

CASE REPORT

Compensatory Retreatment of an Adult Class II Deep-Bite Patient

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When an adult patient presents for retreatment of a moderate skeletal Class II malocclusion and deep bite, both dental and facial characteristics must be carefully evaluated and weighed along with the patient's chief complaint.^{1,2} Camouflage treatment to mask the skeletal problem may be a viable alternative for adult patients, particularly those who do not want to face the additional costs and risks involved with orthognathic surgery.³⁻⁵ A treatment plan involving dental compensations must be fully discussed with the patient and should only be offered when the orthodontist is positive that satisfactory esthetic and functional results will be achieved.

Although an excessive vertical dimension and transverse deficiency of the maxilla may be associated with the development of a skeletal Class II, Hunter observed that the dysplasia in these patients occurs most often in the sagittal plane.⁶ When a full-step Class II without crowding is treat-

ed with the extraction of two upper premolars, the six upper anterior teeth must be retracted to fully occupy the premolar extraction spaces; thus, the canines will finish in a Class I relationship, while the molars remain in Class II.⁷ Anchorage control is a key to success. The introduction of titanium mini-implants has significantly improved the orthodontist's ability to achieve maximum anchorage for anterior retraction with minimal patient cooperation.^{8,9}

This report describes compensatory orthodontic retreatment of an adult patient with a Class II, division 1 malocclusion and deep bite, using mini-implants for anchorage control after the extraction of both upper first premolars.

Diagnosis and Treatment Plan

A 25-year-old female sought orthodontic retreatment because she was dissatisfied with the results of the treatment performed

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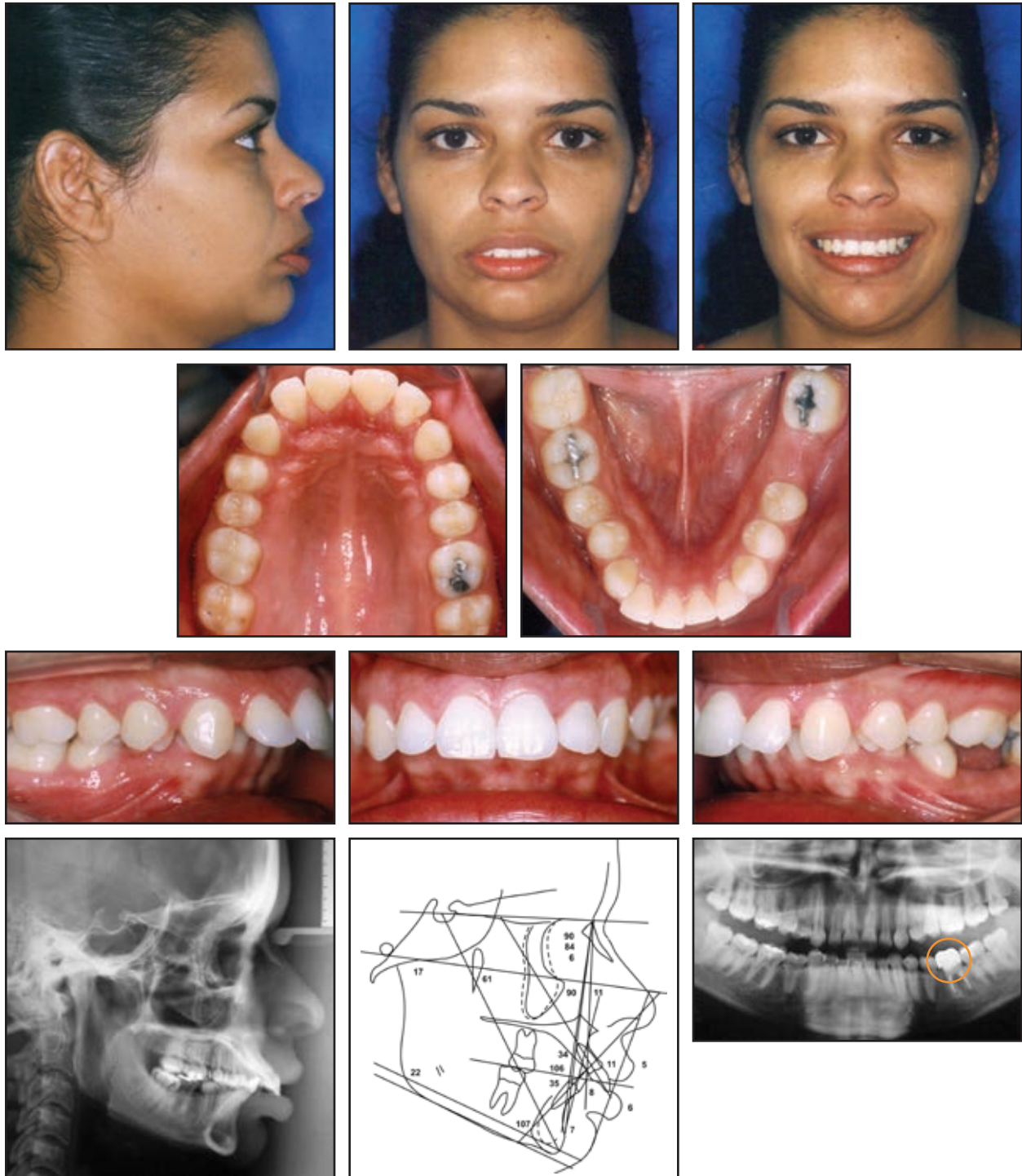


Fig. 1 25-year-old female patient with Class II, division 1 malocclusion and deep bite before treatment (circle on panoramic radiograph indicates first molar extracted due to lesion in furcation).



Fig. 2 Full-coverage maxillary splint and initial mandibular standard edgewise appliances.

when she was a teenager, especially her overbite. She also complained about gingival pain during mastication.

The clinical examination showed a symmetrical face, convex profile, incompetent lip seal at rest, and excessive maxillary incisor display upon smiling (Fig. 1). The patient had a Class II, division 1 malocclusion accompanied by severe overjet (8mm) and overbite (100%), with the incisal edges of the lower incisors contacting the incisive papilla in centric occlusion. She also displayed a buccal crossbite of the upper first premolars.

The panoramic radiograph indicated adequate levels of alveolar bone and the presence of all teeth, including the third molars. (Because the lower left first molar had a lesion in the region of the furcation, it was extracted before the initial photographs were taken.) Cephalometric analysis confirmed the Class II malocclusion (ANB = 6°, Wits appraisal = +5mm), as well as

brachyfacial characteristics (SN-GoGn = 22° and FMA = 17°). Functional analysis showed that centric relation was coincident with centric occlusion; there were no signs of TMD.

Treatment goals were to establish a Class I canine relationship and achieve ideal overjet and overbite, with a mutually protected functional occlusion. The ideal treatment plan presented to the patient involved orthognathic surgery to advance the mandible. Because she had no complaints about her facial appearance and did not wish to assume the costs and risks involved with the surgical-orthodontic option, however, she elected to undergo compensatory orthodontic treatment. This plan involved leveling the curve of Spee and correcting the overjet after the extraction of both upper first premolars. Titanium mini-implants would be inserted between the upper second premolars and first molars to provide anchorage for maximum retraction of the anterior teeth. The space resulting from extraction of the lower left first molar would be maintained for an implant-supported restoration.

Treatment Progress

A maxillary alginate impression was obtained for fabrication of a removable full-coverage maxillary splint to open the bite and allow bonding of the mandibular fixed appliances (Fig. 2). The splint was adjusted with the patient in centric relation, following Dawson's bilateral manipulation technique to ensure simultaneous bilateral contacts of similar intensity in centric occlusion.⁷

Mandibular .022" × .028" standard edgewise appliances* were bonded from second molar to second molar for leveling and alignment, with archwires progressing up to .020" stainless steel.* The maxillary splint was adjusted at each monthly appointment to eliminate potential interferences created by the changes in tooth positions. Six months into treatment, the patient was able to occlude without contacting the lower brackets, and the splint was discontinued.

At this point, .022" × .028" standard edgewise appliances were bonded in the maxillary arch, taking care to allow enough

*Morelli Ortodontia, Sorocaba, São Paulo, Brazil; www.morelli.com.br.



Fig. 3 Maxillary canine retraction with miniscrew anchorage.



Fig. 4 Closing-loop archwire used for maxillary incisor retraction.

space between the first-molar and second-premolar roots for miniscrew insertion. Leveling and alignment progressed to an .018" × .025" stainless steel rectangular archwire with rounded edges.**

After nine months of treatment, the miniscrews*** were inserted, and the patient was referred for extraction of the first premolars. One week after the extractions, 100g nickel titanium closed-coil springs† were attached between the miniscrews and a crimpable hook positioned mesial to the canine brackets to move these teeth independently (Fig. 3). Four weeks later, once the upper canines were in a Class I relationship, an .019" × .025" closing-loop archwire with Bull

loops distal to the lateral incisors was placed for incisor retraction (Fig. 4).

Sixteen months into treatment, the upper-incisor retraction had been completed, and a panoramic radiograph was obtained to check for root parallelism. An .019" × .025" stainless steel ideal archwire was bent to finish detailing of the occlusion. Six months before appliance removal, the patient was referred to a periodontist and a prosthodontist for an implant-supported restoration of the lower left first molar.

After a total 36 months of treatment, all brackets were debonded. A lower fixed 3-3 retainer wire (.028" stainless steel) was placed, and an upper wrap-

around retainer was delivered to be worn full-time for the first year and 12 hours per day for the following year.

Treatment Results

Post-treatment records confirmed that the main treatment goals were achieved (Fig. 5A). A significant improvement was seen in facial esthetics due both to the reduced labial protrusion and to a better labiomental sulcus angle

**TP Orthodontics, Inc., La Porte, IN; www.tportho.com.

***Sin, São Paulo, Brazil; www.sinimplante.com.br.

†Dentsply GAC, Islandia, NY; www.dentsply.com.



Fig. 5 A. Patient after 36 months of treatment. B. Superimposition of pre- and post-treatment cephalometric tracings.

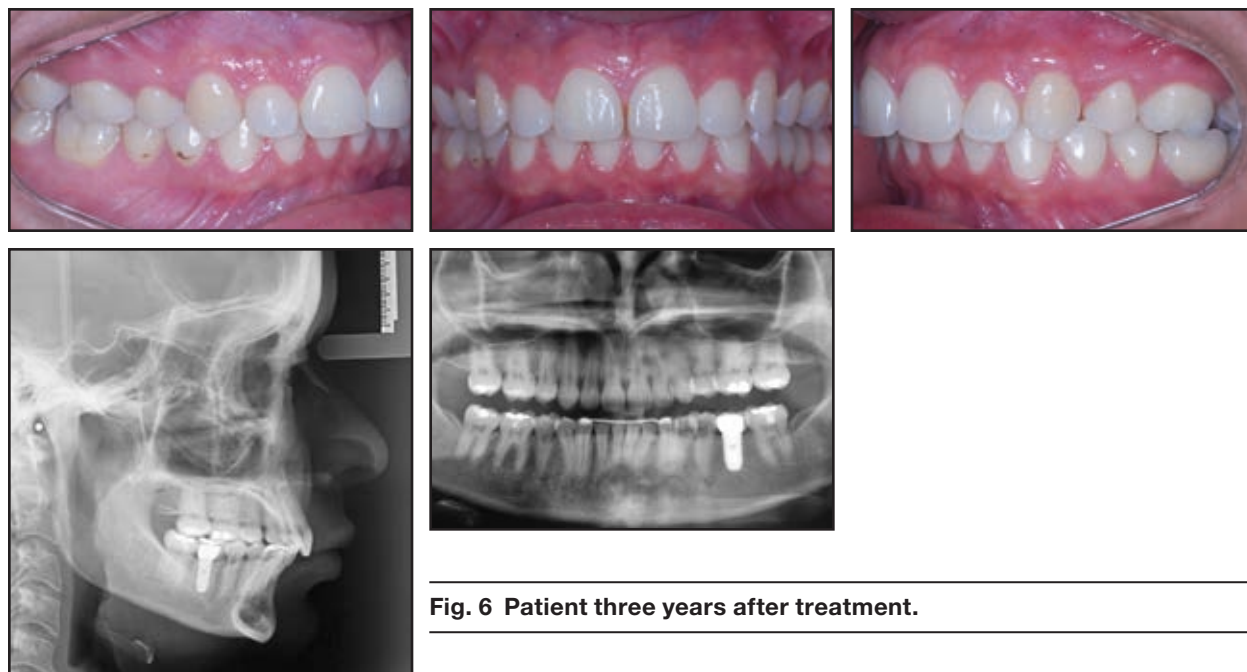


Fig. 6 Patient three years after treatment.

with proper lip seal at rest. The smile contour remained pleasant because the inclination of the upper incisors had been controlled during their retraction. In the final occlusion, the Class II molar relationship had been maintained while the canines were moved into a Class I relationship. Periapical radiographs showed no significant root resorption of either the upper or lower incisors, despite the extensive upper-incisor retraction.

Cephalometric superimpositions showed that the SNA angle remained unchanged, even with the incisor retraction (Fig. 5B). There was a small counterclockwise mandibular rotation, as demonstrated by a reduction in the vertical dimension.

The patient was highly co-

operative and wore her upper retainers as recommended. Treatment results remained stable three years after debonding (Fig. 6).

Discussion

Before deciding whether to perform compensatory orthodontic treatment, the clinician should conduct a detailed facial analysis.¹⁰ The comprehensive analysis developed by Arnett and colleagues, used for both orthodontic and surgical planning, includes 19 main facial traits in the frontal and profile views.^{11,12} The patient is examined in natural head position, with the condyles positioned in the articular fossae (centric relation) and the lips relaxed. Despite our patient's visible mandibular deficiency, as verified by the

profile analysis, we agreed to proceed with compensatory treatment because the quantity of mental bone defining the contour of the chin-neck line significantly improved her prognosis.

Another aspect of the treatment plan discussed with the patient was the full-time wear of a splint to open the bite until the mandibular curve of Spee had been corrected. Many devices have been developed to prevent contact of the upper teeth with lower brackets in patients with deep overbite, including fixed mandibular activators, fixed or removable anterior biteplanes, and lingual appliances incorporating the biteplane in the brackets.^{13,14} In our patient, the objective of constructing a splint with simultaneous bilateral contacts

was to provide greater comfort during mastication.

Considering possible protocols for treating a skeletal Class II malocclusion, Janson and colleagues verified that the extraction of two upper premolars provides better control of the vertical dimension compared to nonextraction treatment or the extraction of four premolars, because it does not require distalization of the upper molars and allows correction of the anteroposterior discrepancy between the arches.¹⁵ In such treatment, the upper anterior segment must be distalized by the width of a premolar (7mm), so that the canines move into a Class I relationship while the molars remain in Class II. To avoid any loss of maxillary posterior anchorage in the case shown here, we elected to use mini-implants as direct support for the anterior retraction. This kind of skeletal anchorage has been increasingly used in recent years for cases where insufficient dental anchorage is available, or simply to make treatment less complex and

more predictable for the orthodontist without requiring special cooperation from the patient.^{8,9,16}

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