# Cleft Lip Repair, Nasoalveolar Molding, and Primary Cleft Rhinoplasty

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**KEYWORDS**

• Cleft lip • Cleft palate • Subunit cleft repair • Nasoalveolar molding • Cleft rhinoplasty

**KEY POINTS**

- The cleft lip design should be measured carefully and executed to reduce variability.
- Primary rhinoplasty at the time of the lip repair repositions the ala improves the stigmata of the cleft lip nasal deformity.
- Specialized orthodontists can be very effective using nasoalveolar molding to simplify the lip repair and ultimate outcome.
- Specialized orthodontia is a labor-intensive therapy that requires parental compliance and motivation.

**Video content accompanies this article at http://www.facialplastic.theclinics.com.**

## INTRODUCTION

Orofacial clefts occur in a spectrum that include cleft lip–cleft palate and are the most common craniofacial birth defect. Cleft lip repair is just the beginning of sequential, interdisciplinary care that this patient population requires. Presurgical care can be optimized by partnering with specialized orthodontists and the use of nasoalveolar molding (NAM) with presurgical infant orthopedics (PSIO). This therapy can enhance the surgical repair. The cleft lip and its corresponding nasal deformity should be considered a complex dentofacial problem in most cases. Often, the residual cleft nasal deformity results in permanent cleft stigmata. An interdisciplinary cleft team can effectively identify and guide treatment in dentition, speech, swallowing, hearing, and psychosocial issues. The objectives of this manuscript are to describe an evidenced-based review of presurgical care (eg, lip taping and NAM), as well as preferred techniques for lip repair and primary rhinoplasty.

## EPIDEMIOLOGY

Orofacial clefting is the fourth most common birth defect after congenital heart deformities, spina bifida, and limb deformities. The incidence of cleft lip–cleft palate in the United States is between 1 in 600 and 1 in 750 live births, with some ethnic variability.[1] A higher incidence in Native American and Asian populations is noted, and the lowest incidence is in African Americans and Africans.[2] Isolated cleft palate is considered separate from a cleft lip occurring with or without cleft palate. Approximately two-thirds of orofacial clefts are cleft lip with or without cleft palate, whereas

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one-third are isolated cleft palate. The majority of cleft lip with or without cleft palate cases are unilateral and are more commonly left sided. Isolated cleft palate is more common in females, whereas cleft lip with or without cleft palate is more common in males.[3]

The classification of an orofacial cleft based on laterality of the cleft lip (unilateral or bilateral), severity, and involvement of lip, alveolus, and/or palate. A complete cleft lip extends through the lip and nasal sill, whereas an incomplete cleft involves diastasis of the orbicularis oris and skin, but remains intact for at least three-quarters of the lip length. The microform, and less described nanoform, cleft is characterized by a philtral skin groove, minor nasal alar hooding and alar base asymmetry, furrowing of the orbicularis oris muscle, and a notch at the vermilion–cutaneous junction. A microform cleft lip, also called a form fruste, does not extend to more than one-quarter of the labial height, measured from the normal peak of Cupid's bow to the nasal sill. The cleft alveolus can be complete or notched. Independent of the cleft lip type, a cleft palate can be unilateral (1 palatal shelf is attached to the nasal septum) or bilateral, and include the primary palate, portions of the hard and soft palate, or soft palate only.[4]

## TIMING OF INTERVENTIONS

Interdisciplinary cleft team management of a child with a cleft lip–cleft palate follows a typical timeline. The cleft lip is typically repaired at 3 to 5 months of age, but may be later if NAM is chosen. Those with cleft palate have a higher incidence of Eustachian tube dysfunction, which is managed with bilateral tympanostomy tube placement based on tympanogram and otomicroscopy. We use a selective tube placement and obtain a behavioral audiogram around 8 months of age. Routine speech assessment and therapy begins in the first 2 years with routine 6-month follow-up. This leads to velopharyngeal dysfunction assessment and potential secondary speech surgery. Alveolar bone grafting usually needs orthodontic preparation at around 7 to 10 years old, with definitive orthognathic surgery reserved for those with dentofacial malocclusion after full skeletal growth. This may be followed by a cleft septorhinoplasty.

## BILATERAL CLEFT LIP

The bilateral cleft lip presents a more involved defect of both sides of the premaxilla/prolabium, but obtaining the general symmetry is inherently easier than in the grossly asymmetric unilateral cleft lip deformity. The greatest challenges of the bilateral cleft lip repair are dealing with the short columella and upper lip, protruding premaxilla, and persistent nasal deformities, including hooding of nostrils and lack of tip projection and definition. Some surgeons choose a 2-stage repair with primary lip repair in infancy and a secondary columellar lengthening between 1 to 5 years of age. More commonly, a 1-stage Mulliken or Millard approach is performed with PSIO and/or NAM used for the more complex, wide cases.

Bilateral cleft lip

- Premaxilla is not attached to the lateral palatal shelves.
- Forward projected premaxilla.
- Absent or small anterior nasal spine.
- Posteriorly displaced lateral piriform apertures.
- Widely splayed lower lateral cartilages.

A wide bilateral cleft lip (**Fig. 1**) may have a protruding premaxilla and excessive tension on the lip segments with the pinch test to allow a primary 1-staged repair. In these situations, we prefer to partner with our cleft team orthodontist team using NAM (see NAM section) to set the premaxilla back, establish the maxillary arch and increase columellar length with nasal prongs (**Fig. 2**). In cases where NAM is not possible, the repair is delayed and lip taping is applied (**Fig. 3**).

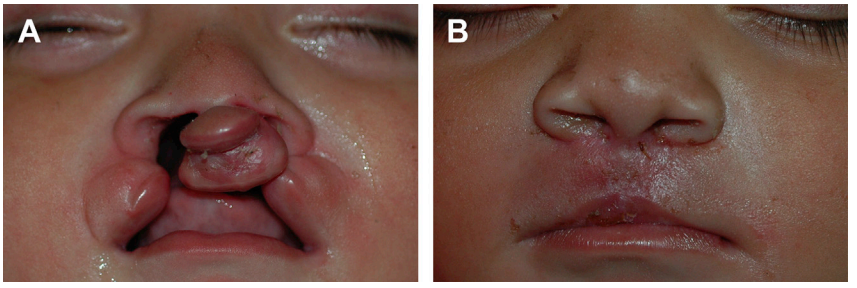


**Fig. 1.** Infant with a complete bilateral cleft lip and palate (*A*) preoperatively and (*B*) postoperatively.