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THE EDITOR'S CORNER

The Stability of Miniscrew Placement

As 2010 draws to a close, temporary anchorage devices (TADs), in the form of mini- or microscrew implants, have become an accepted component of the day-to-day orthodontic armamentarium. JCO printed the initial article on the subject back in 1983 and, in the last decade, has led the way in publishing clinical applications of these devices. Not a month goes by now without at least a few papers on TADs appearing in the orthodontic literature around the world. Still, it's often difficult for the clinician to tell just which of these techniques will be useful in private practice. Without personal experience involving some degree of trial and error, the practicing orthodontist may have trouble deciding whether a certain application will succeed or fail in a particular case.

With that in mind, JCO asked a group of experts, "What are the most important factors determining success or failure with skeletal anchorage?" Our panel included JCO Associate and Contributing Editors, as well as other prominent orthodontists who frequently write and lecture on the subject. These clinical experts from around the world represent a significant amount of hands-on experience in the use of TADs. Our goal was to identify the major scientific, technical, and patient-management factors related to clinical performance and stability. While we received a number of thought-provoking responses, it is noteworthy that the experts agreed on many, if not most, of the key issues.

The factor most commonly associated with the success or failure of skeletal anchorage devices was operator experience. Practice makes perfect. To be sure, this is true of any orthodontic technique, based not only on simple repetition, but also on the practitioner's ability to make correct decisions in diagnosis and treatment planning. In terms of skeletal anchorage, though, what are the most important areas in which experience makes a difference?

One factor mentioned repeatedly by our experts was placement location. The preferred implant sites are those in which the screw will pass through fixed, keratinized gingiva into solid alveolar cortical bone or the midpalatal

region. The mobile oral mucosa has a tendency to wrap around and entangle a TAD as it is being screwed into place, which can result in tissue tearing and prolonged inflammation around the implant. Adequacy of interradicular space and avoidance of root contact were also mentioned repeatedly. In addition, every effort should be made to minimize bone damage from either pre-drilling of the implant site or actual screw insertion. The patient and operator must be stable enough during placement to avoid wobbling of the drill or screw, which can enlarge the hole and thus lead to failure.

Implant design was another subject of discussion. A high-pitched screw thread seemed preferable, and several panelists also mentioned the importance of a raised collar that could be seated against the cortical plate. For tighter retention, self-threading miniscrews were favored over those that require pre-drilling. The consensus was that as long as the entire endosseous portion of the miniscrew stays within dense cortical bone (rather than penetrating into more spongy medullary bone), a longer and wider screw will have a better chance of succeeding.

Regarding the application of orthodontic force, panelists preferred indirect anchorage over direct anchorage. Attention must be paid to the handness of the screw threads, so that the applied forces do not result in undesirable torsion that would act to unscrew the TAD once it is placed. Most, but not all, of our experts agreed that forces should be applied perpendicular to the long axis of the miniscrew, with a maximum magnitude of around 250-300g—ideally, the lower the force, the better.

Without informed patient consent, of course, skeletal anchorage cannot even be attempted. Patients should understand that this is by now a predictable orthodontic technique with minimal risk. The advice given by Dr. Robert Haeger in our survey is worth repeating: "Once you have some basic successes, you will feel comfortable with trying more challenging mechanics. Patients understand if you then tell them you have had success with TADs on simple movements and now want to try extraction-site closure, for example, that would have previously required an endosseous implant. Keep your ears and eyes open for possible treatment planning with TADs, and enjoy helping patients in ways you didn't think possible a few years ago."

As with any clinical technique, there is a learning curve involved in mastering the placement, mechanics, and application of skeletal anchorage devices. Listen to the experts, attend lectures and demonstrations, and study the now-extensive body of literature (you can find many references on our website, www.jco-online.com). I hope the dialogue published in this issue of JCO will stimulate more discussion, debate, and research. And we welcome your suggestions on other topics for which we might solicit expert opinions from our worldwide editors and contributors.

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