

A New Instrument for Controlled Bracket Positioning

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Many techniques have been described to improve bracket positioning,¹ involving several different instruments.²⁻⁴ Although the Boone and Dougherty gauges have been widely used,^{1,2,5,6} brackets can easily slip when one of these instruments is removed. Also, while such a gauge can measure the distance between the center of the slot and the incisal edge of the bonded tooth, it cannot prevent angulation or torque errors. Droschl and Bantleon have developed a modification of the Boone gauge that allows accurate, reproducible bracket placement using various lengths of pencil leads to mark positions on the enamel surfaces.³ Their procedure is time-consuming, however, and may leave pencil marks on the etched enamel.

Samuels has described a new bracket-positioning instrument for direct bonding that enables the clinician to check the bracket's long axis relative to the tooth's long axis, and by using another part of the instrument, to measure the vertical position of the bracket.² The Slot Machine,* developed by Creekmore, can be used for indirect bonding of either lingual or labial brackets.⁷ It orients the bracket slot to the facial surface of each tooth on the cast by holding the slot stationary while manipulating the tooth to any tip, torque, rotation, or height, using orientation templates and a rotation guide.

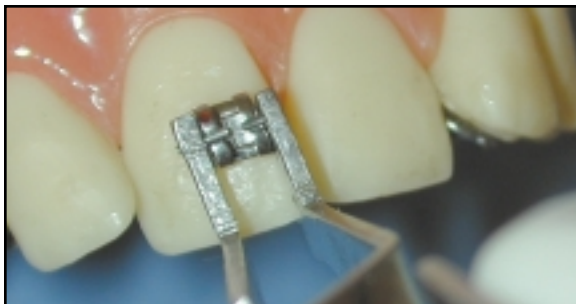


Fig. 1 Height Gauge Tweezer holds bracket by its slot with two cylindrical extensions.

All these devices measure the position of the bracket after it has been positioned with a tweezer. Therefore, the measurement is an additional step that requires extra time. In addition, all these instruments hold the bracket in place through the facial surface of the slot and hence cannot be used with self-ligating brackets, all of which have some kind of cover over the labial surface.

The Height Gauge Tweezer

With the new Height Gauge Tweezer,** bracket height is measured from the bracket slot to the incisal edge at two points simultaneously, thus eliminating angulation errors. The tweezer holds the bracket by its slot with two cylindrical extensions engaged from the mesial and distal, eliminating in-out errors (Fig. 1). When the bracket is pressed against the tooth, it adapts to the contour of the labial surface, eliminating torque errors and squeezing out excess adhesive.

The distance between the cylindrical extension and the incisal extension is fixed, with bracket heights of 5.5mm, 5mm, 4.5mm, 4mm, and 3.5mm available to fit short or long clinical crowns. Each tweezer is color-coded for easy identification (Fig. 2).

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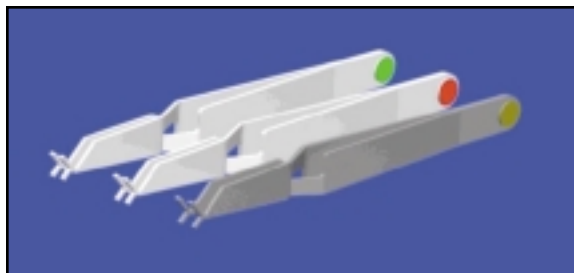


Fig. 2 Color-coded tweezers used for different bracket heights.

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TABLE 1
RECOMMENDED BRACKET HEIGHTS USING HEIGHT GAUGE TWEEZER (mm)

	Central Incisor	Lateral Incisor	Cuspid	First Bicuspid	Second Bicuspid
Maxillary arch	x	x-.5	x	x-.5	x-.5
Mandibular arch	x	x	x	x-.5	x-.5

x = central incisor bracket height in each arch

The tweezers can fit maxillary or mandibular central incisors, lateral incisors, canines, and bicuspid. Since the height is measured from both sides of the brackets to the incisal edges, the tips of cuspids and bicuspid are not included in the measurements. A test of 20 finished orthodontic models showed that cuspid and bicuspid bracket heights should be .5mm less than usual when the Height Gauge Tweezer is used. Therefore, if the central incisor's bracket height is 4mm and the lateral incisor's is 3.5mm, the cuspid's should be 4mm (instead of the customary 4.5mm) and the bicuspid's should be 3.5mm (instead of 4mm). This means that only two different gauges, .5mm apart in height, are normally needed for each arch (Table 1).

Conclusion

Preadjusted appliances and straight wires may produce unanticipated results for many reasons, including variations in tooth structure, tissue rebound, mechanical deficiencies, play between archwire and bracket slot, and force diminution. Although these factors cannot be eliminated, treatment errors can be reduced by improving the accuracy of bracket placement and taking maximum advantage of the bracket prescriptions. Orthodontists will still need to make some archwire bends to move the teeth into the desired final positions, but the number of these bends will be greatly reduced.

The Height Gauge Tweezer has the following advantages over previous bracket-positioning methods:

- Works with all types of brackets, including self-ligating brackets with hinge caps.
- Provides automatic, accurate bracket placement for either direct or indirect bonding.
- Saves chairtime by eliminating the need for measurement after the bracket is placed.
- Avoids placement errors in angulation, in-out, and torque.
- Expresses excess bonding adhesive by closely adapting to the tooth surface.
- Requires less staff training time.
- Achieves treatment goals with maximum efficiency.

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