Le Fort I Distraction with Internal, Submergible Devices: 52 Consecutive Cases

M. Chin

Children’s Hospital Oakland, Oakland, California, U.S.A.

Introduction

Maxillary advancement with Le Fort I osteotomy using miniplate fixation is a standard approach for management of midface retrusion. The method is highly effective and safe in the majority of cases. Special cases involving large advancements, scarring from multiple prior surgeries, and tethering from pharyngeal flaps may be predisposed to failure with conventional orthognathic surgery. Distraction may benefit this subgroup of orthognathic surgery patients. This paper demonstrates the efficacy of advancing the maxilla at the Le Fort I level with internal devices placed transorally.

Materials and Methods

Fifty-two patients with maxillary retrusion underwent Le Fort I advancement with internal, submergible distraction devices. The underlying pathosis included cleft lip and palate (n= 21), syndromic craniosynostosis (n=8), orthognathic midface hypoplasia (n=14), traumatic maxillary retrusion (n=6), and radiation effects (n=3). Paired Lorenz midface distractors were used in fifty cases. Modified Le Fort I osteotomies were performed to allow placement of maxillary distractors. Intraoperatively, the devices were typically activated to a distraction pressure of seven kilograms by applying a predetermined torque to the transport screw. If the vector of distraction was unsatisfactory, the device was repositioned to achieve the desired transport vector. A transmucosal activating rod was engaged into the distraction device and the mucosa closed around the activating rod to allow for postsurgical activation. The devices were not activated further for seven days following surgery. The devices were then activated to seven kilograms every other day until the desired...
maxillary transport had been achieved. After postdistraction lateral cephalometric radiographs verified that transport was satisfactory and transmucosal activating rods were removed. This allowed the devices to be entirely submerged. In most cases the maxilla was transported approximately 2mm anterior to the dental centric relation.

**Case Presentation**

A thirteen year old with bilateral cleft lip and palate presented for surgical maxillary advancement with distraction (figs 1 through 6). Multiple prior palate surgeries resulted in scarring of the palate. A pharyngeal flap had been placed.

**Results**

Fifty cases were successfully treated. Satisfactory occlusion and facial esthetics were documented with photographs and cephalometric

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**Fig 1. Preoperative midface retrusion**  
**Fig 2. Postoperative profile**  
**Fig 3. Preoperative occlusion**  
**Fig 4. Postoperative occlusion**
radiographs. Two cases relapsed into Class III malocclusion and were considered failures. Restriction of maxillary protraction by pharyngeal flaps was felt to be the cause of the two failures. One failed case was successfully retreated with distraction after the pharyngeal flap was removed.

**Discussion**

Distraction involves gradual advancement of the Le Fort I maxillary fragment. When compared to conventional Le Fort I surgery, distraction allows for greater protraction distances. With this technique, the soft tissue pedicle that limits intraoperative maxillary advancement is allowed to accommodate over several days. The interpositional nature of the distraction device improves fixation stability and limits relapse. Because assessment of dental occlusion is done without the influence of general anesthesia, maxillary positioning may be more precise. The ability to
incrementally advance the maxilla introduces the opportunity to place the occlusion into a slight Class II relationship. This may be a benefit to allow accommodation for the temporomandibular joint and for removal of dental compensation with orthodontic therapy. Le Fort I distraction with internal devices placed transorally is a practical and effective method to advance the maxilla. The results are predictable and stable.

Dr. Martin Chin has a patent license agreement with Walter Lorenz Surgical.

References
