Guest Editorial

Benefits and Rationale of Differential Bracket Slot Sizes: The Use of 0.018-Inch and 0.022-Inch Slot Sizes Within a Single Bracket System

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In recent issues of this journal, Rubin[1] and Peck[2] extolled the virtues of standardization to a single universal slot size for all orthodontic brackets. They wrote about advantages of using only a single bracket dimension. The benefits and rationale of using both the currently manufactured 0.018-inch and 0.022-inch slot sizes within a single bracket system were not explored.

Differential slot size treatment uses two different slot sizes within the same appliance setup and is the foundation of bidimensional treatment. Schudy and Schudy[3] first proposed the amalgamation of two different slot sizes within an individual treatment appliance with their bimetric system, and the amalgamation was later proposed by Gianelly et al[4] with their bidimensional technique. In its current form, 0.018-inch brackets are placed on maxillary and mandibular central and lateral incisors, and 0.022-inch brackets are placed on canines and posterior teeth and incorporated into each setup. The two slot sizes represent a different set of distinct advantages to treatment mechanics.

The 0.022-inch system offers more options in archwire size selection.[5,6] With the use of undersized archwires, one can facilitate the free sliding of the archwire through the bracket slot. This provides a system with less frictional resistance or binding at the bracket wings. Being able to use larger diameter archwires for treatment mechanics also has benefits. Larger dimension archwires provide increased stiffness and facilitate keeping teeth upright during space closure and retraction mechanics. Conversely, a distinct disadvantage may be encountered when filling the bracket slot. Full-sized stainless steel rectangular archwire becomes markedly reduced in springiness and range, thereby severely limiting the ability to place effective torque and finishing bends.

The 0.018-inch system provides a contrasting set of benefits. Although there may be fewer choices in arch wire dimensions, filling the bracket slot is more easily accomplished. The capacity to fill the bracket slot allows for a greater use of the program or prescription built into the bracket. With the introduction of preadjusted appliances, the focus has moved to customization of brackets to affect specific and exact positioning of the dentition. Previously, the orthodontist relied on modifications in the archwire in the form of first-, second-, and third-order bends to detail the teeth. Preadjusted appliances build corrections directly into the brackets. Labiolingual positions previously placed into archwire bends are now preprogrammed with the in-out depth of the bracket slots or within the bracket bases. Preangulated slots in the brackets provide for precision mesiodistal angulation. Labiolingual inclinations or torque, previously managed with auxiliary torquing appliances and archwire adjustments, are now provided with accuracy by pretorqued bracket slots and bases.

These preprogrammed features of the orthodontic bracket can be fully employed only if the bracket slot is filled. The bracket slot can be filled in both the 0.018-inch and 0.022-inch systems; however, one can certainly fill the slot in the 0.018-inch bracket more efficiently and earlier in treatment. This feature provides the advantage of early torque control of anterior teeth. Torque control is essential in the precise positioning of anterior teeth and in the retraction phase of extraction treatment. In the course of retraction, a vector of lingual crown torque or labial root torque is applied. The ability to maintain anterior torque will resist this deleterious movement. When this ''under torquing'' of the anterior teeth occurs, it may present difficulties in the finishing stages or may require additional treatment time to correct.

The bidimensional system takes advantage of these differences in bracket slot sizes. Filling the slot early in treatment with a bracket prescription that maintains anterior torque is one of the primary benefits of this appliance system. Another advantage of filling the 0.018-inch slot is mandibular incisor control. During space closure in the mandibular arch, there is a vector that tends to lingualize the anterior teeth. Filling the bracket slots will preserve the position of these teeth and minimize unwanted lingual crown torque. The use of Class II elastics may strain the position of the mandibular anteriors, and this same mechanism helps to maintain their inclination. Protraction of posterior teeth also involves the stabilization of the anterior segment, and filling the slot allows for the maintenance of the incisors in their correct positions. Characteristically, protraction of posterior teeth results in the overretraction of the anterior teeth. This is effectively controlled with the bidimensional system.

The bidimensional mode allows for the use of a 0.018-inch archwire as the widest diameter, thus creating a 0.04-

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inch clearance in the 0.022-inch canine and premolar brackets. This differential provides free sliding of posterior teeth during space closure. Limiting of the frictional forces provides for a more effective space closure system. A free sliding system is available during canine retraction, anterior retraction, and posterior protraction while simultaneously maintaining anterior torque control.

In conclusion, the availability and versatility of 0.018-inch and 0.022-inch slotted brackets is like having the best of both worlds. So, ''if it ain't broken, don't fix it.''

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