Robotic guidance system could be game changer for implant dentistry

Implant dentistry is about to make a leap in development, at least if things go the way US company Neocis predicts. After introducing YOMI, the first robotic system developed for dental implant placement, and receiving Food and Drug Administration (FDA) 510(k) clearance to market its pioneering surgical assistance system, the company has recently announced the completion of the first sale of its device.

The dental implant and prosthetic market is one of the fastest-growing markets in the US. Equally thrilling is the surgical robot, its market, which is estimated to reach US$20 billion (€18.8 billion) across several medical markets by 2021. Combining both medical fields is YOMI, which is intended to provide assistance in both the planning (pre-operative) and the surgical (intra-operative) phases of dental implant surgery.

Commenting on receiving FDA clearance, Neocis CEO and co-founder Dr Alon Mozes said, “We are excited to achieve this important milestone for YOMI. We look forward to further demonstrating the benefits of YOMI to the surgeon’s practice and their patients and to bringing the system to select key opinion leaders in the United States.”

According to Neocis, YOMI is engineered to eliminate dentists’ dependence on plastic drill guides, which can impede the site of surgery and block proper irrigation and visibility. The computerised navigational system delivers physical guidance through the use of haptic robotic technology, which provides sensory feedback and constrains the drill in position, orientation and depth. Notwithstanding its digital guidance, the surgeon remains in control and can dynamically change the plan, during the procedure, the company emphasised.

Neocis further noted that it is committed to ensuring that dentists who choose to use YOMI in their practice undergo sufficient training on the use of the software and the workflow of the system.

The first clinic to use YOMI in daily practice will be the South Florida Center for Periodontics & Implant Dentistry in Boca Raton, Florida. Neocis stated in a press release. The system has been installed, and Drs Jeffrey Ganeles, Frederic Norkin and Liliana Arango have completed training.

“We are excited to incorporate YOMI into our practice,” Ganeles stated. “Adopting state-of-the-art technology is part of our commitment to providing the very best care for our patients. YOMI ensures that the procedure goes precisely as planned. There is nothing else like it, and I believe it will be a game changer for our practice.”

Novel surgical procedure could help combat peri-implantitis

The most common cause of peri-implantitis is the formation of a biofilm on the implant surface. Thus, effectively decontaminating the affected surface is essential for avoiding implant failure. Researchers in South Korea have now tested a novel surgical procedure and shown promising results in combating this inflammation.

In two case studies of male patients over the age of 50 who exhibited severe peri-implantitis, the clinicians used the R-Brush (Neobiotech), a round brush with titanium alloy bristles, to clean the affected implant surfaces. Moreover, a regenerative approach incorporating bone grafting materials was used to re-build the bone surrounding the implant. The titanium brush proved to be highly effective at removing biofilm from the implant surface, the researchers noted. In addition to eliminating the contaminated original rough surface, the brush created a new rough implant surface. This newly created surface made the regenerative process more successful and predictable, the follow-up assessment at three, six and 15 months after treatment indicated.

During the two-year follow-up, the bone level was maintained. Periodal radiographs showed that the alveolar bone height was stable, and no bone resorption was observed minimally or distally.

The results are in line with those of previous studies that have shown that re-osseointegration can occur on surfaces previously contaminated by dental plaque and surrounded by a bone defect. Although there is no similar protocol in the treatment of severe peri-implantitis yet, the two cases in which the R-Brush was used suggest that open debridement may result in re-osseointegration and that this integration may be pronounced on a rough implant surface, the researchers wrote.

In addition to its promising results, the procedure has one significant advantage compared with conservative therapies for removing debris, which include the use of metallic curettes with an adjunct of local or systematic antibiotics, as well as laser and ultrasonic devices: it has a very short chair time. In one of the cases, it took about four minutes to treat the eight exposed threads with the R-Brush, the researchers noted in their paper.

However, owing to the small number of cases considered, the efficacy of the described method needs further investigation in clinical trials, the researchers concluded.

Microthreaded dental implants may preserve crestal bone

Implants with a microthreaded-neck design are more effective than those with a machined or conventional rough surface, researchers have found. Their study findings indicate that less crestal bone is lost with implants with the first design. Furthermore, the shape may contribute to better primary implant stability.

The researchers, from the University of Kentucky in Lexington and the University of Dammam, investigated the impact of a microthreaded-neck design on crestal bone preservation, which is essential for implant stability. For the study, they analysed 13 articles published between January 1995 and June 2016 and obtained via a relevant keyword search on three electronic databases. From these, they concluded that the addition of deeper threads on the implant allowed for greater stabilisation between the implant and the bone, especially with weaker bone, and that less crestal bone was lost with dental implants that had a microthreaded-neck design than with those with a machined surface or conventional rough surface. Their findings demonstrate that geometry does affect the amount of stress and strain on the implant.

The scientists recommended additional trials to evaluate how bone loss might be affected by different implant types. Furthermore, they suggested that future studies use standardised imaging techniques to evaluate the placement of implants with a microthreaded-neck design in bone-augmented sites.