

Mandibular Notch Contouring in Temporomandibular Joint Replacement. Technical Note

Sergio Olate, PhD,*† Victor Ravelo, DDS,*§
Gonzalo Muñoz, MSc,*§§ and Claudio Huentequeo, MSc*

Abstract: Temporomandibular Joint Replacement (TMJ-R) is used to treat maxillomandibular disease related to condylar head augmentation, condylar head reduction, absence of the condylar head and TMJ reconstruction. In most of the cases, TMJ-R could be used together with orthognathic surgery. In cases with facial asymmetry related to overgrowth of the mandibular condyle as in the cases of osteochondroma, there is a progressive facial asymmetry with enlargement of the unilateral mandibular ramus and mandibular body, creating strong mandibular contouring when comparing to the contralateral side. Usually, in this case, a lack is observed in the antegonial notch. The aim of this technical note is to provide the strategy to obtain facial symmetry using the TMJ prosthesis and contouring osteotomy in the same procedure.

Key Words: Facial asymmetry, orthognathic surgery, TMJ replacement

In cases with facial asymmetry related to unilateral growth of the mandibular condyle by benign tumor of the condylar head or osteochondroma, it is necessary to use the low condylectomy and the temporomandibular joint replacement (TMJ-R).¹

Usually, the TMJ-R is used together with orthognathic surgery to achieve the normal position of the maxillary bones to obtain facial symmetry, facial balance, and the stable position of the TMJ. Temporomandibular joint design can include a lacking volume of the mandibular ramus contouring, if necessary.²

The planning of the surgical treatment for facial asymmetry uses specific software to achieve the right facial midline between the upper and lower incisors and the right position of the face; however, the mandibular contouring usually is lacking in this analysis; this is because the augmentation of the condylar head could affect the mandibular ramus and body, creating an augmented size and volume when compared with

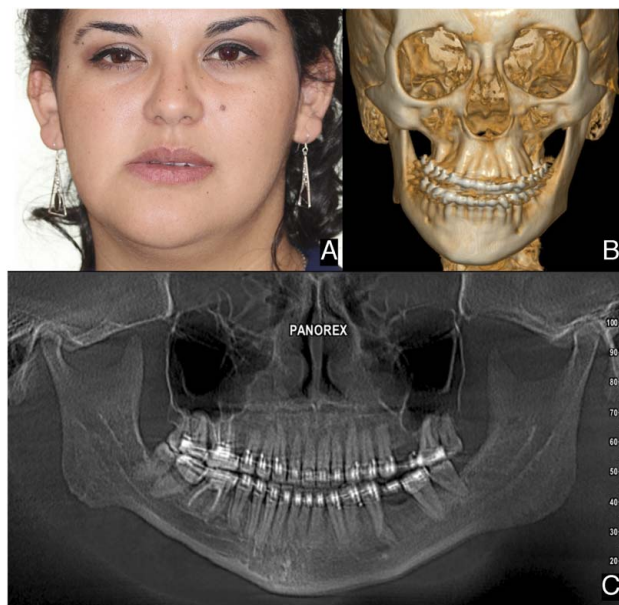


FIGURE 1. (A) Facial asymmetry related to unilateral osteochondromas. (B) Computed tomography showing the class III trend and the facial asymmetry. (C) Orthopantomography showing differences in the condylar size and mandibular ramus morphology.

the opposite side.³ This issue has to be included in the workflow to achieve facial asymmetry using orthognathic surgery and TMJ-R.

TECHNICAL NOTE

Progressive growth of the unilateral mandible condyle is related to progressive augmentation in size and volume of the mandibular ramus and mandibular body. This growth will change the morphology of the mandibular contouring (Fig. 1). Planning of TMJ design and orthognathic surgery should include the mandibular contouring in the mandibular angle to

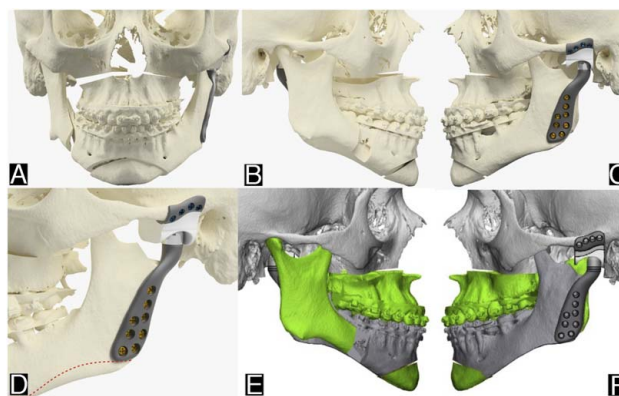


FIGURE 2. (A) TMJ design and orthognathic surgery to treat facial asymmetry and TMJ-R. (B) Right side with the sagittal ramus osteotomy and a high antegonial notch. (C) Left side showing the design of the TMJ and the absence of the antegonial notch. The prosthesis design is performed till the upper border of the basilar osteotomy. (D) design of the mandibular contouring osteotomy to obtain mandibular symmetry. (E) Right side view with the planned osteotomy for mandibular advancement. (F) Left side view with the basilar osteotomy performed in the software showing symmetry with the opposite side. TMJ indicates temporomandibular joint; TMJ-R, temporomandibular joint replacement.

From the *Department of Oral, Facial, and Maxillofacial Surgery, University La Frontera, Temuco, Chile; †Center for Research in Surgery and Morphology (CEMyQ), Faculty of Medicine, University La Frontera, Temuco, Chile; ‡Undergraduate Research Group in Dentistry (GIPO), Faculty of Health Sciences, Universidad Autónoma de Chile, Temuco; and §PhD Program in Morphology, Universidad de La Frontera, Chile.

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Address correspondence and reprint requests to Sergio Olate, PhD, Universidad de La Frontera, Francisco Salazar 01145, Temuco 4811230, Chile; E-mail: sergio.olate@ufrontera.cl

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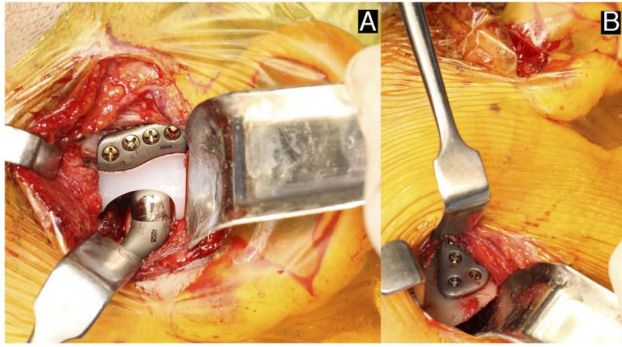


FIGURE 3. (A) Cranial component installed in the planned position (Enterprises, Artfix Implants, Pinhais, PR, Brazil). (B) Submandibular approach with the condylar component installed, showing the mandibular border for osteotomy.

obtain symmetry in the midline and also in the mandible border in the same procedure. It is necessary to obtain a mirror image to include the maxillo-mandibular three-dimensional position and perform an evaluation in the basilar area of the mandible to get symmetry (Fig. 2).

After surgery design, the digital workflow has to be aimed by the symmetry of mandibular volume and mandibular contouring and should confirm the needs for mandibular border osteotomy; this can be evaluated in the TMJ design to include the lower extension of the condylar component, over the mandibular ramus osteotomy.

Using the same submandibular approach for the condylar component of the TMJ, it is possible to achieve the area to perform the osteotomy using a surgical guide (Fig. 3).

In this case, the 6-month follow-up shows the facial balance and symmetry in the midline and the mandible contouring after TMJ-R and mandibular osteotomy (lower border of the condylar component) (Fig. 4) obtaining.

The mandibular contouring should be included in the digital workflow when preparing a TMJ-R after low condylectomy and orthognathic surgery; this is a critical point to obtain facial symmetry and facial esthetic after surgical treatment.

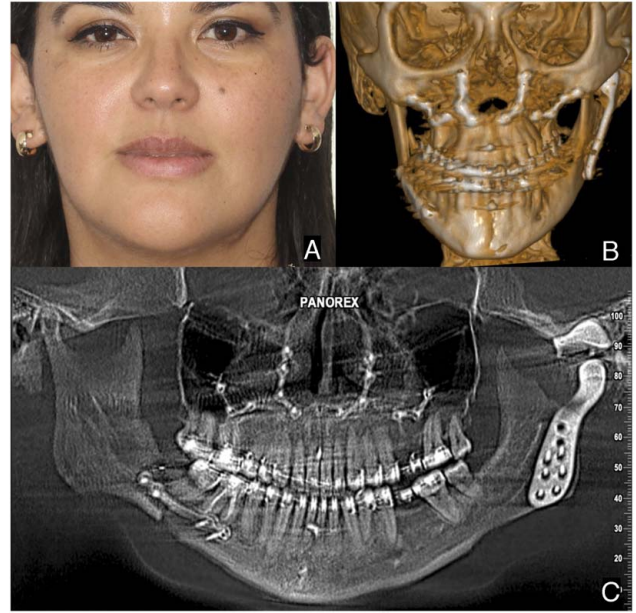


FIGURE 4. (A) Six-month follow-up showing stability in the facial midline and contouring symmetry. (B) Computed tomography showing internal rigid fixation with skeletal symmetry and the TMJ prosthesis with no complications. (C) Orthopantomography showing the position of the TMJ prosthesis and the osteotomy in the basilar border of the left mandibular angle and body. TMJ indicates temporomandibular joint.

REFERENCES

- Olate S, Ravelo V, Huentiqueo M, et al. An overview of clinical conditions and a systematic review of personalized TMJ replacement. *J Pers Med* 2023;13:533
- Olate S, Bahls V, Uribe F, et al. Patient-specific implant for temporomandibular joint replacement in juvenile arthritis and facial asymmetry. *Ann Maxillofac Surg* 2020;10:275–278
- Vásquez B, Olate S, Cantín M, et al. Histopathological analysis of unilateral condylar hyperplasia: difficulties in diagnosis and characterization of the disease. *Int J Oral Maxillofac Surg* 2016;45:601–609

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