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CASE REPORT

Ligature Guide for Implant Placement

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ABSTRACT

Aim: Planning an anchorage requirements of a case for effecient biomechanics is one of the important step in success of treatment outcomes. There are many means to reinforce anchorage. Since last decade, use of mini implants for absolute anchorage has gained popularity which does not depend on pateint compliance. Precise positioning of mini-implant is a key for success of absolute anchorage system. We have devised a simple guide made up of ligature wire, which is a useful tool for an accurate implant placement. The proposed implant guide is a useful aid for accurate placement of implant, which minimizes chances of root damage.

Background: Precise positioning of mini-implant is of paramount importance for success of absolute anchorage system.

Keywords: Absolute anchorage, Implant placement, Ligature wire.

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INTRODUCTION

Precise positioning of mini-implant is of paramount importance for success of absolute anchorage system.[1-4] Insertion too close to adjacent tooth roots increases the risk of implant failure and may also interfere with planned tooth movements.[2,3] A variety of techniques and devices have been proposed to obtain precise implant placement. Many surgical guides have been documented in the literature,[2,3] but most of them require additional patient appointments and extensive laboratory procedure. We have devised a simple guide made up of ligature wire, which is a useful tool for an accurate implant placement.

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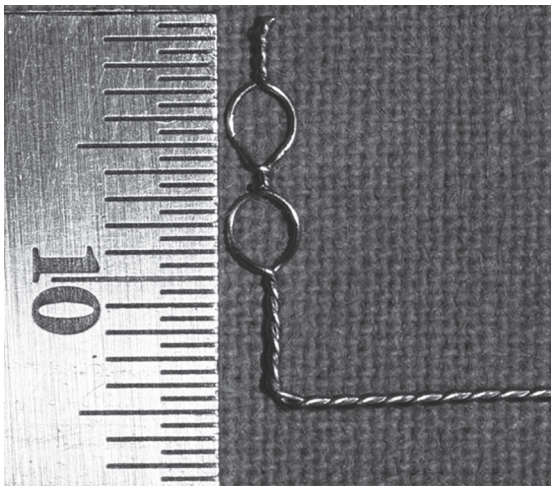

Fig. 1: Implant guide design with 2 mm gap between the loops

Fig. 2: Guide secured in place using module on premolar bracket

TECHNIQUE

Guide Fabrication

- Implant guide is fabricated with 0.012″ ligature wire.
- Twist it between finger and explorer using artery forceps to form a double-stranded thick wire. Make two loops with 2 mm gap between them, in the wire (Fig. 1). The appropriate length of the guide should be till mucogingival junction.
- Secure the fabricated guide in patient's maxillary arch with an elastic module on the premolar bracket (Fig. 2). Preimplant placement intraoral periapical (IOPA) radiograph is taken with the guide in a position to confirm the site of implant placement as well as to access interradicular bone thickness (Fig. 3). The

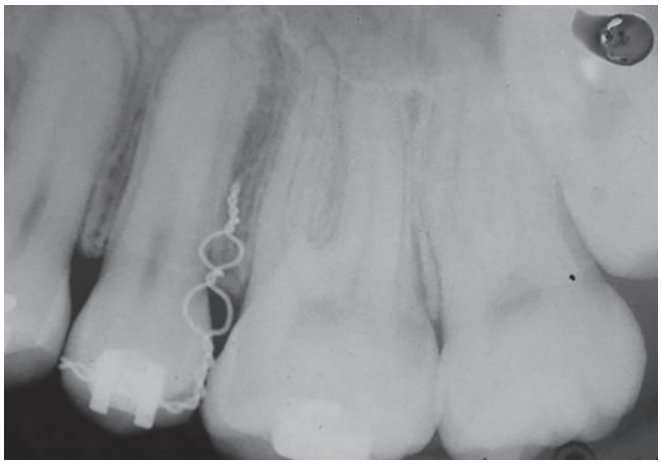

Fig. 3: Intraoral periapical radiograph prior to implant placement

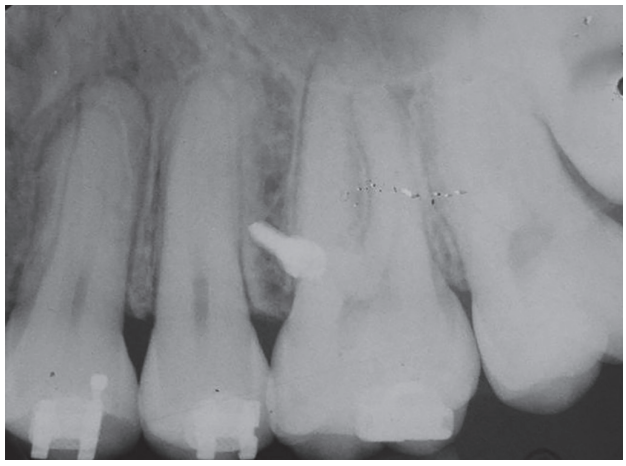

Fig. 4: Postimplant placement IOPA radiograph

center of the loop will help to locate the exact point of implant placement.

Implant Placement

- Administer 0.2 mL of local anesthesia.
- Test for adequate mucosal anesthesia by pressing the periodontal probe firmly against the tissue at the exact site of insertion. Taking radiographic findings into consideration, the site of implant insertion is the center of the second loop of ligature guide (as shown in Fig. 2 with an arrow).
- The soft tissue punch is first made, which provides a visual marker and helps prevent slippage during self-drilling of the implant.
- The implant is placed after the ligature guide disengaged from the premolar bracket. The angulation of the screwdriver during implant placement should be maintained 30 to 40 to the long axis of the teeth in the maxillary posterior region.[5,6]
- Final IOPA radiograph and photograph is taken to confirm the predetermined position of the implant (Figs 4 and 5).

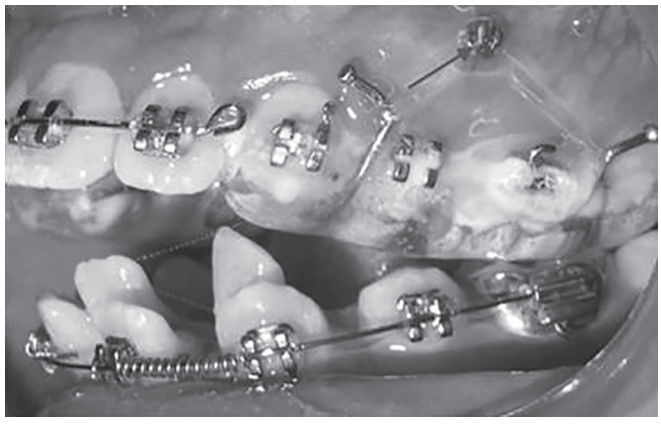

Fig. 5: Postimplant placement intraoral photograph

DISCUSSION

In order to reduce chances of root damage, implant can be placed above the apex of roots in maxillary arch. But even though such site of placement is good for intrusive forces, they are not efficient for horizontal forces.[6] Implant placement between roots ensures horizontal component of force.[6] According to a recent study,[7] there is more failure risk if the implant is placed close to the roots. The quality and quantity of bone at the implant site, the geometry of the implant, and the method of site preparation determine the initial stability of the implant at its placement.[8]

There are various ways documented to reduce root damage. Few are as follows:

- Prealignment of teeth
- Diverging roots before implant placement
- Understanding of the anatomic relationship between roots and surrounding structures
- Intraoral periapical/orthopantomogram/three-dimensional computed tomographic images to check roots
- Placement of implant in an oblique[5,9] direction so that root risk of contact is minimal (buccolingually 30 to 40 to the long axis of teeth in maxillary posterior area and 10 to 20 in mandibular posterior area).

In a classic animal study, Chen et al[10] found higher failure rates when temporary skeletal anchorage device contacted the roots. Few clinical studies[11,12] have also addressed damage to the roots either during or after temporary skeletal anchorage device placement.

A surgical guide for implant placement minimizes risk of root contact and hence, improves implant stability. The horizontal component of our implant guide can be secured in the arch with the module on the premolar

bracket. The vertical extension of the guide can be till the attached gingiva as the implant stability is questionable in the moveable soft tissue.[13] The loops in the guide help to establish the site of implant placement. It is made of 0.12 ligature wire, which is flexible enough and hence, can be used in any part of the arch. Our technique utilizes only routine IOPA radiographs; hence, patient is not subjected to additional radiographs.

CONCLUSION

- The guide will help a clinician to know the available interdental bone for implant placement and the center of the loop will help to mark the exact site of its placement.
- Guide has a simple design, which can be easily fabricated chair-side.
- Requires minimal inventory and is cost-effective.
- Ease of insertion and disengagement of the guide without patient's discomfort.

CLINICAL SIGNIFICANCE

The use of proposed implant guide is a useful aid for accurate placement of implant, which minimizes chances of root damage.

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