Cleft Palate Repair, Gingivoperiosteoplasty, and Alveolar Bone Grafting

Ashley M. Dao, MD[a], Steven L. Goudy, MD[b,*]

KEYWORDS

• Cleft palate • Cleft palate repair • Furlow palatoplasty • Gingivoperiosteoplasty
• Alveolar bone grafting

KEY POINTS

- A multidisciplinary approach is essential in providing the best care for patients with a cleft palate.
- The type and width of the cleft palate determine the appropriate surgical palatoplasty technique to adequately achieve a tension-free and multilayered closure with repositioning of the velar muscle sling.
- Intravelar veloplasty is a critical step during palatoplasty to ensure that children have proper velopharyngeal closure.
- Use of adjunctive surgical techniques and biologic materials can decrease the occurrence of fistula formation.

INTRODUCTION

The primary goal of cleft care is to optimize function and appearance while minimizing surgical interventions and complications. Although cleft palate usually is an isolated finding, greater than 30% may have additional comorbidities or an associated syndrome, which must be considered and may affect surgical candidacy, overall prognosis, and surgical outcomes. There are numerous surgical techniques that may be chosen based on cleft classification, cleft width, and surgeon experience and preference. Management and repair of the alveolar cleft is also an important aspect of care and secondary bone grafting is often required to treat alveolar defects. Primary gingivoperiosteoplasty (GPP) closes the alveolar cleft at the time of cleft lip repair, decreasing the likelihood for alveolar bone graft, although it has produced inconsistent results and is controversial. It is essential to recognize and address the emotional and psychological needs of the family, at birth and before surgical care. Overall, assessment and treatment of those with cleft lip and/or palate requires a multidisciplinary team approach.

Genetics and Prenatal Diagnosis

Cleft lip and/or palate is the most common congenital malformation of the head and neck and occurs in the setting of multiple genetic and environmental factors.[1] The condition is linked to more than 400 genes, occurs in an autosomal-dominant or autosomal-recessive or nonmendelian inheritance pattern, and most (70%) patients present without an associated syndrome.[2]

As genetic advances continue it is necessary to counsel expecting families on advanced

The authors have nothing to disclose.

[a] Department of Otolaryngology, Emory University School of Medicine, 550 Peachtree Street NE, 9th Floor MOT, Atlanta, GA 30308, USA; [b] Division of Pediatric Otolaryngology, Emory University School of Medicine, Children's Healthcare of Atlanta, 2015 Uppergate Drive, Atlanta, GA 30322, USA
* Corresponding author.
E-mail address: Steven.goudy@emory.edu

Facial Plast Surg Clin N Am 24 (2016) 467–476
http://dx.doi.org/10.1016/j.fsc.2016.06.005

diagnostic options available for future children. Ultrasound screening is routinely done in the first trimester to document viability, although the fetal face is typically not imaged adequately at this time. Three-dimensional ultrasound images of the face were first obtained in 1986 and became widely used in the mid-1990s, prenatally identifying many more cleft lip and palate patients. In 2000 this technology was used for multiplanar volume rendering[3] and the 2007 American Institute of Ultrasound in Medicine Guidelines for Prenatal Ultrasound Screening require the fetal face to be imaged in the second trimester. Addition of four-dimensional ultrasounds has improved accuracy, although diagnosing an isolated cleft palate remains difficult[4] and false-positives may occur because of shadowing.[5]

Classification

Multiple classification schemes have been created for orofacial clefts.[6] These models are usually based on several features of the cleft including laterality, completeness, severity (wide vs narrow), and presence of any abnormal tissue. Diminutive orofacial clefts may also be described as microform, occult, or minor.[7] Laterality is described as being either unilateral or bilateral. A complete cleft lip extends through the lip and the nasal sill and an incomplete cleft lip extends only through the lower part of the lip with some intact lip tissue above the cleft. The cleft alveolus can be considered complete or only notched. Weblike tissue may extend from the lip's cleft side to the noncleft side at the nasal sill, which is termed a Simonart band and is not equivalent to an incomplete cleft. A cleft palate is unilateral if one palatal shelf attaches to the nasal septum, or bilateral. The four group classification scheme introduced by Veau[8] is the most frequently used system:

- Group I: defect of the soft palate only.
- Group II: defect involves the soft palate and the hard palate to the incisive foramen.
- Group III: unilateral defect extending through the entire palate and alveolus.
- Group IV: bilateral complete cleft.

PATIENT ASSESSMENT

Multidisciplinary Care

A multidisciplinary approach should be used when addressing these patients to achieve optimal outcomes. The team includes initial evaluations by a pediatrician, geneticist, surgeon, feeding specialist, social worker, and possibly others. The children also need to be seen by audiology, otolaryngology, dental, oral surgery, and speech pathology after the initial visit. Prenatal surgical consultation with the surgeon, geneticist, and speech pathologist before birth is recommended to alleviate some of the anxiety parents may be experiencing.

Surgical Assessment

A thorough physical examination is necessary soon after birth. This should include special attention to the upper lip, alveolar arches, nostrils, primary and secondary palates, nasal alar symmetry, tip projection, alar base position, and width, and any signs of dysmorphia that may lead to identification of additional congenital anomalies or syndromes. Any concern for cardiac or airway issues must be identified and assessed before surgical intervention. Specific evaluation for microform cleft lip and submucosal cleft palate, even considering ultrasound evaluation,[9,10] is important because their presentation is overlooked due to subtle findings on examination. Regular clinic visits after birth allow proper counseling and guidance to the patient's caretakers and the surgeon may need to place several referrals to any necessary specialists.

PRIMARY REPAIR OF CLEFT PALATE

Preoperative Planning and Considerations

The preoperative evaluation is the same as for a child with a cleft lip, although it is particularly important that the caretakers understand proper feeding methods. Cleft palate may also lead to airway obstruction, therefore any airway concerns must be addressed before surgery.[11] The type and width of the cleft must be accurately determined to select the appropriate surgical technique. Of note, patients with a submucous cleft palate may be closely monitored without intervention and only surgically repaired if they develop speech, feeding, or otologic difficulties.[12]

Timing of Repair

The customary timing of cleft palate repair is before 18 months, with the ideal time being 10 to 12 months of age[12] to avoid poor speech and language development associated with delayed repair. Early palate repair must be weighed against the concern of negatively affecting the patient's maxillary growth that may occur with an earlier repair.[13]

Patient Positioning

Positioning is similar for all techniques described next. The patient is placed supine on the operating table usually on a shoulder roll for gentle cervical