

Concurrent High Condylectomy and Orthognathic Surgery to Address Mandibular and Facial Asymmetry

Seija Maniskas, MS,* Yassmin Parsaei, DMD,*† Karl C. Bruckman, MD, DMD,*
and Derek Steinbacher, MD, DMD*

Abstract: Correction of facial asymmetry caused by active unilateral condylar hyperplasia (CH) requires proper diagnosis, arrested ongoing condylar growth, and ultimately orthognathic surgery. Traditionally, prior to performing orthognathic surgery, active CH is addressed either by: awaiting natural cessation of condylar overgrowth, or performing an interval high condylectomy (to stop growth). However, these strategies both add to the total treatment time, by either waiting and confirming no active growth, or performing a first stage growth-arresting procedure. In this report, the authors describe concurrent high condylectomy, and 3-jaw orthognathic surgery, to address the root of the problem and provide aesthetic correction in the same setting. This clinical series illustrates a detailed description of this approach, highlighting operative order, and an analysis of outcomes.

Key Words: Condylar hyperplasia, high condylectomy, mandibular asymmetry, orthognathic, unilateral condylar hyperplasia

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Condylar hyperplasia (CH) is characterized by overgrowth of the condyle, leading to dentofacial asymmetry, mandibular deviation, and malocclusion.^{1,2} Proper diagnosis is critical as treatment plan can vary depending on the growth state of the condyle.^{3,4} Activity of CH is established through a combination of serial clinical and radiographic examinations as well as bone scintigraphy. Worsening functional and aesthetic changes over time point to an active state. Bone scintigraphy with single-photon-emission computerized tomography (SPECT) is considered positive for unilateral hyperplasia with a 10% difference in uptake between condyles.⁵

Once activity is established, 3 main treatment choices exist: wait for the condyle to “burn out” and perform orthognathic surgery alone^{4,6}; perform a staged high condylectomy to arrest growth,

followed by orthognathic surgery 4 to 6 months later; and perform concurrent high condylectomy and orthognathic surgery. This report describes our surgical approach to simultaneous high condylectomy and orthognathic surgery, for comprehensive, time saving, and aesthetic correction of facial asymmetry in patients with active CH.

METHODS

A retrospective review of patients with active unilateral CH undergoing concurrent high condylectomy and orthognathic surgery over the last 5 years was conducted. Demographic and perioperative details were gleaned from the medical records and displayed in Table S1 (Supplemental Digital Content, <http://links.lww.com/SCS/A814>). Three-dimensional photos were used to assess pre- and postoperative asymmetry of the face and mandible at 6 weeks and longest follow-up. Outcome parameters included: facial nerve function, correction of symmetry, stability of occlusion, scarring, and overall patient satisfaction. Time, from diagnosis to healing from surgical correction, was compared to a control “burnt-out” CH group.

Indications and Management

This method is indicated in adult unilateral CH patients (women >15 years, men >18 years) with active unilateral CH (progressive clinical presentation, positive history, positive bone scintigraphy), mandibulofacial asymmetry, and stable, moderate temporomandibular joint (TMJ) symptoms.

Clinical Example

A 19-year-old woman presented with mandibular asymmetry, large anterior cross-bite in Class III occlusion, and associated TMJ symptoms. Work up for CH was performed. The SPECT demonstrated asymmetrically increased tracer uptake in the left condyle (difference of 30.8%) and cone-beam computed tomography showed corresponding condylar mass.

Surgical Techniques High Condylectomy

The patient is prepped and draped following induction of anesthesia. Epinephrine only solution is injected in/around the field. A retrotragal composite approach to the TMJ is performed.⁷ The frontal branch is tested and preserved. A skin and SMAS flap are raised and reflected. The lateral capsule of the joint is palpated. A T-shaped incision is opened into the capsule itself. The disk, condyle, and condylar neck are identified. A high condylectomy is performed using a fissure burr, at the level of at least 5 mm from the superior surface of the head (or at the visible chondroid fusion plane).⁸ The neo-condylar head is smoothed and the disc repositioned over top. The joint space is irrigated copiously and the mandible is manipulated. Fat is harvested from the inner thigh or abdomen and placed around the joint and joint space to improve joint mobility and reduce inflammation. This area is left open until

From the *Division of Plastic Surgery, Yale School of Medicine, New Haven, CT; and †Department of Orthodontics, University of Connecticut, Farmington, CT.

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Address correspondence and reprint requests to Derek Steinbacher, MD, DMD, Yale School of Medicine, Section of Plastic and Reconstructive Surgery, 330 Cedar St, Boardman Bld, 3rd fl, New Haven, CT 06510; E-mail: Derek.Steinbacher@yale.edu

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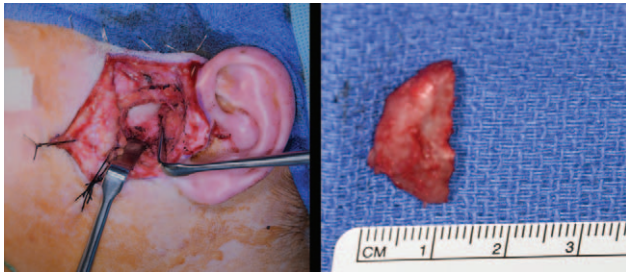


FIGURE 1. Removal of the left hyperactive mandibular condyle with a high condylectomy surgical procedure.

the bilateral sagittal split osteotomies (BSSO) is performed so the neocondyle can be observed seated in the fossa. Once the disk is repositioned, the capsule is closed, followed by the superficial musculoaponeurotic system and skin (Fig. 1).

Orthognathic Surgery

The critical aspect to understand when performing concurrent condylectomy and orthognathic surgery is the sequencing. The classic sequence is: maxilla repositioning, followed by condyle, followed by BSSO.⁹ However, the option we prefer is: condyle (first), followed by BSSO, then maxilla (Le Fort) (last). The BSSO done following condylectomy prior to closing the joint capsule also allows the position of the condyle to be visualized in the fossa. Intermediate and final splints are used and removed at the end of the case. Rigid internal fixation is used for all osteotomy sites. No additional external incisions are required to complete this portion of the procedure.

RESULTS

This series included 6 patients (all female) treated using concurrent condylectomy and orthognathic surgery. Mean age of the patients was 32 years (range, 17–57 years). Average length of follow-up was 1.3 years. No continued condylar growth or reactivation of hyperplasia was observed. Objective analysis of mandibular asymmetry demonstrated successful correction in all patients (Fig. 2). Occlusion was corrected and stable in all patients. One patient experienced temporary postoperative facial nerve weakness, which improved by 6 months. Scarring was minimal and all patients were satisfied with aesthetic and functional outcomes. Average treatment time was 2.5 ± 1.3 years (range, 0.9–4.9 years) from the beginning of corrective orthodontia to surgery. The control group had an average correction time of 6.8 ± 5.8 years (range, 1.4–16.0 years).

DISCUSSION

The present technique combines the 2 treatment goals of arresting condylar growth and correcting asymmetry to optimize aesthetic and functional results while dramatically reducing overall treatment time compared to a watch and wait method. For this combined procedure, we favor an open facelift approach to condylectomy¹⁰ for ideal access and visualization, and inconspicuous healing. Condylectomy needs to be performed either after the Le Fort (in maxillary first sequencing), or before the BSSO (in mandible first sequencing). We favor mandible first orthognathic, and the condylectomy must be completed prior to osteotomies and plating of the BSSO segments. Additional benefits of this sequence include beginning sterilely externally and having the ability to visually seat the neocondyle in the best glenoid fossa position when manipulating and plating the proximal mandibular segment.



FIGURE 2. Example of improvement of mandibular/facial asymmetry in 2 patients with active unilateral condylar hyperplasia treated with concurrent high condylectomy and orthognathic surgery.

Concurrent high condylectomy and orthognathic surgery, carries several advantages: only a single anesthetic and operative episode is needed; the growth center is arrested and aesthetic/functional balance of the occlusion and face is achieved in a single setting; and total treatment time is significantly shortened (single surgery with less orthodontic treatment time, and no delays “watching and waiting”). This approach also prevents worsening of the mandibular deformity and asymmetry, which can occur by waiting for the active growth to burn out. Long-term functional and aesthetic outcomes are excellent using our reported technique. The TMJ symptoms are eradicated with no negative consequences, and no persistent frontal nerve weakness was seen. The “facelift” type scar blends and cannot easily be discerned. The results were all stable without future increase condylar growth, and patients were all universally satisfied with their appearance, functionality, and recovery.

CONCLUSION

Concurrent high condylectomy and orthognathic surgery is an effective means to address facial asymmetry from active CH. This expeditious treatment approach arrests condylar growth, leading to stable outcomes, while optimizing facial aesthetics and balance in a single setting.

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