

Distalization with the Miniscrew-Supported EZ Slider Auxiliary

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Intraoral molar-distalization appliances that require little or no patient compliance—including the Pendulum, Distal Jet, and sliding jigs¹⁻³—have been developed as alternatives to headgear. To avoid the anchorage loss that often occurs with these devices, skeletal anchorage has increasingly been employed,⁴⁻⁶ leading to the introduction of new systems.

This article introduces the EZ Slider* sliding auxiliary for use with mini-implants in the distalization of posterior segments.

Appliance Design

EZ Sliders, made of medical-grade 304 stainless steel, are interchangeable auxiliaries for the delivery of distal or mesial forces in conjunction with buccally placed temporary anchorage devices (TADs) and closed-coil springs (Fig. 1A). With their secure “click-in-click-out” arms, they can easily be clipped to any archwires (Fig. 1B). Parallel force application prevents unwanted tooth movements such as rotations and tipping (Fig. 1C).

Left- and right-side variations come in three lengths. In normal posterior-distalization treatment, the long (30mm) Slider is used initially to apply force to the second molars, followed by the medium (20mm) Slider for the first molars and the short (12.5mm) Slider for the premolars and canines (Fig. 2). Any Slider can be shortened or lengthened by simple bending.

*Ortho Technology, Inc., Tampa, FL; www.orthotechnology.com.

tion of any tooth, a crimpable hook can be used as a stop if needed.

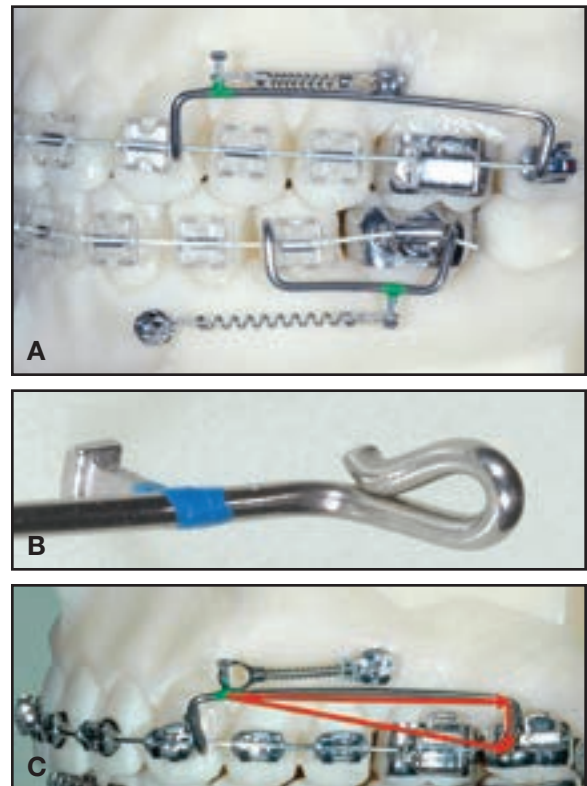


Fig. 1 A. EZ Sliders for retraction of upper left second molar and protraction of lower left first molar. **B.** “Click-in-click-out” arm. **C.** Horizontal force vector greater than vertical force vector, with power arm placed at same horizontal level as mini-implant.



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Fig. 2 Long (30mm), medium (20mm), and short (12.5mm) EZ Sliders.

Case 1

A 14-year-old female presented with the chief complaint of her dental appearance. Examination indicated a mild skeletal Class I malocclusion with Class II canine and molar relationships and congenitally missing upper lateral incisors (Fig. 3). Because of her poor lip profile and excessive nasolabial angle, we planned to open 6mm of space per side for future dental implants.

TADs were inserted bilaterally between the upper second premolars and first molars. After .018" edgewise brackets were bonded and an .016" nickel titanium archwire was placed, a 250g distalizing force was applied on each side with a nickel titanium closed-coil spring from the mini-implant to the power arm of a 30mm EZ Slider. Eight weeks later, 4.5mm spaces had opened bilaterally between the first and second molars (Fig. 4A), and the Sliders were replaced with 20mm EZ Sliders to distalize the first molars. Another six weeks later, the first molars had been moved 4mm distally, and the premolars had drifted distally with the help of the transseptal fibers (Fig. 4B). Distalization of the premolars and canines was completed in seven more weeks using 12.5mm EZ Sliders (Fig. 4C).

After five months of EZ Slider application, Class I molar and canine relationships had been established, and 7mm spaces had been created to accommodate dental implants distal to the central incisors (Fig. 4D). Up-and-down elastics were prescribed to stabilize the occlusal relationship, and the case was finished in another month (Fig. 5).



Fig. 3 Case 1. 14-year-old female patient with congenitally missing upper lateral incisors before treatment.

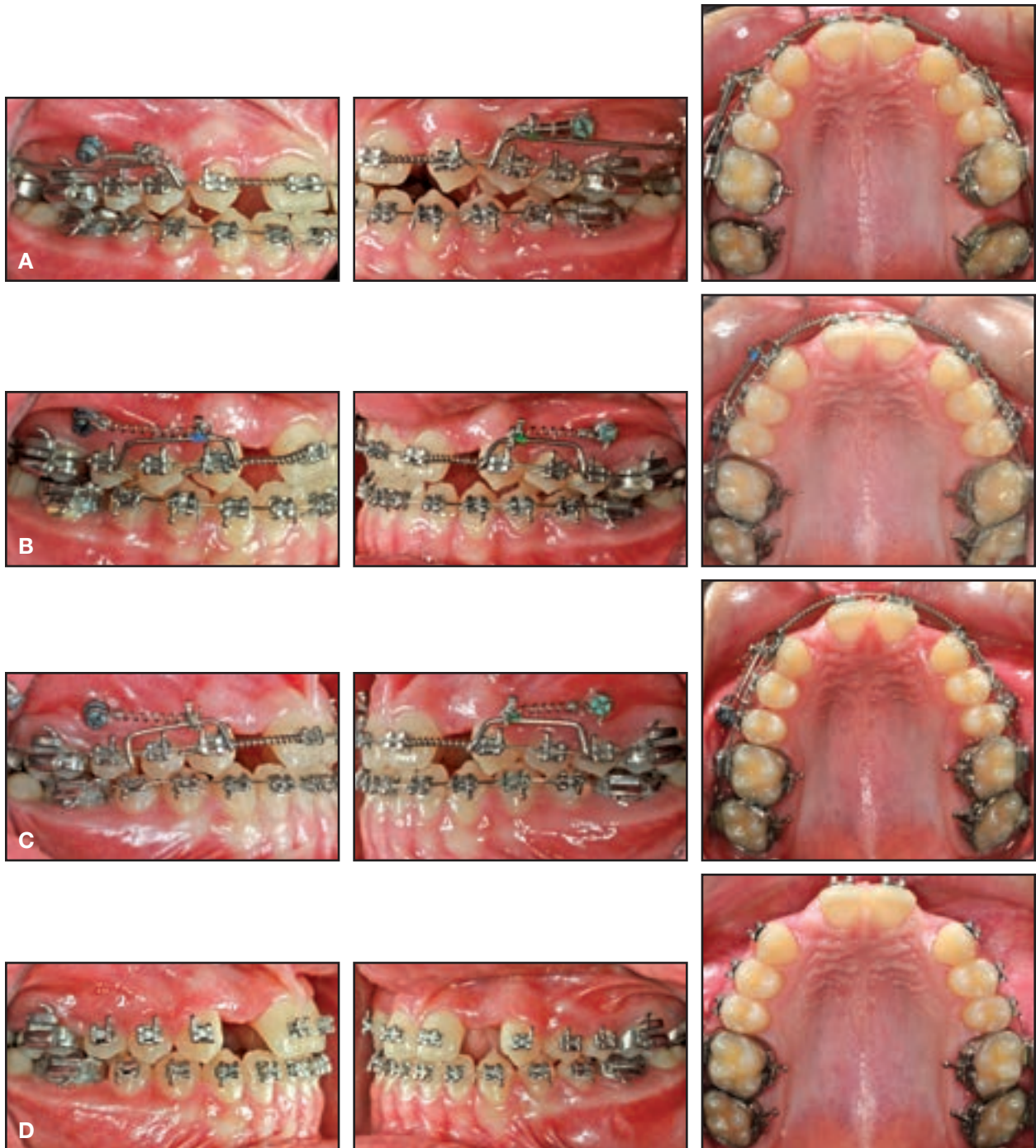


Fig. 4 Case 1. A. After eight weeks of second-molar distalization with closed-coil springs between mini-implants and 30mm EZ Sliders. B. After another six weeks of first-molar distalization with 20mm Sliders, 12.5mm Sliders placed for premolar distalization. C. After another seven weeks of distalization of first and second premolars and canines with 12.5mm Sliders. D. After five months of distalization with EZ Sliders.

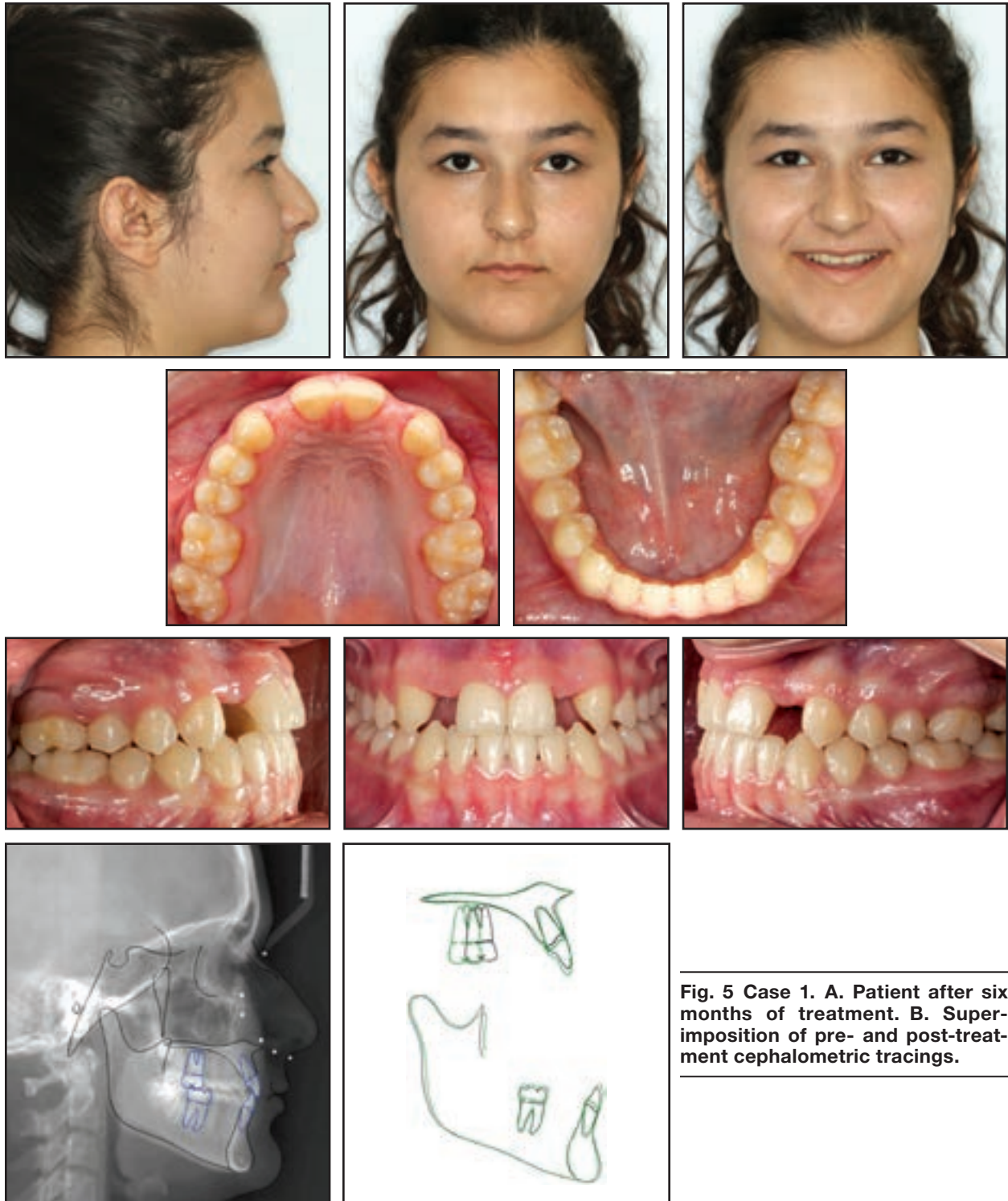


Fig. 5 Case 1. A. Patient after six months of treatment. B. Superimposition of pre- and post-treatment cephalometric tracings.

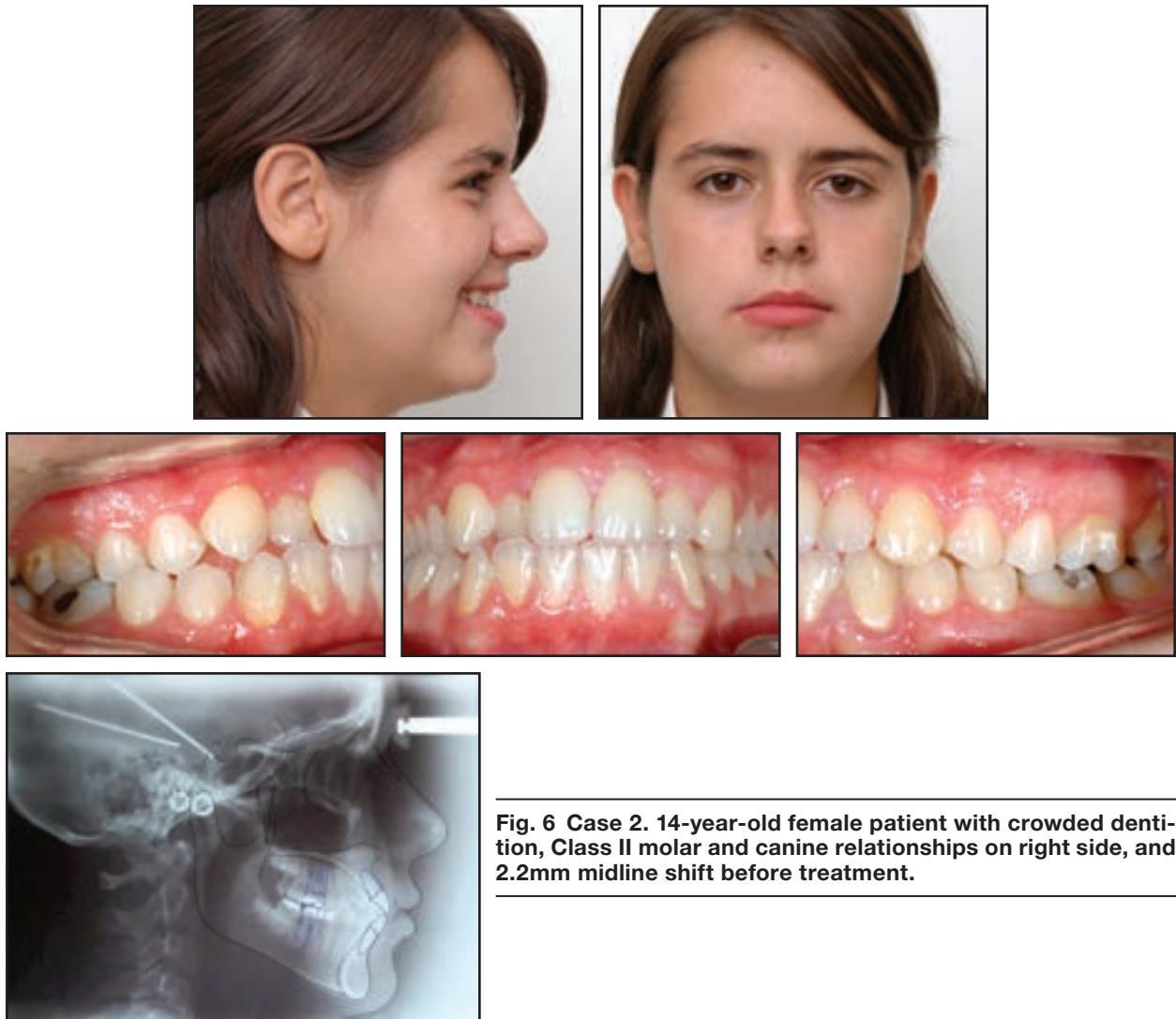


Fig. 6 Case 2. 14-year-old female patient with crowded dentition, Class II molar and canine relationships on right side, and 2.2mm midline shift before treatment.

Case 2

A 14-year-old female presented with the chief complaint of dental crowding. She had Class II molar and canine relationships on the right and Class I molar and canine relationships on the left; the midline was shifted 2.2mm to the left (Fig. 6). After leveling of both arches, distalization of the upper right posterior segment was planned to correct the midline discrepancy and Class II relationship (Fig. 7).

A mini-implant was inserted between the upper right second premolar and first molar. A 30mm EZ Slider was clipped onto the .016" × .022" nickel titanium archwire to distalize the upper right second molar with a 250g nickel titanium closed-coil spring. Six weeks later, 2.3mm of space had been opened between the first and second molars (Fig. 8A). After another six weeks with the 20mm Slider, the first molar had been distalized 2.4mm (Fig. 8B). The 12.5mm Slider was then used to distalize the first and second premolars; to

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Fig. 7 Case 2. Midline discrepancy remaining after three months of leveling.

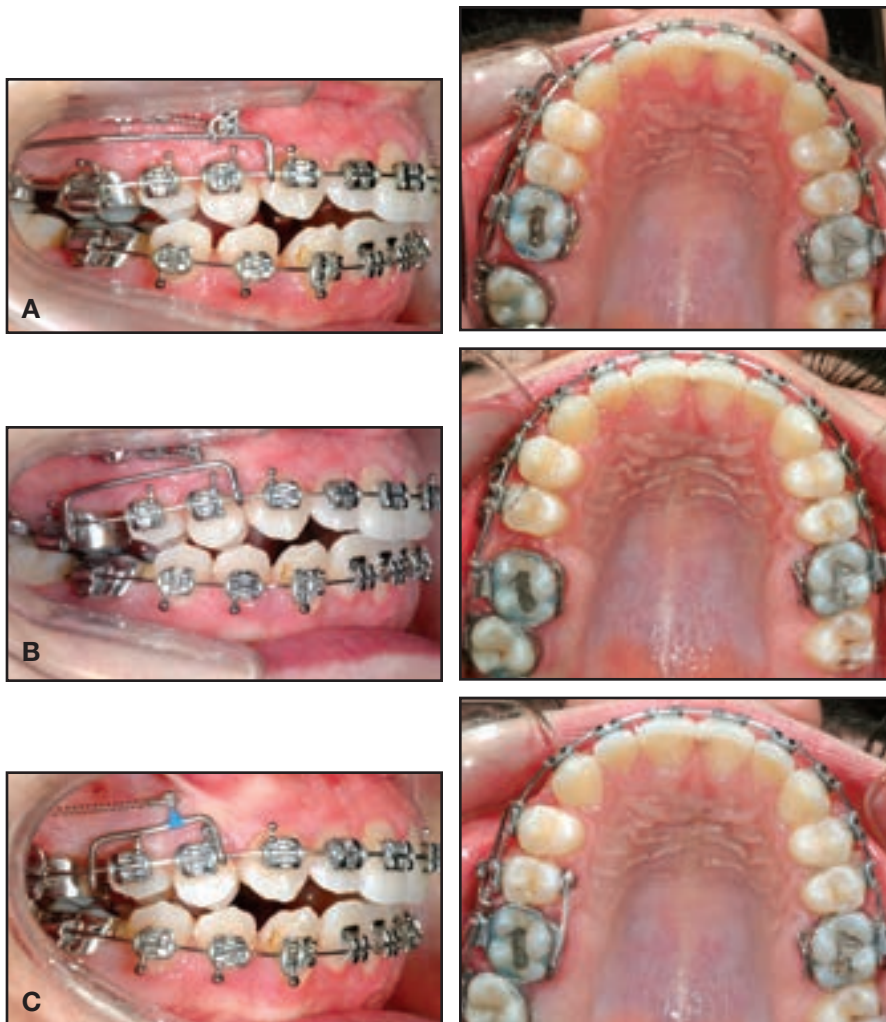


Fig. 8 Case 2. A. After six weeks, upper right second molar distalized 2.3mm using 30mm EZ Slider. B. After another six weeks, upper first molar distalized 2.4mm using 20mm Slider. C. Mini-implant re-located between first and second molars to prevent root contact during premolar distalization with 12.5mm Slider.



Fig. 9 Case 2. Slider with mesial hook (blue) replaced by Slider with distal hook (green) to prevent further bite opening; triangular up-and-down elastics worn to close lateral open bite.

avoid contact with the second-premolar root,⁶ the mini-implant was relocated between the first and second molars (Fig. 8C). To prevent further rotation of the anterior segment, the Slider with a mesial power hook was replaced by a Slider with a distal power hook, and triangular up-and-down elastics were used to close the lateral open bite (Fig. 9). The canine was subsequently distalized with the same 12.5mm Slider (Fig. 10A).

After seven months of EZ Slider treatment, the entire right posterior segment had been distalized, the midline corrected, and Class I molar and canine relationships established (Fig. 10B). Up-and-down elastics were worn for six weeks, and the case was finished after a total nine months of treatment (Fig. 11).

Discussion

When intraoral appliances are used for posterior distalization, anchorage loss prolongs treatment due to round-tripping⁷ and can lead to labial bone loss and gingival-height deficiencies in patients with proclined maxillary incisors.⁸ Distal tipping of the molars may require attachments such as uprighting springs to prevent early relapse.⁸ By comparison, though leveling of the anterior teeth will inevitably require some round-tripping of the incisors, the combination of a skeletally anchored EZ Slider with an .016" × .022" stainless steel archwire will allow the posterior teeth to upright spontaneously during distalization.



Fig. 10 Case 2. A. Upper right canine distalized with 12.5mm Slider. B. After seven months of distalization.

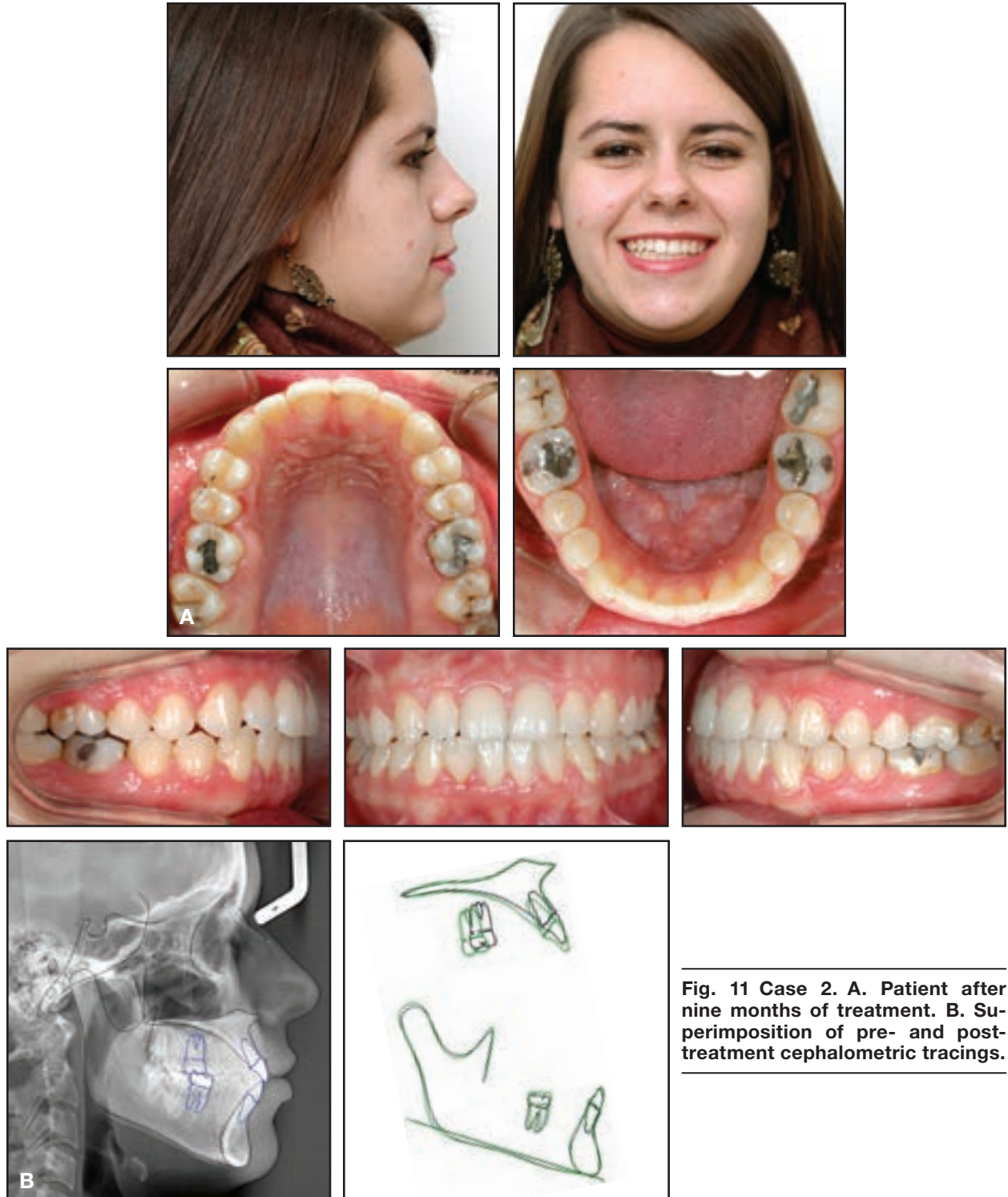


Fig. 11 Case 2. A. Patient after nine months of treatment. B. Superimposition of pre- and post-treatment cephalometric tracings.

With headgear and some intraoral-distalization appliances or even skeletally anchored mechanics, the second molars can limit distal movement of the first molars.⁸ The EZ Slider avoids this problem because only one tooth is distalized at a time. The third molars should always be considered, but were not an issue in our young patients because they had not yet erupted. To prevent root contact with the second premolar, a mini-implant between the second premolar and first molar should be replaced at the appropriate time with one between the first and second molars.

Since EZ Slider mechanics can cause molar extrusion and premolar or canine intrusion, the appliance should not be used in high-angle cases. When a retraction force from the mini-implant to the canine is supported by indirect anchorage, the occlusal plane will be canted due to the vertical force vector.⁷ To avoid this adverse effect, the vertical component of the distalization force must be minimized while the horizontal vector is maximized. Therefore, the point of application of the retraction force (the power arm) should be at the same horizontal level as the mini-implants (Fig. 1C). Coil springs are preferred over elastics because of their ability to exert continuous forces with stable skeletal anchorage.⁹

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