



CASE REPORT

Treatment of Class II, Division 2 Malocclusion with Miniscrew Supported En-Masse Retraction: Is Deepbite Really an Obstacle for Extraction Treatment?

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ABSTRACT

A 17-year-old female patient, whose chief complaint was her unpleasing smile, had skeletal and dental class II malocclusion, hypodivergent facial type with a severely increased overbite. Among the treatment options, upper-first-premolar extractions followed by miniscrew-supported en-masse retraction was the treatment of choice. After the initial levelling and alignment, miniscrews with 1.5- to 1.4-mm diameter and 7-mm length, were installed between the roots of the second premolars and the first molars, bilaterally. En-masse retraction was achieved on a 0.016x0.022-inch stainless steel archwire with 7-mm long power hooks placed distal to the lateral incisors, and with nickel-titanium (NiTi) closed coil springs exerting 250-gr of force per side. At the end of the treatment, deepbite, incisor inclinations and interincisal angle were corrected, and Class II molar relationship with good intercuspation was achieved. Upper 2-2, lower 3-3 retainers were bonded for retention. As a result, deepbite and Class II canine relationship was successfully corrected with simultaneous incisor intrusion and retraction using miniscrew-supported en-masse retraction.

Keywords: Orthodontic anchorage techniques, Class II malocclusion, division 2, orthodontic space closure

INTRODUCTION

It was the beginning of the new millennia when researchers presented solid evidence against the long-standing bias; that extraction therapy had major aesthetic drawbacks in patients with increased overbite and/or gingival exposure, as the incisors tend to extrude during retraction (1-3). Miniscrews were the secret ingredient in this new treatment recipe. In a clinical case report, Park and Kwon stated that maxillary anterior teeth showed bodily intrusion and retraction during miniscrew-supported en-masse retraction if an upward and backward force passing near the center of resistance was used (1). Therefore, extraction therapy was no more a contraindication for deepbite patients when planned with the appropriate adjunct treatment mechanics.

The aim of this case report is to present the treatment planning and progress of a young adult patient with a skeletal Class 2 malocclusion and a severe deepbite.

CASE PRESENTATION

A 17-year-old female patient complained of her unpleasing smile. Diagnostic records revealed that she had a mild skeletal Class 2 malocclusion, bimaxillary retrusion, and hypodivergent facial type. She also had Angle Class II malocclusion with retrusive upper and lower incisors, mildly increased overjet, and severely increased overbite due to both upper- and lower-incisor overeruptions (Figure 1, 2). The Curve of Spee in the lower arch was deepened as expected. Skeletal maturational indicators showed that she had completed her growth. According to the dental casts analysis, 5.5 mm upper and 4.4 mm lower dental arch discrepancies were present.

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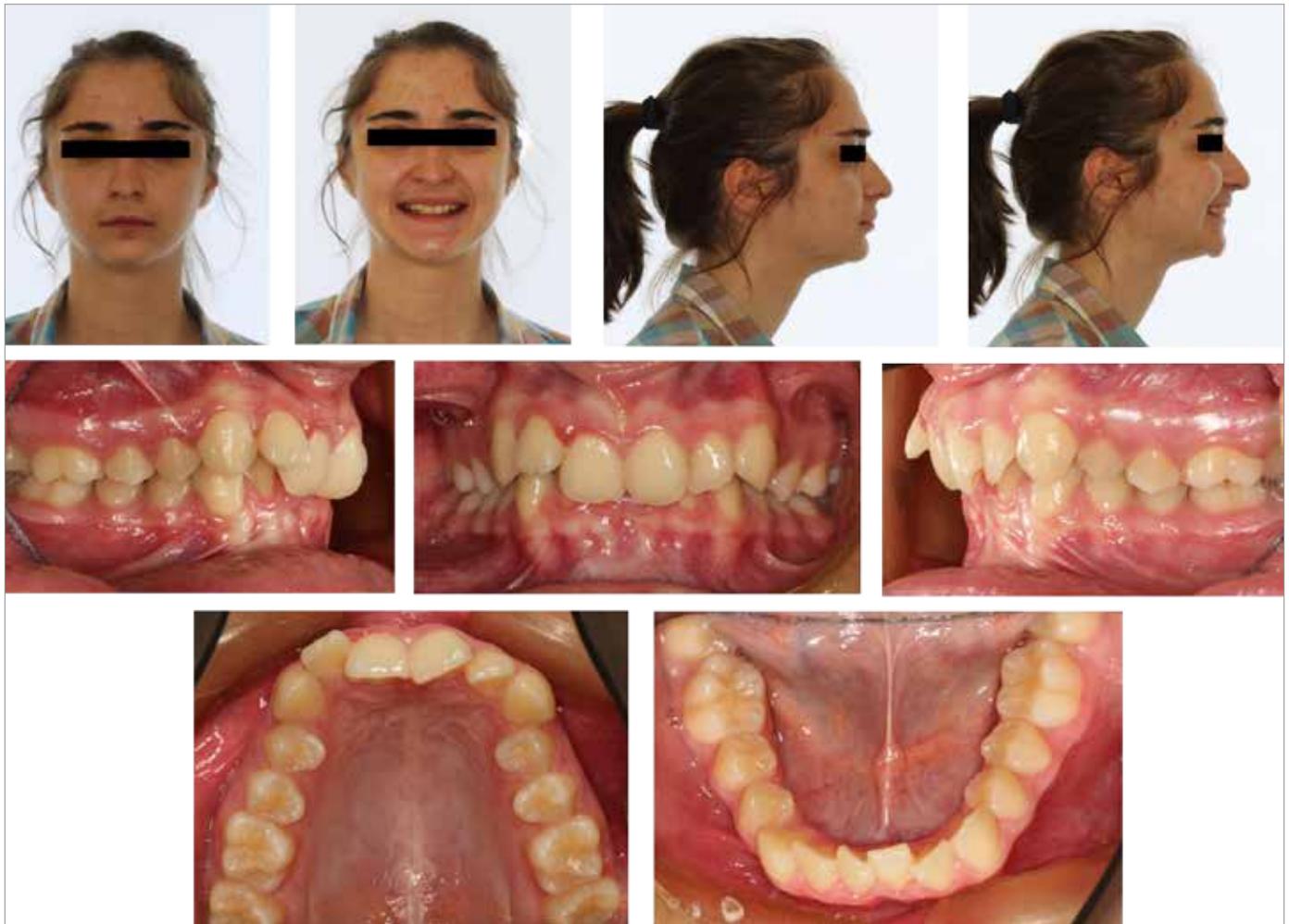


Figure 1. Pretreatment (T0) extraoral and intraoral photographs.

The following were the treatment options: mandibular advancement surgery, fixed functional appliance treatment with maxillary molar distalization, and upper-first-premolar extractions followed by miniscrew-supported en-masse retraction. The patient was reluctant to accept the first two treatment options, and she decided to proceed with extraction therapy followed by miniscrew-supported en-masse retraction.

After the extractions, 0.018x0.025-inch incisor and canine brackets, and 0.022x0.028-inch premolar brackets and molar tubes with MBT prescription (Victory™ Series, 3M Unitek, CA, USA) were bonded on the upper arch. Wider brackets and tubes were used at the posterior section, and the second molars were not bonded until the end of retraction to ease the sliding of the archwire through the slots. The incisor brackets were not bonded incisally to let them express their predetermined torque values.

After the maxillary dental arch was fully levelled and aligned, miniscrews 1.5- to 1.4-mm diameter and 7-mm length (AbsoAnchor, Dentos, Daegu, Korea), were installed between the roots of the second premolars and the first molars bilaterally, and 6-8 mm apically to the archwire level. En-masse retraction was achieved on a 0.016x0.022-inch stainless steel archwire with 7-mm-long power hooks (Ortho Organizers, CA, USA) placed distal to the

lateral incisors. From these power hooks, nickel-titanium (NiTi) closed coil springs (Ormco Corp, CA, USA) were attached to the miniscrews and adjusted to exert 250-gr of force per side (Figure 3). Retraction was ended when canines reached Class I relationship.

During en-masse retraction, molars moved distally and achieved a cusp-to-cusp relationship on the right side. At the end of the treatment, Class II molar relationship was preserved, and canines reached Class I canine relationship (Figure 4). Overbite and interincisal angles were overcorrected to provide retention of the deepbite. Supracrestal fiberotomies were performed around the formerly rotated teeth. Upper 2-2, lower 3-3 retainers were also bonded for retention (Figure 5, 6). The total treatment time was 29 months, without any significant root resorption.

DISCUSSION

Our aim in this case was to open the bite both with upper- and lower-incisor intrusions and still provide the patient with an aesthetic smile against her decreased lower facial height. We were aware that the treatment planning needed compromise, because the upper-incisor exposure was almost ideal at the beginning of the treatment and would worsen with intrusion. However, this

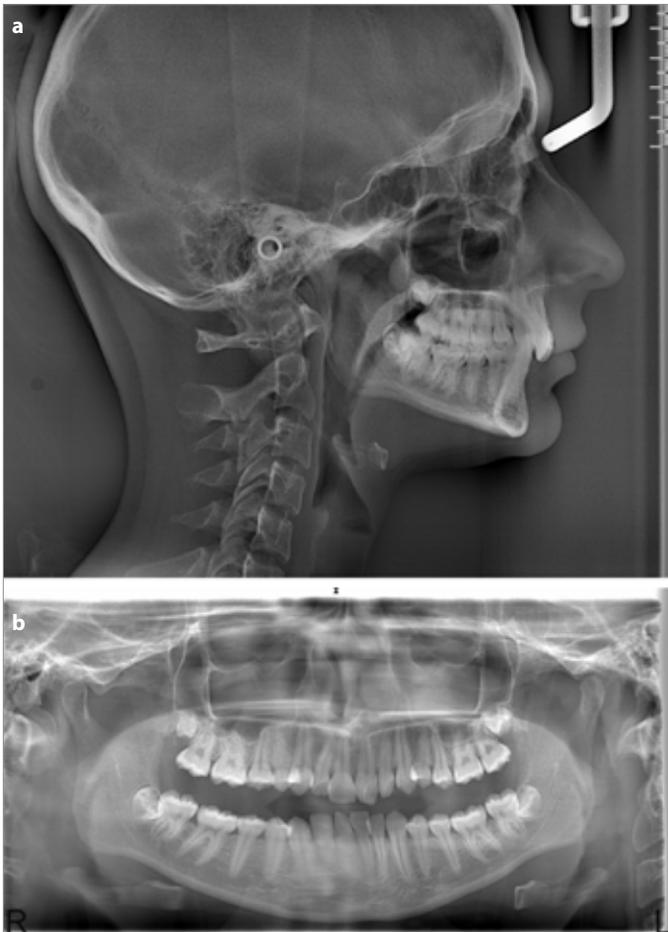


Figure 2. Pretreatment (T0) radiographic records; (a) lateral cephalometric radiograph, and (b) panoramic radiograph

was the best treatment approach we could offer the patient other than surgery, given the sagittal and vertical dimensions of the skeletal infrastructure.

Upper incisors intruded approximately 2.7 mm throughout the treatment period, 1 mm of which purely occurred during retraction, as a result of the vertical component of the retraction force. The effect of intrusion can also be confirmed with the upward movement of the root apices of the incisors (-1.5 mm) (Figure 7). Yet, the numerical value of the intrusion degree can be assumed to be much higher, because the incisors kept intruding, while the retraction process itself was forcing them to extrude.

When evaluated sagittally, the anterior teeth tipped palatally by 6°. The amount of incisal edge and apical root movement was 4.5 mm and 1.3 mm, respectively. The Ia/Io ratio (the amount of apical root movement over incisal edge movement) was found to be 0.29 (2). These data, altogether, indicate that en-masse retraction was primarily achieved by controlled tipping and partly by translation. This more parallel-like retraction pattern can be attributed to the level of force that is closer to the center of the resistance than conventional en-masse retraction.

The SNA angle decreased gradually during the treatment, whereas the SNB angle stayed almost the same, reducing the ANB angle. The A point moved 1.1 mm backwards as a result of 1.3 mm of apical root movement and 6° of palatal tipping (Figure 7). This movement of the A point can be explained as the result of alveolar remodeling that occurred together with the change in the axial inclinations of incisors, which is also shown in a prospective study conducted by Al-Nimri et al. (4) on cases presenting Class

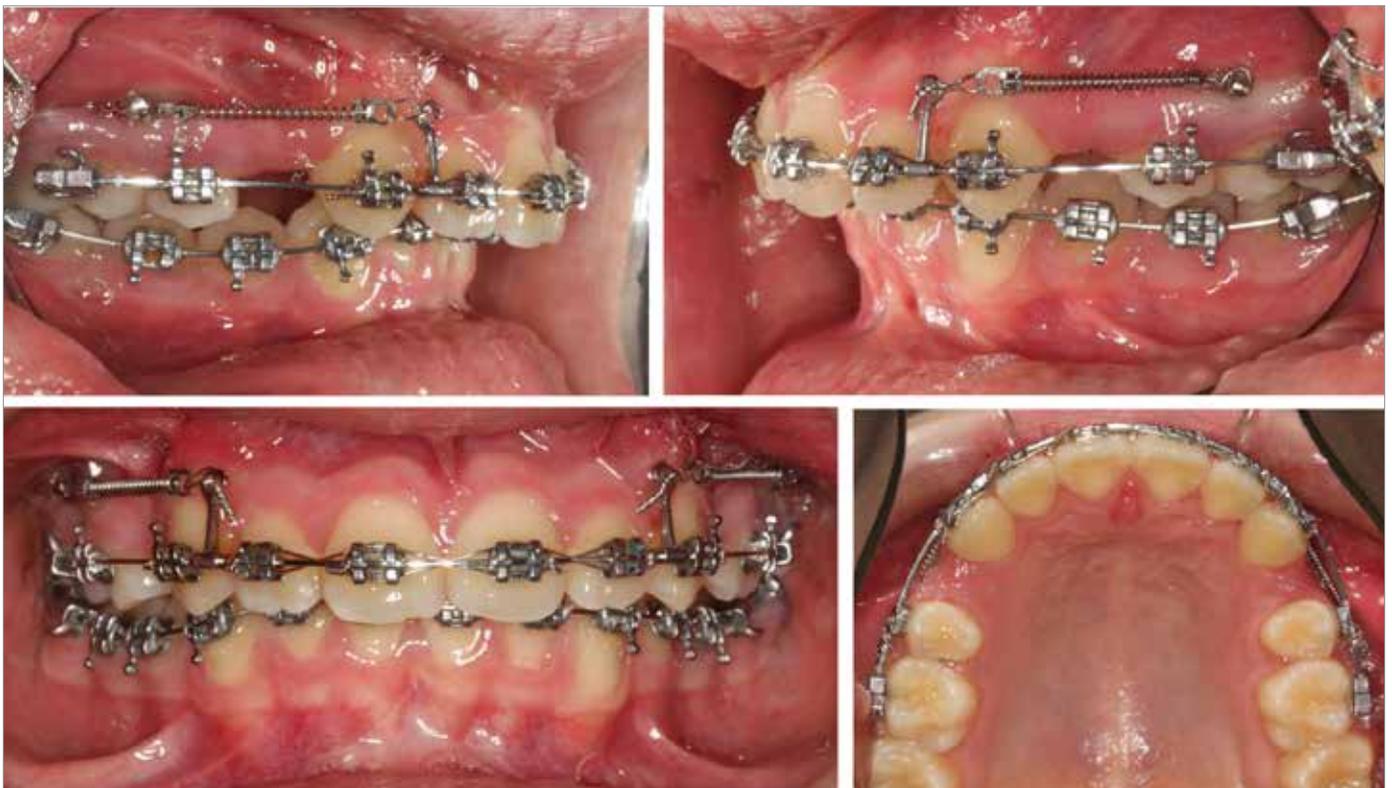


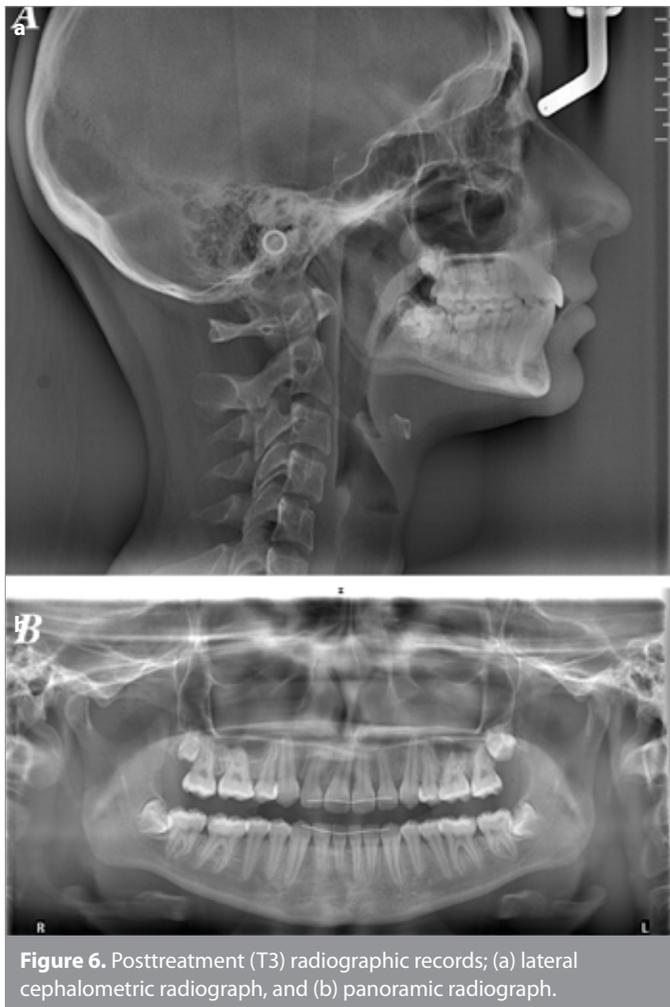
Figure 3. Miniscrew-supported en-masse retraction mechanic.



Figure 4. Extraoral and intraoral photographs at the end of retraction (T2)



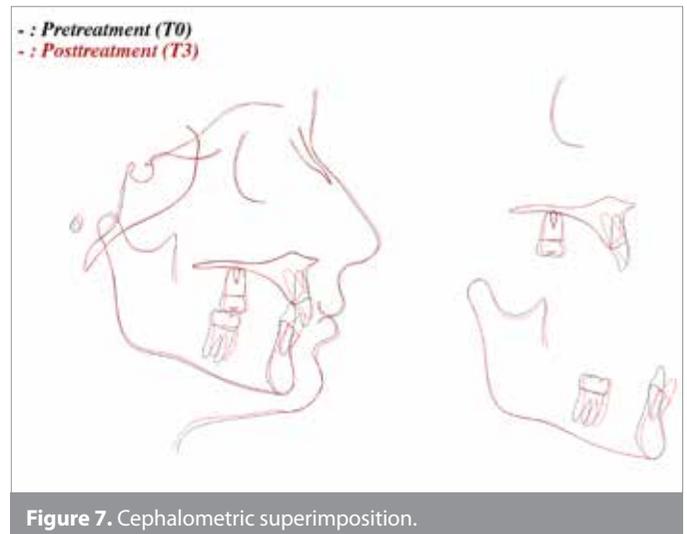
Figure 5. Posttreatment (T3) extraoral and intraoral photographs.



II, division 2 malocclusion. Although a reduction in the prominence of soft tissue A point was not desired in this particular patient, this type of tissue remodeling may especially be beneficial in bimaxillary protrusive or skeletal Class 2 cases with maxillary prognathia.

CONCLUSION

Miniscrews introduce versatility to the retraction mechanics by offering the opportunity of intruding the incisors, while retracting them in a more parallel fashion, without significant amount of root resorption or miniscrew loss.



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