

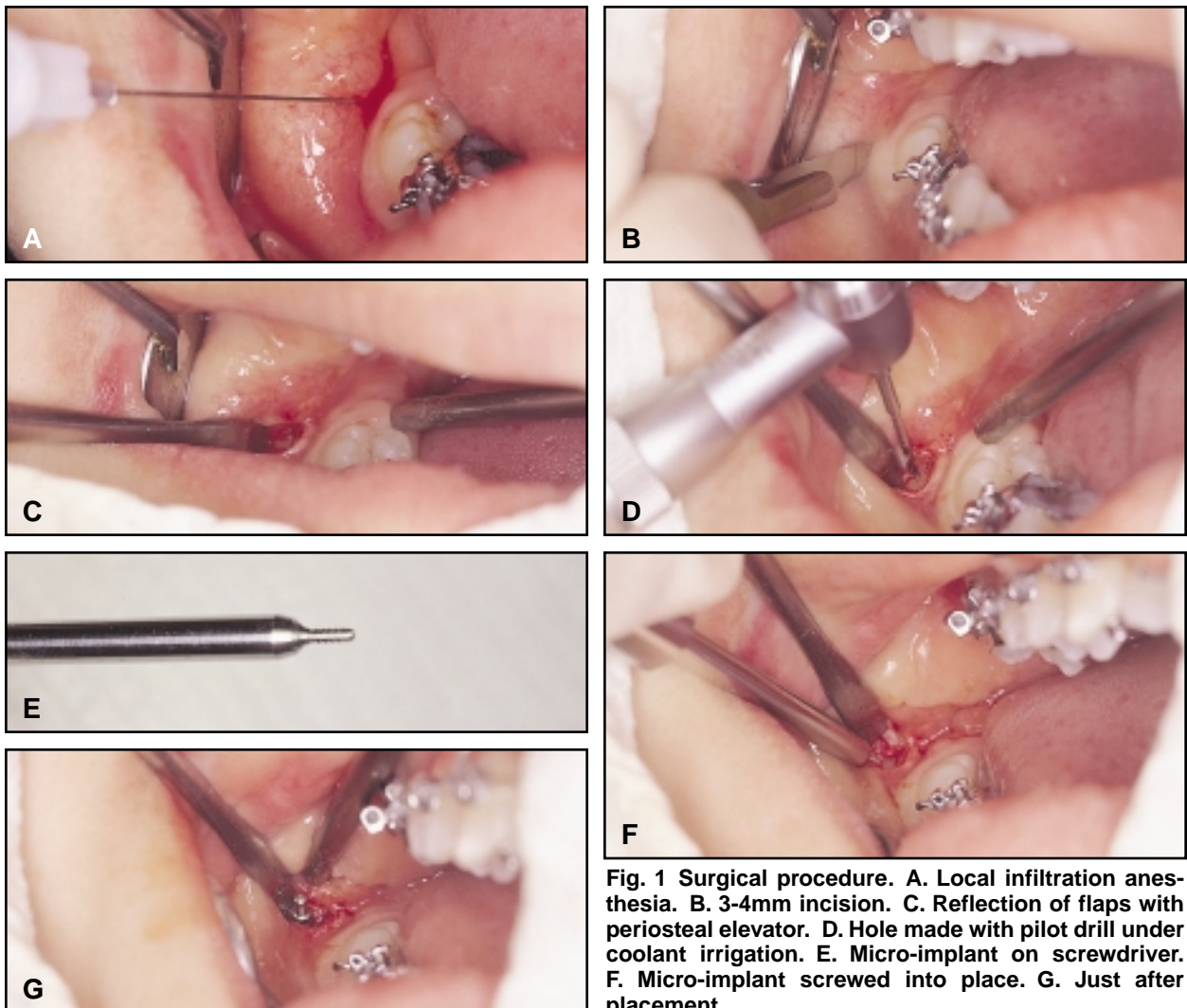
A Simple Method of Molar Uprighting with Micro-Implant Anchorage

HYO-SANG PARK, DDS, MSD, PHD
HEE-MOON KYUNG, DDS, MSD, PHD
JAE-HYUN SUNG, DDS, MSD, PHD

Numerous approaches have been proposed for uprighting mesially tipped mandibular second molars after loss of the adjacent first molars.¹⁻⁷ Most of these have had problems with molar extrusion and movement of the anchorage unit, making it necessary to apply interarch sta-

bilization to minimize side effects. The only sure way to obtain absolute anchorage is with implants.

Roberts showed good clinical results in terms of molar protraction with retromolar implants,⁸ and Shellhart and colleagues placed



Dr. Park is an Associate Professor, Department of Orthodontics and Dentistry, Keimyung University, Taegu, Korea; e-mail: hyosang@dsmc.or.kr. Dr. Kyung is Dean and Professor and Dr. Sung is Chairman and Professor, Department of Orthodontics, Dental College, Kyungpook National University, Taegu, Korea. Dr. Kyung is President of Dentos, Inc.



Dr. Park



Dr. Kyung



Dr. Sung

dental implants in extraction sites to upright lower second molars.⁹ Conventional dental implants have some disadvantages in orthodontic treatment, however, including the need to wait for osseointegration, difficulty of removal after treatment, and cost.

Recently, Kanomi¹⁰ and Costa and colleagues¹¹ introduced the use of titanium microscrews and miniscrews for orthodontic anchorage. Several authors have reported retraction of the upper anterior teeth against micro-implants and simultaneous uprighting of the lower molars.¹²⁻¹⁵ The micro-implants were stable during such treatment, demonstrating that they could provide absolute anchorage for tooth movement.

This article describes how upper and lower second molars can easily be uprighted with Micro-Implant Anchorage.

Surgical Procedure

After an injection of local anesthesia, make a 3-4mm incision with a No. 15 blade, and reflect the flaps with a periosteal elevator (Fig. 1). Drill a hole with a .9mm pilot drill under coolant irrigation. Place the micro-implant with a special screwdriver.*

CT scans show considerable space for micro-implant placement buccal and distal to the lower second molar (Fig. 2). Positioning the head of the microscrew in the occlusogingival dimension, as well as in the buccolingual and mesiodistal dimensions, is critical to controlling tooth movement. If the head of the microscrew is lower than the occlusal surface of the molar, the molar will tend to intrude during uprighting, which will complicate the orthodontic mechanics.

Gingival inflammation is sometimes seen distal to the second molar. This can be reduced

by proper oral hygiene and topical medication or, if necessary, by periodontal surgery.

The microscrew is removed simply by unscrewing it in the opposite direction after exposure.

Case 1

A 35-year-old male patient was referred by a prosthodontist for uprighting of a mesially tipped lower right second molar, which was in crossbite with the upper right second molar (Fig. 3A).

After extracting a microdontia distal to the second molar, the oral surgeon placed a microscrew* (1.2mm in diameter, 6mm in length) in the retromolar area. Because a second molar is usually tipped lingually as well as mesially when the adjacent first molar is missing, we placed the microscrew distobuccally, 10mm from the distal surface of the lower right second molar.

During surgery, an .009" ligature wire was extended outward for force application (Fig. 3B). To ensure patient comfort, the ligature wire should be extended in the planned direction of force. After two weeks of healing, we bonded a

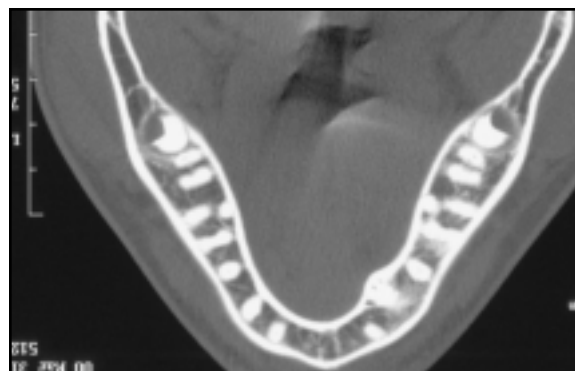


Fig. 2 CT section shows space for micro-implant buccal and distal to mandibular second molar.

*OsteoMed Corp., 3750 Realty Road, Dallas, TX 75001.

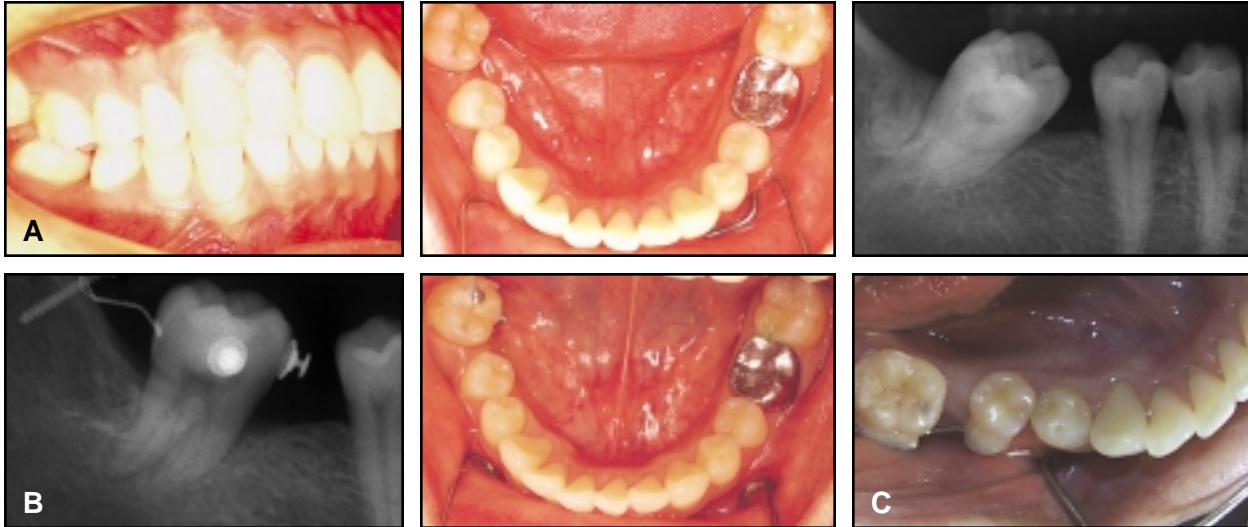


Fig. 3 Case 1. A. 35-year-old male patient with mesially tipped lower second molar in crossbite with upper second molar. B. Placement of micro-implant in retromolar area and application of distobuccally directed force. C. After six months of molar uprighting.



Fig. 4 Case 2. A. Micro-implant placed distal to second molar for anchorage to upright molar in 14-year-old male patient. B. Three months later. C. Another five months later.

lingual button to the mesiolingual surface of the second molar and applied 70g of force with elastomeric thread. To prevent buccolingual movement of the elastomeric thread, the occlusal surface of the crown can be grooved if a prosthetic replacement is planned.

After three months of treatment, the molar was uprighted, but showed a mesiobuccal rotation. This was corrected by bonding a second button to the lingual surface of the molar and applying a distobuccally directed force (Fig. 3B).

Orthodontic treatment was completed in six months (Fig. 3C), and a bridge was delivered after three months of retention. No orthodontic brackets were used, and no forces were applied

to the premolars or anterior teeth, which were used as an anchorage unit.

Case 2

A 14-year-old male patient developed a mesially tipped lower second molar during orthodontic treatment. A micro-implant* (1.2mm in diameter, 8mm in length) was placed in the retromolar area distal to the second molar, and a ligature wire was extended outward for elastomeric force application (Fig. 4A).

To avoid root damage, only 50g of orthodontic force was applied (Fig. 4B). The molar was uprighted after eight months of treatment,



Fig. 5 Case 3. A. 23-year-old female patient with mesially tipped upper left second molar. B. Two months after placement of micro-implant. C. Another two months later.

and a bracket was bonded to it for further movement (Fig. 4C).

Case 3

A 23-year-old female patient was referred by her general dentist for uprighting of a mesially tipped upper left second molar in need of prosthetic replacement (Fig. 5A). A micro-implant* (1.2mm in diameter, 12mm in length) was placed

*OsteoMed Corp., 3750 Realty Road, Dallas, TX 75001.

**RMO, Inc., P.O. Box 17085, Denver, CO 80217.

in the maxillary tuberosity. (There is no need to make an incision in the attached gingiva for placing the implant.) A longer microscrew was used than in the lower retromolar area because the cortical bone is much thinner in the maxillary arch than in the mandibular arch.

After two weeks of healing, 70g of force was applied with Super Thread** between the microscrew and lingual cleats on the buccal and lingual surfaces of the second molar (Fig. 5B). Four months later, the second molar showed considerable uprighting (Fig. 5C).

Conclusion

With Micro-Implant Anchorage, upper and lower second molars can easily be uprighted without side effects on the anterior teeth and without using orthodontic brackets. Simultaneous molar intrusion can be performed, eliminating the need for occlusal reduction.

We have recently developed new micro-implants*** for orthodontic anchorage, with the heads, necks, and threads of the screws modified to improve their efficiency (Fig. 6).

REFERENCES

1. Kraal, J.H.; Digiancinto, J.J.; Dail, R.A.; Lemmerman, K.; and Peden, J.W.: Periodontal conditions in patients after molar uprighting, *J. Prosth. Dent.* 43:156-162, 1980.
2. Lubow, R.M.; Cooley, R.L.; and Kaiser, D.: Periodontal and restorative aspects of molar uprighting, *J. Prosth. Dent.* 47:373-376, 1982.
3. Tuncay, O.C.; Biggerstaff, R.H.; Cutcliffe, J.C.; and Berkowitz, J.B.: Molar uprighting with T-loop springs, *J. Am. Dent. Assoc.* 100:863-866, 1980.
4. Roberts, W.W.; Chacker, F.M.; and Burstone, C.J.: A segmental approach to mandibular molar uprighting, *Am. J. Orthod.* 81:177-184, 1982.
5. Weiland, F.J.; Bantleon, H.P.; and Droschl, H.: Molar uprighting with crossed tipback springs, *J. Clin. Orthod.* 26:335-337, 1992.
6. Capelluto, E. and Lauweryns, I.: A simple technique for molar uprighting, *J. Clin. Orthod.* 31:119-125, 1997.
7. Shellhart, W.C. and Oesterle, L.J.: Uprighting molars without extrusion, *J. Am. Dent. Assoc.* 130:381-385, 1999.
8. Roberts, W.E.; Nelson, C.L.; and Goodacre, C.J.: Rigid implant anchorage to close a mandibular first molar extraction site, *J. Clin. Orthod.* 28:693-704, 1994.
9. Shellhart, W.C.; Moawad, M.; and Lake, P.: Case report: Implants as anchorage for molar uprighting and intrusion, *Angle Orthod.* 66:169-172, 1996.
10. Kanomi, R.: Mini-implant for orthodontic anchorage, *J. Clin. Orthod.* 31:763-767, 1997.
11. Costa, A.; Raffaini, M.; and Melsen, B.: Miniscrews as orthodontic anchorage: A preliminary report, *Int. J. Adult Orthod. Orthog. Surg.* 13:201-209, 1998.
12. Park, H.S.: The skeletal cortical anchorage using titanium microscrew implants, *Kor. J. Orthod.* 29:699-706, 1999.
13. Park, H.S.: A new protocol of the sliding mechanics with micro-implant anchorage (MIA), *Kor. J. Orthod.* 30:677-685, 2000.
14. Park, H.S.; Bae, S.M.; Kyung, H.M.; and Sung, J.H.: Micro-implant anchorage for treatment of skeletal Class I bilateral protrusion, *J. Clin. Orthod.* 35:417-422, 2001.
15. Park, H.S.: *The Use of Micro-Implant as Orthodontic Anchorage*, Nare Publishing Co., Seoul, Korea, 2001.

***Dentos, Inc., Dong Bu B/D 2F #22, 251, 4Ga, Dong-In Dong, Jung-Gu, Taegu, Korea.

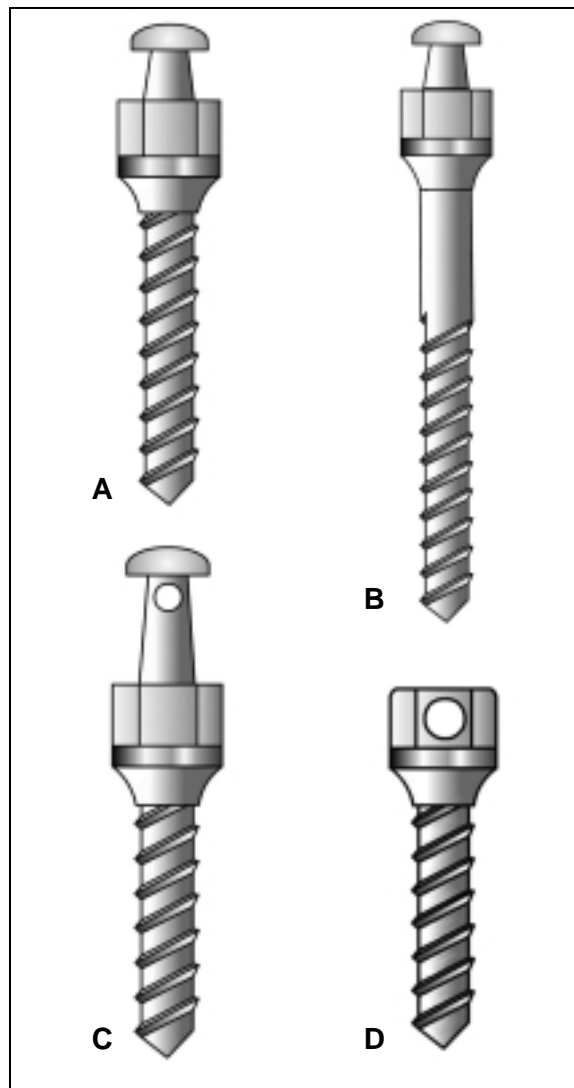


Fig. 6 New micro-implant for orthodontic anchorage. A. Maxillary buccal. B. Maxillary palatal. C,D. Mandibular.