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# THE EDITOR'S CORNER

## High-Tech Orthodontics

Technological progress in any healthcare-related discipline is always met with an initial degree of skepticism. After all, it makes sense to stick to tried-and-true techniques and appliances with long and strong track records in a field in which patient well-being is the ultimate goal. Not every new product entering the marketplace lives up to its claims, and the prudent doctor does well to exercise his or her well-developed critical-thinking skills before jumping on any bandwagon. Commendable as this skepticism might be, however, it should not stand in the way of new technologies that really do improve overall treatment outcomes or patient comfort—not only fulfilling the prime objective of well-being, but achieving new levels of excellence.

A notable example in the medical field would be the development of robotic surgery. Introduced in the mid-1980s, it was first used to place needles for brain biopsies under the guidance of computed tomography. Since then, it has become a mainstay of surgical practice, with applications in a wide variety of specialties, from urological and cardiovascular surgery to orthopedics and neurosurgery. It was difficult for many practitioners to get used to the idea of robot-assisted surgery, simply because most people picture robots like the ones described in science fiction. But thanks to the pioneers who persisted in working through the considerable challenges posed by surgical robotics, the rewards have been tremendous, including more precise and less invasive surgeries, shorter hospital stays, and improved recoveries.

Looking back at the technological developments in orthodontics over the last 40 years, we first saw a movement toward standardized treatments for similar malocclusions, with advances such as pre-programmed fixed appliances, the “straightwire” movement, and prefabricated removable positioners. The advent of straightwire mechanics helped overcome a professional tendency toward undertreatment, but it was all too tempting to settle for the results we got from expression of the appliance prescriptions, without performing the finishing wire bends

that might have improved the outcome of a particular case. Now, the pendulum is swinging in the other direction, away from generalization; the next major trend appears to be toward technologically enhanced customization.

Recent innovations in orthodontics may prove to be as revolutionary as robotic surgery has been in medicine. New technologies include three-dimensional imaging, digital intraoral scanning, robotic wire bending, digital setups, virtual modeling, digitally generated indirect bonding setups, and customized bracket and wire fabrication. Robotic wire-bending technology is already being used in practices around the globe with the SureSmile system (see the article by Dr. Randall Moles in the March 2009 issue of JCO). Wire-bending robots are now able to produce customized archwires with benefits mirroring those of robotic surgery.

In this issue of JCO, Dr. K. Hero Breuning provides a fascinating overview of the current applications of high-tech orthodontics. After reading this article, I find it conceivable that, in the not-too-distant future, the orthodontist could

meet with a patient for an initial consultation, take a three-dimensional scan and perhaps an intraoral scan, and from that one set of digital records generate everything needed to start treatment: a set of digital models, a detailed diagnosis and treatment plan, customized brackets and archwires with indirect bonding trays, or, alternatively, Invisalign or other removable appliances. It is entirely possible that the final retainers might even be made from these initial digital records.

While the new technologies certainly have promise, most of them still need to meet the criteria of double-blind clinical trials to evaluate their overall efficacy, as emphasized by Dr. Breuning. In addition, like the Digital-Titanium (DTi) Herbst presented in this month's Cutting Edge column by Dr. Giampietro Farronato and colleagues, many of these devices need to come into more widespread use before they will be affordable to the average practice. Still, despite such prudent caveats, Dr. Breuning's article left me excited about what is to come. I trust you will feel the same way.

RGK

## Have you seen this questionnaire??



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