



Technical description subapical osteotomy in the treatment of mandibular traumatic deformity

Descripción de técnica de osteotomía subapical en el tratamiento de deformidad mandibular postraumática

Luis Arturo Viteri Luzuriaga,* Diego Esteban Palacios Vivar,§ Marcelo Cazar Almache,^{||} José Ernesto Miranda Villasana,[¶] Yonatan Josué Torres Cruz**

ABSTRACT

Post-trauma deformity after a complex trauma fracture or mishandle is not an often situation and represents a challenge for health professionals who treat the facial area. Treatment begins with a pre- and post-trauma radiographic interpretation, clinical assessment and measurement of study models. The aim of treatment is to recover function, aesthetics and correction of the facial sequel. The treatment plan for this condition may be orthodontic, surgical, rehabilitation or a combination of these. Several surgical techniques to correct maxillary deformities have been described. The most common osteotomies are at body, ramus and alveolar level. This article presents the case of a patient with right alveolar mandibular deformity as a consequence of an inadequate management of facial trauma re-treated with a subapical segmental osteotomy and cortical release to move the alveolar nerve.

Key words: Post-traumatic deformity, orthognathic surgery, subapical osteotomy.

Palabras clave: Deformidad postraumática, cirugía ortognática, osteotomía subapical.

RESUMEN

La deformidad facial posterior al trauma como secuela de una fractura compleja o una fractura mal manejada es una situación poco frecuente y representa un reto para los profesionales de la salud que tratan el área facial. Su tratamiento inicia con una interpretación de imágenes radiográficas previa y posterior al trauma, valoración clínica y medición de modelos de estudio. El objetivo del tratamiento está dirigido a recuperar la función, estética y en la corrección de la secuela facial. El plan de tratamiento puede ser ortodóntico, quirúrgico, rehabilitación o una combinación entre ellos. Se han descrito múltiples procedimientos para la corrección de la deformidad maxilar. Las técnicas más comunes son osteotomías a nivel de cuerpo, rama y procesos alveolares. Este artículo presenta el caso de un paciente con deformidad alveolar mandibular derecha como secuela de un manejo inadecuado del trauma facial tratado mediante osteotomía segmentaria subapical con liberación de la cortical para movilización del nervio dentario.

INTRODUCTION

Segmentary subapical osteotomy is a technique for orthognathic surgery used in cases of dentoskeletal malocclusions that cannot be dealt with only by conventional orthodontic treatment. Its use has been focused to achieve occlusal stability through dentoalveolar movement.^{1,2} Using this technique a favorable occlusal relationship may be established thus allowing good interaction between the dental arches at mastication during mandibular movements.³ These dental-alveolar changes are performed in an axial, antero-posterior, transverse and vertical direction with an alveolar-dental impact. Intrusion movements are useful when you need to mobilize more than 2 mm in adult patients.^{1,2,4}

Hullihen first described this technique in 1849.⁵ However, this surgery was limited only to the anterior

mandibular part. Hofer in 1942 and Kole in 1959 popularized the subapical technique for segments of both maxillaries in the anterior and posterior sectors.⁶ MacIntoch described the total mandibular alveolar osteotomy in 1974 for the correction of anterior open

* Maxillofacial Surgeon. Private practice – Ecuador.

§ Maxillofacial Surgeon, Monte Sinaí Hospital – Ecuador.

^{||} Head of the Postgraduate Center of the Faculty of Dentistry of the University of Cuenca, Ecuador.

[¶] Master in Education, Chief of the Maxillofacial Surgery Service of the Regional Hospital «General Ignacio Zaragoza», ISSSTE, Mexico.

** Maxillofacial Surgeon. Private practice – Mexico.

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bite.⁷ Eliades and Hegdvedt reported in 1996 the first combination of sagittal osteotomy with complete subapical osteotomy for the successful correction of class II malocclusions.⁸ The biological bases of maxillary osteotomy were described by Obwegeser,⁹ Kole⁶ and Bell¹⁰ in their different articles. Kulbersh and Pangrazio compared total subapical osteotomy with bilateral sagittal osteotomy for the correction of class II dentofacial deformities showing for both techniques long-term stability.¹¹

CASE REPORT

A 22 year-old patient attended the Maxillofacial Surgery Service of the Monte Sinaí Hospital of the city of Cuenca with a history of facial trauma. Upon interrogation he declared to have suffered a traffic accident two years ago that caused him multiple bruises, mandibular fracture and loss of teeth. He was treated in a house of health by the emergency services where he was stabilized with plates and screws with a poor outcome.

Upon physical exploration he presented facial asymmetry, a discreet mandibular deviation to the right side, and a limited mouth opening (less than 30 millimeters). Intraorally, partial edentulism and bimaxillary protrusion were observed. The lower dental arch had a «V» shape with collapse on the right side towards the midline, a reduction in diameter of the anterior portion of the arch and absence of the lower incisors. The upper arch showed good arch form but also fracture of the central incisors. The dental-alveolar relationship was inadequate at the level of the right posterior segments (*Figures 1 and 2*). The upper segment created a deep bite with the lower

causing loss of dynamic and static function as well as aesthetics.

The therapeutic options to treat this sequel of facial trauma can be summarized in: distraction osteogenesis close to the midline, conventional orthognathic surgery, fracture again and perform segment mobilization or perform a segmental subapical osteotomy. Prior to the determination of a particular technique it was necessary to study the patient's photographs and models.

At the imaging study, the lateral headfilm was analyzed, as well as the posteroanterior and panoramic radiographs (*Figure 3*). In the first study, a proper relationship between the maxillae and the cranial base was found so conventional orthognathic surgery was discarded. The posteroanterior study showed an inadequate relationship between the teeth on the right side and a slight asymmetry. In the panoramic X-ray, the mandibular right side was measured as well as the diameter of the edentulous spaces and location of the mental canal. The distance from the apices and mandibular ridge was also measured. The canal may be in close contact with molars and the second premolar, then it distances itself as it progresses toward the midline. All the abovementioned measurements showed values necessary for any of the options proposed.

The models of both arches were mounted in an articulator. The distance from the cross bite was measured and model surgery was performed to assess the occlusal feasibility in the lateral movement of the right side of the lower model to simulate the subapical segmental surgery (*Figure 4*). When an acceptable occlusal stability of the right posterior segment and an appropriate canine relationship were verified, the subapical segmental osteotomy was determined as a viable treatment.



Figure 1. Lateral intraoral photograph. Fractured teeth, absence of the lower incisors. Right posterior scissor bite.



Figure 2. Lower intraoral photograph. «V»-shaped arch, right side intruded towards the midline.

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