

## Simultaneous Intraoral Condylectomy and Orthognathic Surgery for Unilateral Condylar Hyperplasia: A Case Report

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## 1. Abstract

Unilateral condylar hyperplasia is a rare condition characterized by persistent condyle growth resulting in progressively worsening facial asymmetry and malocclusion. Multiple treatment modalities have been described. This case report details the diagnosis and management of a 33-year-old female with type 2 unilateral condylar hyperplasia. The patient underwent simultaneous intraoral condylectomy and orthognathic surgery. The surgical plan included a patient-specific guide for precise condyle osteotomy and repositioning. Postoperatively, the patient exhibited satisfactory outcomes with minimal skeletal relapse at one year. The described surgical protocol, incorporating a patient-specific guide in an intraoral approach, demonstrates successful management of type 2 condylar hyperplasia.

## 2. Introduction

Unilateral condylar hyperplasia is characterized by unilateral increased vertical ramus height, facial asymmetry with chin point deviation to the contralateral side, and occlusal canting. Several classification systems have been proposed for mandibular asymmetries. Obwegeser and Makek [1] first classified mandibular asymmetries into hemimandibular hyperplasia (HH) characterized by vertical asymmetry, hemimandibular elongation (HE) characterized by transverse asymmetry, or a combination of both. Wolford [2] classified condylar hyperplasia into types 1-4, classifying them based on both clinical and histological causes of hyperplasia.

In this case report we present the diagnosis and management of a patient with type 2 unilateral condylar hyperplasia who underwent intraoral condylectomy with orthognathic surgery with the aid of a patient-specific cutting and positioning guide.

## 3. Case Presentation

A healthy 33-year-old female presented with a complaint of progressively worsening jaw asymmetry of more than 10 years duration. No temporomandibular joint (TMJ) dysfunction was noted. Clinical assessment showed a class III dental malocclusion on a skeletal class III base, with significant left-sided mandibular elongation and hyperplasia, resulting in lower dental midline and chin deviation to the right with significant clockwise maxillary cant (Figure 1). Dental panoramic tomography revealed an enlarged and elongated left condyle, and Technetium-99m Quantitative Single-Photon Emission Computed Tomography showed a left to right mandibular condyle uptake ratio of 2.86, and a left condyle to clivus uptake ratio of 2.87. The patient was diagnosed with left hemimandibular hyperplasia and elongation using the Obwegeser and Makek classification, which was also consistent with Type 2 condylar hyperplasia using the Wolford classification.

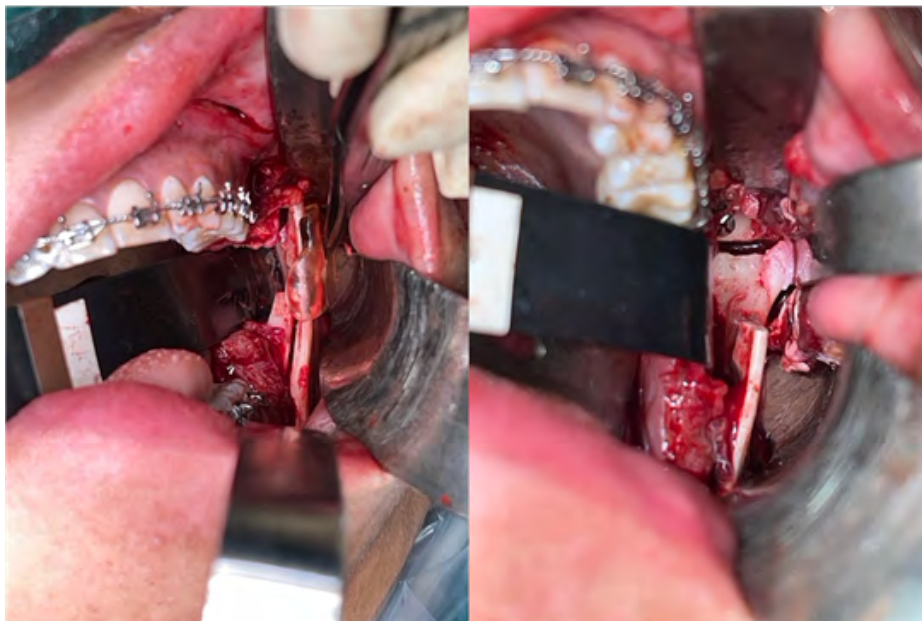
The patient underwent a period of pre-operative orthodontics for 4 months before proceeding with simultaneous intraoral condylectomy and orthognathic surgery. A Lefort I osteotomy was performed for the correction of cant and yaw, advancement, and posterior impaction. Through an intraoral BSO incision, subperiosteal dis-

section was performed to expose the left coronoid and condylar processes. The surgical guide was fitted and a planned left coronoidectomy was performed to improve access to the condylar process (Figure 2). Again, using the surgical guide, the planned osteotomy line for the left condylectomy was marked (Figure 2). The cutting guide was removed and the osteotomy completed. The left pathologic condyle was resected. A fixation screw with a stainless-steel wire attached was fixed onto the anterior surface of the condyle to aid in its distraction from the fossa. A bilateral sagittal split osteotomy was then performed.

The patient was discharged well on post-op day 2. She was placed on 1 week of intermaxillary fixation with elastics, and subsequent 2 weeks with guiding elastics. No complications except transient right lingual parasthesia was reported which resolved after 4 months. Histological diagnosis of the resected left condyle was consistent with an osteochondroma. At 1-year post-surgery, the patient presents with no recurrence of the osteochondroma, and minimal skeletal relapse from her surgery. There was an absence of temporomandibular joint dysfunction or pain, with a full range of motion and no deviation on opening or closing.



**Figure 1:** Left: Frontal photo of patient pre-operatively showing marked right-sided facial asymmetry and can't. Right: Frontal photo of patient 1 year postoperatively showing correction of facial asymmetry.



**Figure 2:** Left: Intraoperative photo showing fit of cutting guide along the left lateral and anterior ramus. Right: Intraoperative photo showing osteotomy line marked for condylectomy made using the surgical guide.

#### 4. Discussion

Type 2 condylar hyperplasia is an acquired deformity that often begins in the second decade and is characterized by unilateral vertical elongation of the face and jaws. It is not self-limiting and has the potential to grow indefinitely, resulting in an ipsilateral posterior open bite. The condition is associated with an enlarged condylar head and neck due to the growth of an osteochondroma. Contralateral TMJ disc displacement and arthritis are present in up to 75% of cases.

When considering initial treatment options for unilateral condylar hyperplasia, various strategies exist, such as staged or simultaneous condylectomy and orthognathic surgery, or adaptable condylectomy alone. Other options include a sliding vertical ramus osteotomy, or reconstruction of the TMJ complex with custom prostheses or autogenous grafts.

The advantages of performing simultaneous condylectomy and orthognathic surgery are an immediate correction of both acquired and developmental facial deformities to provide the patient with a satisfactory outcome with the shortest treatment time [3]. However, this approach requires more complex treatment planning, longer surgery time, and an overall higher risk than a staged or condylectomy-only approach.

A staged or condylectomy-only approach is a viable alternative for the management of unilateral condylar hyperplasia. A study of seven patients by Nitzan showed correction of malocclusion and gradual reversal of facial asymmetry after unilateral condylectomy [4]. This approach subjects the patient to minimal surgical intervention, although patience is required to observe results. This approach also corrects only the acquired deformity, and patients should be informed that a second intervention via orthognathic surgery may be required if the self-correction is unsatisfactory.

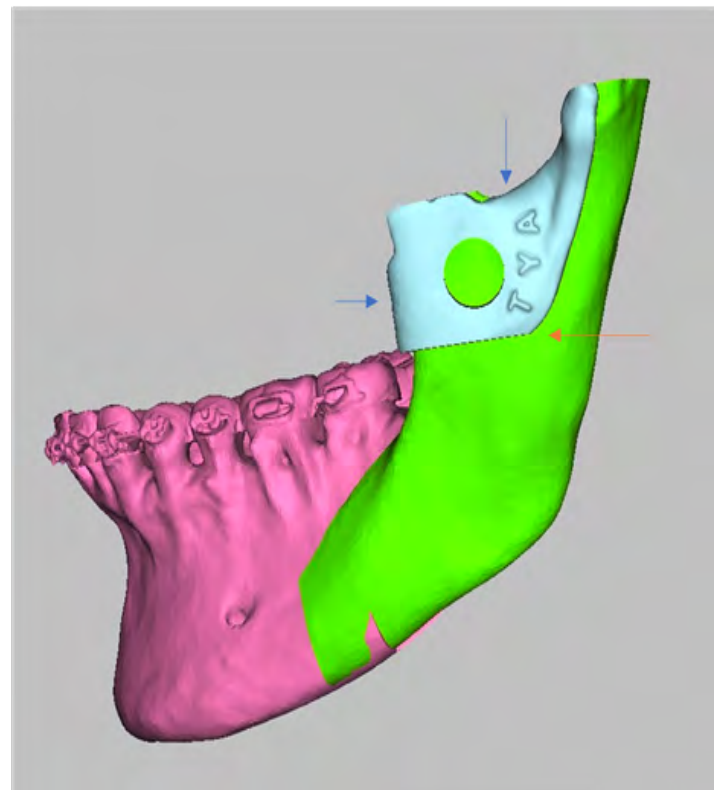
The surgical protocol used in this case is a modification of that proposed by Larry Wolford who advocated a single-stage surgery to correct both the acquired and developmental deformities via a simultaneous low condylectomy and orthognathic surgery [5]. The original protocol involves a low condylectomy to remove the ipsilateral condyle head. The condylar neck is reshaped to function as the new condyle. Patients with TMJ symptoms may require repositioning of the ipsilateral or bilateral articular discs, followed by orthognathic surgery and inferior border ostectomy if indicated.

The condylectomy approach used in this case was an intraoral approach, similar to that published by Luo et al in their review of anatomic changes of the temporomandibular joint after intraoral condylectomy combined with orthognathic surgery [6]. Benefits of an intraoral approach would be the avoidance of complications associated with the conventional extraoral approach such as facial nerve injury, sialocele formation, and scarring. However, access and visualization are poor. The lack of direct visualization of the condylar capsule, disc, and condyle head makes accurate osteoto-

my and repositioning of the neo-condyle difficult.

These challenges were overcome with design features incorporated into the patient-specific guide used intraoperatively. The objectives of the surgical guide were to guide accurate condylectomy osteotomy as planned so as to ensure complete resection of the growing lesion, as well as to position the proximal segment prior to plating, ensure accurate seating of the neo-condyle within the fossa, and to re-establish normal vertical ramus height. The guide was designed and printed in clear acrylic. Salient features of the guide include notches to engage the anterior border of the ramus and the sigmoid notch to aid in intraoperative positioning of the guide. A circular window was made in the body of the guide to allow checks that it was well seated on bone. Superior edges of the guide act as an open face cutting guide for coronoidectomy and condylectomy cuts at the pre-planned levels. The inferior border of the guide was used as a reference to approximate the vertical position of the left ramus segment, which would otherwise be free of all superior attachments in the form of the condylar capsule and temporalis attachments. The line was planned such that when placed at the level of the occlusal plane, would approximate equal rami heights bilaterally (Figure 3-6).

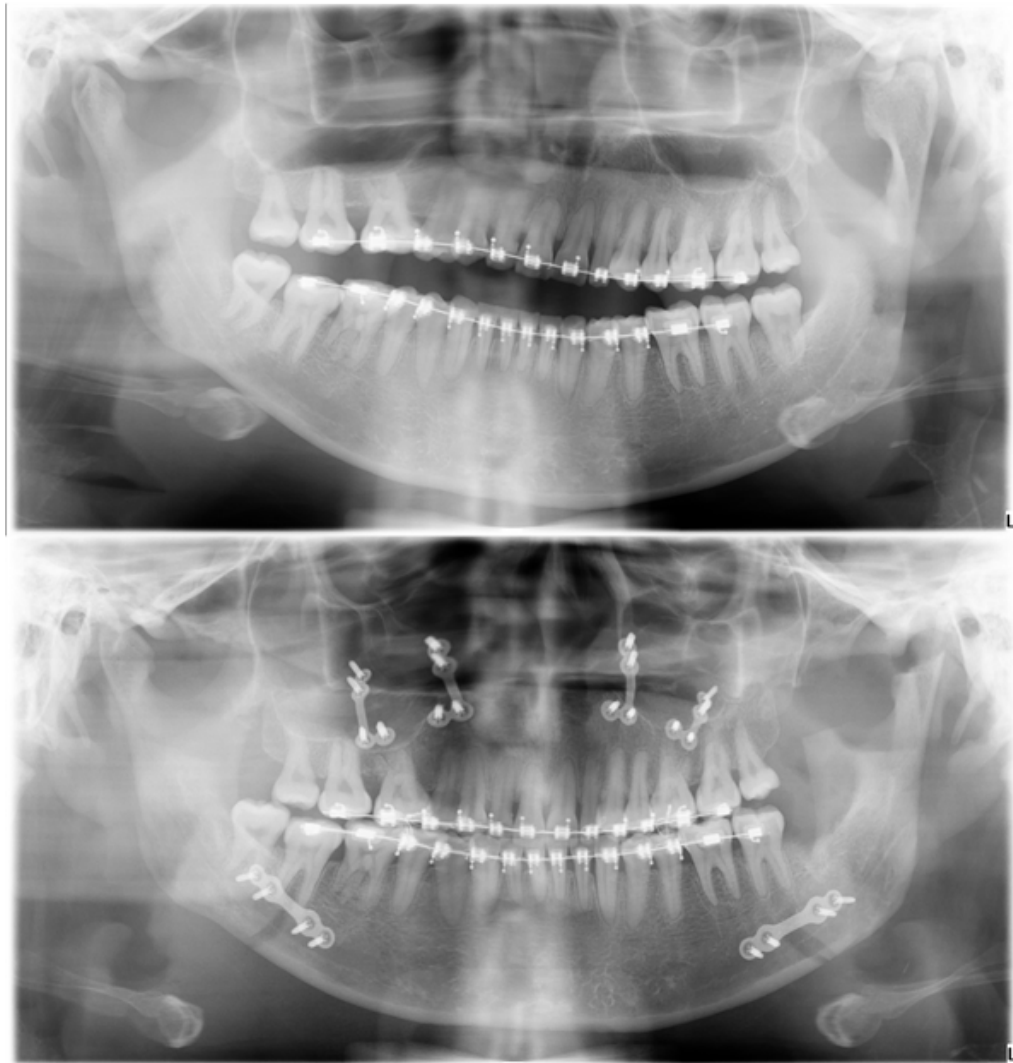
In conclusion, this case report showcases the possibility of good outcomes with an intraoral condylectomy and orthognathic surgery approach for patients with type 2 unilateral condylar hyperplasia.



**Figure 3:** Digital design of custom printed acrylic surgical guide. The blue arrows indicate notches made for accurate position of the guide. The red arrow indicates the inferior border of guide intentionally corresponding to the mandibular occlusal level in the final planned position of the proximal segment.



**Figure 4:** Photo of resected left condyle head. An IMF screw and stainless-steel wire was fixed onto the anterior condyle surface to aid in its distraction from the glenoid fossa.



**Figure 5:** Top: Pre-operative dental panoramic tomography. Bottom: Immediate post operative dental panoramic tomography.



**Figure 6:** Top: Pre-operative occlusion in MI. Bottom: Occlusion in MI 6 months postoperatively

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