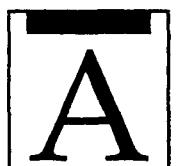


Major Revision of Cleft Lip With Limited Rhinoplasty

ARTICLE BY META HUESCH, CST



cleft lip is a congenital condition characterized by a vertical cleft or clefts in the upper lip possibly resulting from the faulty fusion of the median nasal process and the lateral maxillary processes, which contribute to facial development.¹ Nongenetic factors may also be responsible for this condition. It is usually unilateral and on the left side although it may be bilateral. It may involve the upper lip or the upper jaw alone or both structures and often occurs with cleft palate. The incidence of harelip is from 1 in 600 births to 1 in 1,250 births.²

If left uncorrected, cleft lip results in abnormal facial development. When cleft palate is also present, problems from sucking prevent proper feeding and speech difficulties may result, particularly when cleft palate is also present.

Anatomy and Physiology of the Region

The normal lip is marked by a symmetric vermillion with a full and mobile upper lip with a tubercle that provides fullness and a natural pout to the corner of the lip. The vermillion is bordered by mucous membrane beginning at approximately the free border of the lip, and by the "white line" or mucocutaneous ridge, between the vermillion and the skin of the lip. The center of the lip is highlighted by the philtrum with a roughly vertical ridge on either side. The ridges may be parallel to each other or may outline a shield-shaped philtrum of varying proportions. Dynamic func-

tion of the lip is provided primarily by the orbicularis oris muscle.³

In contrast to the normal lip, the unilateral cleft lip is an asymmetrical structure. The cleft may be complete or partial. The incomplete cleft includes gradually enlarging V-shaped defects passing from the inferior lip border toward the intact alar base. When this skin bridge is very minimal, it is referred to as a Simonart's band, and the cleft is essentially complete. These clefts also range from narrow to very wide and from an alveolar arch that is in relatively good alignment to one in which the premaxilla has an extreme amount of projection and outward rotation. The white roll at the mucocutaneous junction disappears as the mucosa turns upward to border the medial and lateral cleft margins. The medial side of the cleft remains attached to the

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premaxilla with a frenulum but tends to be more adherent and less pliable than the median part of a normal lip.⁴

In addition to the presence of the cleft, which creates a gap between the median and lateral segments of the lip (ie, tissue displacement), there is an overall tissue deficiency and asymmetry present on the cleft side of the lip. The vertical height of the lip on the cleft side is diminished as compared to the noncleft

side, the medial cleft margin is shorter than the lateral cleft margin, and the cleft side of the lip is shorter than the noncleft side in a horizontal dimension as well.⁴

The normal nose consists of symmetrically paired structures. The upper part is bony and consists of the paired nasal bones and frontal processes of the maxilla, supported by the perpendicular plate of the ethmoid and vomer (contributing to the nasal septum). The lower part is cartilaginous and consists of paired

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upper lateral cartilages and alar cartilages and the cartilaginous portion of the septum in the midline, supporting the columella and its base as a central strut. The lateral crus of each alar cartilage contributes to the alar base and the lateral wall of the alar; the medial crus contributes to the nostril sill, the medial wall of the alar, and the lateral margin of the columella; and the body of the alar cartilage contributes to the arch and shape of the alar cartilage and the dome of the nose. Two systems of intrinsic sphincteric muscles are present just above the mucosal surface and more superficially streaming above the cartilages. The floors of each nostril are of the same width. Alar grooves that blend inferiorly with a groove at the junction of the lip and alar base laterally surround the lower half of the nose.⁴

As occurs in all other areas of clefting, the cleft lip nasal deformity is due in part to a lack of tissue (the so-called "primordial nasal deficiency") due to the deficiency of primitive nasal ectoderm. This results in deformity and asymmetry of the paired nasal structures and is accentuated as growth occurs, with the key structures held in an abnormal, restricted position. The unilateral cleft lip nasal deformity varies with the severity of the cleft, and its typical features show a marked lack of symmetry. The septum is deviated and oblique so that the columellar base lies nearer the normal side of the nose than the tip. The inferior edge of the septum and the vomer are attached to the greater segment of the maxilla and present with the nasal spine in the noncleft nostril. Within the nasal cavity, the septum has a reciprocal curve and bulges into the cleft nostril's airway. The columella is shorter on the cleft side and slants obliquely. The major

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deformity is the malpositioned cleft alar cartilage. It is subluxated inferiorly and laterally and frequently folds into the vestibule. The medial crus may be in a more dorsal position relative to the columella on the cleft side, thus accounting for its shorter appearance. The lateral crus is displaced in a dorsocaudal direction, causing its caudal edge to jut out and accounting for the fold in the vestibule. It is thought that the cartilage acts to pull the skin and dome of the nose downward and outward, flattening the tip of the nose, pulling the domes of the cleft and noncleft alar cartilages apart, and obliterating the alar-facial groove as the cartilage joins the face at an obtuse angle. This inferior displacement of the alar cartilage, unless corrected at the time of the

lip repair, results in persistence of a drooped nostril associated with an intranasal fold obstructing the nostril aperture. The intrinsic nasal muscle, which in a normal state holds the cartilage up in its natural form, is attenuated and contributes to the obtuse angle between the medial and lateral alar crus and the obliteration of the alar facial groove.⁴ The upper lateral cartilages on the cleft side are in relatively normal position and the nasal bones, while relatively symmetrical, may have excess flaring and result in an overly broad nasion.⁴

Review of Patient: A Case Study

The patient, Miss X, was a three-and-a-half year old female whose chief complaint and present illness was a complete unilateral cleft of the lip and pre-palate with a flared and flattened nose.

Upon physical examination, a significant cleft lip deformity was observed. Primary surgery had been performed in Jamaica and the patient had been scheduled for secondary surgery but had moved. The first surgery had been performed without muscle repair across the defect. A widened scar was present with an irregular contour to the vermillion. The patient had a flared and flattened nose as a result of the cleft lip defect.

The patient was slightly anxious upon arrival to the operating room

as could be expected of a pediatric patient. The patient's nutritional status was excellent. Her fluid and electrolyte balance were normal as was her blood volume. She was free from infection and her heart, lungs, and kidneys were all functioning properly. Her vascular and nervous systems were also normal. All of her body systems were intact and functioning properly.

Case Set-Up

The surgical technologist first sets up the prep table draped with two sheets, the first open all the way

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and the second open halfway. Two small finger bowls, cotton-tipped applicators, sponges, a 25-gauge needle on a Rhode Island clamp, specimen cup, sterile towel, and a pair of gloves are placed on this table. The circulator pours povidone-iodine and chlorhexidine gluconate into the bowls and brilliant green into the specimen cup.

Next, the scrub sets up a regular operating room table. It is draped

Table 1. Surgical Instruments for Cleft Lip

Plastics Minor Set

2 No. 3 knife handles	2 Adson microforceps with teeth
2 Adson microforceps, smooth	2 Heavy Adson forceps
1 Adson Brown forceps	1 Forceps with teeth
1 Smooth forceps	2 Smooth plastic forceps
2 Plastic forceps with teeth	1 Pair curved iris scissors
1 Pair straight iris scissors	1 Pair curved Stevens tenotomy scissors
1 Pair straight microscissors	2 Metzenbaums
1 Pair straight Mayo scissors	12 Rhode Island clamps
6 Allis clamps	3 Webster needle holders
2 Fine regular needle holders	6 Small towel clips
2 Large towel clips	2 Baby thyroid retractors
2 Single hooks	2 Double hooks
2 Sharp, four-pronged plastic rakes	1 Pilling suction tip
2 Small finger bowls	1 Set plastic scissors

Calipers added along with the surgeon's own instrument set.

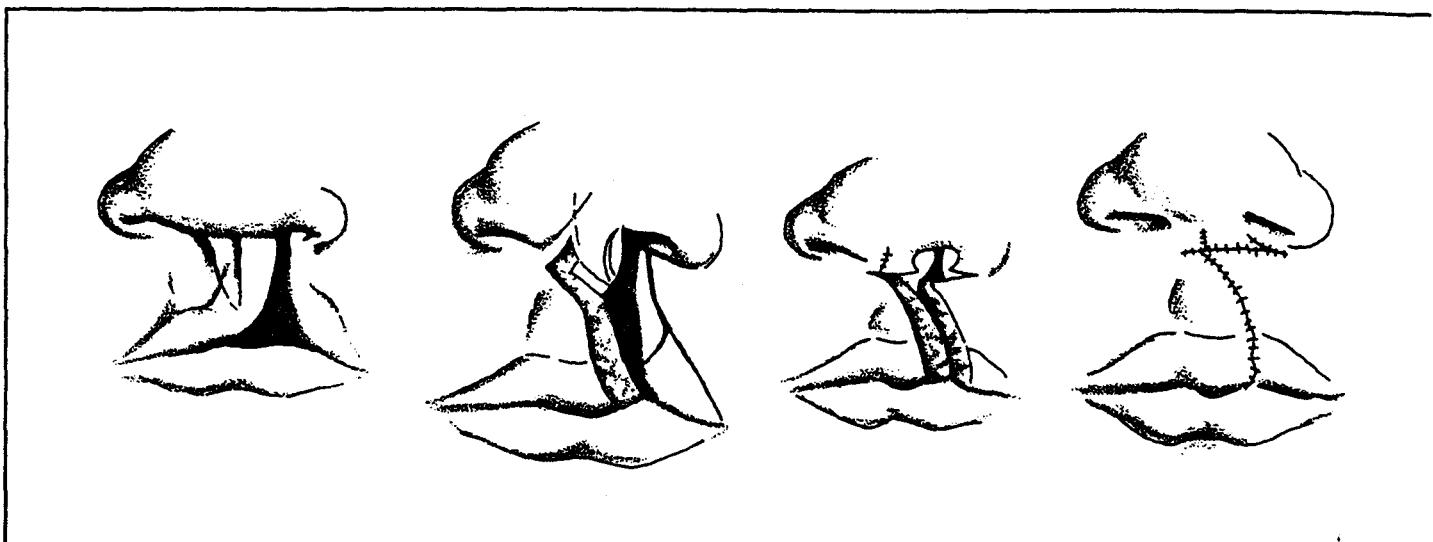


Figure 1. Surgical procedure for repair of cleft lip. (Adapted from Meeker MH, Rothrock JC. *Alexander's Care of the Patient in Surgery*. 9th ed. St Louis, MO: Mosby-Year Book; 1991.)

with a major pack. The following are placed on this table: a bovie with a needle tip, two local syringes, 22- and 25-gauge needles, No. 11 and No. 15 blades, suction tubing, sponges, and the drape. In addition, the following sutures are needed: 6-0, 5-0 chromic on a P3; 5-0 PDS on a P3; 5-0, 4-0 monofilament nylon (clear) on a P3; 5-0 uncoated monofilament polyglactin; and 7-0 chromic, double-armed. The local anesthesia, 0.25% bupivacaine hydrochloride with epinephrine 1:200,000, was dispensed to the table by the circulator who poured it into a specimen cup. The scrub

...Key structures [are] held in an abnormal, restricted position.

person also set the instruments on the operating room table (Table 1).

Patient Positioning, Preparation, and Draping

The patient is placed in supine position with a donut under the head. The skin prep consists of a wash with chlorhexidine gluconate followed by povidone-iodine. The patient's head is wrapped in a head drape consisting of a small towel and a sheet folded in quarters. The

towel is secured around the head with a small towel clip. Three small dressing towels are used to form a surgical window and are fastened with small towel clips. A thyroid sheet is used to cover the patient's body and complete the sterile field.

Anesthesia

Oxygen, nitrous oxide, and halothane are given by mask. Spontaneous ventilation with a progressive increase of halothane is used to achieve general anesthesia.

The intravenous needle is placed in the patient's left hand once he or she is asleep. An IV of 5% dextrose with lactated Ringer's is connected to prevent dehydration. Atracurium besylate, a nondepolarizing neuromuscular blocker is injected intra venously to facilitate endotracheal intubation and provide skeletal muscle relaxation during surgery. The initial dose of 0.4 to 0.5 mg/kg may be given by intravenous bolus. A maintenance dose of 0.08 to 0.10 mg/kg should be administered within 20 minutes to 45 minutes of the initial dose during prolonged surgical procedures.⁵

General anesthesia is maintained throughout the surgery with isoflurane because it produces less cardiac effect than halothane.

The surgeon uses 5 cc of 0.25% bupivacaine hydrochloride with epinephrine 1:200,000 at the incision

site to achieve hemostasis. Cefazolin sodium is given prophylactically to prevent infection.

Following the procedure, neostigmine methylsulfate may be administered as an antidote for the atracurium used as a muscle relaxant. Neostigmine may cause bradycardia, so atropine sulfate, which prevents bradycardia, is also injected.

Surgical Procedure

Key anatomical landmarks are tattooed on the lip. The edges of the cleft are pared and mucosal flaps are developed on both sides of the

Key anatomical landmarks are tattooed on the lip.

cleft. The muscle is dissected free from its dermal and mucosal attachments. The undermining proceeds toward the nasolabial and up around the alar facial groove. The superior margin of the muscle bundle is cut from its attachments to the maxilla at the alar base. The bunched-up muscle now lies flat and the loose overlying skin redrapes. On the medial side of the cleft, a pocket is dissected at the nasal spine and inferior lip border

and minimal undermining of the skin edge is performed.

The mucosal flaps are sutured together to form the first layer of closure. The muscle flap is advanced to the midline of the lip and sutured superiorly to the connective tissue at the base of the nasal spine. This maneuver brings the alar base inward and maintains the alar-facial groove. The muscle is split in a horizontal direction with two-thirds of the bundle above the split and one-third below the split. The lower third is advanced and sutured into the pocket at the inferior lip border to create fullness in the

The patient's parents are informed as to how to take care of the dressing and how to administer medications.

area of the tubercle. Further sutures are placed to advance the muscle medially. The sutured edge of muscle is advanced beyond the pared medial cleft margin and is not directly beneath it. The third layer to be closed is the skin. A suture is placed at the tattooed mucocutaneous junction, joining the lateral and medial cleft margins. Slight traction is exerted to this point, level with the high point of the lip on the noncleft side. A Z-plasty is created at the alar base to lengthen the lip. If further lengthening is needed, a second, smaller Z-plasty is designed just above the mucocutaneous junction (Figure 1).⁶

General Postoperative Progress
The patient is transported to the recovery room and may experience slight oozing from the nostril. The surgeon may prescribe suspension for infection control and acetaminophen elixir for pain. The patient's parents are informed as to how to take care of the dressing and how to administer medications. The patient is released from the hospital the same day and is scheduled for a followup visit the next week. Δ

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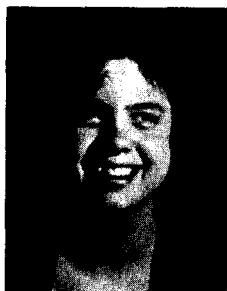
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Meta Huesch, CST, graduated from the surgical technology program at Manchester Community-Technical College and the Hartford Hospital School of Allied Health in June 1994, and became a CST in September 1994.



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