Micrognathia in a patient with Treacher Collins Syndrome. Corrected by curvilinear distraction.

Case Report

SYNTHES® Instruments and implants approved by the AO Foundation
Micrognathia in a patient with Treacher Collins Syndrome.
Corrected by curvilinear distraction.

Patient profile
The patient is a 4-year-old male with obstructive sleep apnea (OSA) secondary to micrognathia and short posterior facial height in the setting of Treacher Collins Syndrome. Previously, he had a tonsillectomy and adenoidectomy with additional adenoid revision. His parents sought consultation for persistent severe OSA.

A 3D airway analysis showed significant obstruction (Figure 1).
Preoperative planning
A CT scan was obtained for virtual surgical planning using Synthes ProPlan CMF (Figure 2). During a web-based planning session, the surgeon identified the proposed osteotomy location and desired position of the distal segment of the mandible, shown in green (Figure 3). Curvilinear distraction devices with a 40 mm radius of curvature were selected bilaterally and positioned on the mandible virtually (Figure 4).

Based on the approved plan, anatomical models and surgical guides were fabricated. The surgical guides, made from polyamide, identified the planned location of the screw holes and osteotomies (Figure 5).
Micrognathia in a patient with Treacher Collins Syndrome.
Corrected by curvilinear distraction.

**Surgical treatment**

Bilateral submandibular incisions were used to expose the lateral and posterior aspects of the mandible. The surgical guides were placed on the gonial angle and a pencil was used to mark the osteotomy location. Screw holes were drilled through the guide using a 1.5 mm drill bit with 8 mm stop. Three screw holes were drilled in the proximal footplate and 4 were drilled in the distal footplate.

The guides were removed and the osteotomies were made using a reciprocating saw. Cuts were made through both cortices at the superoanterior aspect and then monocortically through the middle and inferior thirds of the lateral side of the mandible to protect the inferior alveolar nerve.

Flexible extension arms, 60 mm in length, were attached to the distractors. The curvilinear distractors were placed on the mandible and the activation arms were passed through the soft tissue via a stab incision in the preauricular region. The distractors were secured using 2.0 mm screws, 8 mm in length. Three screws were placed in the proximal footplate and 4 in the distal footplate for a total of 7 screws per distractor. The osteotomies were completed. The devices were activated to confirm consistent and equal separation of the segments. The devices were left open 2 mm to prevent premature fusion in this young patient. The wounds were closed and dressed.
**Postoperative management**

**Distraction protocol:**
The patient was discharged from the hospital the day after distractor implantation. The parents activated the distractors 1 mm per day bilaterally beginning on the 6th postoperative day for a total of 19 days.

**Extension arm removal and consolidation phase:**
The activation arms were removed 3 weeks after completion of distraction, which was 7 weeks after implantation of the distractors. The consolidation phase was extended to a total of 3 months due to repeated minor trauma to the site resulting from the child's activity. This led to seroma formation and superficial infections requiring treatment with oral antibiotics.

The devices were removed via the same submandibular incisions and slight extension of the exit port in the preauricular region to remove the proximal screws. The regenerate had solidified and was nearly imperceptible from the native bone.
Micrognathia in a patient with Treacher Collins Syndrome.
Corrected by curvilinear distraction.

Results
The child’s mandible was advanced 19 mm bilaterally resulting in a 5 mm reverse overjet (Figure 6). This overcorrection was planned to accommodate for future facial growth. The patient had significant improvement in breathing. He stopped snoring and began sleeping through the night, halfway through the distraction phase.

Postoperative 3D CT scans and airway analysis showed significant improvement in volume and cross-sectional area of all airway levels (Figures 7–8). A superimposition of the preoperative and postoperative CT scans shows the forward, rotational advancement of the mandible (Figure 9). Overall, the patient and parents tolerated the process well.

Long-term outcome
Ten months after the end of distraction, the child’s mandibular position was stable. The reverse overjet remained at 5 mm.
Micrognathia in a patient with Treacher Collins Syndrome Case Report

**Synthes**

---

**Product information**

- 04.500.140 Curvilinear Distractor, R40, right
- 04.500.141 Curvilinear Distractor, R40, left
- 04.315.132 Removeable Extension Arm, flexible, 60 mm

---

**Surgeon profile**

**Zachary S. Peacock, DMD, MD**
Instructor

**Maria J. Troulis, DDS, MS**
Associate Professor

**Leonard B. Kaban, DMD, MD, FACS**
Walter C. Guralnick Professor and Chairman

Department of Oral and Maxillofacial Surgery
Harvard School of Dental Medicine
Massachusetts General Hospital

---

Results from case studies are not predictive of results in other cases. Results in other cases may vary.