical method has the following characteristics: 1) The surgical incision line is designed on the contour line of the mouth and nose, which is easy to hide; 2) Fully peel and release the attachment points of malformed tissue, and reasonably restore and rebuild the function of orbicularis orbicular muscle; 3) The alar cartilage and mucosa of the affected side rotated inward and outward upward, and the medial foot of the alar cartilage turned outward and downward to correct the alar cartilage of the affected side; 4) Using mattress sutures for lip muscle alignment to reconstruct the ridge height on the affected side.; 5) Maintain the integrity of human ridge skin. The nasolabial effect and symmetry were observed.

Results • Patients with ipsilateral upper lip shape, lip peak length, nostril size, the morphology of nasal columella, nose shape, and nasal base collapse degree exhibited significant improvement compared to preoperative measurements. The postoperative nose and lip shapes closely resembled normal anatomical features, with minimal scarring and high levels of patient satisfaction regarding the plastic surgery outcome.

Conclusion • Based on the morphology of the oral and nasal regions, cicatricial camouflage following primary unilateral cleft lip repair can yield favorable aesthetic outcomes and represents a viable clinical approach. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

As we all know, Unilateral cleft lip with or without cleft palate is one of the most common birth defects, with a reported incidence of 0.1 to 2.1 per 1000 births, with rates varying by ethnicity. The incidence of cleft lip and palate varies by ethnicity, with 1 in 2000 births among African Americans, 1 in 1000 among Caucasians, and 1 in 450 among Asians and Native Americans.The prevalence of left cleft lip is twice that of right cleft lip, and unilateral cleft lip is 9 times more common than bilateral cleft lip. Common surgical techniques employed in the primary surgical management of cleft lip include the Davies double triangle flap, Tennison lower triangular flap, Millard rotation-advancement flap, Salyer procedure, Noordhoff technique, etc.[1-5]

However, the aforementioned surgical methods may compromise the skin anatomy of the lip ridge. During phase II repair, the initial surgery's impact on normal skin contour can result in challenging postoperative scar removal and incomplete correction of nasal deformities, posing difficulties for subsequent surgical repair.

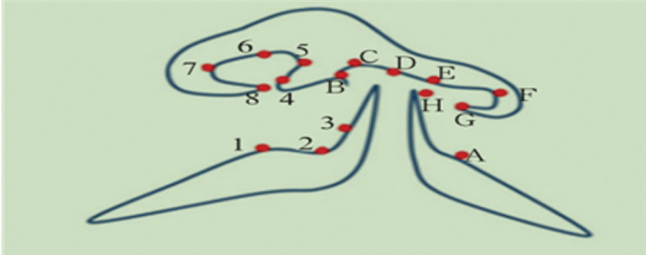
In order to address the aforementioned issues, taking into consideration the anatomical characteristics of cleft lip and nasal deformity in clinical practice,[6] an anatomical and mechanical analysis[7-9] was conducted to establish a reference line for operation design based on the horizontal line of inner canthus and the vertical line in the middle of the face. By carefully examining the curved profile of the nose and lip, a stage I cleft lip operation method was gradually developed with surgical incisions aligned with the curved profile of the mouth and nose.[10-11] The following section introduces this surgical approach.

MATERIALS AND METHODS

Case selection

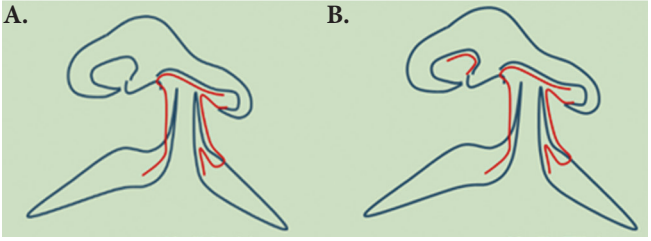
A total of 54 children with unilateral cleft lip, including 30 males and 24 females, who participated in Operation Smile International from March 2018 to March 2020 in Yunnan

Figure 1. Schematic diagram of the mark



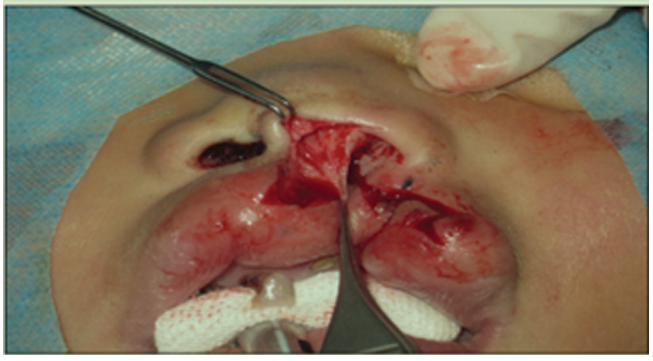
Note: 1: healthy lip peak; 2: middle notch; 3: affected labial peak; 4: healthy side of the nasal column base; 5: healthy side nasal column Angle; 6: healthy side nostril notch; 7: healthy side nasal wing fullness (auxiliary point); 8: healthy side nasal sill notch; A: affected labial peak; B: The base of the affected nasal column (before surgery); C: the base of the affected nasal column (after surgery); D: Angle of affected nasal column; E: affected nostril notch; F: the fullness of the affected nasal column (auxiliary point); G: notch of affected nasal sill; H: skin triangular flap point; 14=3BC, 45=CD, 56=DE, 678=EFG, 84=GC, 18=AG, 145678=A (3) BCDEFGH.

Figure 2. Schematic diagram of surgical incision



Note: A: incisions on the affected side of the human crest, the edge of the nasal column, and the edge of the nostril; B: At the same time, cut the healthy nasal column and the skin on the side of the nostrils to facilitate the repair of the altar.

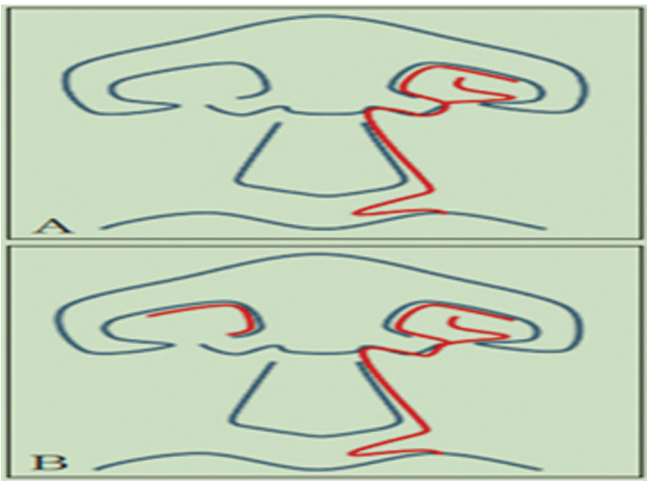
Figure 3. Stripping of alar cartilage



Province were selected. The minimum age was 6 months, the maximum age was 12 years, and the average age was 3 years and 5 months. All the patients received stage II cleft lip surgery with the curved contour of the mouth and nose as the incision. The minimum postoperative follow-up was 1 month, the longest was 24 months, and the average was 9 months.

Inclusion criteria: (1) Patients with non-syndromic cleft lip, aged over 6 months, weighing over 7kg, and without other facial deformities; (2) To conduct various examinations to rule out any contraindications; (3) All patients underwent the initial operation. Such patients are better able to tolerate general anesthesia and improve surgical safety.

Figure 4. Schematic diagram of postoperative incision



Note: A: incisions on the affected side of the human crest, the edge of the nasal column, and the edge of the nostril; B: At the same time, cut the healthy side nasal column and the skin on the side of the nostril.

Surgical method

Surgical marker. The healthy side is marked with numbers, and the affected side is marked with English letters to facilitate the marking of the healthy side and the affected side (Figure 1).

Surgical incisions. Surgical incisions were made with the human crest, the edge of the nasal columella, and the edge of the nostril on the affected side (as shown in Figure 2A). If the surgeon has difficulty peeling and stitching the alar cartilage, the healthy nasal column and the skin of the nostril can be cut at the same time to facilitate the repair of the alar (see Figure 2B).

Surgical procedure. The procedure connects the 3BCDE and AGH, the human cristae, the base of the nasal column, the nasal sill, the nasal sill notch, the nasal column, and a curved contour curve at the edge of the nostrils. 1) Release and separate tissue: detach the lip skin and orbicularis orbicular muscle, release the orbicularis orbicular muscle with abnormal attachment, and dissect the orbicularis orbicularis muscle from the skin and Oral mucosa**.** The skin and alar cartilage were peeled off, and the affected side and the healthy side of the medial foot were separated. The medial foot of the affected side of the alar cartilage could rotate to the designed position as well (Figure 3). 2) Tissue trimming and suture: suture alar cartilage, orbicularis oris muscle, nasal threshold, and nasal base, and suture lip skin after reducing tension. Trim the skin of the affected side of the nostril edge and the healthy side after symmetry interrupted suture. The mucosal flap of the affected side is inserted into the healthy side to form the labial bead and the parabolic groove. 3) Strengthening of alar groove contour line: 1~2 stitches can be made through the alar groove contour line and nasal mucosa to form the alar groove contour.

Diagram of the wound after surgery. The surgical incision is a curved curve following the nasolabial contour (Figure 4).

Postoperative management. According to the conventional treatment after cleft lip surgery, wear nose mold for 6 months, postoperative anti-scar treatment to prevent scar hyperplasia.

RESULT

The sutures were removed 5 to 7 days post-surgery, and the wound healed without complication. The follow-up period ranged from 1 to 24 months, with results indicating significant improvements in upper lip shape, lip peak length, nostril size, nose column shape, nose column beam shape, and nasal base collapse degree compared to pre-surgery measurements. These improvements were not found to be significantly correlated with the length of follow-up. The appearance of the nasolabial region approached normalcy, and postoperative contour scarring was minimal. (Postoperative case photos can be seen in Figure 5.)

Figure 5. Typical case

Note: A: Before surgery; B: Immediately after surgery; C: One year after surgery.

DISCUSSION

The Millard operation is the most common method of traditional cleft lip repair. Various subsequent operations, such as Molder's and Noordhoff's, can be understood as variations of this operation, the basic principle of which is to use rotary propulsion to reduce the lip peak. The difference lies in the design and utilization of the C-flap. The method of rotary propulsion has obvious advantages. This kind of surgery avoids additional incisions in the lower part of the white lip, which makes the affected side more natural. The application of the C flap is more conducive to the formation of the nasal base, and in some surgeries, it can even facilitate the upward lifting of the nose tip. However, there are also many defects in the method of rotary promotion. When the patients are young in the first stage of surgical repair, various anatomical marks are difficult to identify, and complete anatomical reduction is often not guaranteed.

Secondly, bone and chondro developmental malformations associated with cleft lip will continue to appear with age, so most patients with cleft lip will show lip and nose malformations with age. The nasal column is short and oblique, the nasal wing is obviously evaporative displacement and collapse, the affected side nostril is transverse, the nose tip is collapsed and blunt, the upper lip width is basically normal, and the affected side lip height is obviously insufficient. This deformity is the most common clinical nasal deformity secondary to cleft lip[1,4,5].

Based on the fine contours of the healthy side of the nose and lip, the characteristics of the cleft lip rectification operation on the affected side were designed.

Based on the normal anatomic marks of the lip and nose, the human crest, the base of the nasal column, and the nasal sill were selected in the surgical design of unilateral cleft lip. The surgical contour of this method is connected with the fine contour of the nasal sill notch and the contour of the nostril edge. This surgical method has the following characteristics: 1) The surgical incision line is designed on the curved contour line of the mouth and nose and overlaps with the curved contour line, which makes it easy to conceal postoperative scar; 2) Sufficient dissection to release abnormal attachment of malformed tissues. 3) The alar cartilage and mucosa of the affected side rotated inward and upward, and the medial foot of the alar cartilage turned outward and downward to correct the alar cartilage of the affected side. 4) Overlapping of lip muscles or mattress suture to increase the height of the human crest on the affected side. 5) Can maintain the integrity of human ridge skin. 6) Postoperative scar on the contour line is conducive to stage II repair, which lays a good foundation for stage II repair. In stage II repair, it is only necessary to open the original incision and do some subtle symmetrical repair and scar repair.

According to the profile design of unilateral cleft lip nose and mouth reconstructive operation method, through to the nose lips curved contour measurement and microscopic study, combined with the characteristics of the cleft palate deformities, from the anatomy of the nose, lip and mechanics analysis, refer to the center of the horizontal and vertical line, gradually formed to nose and mouth curved contour line incision, repair for nasal lip shape integrated as a whole, The surgical method is the combination of oral and maxillofacial surgery specialty and beauty, this method is applied to clinical, has obtained the good effect of repairing function and appearance to repair, after meeting the needs of nasolabial appearance beauty, this method is worthy of clinical popularization and application

Problems to be noticed in surgical marker

Attention should be paid to the following points: 1) A refers to the distance from 1, 8, and G to the corner of the mouth. 2) 3BC will become the new medial ridge of the affected side after surgery, and 4C will become the boundary between the nasal column and the lip, which is the base of the nasal column. 3) Part of the patients with not very serious lip height defects may be close to point B and point C; 4) In the actual operation, the labial arch skin was sutured first, and the design points B, C, and H were adjusted slightly according to the appearance of the nasolabial.

Problems to pay attention to during the operation

Release and separate: 1) Healthy lip: the mucous flap is used to separate the skin of the lip and the orbicularis oris, cut the base muscle of the nasal column, and peel the orbicularis oris and the skin from the maxilla on the deep

side of the orbicularis oris so that the skin and the skin can move easily. The skin and the orbicularis oris can not be peeled off or slightly, as long as the affected side and the healthy side can be sutured. 2) Lip of affected side: mucous flap to be used, cut or peel off the orbicularis oris muscle and the wrong attached muscle at the edge of the maxilla and piriform foramina, peel off the orbicularis oris muscle from the skin and the mucosa between the oral mucosa. 3) Nasal part: Skin and alar cartilage and part of lateral alar cartilage were peeled off, and the affected side was separated from the healthy side of the medial foot. During peeling, the affected side was separated to the edge of septal cartilage or part of septal cartilage, and the principle was that the medial foot of the alar cartilage could rotate to the designed position and the mucosa could be sutured to close the nasal floor.

Points for attention during tissue trimming and suture: 1) Suture nasal threshold nasal bottom: Generally, the suture of nasal bottom mucosa can directly close the nasal bottom after the release of cleft lip. The nasal threshold is the boundary between the inner nasal cavity and the outer nasal cavity. Attention should be paid to the symmetry and ventilation function when stitching the nasal threshold compared with the healthy side. 2) Suture of alar cartilage: After the skin and cartilage of the nose are peeled off, the alar cartilage is sutured to complete the inward and upward rotation of the alar cartilage and nasal mucosa on the affected side, and the downward and outward rotation of the medial foot of the alar cartilage on the affected side, so that the medial foot of the alar cartilage on the affected side is restored to the normal position. 3) Suture of orbicularis orbicularis muscle: start from the lower lip and gradually suture in the direction of the nasal column. The suture of the orbicularis oris muscle near the nasal column plays a key role in reducing the lip peak of the healthy side (near the affected side) and improving the tissue of the affected side. Due to the congenital unbalanced distribution of the perioral muscle bundles on both sides, the suture methods of opposite suture, mattress suture, and superimposed on the orbicularis orbicularis on the affected side should be adopted according to the principle of bilateral muscle force balance. 4) Treatment of the skin on the affected side of the nostril: there will be excess skin similar to a half-moon or triangle on the affected side of the nostril, which will be removed during the operation. During the removal, refer to the horizontal line and the median line, and pay attention to the symmetry of the two sides of the nostril and the nasal column.

Strengthening of alar groove contour line: 1~2 stitches can be used to suture the nasal mucosa through the alar groove contour line, to facilitate the formation of the contour and make the nasal skin, cartilage, and nasal mucosa fit.

The practice of this surgical method shows that it is feasible to design and operate the surgical plan according to the subtle features of the curved contour of the lip and nose and the characteristics of the deformity.

CONFLICT OF INTEREST

The author declares no competing interests.

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