New Screw Design for Securing Buried Distractors Usefulness and Ease of Removal

Rodrigo Fariña, DDS, Andrés Hinojosa, DDS,† Martín Sánchez, DDS,† and Sergio Olate, DDS‡*

Abstract: There are 2 types of distraction devices for mandibular distraction: buried and external. The advantage of buried devices is the stability, but the difficulty in removing the screws is the greatest disadvantage. To resolve this problem, an osteosynthesis screw (Fariña Screw) has been designed, which greatly facilitates its removal when buried distractors are used.

Key Words: Complications of removal of the distractor device, distraction osteogenesis, mandibular distraction, transport disc distraction

Osteogenic distraction is a process that allows the formation of new bone tissue in a space that is gradually separated using a distraction device. There are 2 types of distraction devices for mandibular distraction: buried and external.[1]

The advantages of buried devices are the stability of the device, the patient's comfort, the one-to-one ratio between the device's activation and the bone separation (smaller lever arm).[2]

External devices require insertion pins that leave behind an undesired scar, are unstable and pose a greater risk of the pins coming loose, in addition to causing discomfort among patients.[3]

The greatest disadvantages that buried devices present are the need for a second operation to remove them and the difficulty in removing the screws that hold the device in place. In vertical ramus mandibular distraction (hemifacial microsomia, transport disc distraction in temporomandibular joint ankylosis, etc), the neoformed bone usually covers the screw heads, especially in the proximal segment, which is also gradually moved in the cephalic direction during traction. When it comes to removing the device, once the consolidation process has concluded, it becomes very difficult to see and to remove this osteosynthesis material. The need to remove bone tissue covering the screws (with a bur) generally damages the screw head's shape, making its removal even more difficult.

To resolve this problem an osteosynthesis screw (Fariña Screw, FS) has been designed that facilitates its removal when buried distractors are used on vertical ramus mandibular distraction.

This adaptation reduces manipulation of the recently formed bone segment, avoids expanding the initial approach or the need to create a new approach (generally preauricular) to remove the conventional osteosynthesis material, and significantly cuts down on surgery time.

This study was approved by the Hospital del Salvador ethics board.

FIGURE 1. The Fariña Screw.

FIGURE 2. Fariña Screw fixes the distractor device.

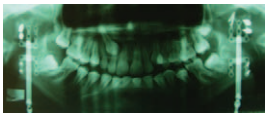

FIGURE 3. Panoramic x-ray showing Fariña Screw in bilateral temporomandibular joint ankylosis after gap arthroplasty and transport disc distraction.

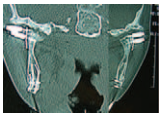

FIGURE 4. Computed tomography scan showing Fariña Screw after the end of consolidation time of transport disc distraction (before removal of the distractor device).

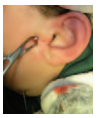

FIGURE 5. Removal of the Fariña Screw through a simple and small incision on the skin, over the screw.

TECHNICAL DESCRIPTION

A screw (FS) made of surgical steel was designed, with a 2 mm diameter thread and 9 mm long, the head of which is hexagonal in shape and with a volume of $3 \times 3 \times 10$ mm (Figs. 1-2). The FS allows the distractor to be stabilized safely and to locate the precise location of the screw through external palpitation of the skin (Figs. 3-4), allowing it to be easily removed via a small incision directly above it (Fig. 5).

The FS has been successfully used in 7 patients, without difficulties.

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From the *Maxillofacial Department, Hospital del Salvador, Hospital San Borja Ariiarán, Profesor of Maxillofacial Surgery Universidad de Chile; †Resident in Oral and Maxillofacial Surgery, Hospital del Salvador, Santiago; and ‡Maxillofacial Department, Universidad de la Frontera, Temuco, Chile.

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Address correspondence and reprint requests to Rodrigo Fariña, Chilean Society of Oral and Maxillofacial Surgery, Providencia 2330, Appt 23, Santiago, Chile; E-mail: rofari@gmail.com

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