Distraction Osteogenesis

James Sidman, MD[a,*], Sherard Austin Tatum, MD[b,*]

KEYWORDS

• Distraction osteogenesis • Orthognathic surgery • Distraction osseogenesis • Maxillofacial surgery • Craniofacial surgery • Facial skeletal surgery

Distraction Osteogenesis (DO) Panel Discussion

James Sidman, MD and Sherard A. Tatum, MD address questions for discussion and debate:

1. Is neonatal DO better than lip-tongue adhesion or tracheotomy for micrognathic airway compromise?
2. What role does DO have in adult orthognathic surgery situations?
3. In monobloc and Le Fort III procedures, are internal or external devices preferable?
4. What role does DO play in craniofacial microsomia?
5. Is endoscopic DO better than open procedures for synostosis management?
6. Analysis: how has your technique changed or evolved over the past 5 years and what has doing this technique taught you?

Is neonatal DO better than lip-tongue adhesion or tracheotomy for micrognathic airway compromise?

SIDMAN

Tongue-lip adhesion (TLA) will certainly work in neonates with minimal airway compromise. There is however the "elephant in the room" with TLA, and that is the issue of swallowing after the surgery. Most studies looking at this carefully are showing very high rates of gastrostomy, even in nonsyndromic children. Our own papers show a very low rate of needing gastrostomy with distraction osteogenesis (DO) during infancy.

We also feel that nasal airway ("trumpet") is underutilized in most institutions in the management of micrognathic children. If indeed the trumpet works, then TLA is not necessary as they both accomplish the same thing. Either the trumpet or TLA really only works in the less severely affected children.

The last item to address is the issue of isolated micrognathia. We have found very few children with micrognathia who have airway obstruction based on the micrognathia and do not also have full blown Pierre Robin sequence (RS) with cleft palate, glossoptosis, and micrognathia. When we are referred airway obstructed babies without the triad of Pierre Robin, then invariably the airway issue is caused by something other than

Disclosures: None.

[a] ENT and Facial Plastic Surgery, Children's Hospitals and Clinics of Minnesota, University of Minnesota Medical School, 2530 Chicago Avenue S, Suite 450, Minneapolis, MN 55404, USA; [b] Cleft and Craniofacial Center, Division of Facial Plastic Surgery, Upstate Medical University, 750 E. Adams Street, Syracuse, NY 13210, USA
* Corresponding authors.
E-mail addresses: sidma001@umn.edu (Sidman); tatums@upstate.edu (Tatum)

Facial Plast Surg Clin N Am 22 (2014) 139–146
http://dx.doi.org/10.1016/j.fsc.2013.09.003
1064-7406/14/$ – see front matter

micrognathia and DO is almost never the appropriate treatment.

In summary, we have little use for TLA as we would use either a nasal trumpet, or proceed to DO of the mandible. The significant deleterious effects of TLA on swallowing should not be discounted, and seems to be almost universal.

TATUM

MDO for airway compromise in the neonate/infant micrognathic patient was introduced in 1999.[1] Until then positioning, special feeding techniques, temporary pharyngeal airways, TLA, and tracheotomy were the main options. Similar controversy existed then among those options. The addition of MDO has not diminished the controversy. There has been no definitive comparative study published that clearly shows the superiority of one method over the others. This conundrum exists due to several factors.

First of all, RS and other micrognathic patients are an inhomogeneous group.[2] Syndromic RS patients tend to be more severely affected than nonsyndromic RS patients. Other diagnoses associated with micrognathia such as Nager, Treacher Collins, and craniofacial microsomia are frequently worse as well. Secondly, there is significant variation in patient population presenting to various institutions. This variation depends on numerous factors. Location of the center is one of the most important. The larger the referral base, the more likely the center is to have exposure to rare conditions. If that center has trained many providers who remain in the area, those providers can manage the more straightforward patients referring on only the most challenging cases. Large metropolitan areas might have several centers competing for patients. One of the more interesting factors is the specialty of the provider. It has been suggested that certain specialties tend to favor one management option over the others. The choice seems to come down to training, experience and comfort level with the various options. That being said, there is some useful information in the literature.

It is reasonable to say there is a consensus in the literature that RS patients should be managed with a spectrum of intervention that is appropriate to severity.[3] Where the controversy begins is after positioning, special feeding techniques, supplemental feeding and temporary airway adjuvants fail.[4] Abel and colleagues[5] recently reported 86.5% of their Robin patients managed successfully with positioning or nasopharyngeal airways. Relatively long term home use of nasopharyngeal airways has been suggested.[6] The surgical interventions of lip-tongue adhesion (LTA), MDO and tracheotomy all have their costs and benefits. The trend is to save tracheotomy for those who fail the first two because once trached these patients tend to not be decannulatable for several years. LTA has waned a little as well, but there are still strong advocates.[7] Cost has recently been looked at as a factor, and tracheotomy loses there because of the long term care needs. The difficulty is knowing which patients will benefit most from each intervention. Recently the GILLS score (gastroesophageal reflux disease, intubation, late airway surgery, low birth weight) has been shown to have predictive value for LTA.[8] Neurologic impairment has been added to this list as well.[9] Additionally, other airway pathology worsens the prognosis.

To summarize, most PRS patients will be successfully managed with nonsupine positioning, special feeding techniques and temporary nasopharyngeal airway support allowing growth and maturation to reduce the problems. Patients with gastroesophageal reflux disease, requiring intubation in the first 24 hours, of low birth weight, or with neurologic or other airway impairment are more likely to need surgical intervention. My first choice is MDO except for the patients with severe neurologic impairment or other airway pathology. They are more likely to be managed with tracheotomy.

What role does DO have in adult orthognathic surgery situations?

SIDMAN

DO for the mandible is almost never indicated in adults as sagittal split osteotomy is the procedure of choice. It is indicated in midface deficiency if there is a need to bring the maxilla forward more than 10 to 12 mm. Single stage movement of this amount will result in some relapse due to the pressure of the soft tissue envelope. In this case, maxillary DO would be indicated even in an adult. Most of the time, two jaw (mandible and maxilla) surgery is needed in these cases.