Mandibular Condylectomy Revisited: Technical Notes Concerning the Use of an Ultrasonic System

Sergio Olate, DDS, MS, PhD,* Alejandro Unibazo, DDS,† Andrés Almeida, DDS,‡ and Márcio de Moraes, DDS, MS, Pbd§

Condylar hyperplasia is a well-known pathologic entity with an established treatment protocol. Traditionally, saws and drills have been used in the condylar osteotomy. The use of ultrasonic systems has optimized many procedures in the maxillofacial area; however, exploration of the use of this technique for condylectomy has been limited. Ultrasonic systems offer several advantages, such as a decrease in the risk of blood vessel damage and clarity of the osteotomy. The present report addressed the scope of condylar osteotomy using ultrasonic systems.

© 2013 American Association of Oral and Maxillofacial Surgeons

Surgical Technique

The surgical approach is conventional until the condylar neck is reached. From that point, there is separation of the capsule and the entrance to the condylar head. The tips used with our technique are shown in Figure 1.

The osteotomy is one of the more complex stages of the surgical procedure; damage to neighboring vascular structures, such as the maxillary artery, has been associated with surgical complications and considerable hemorrhaging during the condylar fracture or osteotomy. These complications primarily reflect the use of saws and drills in osteotomy without visualization of the entire surgical area.

Ultrasonic systems using cavitation technology are a viable alternative for osteotomy, because these systems facilitate selective cutting of the bone but not the soft tissues, thereby facilitating adequate and clean visualization.

The aim of the present report was to present the technical aspects of mandibular condylectomy performed in 5 consecutive cases using an ultrasonic system.
more generous retraction can be made in the anterior sector and released in the posterior sector (Fig 4), allowing the tip to penetrate the anterior sector of the condyle. The same procedure is subsequently performed in the posterior area.

Thus, the osteotomy has been completed up to the medial sector of the condylar neck. A second tip (1 mm thick, 2 mm wide, and 1.8 cm long) is then used to cut the condylar segment along the medial side to separate (Fig 5) or mobilize (Fig 6) the superior aspect of the condyle. A chisel is not required at any stage of the osteotomy, because the medial cortical bone of the condylar segment will automatically retract when the tip is placed. Medial and superior dissection of the condyle will be necessary, and the segment can be extracted using a Kelly clamp, detaching any sector that was not previously completely

FIGURE 1. The tips used in the condylectomy technique.

FIGURE 2. Position of the tip in the initial step, perpendicular to the lateral side of the condyle in the left temporomandibular joint.

FIGURE 3. Left temporomandibular joint, inferior view. Initial osteotomy using a tip (0.2 mm thick, 1 cm long, and 1 mm wide) on the lateral, posterior, and anterior surfaces of the condyle. The lines on the tip surface are separated by 2 mm. Retraction can be seen in anterior and superior area of the approach.
detached from the soft tissue. The condylar fragment showed a clean and straight cut without irregularities on the cut surface (Fig 7).

Discussion

One of the major complications of the osteotomy for high condylar fractures has been the proximity of the maxillary artery and other vascular elements of the temporomandibular joint. As many as 10 vascular elements can be present in the different sectors. Vascular complications demand local control of hemorrhage, ligation of the maxillary artery, ligation of the external carotid artery, or endovascular embolization.

Conventionally, condylar osteotomy has been performed using a saw, drill, or chisel. However, the use of these tools can damage the vessels or soft tissue on the medial side. Although dissection of the soft tissue on the condylar head is necessary, the use of a piezoelectric ultrasonic system will offer better control of bleeding and relatively minor soft tissue damage compared with the other traditional osteotomy tools.
Thus, we examined the use of an ultrasonic device, the Piezotome Solo (Satelec®, Action Group, Merignac, France), at 50 Hz/60 Hz, with an ultrasonic frequency of 28 kHz minimum (28kHz permit this use only on mineralized tissue without activation in non mineralized tissue), using a D1 program with 90-mL/minute irrigation flow rates for better potency. Titanium tips (Fig 1) were used for the osteotomy, with movement from 60 to 120 μm. The cavitation phenomenon produced by the ultrasonic device allows the cutting of only the mineralized tissue and not soft tissue.3,7

Osteotomy with ultrasonic systems has been reported as successful in other procedures.3 The use of this system in condylar surgery has great advantages, including 1) visual clarity and control of the osteotomy, 2) decreased rigor of tissue separation and detachment, 3) increased access to the medial cortex without requiring the use of chisels or a saw, 4) a reduced need for external irrigation, because an intrinsic physiologic solution is supplied with the system, 5) adequate visualization owing to the irrigation and cleaning of the osteotomy, and 6) a reduced risk of damage to the soft tissues and vascular structures.

The increased operating time has been indicated in other studies as a disadvantage of the system; however, in 5 cases in which we used this technique, the duration of the osteotomy was 8 to 15 minutes, a trivial period in the entire surgery. In addition, unlike saws and drill bits, the osteotomy performed with ultrasonic systems does not create necrosis in the residual bone,7 which could lead to improved postoperative bone repair and reduced patient symptoms.

Thus, optimization of the condylectomy technique is essential in the surgical approach and the use of endoscopy technique.11 Perhaps, the endoscopic use of ultrasonic systems could be proposed as a new possibility for further optimizing the outcomes of this surgery. Moreover, the surgical conditions observed using this technique have demonstrated the efficiency and safety of the ultrasonic system.

References