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Drilling into the future of robot-assisted dentistry

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Contributed photo

Jonathan Ross is the first provider in Ohio to offer the new Yomi robotic technology, which assists him in dental implant surgery.

In May, Jonathan Ross of Ross Periodontics and Dental Implants became the first and only provider in Ohio to adopt the Yomi Robotic Dental System.

With not even a fraction of a millimeter to spare, Jonathan Ross centered in on his surgical site and was able to successfully complete a dental implant with the help of new robotic technology.

Developed by Miami-based robotics health care startup Neocis, the Yomi Robotic Dental System markets itself as the first and only U.S. Food and Drug Administration-cleared robotic device for dental implant surgery.

While surgical robotics have been available in the health care setting for many years, they have taken longer to reach the dental space.

Ross, of Ross Periodontics and Dental Implants (which has locations in Mayfield Heights and Willoughby), said he imagined robotics would come to dentistry "eventually" but didn't realize there was a commercially available device until earlier this year.

"I was intrigued by it but didn't just jump on in," he said. "I mean, as you can imagine, this technology is expensive to implement in the office. But the more I thought of it, I kind of saw that Yomi was meeting me at kind of the intersection of what my goals are for dentistry, for implant dentistry and the changing technology."

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Yomi enables a surgeon to plan a dental implant procedure based on imaging of the patient. Using anatomical references, the surgeon can map out a procedure, planning around the nerve or other teeth or the sinus. Once the plan is set, the robot arm assists the surgeon during the procedure. It doesn't act autonomously, but instead will physically resist motion outside the bounds of the planned procedure. A screen shows the surgeon where they are at all times.

"It's very much like a lane-assist for a car; it's going to keep you exactly where you want to be," said Alon Mozes, CEO and co-founder of Neocis.

Neocis received FDA clearance for Yomi in 2016 and began its commercial efforts at the start of last year.

Over the past decade, Ross has placed most of his implants freehand, measuring the site and then placing the implant by hand. He had considered existing technology solutions in the space, but didn't feel they fit his needs.

Navigation systems are optical systems that show on a screen where the handpiece is in relationship to the patient and the planned implant, Ross said. Though this gives the dentist a better view of the surgery, it is still freehand, he noted.

He'd tried guided surgery, which uses a physical restriction on the placement.

"With the physical surgical guides, if it doesn't fit on the teeth, you can't use it," Ross said. "If you don't realize that it's not fully seated, you're going to go off angle, and if you planned it wrong in the first place, it's not going to work. And if the patient can't open wide enough — because with these surgical guides you need extra-long drills — if the patient can't open up wide enough, you can't use it. So all those limitations: I have not really gotten into guided surgery."

Guided surgery is also considered more static, without the freedom to change course during the procedure if needed, said Stephanie Carter, clinical sales representative with Neocis who's been working with Ross. Yomi allows the surgeon to "dynamically plan," meaning if things change during the surgery, the robot can adjust.

"Now, if I go in there and I see that it's planned wrong or it's going in the wrong direction ... I can change the plan on the fly, and then get it into the right position without having any special surgical kit," Ross said.

Dr. Faisal Quereshy, residency director and professor of oral and maxillofacial surgery at Case Western Reserve University, said transoral robotic surgery has been performed with some of the same surgical robots used in urology and oncology.

He said he believes that part of the reason the industry hasn't seen dental-specific robotics sooner is that the mouth is so accessible and visible. Also, some surgeons are more old-fashioned and haven't adopted newer technology, to which younger surgeons may be drawn.

"From what we learned, the dental industry is often ignored. It's a very separate market from the traditional medical markets," Mozes said. "So you'll see robotic systems in the cardiac space, in orthopedic space, in neurosurgery, but the dental market has just been completely different in terms of the medical device manufacturers that address that market. So it was really a wide-open opportunity."

So far, in the cases in which Ross has used Yomi, he said he doesn't believe he's stretched the boundaries of what the technology is capable of. He's been starting with simpler cases.

Mozes said there are a variety of procedures that Yomi could help make more consistent and reliable. He sees opportunity in not just the dental implant space, but in the dental industry more broadly. Yomi, Mozes said, has the capacity to be valuable in every dental office.

Quereshy, who hasn't used Yomi, said he would like to see more research into newer technology in general to determine what it means for patient outcomes, looking at patient safety, success rates and efficiency.

"In terms of patient outcomes assessment, whenever you have technology, I think it's important to look at does it really help outcomes and patient care?" he said.

Mozes said that while clinical studies have focused on safety and effectiveness of the robot, there are additional ongoing studies to examine outcomes compared to traditional methods.

Inline Play

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