

## Oblique Condylectomy for the Treatment of Condylar Hyperplasia and Associated Dentofacial Anomalies

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### Abstract

**Background:** To date, different techniques have been described to perform condylectomies, in order to correct the abnormal growth center that causes mandibular condylar hyperplasia (CH). The cephalo-caudal level of the cut has been the main variable, but not its inclination.

**Methods:** This technique uses an oblique osteotomy to eliminate the proliferative tissue of the condyle, providing a wider space between the glenoid fossa and the condylar head at the same time, which allows the cephalic-posterior displacement of the latter. The resulting mandibular rotation avoids the corrective orthognathic surgery (OS) when there is mild facial asymmetry. In the event that the CH has caused a facial asymmetry that needs to be corrected by OS, the traditional bilateral sagittal ramus osteotomy (SRO) can be replaced by a single one, contralateral to the condylectomy. Elastic traction will allow immediate occlusal stabilization during the postoperative period.

**Results:** We have been using successfully this technique during the last 5 years in the Department of Oral and Maxillofacial Surgery at the Universidad El Bosque, Bogotá Colombia.

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### Introduction

CH is an acquired abnormality of the mandibular condyle, mainly developed during puberty. Humphry were the first author who described this pathology and proposed the condylectomy for its management [1]. The etiology of CH is still under debate, however, multiple causes have been proposed, such as the presence of neoplasms, traumas, infections, abnormal condylar loads, hormonal influences, hypervascularity, inheritance and the excessive influence of growth factors [2,3].

CH is presented unilaterally, with predominance for the right condyle in 57% of the cases, and a female-to-male ratio of 2:1 [2]. As only one side is affected, mandibular deviation occurs, causing facial asymmetry, ipsilateral open bite, contralateral crossbite and midline deviation.

The main therapeutic goal for the management of this condition is the surgical removal of the proliferative layer of the affected condylar head, but sometimes, additional procedures as OS are required. The objective of this paper is to describe a modification to the classic condylectomy, which has been used alone or combined with OS, to correct the sequels caused by CH. Only a contralateral sagittal ramus osteotomy (SRO) was performed when OS was required.

### Surgical Technique

Under general anesthesia with nasotracheal intubation and local anesthetic infiltration, a modified endaural approach is performed [4], followed by blunt dissection until the TMJ capsule is visible. Complete exposure of the affected condyle should be made using a vertical linear incision. The upper joint compartment must remain unscathed. An oblique osteotomy is then executed including the lateral and medial poles of the condyle, as shown in the Figures 1 and 2B. Condyle reshaping is then performed, followed by deep layer suturing using 4-0 Vicryl®, and cutaneous suturing with 6-0 Prolene®.

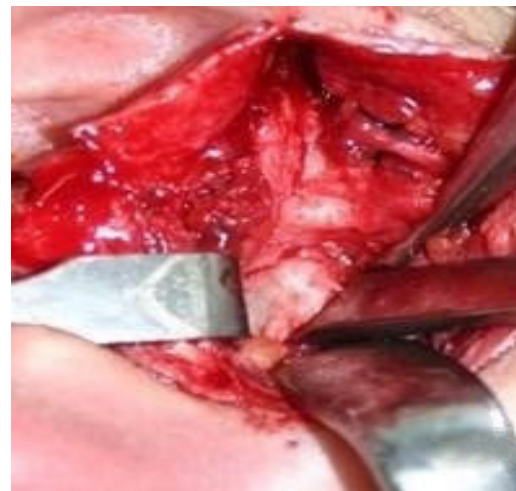


Figure 1: Picture showing the oblique osteotomy that removes the proliferative layer of the condylar head.

When OS is required to avoid the excessive condyle rotation, the use of 3D virtual planning allows to project the movement of the jaws and to obtain surgical splints that stabilize the maxillomandibular position for the rigid fixation with the osteosynthesis material. In our protocol, a LeFort I is the first step (if there is maxillary canting),

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followed by the oblique condylectomy, and finally a SRO (if necessary) on the opposite side to the affected condyle (Figures 3 and 4). Early functioning using rubber bands is mandatory after the surgery (Figure 5).

### Discussion

CH is defined by Bell as a facial asymmetry, in which both, unequal condylar size and elongation of the neck of the condyle

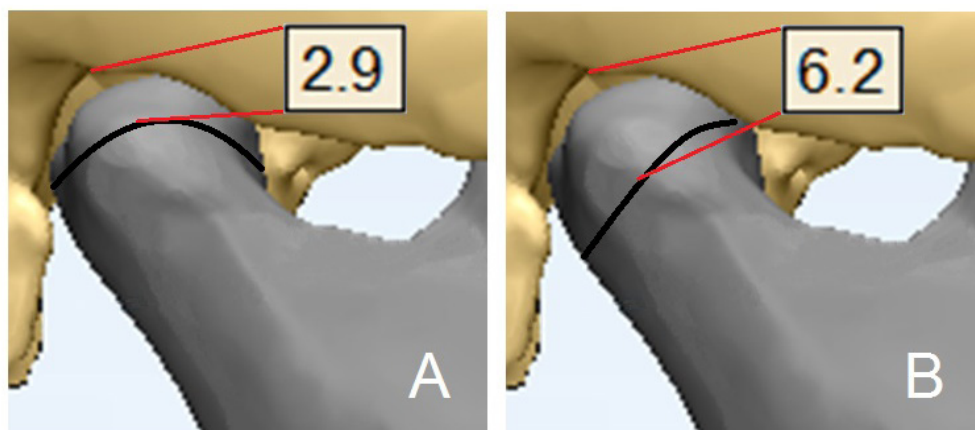


Figure 2: Diagram that shows the design of A) the conventional condylectomy and B) the oblique condylectomy, which generates wider space.

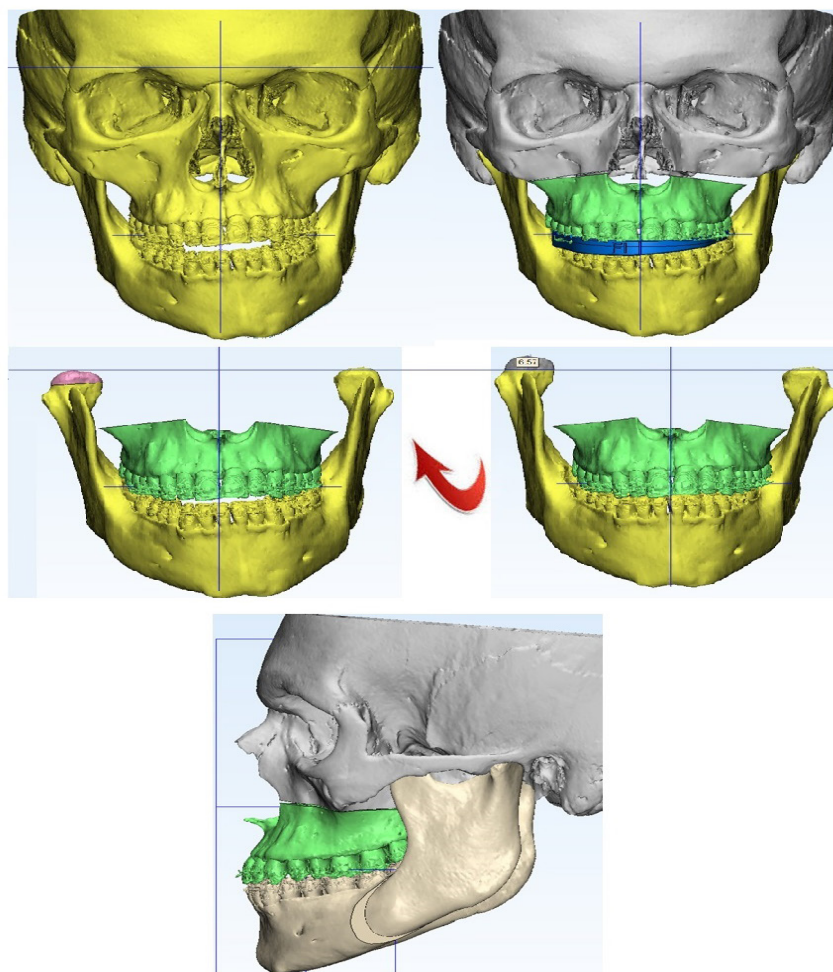


Figure 3: 3D planning of orthognathic surgery combined with right oblique condylectomy. Note that only the left SRO is required.



Figure 4: Postoperative panoramic X-ray of the case.



Figure 5: Postoperative picture showing occlusal stability and correction of the dentofacial asymmetry.

on the hyperplastic side, cause mandibular deviation towards the opposite side [5]. The mandibular shape usually remains proportional in relation to the maxillary arch, without significant compensatory alveolar modifications. Holmlund classifies the CH as vertical or rotational [6]. In patients with the rotational type, there is ramus elongation and chin deviation towards the contralateral side, causing dental midline deviation and crossbite. Open bite can be found on the affected side if the hyperplasia occurs when the patient's growth has stopped. Wolford classifies the CH according to the growth vector as type 1 (horizontal) or type 2 (vertical), being the first the most common. In the type 1, if one side of the mandible grows faster than the other, midline deviation and prognathism will be found [7].

Several surgical approaches have been described to treat CH and its sequels, of which HC is probably the most widely spread. It was described by Wolford as the removal of the top 3-5mm of the condylar head, including the lateral and medial poles [7]. The same author reported predictable long-term results using this technique with orthognathic surgery to treat active CH type I [8].

Because both, the maxillomandibular proportions and the shape of the alveolar bone remain unchanged in most cases of CH, the condyle and neck are the main cause of the asymmetry. This led us to consider the condylar size reduction by using an oblique osteotomy, following the anatomy of the glenoid fossa, with the aim of generating a wider joint space (Figure 5), to allow cephalic-posterior mandibular displacement. In the presence of an open bite ipsilateral to the CH, we found that this technique alone permitted us to correct midline deviations from up to 5 mm intraoperatively, manipulating passively the mandible to bring the teeth to maximum intercuspitation after the osteotomy. If the asymmetry was greater, a contralateral SRO was enough to correct the anomaly avoiding the excessive condylar rotation. When there was maxillary canting, a LeFort I osteotomy was performed, followed by the oblique condylectomy and the contralateral SRO, in case of excessive condylar rotation.

It is important to emphasize that the procedure must ensure a safe positioning of the contralateral condyle, which would allow a gradual functional adaptation, avoiding the deterioration of the joints in the medium and long term. Dimitroulis and Slavin developed an experimental animal study in 15 New Zealand white rabbits, showing that even though unilateral condylectomies have an early adverse effect on the structural integrity of the contralateral TMJ, the equilibrium developed by the operated TMJ will balance the forces imparted on the unoperated TMJ as time passes [9]. It suggests that short term remodeling effects on the unoperated side, appear to be reversible as the operated side heals.

## Conclusions

To date, by means of this novel technique, we have confirmed that mild mandibular rotation, aided by careful and controlled elastic force, is harmless to the joints due its adaptive functioning. We have also found that presurgical orthodontics provides adequate occlusal stability; meanwhile elastic traction guides the protrusive and lateral excursive movements. Additionally, some patients referred that elastics make them to feel safer during the postoperative period.

## Competing Interests

The authors declare that they have no competing interests.

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