CAD-CAM Customization Leads to Lower Surgical Time and Complications

In a recent article in the Journal of Oral Implantology, researchers study the use of CAD-CAM technology to customize titanium mesh used in dental implant surgery. While many benefits have been noted, there are still complications relating to CAD-CAM customization that need to be addressed.

LAWRENCE, Kan. (PRWEB) May 21, 2018 -- Journal of Oral Implantology — Technological advancements are creating exciting opportunities for clinicians to increase the success of dental implant surgery. Currently, developments in three-dimensional (3D) modeling and printing are allowing for exact rendering and visualization for implant placement. By using computer-aided design-computer-aided machine (CAD-CAM) customization, clinicians are expecting to lower surgical procedure time and reduce postoperative complications.

Researchers from the University of Bologna (Italy) and a private practice in Bologna recently published a study in the Journal of Oral Implantology that evaluates the application of CAD-CAM customization implant surgery. In examining the surgical outcomes from nine patients, the researchers found several advantages to using CAD-CAM customization; however, they did note corrections that still need to be made before implementing CAD-CAM as the new standard of care.

Nine patients scheduled for dental implant surgery requiring the use of titanium mesh to form a solid implantation site were evaluated. CAD-CAM was used in all cases to achieve a pre-surgical virtual rendition of the implant area, as well as the use of 3D printing to create the titanium mesh. The researchers examined the ability to complete the implantation as planned via the computer model, bone regeneration and timing of exposed titanium mesh.

During the 6- to 18-month observation period following implantation, the researchers found that in all patients the implant position was well matched with the virtual rendition and there were sufficient increases in bone. However, problems were found with the titanium mesh. Three patients experienced 4- to 6-week premature mesh exposure, a 4- to 6-week mesh delay was found in three others and one patient needed the mesh completely removed earlier than anticipated. Although these complications did not affect the overall success of the implant surgery, they did cause a higher risk for infection. The researchers also note an increased monetary cost to surgery using CAD-CAM, which could hinder its utilization.

The researchers believe that the use of CAD-CAM will have many overall benefits for implantation surgery. As one researcher states, “Many advantages were observed: the possibility to project and visualize the bone augmentation needed for implants placement, the reduction in surgical time thanks to the CAD-CAM manufactured titanium mesh, the preoperative evaluation of the least amount bone that needs to be harvested, the reduction of postoperative morbidity due to above mentioned reasons and finally the possibility to position implants according to the programmed treatment planning based on both prosthetic and surgical evaluations. However, due to the possibility of mesh exposure correlated to the stiffness of the mesh and to the learning curve of the digital mesh projecting, a cautious approach to this procedure should be suggested to avoid postoperative infections that can jeopardize the desired bone augmentation.”

As dynamic as technological advancement is, the researchers are confident that the complications relating to CAD-CAM customization will be addressed swiftly. Future research is necessary to reevaluate this process for
precision, reliability and affordability.


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