

Correction of facial asymmetry and maxillary canting with corticotomy and 1-jaw orthognathic surgery

Hyo-Won Ahn,^a Dong Hwi Seo,^b Seong-Hun Kim,^c Baek-Soo Lee,^d Kyu-Rhim Chung,^e and Gerald Nelson^f
Seoul and Suwon, Korea, and San Francisco, Calif

Although 2-jaw orthognathic surgery is a typical recommendation for the treatment of facial asymmetry, another good treatment alternative is maxillary corticotomy with temporary skeletal anchorage devices followed by mandibular orthognathic surgery. The corticotomy procedure described here can achieve unilateral molar intrusion and occlusal plane canting correction with potentially fewer complications than 2-jaw orthognathic surgery. The approach allows movement of dentoalveolar segments in less time than with conventional dental intrusion using temporary skeletal anchorage devices. A 2-jaw asymmetry with occlusal plane canting might be corrected using maxillary corticotomy and mandibular orthognathics rather than 2-jaw orthognathics. Two patients with facial asymmetry are presented here. In each one, the maxillary cant was corrected over a period of 2 to 3 months with 3.5 mm of intrusion of the unilateral buccal segment. After the preorthognathic cant correction, orthognathic surgery was done to correct the mandibular asymmetry. (*Am J Orthod Dentofacial Orthop* 2014;146:795-805)

Facial asymmetry is one reason that patients seek orthognathic surgery combined with orthodontic treatment. Common features of facial asymmetry include a mandibular deviation to the right or left that increases gradually from the upper to the lower face. This is usually associated with a cant of the maxilla and the maxillary occlusal plane.¹ Severt and Proffit² reported that the frequencies of facial asymmetry are 50%, 36%, and 74% in the upper, middle, and lower thirds of the face, respectively. In such cases, dramatic improvement

of facial balance comes with surgery to the mandible. Correction of the maxillary cant is usually a prerequisite. Consequently, correction typically includes a combination of LeFort 1 osteotomy and bilateral sagittal split ramus osteotomy.³

Case reports have been published demonstrating nonorthognathic correction of the maxillary cant before orthognathic surgery.^{4,5} Posterior bite-blocks or high-pull headgear has been used to intrude the molars conventionally. Both of these methods require significant patient cooperation. With either method, it is difficult to control the direction and quantity of tooth movement.^{6,7} With the advent of temporary skeletal anchorage devices (TSADs), orthodontic molar intrusion and occlusal plane canting correction have been reported, with minimal surgical intervention.^{4,5,8,9} Kang et al⁴ introduced a rhythmic arch system using TSADs and obtained a considerable amount of canting correction. Jeon et al⁵ reported correction of mandibular prognathism with mandibular surgery only, correcting the maxillary asymmetry by intrusion of the maxillary molars unilaterally using TSADs. However, the treatment times were extended, increasing the risk of side effects.¹⁰

Since Köle¹¹ suggested clinical applications of corticotomy in 1959, various technical advancements have been reported.¹²⁻¹⁵ One is orthopedic force application against intraosseous anchorage after corticotomy.^{14,15} A heavier force is applied than the orthodontic force because the

^aAssistant professor, Department of Orthodontics, College of Dentistry, Kyung Hee University, Seoul, Korea.

^bPostgraduate student, Department of Orthodontics, College of Dentistry, Kyung Hee University, Seoul, Korea.

^cAssociate professor and chair, Department of Orthodontics, College of Dentistry, Kyung Hee University, Seoul, Korea.

^dProfessor, Department of Oral and Maxillofacial Surgery, College of Dentistry, Kyung Hee University Medical Center, Seoul, Korea.

^eProfessor and chair, Department of Orthodontics, School of Medicine, Ajou University, Suwon, Korea.

^fClinical professor and interim chair, Division of Orthodontics, Department of Orofacial Science, University of California at San Francisco, San Francisco, Calif.

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Address correspondence to: Seong-Hun Kim, Department of Orthodontics, College of Dentistry, Kyung Hee University, #1 Hoegi-dong, Dongdaemun-gu, Seoul 130-701, Republic of Korea; e-mail, bravortho@gmail.com.

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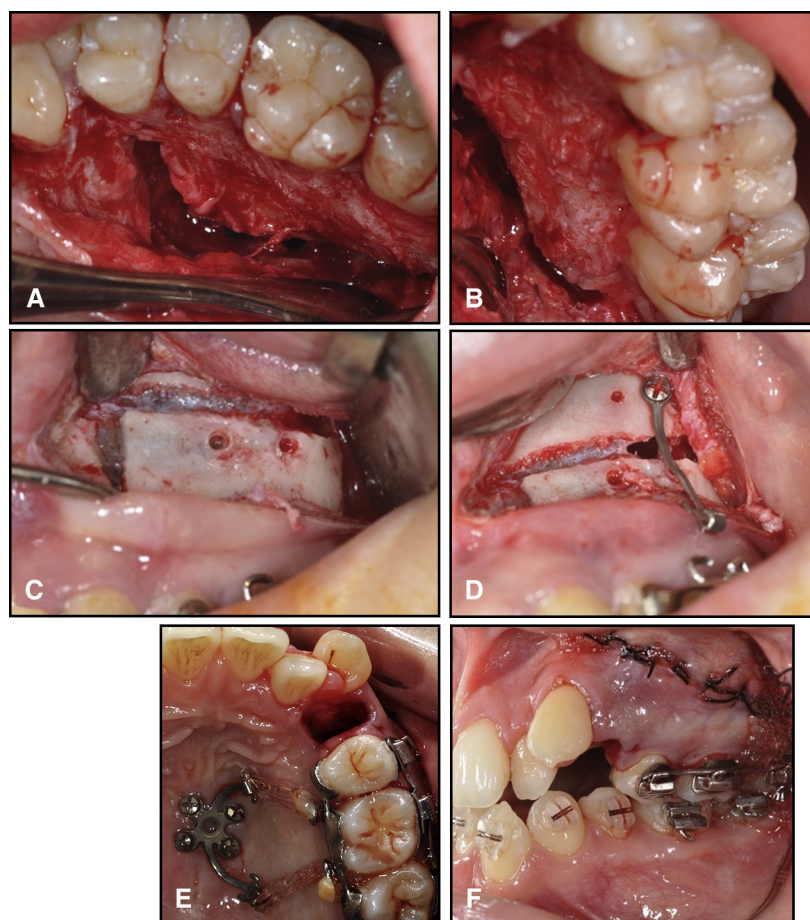


Fig 1. **A** and **B**, Palatal and **C** and **D**, buccal corticotomy with piezosurgery (SONIC SURGEON 300; Dong Il Technology, Hwasung, Korea); **E** and **F**, application of miniplates for intrusion of the posterior segment.

aim of this technique is not tooth movement through the bone but rather bony block movement by compression osteogenesis.^{12,16} If the cortical layer of the basal and alveolar bone is removed, medullary bone can be bent by traction force.¹⁴

We have called the combination of corticotomy and orthopedic force application using TSADs speedy surgical orthodontics (SSO).^{14,15} By using this protocol, correction of a significant facial asymmetry can be achieved with single-jaw surgery. Omitting the corticotomy element means slower correction and lacks the correction of the supporting bone that corticotomy allows. This report includes 2 patients who demonstrate the clinical application of correcting an occlusal plane cant with corticotomies and orthopedic force.

Overerupted maxillary molars and premolars are first passively splinted with a prefabricated bondable splint. This splint consists of a 0.036-in stainless steel wire

with a power arm extension, soldered to mesh-backed pads. Bonding these splints to the buccal and palatal aspects of the teeth stabilizes the teeth as 1 unit. The corticotomy procedure can be done after the teeth are stabilized.

The corticotomies were performed in 2 stages to ensure a good blood supply. The first was done on the palatal side. The second was done 2 weeks later on the buccal side (Fig 1).

For the palatal corticotomy, a flap was elevated in the regions of the maxillary premolars and molars after a sulcular incision. A vertical corticotomy using piezosurgery and a round bur with a slow-speed hand piece was performed between the first premolar and the second premolar with care not to damage the root apices. A horizontal corticotomy was next, 3 mm above the root apex from the premolars to the distal aspect of the second molar. A second vertical corticotomy was performed distal to the second molar up to the alveolar crest

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