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THE EDITOR'S CORNER

A Breakthrough in Miniscrew Stability

As with all other practical innovations in orthodontics, temporary anchorage devices (TADs) have involved a significant learning curve. Although Creekmore and Eklund's seminal paper on skeletal anchorage appeared in JCO more than 25 years ago,[1] it remained on the fringes of the profession until around the turn of the century, when the concept took off like a rocket. Since then, paper after paper has illustrated successful treatment of most categories of malocclusion. Like many orthodontists, I held back for awhile, then gradually worked my way into using TADs where I thought they would be of most benefit and, more important, where I felt confident in their successful application. Also like many orthodontists, I saw some spectacular successes and some other outcomes that were not so spectacular. Of course, it behooves any professional to learn from both irreproachable results and more problematic cases. Perhaps the most extensive account of the benefits and drawbacks of TADs was provided by Luzi, Verna, and Melsen in an excellent JCO Overview earlier this year.[2]

As detailed in our recent, two-part Roundtable discussion by a panel of miniscrew experts,[3] the most challenging problem currently associated with TADs is a failure rate that reportedly ranges from 10-30%, if we define failure to include any loosening or tipping of an implant. Indeed, following my initial period of enthusiasm for the potential of TADs, I began to notice failures in more cases than I personally found acceptable. Contributing factors may include insufficient bone quantity or quality at the insertion site, use of screws of inadequate diameter or length, inappropriate intraosseous design, root contact during insertion, patient manipulation of the implant, poor oral hygiene, and application of excessive forces or moments. In my own practice, I've seen a higher failure rate from TADs placed in the maxillary buccal segments, most notably the premolar regions.

Several authors have attempted to address this situation by taking advantage of the characteristics of palatal bone. In fact, articles on palatal implants have appeared

in three of our last four issues, including this month's paper by Drs. Benedict Wilmes, Dieter Drescher, and Manuel Nienkemper. These authors have developed a system using a miniplate secured to the palatal bone by two in-line screws, allowing a variety of attachments for treatment of most sagittal, transverse, and vertical malocclusions originating in the upper arch without the high failure rates associated with other maxillary placement sites.

Mesial space closure is an attractive method for resolving the malocclusion caused by congenitally missing upper lateral incisors because it obviates prosthetic implants. On the other hand, it has always been difficult to execute, due to the anchorage demands of moving the upper posterior dentition forward. The new plate system shown by Drs. Wilmes, Drescher, and Nienkemper solves this problem by means of a fixed mushroom-shaped wire that is welded to the palatal plate and bonded to the palatal aspect of the upper central incisors, providing skeletal anchorage for the mesialization mechanics. Similarly, distalization forces can be applied to the upper molars with push-coil springs that transmit forces from screw-type locks on an .045" wire, bent to the curvature of the upper arch, to sleeves soldered on the palatal aspects of the upper molar bands. In cases involving midline discrepancies, the new miniplate system can apply unilateral or bilateral forces for symmetrical or asymmetrical applications. The authors also illustrate the versatility of their apparatus in resolving transverse discrepancies, using a hybrid Hyrax device for maxillary expansion with anchorage from the palatal plate. Another case shows the correction of a vertical problem caused by overeruption of a maxillary molar.

While articles addressing each of the malocclusions mentioned above have appeared previously in JCO, no single mini-implant system has been able to handle all these problems. The approach described in this issue takes full advantage of the quality of the palatal bone for skeletal anchorage and, in so doing, provides the practitioner with a versatile system for addressing most malocclusions originating in the upper arch. We can only hope for the development of a system just as versatile for the mandible. RGK

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