

A New 2D Bracket-Positioning Gauge

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ABSTRACT

Orthodontists have used a variety of hand-held dental instruments to position the brackets for direct bonding. A number of instruments, including the Boone and Dougherty gauges, have been used for accurate positioning of brackets in direct bonding. Although position adjustments can be made with such an instrument, the bracket can easily slip when the instrument is removed. Indirect bonding may be a solution, but it is time-consuming and does not provide for precise repositioning of brackets that fall off.

We have developed a gauge that allows accurate, reproducible bracket placement at 3 to 6 mm from the instrument base.

Keywords: Boone and Dougherty gauges, Bracket placement, Metallic or wooden jigs.

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INTRODUCTION

One of the most important skills for an orthodontist in modern day orthodontic practice is bracket placement. Roth says, 'At the heart of every excellent treatment result lies a well-placed appliance, regardless of the appliance that is used.'¹

Orthodontists have used a variety of hand-held dental instruments to position brackets for direct bonding. Many techniques have been described to improve bracket positioning, involving several different instruments.^{2,3} Although the Boone and Dougherty gauges have been widely used,^{2,4-6} 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 Bantleon⁷ 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. Their procedure is time-consuming and may leave pencil marks on the etched enamel.

Samuels² 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. The slot machine, developed by Creekmore,⁸ can be used for indirect bonding of either lingual

or labial brackets. 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.

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.

McLaughlin and Bennett⁹ have designed gauges to measure bracket heights according to their bracket placement chart. Metallic or wooden jigs are available for bracket heights ranging from 2 to 5.5 mm from the incisal or occlusal edges, with each jig having a bracket placement gauge on each end. These are cumbersome to use, however, and have to be interchanged frequently during the bonding procedure, causing considerable loss of chairtime.

New 2D bracket-positioning gauge has been specifically designed for direct bonding (Figs 1 and 2). A hand-held instrument with a bracket-positioning blade allows quick and easy manipulation of orthodontic brackets into the desired positions on the tooth.

Narendra Sharma's 2-dimensional bracket positioner (NS2DBP) replaces these separate jigs with a single tool

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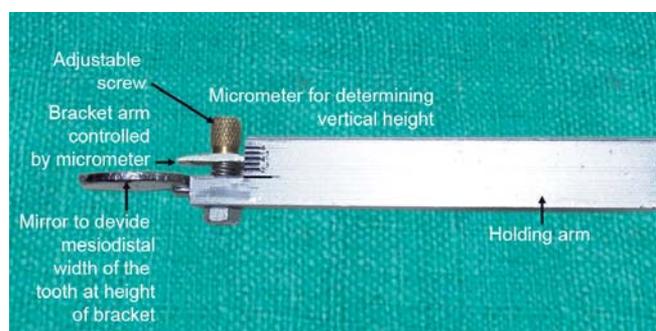


Fig. 1: 2D bracket-positioning gauge



Fig. 2: Occlusal view of 2D bracket-positioning gauge

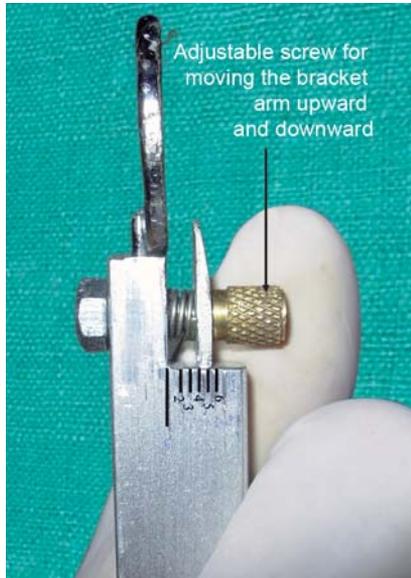


Fig. 3: The bracket height can be varied by adding to or subtracting from the micrometer reading by rotating screw with thumb

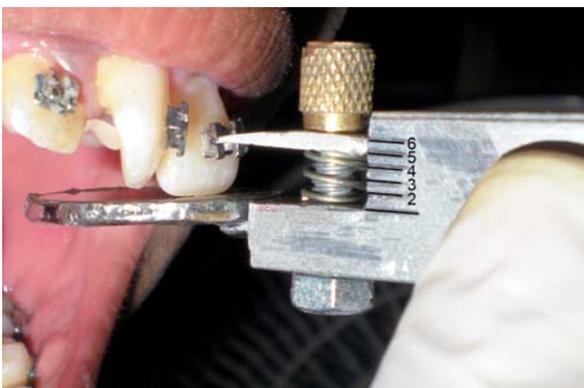


Fig. 4: Bracket arm contacts the bracket slot base to position the bracket at the vertical midpoint

consisting of an incisal/occlusal arm with an engraved millimetric ruler, a vertical screw, a spring, an horizontal bracket-engaging arm, and a nut to hold the bracket arm in place over the spring (Fig. 1). Bracket heights from 2.5 to 5.5 mm can be set by rotating the nut clockwise or counterclockwise with the thumb (Fig. 3), thus moving the horizontal arm downward or upward.

Clinical Use

Measure the vertical height of the tooth, from incisal edge or cusp tip to gingival margin. One-half of this vertical height is

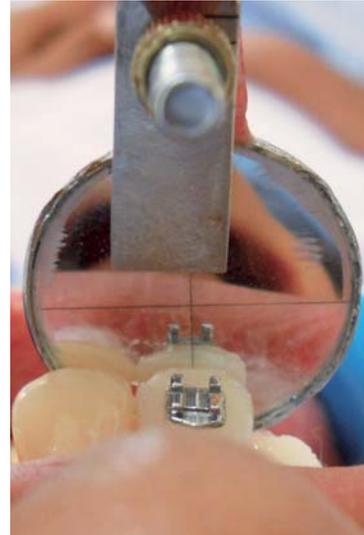


Fig. 5: Mirror line to locate the proper bracket position mesiodistally

used for the instrument's micrometer setting. For example, if the vertical crown height is 10 mm, the micrometer would be set at 5 mm to place the bracket in the center of the tooth. The bracket height can be varied by adding to or subtracting from the micrometer reading (Fig. 3).

Coat the bracket base with adhesive and place it on labial surface of tooth. Place the instrument against the tooth with the mirror face on the incisal edge or cusp tip and the bracket arm in bracket slot (Fig. 4). Press the instrument until bracket arm contacts the bracket slot base. The bracket is now positioned at the vertical midpoint.

After removing the instrument from the tooth, place the mirror against the tooth using incisal edge or cusp tip. Then see the vertical mirror line in mirror which should be in the center of the mesiodistal width of the tooth. Thus, it is dividing the tooth into two equal halves. Adjust the bracket center on this line to locate the proper bracket position mesiodistally (Fig. 5). Activate the light-curing system or release the instrument while the chemical adhesive sets.

Clinical Testing

Bracket placement time has been reduced with this instrument because no time is spent adjusting the bracket on the tooth surface. Less adhesive is needed on the bracket base; therefore, less adhesive is expressed during bonding making cleanup easier.

The most significant change found is the increased awareness of bracket positions, tooth sizes, crown shapes and tooth-to-tooth relationships. In reviewing previous cases, it was found that brackets were often placed improperly because of insufficient crown surface exposure, variations in tooth size or poor technique.

This instrument will decrease bracket placement errors, and thus, improve overall treatment results.

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