

Inferior Alveolar Nerve Transposition Using a Piezosurgery Device with Simultaneous Implant Insertion

Transposición del Nervio Alveolar Inferior Utilizando un Dispositivo Piezoeléctrico con Inserción Simultánea de Implantes

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ABSTRACT: Implant rehabilitation of the edentulous mandible tends to be complicated by the presence of bone atrophy. In cases of moderate to severe mandibular atrophy the bone height between the alveolar crest and inferior alveolar nerve (IAN) is small and sometimes limited to only a few millimeters. Implant placement in such situations is very difficult and implies the risk of inferior alveolar nerve damage. Piezosurgery is being recently used as an alternative to obtain greater accuracy and safety. The advantages of using piezosurgery in inferior alveolar nerve transposition are: (a) the lowest risk of injury the IAN; (b) less intraoperative bleeding and reduction of postoperative swelling, (c) less thermal damage the bone surfaces and to the IAN. We present a case of mandibular atrophy in which inferior alveolar nerve transposition and implant placement were carried out using a piezosurgery device.

KEY WORDS: inferior alveolar nerve, dental implants, ultrasonics.

INTRODUCTION

Implant rehabilitation is used in increasing number of partially edentulous patients. In most of those patients the standard method can be used to place the implants with satisfactory results. However, with increasing alveolar bone resorption, modifications of the standard procedure need to be made. The size and quality of bone in the posterior mandible are the main obstacles when considering the rehabilitation with dental implants in that area (Rosenquist, 1994; Nocini *et al.*, 1999; Chrcanovic & Custódio, 2009; Pavlíková *et al.*, 2011).

Jensen & Nock (1987) were the first to describe a technique for restoration of an atrophic posterior mandible with endosseous implants in conjunction with inferior alveolar nerve transposition. The main risk involved this technique is the possibility of a prolonged

neurosensory dysfunction (Kan *et al.*, 1997; Sakkas *et al.*, 2008; de Castro e Silva *et al.*, 2011).

In recent years minimally, invasive surgery has become a tendency among surgeons. The piezosurgery has been introduced in maxillofacial surgery with good results in reducing the risk of injury to soft tissues and important structures during osteotomies. The ease handling of the instrument, appropriate irrigation and reduced bleeding enable better visibility of the cutting area, avoiding the need to use saws and drills (Eggers *et al.*, 2004; Stübinger *et al.*, 2005; Schlee *et al.*, 2006; Bovi, 2005; Baldi *et al.*, 2011; Nusrath & Postlethwaite, 2011).

This article reports a case of patient with mandible atrophy treated with transposition of the IAN

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using a piezosurgery device with immediate implant insertion.

CASE REPORT

A 45-year-old man presented to our Department, seeking oral rehabilitation with dental implants. Examination showed resorption of the alveolar ridge on the left side of the mandible and panoramic radiograph demonstrated the position of the alveolar inferior nerve to be near to the alveolar ridge (Fig. 1). It was decided to perform transposition the IAN and the immediate installation of endosseous implants under general anesthesia using a piezosurgery device.

Following incision and rising of the vestibular gingiva, the inferior alveolar nerve foramen was identified and an osteotomy was performed ahead of the foramen using a

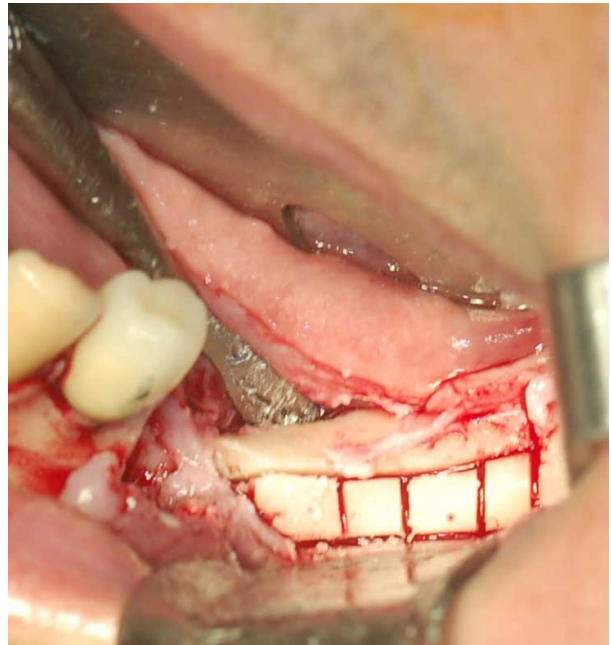


Fig. 2. Drawing a smaller window with the piezosurgery device.



Fig. 1. Panoramic radiograph showing a severe atrophy of the mandible in the left side.

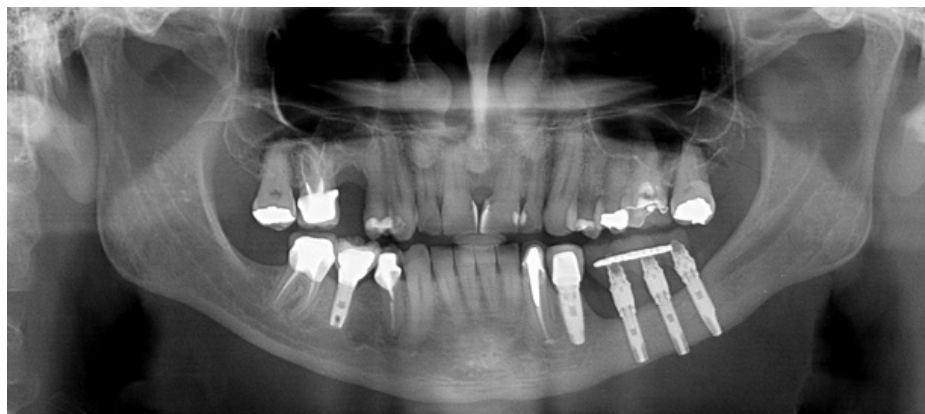


Fig. 3. Panoramic radiograph showing the implants in excellent position after 2-years.

piezosurgery device (VK Driller®, São Paulo, Brazil). A posterior window was performed using the piezosurgery device in the external cortical layer along the trajectory of the nerve (Fig. 2). With the nerve fully lateralized, three 15 mm endosseous implants (Neodent®, Curitiba, Brazil) were positioned fixed at crestal level and in the mandibular basal layer. A mixture of particulate autogenous cortical bone and Chronos (Mathys Medical®, Belltlach, Switzerland) were placed in the surgical site. After six months a definitive prosthesis placement with good esthetic and functional results (Fig. 3).

Healing was uneventful and the neurosensory test one month after the surgery showed normal function of the mental nerve.

DISCUSSION

Transposition of the inferior alveolar nerve using piezosurgery offers the following advantages: (a) lower risk of injury the IAN; (b) less intraoperative bleeding and reduction of postoperative swelling, (c) less thermal damage the bone surfaces and to the IAN (Stübinger *et al.*; Schlee *et al.*; Pavlíková *et al.*).

The successful use of piezosurgery devices on soft tissues has already been reported (Eggers *et al.*; Bovi). The reduction of flap elevation and the reduced of the tissue injury compared to the traditional technique allows better control of postsurgical sensory alterations. The objective postoperative assessments of the neurosensory function of the mental nerve and our

experience with piezosurgery in several types of procedures confirms that fact.

Many authors believe that the major limitation of piezosurgery is the time (Eggers *et al.*; Stübinger *et al.*; Schlee *et al.*; Bovi; Baldi *et al.*). Procedures using this device can be substantially longer when compared with conventional devices. On the present case surgical time was increased by about 30 minutes. Therefore we consider this minimal increase in operating of no consequence regarding the gains for the patient. Employment of piezosurgery does require a learning curve, being the reduction in surgical time directly related to an improvement in the handling of the device.

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RESUMEN: La rehabilitación implantológica de la mandíbula edéntula tiende a ser compleja por la presencia de atrofia ósea. En los casos de atrofia mandibular moderada a severa, la altura del hueso entre la cresta alveolar y el nervio alveolar inferior (NAI) es escasa y, a veces se limita a unos pocos milímetros. La colocación de implantes en estas situaciones es muy difícil e implica el riesgo de daño al NAI. La cirugía con el dispositivo piezoeléctrico está siendo utilizado recientemente como una alternativa para obtener una mayor precisión y seguridad. Las ventajas de utilizar el dispositivo piezoeléctrico en la transposición del NAI son: (a) el menor riesgo de lesión al NAI, (b) menor sangrado intraoperatorio y reducción de la inflamación postoperatoria, (c) menor daño térmico de las superficies del hueso y el NAI. Presentamos un caso de atrofia mandibular en el que se realizaron la transposición del NAI y la colocación de los implantes utilizando un dispositivo piezoeléctrico.

PALABRAS CLAVE: nervio alveolar inferior, implantes dentales, ultrasonido.

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