Modified channel retractor for the sagittal split ramus osteotomy: A technical note

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SUMMARY. The authors describe a modification of the commonly used inferior border channel retractor for the sagittal split osteotomy of the mandible. We modified this instrument by hollowing out the shank and working surface allowing improved access during the vertical cut through the inferior border of the mandible. Advantages of this modification over the original design include less dulling of the cutting instrument, less damage to the channel retractor, less debris in the surgical wound, and most importantly, less damage to the surrounding soft tissue. In our experience with this instrument, there have been no incidences of excessive blood loss requiring transfusion, avascular necrosis, bony nonunion or permanent nerve injury. We believe this modification improves maneuverability during orthognathic surgery thereby decreasing morbidity and operating time, thereby making a successful outcome more likely. © 2008 European Association for Cranio-Maxillofacial Surgery

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INTRODUCTION

Since Trauner and Obwegeser’s (1957) landmark description of the Bilateral Sagittal Split Osteotomy (BSSO) in 1957, numerous modifications have been made by various authors. Early on, Epker (1977) suggested that the vertical osteotomy cut, now the second or third cut in contemporary BSSO technique, should be made completely through the inferior border of the ramus claiming that it made a favorable sagittal split of the ramus easier. Wolford perpetuated this view, and also recommended cutting through 2–3 mm of the lingual cortex when making the inferior border cortical cut claiming that this allowed forces to be directed to the inferior border when splitting the mandible, minimizing the stress placed on the lateral cortex, increasing the likelihood of a favorable split at the inferior border and thereby reducing the risk of lateral cortical fracture (Wolford et al., 1987).

Following modifications made by Dal Pont (1961), Obwegeser (1964) suggested that during the vertical cut, the surrounding soft tissue should be protected at the inferior border with a retractor having a “gutter-shaped cross section”. Typically, surgeons use a channel retractor (e.g., Bauer retractor, Hargis retractor; named after other surgeons who have made modifications to the original description by Obwegeser) to retract the soft tissue from the inferior border and to grasp and isolate it for the vertical cut of the BSSO.

A problem often encountered when performing the vertical osteotomy cut with this instrument is that while cutting toward the inferior border with the Lindemann bur or reciprocating saw blade, the cutting instrument strikes the metal surface of the channel retractor minimizing visualization and access. This makes the completion of the inferior corticotomy difficult to accomplish as described by Epker. Furthermore, the prolonged presence of the bur or saw blade in this area is accompanied with a greater chance of; dulling the cutting instrument, damaging the channel retractor, introduction of debris to the wound, and more importantly, damage to the surrounding soft tissue.

We present a modified inferior border channel retractor design with a hollowed out shank and working surface to ensure an unobstructed vertical cut through the inferior border during BSSO (Fig. 1). We describe the sequence of its use in modern BSSO and report the benefits of this modification to a time-tested instrument.

TECHNIQUE

The modified channel retractor in surgery

When in the operating room, standard preparation of the patient for orthognathic surgery should be employed (Wolford et al., 1987). A full thickness incision is made from approximately halfway up the external oblique ridge anteriorly until approximately the lateral aspect of the first molar. Soft tissues are then retracted for adequate access to the anterior border of the ramus in a direction superiorly to the most anterior aspect of the coronoid process, and medially toward the internal oblique...
ridge and medial surface of the ramus. A curved Kelly clamp is then used to palpate the sigmoid notch and subperiosteal dissection of the lingual soft tissues is continued inferiorly to the superior aspect of the lingula, and posteriorly to the posterior border of the ramus and condylar neck.

The first osteotomy is made horizontally on the lingual cortex of the ramus perpendicular to the surface of the ascending ramus and parallel to the mandibular occlusal plane maintaining a level just above the superior aspect of the lingula. This cut should be extended 3–6 mm posteriorly past the lingula at a monocortical depth just into the medullary space.

The second osteotomy cut should be directed down the anterior border of the ascending ramus from the anterior aspect of the first cut running parallel to the buccal cortex and ending approximately 5–10 mm posterior to the second molar. The lateral oblique ridge and cortex are then exposed via extension of the full thickness envelope flap down to and including the inferior border of the mandible. Access to the inferior border of the mandible should be done with minimal trauma to the pterygomaxillary sling using an inferior border (J) stripper. The second osteotomy is then extended anteriorly via a horizontal cut made through the lateral cortical plate perpendicular to the long axis of the teeth creating an osseous ledge superior to the proximal segment. This ledge of bone aids to control the postoperative position of the proximal segment. The anterior ascending ramus and posterior aspects of the horizontal osteotomies are then joined if not already completed.

Finally, the third osteotomy, a vertical monocortical cut, is made with either a reciprocating saw or Lindemann bur vertically through the lateral cortical bone from the anterior aspect of the buccal horizontal osteotomy (at the distal aspect of the 1st molar) down to the inferior border parallel to the long axis of the lower molar teeth. A channel retractor is typically used to isolate the body and inferior border of the mandible and to guide the bur/blade when making the vertical osteotomy cut (Figs. 2 and 3).

Our modified channel retractor significantly aids in visualization and access to the inferior border making the required osteotomy easier. In addition, by making room for the saw blade or bur, the modified channel retractor reduces the number of passes needed by the cutting instrument, reducing the chance of peripheral soft

Fig. 1 — Modified channel retractor with hollowed out shank and working surface.

Fig. 2 — (a) Modified channel retractor with hollowed out shank allowing complete visualization and instrumentation of the inferior cortical border of the ramus during the vertical osteotomy. (b) Displaying the space provided by the modified channel retractor for the reciprocating saw blade allowing complete osteotomy of the inferior border of the ramus, while protecting surrounding soft tissues (Lindeman bur may also be used).