Optimal Timing of Cleft Palate Closure

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Since the first reports documenting successful surgical repair of the congenital cleft palate more than 200 years ago, those involved in the management of children with palatal clefts have been engaged in a debate over the optimal timing of cleft palate repair. This debate has placed the cleft palate surgeon within the classic Homeric dilemma, forced to navigate a proper course between the late-repair Scylla of faulty articulation and the early-repair Charybdis of impaired midfacial growth. Drs. Rohrich, Love, and Byrd have provided a thoughtful review of the literature and offered a logical algorithm for the surgical management of palatal clefts. Nevertheless, one can be certain that the longstanding debate regarding the optimal timing of cleft palate closure will continue well into the new century.

Brophy and Veau first recognized the beneficial effect of early cleft palate closure on speech in the early part of the last century, but it was not until the 1940s that refinements in surgical and anesthetic techniques improved the safety of such procedures during the first year of life. Enthusiasm for early repair was significantly dampened, however, by the reports of Graber and others in the 1940s and 1950s documenting significant maxillary growth restriction in patients who had undergone early palatoplasty. These findings led to the recommendation that palate repair be delayed until after 5 or 6 years of age. The effects of palatal surgery on maxillary growth have been perhaps most clearly demonstrated by examining the midfacial growth of adult patients with unrepaired clefts. The excellent maxillary development demonstrated by such patients attests to the fact that the midfacial deformity seen in many postoperative cleft patients is truly iatrogenic. Yet, despite the early reports of Graber and others, and as appropriately pointed out by Rohrich et al., many palate surgeons have subsequently been unable to show definitively that the timing of cleft palate repair makes a significant difference in the degree of midfacial growth restriction.

It is perhaps an impossible task to answer the question of the influence of palatal surgery on maxillary growth, because multiple factors may contribute to disturbances in midfacial growth in each individual patient. Perhaps more important than the timing of surgery is the type of procedure performed and the degree of scarring so induced. Most of the cases reviewed by Graber, for example, were patients whose clefts were treated by Brophy's rather destructive technique of wire compression. Apart from palatal repair, many studies have demonstrated that cleft lip repair alone may induce midfacial retrusion in patients with cleft lip and palate. Finally, as Rohrich et al. note, restricted midfacial growth in some patients with isolated palatal clefts may be more the result of an intrinsic restriction in maxillary growth than of surgical trauma. In fact, clinical studies have demonstrated that surgical repair itself does not interfere with maxillary development in patients with isolated clefts of the palate.

The concept of early velar closure and delayed hard palate closure, as proposed by the authors, was first popularized in Europe by Schweckendiek and in the United States by Slaughter and Brodie. The concept is a logical one: limit early surgical trauma to the growing maxilla while restoring normal anatomy and function to the velum in infancy. Closure of the velar musculature provides the additional benefit of molding the posterior maxillary segments into closer approximation, as lip adhesion does with the anterior maxillary arch. Schweckendiek advocated velar closure by 8 months of age, delaying closure of the hard palate until maxillary growth was nearly complete.

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complete at 12 to 15 years. These patients had excellent midfacial growth but, as several studies would later show, such delayed closure of the hard palate had disastrous implications for speech outcome in the majority of these patients. To avoid the severe speech problems associated with delayed closure of the palate, Rohrich et al. have proposed an early two-stage repair of the palate that results in complete closure of the cleft by 15 to 18 months of age.

Several recent studies have documented improved speech quality and language development associated with such early closure of the palate. Dorf and Curtin\textsuperscript{13,14} demonstrated that children who underwent palate repair before 12 months of age had a significantly lower incidence of compensatory articulations than those who underwent palatoplasty from 12 to 29 months of age. In contrast, Peterson-Falzone\textsuperscript{15} noted a higher incidence of compensatory articulations in patients who underwent palatoplasty before 12 months of age than in those undergoing later repair, although the differences were not statistically significant. O’Gara and Logemann\textsuperscript{16} compared the prelinguistic and early linguistic utterances of infants with cleft palate who underwent repair before 12 months of age with those of infants in whom palatoplasty was performed between 13 and 18 months of age. The patients who underwent earlier repair demonstrated fewer errors in articulation. In a follow-up study,\textsuperscript{17} the same authors again noted improved velar function with the passage of time in children undergoing earlier palatoplasty. In their studies, however, infants with the least severe clefts were more likely to undergo early repair, potentially confounding the results. Haapanen and Rantala\textsuperscript{18} reported similar results in a study of 108 patients with isolated cleft palate. At 3 years of age, those children who underwent palatal closure at a mean age of 12.9 months had a significantly lower incidence of compensatory articulations and of secondary pharyngoplasty than those in whom the palate was repaired at a mean age of 22.1 months.

It has now become widely accepted that closure of the cleft palate before 18 months of age results in fewer speech problems than later repair. But if early is good, is very early even better? Rohrich et al. assert that because speech acquisition begins shortly after birth, it would seem logical to provide the cleft palate patient with an intact velar mechanism in very early infancy. Therefore, they propose closing the cleft velum at 3 months of age and completing closure of the hard palate by 15 to 18 months of age. Although the theoretical basis for such very early velar closure seems sound, there are few data to support the approach. Kaplan\textsuperscript{19} also proposed 3 to 6 months of age as the ideal time to close the palate to avoid the development of “poor habit and inappropriate physiological integration.” He provided no data, however, on the outcome of such very early repair.

Evans and Renfrew\textsuperscript{20} published Peet’s results with very early repair and noted that children who underwent palatal repair before 8 months of age had slightly better resonance and demonstrated fewer articulation errors than those in whom the palate was closed later (before 30 months). The differences were too small, however, to draw any meaningful conclusions. Desai\textsuperscript{21} similarly reviewed his results in 100 patients in whom cleft palate repair was completed at or before 16 weeks of age and found that none demonstrated hypernasality. The follow-up in more than half of the patients in his series was less than 3 years and, again, no groups were presented for comparison. In a study of 100 patients who underwent palatoplasty before 6 months of age, Copeland\textsuperscript{22} reported that 87 percent were later judged to have “acceptable speech” and that 13 percent were thought to have “unacceptable speech.” Noting a low frequency of compensatory articulations in infants undergoing palatoplasty before 6 months of age, he recommended palate repair by 4 months of age. Again, no groups of patients repaired later in infancy were presented for comparison.

In our recent study of 181 patients undergoing Furlow palatoplasty at The Children’s Hospital of Philadelphia,\textsuperscript{23} we found no statistical difference in velopharyngeal function between patients undergoing palatoplasty at or before 6 months of age and those undergoing later repair before 24 months of age. We also recently reported the speech outcome in 90 children with complete unilateral cleft lip and palate who underwent soft palate repair using a modification of the Furlow technique either between 3 and 7 months of age or later than 7 months of age.\textsuperscript{24} A total of 40 patients in the series underwent very early repair (age at velar closure, 3 to 7 months; mean age, 4.5 months). A two-stage palatoplasty was performed in 28 patients (70 percent), and single stage repair in 12 (30 percent). In all cases, closure of the hard and soft palate was completed by 13
months. A total of 50 patients underwent later repair (age, 8 to 24 months; mean age, 11.3 months). All but four of the patients in the latter group underwent single-stage repair of the hard and soft palate, and repair of the soft and hard palate was completed by 18 months in 94 percent of patients. There were no differences between the groups with respect to resonance, articulation, and nasal air emission. Secondary pharyngoplasty for velopharyngeal insufficiency was required in 10 percent of patients undergoing very early repair and in 6 percent of patients undergoing later repair. These results suggest that very early closure of the soft palate may not offer significant advantages over repair later in infancy with respect to speech outcome. Our current practice is to repair the palate in one stage between 10 and 12 months of age in the majority of patients.

Although there are some logical reasons for repairing the velum at 3 to 6 months of age, there are few solid data to support this approach. Certainly, the potential benefits of such very early repair must be weighed against the risks and difficulties of performing such surgery at this early age. All of the structures are smaller, and operative exposure is poorer in the very young infant. Moreover, the tolerance for blood loss, postoperative airway changes, and anesthetic complications is much lower than in the older child. There remains, as has long been the case, a need for well-controlled prospective studies to provide better information on the optimal age for cleft palate repair. Until better evidence is available, we must consider the advantages of cleft palate closure at 3 to 6 months of age to be theoretical; we think that such very early repairs should only be performed by those surgeons in centers poised to deal with the additional challenges of such patients.

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