Controversies in the Management of Patients with Cleft Lip and Palate

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KEYWORDS

• Cleft lip • Cleft palate • Cleft nasal deformity • Rhinoplasty • Nasoalveolar molding
• Presurgical infant orthopedics

KEY POINTS

- Nasoalveolar molding (NAM) is a form of presurgical infant orthopedics (PSIO) whose goal is to reduce the severity of the cleft deformity and improve surgical outcomes. The data on efficacy and benefit of NAM are mixed.
- Those in favor of NAM report improved nasal symmetry and appearance, reduced overall costs, psychosocial benefit to family, and decreased need for early nasal revision.
- Those in opposition to NAM argue NAM causes increased caregiver burden, poor patient compliance, increased costs in the short term, relapse of nasal symmetry in the first year, and no conclusive data of improved outcomes.

INTRODUCTION

Cleft lip and palate is one of the most common congenital craniofacial disorders. Patients born with a cleft deformity might experience problems with feeding, speech, and hearing, as well psychological stresses and issues with social well-being secondary to their aesthetic deformity. To fully address the needs of the cleft patient, a multidisciplinary team approach is required. Complete care of the cleft patient is a challenging task, with new techniques and technologies developing all the time. This article focuses on the new developments in the management of cleft lip and palate patients and the controversies surrounding such technique.

PRESURGICAL INFANT ORTHOPEDICS

For many years, surgeons have been attempting to reduce the severity of the deformity before the surgical repair to achieve a better outcome. The field of PSIO emerged based on this need. Reports of attempts to retract the premaxilla in bilateral cleft cases date back to the sixteenth century. Since then, multiple treatments have been developed in an attempt to reduce the deformity before definitive primary lip surgery, including maxillary plates, the Latham appliance, lip taping, elastic bands, lip adhesion, and NAM (**Figs. 1** and **2**). Infant orthopedics (IO) was first introduced by McNeil in the 1950s[1] and further developed over the following decades. A device that was screwed into the lateral arch segments and activated with pins through the premaxilla was developed by Georgiade and colleagues[2,3] in the 1960s. The Latham device, developed in the 1980s, is another device that expanded the lateral alveolar cleft segments and deprojected the maxilla by activating a screw mechanism.[4,5]

NASOALVEOLAR MOLDING

In the late 1990s, Grayson and Cutting described a presurgical appliance that added additional nasal

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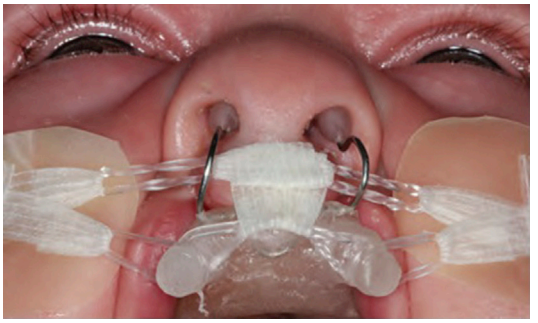

Fig. 1. Taping for bilateral cleft lip and palate. The taping is similar to the UCLP case except each retention tape inserts on the retention button on its respective side. Differential force can be placed on each tape to address any premaxillary deviation. A prolabial tape can be added to facilitate nonsurgical columella elongation. A cross-cheek tape can be added to provide additional force for premaxillary retraction. (*From* Goudy SL, Tollefson TT. Complete cleft care: cleft and velopharyngeal insufficiency treatment in children. New York: Thieme; 2014; with permission.)

molding prongs.[6–8] The NAM technique uses acrylic nasal stents attached to the vestibular shield of an oral molding plate to mold the nasal alar cartilages into more normal form and position during the presurgical period. This technique is based on the technique of molding auricular deformities in the neonate described by Matsuo and colleagues.[9] This technique nonsurgically improves congenital deformities by taking advantage of the plasticity of infant cartilage thought to be the result of increased levels of circulating maternal estrogen during the first 6 months of life. In addition, NAM attempts to lengthen the columella through the application of tissue expansion principles. The

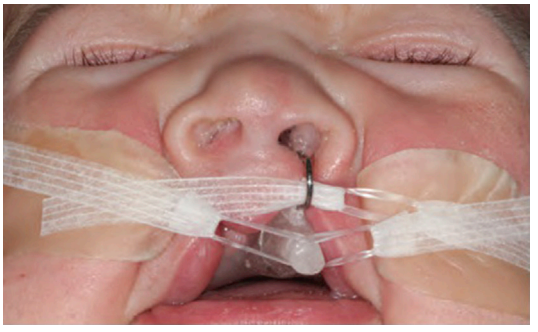

Fig. 2. Face tapes and the NAM appliance for unilateral cleft lip and palate. Base tapes are applied to the cheeks. The appliance is then inserted and the retention tapes are secured to the retention button. Greater tension can be placed on the side with the cleft to favor alveolar cleft closure. (*From* Goudy SL, Tollefson TT. Complete cleft care: cleft and velopharyngeal insufficiency treatment in children. New York: Thieme; 2014; with permission.)

columellar improvement is achieved by gradual elongation of the nasal stents and application of tissue-expanding elastic forces applied to the prolabium.[8,10] The process begins as soon as possible after birth; a custom-made alveolar mold is worn full time with weekly or biweekly adjustments until the alveolar cleft is narrowed to 5 mm or less, achieving the goals of bringing the lip segments together, reducing the alar base width, and relaxing tension on the splayed alar rim. A nasal stent extending from the intraoral plate to the cleft nostril is then added to elevate the alar rim into a more symmetric and convex position.[11]

A recent survey of all surgeons in the American Cleft Palate-Craniofacial Association and the Canadian Society of Plastic Surgeons revealed that 71% of cleft surgeons use some form of presurgical orthopedics at least occasionally and that NAM is used at least occasionally by 38% and greater than half the time by 25% of surgeons.[12] This increase in use in the past 20 years raises the question, Is NAM effective? The purpose of this article is to review the data for and against the use of NAM.

BENEFITS OF NASOALVEOLAR MOLDING

Psychosocial Benefit to Caregivers

Proponents of NAM claim several benefits, including improved aesthetic outcome, reduced overall costs, and a psychosocial benefit to the family. To evaluate the psychosocial effects of NAM, a prospective, multicenter longitudinal study was performed examining 118 caregivers at 6 different cleft treatment centers in the United States.[13] The patients were in 2 groups: those who underwent NAM plus traditional care and those who underwent traditional care only. Although the first year was demanding for all caregivers, NAM onset and the child's lip surgery were particularly stressful times. Qualitative and quantitative results, however, indicated caregivers of NAM-treated infants experienced more rapid declines in anxiety and depressive symptoms and better coping skills over time than caregivers whose infants had traditional care.[14] This is believed to be because the frequent visits for NAM adjustments reduce caregiver anxiety and lead to a sense of empowerment. These changes arise as a caregiver develops increased skill in managing the NAM appliance, observes improvement in the baby's appearance, and receives support and counseling from weekly visits to the cleft team.[13]

Clinical Benefits of Nasoalveolar Molding

When evaluating the clinical effects of NAM, they can be broken down into maxillary growth, dentition and occlusion, facial appearance, nasal symmetry, nasal growth, and speech. It has been shown in a