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## Unilateral cleft lip repair

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### Introduction

Cleft lip with or without cleft palate is a relatively common congenital craniofacial anomaly affecting 7.75 per 10,000 live births in the United States. Its treatment requires an in depth understanding of the underlying anatomic abnormalities, surgical expertise, and a multidisciplinary team of health care providers capable of providing comprehensive care that extends from infancy through adolescence with the goal of restoring normal form and function. This article is focused on the surgical techniques used in the correction of unilateral cleft lip.

Cleft lip repair is a procedure of the soft tissues. Bony abnormalities are not addressed in the primary repair and secondary procedures are needed to manage the bony framework in order to attain the best possible outcomes. Multiple methods for cleft lip repair have been described. These methods differ primarily in their cutaneous incisions and scar lines while management of the muscle and mucosal layers are fairly consistent. Here, we review the anatomy of the unilateral cleft lip, objectives of surgical correction, preoperative considerations, surgical techniques, and postoperative care.

### Preoperative considerations

The ideal timing of lip repair is between 3 and 6 months of age and it is recommended that the patient weigh at least 10 pounds and have a hemoglobin of at least 10 g/dL. Prior to surgery, infant orthopedic remodeling through the use of taping, nasoalveolar molding (NAM), or lip adhesion can improve outcomes and ease of repair, particularly in wide clefts and those with severe nasal deformity or alveolar arch malalignment. These techniques are ideally initiated in the first week of life and are continued until the time of repair.

NAM requires an oral appliance that is custom made and adjusted weekly by a pediatric dentist or orthodontist that gradually aligns the maxillary alveolar segments and narrows the cleft. The device also includes nasal prongs that are used for nasal remodeling. When NAM is not possible due to social reasons or lack of access to a pediatric orthodontist or dentist, taping can be used. To do this, hypoallergenic tape is placed across the cleft and secured to the cheeks to provide a mechanical force that will reduce the cleft width and premaxillary protrusion. Finally, lip adhesion is another option when a NAM device or taping is not feasible. In this case, the surgeon may elect to perform an adhesion between the 2 lip segments using the cleft margins that will be discarded in the definitive repair. Unfortunately, this may lead to significant scar formation that could impair definitive cleft repair.

## **Surgical repair**

### **Objectives**

The goal of cleft lip repair is to recreate a continuous oral sphincter, attain adequate vertical lip height with symmetry of cupid's bow, and generate symmetry of the nostrils and nasal sill with a minimally visible scar.

### **Surgical preparation**

Surgical repair is performed under general anesthesia with an oral RAE tube placed at the midline lower lip so that it does not distort the upper lip. The neck is slightly extended with a small shoulder roll and the OR table is tilted slightly in reverse Trendelenburg position. An alcohol pad is used to dry the vermillion boarder and enhance its identification. Key landmarks (as described below) are marked with methylene blue using a 30-gauge needle. This is performed prior to injection of the local anesthetic.

### **General surgical principles**

Over the years, many variations in surgical approaches to the cleft lip have been described. Generally, each method involves rotation of cupid's bow inferiorly with increased lip height, and advancement of the cleft side superiorly and medially. Each repair recognizes that each structural component of the lip- the skin, muscle, and mucosa, must be individually repaired. Herein we describe the rotation advancement, Fisher subunit, and Tennison Triangle techniques that differ primarily in the placement of cutaneous incisions and how that permits gains in lip height.

In all methods, after the skin incisions have been made as detailed below, medially based mucosal flaps are created from the medial and lateral lip segments and gingivobuccal sulcus incisions are made to allow for mobilization of the lip. The orbicularis oris is released from its aberrant attachments medially and laterally (the columella, anterior maxilla, piriform aperture, and alveolar ridge), allowing the muscle edges to rotate inferiorly and medially into proper position. The skin, vermilion, and mucosa are freed from the muscle for approximately 1 mm along the medial and lateral lip segments.

The mucosal flaps are then swung medially and sutured together across the cleft using an absorbable suture. The gingivobuccal sulcus is also reapproximated in its new position using absorbable suture. Next, the muscle layer is closed. This is accomplished using interrupted absorbable sutures that bring the lip into its desired alignment. Optional use of deep dermal sutures may assist with skin alignment. Cutaneous closure can be performed with either dermal glue, absorbable, or nonabsorbable sutures. If nonabsorbable sutures are used, they will need to be removed under anesthesia in 4-7 days.

## Postoperative care

At the conclusion of the procedure, some surgeons advocate the placement of nasal stents. Arm splints that prevent the infant from touching their face postoperatively are placed and are worn at all times when the infant is not under direct supervision for 2 weeks postoperatively. Most patients spend the night in the hospital to ensure sufficient oral intake and pain control. Patients may breast or bottle feed immediately after surgery. Parents are trained in wound care and are taught to remove blood in the nostril or along the incision gently with half strength hydrogen peroxide and to keep a thin layer of ointment on the incisions. If permanent sutures are placed, these should be removed in 4-7 days under mask anesthesia.

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