

# CASE REPORT

## Correction of Asymmetry with a Mandibular Propulsion Appliance

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This article describes the correction of dental and skeletal asymmetry<sup>1-4</sup> with the use of a unilateral fixed mandibular propulsion appliance.

### Diagnosis and Treatment Plan

A 12-year-old female was referred for orthodontic treatment with the chief complaint of poor facial and dental esthetics. Clinical examination revealed mandibular asymmetry, lip incompetence, and a slightly convex profile with mandibular retrusion (Fig. 1). The patient had a Class II subdivision left malocclusion, with an overjet of 7mm and a lower midline deviation of 3mm to the left.

The lateral cephalometric tracing showed a good antero-posterior skeletal relationship with a slightly vertical growth pattern. The incisors were properly inclined, but the bite was open. The panoramic radiograph revealed proportional condylar structures and the presence of all permanent teeth except the third molars. The patient related a history of facial trauma and asymmetrical mandibular growth.

Treatment goals were to correct the patient's skeletal and dental relationships and improve the soft-tissue balance. The antero-posterior and alignment problems, including the lower midline deviation and asymmetrical mandibular growth, were addressed by

using a mandibular propulsion appliance on the left side.

### Treatment Progress and Results

Full fixed .022" appliances\* were placed to level and align both arches. After one year, the open bite had improved, but the unilateral Class II malocclusion persisted (Fig. 2). Although the panoramic radiograph demonstrated integrity of the roots and periodontal structures, a frontal cephalometric tracing continued to show dental and skeletal mandibular asymmetry.

To reinforce anchorage, .019" × .025" stainless steel archwires were inserted. A mandibular propulsion appliance, the Twin Force Bite Corrector\*\* (TFBC), was placed on the left side to correct the lower dental midline deviation and improve the mandibular asymmetry (Fig. 3).

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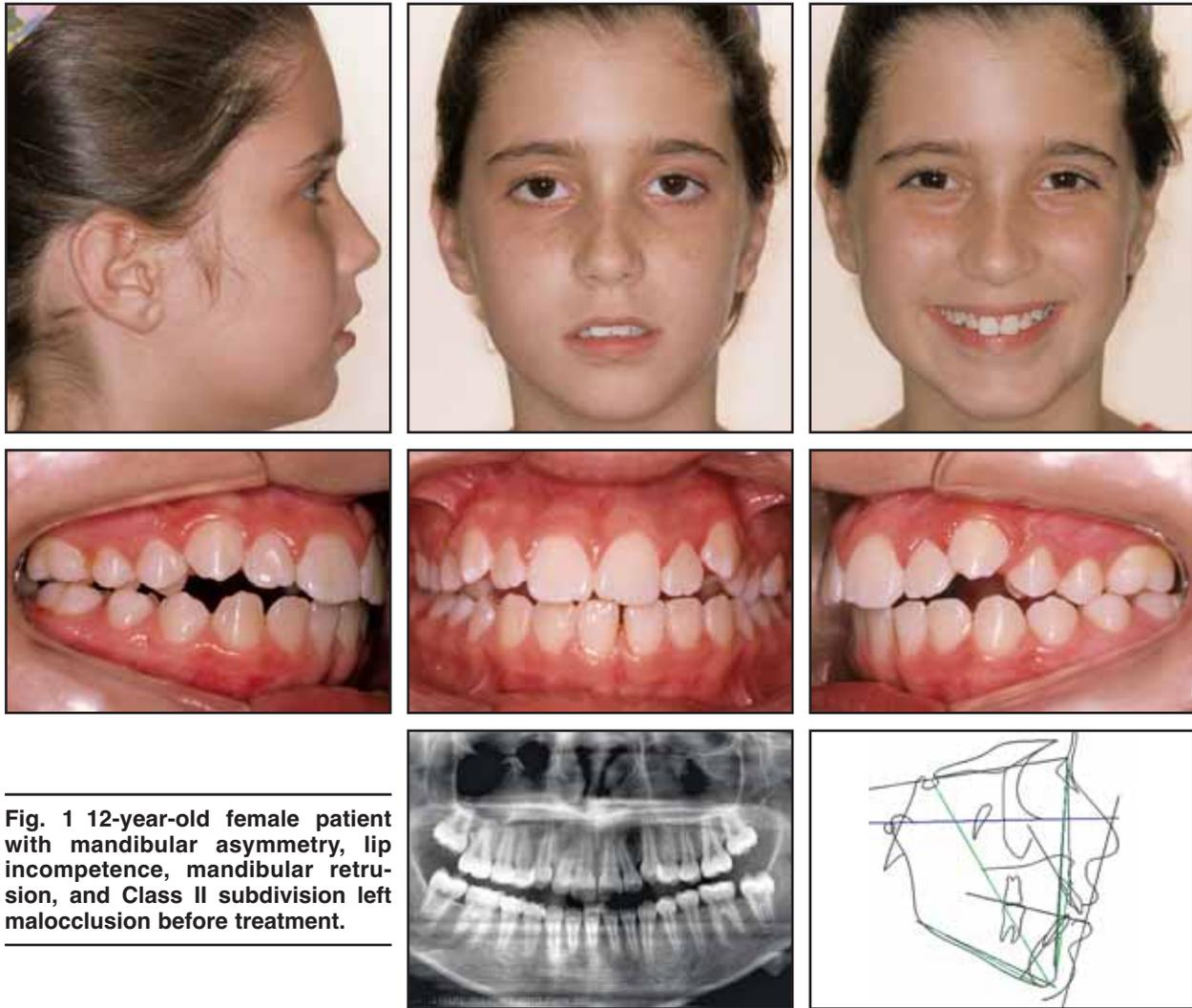
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**Fig. 1** 12-year-old female patient with mandibular asymmetry, lip incompetence, mandibular retrusion, and Class II subdivision left malocclusion before treatment.

The TFBC is a fixed intermaxillary propulsion appliance that exerts a force of approximately 200g through nickel titanium coil springs. It controls the vertical dimension better than Class II elastics, which tend to extrude the lower molars. As shown in this patient, it can be used to correct a unilateral skeletal asymmetry, although some dental compensation can occur.

Because it is worn full-time, it does not depend on patient cooperation.<sup>1</sup>

After eight months, the TFBC was removed, and lighter .016" stainless steel archwires were inserted, along with vertical elastics (Fig. 4).

After 30 months of treatment, skeletal and dental Class I relationships had been attained, and the fixed appliances were

removed (Fig. 5A). The patient's facial profile was slightly concave because of the soft-tissue modifications and the mandibular advancement. The lower incisors were slightly proclined, while the upper incisors were upright.

Cephalometric superimpositions showed that mandibular and maxillary growth had occurred during orthodontic treatment (Fig. 5B, Table 1). Signif-

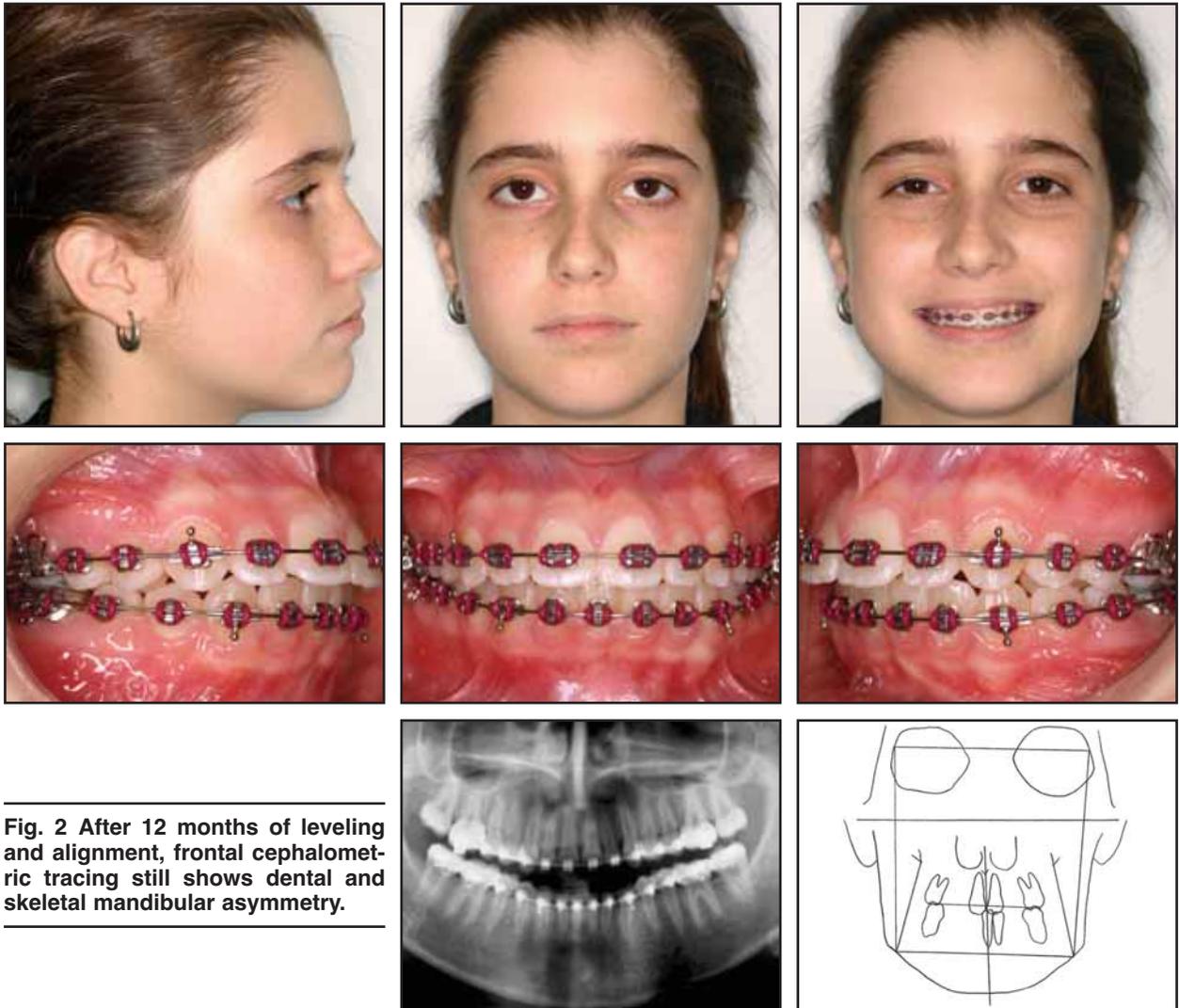


Fig. 2 After 12 months of leveling and alignment, frontal cephalometric tracing still shows dental and skeletal mandibular asymmetry.



Fig. 3 Twin Force Bite Corrector (TFBC) inserted on left side to correct lower midline deviation and reduce facial asymmetry.



Fig. 4 Vertical elastics placed after eight months of treatment with TFBC.

TABLE 1  
CEPHALOMETRIC DATA

	Norm	Pre-treatment	Post-Treatment
SNA	82°	82.2°	81.9°
SNB	80°	77.6°	78.6°
ANB	2°	4.7°	3.3°
FMA	25°	29.6°	32.2°
SN-GoGn	32°	34.5°	30.3°
1/NA	22°	29.8°	25.6°
1-NA	4.0mm	5.0mm	3.9mm
1/NB	25°	33.0°	35.6°
1-NB	4.0mm	5.2mm	6.4mm
1/1	131°	112.6°	115.5°
IMPA	93°	98.1°	103.8°

icant improvement was observed in the patient’s dental esthetics, including correction of the mid-line deviation, achievement of ideal overbite and overjet, and reduction of the mandibular asymmetry.

**Discussion**

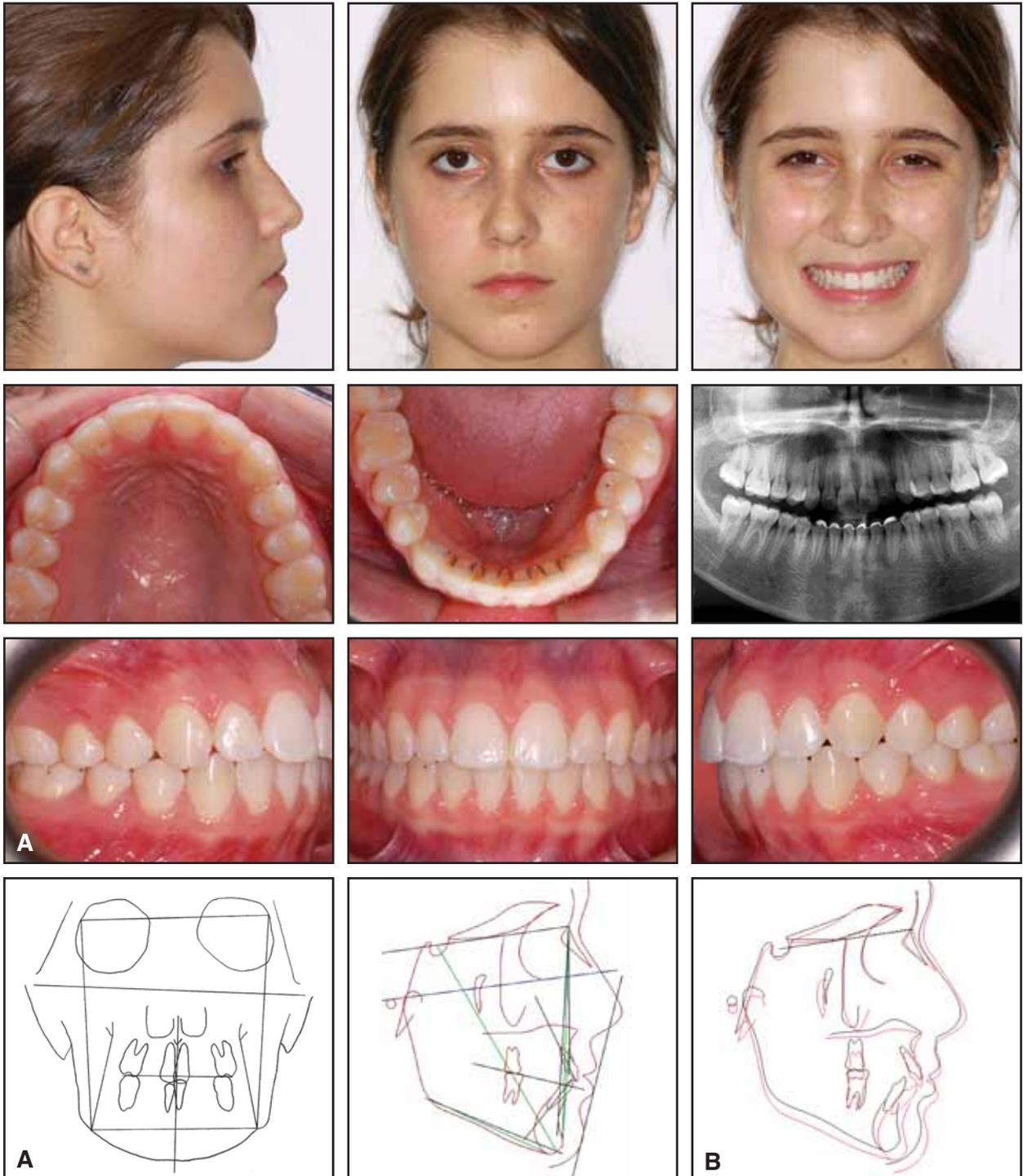
The efficacy of using fixed appliances to permanently advance the mandible has been confirmed in several studies.<sup>5-9</sup> The TFBC was first investigated by Campbell in a longitudinal study involving 20 patients between 10 and 16 years of age.<sup>10</sup> Use of the TFBC for three months, followed by Class II elastics, was found to

be effective in the correction of a half-unit or full Class II dental relationship. Molar correction was achieved through both skeletal (36%) and dentoalveolar (64%) changes. The TFBC produced favorable vertical changes, such as intrusion of the upper molars and the lower anterior region and extrusion of the lower posterior teeth.<sup>1</sup>

The side effects of the TFBC are those found in all unilateral Class II mechanics: transverse asymmetry, protrusion of the lower incisors, and retroclination of the upper incisors. These effects can be reduced with the use of palatal and lingual bars.

**REFERENCES**

1. Nanda, R.S.; Dandajena, T.S.; and Nanda, R.: Biomechanics strategies for non-extraction treatment of Class II malocclusion, in *Biomechanics and Esthetic Strategies in Clinical Orthodontics*, ed. R. Nanda, W.B. Saunders Co., Philadelphia, 2005, pp.188-189.
2. Proffit, W.R. and Turvey, T.A.: Dentofacial asymmetry, in *Contemporary Treatment of Dentofacial Deformity*, ed. W.R. Proffit, R.P. White Jr., and D.M. Sarver, Mosby, St. Louis, 2003, pp. 609-615.
3. Proffit, W.R.: Etiology of orthodontic problems, in *Contemporary Orthodontics*, 3rd ed., ed. W.R. Proffit and H.W. Fields Jr., Mosby, St. Louis, 2000, pp. 107-109.
4. Severt, T.R. and Proffit, W.R.: The prevalence of facial asymmetry in the dentofacial deformities population at the University of North Carolina, *Int. J. Adult Orthod. Orthog. Surg.* 12:171-176, 1997.
5. Stöckli, P.W. and Willert, H.G.: Tissue reactions in the temporomandibular joint resulting from anterior displacement of the mandible in the monkey, *Am. J. Orthod.* 60:142-155, 1971.
6. McNamara, J.A. Jr. and Carlson, D.S.: Quantitative analysis of temporomandibular joint adaptations to protrusive function, *Am. J. Orthod.* 76:593-611, 1979.
7. Pancherz, H.: Treatment of Class II malocclusions by jumping the bite with the Herbst appliance: A cephalometric investigation, *Am. J. Orthod.* 76:423-442, 1979.
8. Rothenberg, J.; Campbell, E.S.; and Nanda, R.: Class II correction with the Twin Force Bite Corrector, *J. Clin. Orthod.* 38:232-240, 2004.
9. White, L.W.: Current Herbst appliance therapy, *J. Clin. Orthod.* 28:296-309, 1994.
10. Campbell, E.: A prospective clinical analysis of a push-type fixed intermaxillary Class II correction appliance, thesis, University of Connecticut, Farmington, 2003



**Fig. 5 A.** Post-treatment records showing reduction of mandibular asymmetry. **B.** Superimposition of pre- and post-treatment cephalometric tracings.