

Modified Wire Mesh Guide For Precise Miniscrew Implant Placement

Abstract

Optimal positioning has always been critical to the effectiveness of dental implants. The choice of location depends on the initial diagnosis, the purpose of the implant therapy, the proximity of adjacent structures such as the mandibular nerve and maxillary sinus, and esthetic factors, and often involves collaboration among the prosthodontist, radiologist, and oral surgeon. The present article describes a new and inexpensive device that can be used to identify ideal miniscrew positions, minimizing the risk of root injury and a three-dimensional method of positioning miniscrews that improves the insertion success rate.

Key Words

Wire Mesh Guide, Stent, Miniscrew Implant

Introduction

The devices widely used for skeletal anchorage in orthodontics were osseointegrated dental implants, placed in the palate^[1] or in the retromolar area of the mandible.^[2] More recently, miniscrews have been successfully inserted in the dentoalveolar areas.^[3] The placement of these implants between the roots of the teeth has been challenging, however, because of the limited space and the risk of root damage.^[4]

Several methods have been proposed to accurately transfer implant locations from the two dimensional radiographs used for surgical planning. A radiopaque marker such as a brass wire^[3] or a bent stainless steel wire^[4] has been inserted into the interproximal space of the selected implant site to guide the pilot drill, but these do not completely avoid the risk of root contact. Kravitz and Kusnoto^[5], Choi and Kim (Kim's stent)^[6], Metallic markers^{[4],[7]} were few of the techniques that have been used to facilitate safe placement of interradiographic miniscrews but because their relative positions may be inconsistent in different radio-graphic views, they are not always accurate.

This article introduces a new wire guide (Wire Mesh guide), a two-dimensional method of positioning miniscrews that avoids root damage and improves the insertion success rate.

Fabrication and Use of Wire Guide

We describe the fabrication of wire mesh guide in the region between 2nd premolar & 1st molar as this is most common site

for miniscrew placement for anterior retraction in 1st premolar extraction cases. The wire mesh is made up of 0.010" stainless steel ligature wire. The wire strands are straightened and are arranged and welded together to make columns and rows. These make a square of 4 mm² area (Fig 1). A 0.7 mm stainless steel wire is used to make the framework adapted in the posterior vestibular region and on the occlusal aspect of posterior teeth for stability (Fig 2). The wire mesh is welded on the wire framework (Fig 3) and acrylicization of the framework is done on the occlusal aspect for stabilization of stent (Fig 4).

Modified Wire Mesh guide can be customized for each patient. Once the stent is ready for use, the acrylic pad is stabilized on the occlusal aspect of posterior teeth. And a radiograph is taken with the stent on to identify the favourable site for implant placement (Fig 5). The square with the maximum distance from vital structures like roots, maxillary sinus and mandibular nerve is selected. And miniscrew placement is done through that square of Modified wire mesh guide (Fig 6 & 7, 8).

Discussion

Several authors have suggested that the drill will stop or the patient will report pain if a root is contacted, and that the direction of drilling can then be adjusted until a satisfactory implant site is found.^[3]

Liou and colleagues found that miniscrews do not always remain stationary after orthodontic force loading, concluding that at least 2mm of

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clearance is required between a miniscrew and the adjacent roots to avoid trauma to the roots or the periodontal ligament.^[8] According to Kyung and colleagues, the roots can be expected to recuperate completely even when severely damaged.^[3] In our opinion, any

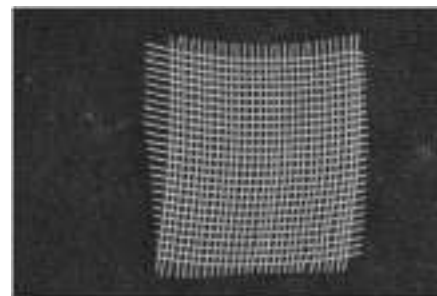


Figure 1: Fabrication Of Wire Mesh With 0.010" Stainless Steel Ligature Wire



Figure 2: Fabrication Of Framework With 0.7 Mm Stainless Steel Wire



Figure 3: Welding Of Wire Mesh To The Framework.



Figure 4: Custom Made Acrylic Stop.

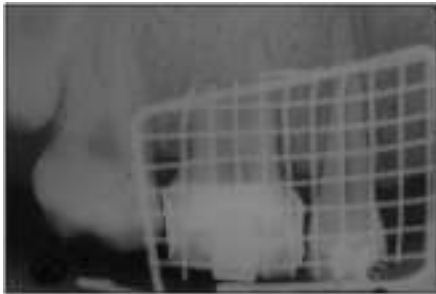


Figure 5: Preoperative Radiograph With Wire Mesh Guide In Position.



Figure 6: Insertion Of Micro Implant With Wire Mesh Guide In Position.



Figure 7: Insertion Of Micro Implant With Wire Mesh Guide In Position.



Figure 8: Postoperative Radiograph With Microimplant In Position.

approach that avoids patient discomfort or stress during implant surgery should be favoured.

Wire Mesh guide is easy to fabricate and inexpensive, and can be used with a variety of mini - screws. Its precise positioning of interradicular miniscrews helps prevent trauma to anatomical structures and thus reduce miniscrew failure rates.

References

1. Janssens, F.; Swennen, G.; Dujardin, T.; Glineur, R.; and Malevez, C.: Use of an onplant as orthodontic anchorage, *Am. J. Orthod.* 122:566-570, 2002.
2. Roberts, W.E.; Marshall, J.K.; and Mozsary, P.G.: Rigid endosseous implant utilized as anchorage to protract molars and close an atrophic extraction site, *Angle Orthod.* 60:135-152, 1990.
3. Kyung, H.M.; Park, H.S.; Bae, S.M.; Sung, J.H.; and Kim, I.B.: Development of orthodontic micro-implants for intraoral anchorage, *J. Clin. Orthod.* 37:321-329, 2003
4. Carano, A.; Velo, S.; Leone, P.; and Siciliani, G.: Clinical applications of the miniscrew anchorage system, *J.*

Clin. Orthod. 39:9-24, 2005.

5. Kravitz N., Kusnoto B., Hohlt W. A Simplified Stent for Anterior Miniscrew Insertion. *J. Clin. Orthod.* 41:224-226, 2007
6. Choi HJ, Kim TW, Kim HW. A Precise Wire Guide for Positioning Interradicular Miniscrews. *J. Clin. Orthod.* 41:258-261, 2007
7. Bae, S.M.; Park, H.S.; Kyung, H.M.; Kwon, O.W.; and Sung, J.H.: Clinical application of micro-implant anchorage, *J. Clin. Orthod.* 36:298-302, 2002.
8. Liou, E.J.; Pai, B.C.; and Lin, J.C.: Do miniscrews remain stationary under orthodontic forces? *Am. J. Orthod.* 126:42-47, 2004.

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