**REVIEW ARTICLE**

**Micro Implant : An Absolute Orthodontic Anchorage System : A Review**

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**Abstract**

In Orthodontics, implants have been used to extrude impacted teeth, to retract anterior teeth, and to correct tooth position in pre-prosthetic treatment. These osseointegrated implants are usually used as an anchorage to assist orthodontic tooth movement and as support for prostheses because these devices provide maximal anchorage and do not depend on patient cooperation. Here we are reviewing highly used type of Implant for Orthodontic purpose id Micro Implant.


**Key words**: Micro Implant, Placement site, Removal of implant.

**Introduction**

Anchorage control is fundamental to successful orthodontic treatment. Orthodontic tooth movement has always been limited to action-reaction reciprocal force mechanics in anchorage control. Additional anchorage aids such as headgears and inter-maxillary elastics can be used, but have disadvantages of visibility, compliance dependence, and the risk of undesirable side effects. Not all patients are cooperative enough to rely on these types of anchorage aids.

In recent time a narrow titanium micro-implant, the “Absoanchors” that has a button shaped head with a hole for ligatures and elastomers developed.1

Its small diameter allows its insertion into many areas of the maxilla and mandible that were previously unavailable, such as between the roots of adjacent teeth.

**Implant Design**

The Absoanchors comes in different diameters from 1.2 mm to 1.6 mm for different movements and sites.1,2

Even the smaller 1.2 mm and 1.3 mm micro-implant can withstand as much as 450 gms of force. Tapered type of micro-implant offers a tighter initial fit than the cylindrical type (Fig 1, 2A,B).

**Placement Sites**2,3
- In the mandible, the buccal surface and the retromolar areas offer adequate thickness and quality of cortical bone for placement of
1.2-1.3 mm diameter micro-implant, 4-5 mm in length.
- If lingual implants are needed, the Tori are suitable implant sites.
- The cortical surfaces of maxillary buccal area are thinner and less compact than those of the mandible and so it requires longer micro-implants.
- The best sites for enmasse retraction are the interdental spaces between the second premolar and the first molar. Below the anterior nasal spine.
- For palatal placement, the mucosal thickness should be measured with an anesthetic needle or probe. The midline area contains high quality of bone, but also osseous sutures, so micro-implant placed in the suture area should be little thicker. If the bony resistance of the suture is inadequate, the micro-implant can be placed adjacent to the sutures.
Placement Procedure (Fig. 6)

This procedure is performed under local anesthesia.

Maxillary micro-implant sites need a 30°-40° angulation to the long axis of the tooth, either buccally or lingually,¹ to increase the surface contact between the microscrew and the bone. This will improve retention while reducing the risk of striking a root (Fig 3).

Thicker mandibular cortical bone generally requires 10°-20° angulation (Fig 3).

When placing micro-implant in palate, the greater palatine artery and nerve must always be avoided (Fig 4).

If micro-implant is inserted through movable soft tissue rather than attached gingiva, it is preferred to use a screw without a button head, placing it completely beneath the gingiva with an emerging ligature wire hook for elastic engagement (Fig 5). This reduces the risk of inflammation and infection.

The micro-implant depends upon mechanical retention within the bone, thus requires a tight fit.

A low speed contraangle with a drill 0.2-0.3 mm narrower than microscrew is used for initial entry into the bone. The micro-implant should not be used for self-drilling, because this can lead to metal fatigue and eventual screw fracture.⁵

The drill can penetrate the mucosa, attached gingiva and underlying bone without a surgical flap, but when entering through movable soft tissue, a small (5mm) retractable flap will prevent soft tissue from rolling up around the drill.

Any serious resistance after passing through the cortical plate is probably due to root contact, which means the drill should be reinserted at a different angle.

It is safer to use a manual screwdriver, however, so the clinician can feel resistance from roots and make adjustments to avoid them.

Whenever resistance is encountered, withdraw the implant and redrill the bone with the pilot drill before reinserting the micro-implant.

When the micro-implant fits tightly, orthodontic forces can be applied immediately.

Implant Removal

Since complete osseointegration does not occur between the micro-implant and bone, implant removal is simple. Engage the screw head with the driver and turn it in the opposite direction of insertion, this will remove the implant easily without local anesthesia.

Advantages of micro implant system

1) Provides absolute anchorage for orthodontic tooth movement.
2) Easily placed and removed. It takes only few minutes for each screw insertion.
3) Does not depend on patient compliance as with extraoral appliances
4) Produces an early profile improvement.
5) Short terms treatment time by retracting anteriors simultaneously.
6) Reduces chair time.

Disadvantages of other absolute Anchorage systems:

Dental Implants (Ossointegrated)

1) Cost
2) Delay of the loading for several months
3) The intervention necers any for removed of the unusable implant.

On Plant:

1) Cost
2) Delay in loading
3) Location in limited by the morphology of the osteointegrating surface.

Fig 5. Maxillary micro-implant placed in palatal mucosa. More space exists between palatal roots than buccal roots.
Zygoma wires:
1) Limited by location.
2) Invasive surgery

Zygoma Anchorage System and Miniplate with C tube
1) Invasive surgery
2) Inflammation of mucosa at the site

Fig 6 A, B. Maxillary micro-implant placed through movable soft tissue. C. Mandibular micro-implant placed through movable soft tissue.
Conclusion

Implants for the purpose of conserving anchorage are welcome additions to the armamentarium of a clinical Orthodontist. They help the Orthodontist to overcome the challenge of unwanted reciprocal tooth movement. The presently available implant systems are bound to change and evolve into more patient friendly and operator convenient designs. Long-term clinical trials are awaited to establish clinical guidelines in using implants for both orthodontic and orthopedic anchorage.

References