Otolaryngology–Head and Neck Surgery (2007) 137, 233-238

ORIGINAL RESEARCH

Distraction osteogenesis in the pediatric population

Samuel J. Lin, MD, Saswata Roy, MD, and **Pravin K. Patel, MD,** Boston, MA, and Chicago, IL

OBJECTIVES: Distraction osteogenesis has been described routinely in the mandible for the advancement of bony segments. Complications, though infrequent, may include postoperative infection, implant extrusion, nonunion of the bony segments, device malfunction, cranial nerve paresis, and premature consolidation.

METHODS: Seventy-eight distractions of the mandible were performed over 10 years. The technique in placement of these internal microdistraction devices involves making intraoral and extraoral incisions and beginning distraction after a latency period of 3 days. Following this latency period, distraction occurs at 1 mm/day.

RESULTS: In this series of patients, distraction was accomplished successfully. There was a 2.6% rate of wound infection in this series; 2.6% also had bony nonunion; 3.8% had premature bony consolidation; and 3.8% had facial nerve complications. In the three patients with facial nerve paresis, we followed the facial nerve clinically and each paresis resolved within 6 months.

CONCLUSIONS: Distraction of the mandible may be accomplished in the pediatric population. As with any intervention, inherent perioperative complications may still arise.

Aplasia or hypoplasia of the mandible in the pediatric patient may be a serious harbinger of airway compromise. Among earlier methods of displacing the mandible and tongue-floor of mouth anteriorly, continuous prone positioning of the patient has been advocated. However, in more recent years, interventions that are able to bring the mandible and the base of tongue forward have been developed. The use of internal distraction devices for lengthening the mandible has become more frequent in the pediatric population with bony deficiency.[1-3] Individual craniofacial centers across the country may have varying protocols for the use of distraction devices, but overall general principles remain similar.

Traditional methods of mandibular distraction have used multidirectional external distractors. These distractors allow for multiplanar manipulation of the mandibular segments which in turn allows fine adjustment to the maxillomandibular relationship. More recent unidirectional internal microdistractors have allowed placement of inconspicuous internal devices with minimal morbidity. These internal distractors are more easily tolerated by the infants and offer minimal risk of dislodgement while avoiding scars associated with tracking external distractor pins through soft tissue and skin. Nonetheless, one criticism of these internal devices has been that these devices do not allow fine adjustment of mandibular segments to correct any occlusal disharmony that may occur during the distraction process.

There are several congenital craniofacial syndromes that may require distraction; these include infants with syndromes such as Nager, Treacher Collins, and Goldenhar's. In addition, specific secondary conditions that may be improved through distraction include maxillary hypoplasia in the setting of cleft lip and palate, hemifacial microsomia, and Pierre Robin sequence. Mandibular distraction osteogenesis provides an alternative to traditional methods of airway management in infants with Pierre Robin sequence by mandibular lengthening.[4,5] As the mandible is lengthened, the tongue base moves forward by its anterior muscular attachments to the mandible.[4] This method has allowed avoidance of tracheostomy as well as early decannulation in infants with Pierre Robin sequence. Although there is wide variation in the clinical manifestation of Pierre Robin sequence, a significant portion of these infants exhibit severe upper airway obstruction with associated feeding and swallow difficulties.[6-8] Up to 23% of these infants require more invasive intervention for the relief of the upper airway obstruction.[9] The small mandible causes prolapse of the tongue base against the posterior pharyngeal wall leading to respiratory distress.[4]

The ability of the growing child to heal wounds and regenerate tissue has long been a subject of research and discussion. In a consecutive series of 78 patients in the pediatric population, we have placed both external and internal distractors. The aim of the study was to examine the incidence of complications of distraction in a large series of pediatric patients.

METHODS

In this consecutive series, there were 78 patients. The patient population consisted of consecutive patients who un-

Received August 20, 2006; accepted March 20, 2007.

0194-5998/$32.00 © 2007 American Academy of Otolaryngology–Head and Neck Surgery Foundation. All rights reserved.
doi:10.1016/j.otohns.2007.03.035