

Short Communication

Noninvasive palatal implant removal

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Abstract

Objective: Orthodontic palatal implants are commonly used and do provide reliable absolute anchorage to assist orthodontic treatment. However, once treatment is completed, removal of these temporary implants is not considered easy or risk free. This short communication presents a clinical case in which a novel noninvasive procedure was applied to remove an osseointegrated palatal implant.

Material and methods: A customized explantation tool, tightly fixed to the implant and precisely grasping the implant's head, was used in combination with a ratchet to unscrew the implant instead of the traditional removal by trephine.

Results: Only a topical anesthetic was necessary before the implant–bone contact was broken by turning the ratchet counterclockwise. The implant was retrieved without any local anesthesia. The explanted palatal implant had no bone appending to it, except in its apical anti-rotational grooves, and the healing process thereafter was unproblematic.

Conclusions: Noninvasive palatal implant removal offers a simple and fast approach for explantation. Moreover, it might reduce the risk of adverse patient reactions, iatrogenic tooth and nerve injuries, and possible oro-antral communications.

Since the introduction of bone-borne TADs, orthodontists are no longer dependent on non-predictable and often insufficient patient's cooperation (Nanda & Kierl 1992). Orthodontic palatal implants, such as the Orthosystem® (Institut Straumann AG; Basel, Switzerland), provide reliable absolute orthodontic anchorage and are considered to be superior to any orthodontic tooth-borne anchorage device (Schätzle et al. 2009a). Although palatal implants are now successfully used for almost two decades (Triaca et al. 1992; Wehrbein et al. 1996), there is only one study assessing the spectrum of possible surgical complications or risks during palatal implant removal (Fäh & Schätzle 2014).

In addition to rare wound-healing disorders after palatal implant explantation, possible root damage (Nicolas & Bart 2008) of the incisors, damaged nerve–vessel thread, persisting oronasal fistula, and a small risk of a permanent sensory impairment might be a clinical consequence (Schätzle et al. 2009b; Fäh & Schätzle 2014). After completing the orthodontic treatment, palatal implants traditionally were removed using a standard trephine of 5.5 mm diameter and a mounted

implant cylinder for guidance (Fig. 1). In addition, a small amount of neighboring bone was removed (Fig. 2). If the amount of harvested bone could be minimized or the implant removal could be performed without any bone removal, the range of surgical complications and adverse patient reactions after palatal implant removal might be reduced.

In another study, a method to simply unscrew a different type of osseointegrated palatal implants (Exacta MS) has been described (Favero et al. 2007). Until recently, no such explantation was possible for the widely used Orthosystem palatal implant (Institut Straumann AG, Basel, Switzerland).

Therefore, the aim of this short communication is to introduce a novel approach for a noninvasive palatal implant removal by simply unscrewing the palatal implant counterclockwise with a ratchet after some initial loosening.

Material and methods

After completing the intended orthodontic treatment, a patient was assigned for palatal

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Fig. 1. Traditional removal set of standard trephine of 5.5 mm diameter and a mounted implant cylinder for guidance.



Fig. 2. Explanted implant with a small amount of neighboring bone.

implant removal. Only a topical anesthetic was necessary before a customized implant key with an almost triangular-shaped internal notch precisely grasping the implant head was securely tightened with an occlusal screw (Fig. 3). Thereafter, the respective ratchet used for implant insertion was mounted on the implant key and after some initial loosening by slightly tilting in all directions, the ratchet was turned counterclockwise decisively (Fig. 4).

Results

The implant–bone contact was broken by turning the ratchet counterclockwise. After the first rotation, the implant was already loose enough to unscrew it by hand. The patient did not have pain but felt a short, strong pressure during the first rotation. The explanted palatal implant had no bone appending to it, except in its apical anti-rotational grooves (Fig. 5). Inspection of the remaining explantation cavity revealed no signs of trauma or perforation of the nasal floor. One week after explantation, the wound was completely covered, and there was no adverse patient reaction.

Discussion

A wide spectrum of surgical complications and adverse patient reactions is reported



Fig. 3. Customized implant key with an almost triangular-shaped internal notch (left), precisely grasping the implant head tightened with an occlusal screw (right).



Fig. 4. Respective ratchet used for implant insertion mounted on the implant key.

after palatal implant removal. The incidents are mostly of transitional manner and minor. Although only a small risk of a permanent sensory impairment of the anterior palatal region or damage of the nerve–vessel thread remains, the patients must be informed accordingly (Fäh & Schätzle 2014).

Up to this point, after completing the orthodontic treatment, palatal implants were removed by mounting an implant cylinder for guidance and subsequent drilling with a trephine of 5.5 mm diameter. By decreasing the volume of redundantly removed bone while retrieving the implant, the risk to injure adjacent structures such as incisor roots (Nicolas & Bart 2008), nerve–vessel threads of incisors, or the nasopalatal nerve likely might be reduced.

With the classic surgical method, it might be suspected that water cooling is problematic



Fig. 5. Explanted palatal implant without any bone appending to it, except in its apical anti-rotational grooves.

through the tiny gap of the trephine and therefore bears the danger of more frequent osteitis sicca due to increased temperature during the drilling procedure. For implantations, the temperature changes in different bone depths with different irrigation temperatures were investigated (Sener et al. 2009). It was shown that without irrigation, the maximum temperature was 50.9°C at a depth of 3 mm. While cooling with a 25°C saline solution, maximum temperature was found to be 37.4°C in a depth of 12 mm (Sener et al. 2009).

However, these results are only valid for the implantation procedure where cooling might be easier through the drilled canal in comparison with the explantation procedure during which the rinsing solution has to enter a very narrow space between the implant and the surrounding bone.

Therefore, palatal implant removal without a drilling trephine might be beneficial. Furthermore, by reducing the amount of retrieved bone together with implant removal, the range of surgical complications and adverse patient reactions might be reduced. Clinical studies are necessary to document the superiority of the noninvasive palatal implant removal procedure compared to the removal by trephine.

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