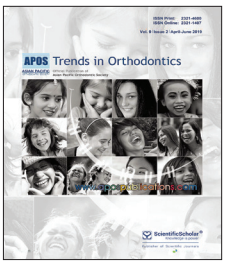
ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

www.apospublications.com

APOS Trends in Orthodontics

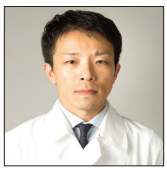


Case Report

Alternative approach using miniscrew-anchored sliding jig to correct maxillary midline deviation in a patient with unilateral missing premolar

Kazuo Shimazaki, Zuisei Kanno, Takashi Ono

Department of Orthodontic Science, Graduate School, Tokyo Medical and Dental University, Tokyo, Japan.



***Corresponding author:**
Kazuo Shimazaki,
1-5-45 Yushima, Bunkyo-ku,
Tokyo 113-8549, Japan.

kazortho@gmail.com

Received : 22 May 19
Accepted : 24 May 19
Published : 29 June 19

DOI
10.25259/APOS-57-2019

Quick Response Code:

ABSTRACT

This case report describes the use of a miniscrew-anchored sliding jig (SJ) to distalize molars in a patient with maxillary midline deviation. A 41-year-old female presented with a chief complaint of maxillary midline deviation toward the left caused by prior orthodontic treatment involving unilateral extraction of a maxillary left premolar. Clinical examination revealed facial symmetry and a straight profile. The maxillary midline was deviated 2.5 mm to the left. The patient was treated with molar distalization using miniscrew-anchored SJs. Midline correction and alignment were obtained with maxillary unilateral distalization and mandibular full-arch distalization. The total active treatment period was 32 months. Appropriate occlusion and centered midlines were maintained after 29 months of retention. Our results suggest that the treatment method described herein is effective to distalize the unilateral posterior segment in either arch.

Keywords: Distalizer, Midline correction, Midline deviation, Molar distalization, Sliding jig

INTRODUCTION

Treating midline deviation without tooth extraction is a challenging problem in orthodontics. When correcting midline deviation, it is important to determine the etiology and to evaluate the effects on occlusion.[1] Interarch elastics, symmetrical extraction, and unilateral distalization are the recommended treatments for midline deviation. However, unilateral distalization is challenging in patients with asymmetric molar relationships. Multiple treatment methods and appliances for molar distalization have been described.[2,3]

The use of miniscrews to obtain an absolute anchorage in other applications has recently been shown to optimize orthodontic mechanics, minimize unwanted reciprocal movement of other teeth, and require minimal patient cooperation.[4,5] Some reports have described the successful use of miniscrews with a sliding jig (SJ) to distalize the posterior teeth both unilaterally[6] and bilaterally.[7]

In this case report, we describe simultaneous unilateral distalization to correct maxillary midline deviation and full-arch mandibular distalization using miniscrew-anchored SJs.

CASE REPORT

A 41-year-old female presented with the chief complaints of uncentered maxillary dental midline and crowding of the mandibular anterior teeth. She had previously undergone 4 years of

unsuccessful orthodontic treatment involving the extraction of the maxillary left first premolar.

The patient had facial symmetry and a straight profile. Her upper and lower lips were anterior to the E-line by 0.5 mm and 2.5 mm, respectively. The maxillary and mandibular dental midlines were coincident, although both were 2.5 mm to the left of the midsagittal plane, with the maxillary central incisors tipped to the left. The right molar relationship was Class I, whereas the left molar relationship was Class II because of the missing maxillary left first premolar [Figure 1].

Cephalometric analysis indicated a slight skeletal Class II tendency with an SNA angle of 79.7°, an SNB angle of 75.2°, and a high mandibular plane angle of 39.0°. Labial inclinations of the maxillary incisors (U1 to FH) and mandibular incisors (L1 to occlusal) were 118.2° and 34.2°, respectively.

On the basis of these findings, the patient was diagnosed with Angle Class II subdivision malocclusion, skeletal Class II relationship, a large mandibular plane angle, midline deviation toward the left, and mild mandibular anterior crowding.

Treatment objectives

The treatment objectives were to center the maxillary and mandibular dental midlines on the facial midline and to obtain functional molar occlusion and Class I canine occlusion.

Treatment alternatives

Asymmetric extraction is often considered in patients with dental asymmetry. We did not consider premolar extraction an attractive treatment option in this patient because her lip position and profile were acceptable. Another treatment option was to regain the extracted space. However, that approach risked causing labial inclination of the incisors and would have required prosthetic treatment. Instead, we planned simultaneous asymmetric distalization of the

Figure 1: Pretreatment facial and intraoral photographs and lateral cephalometric and panoramic radiographs.

maxillary right segment (after extraction of the third molar) and bilateral mandibular full-arch distalization to obtain alignment. The nonextraction treatment plan appeared to have advantages for maintaining tongue space. To accomplish these goals, conventional full fixed appliances and miniscrew-anchored SJs were used.

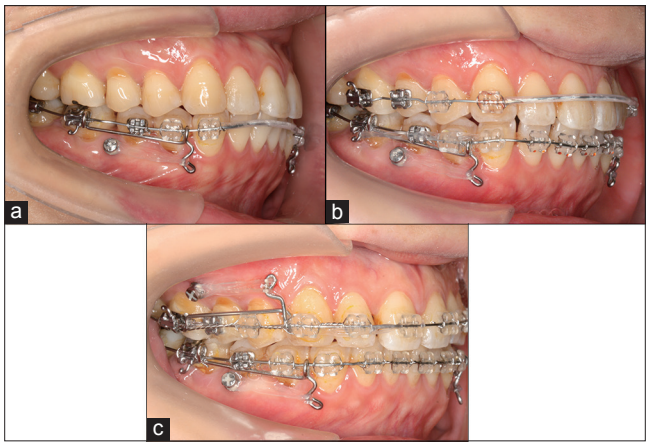


Figure 2: Progressive intraoral photographs.

Treatment progress

Before orthodontic treatment, the right maxillary third molar was extracted and the orthodontic miniscrews (Dual top; Jeil Medical, Seoul, Korea) were inserted between the mandibular second premolar and first molar bilaterally to serve as an abutment for SJs fabricated of 0.032-inch wire. Orthodontic tooth movement at all stages was performed with 0.018 × 0.025-inch slot preadjusted brackets (Dentsply-Sankin and Tomy International, Tokyo, Japan) and 0.016 × 0.022-inch improved superelastic nickel-titanium alloy wire (L and H Titan; Tomy International, Tokyo, Japan).

Multibracket appliances and an SJ were placed for distalization of the mandibular arch prior to the backward-left movement of the maxillary arch [Figure 2a]. After

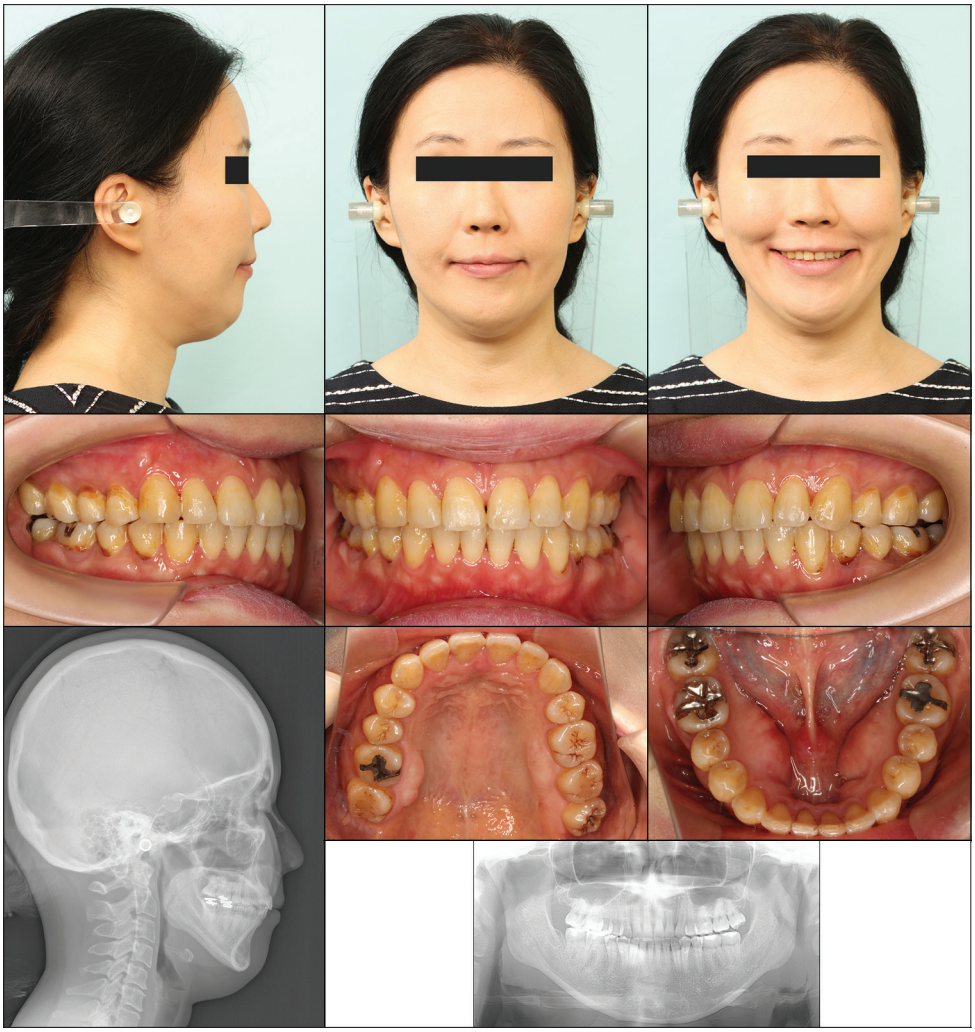


Figure 3: Post-treatment facial and intraoral photographs and lateral cephalometric and panoramic radiographs.

the space had been opened mesial to the first molar, an elastomeric chain was placed from the first molar to the premolar and canine to move distally. Anterior retraction and intrusion of the mandibular incisors was performed concurrent with alignment of the dental midline to the facial midline [Figure 2b].

In the maxilla, unilateral distalization of the right posterior segment was performed with an SJ [Figure 2c]. After molar distalization, anterior retraction toward the right side progressed with the alignment of the midline of the maxillary incisors with the facial midline.

The duration of active treatment was 32 months. After all the appliances were removed, a Hawley-type retainer was placed for the retention.

Treatment results

The patient's facial esthetics improved with correction of dental midline discrepancies and repositioning of the incisors without additional premolar extraction, which maintained profile esthetics [Figures 3 and 4]. Class I molar and canine relationships were achieved on the right side, and full-cusp Class II molar and Class I canine relationships were achieved

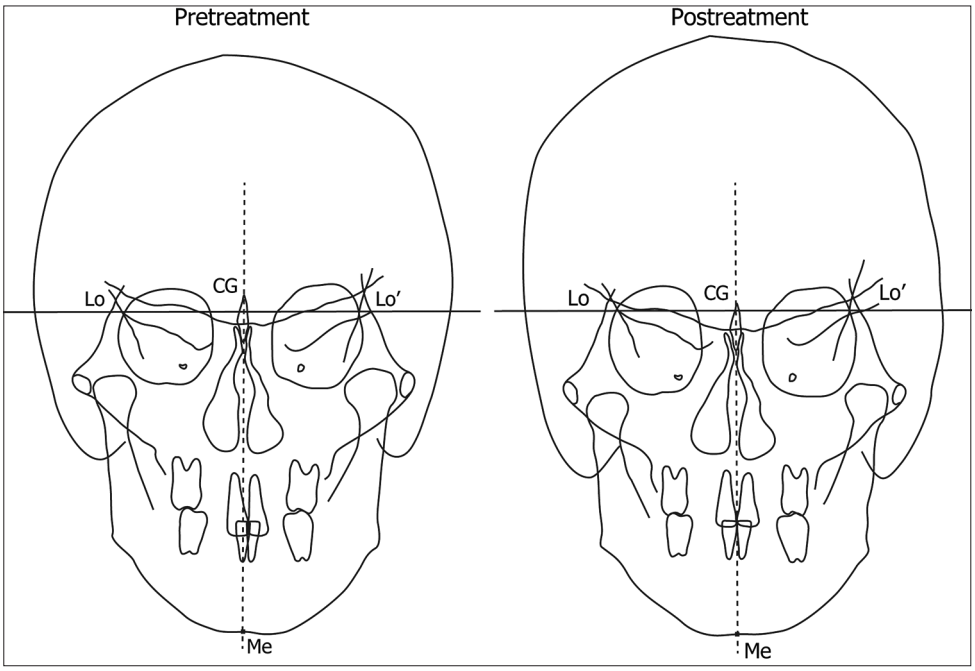


Figure 4: Tracing of pretreatment and post-treatment posteroanterior cephalometric radiographs. Abbreviations: (Lo) Right latero-orbitale. (Lo') Left latero-orbitale. (CG) Crista gali. (Me) Lowest point on the midline curve of the symphysis.

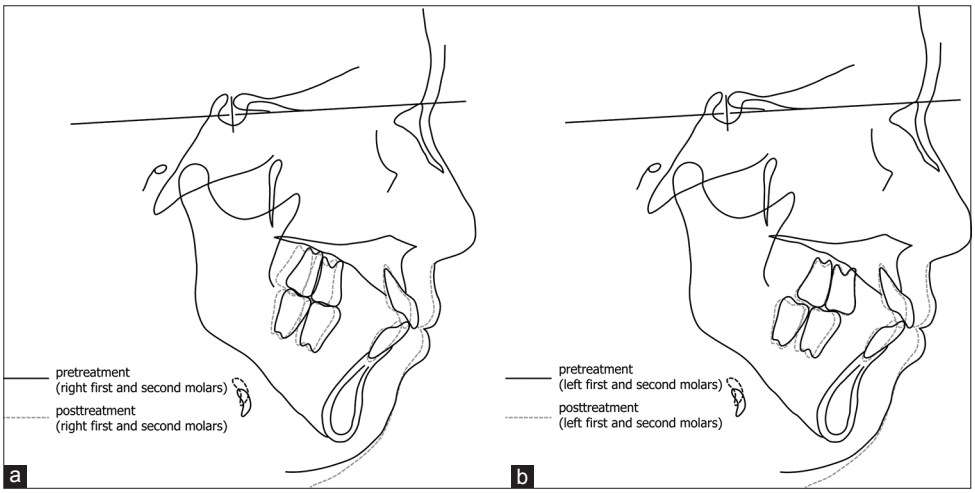


Figure 5: Superimposition of pretreatment and post-treatment lateral cephalometric radiographs. (a) Superimposition of right molars. (b) Superimposition of left molars.

Figure 6: Facial and intraoral photographs after 29 months of retention.

on the left side. The overjet was corrected, adequate overbite was maintained, the mandibular molars were uprighted, and the proper contact points were obtained.

Cephalometric superimposition showed molar distalization of both the maxilla and mandible [Figure 5a] except for the left maxillary molars [Figure 5b].

Twenty-nine months after completion of active treatment, occlusion remained good and stable [Figure 6].

DISCUSSION

Midline deviation can be isolated or can occur in combination with dental factors, skeletal asymmetry, or functional shifts of the mandible.[8] Asymmetrical midlines in nongrowing patients are commonly treated with premolar extractions.[9] However, our patient's previous orthodontic extraction made this case more complicated. The development of skeletal anchorage devices provides new treatment options, particularly in adults.[10] Previous reports have described the successful use of an SJ, which combines the benefits of skeletal anchorage with a simply designed, versatile distalizing appliance. Pithon[6] described correction of dental asymmetry with SJs. Lim *et al*.[7] reported a method for full-arch distalization with SJs. In our patient, the use of orthodontic miniscrews made it possible to deliver consistent low force levels with SJs for molar distalization without proclination of the incisors. Their use enabled the maxillary dental midline to be moved 2.5 mm to the right and prevented unwanted arch deformity.

CONCLUSION

In this case, midline correction and alignment were obtained with unilateral maxillary distalization and full-arch mandibular distalization without additional premolar extraction. SJs provided efficient unilateral or bilateral molar distalization mechanics in both arches and facilitated midline coordination without requiring patient's cooperation.

ACKNOWLEDGMENT

We thank Rebecca Tollefson, DVM, from Edanz Group (www.edanzediting.com/ac) for editing a draft of this manuscript.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patient understands that her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Nanda R, Margolis MJ. Treatment strategies for midline discrepancies. Semin Orthod 1996;2:84-9.
2. Altug H, Bengi AO, Akin E, Karacay S. Dentofacial effects of asymmetric headgear and cervical headgear with removable plate on unilateral molar distalization. Angle Orthod 2005;75:584-92.
3. Bondemark L. A comparative analysis of distal maxillary molar movement produced by a new lingual intra-arch NiTi coil appliance and a magnetic appliance. Eur J Orthod 2000;22:683-95.
4. Kircelli BH, Pekta ZO, Kircelli C. Maxillary molar distalization with a bone-anchored pendulum appliance. Angle Orthod 2006;76:650-9.
5. Arcuri C, Muzzi F, Santini F, Barlattani A, Giancotti A. Five years of experience using palatal mini-implants for orthodontic anchorage. J Oral Maxillofac Surg 2007;65:2492-7.
6. Pithon MM. Correction of dental asymmetry using miniscrew-supported sliding jigs. J Clin Orthod 2013;47:57-62.
7. Lim JK, Jeon HJ, Kim JH. Molar distalization with a miniscrew-anchored sliding jig. J Clin Orthod 2011;45:368-77.
8. Dahiya G, Masoud AI, Viana G, Obrez A, Kusnoto B, Evans CA. Effects of unilateral premolar extraction treatment on the dental arch forms of Class II subdivision malocclusions. Am J Orthod Dentofacial Orthop 2017;152:232-41.
9. Arnett GW, Bergman RT. Facial keys to orthodontic diagnosis and treatment planning-part II. Am J Orthod Dentofacial Orthop 1990;103:395-411.
10. Paik CH, Woo YJ, Boyd RL. Treatment of an adult patient with vertical maxillary excess using miniscrew fixation. J Clin Orthod 2003;37:423-8.

How to cite this article: Shimazaki K, Kanno Z, Ono T. Alternative approach using miniscrew-anchored sliding jig to correct maxillary midline deviation in a patient with unilateral missing premolar. APOS Trends Orthod 2019;9(2):111-6.