Micro-osteoperforations in Orthodontics- A Review

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ABSTRACT

In orthodontics, the patients usually complain about long treatment duration of about 2-3 years. To accelerate the orthodontic tooth movement and reduce the treatment duration, various approaches are used in orthodontics. In adults, the surgical approach is used for accelerating orthodontic tooth movement. Various drugs are available for accelerating orthodontic tooth movement, but they have other side effects. Device-assisted approach for faster tooth movement requires patient cooperation. Therefore, surgical approach is the safest approach for accelerating orthodontic tooth movement. Various surgical techniques for accelerating orthodontic tooth movement are distraction osteogenesis, corticotomy, and osteotomy. However, these techniques are invasive in nature. Hence a new technique has developed known as ‘micro-osteoperforation’ for accelerating orthodontic tooth movement.

Keywords: Micro-osteoperforations, Accelerated Orthodontics.

1. INTRODUCTION

In orthodontics, the patients usually complain about long treatment duration of about 2-3 years. To accelerate the orthodontic tooth movement and reduce the treatment duration, various approaches are used in orthodontics. In adults, the surgical approach is used for accelerating orthodontic tooth movement. Various drugs are available for accelerating orthodontic tooth movement, but they have other side effects. Device-assisted approach for faster tooth movement requires patient cooperation. Therefore surgical approach is the safest approach for accelerating orthodontic tooth movement. Various surgical techniques for accelerating orthodontic tooth movement are distraction osteogenesis (1), corticotomy (2) and osteotomy (3). However, these techniques are invasive in nature. Hence a new technique has developed known as ‘micro-osteoperforation’ (4) for accelerating orthodontic tooth movement.

Micro-osteoperforations

To reduce the invasive nature of surgical irritation of bone, a device called Propel, was introduced by Propel Orthodontics (Fig.1). They called this process as Alveocentesis, which literally translates to puncturing bone.

Fig.1: The device Propel
It is ready to use sterile device. It consists of an adjustable depth dial and an indicating arrow on the body of the device. The adjustable depth dial can be adjusted to 0 mm, 3 mm, 5 mm and 7 mm of the depth of puncturing the bone based on the required depth of operation. In the anterior region, the depth of puncturing the bone is 3 mm, in premolar region, it is 5 mm, and in the molar region, the depth is 7 mm (Fig.2).

**Steps of using PROPEL**

1) Remove from the sterile package and turn the Adjustable Depth Dial to the preferred setting 3mm, 5mm, or 7mm by holding the driver body and rotating the dial clockwise.
2) Hold the Propel device against the gingival while keeping the tissue taut (Fig.3).
3) Apply gentle pressure to engage the leading edge while turning the device handle clockwise. Check engagement by releasing pressure.
4) Continue to turn until the desired depth is reached for penetration of the cortical plate into cancellous bone.
5) The LED Depth Stop indicator will illuminate when desired depth is reached (Fig.4).
6) Rotate the device counter-clockwise to remove.

Clinical results of a MIRO, maintains the advantages of speedy orthodontics described by Jorge et al. in 2013 but is a much less traumatic, as it is flapless, reducing both trauma and convalescence. MIRO also enhances accuracy by relying on radiographic surgical guides that help to make a precise corticotomy avoiding damage to vital structures and teeth.
**Standardized Surgical Procedure**

Patients undergoing surgical procedure should be periodontally healthy. One day before surgery, patients should rinse with chlorhexidine 0.12% mouthwash twice (morning and evening). Immediately before surgery, the patients should rinse with chlorhexidine 0.12% for 1 minute, and the peribuccal area is cleaned with gauze soaked in chlorhexidine. All surgeries are to be carried out under local anesthesia (lidocaine hydrochloride 2% with epinephrine 1:100,000). Radiographic metal guides are to be positioned between each tooth, and digital radiographs are to be taken to assure that the metal pin does not project over the tooth roots (Fig.6).

*Fig.6: The radiographic metal guides between each tooth are positioned, and digital radiographs are taken to assure that the metal pin does not venture over the tooth roots.*

The metal pin is used as a strict guide to make mucoperiosteal incisions. The incisions begin 2 mm below the papilla (Fig.7).

*Fig.7: The metal pin allows an accurate mucoperiosteal incision 2 mm below the papilla. Vertical corticotomies are to be performed using an ultrasonic microsaw OT7.*

An ultrasonic microsaw OT7 (Piezosurgery, Mectron Medical Technology) is placed over the incision. Using bone 1 cutting power and irrigation solution pump level 4, vertical corticotomies are to be performed following the gingival incision trace. After corticotomies, the patients are prescribed a soft diet and prohibited from using mouth rinse for 24 h. No anti-inflammatory drugs are indicated. Patient check-ups are scheduled for 24 h, day 7, and then every two weeks for a month, performing adjustments if needed.

**REFERENCES**