Cleft Lip and Palate
An Evidence-Based Review

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KEYWORDS

• Cleft lip • Cleft palate • Evidence-based medicine • Outcomes

KEY POINTS

- The repair of unilateral cleft lip is performed using a rotation-advancement, geometric, straight-line, or hybrid technique.
- For bilateral cleft lip repair, most surgeons use either the Millard or Mulliken technique, and their variations.
- Most cleft centers perform cleft lip repair at the age of 3 to 5 months.
- Presurgical infant orthopedics, which can include nasoalveolar molding, is used before definitive cleft lip repair.
- For cleft palate repair, the 2-flap palatoplasty and Furlow double-opposing Z-plasty are most commonly used.

INTRODUCTION

At an estimated prevalence of 16.86 cases per 10,000 live births, isolated cleft palate, as well as cleft lip with or without cleft palate, is the most common congenital orofacial malformation in the United States.[1] Children with cleft anomalies may experience a multitude of physical and developmental challenges. There also may be psychosocial and emotional concerns for the patients and their families. As such, comprehensive care for the patient with cleft lip and/or palate requires an interdisciplinary team. The guidelines for team care outlined by the American Cleft Palate Association recommend team members that may include anesthesiology, audiology, genetics, neurosurgery, nursing, ophthalmology, oral maxillofacial surgery, orthodontics, otolaryngology–head and neck surgery, pediatrics, pediatric dentistry, physical anthropology, plastic surgery, prosthodontics, psychiatry, psychology, social work, and speech-language pathology.[2] Although every specialty may not be represented, the quality of care is augmented through collaborative discussion and coordination of care.

Broadly speaking, orofacial cleft anomalies may be unilateral or bilateral and involve the lip, the palate, or both. Although there have been considerable publications on this topic, most are single-surgeon/center experience papers or are retrospective in nature. As a result, the cleft lip–cleft palate literature regarding the clinical and surgical decision points lacks consensus. This review article seeks to define the typical management plans, describe the various viewpoints, and suggest recommendations based on the levels of evidence (**Table 1**) on the management of cleft lip

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Table 1
Levels of evidence

Level I	High-quality, properly powered and conducted randomized controlled trial, systematic review, or meta-analysis of these studies
Level II	Well-designed controlled trial without randomization; prospective comparative cohort trial
Level III	Retrospective cohort study, case-control study, or systematic review of these studies
Level IV	Case series with or without intervention; cross-sectional study
Level V	Expert opinion, case reports, or bench research

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and palate. The article is organized to address management of the techniques, timing, outcomes, and complications starting with cleft lip, and then addressing the same in cleft palate management.

CLEFT LIP

Overview

A typical orofacial cleft can be classified by *laterality*, *extent*, and *severity*. The *laterality* (left, right, asymmetric/symmetric bilateral) is noted with the unilateral deformity being more common than the bilateral. The *extent* of the cleft lip is variable and can include the cleft alveolus, which can be complete or notched. Independent of the cleft lip type, the cleft palate is described as unilateral (one palatal shelf is attached to the nasal septum) or bilateral. The extent of the cleft is classified as complete (**Fig. 1**), incomplete (**Fig. 2**), or microform (**Fig. 3**). In the complete cleft, there is disruption of the lip's mucosal up to the nasal floor with the associated nasal deformity. There is a spectrum of incomplete clefting, ranging from vermilion notching to near-complete disruption of the lip with a remaining Simonart band.[3] An incomplete bilateral cleft lip can be quite asymmetric (**Fig. 4**). The *severity* of the cleft lip width can make the repair more difficult because of wound tension. Management of the more severe cleft lip often requires a more prolonged presurgical preparation period (eg, presurgical infant orthopedics [PSIO]).

In the complete unilateral cleft lip, there is an external and upward rotation of the medial segment of the premaxilla and an internal and posterior rotation of the lateral segment.[2] Fibers of the orbicularis oris muscle attach medially to the base of the columella and laterally to the alar base. The nasal septum is dislocated from the vomerian groove with a shortening of the columella. The alar cartilage of the cleft side is deformed such that the medial crus is displaced posteriorly and the lateral crus is flattened over the cleft.[2]

In the complete bilateral cleft lip deformity, the premaxilla and prolabium are entirely separate from the lateral lip and maxillary segments. As a result, the premaxilla protrudes past the lateral segments. The prolabium can vary in size and lacks the normal philtral structure of a central groove and philtral ridges. The vermilion cutaneous junction and cutaneous (white) roll are often

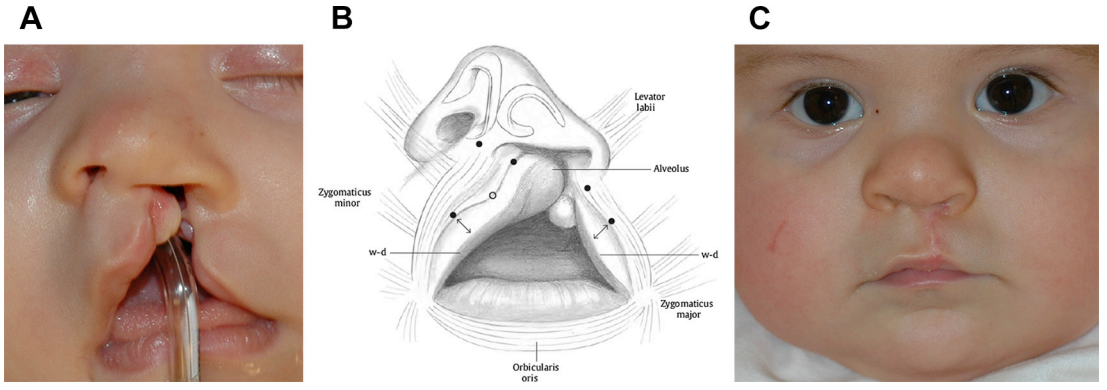

Fig. 1. Infant with unilateral complete cleft lip and palate. (*A*) Preoperative. (*B*) Illustration depicting the alveolus of the premaxilla, perioral muscles, and typical cleft nasal deformity. The arrows show the vermilion height, which should be made symmetric and the red line of Noordhoff (wet-dry junction) of the lip. (*C*) Postoperative view of same child after modified Mohler rotation-advancement repair and primary rhinoplasty. w-d, wet-dry vermillion. (*From* [*A*, *B*] Tollefson TT, Sykes JM. Unilateral cleft lip. In: Goudy S, Tollefson TT, editors. Complete cleft care. New York: Thieme; 2015. p. 40; with permission.)