

# Crossbar: An Effective Orthodontic Mini-implant Placement Guide

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## ABSTRACT

Anchorage control is a fundamental concept in orthodontic treatment. Titanium mini-implants are used in orthodontics as absolute anchors. They are placed between roots of adjacent teeth as a common location during various treatment mechanics like retraction or intrusion of anterior teeth. However, contact on the root or the periodontal ligament and the surrounding anatomical structures can cause damage. This case presents a new implant placement safe guide called the cross implant guide for precise placement of mini-implants.

**Materials and methods:** A case for maxillary anterior intrusion where the cross implant guide used has been described in this case. Dental implants were placed between canines and the lateral incisor roots on both sides using this guide.

**Conclusion:** The cross implant guide is easy to fabricate and use, fully adjustable and is valuable in selecting the site and direction of the mini-implant.

**Keywords:** Crossbar implant guide, Mini-implants, Implant site, Enmasse intrusion, TAD.

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## INTRODUCTION

A key issue in orthodontics is controlling anchorage.<sup>1</sup> Recently a number of case reports have appeared in the orthodontic literature documenting the possibility of overcoming anchorage limitations via the use of temporary anchorage devices—biocompatible devices fixed to bone for the purpose of moving teeth. Although skeletal anchorage is here to stay in orthodontics, there are some issues about the safety of the surrounding anatomical structures like the roots, nerves, blood vessels and the maxillary sinuses, which have to be considered. Contact with root or the periodontal ligament may not only damage these structures but also result in implant mobility leading to failure,<sup>2,3</sup> studies show extensive damage can be caused by mini-implants. This article presents the use and fabrication of a cross implant guide which can be used by orthodontists to place the mini-implants, saving time without any laboratory procedure with accuracy and safety of placement in the maxillary anterior region between the roots of the canines and the lateral incisors on right and left sides.

## PROCEDURE

A case with a deep bite reported for orthodontic treatment. After initial leveling and alignment, anterior mini-implants bilaterally between the lateral incisors and the canines was planned for intrusion of the anteriors. A periapical radiograph of this area was taken to observe the width of bone present between the roots. A 21 × 25 stainless steel rectangular crossbar (Fig. 1) wire was inserted in the canine bracket slot vertically and a module was inserted to hold the guide and final adjustments were made by moving the guide in vertical direction to allow the horizontal arm of the guide to be located just below the mucogingival margin (Fig. 2). Markings were done using a marker after determining the point at which the implant had to be placed. Local anesthesia with lidocaine was applied topically at the site by spraying. And the mini-implants were placed at the predetermined site (Figs 3 and 4). A radiograph was taken to confirm the exact placement of the implant (Fig. 5).

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Fig. 1: Crossbar implant guide

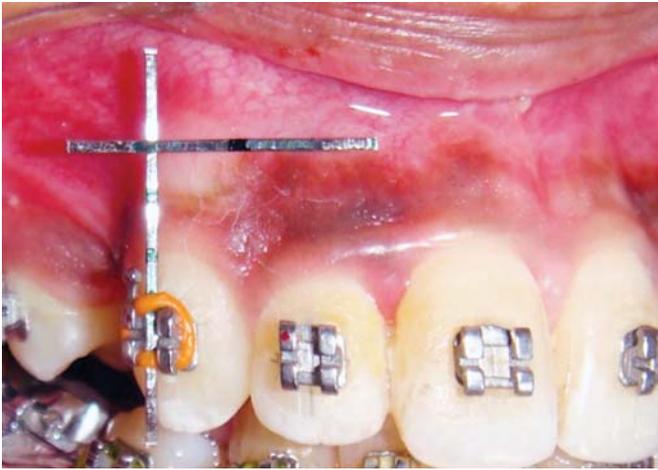


Fig. 2: Crossbar implant guide inserted in canine bracket



Fig. 3: Implant being placed at the predetermined site



Fig. 4: Mini-implants in place

**DISCUSSION**

During the past few years, the application of mini-implants has expanded to include a wide variety of cases, including intrusion mechanics during the deep bite correction cases, retraction mechanics, and correction of canted occlusal planes, molar intrusion, molar distalization, uprighting and mesialization.



Fig. 5: IOPA showing the mini-implant between the roots

When an implant is inserted into the anatomic site it is surrounded by mucosa, cortical bone and spongy bone. And any error can result in root damage of the adjacent tooth causing inflammation and root resorption, which can be exacerbated by orthodontic tooth movement.<sup>4,5</sup> Displacement of miniscrews is a common problem, loading period, cortical thickness, miniscrew characteristics, force magnitude and force direction are important factors for the success of the treatment. At least 2 mm of clearance is required between a miniscrew and the adjacent roots to avoid trauma to the root or the periodontal ligament.<sup>2</sup> Hence, clinicians in the last decade have been on a lookout trial for an implant guide to place these implants safely like a stent fabricated on a selectively colored stereolithographic models for placement of orthodontic mini-implants.<sup>6</sup> A 3D surgical guide was designed along with radiographic assessment and various other surgical guides for optimal placement.<sup>7-12</sup> However, most of these guides require laboratory work which is time consuming. The crossbar implant guide can be used on any tooth bracket, easily interchangeable and adjustable in vertical direction according to the desired position clinically. The implant guide used in this case was for the insertion of dental mini-implants which were placed for intrusion of maxillary anteriors after initial leveling and aligning. The maxillary dental arch was divided into one anterior and two posterior segments. The anterior segment extended from distal of canines on either side. A 21 × 25 stainless steel arch was placed in all the three segments. In the anterior segment, inverted U loops were placed between lateral incisor and canine bilaterally for attaching E-chains. This was followed by placement of mini-implants which were loaded immediately.

**CONCLUSION**

There are various safety guides available today and most of them require elaborate laboratory procedure. The crossbar implant guide is easy to fabricate, reduces chair time, adjustable, and can be easily detached and used on different tooth brackets to ensure safe placement of mini-implants and is valuable in selecting the site and direction of the mini-implant.

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