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THE EDITOR'S CORNER

Game Changers in Orthodontics

At the University of Southern California's Ostrow School of Dentistry, where I'm an associate professor, it is customary for one of the departments to host a "Grand Rounds" lecture once a month. The goal is to keep all faculty members abreast of what is going on in the profession outside their own particular specialties. This spring, I was asked to represent the Orthodontic Department in a two-part Grand Rounds lecture series covering "what's new in orthodontics". To narrow my topic, I had to ask myself what innovations in orthodontics over the past 15 years—and there have been many—have really made a difference in our lives and the lives of our patients. In other words, what have been the game changers in our specialty? After a good deal of internal debate, the title I finally settled on was "Orthodontics for the 21st Century: Braceless Braces and Skeletal Anchorage".

I did consider including three-dimensional diagnostics from cone-beam computed tomography (CBCT), which has made a big splash in the orthodontic literature in recent years. But though many research papers have been published using data that would previously have been impossible to obtain due to anatomical restrictions, in practical terms CBCT has done little to change how we do things. I don't remember ever using CBCT to develop a treatment plan that was any different than it would have been with conventional two-dimensional cephalometric and panoramic radiographs and a good set of study models. CBCT has proven to be a valuable research tool, but it has had little or no effect on my day-to-day routine.

On the other hand, the two developments covered in my title have really changed the way I and many other orthodontists operate our practices, compared to what we were taught in our graduate programs. These developments, of course, are computer-designed, vacuum-formed clear plastic aligners—Invisalign and its imitators—and temporary anchorage devices, known as TADs or mini-screws. The way I see it, Invisalign has offered patients a viable alternative to fixed braces, while TADs have pushed the envelope of what an orthodontist can do with-

out surgery. When these two technologies are used together, the possibilities are innumerable.

Both subjects have been meticulously chronicled in JCO. In April 2000, Drs. Robert Boyd, Ross Miller, and Vicki Vlaskalic of the University of the Pacific Department of Orthodontics introduced clear aligners with an article called "The Invisalign System in Adult Orthodontics: Mild Crowding and Space Closure Cases". As the title suggests, only minor malocclusions were treatable at the outset. Like most other game-changing technologies, however, Invisalign went through a process of improvement and refinement; today, practically any malocclusion can be successfully treated using this or similar systems. Dr. Boyd went on to publish articles in JCO demonstrating the use of aligners in difficult surgical cases ("Surgical-Orthodontic Treatment of Two Skeletal Class III Patients with Invisalign and Fixed Appliances", April 2005) and in finely detailed finishing ("Complex Orthodontic Treatment Using a New Protocol for the Invisalign Appliance", September 2007).

The concept that led to the development of TADs was introduced in the pages of JCO by Drs. Thomas Creekmore and Michael Eklund way back in April 1983 ("The Possibility of Skeletal Anchorage"). Since then, many JCO articles have documented treatment outcomes that would previously have required surgical intervention. Drs. Cheol-Ho Paik, Youngjoo J. Woo, and Robert Boyd (again!) showed that vertical maxillary

excess could be managed without extractions by using skeletal anchorage to intrude posterior teeth ("Treatment of an Adult Patient with Vertical Maxillary Excess Using Miniscrew Fixation", August 2003). Drs. Hugo De Clerck and Marie Cornelis demonstrated remarkable results in maximum-anchorage extraction cases without the use of headgear or palatal bars ("Biomechanics of Skeletal Anchorage", Parts 1 and 2, April-May 2006). Two years later, Drs. De Clerck and Cornelis, this time with Dr. Hilde Timmerman, described how miniscrew anchorage could be used for intrusion of severely overerupted teeth prior to restorative rehabilitation ("Biomechanics of Skeletal Anchorage, Part 3: Intrusion", May 2008). In years past, such a case would have been treated using a combination of endodontics and prosthodontics, effectively devitalizing otherwise healthy teeth to reestablish the occlusal plane.

Invisalign and TADs were clearly the major game changers in orthodontics over the past decade and a half. It is entirely possible now, using these two techniques—individually or in conjunction—to treat extraordinarily difficult malocclusions to a high standard of care without the need for fixed appliances or dentoalveolar surgery. Many other JCO authors besides those mentioned here have contributed to the advances that have indeed changed the day-to-day practice of orthodontics. Our thanks should go out to all of them.

RGK