

A simple mesh guide for accurate inter-radicular miniscrew placement

Divyaroop Rai^a, Janardhanam P^b, Anuroop Rai^c, Dhruv Yadav^d

Miniscrews are being widely used for intrusion of incisors and posteriors, as well as antero-posterior dental retraction and protraction. With the increase in the usage of Miniscrews in recent times, particularly in the dentoalveolar areas, the accuracy in inter-radicular insertion of miniscrews without harming the roots of the adjacent teeth have been found challenging. Since the roots are in contiguity of the buccal cortical plate and have space restraints between the roots of two adjacent teeth, the probable risk of root damage while insertion can be high.¹⁻⁸

There are several suggested methods for determining implant locations from the two dimensional radiographs. A bent stainless steel wire^{9,10} or a brass wire¹¹ has been placed over the dentoalveolar areas of the selected implant site as a radiopaque marker, but these do not completely avoid the risk of root contact. Various methods, stents and guides have been designed and developed in recent times for accurate inter-radicular placement of mini implants,¹²⁻¹⁷ but most of those requires laboratory fabrication which adds to number of appointments.

Ideally, inter-radicular insertion of the miniscrews should be into thin, attached gingiva, to obtain favorable soft tissue health for attaining stationary anchorage during force loading.⁹ If the miniscrews are inserted in the loose alveolar tissue the risk of inflammation, peri-implantitis, soft-tissue overgrowth, and aphthous ulceration increases which thereby raises the likelihood of miniscrew failure by 30%.¹⁰ That is why a clinical evaluation of attached gingiva is of prime importance to decide the height at which the implant is to be inserted.

The present article describes a simple Mesh guide that permits accurate miniscrew placement in the septal bone area while preventing root damage.

Fabrication:

1. Clinically measure the mucosal height (till the attached gingiva) using periodontal probe or a divider and measure it on a scale.
2. Take a piece of stainless-steel mesh with internal dimension of 1mm each side of the mesh unit (easily available in the market)
3. The total height of the mesh frame should be 2-3 mm greater than the measured mucosal height and
4. Width of the mesh frame should be of the width of two adjacent teeth between which implant has to be placed
5. Once the dimensions of the mesh frame are decided make the border of the mesh using a 0.018 brass wire and weld it with the meshwork, using a spot welder, commonly available at every clinical setup.

^aReader. Department of Orthodontics & Dentofacial Orthopedics, Rajasthan Dental College and Hospital, Jaipur

^bProfessor. Department of Orthodontics & Dentofacial Orthopedics, Sibar Institute of Dental Sciences, Guntur

^cReader. Department of Oral & Maxillofacial Surgery, Ahmedabad Dental College & Hospital, Ahmedabad

^dSenior Lecturer. Department of Orthodontics & Dentofacial Orthopedics, Rajasthan Dental College and Hospital, Jaipur



Fig 1. Mesh Frame with “T” design



Fig 2. Mesh Frame with Crimpable Hook

1. Weld a 0.019x0.025 inch straight wire in a “T” design at the center of the lower border of the mesh (Figure 1) or
2. Weld a Crimpable hook at the center of the lower border of the mesh. (Figure 2)

Placement of the Jig:

Place the Mesh Jig with the ‘0.019x0.025 inch’ attachment can be placed into the bracket slot and tied either with a ligature wire or elastomeric module (Figure 1) or if a ‘Crimpable’ attachment was used place the mesh on the main arch wire.

Implant placement:

- After placing the Jig in the desired area, use a radiograph to identify the number of grid deciding the best site for micro-implant placement, based on root locations and bone levels
- IOPA X-Ray will show the meshwork covering the root surface. (Figure 3)
- Check the desired implant position (between the roots) & count the grids from the border of the frame over the desired row (Height - as measured clinically)
- Once the grid is decided, make a small punch hole either with a sharp probe or with a round bur using a micro-motor. (Figure 4)
- Remove the mesh assembly and place the implant over the marked area at the desired angle. (Figure 5)
- After placing the Micro-implant, take an IOPA X-ray again to check the accuracy of the micro-implant placement. (Figure 6)



Fig 3. IOPA X-Ray with the meshwork covering the root surface



Fig 4. Punch hole with a sharp probe



Fig 5. Mark for Micro-Implant placement



Fig 6. IOPA X-Ray with Micro-Implant accurately placed

Conclusion:

This versatile Mesh Guide can be used in the upper and lower buccal segments, in the upper midline (H), or in the mandibular symphyseal region (I). We have found it simple and safe to use and easy to fabricate for individual patients and can be easily autoclaved to be re-used. A supply of the Mesh Guide can be prepared in advance with few common sizes seen in the patients, for added convenience, which can help reduce the clinical chair-side time along with an accurate placement of the Micro-Implant.

Referances:

1. Creekmore, T.D. and Eklund, M.K.: The possibility of skeletal anchorage, *J. Clin. Orthod.* 17:266-269, 1983.
2. Kanomi, R.: Mini-implant for orthodontic anchorage, *J. Clin.Orthod.* 31:763-767, 1997.
3. Kyung, H.M.; Park, H.S.; Bae, S.M.; Sung, J.H.; and Kim, I.B.:Development of orthodontic micro-implants for intraoralanchorage, *J. Clin. Orthod.* 37:321-329, 2003.
4. 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.
5. Carano, A.; Velo, S.; Leone, P.; and Siciliani, G.: Clinical applicationsof the miniscrew anchorage system, *J. Clin. Orthod.*39:9-24, 2005.
6. Lin, J.C. and Liou, E.J.: A new bone screw for orthodonticanchorage, *J. Clin. Orthod.* 37:676-681, 2003.
7. Schnelle, M.A.; Beck, F.M.; Jaynes, R.M.; and Huja, S.S.: Aradiographic evaluation of the availability of bone for placementofminiscrews, *Angle Orthod.* 74:832-837, 2004.
8. Somchai, M.: Titanium mini-implant for orthodontic anchorage,*J. Thai Orthod.* 3:41-46, 2004.
9. Lee, J.S.; Kim, D.H.; Park, Y.C.; Kyung, S.H.; and Kim, T.K.: The efficient use of midpalatalminiscrew implants, *Angle Orthod.* 74:711-714, 2004.
10. Miyawaki, S.; Koyama, I.; Inoue, M.; Mishima, K.; Sugahara, T.; and Takano-Yamamoto, T.: Factors associated with the stability of titanium screws placed in the posterior region for orthodontic anchorage, *Am. J. Orthod.* 124:373-378, 2003.
11. Liou, E.J.; Pai, B.C.; and Lin, J.C.: Do miniscrews remain stationary under orthodontic forces? *Am. J. Orthod.* 126:42-47, 2004.
12. Suzuki, E.Y. and Buranastidporn, B.: An adjustable surgical guide for miniscrew placement, *J. Clin. Orthod.* 39:588-590, 2005.
13. Morea, C.; Dominquez, G.C.; Wuo, A.V.; and Tortamano, A.: Surgical guide for optimal positioning of mini-implants, *J.Clin. Orthod.* 39:317-321, 2005.
14. Cousley, R.R. and Parberry, D.J.: Surgical stents for accurate miniscrew insertion, *J. Clin. Orthod.* 40:412-417, 2006.
15. Estelita C.B., S.; Janson, G.; Chiqueto, K.; de Freitas, M.R.; Henriques, J.F.; and Pinzan, A.: A three-dimensional radiographic- surgical guide for mini-implant placement, *J. Clin. Orthod.* 40:548-554, 2006.
16. Kravitz ;Kusnoto and Hohlt: A Simplified Stent for Anterior Miniscrew Insertion, *J. Clin. Orthod.* 41:224-226, 2007
17. Hemanth M.; G.S. Patil and SudhanshuVerma: Micro-Implant Positioning Guide, *J. Clin. Orthod.* 46:37-38, 2012