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THE EDITOR'S CORNER

To Bend or Not to Bend

My Editor's Corner in May 2012, entitled "Game Changers in Orthodontics", focused on the developments over the past 15 years that have actually changed the way we do things. It seemed obvious to me that the two innovations that had affected orthodontic practice the most during that period were Invisalign and skeletal anchorage. The column turned out to be one of the most widely read and cited editorials I've written for JCO. My thanks go to the many readers who e-mailed their comments (most of which were positive) and especially to those who offered their own opinions about "game changers". Although most agreed with me about Invisalign and skeletal anchorage, others mentioned superelastic archwires, direct bonding, and computerized cephalometry. The "game changer" that received the most nominations, however, was the preadjusted appliance—or, as everyone calls it, the straightwire appliance.

Edward H. Angle envisioned the development of preadjusted brackets almost a century ago. As he predicted, when 1st-, 2nd-, and 3rd-order "bends" were built into the bracket itself through precision machining of the base and slot, less wire bending was needed to achieve ideal tooth positions. Lawrence F. Andrews, after studying ideal non-orthodontic cases and developing his "six keys to occlusion",¹ brought the concept of preprogrammed orthodontic appliances to full fruition in the 1970s.² Thomas D. Creekmore and others recognized that some wire bending would still be necessary to finish individual cases, however, and they developed precise means of applying that principle to straightwire systems.³

Our recent JCO Master Clinician, Richard P. McLaughlin, has probably done more than anyone else in the specialty to advance the application of preadjusted appliances. In a 1989 JCO article, McLaughlin and his colleague John C. Bennett summarized, "This preadjusted, preangulated appliance was based on the concept that in an ideal gnathological setup for a given patient, the bracket bases would accurately fit each tooth at a predetermined point, and the bracket slots would passively accept a straight wire coordinated to the patient's archform."⁴ The "infor-

mation” built into all preadjusted appliance prescriptions is based on average values for crown tip, torque, and buccolingual tooth thickness. Unfortunately, individual variability is a fact of life in our world. No two teeth are identical, no two labial surfaces have the same facial curvature, no two clinical crowns have the same buccolingual width. That means that even though manufacturers strive impressively to produce accurate measurements in their preadjusted brackets, some degree of wire bending is necessary in almost every case to achieve optimal occlusal and esthetic results. Moreover, as McLaughlin and Bennett explained, “bracket placement is such an exacting requirement of preadjusted appliances that when brackets are not properly positioned, they must either be repositioned or compensating bends must be placed. It quickly became apparent that it was far more efficient to reposition brackets at strategic points in treatment (such as when including previously unerupted teeth) than to place compensating bends in all three planes of space during finishing.”⁴

Obviously, bracket repositioning is a time-consuming, tedious solution to the problem of ideal tooth finishing. Consequently, the quest to eliminate individualized wire bending in the closing stages of treatment has continued to the present day.

Ormco introduced its Insignia custom brack-

et system nearly a decade ago as a potential solution to this dilemma. Insignia’s proprietary software interface allows the clinician to visualize the ideal orthodontic treatment outcome for each patient individually. All the wires and brackets are then reverse engineered, “keeping the end in mind”, on a completely customized basis. In theory, at least, each patient is treated to individualized ideal tooth positions with little or no need for finishing bends in any of the archwires. Too good to be true? In this issue of JCO, a team of researchers from the University of North Carolina—Dennis Weber, Lorne Koroluk, Ceib Phillips, Tung Nguyen, and William Proffit—puts Insignia to the test in a comparison with a conventional preadjusted edgewise system. While some of their results were predictable, I found others to be a bit surprising. And though further research with larger sample sizes is undoubtedly in order, this approach does look promising. See what you think.

RGK

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