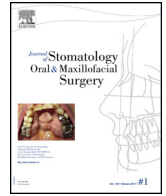




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Technical Note

Vertical ramus elongation and mandibular advancement by endobuccal approach: Presentation of a new osteotomy technique



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ABSTRACT

Introduction: Several surgical procedures have been proposed for the treatment of hyperdivergent dentoskeletal deformities. We propose a new osteotomy technique allowing for lengthening and advancement of the mandibular ramus by intra-oral approach.

Surgical procedure: This technique differs from the conventional sagittal split osteotomy in that which the anterior osteotomy line is not continued until the basilar edge but stopped 5–6 mm above it. Cutting of the pterygomasseteric sling is systematically done allowing for the lowering of the mandibular angle. Osteosynthesis is performed by transjugal and intra-oral approaches, using two adjustable miniplates. Our supra-angular technique allows for both elongation of the ramus and advancement of the mandible. Unlike the vertical ramus osteotomy proposed by Caldwell-Letterman, external incision and intraoperative cervical hyperextension are not required.

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1. Introduction

Surgical management of hyperdivergent Class 2 malocclusion with posterior vertical deficiency raises many challenges for orthognathic surgeons [1,2]. Traditional Epker or Obwegeser bilateral sagittal split osteotomies (BSSO) neither allow for significant lengthening of the ascending ramus nor for horizontalisation of the occlusal plane. To address this issue, the standard procedure consists in a vertical ramus osteotomy (VRO) according to Caldwell-Letterman or an inverted “L” osteotomy [1,3,4]. However, these surgical techniques are more complex and invasive than a BSSO because they need an extraoral approach, a possible coronoidectomy and an intraoperative cervical hyperextension which can be contraindicated in some patients. We propose a new intra-oral osteotomy technique allowing for both a lengthening of the ramus and a mandibular advancement without coronoidectomy and excessive cervical mobilization.

2. Surgical procedure

The procedure was performed under general anaesthesia with nasotracheal intubation. After sub-periosteal infiltration with 1% adrenaline solution, a standard intra-oral incision was done along

the external oblique ridge [5]. A sub-periosteal dissection was made on both buccal and lingual sides of the mandibular ramus. Externally, dissection was extended to the lower border of the mandibular angle where the pterygomasseteric sling was cut. Medially, the insertion of the medial pterygoid muscle was detached from the angle.

The lingula was identified and the mandibular pedicle was protected. The upper horizontal osteotomy was realized medially above the lingula, over the entire width of the ramus, parallel to the occlusal plane, as first described by Obwegeser [6], by mean of a number 8 bur and a diamond insert tip or an ultrasonic cutting device. The osteotomy line was continued downwards and anteriorly along the external oblique ridge up to the middle or distal part of the second mandibular molar. The buccal vertical cut was made in front of the second molar and stopped about 5–6 mm before reaching the lower border. The buccal cortical osteotomy was continued backwards, parallel to the lower border of the angle basilar edge, using a number 4 bur or a standard surgical insert tip until the posterior side of the ramus was reached. Thus, the mandibular angle and the lower border were left on the medial valve (Fig. 1). Splitting was cautious, identifying the inferior alveolar bundle, which had to stay connected to the medial valve.

It was critical to cut the pterygomasseteric sling at the posterior edge of the angle in order to allow for an easy lowering of the medial valve and to minimize the risk of relapse [7].

A preformed occlusal splint was positioned creating a posterior open-bite and a mandibular advancement as planned

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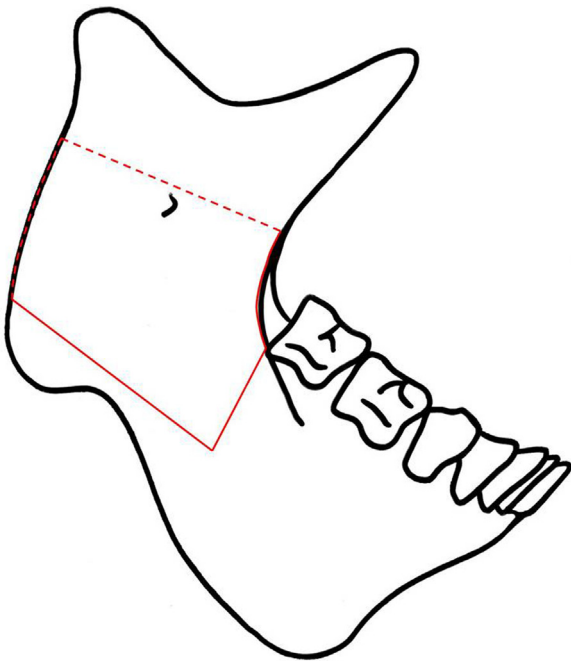


Fig. 1. Osteotomy drawing line.

preoperatively. The osteosynthesis was carried out rigidly after temporary intermaxillary fixation with elastics by mean of two adjustable 1 mm thick miniplates fixed with monocortical screws. The first plate was conventionally located along the external oblique line the adjustable part of the plate being placed

forward to permit adjustment of mandibular advancement. The second plate was placed along the posterior border of the mandibular ramus and shaped in order to place the most distal hole under the mandibular angle, the adjustable portion facing up (Fig. 2). This lower plate was bent in order to wedge the inferior side of the mandibular angle. This fixation required the use of a transjugal device.

Incisions were closed using absorbable suture after irrigation and hemostasis. Postoperative instructions were the same as in a conventional osteotomy: smooth non-chewing diet or soft diet and intermittent elastic maxillomandibular fixation (according to the surgeon's preference) for 6 weeks.

The use of a preformed occlusal splint made on the patient preoperative casts was essential (Fig. 3) in order to obtain a posterior open-bite and a lowering of the occlusal plane. After 6 weeks, bone healing was supposed to be obtained and the posterior open-bite was closed by allowing egression of the maxillary teeth [8] from distal (second maxillary molars first) to mesial.

Aesthetical aspect was improved by a better outlining of the mandibular angle (Figs. 4–6).

3. Discussion

We present a surgical alternative to conventional BSSO for surgical management of posterior vertical insufficiency and short mandibular body. Our technique allows both for lengthening of the mandibular ramus and for advancement of the horizontal branch by mean of an intra-oral approach. Furthermore, no cervical hyperextension is necessary, contrarily to the vertical ramus osteotomy (VRO) proposed by Caldwell-Letterman and no



Fig. 2. Visualization of the osteotomy line in a three-dimensional reconstruction of postoperative CBCT, front view (left), right profile (middle) and rear view (right).

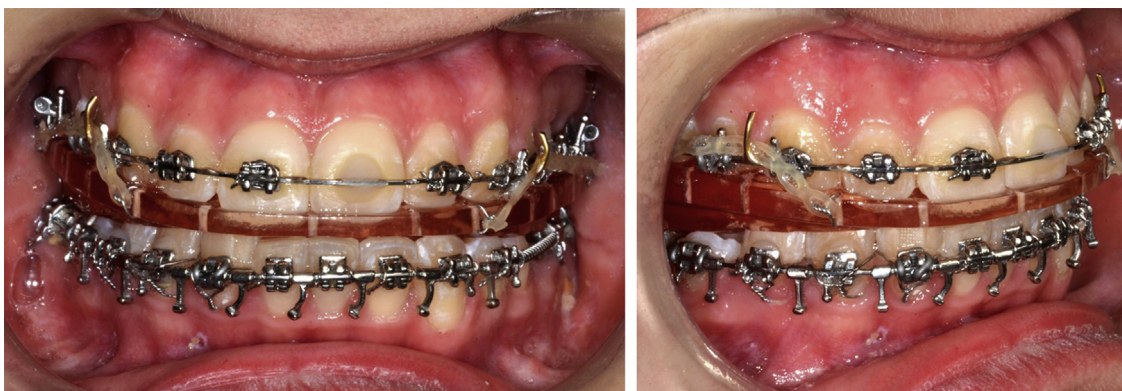


Fig. 3. Preformed occlusal splint used preoperatively for mandibular position.

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