

Overlay Mechanics with the Tip-Edge PLUS Bracket

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The traditional procedure for treating Class I crowded cases requires the application of force to create space before a flexible archwire can be inserted for alignment. Simultaneous use of an overlay wire can reduce treatment time and minimize the side effects of continuous-wire sliding mechanics,¹ especially in cases with significant individual tooth malalignments. Conventional appliances need extra ligatures to be tied over the main archwire, however, which adds chairtime.

Self-ligating brackets are reportedly effective in reducing the friction created by sliding mechanics,²⁻⁸ but they have several drawbacks: they can only be used with certain sizes of archwires, they may require special instruments to open and close the clips, and they are generally more fragile than conventional brackets.

A new alternative, the Tip-Edge PLUS* bracket (Fig. 1), offers a way to use overlay mechanics with reduced friction. This bracket is not self-ligating, but limits friction by combining

*Registered trademark of TP Orthodontics, Inc., 100 Center Plaza, La Porte, IN 46350.



Fig. 1 Tip-Edge PLUS bracket.

two slots—a standard Tip-Edge slot, which can accommodate a wire as large as .022" × .028", and a hidden "deep tunnel", which accepts wires as large as .018" (Fig. 2). The space opening and alignment can be performed simultaneously, thus reducing treatment time. When the deep tunnel slot is used for leveling and alignment or for correcting rotations and angulations after space closure, the applied force is minimized. The PLUS bracket can accommodate an overlay wire without additional ligatures, saving chairtime, and it can align teeth with a flexible .012" nickel titanium wire, improving patient comfort.

Case Report

A 13-year-old female presented with a Class II molar relationship and severe crowding (Fig. 3). Conventional space analysis would have suggested maxillary extractions to relieve the crowding, but her profile ruled out lip retraction. Since both maxillary first molars were mesially rotated, the necessary space could be gained without extractions.

A modified Nance appliance with coil

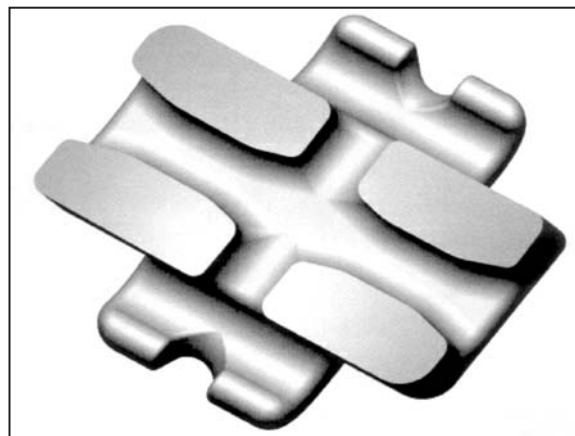


Fig. 2 "Deep tunnel" slot of Tip-Edge PLUS.



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Fig. 3 13-year-old female with Class II molar relationship and severe crowding before treatment.

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Fig. 4 Modified Nance appliance with coil springs used to correct molar rotations.

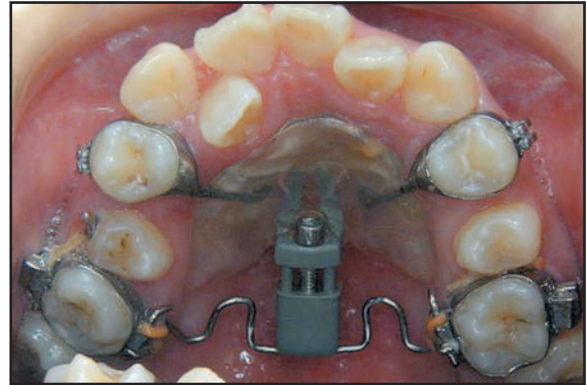


Fig. 6 Class I elastic used to guide right second premolar into space created by molar distalization.

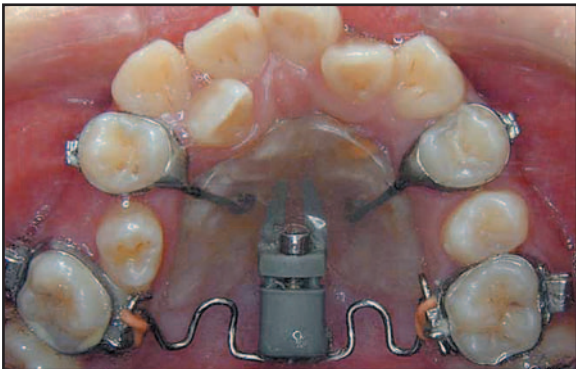


Fig. 5 Screw-type molar distalizer used to establish Class I molar relationships.



Fig. 7 Transpalatal bar inserted for molar derotation and torquing.

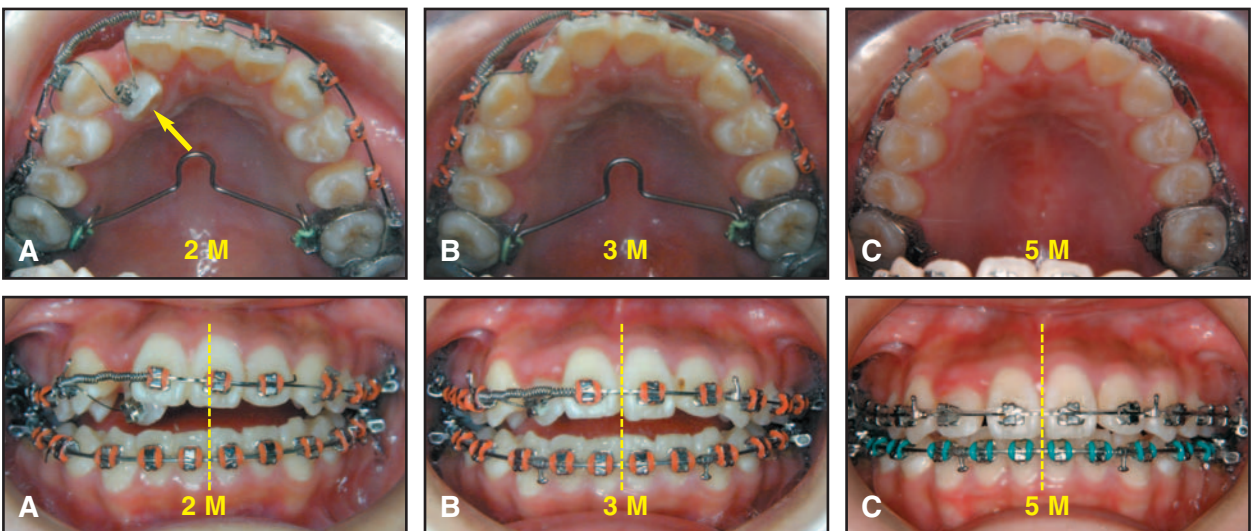


Fig. 8 A. Overlay mechanics used to align right lateral incisor with PLUS brackets. B. Main archwire changed to .022" x .028" nickel titanium. C. Interarch and Class I elastics used to close spaces. (M = months of treatment.)

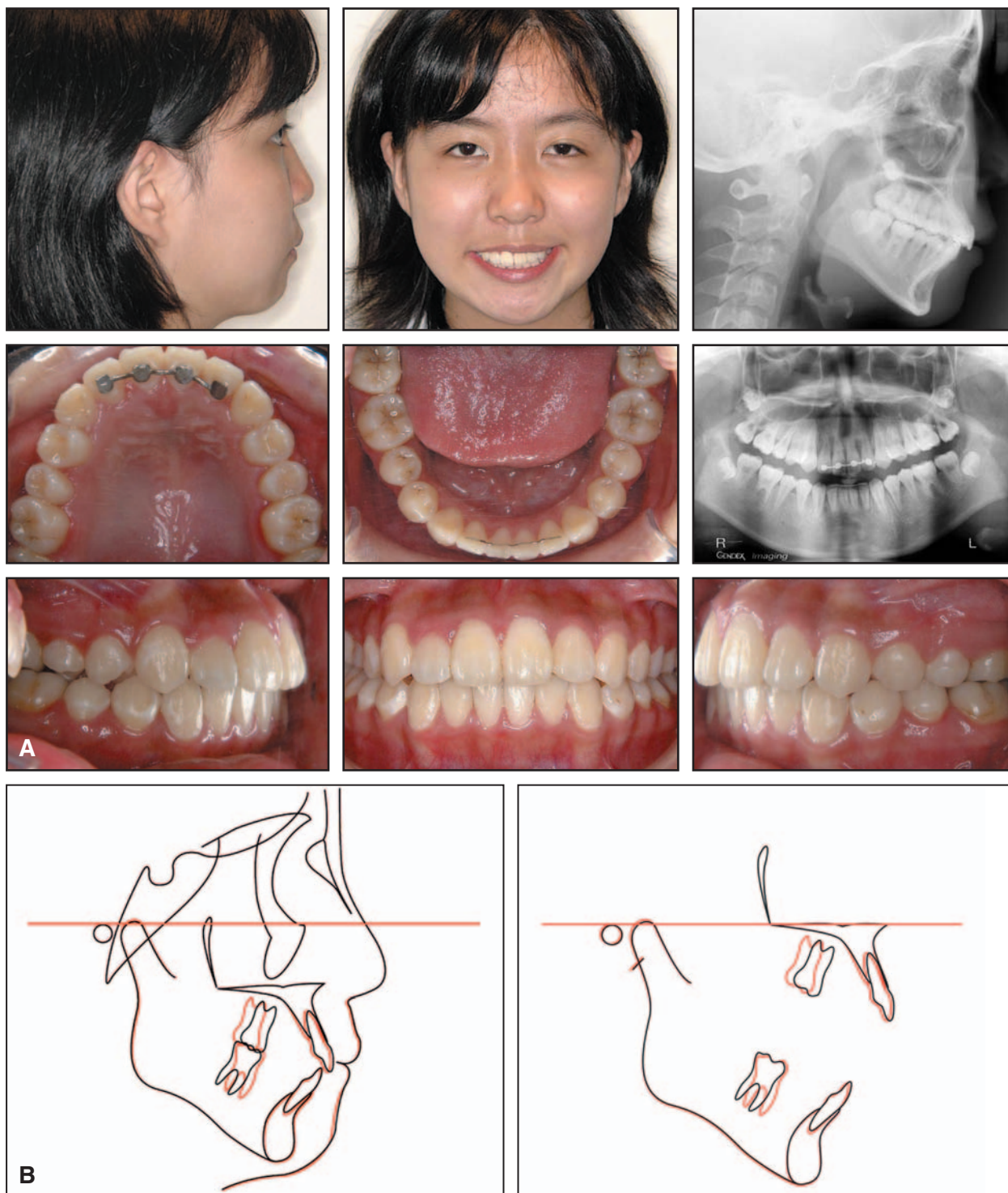


Fig. 9 A. Patient after 13 months of total active treatment. B. Superimposition of cephalometric tracings before and after treatment.

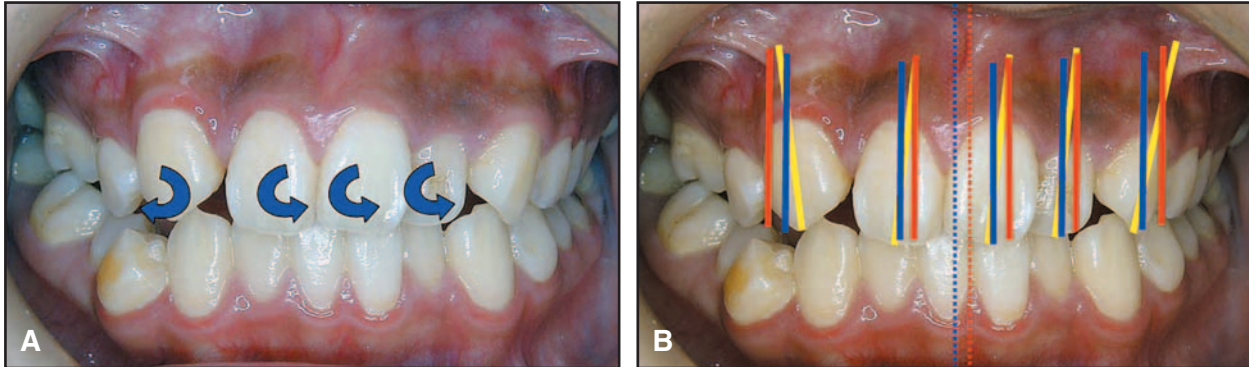


Fig. 10 A. Conventional edgewise appliances create moments around centers of brackets. B. Yellow lines indicate original axial inclinations; blue lines show tooth movements with conventional edgewise brackets; red lines show tooth movements with PLUS brackets. Note difference in midline correction (dotted lines).

springs was placed to correct the molar rotations (Fig. 4). A screw-type molar distalizer was then used to establish Class I molar relationships (Fig. 5), while a Class I elastic guided the right second premolar into the space that was opened (Fig. 6). A transpalatal bar was inserted to complete the molar derotation and to provide proper torque (Fig. 7).

After six months of arch development, PLUS brackets were bonded in both arches. As soon as enough space had been created to bond a PLUS bracket to the maxillary right lateral incisor, overlay mechanics were used to bring it into the arch (Fig. 8A). In the second month of this phase, an .012" nickel titanium wire was placed in the deep tunnel and an .016" × .012" nickel titanium wire in the main slot. A month later, the main archwire was changed to .022" × .028" nickel titanium (Fig. 8B). Another two months later, interarch and Class I elastics were placed to close the remaining spaces (Fig. 8C).

After seven months of treatment with the PLUS brackets and maxillary overlay system, the brackets were removed, and fixed lingual retainers were bonded (Fig. 9).

Discussion

With conventional edgewise appliances, moments are created around the centers of the

brackets (Fig. 10). Once the teeth have been leveled and aligned, the midlines then have to be corrected by bodily tooth movement. With PLUS brackets, on the other hand, the root positions are maintained while the crowns are shifted toward the dental midline. Thus, no "round tripping" is required.

The case shown in this article was bracketed for only seven months, which is considerably less than the average treatment time. Because the overlay mechanotherapy is more efficient, treatment times can often be reduced, benefiting the patient as well as the orthodontist.

REFERENCES

1. Verna, C.; Troiani, S.; Luzi, C.; and Melsen, B.: Passive and active overlay systems, *J. Clin. Orthod.* 38:673-676, 2004.
2. Hanson, G.H.: The SPEED system: A report on the development of a new edgewise appliance, *Am. J. Orthod.* 78:243-265, 1980.
3. Heiser, W.: Time: A new orthodontic philosophy, *J. Clin. Orthod.* 32:44-53, 1998.
4. Damon, D.H.: The Damon low-friction bracket: A biologically compatible straight-wire system, *J. Clin. Orthod.* 32:670-680, 1998.
5. Weinberger, G.L.: Utilizing the SmartClip Self-Ligating Appliance, *Orthod. Persp.* 12:3-7, 2004.
6. Berger, J.: Self-ligation in the year 2000, *J. Clin. Orthod.* 34:74-81, 2000.
7. Pizzoni, L.; Ravnholt, G.; and Melsen, B.: Frictional forces related to self-ligating brackets, *Eur. J. Orthod.* 20:283-291, 1998.
8. Thomas, S.; Sherriff, M.; and Birnie, D.: A comparative in vitro study of the frictional characteristics of two types of self-ligating brackets and two types of pre-adjusted edgewise brackets tied with elastomeric ligatures, *Eur. J. Orthod.* 20:589-596, 1998.