Doctors using computers to assist in giving patients new teeth

By JAMES KIRLEY
jim.kirley@scripps.com
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STANTON M. PADDOCK
stanton.paddock@scripps.com

Dr. Shawn Engebretsen and Dr. Daniel Velinsky teamed up to provide Amedeo Masi with a permanent bridge. The morning procedure took two hours using the latest technology. Before this technology was available a similar procedure would have taken several surgeries over many months.

STUART — Early in September, Amedeo Masi had to pass up eating a New York strip steak.

"A good steak," he recalls, "but I couldn't chew it."

The problem was that he was wearing dentures, removable appliances for people who have lost their teeth. They can leave much to be desired.

"They would not work because I don't have enough jaw bone," he said. "They kept falling out on me. It was embarrassing."

The 73-year-old Stuart man went to sleep in the dentist's chair recently without a single tooth in his upper jaw and awoke a short time later with a new set of pearly whites -- anchored right into his jawbone like nature's own.

"The teeth feel great," he said. "My wife tells me they look beautiful."

The dental implants and bridge of man-made teeth that Masi got while under general anesthesia have been available for many years.

What is new about the procedure being performed by Stuart doctors Shawn Engebretsen and Daniel Velinsky is that it allows oral surgery and prosthetic teeth to be planned on a three-dimensional computer model.

"We're reducing the number of surgeries to one time, as opposed to two, three or four surgeries to do the same treatment," Velinsky said.

Velinsky, a cosmetic and reconstructive dentist, and Engebretsen, an oral surgeon, planned Masi's surgery based on computed axial tomography, a CAT scan, of their patient's head. The image was taken during a single visit and Masi didn't have to return until the dentists were ready to install his new teeth.

A three-dimensional computer model made from the CAT scan allowed local technicians and counterparts at Nobel Biocare's laboratories in Sweden to build Masi's new teeth without him being present for fittings.

The same model was used by Nobel to build the dentists a surgical template. It fitted snugly over Masi's gums. Engebretsen used the template to drill and place six titanium implants that anchor Masi's new teeth into the bone of his jaw.

Such surgery used to take six months or more, with multiple appointments in the dentist's chair. When limited by two-dimensional X-ray images, dentists often needed to cut back flaps of gum to make sure sufficient bone was underneath and that nerves would not be affected by implants.

The finished work was as close to real teeth as possible; Masi would need a dentist to remove them.

Dental implants have been used for about 40 years and dentists have been using CAT scan images for at least 10 years. But only within the last two years have such techniques been married to computer-assisted design and manufacturing, said Dr. Sharon Siegel, chairman of the Department of Prosthodontics at Nova Southeastern University in Fort Lauderdale.

"Before, it was all done in separate stages," she said.

The procedure is expensive: Velinsky said it costs $30,000 to $40,000 to replace all the teeth in an upper or lower jaw using the new technology.

By comparison, Masi said his old dentures cost about $2,100 for both uppers and lowers.

But it's hard to place a value on teeth.

"When you think about what gives us pleasure in life, right up until our last breath, it's eating and talking and smiling at people," Siegel said.

COMPUTER-GUIDED DENTISTRY

Recent advancements in the branch of dentistry dealing with the replacement of missing teeth allows dentists to plan oral surgery using a computer model of a patient's face and jaw. The process allows doctors to make major decisions before surgery. Patients usually leave the chair with dental implants anchoring new teeth after one surgery.

HOW IT WORKS

A computed axial tomography (CAT scan) image is taken of a patient's head.

A computer-aided three-dimensional image is created on software patented by Nobel Biocare, a medical devices group in Switzerland and Sweden. The patient's oral surgeon and reconstructive dentist plan the surgery.

Their plans are sent to Nobel, which uses computer-assisted design and manufacturing to build a surgical guide molded to the patient's jaw. It shows the surgeon exactly where each titanium implant will go and how deep into the bone.

The patient is sedated. Working through holes in the surgical guide, now pinned in the patient's mouth, the surgeon drills holes in the patient's jaw. Into each one, an implant is screwed.

Using CAT scan images, a restorative dentist has designed a prosthetic bridge of replacement teeth. Completed before surgery, they now are attached to the implants. The teeth do not come out without a dentist.

Daniel Velinsky D.M.D.; Shawn Engebretsen, D.M.D.; Nobel Biocare Web site.