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THE EDITOR'S CORNER

The Latest on Skeletal Anchorage

It would be hard to think of a single innovation in clinical orthodontics that has produced as profound a paradigm shift in as short a time as the introduction of temporary anchorage devices—TADs, also known more simply as miniscrews. In years past, anchorage was perhaps the single greatest area of concern in diagnosis and treatment planning. Ever resourceful, orthodontists came up with a variety of techniques and gadgets: transpalatal arches and lower lingual holding arches, Tweed's 10-against-2 philosophy, and the once-ubiquitous headgear, whether Kloehn-type or J-hook. Differential force procedures were developed, as were such concepts as "setting up the anchorage" and the establishment of "reciprocal anchorage" prior to any retraction mechanics being applied. Various "anchorage values" were ascribed to individual teeth and to the different treatment methods.

Even though orthodontists tend to be a pretty conservative lot when it comes to changing clinical techniques, an ever-increasing number of them over the past decade have begun to use TADs to address practically any situation in which anchorage is a concern. Of course, when you think about it, anchorage is a concern in all but a few patients—maybe only Class I spaced or mildly crowded cases where little profile change is needed.

It should be noted that the first article proposing the use of temporary skeletal anchorage appeared in JCO more than a quarter-century ago.¹ Since that time, the number of papers published on TADs has increased exponentially. Authors from all over the world have demonstrated successful management of Class IIs, Class IIIs, high-angle cases, low-angle cases, and even crossbites with skeletal anchorage. They've presented cases in which miniscrews have been used to move teeth mesially, distally, up, down, back and forth—and not just individual teeth, but entire arches. In 2006, DeVincenzo published a fascinating series of articles in JCO, showing how the entire maxillary arch could be intruded to address a high-angle, long-face situation that, in the past, would have mandated surgical maxillary impaction.² Thus, he estab-

lished that TADs have the potential to correct malocclusions that previously would have required orthognathic surgery or massive camouflage treatment.

The idea that skeletal anchorage can obviate many surgical procedures is echoed by several contributors to the current issue of JCO. In this single-theme edition, we hope to help our readers keep abreast of the myriad applications of TADs that are developing almost daily. To begin with, we assembled a panel of experts from around the globe in a Roundtable moderated by our Contributing Editor, Vittorio Cacciafesta. Experts from Italy, Germany, Korea, and the United States address questions dealing with diagnosis and treatment planning, TAD design and selection, anesthesia and miniscrew insertion, patient medical considerations, and a host of other topics, demonstrating the current best practices in skeletal anchorage.

In addition, we have included articles from international contributors illustrating innovative applications of TADs to solve commonplace malocclusions. In an interesting case presentation, Drs. Giuliano Maino, Jeffrey Lemler, David Kornbluth, and Anamaria Munoz show how skeletal anchorage can be used to correct a Class II malocclusion without the need for compliance-dependent headgear. By placing miniscrews in the zygomatic buttress, in line with the force vectors that would have been generated by a headgear, the authors were able to beautifully treat a Class II case to a Class I finish in a non-compliant patient. To me, at least, this is an orthodontist's dream come true. Similarly, Dr. Stephen Weisner presents a successfully treated Class III case. As the author notes, "The use of TADs allows the application of force vectors that were previously difficult or impossible to achieve. This enables the clinician to produce the desired dentoalveolar

or skeletal changes without detrimental side effects." Again, it seems like an orthodontist's dream come true. Although I seriously doubt that TADs will eliminate *all* orthognathic surgery, they may well enable us to treat a wide variety of cases that would have gone undertreated in the past, simply because of patients' desires to avoid surgery.

Miniscrew failure due to inadequate bone quality has proven to be a major concern. The midpalate, because of the quality of its underlying bone, has been one of the most successful insertion locations. While a variety of techniques and devices have appeared in the literature promoting the use of the midpalatal area for TAD placement, each has had a number of drawbacks. In this issue of JCO, Drs. Yasuhiro Itsuki and Eisaku Imamura introduce a new palatal implant that utilizes interchangeable upper units to address those problems.

Two other issues regarding the insertion and retention of TADs have perplexed clinicians for some time now: the magnitude of torquing forces to which the recipient bone sites are subjected during TAD insertion, and the appropriate angle of insertion. Drs. James Noble, Nicholas Karaiskos, Thomas Hassard, Frank Hechter, and William Wiltshire, by means of an innovative cadaver study, provide straightforward answers for the practicing orthodontist.

Indeed, I want to thank all the authors who contributed to this issue for providing us with a tremendous amount of valuable clinical information. RGK

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