



Research Paper

A New Simplified Template for Mini-Implant Placement in Orthodontics.

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Abstract: Orthodontic mini-implants (MI) have gained popularity among orthodontists mainly because they provide an effective tool in orthodontic cases with high anchorage demands. The main objective of this study is to avoid a risk of injury to dental roots during placement of orthodontic mini-implants, especially when they are inserted between teeth and design a placement guide which is simple in design, easy to fabricate, inexpensive, supportive and can be used with a variety of mini-screws. The mini-implant placement guide was fabricated using rectangular 0.017 x 0.025/0.019 x 0.025 stainless steel (SS) archwire, the wire was bent vertically distal to second premolar along the long axis. The vertical length of the wire is according to the desired length for micro-implant insertion, which is generally 6-7 mm apical to the alveolar crest. After the vertical bend, 3-4 mm horizontal bend (which is an interradicular space between two roots) is given in the interradicular space between 2nd premolar and 1st molar. A CBCT is taken to confirm the correct position of template guide. The point of mini-implant insertion site is just at the middle of the horizontal bend, which can be readily marked using a marker or a micromotor burr. This micro-implant placement guide is simple in design, easy to fabricate, inexpensive, supportive and can be used with a variety of mini-screws.

Keywords: Mini-implant, Mini-implant placement guide.

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I. INTRODUCTION

Orthodontic mini-implants (MI) have gained popularity among orthodontists mainly because they provide an effective tool in orthodontic cases with high anchorage demands. However, there are several factors affecting the survival rate of the implants that need to be taken into consideration before their insertion [1]. One of the greatest concerns with orthodontic mini-implants is the risk of injury to dental roots during placement is, especially when they are inserted between teeth. [2] Root proximity appears to also have a role in mini-implant stability, Therefore the choice of an appropriate insertion site is critical. [3]

Placement of a mini-screw too close to the root can also result in insufficient bone remodeling around the screw and transmission of occlusal forces through the teeth to the screw, which can lead to implant failure. [4] Even though, periodontal structures can heal after being injured by temporary orthodontic anchorage

devices, [5] It is important to carefully select insertion sites using the clinical and radiographic evaluation of their anatomical details.

Many techniques have been used for the placement of interradicular mini-screws. Brass wires [6] or metallic markers [7] are easy to place in the interproximal spaces, but because their relative positions may be inconsistent in different radiographic views, they are not always accurate.

K.A. micro-implant placement guide does not need any kind of new wires/markers and can be easily made with the help of the 0.017 x 0.025 or 0.019 x 0.025 stainless steel archwire, which we use in our daily practice. It can be easily located radiographically and need few minutes to fabricate.

II. Materials and Methods

Design and Steps in Fabrication of Implant Guide: The mini-implant placement guide was fabricated using rectangular 0.017 x 0.025/0.019 x 0.025 stainless steel (SS) archwire, the wire was bent vertically distal to second premolar along the long axis. The vertical length of the wire is according to the desired length for micro-implant insertion, which is generally 6-7 mm apical to the alveolar crest. [Figure 1]

After the vertical bend 3-4 mm (which is an interradicular space between two roots) [8] horizontal bend is given pointing posteriorly towards the first molar region. A CBCT Radiograph is taken to confirm the correct position of template guide, radiograph is repeated until the desired position is achieved. [Figure 3 and Figure 4]

The point of mini-implant insertion site is just at the middle of the horizontal bend, which can be readily marked using a marker or a burr. This is how the implant is placed at the desired length and position. [Figure 4], after that a CBCT Radiograph is taken to confirm the correct position of the mini-implant. [Figure 5].

In routine daily clinical practice, there is no need for CBCT radiograph, this method can be simply applied using IOPA or RVG. [Figure 6]

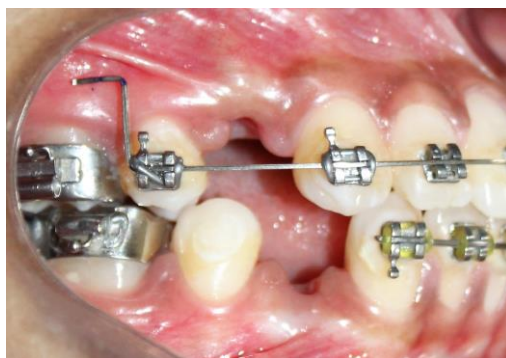


Figure 1-After Placement of Mini-Implant Placement Guide using 0.17 X 0.25 Stainless Steel wire.

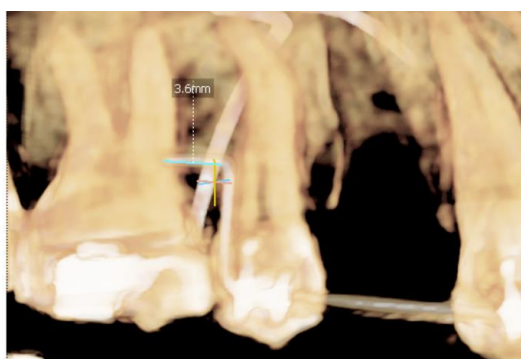


Figure 2- CBCT For Right Maxillary Quadrant After Template Guide Placement.

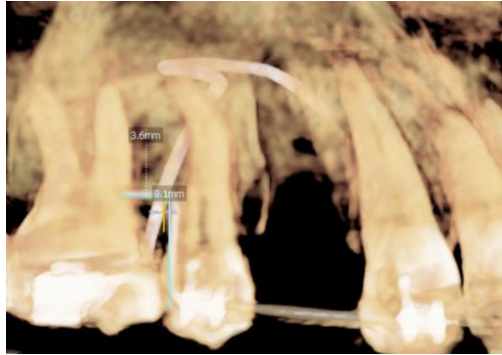


Figure 3- CBCT For Right Maxillary Quadrant After Template Guide Placement 8.1mm in length vertically and 3.6 mm in width horizontally.



Figure 4-After Placement of Mini-Implant at the center of horizontal bend.



Figure 5-CBCT For Right Maxillary Quadrant Taken After Placement of Implant.

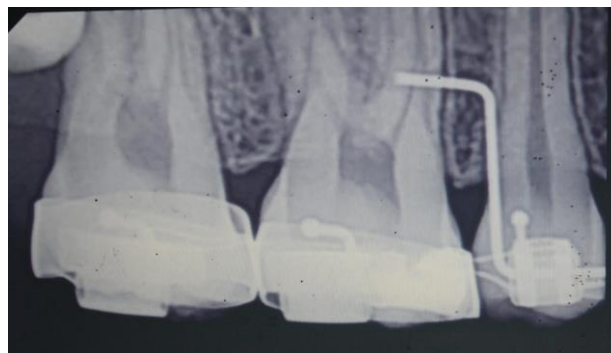


Figure 6-IOPA For Right Maxillary Quadrant After Template Guide Placement 8.1mm in length vertically and 3.6 mm in width horizontally.

III: Results and Discussion

The use of mini-implants for an absolute anchorage has been most commonly used today in the current orthodontic practice. The main disadvantage during micro-implant placement is damage to the adjacent roots and bony structures. There are various methods mentioned in the literature; e.g. using a mesh placed in an interradicular area and radiographed to use as a guide to implant placement, or custom-made soldered wire guides placed both buccally and lingually and then radiographed to use as a guide. The technique described in this article is simple and accurate because the implant is inserted at the exact point and very less chances of misplacement. The main advantage is that it did not require any other material for the preparation of template and can be removed easily without any difficulty. The existing orthodontic appliance is not disturbed. In this article CBCT Radiograph was taken to prove our technique, but we can do it simply with the help of IOPA Radiograph.

IV: Conclusion

K.F Mini-implant placement guide is simple in design, easy to fabricate, inexpensive, supportive and can be used with a variety of mini-screws. This micro-implant insertion template guide helps us to determine the exact point and desired vertical length from alveolar crest for implant insertion. This template guide is time saving in our daily clinical practice.

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