

Bonded Acrylic Lingual Biteplanes

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Since the early 1980s, when Kurz and the Ormco Lingual Task Force described the use of lingual brackets with built-in biteplanes to open the bite,¹ I have been using this same principle in a labial edgewise practice. Acrylic extensions are bonded to the lingual surfaces of the maxillary incisors, producing an intrusive effect or growth restraint on the incisors while allowing the extrusion of the posterior teeth.

I originally called these "lingual bite steps" (because of their stairstep form) to distinguish them from removable biteplanes.² Similar systems have been described in recent years as bonded biteplanes³ or "bite turbos".⁴

Fabrication

I prefer conventional self-curing acrylic resins (Marche or Simplex Rapid) because of their low cost and ease of handling. The runny consistency of these fast-setting acrylics allows better penetration of the microscopic irregularities in the etched enamel, thus improving bond strength.⁵

Mix 10 parts liquid to 1 part powder in a Dappen dish or glass salt dish that has been refrigerated to allow longer working time. To ensure complete polymerization and avoid volatility of the monomer, do not allow the mixture to sit for more than 45 seconds before applying it to the enamel.

Etch the lingual surfaces of the maxillary incisors for 20 seconds. Paint on the resin with the spoon end of a Le Cron spatula. The initial coating will be fluid, like a primer, but as the acrylic mixture hardens in the dish, succeeding coats will become thicker.

Add one coat after another until a stalactite-like formation takes shape (Fig. 1B). Extend the biteplanes far enough back to make contact with the mandibular incisors (Fig. 1C).

While the acrylic is still curing, check the bite opening by having the patient occlude with the mandibular incisors. Hold the flat end of the spatula between the posterior teeth to prevent distortion of the acrylic.

After curing, use articulating paper to check the bite in centric occlusion and in lateral and forward excursions. Finish the biteplanes by adding more acrylic if necessary, or by grinding with a bur in a high-speed handpiece. As the overjet improves, reduce the biteplanes by grinding them with a diamond bur (Fig. 1D).

Biteplanes can be removed more easily if the acrylic is first grooved with a carbide bur in a high-speed handpiece. The acrylic is then broken up by squeezing it with an angled wire cutter.

Other Applications

After orthodontic correction has been achieved, the reduced biteplanes can be left in place for vertical retention. I prefer to bond the maxillary lingual retainer with light-cured composite resin instead of using an acrylic plate, because the inorganic component of the light-cured adhesive provides more resistance to abrasion. To avoid untwisting of the retainer wire, I use braided .016" x .016" stainless

steel (Fig. 2).

Self-curing acrylic biteplanes can also be used to open the bite temporarily during the correction of posterior or anterior crossbite (Fig. 3). These biteplanes can be placed lingually or labially, or they can even be bonded occlusally to provide more comfortable mastication, especially on first permanent or deciduous molars in children and on bicuspid or molars in adults.

Biteplanes can be combined with open activators for treatment of Class II cases with deep overbite. In the mixed dentition, when there is a lack of posterior support due to the loss of deciduous teeth, the biteplanes permit the overbite to be corrected before the overjet and Class II relationship are addressed. During the day, when the activator is not being worn, the biteplanes control or intrude the incisors while the posterior teeth are allowed to erupt. At night, the interincisal acrylic of the activator achieves the same effect (Fig. 4).

Case 1

A 9-year-old female presented with deep overbite and retrusive mandibular incisors. Self-curing acrylic lingual biteplanes were bonded, and a lower utility arch with tipback was placed to intrude and advance the mandibular incisors (Fig. 5).

After 20 months of treatment, cephalometric analysis showed a normal amount of horizontal and vertical growth (Fig. 6). The maxillary incisors did not grow vertically and were proclined. The mandibular incisors were advanced and intruded.

Case 2

A 20-year-old female presented with retrusive incisors and deep overbite. Her bicuspid had been extracted at an early age. Mandibular brackets were bonded with sufficient angulation to procline the mandibular incisors and move the buccal segments mesially. Lingual acrylic biteplanes were bonded to counteract the anterior extrusive component of these mechanics and to intrude the maxillary and mandibular incisors (Fig. 7).

After 31 months of treatment, cephalometric analysis showed a small amount of residual skeletal growth, an increase in vertical dimension, and a posterior mandibular rotation (Fig. 8). The maxillary incisors and canines were intruded, while the bicuspid and molars were extruded. The mandibular superimposition showed intrusion of the incisors and canines, extrusion of the molars, and mesial inclination of all the teeth.

Case 3

A 9-year-old female presented with deep overbite and a skeletal Class II malocclusion. Self-curing acrylic lingual biteplanes were bonded. Initially, a utility arch with tipback was used to intrude the maxillary central incisors. Seven months later, an open activator was placed in conjunction with the biteplanes (Fig. 9).

Cephalometric analysis showed a significant amount of horizontal and vertical growth during 31 months of treatment (Fig. 10). The maxillary incisors did not grow vertically, but the maxillary molars were extruded. The mandibular incisors were proclined and did not exhibit any vertical growth.

Discussion

Lingual biteplanes made of acrylic or composite resin can open the anterior bite and allow the posterior teeth to extrude. Contraction of the jaw muscles produces an intrusive force on the incisors when the mandibular teeth occlude against the biteplanes.

In growing patients, the intrusive effect of the biteplanes is canceled out by vertical skeletal growth, so that the posterior teeth develop vertically while the incisors do not. In adult patients, the biteplanes produce a net intrusion of the incisors and canines along with extrusion of the posterior teeth.

Bonded lingual biteplanes are recommended as an auxiliary to labial edgewise appliances for incisor intrusion, leveling, overbite correction, or relief of occlusal interference. They can also be used for vertical retention in younger patients until growth has stopped, or in adults until dentoskeletal and soft-tissue adaptation has occurred. □

FIGURES

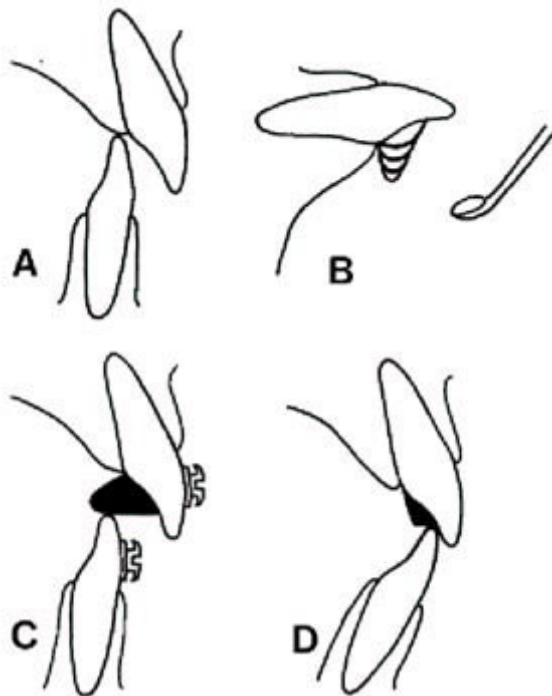


Fig. 1 A. Deep bite. B. Self-curing acrylic is added gradually with spoon of Le Cron spatula. C. Mandibular incisors occlude against finished biteplane. D. Biteplane is reduced posteriorly as overjet is corrected.



Fig. 2 A. Lingual biteplanes with edgewise appliance. B. Reduced biteplanes kept in place for vertical retention; braided .016" x .016" stainless steel retainer wire bonded with light-cured composite.

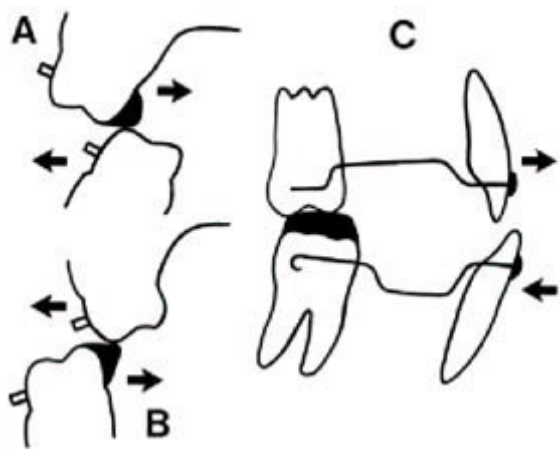


Fig. 3 A,B. Biteplanes bonded to lingual surfaces of molars allow free transverse movement of molars during correction of posterior crossbite. C. Biteplanes bonded to occlusal surfaces of molars provide temporary bite opening while anterior crossbite is corrected.

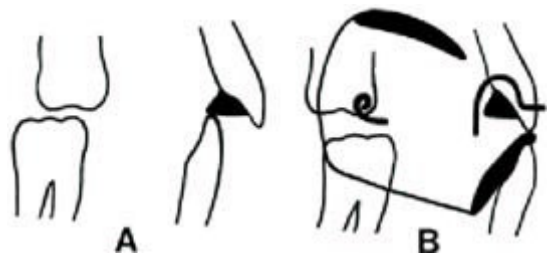


Fig. 4 A. Lingual biteplanes control or intrude incisors and allow posterior eruption during day, when activator is not worn. B. At night, interincisal acrylic of activator achieves same effect.

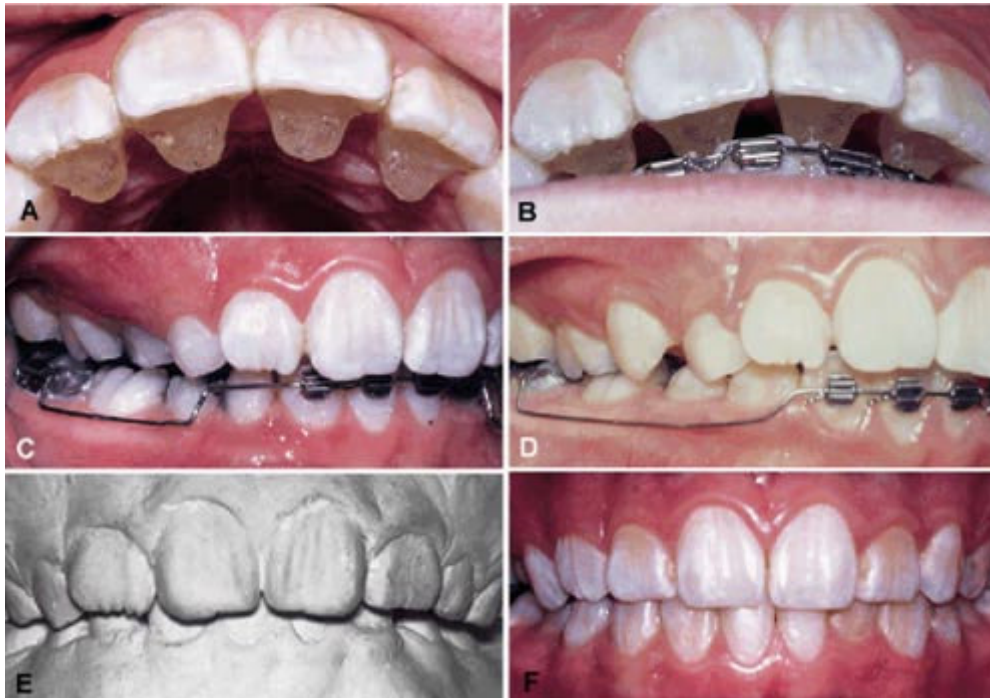


Fig. 5 Case 1. A. Acrylic biteplanes bonded to lingual surfaces of maxillary incisors in 9-year-old female with deep overbite. B-D. Lower utility arch with tipback used to intrude and advance mandibular incisors. E,F. Before and after 20 months of treatment.

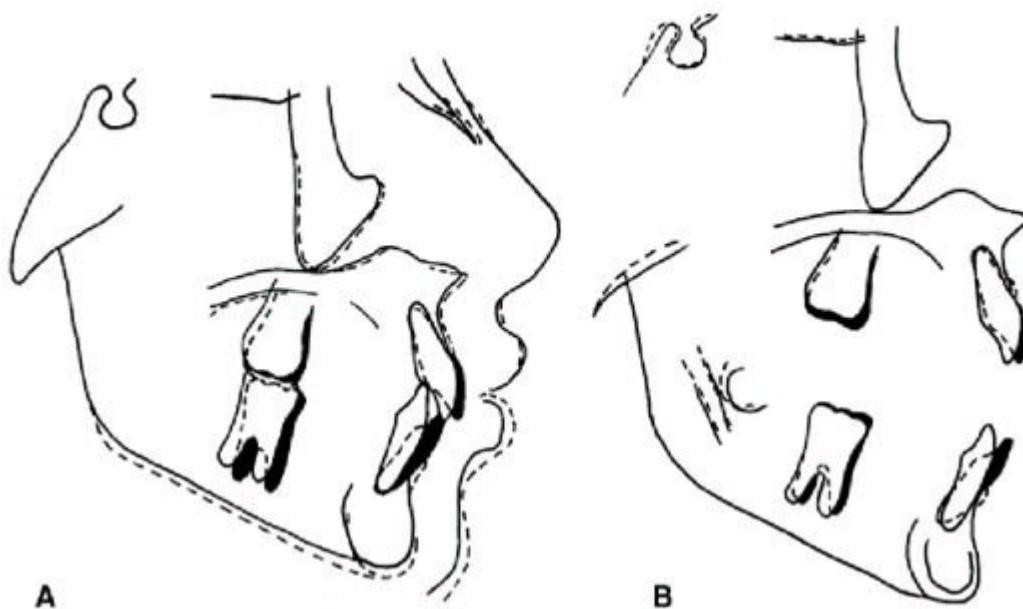


Fig. 6 Case 1. A. Superimposition on anterior cranial base at sella and cribriform plate. B. Maxillary superimposition at anterior surface of zygomatic process. Mandibular superimposition at symphysis, mandibular canal, and third molar.

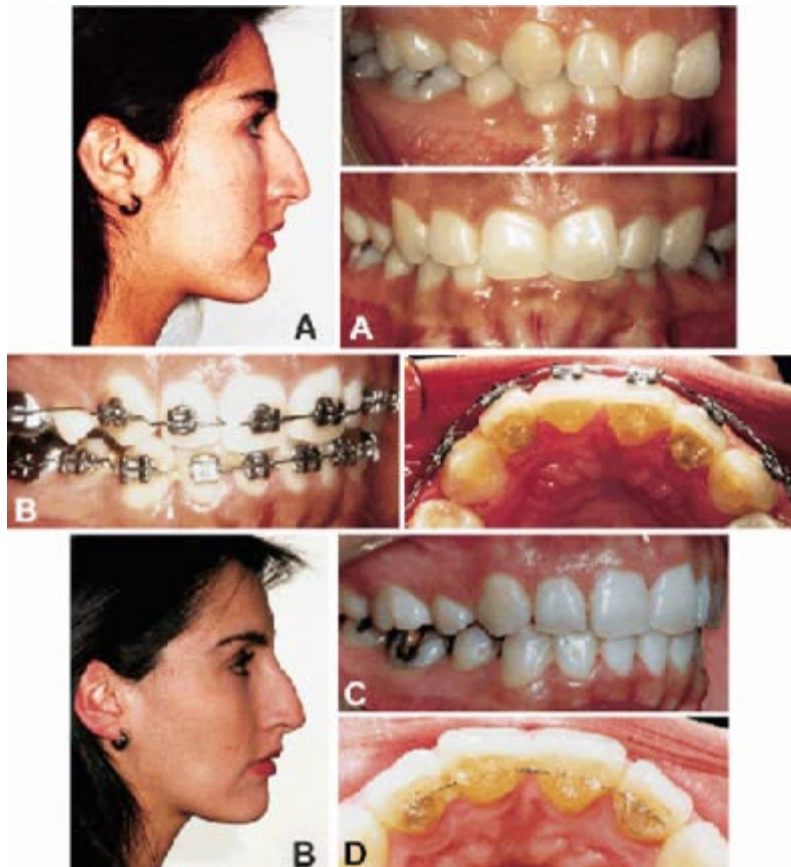


Fig. 7 Case 2. A. 20-year-old female before treatment. B. Lingual biteplanes and edgewise appliance used to intrude and procline anterior teeth. C. After 31 months of treatment. D. Resilient wire added to lingual biteplanes for vertical retention.

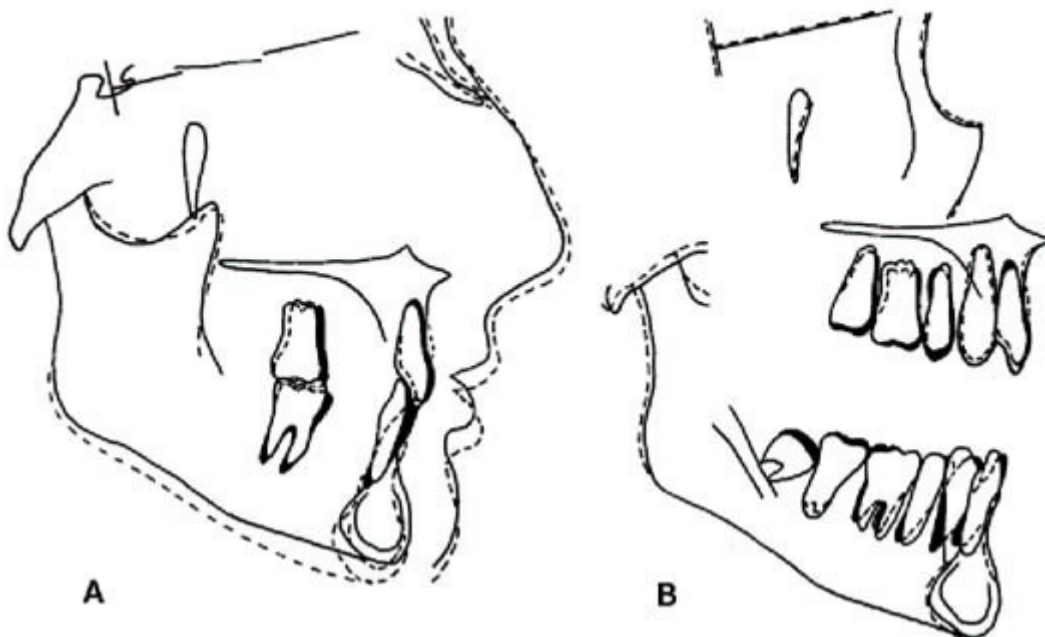


Fig. 8 Case 2. A. Superimposition on anterior cranial base at sella and cribriform plate. B. Maxillary superimposition at anterior surface of zygomatic process. Mandibular superimposition at symphysis, mandibular canal, and third molar.

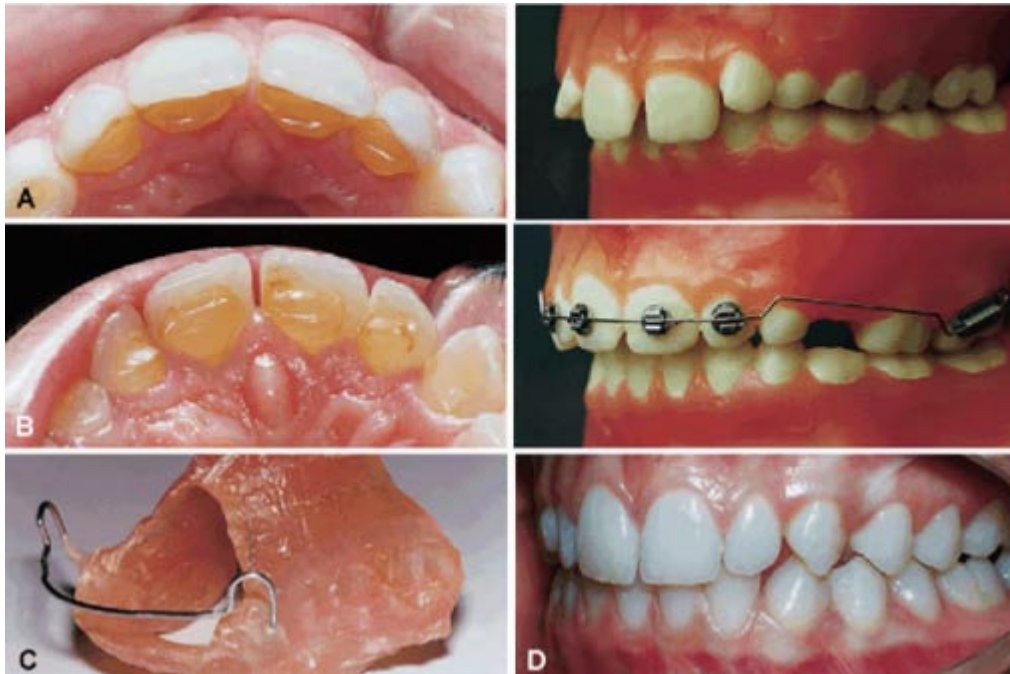


Fig. 9 Case 3. A. 9-year-old female with deep overbite and skeletal Class II malocclusion before treatment. B. Lingual biteplanes and lower utility arch with tipback used to intrude maxillary central incisors. C. Open activator added seven months later. D. After 31 months of treatment.

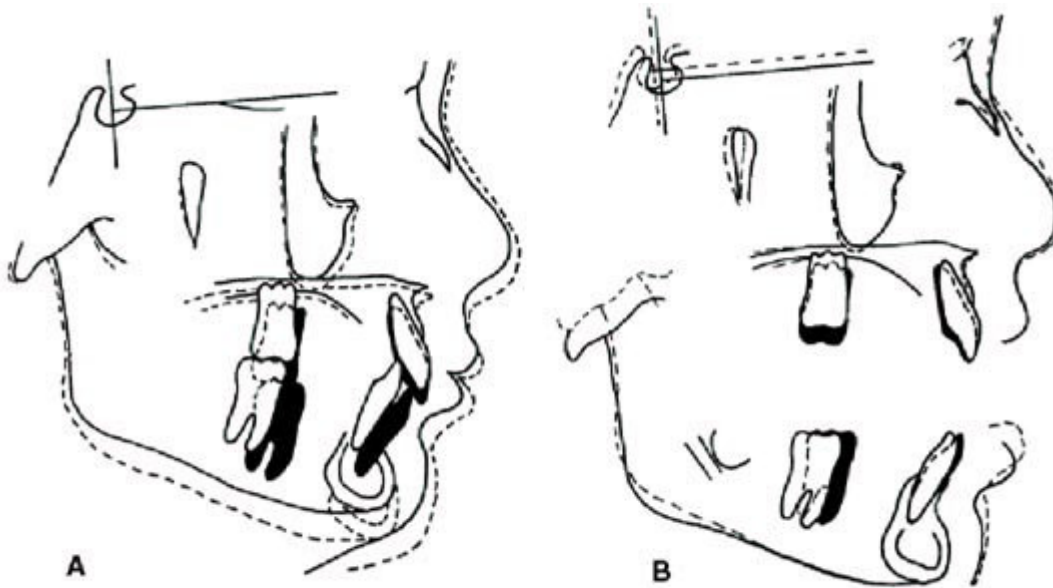


Fig. 10 Case 3. A. Superimposition on anterior cranial base at sella and cribriform plate. B. Maxillary superimposition at anterior surface of zygomatic process. Mandibular superimposition at symphysis, mandibular canal, and third molar.

Fig. 10 Case 3. A. Superimposition on anterior cranial base at sella and cribriform plate. B. Maxillary superimposition at anterior surface of zygomatic process. Mandibular superimposition at symphysis, mandibular canal, and third molar.

REFERENCES

1 Alexander, C.M. et al.: Lingual orthodontics: A status report, J. Clin. Orthod. 16:255-262, 1982.

- 2 Madsen, R.: Escalón palatino de mordida (lingual bite step), Rev. Fac. Odont. Univ. Chile 4:25-31, 1986.
- 3 Philippe, J.: Treatment of deep bite with bonded biteplanes, J. Clin. Orthod. 30:396-400, 1996
- 4 Mayes, J.H.: Bite turbos: New levels of bite-opening acceleration, Clin. Impres. 6:15-17, 1997.
- 5 Newman, G.V. et al.: Update on bonding brackets: An in vitro survey, J. Clin. Orthod. 28:396-402, 1994.

FOOTNOTES

1 Marche Felix Martin y Cía, Santiago, Chile

2 Simplex Rapid: Howmedica International Ltd., London, England.