

## NuCraft Dental Arts | Perfactory® 4 DDP

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-- Terry Fohey,  
owner and head  
laboratory technician  
at NuCraft Dental Arts.



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The computer-aided design processes that go hand-in-hand with 3D printing often excise one or more steps associated with traditional techniques. But 3D printing also provides solutions that wouldn't be achievable without the holistic process of additive manufacturing by EnvisionTEC. NuCraft Dental, a lab located in Atlanta, Georgia, uses a 3D printer from EnvisionTEC to make custom drill guides for surgical dental procedures.

Terry Fohey has owned and operated NuCraft Dental Arts for thirty years. The lab is on the cutting edge of the latest treatments and professional methods. NuCraft, specializing in dental restorations, prides itself on its position as a dental lab that completes work in-house using FDA-approved materials, rather than outsourcing to foreign companies. NuCraft also prides itself on its focus on the individuality of each case in order to provide a well-fitting solution. As a technician, Fohey spends his days at his workbench making teeth for restorations. Being so intimately connected with his work, over the years Fohey saw a problem within the industry, specifically in the domain of implant dentistry.

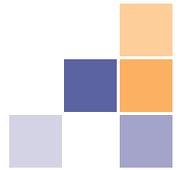
### Implant Dentistry

Placing implants is a somewhat risky procedure that requires careful planning. During surgery, the implant needs to be drilled into the bone both for stability and successful osseointegration, where the artificial piece incorporates with

existing bone. Additionally, during surgery the implant can damage the sinuses or blood vessels if placed improperly. Doctors take a CT scan of the patient so as to avoid these structures, but in implant surgery the norm is currently to perform the actual drilling freehanded. “I was at my wits end with implant dentistry,” said Fohey.

Fohey says he often hears complaints from dentists about the placing of implants done by oral surgeons and periodontists. The imprecise placement of implants led to “Laboratory gymnastics” for implants, adding porcelain or filing down parts in an implant that was already placed. “Not accomplishing excellent dentistry.”





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“The guide snapped on and they were able to place the implants ... without laboratory gymnastics!” says Fohey.

### Experiencing Innovation

Fohey visited the University of Zurich Dental School late last summer with eight American dentists, where saw a live surgery in which a drill guide was used. “The guide snapped on and they were able to place the implants right where they decided they’d be the most aesthetic, the most osseointegrated, and would give them a restoration that looked like a human tooth -- without laboratory gymnastics!” Fohey said.



He and the eight dentists were the first Americans to visit the Swiss dental school and see their methods -- this solution needed to be brought back to the United States and NuCraft Dental decided they would be the lab to do it.

Once NuCraft Dental decided on bringing this method to their lab, the task arose of choosing a 3D printer for the job. The laboratory already had an EnvisionTEC Perfactory® 4 Standard which the team already employed in the processes of making copings, crowns, bridges and inlays. Fohey originally wanted the same printer that had made the stent in Switzerland.

The Swiss showed them how they got the results and Fohey and the rest of the group saw how routinely successful this process is. Dr. Rony Jung, a well-known perostidontist, gifted Fohey the software to make the guides for a year. For a while, NuCraft sent their scan data to Switzerland to print the guides and ship them to the States. “We wanted to see if the American dentists would go for it before we bought a 3D printer,” Fohey said.

### Starting in EnvisionTEC

“The businessman in me said, don’t waste any time, they did it with that, buy that printer. They’ve already figured out the details.” However, when Fohey returned back to the lab and brainstormed with his team, they started looking at different models and RPD frameworks, where they were led to EnvisionTEC.

Fohey wanted the Objet model but the rest of his team wanted the extra capabilities of EnvisionTEC so NuCraft bought a Perfactory® 4 Digital Dental Printer. “The guides were starting to take off and I needed to print.”



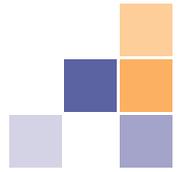
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CEO Al Siblani and Perfactory® technician Matt Moser visited the lab in Georgia to NuCraft to evaluate the printer and work with the operation team. Fohey was very impressed by EnvisionTEC's CEO: "I would say [he did] whatever it took." EnvisionTEC technical support performed work on both the hardware and software ends of the process by calibrating the machine and also changing the design of the guides so that they translated better for the print process.

while the software also remains open enough to be used across systems.

NuCraft has been working with dentists and dental surgeons all over the country successfully using 3D printed guides. The reactions from these dental professionals usually begin with deadpan disbelief.

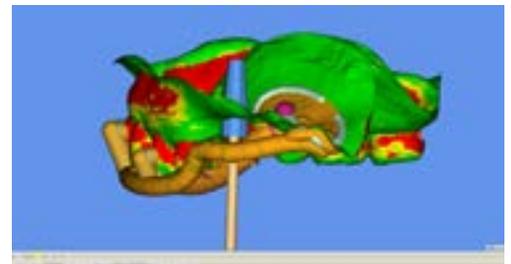
A guide from ET in New Hampshire, an implant rep friends with a restoring dentist, who friends with a placing dentist, who said the guide wasn't going to work. They were looking at the guide incorrectly -- NuCraft had checked and re-checked the guide for fit -- but the dentist and surgeon claimed the math was incorrect, assuming that the guide went to the bone, rather than resting on gum tissue.

### A Fitting Solution



*"The guides fit wonderfully."*

NuCraft has been successfully printing their own custom drill stents on EnvisionTEC machinery since late January. Jacob Reuter says NuCraft is making around five stents a week, estimating guides used in surgery around 100. Jacob Reuter, designs and constructs the surgical guides as well as operating EnvisionTEC 3D printers. He said the 3D printer is "fairly easy to use." Fohey also mentioned that the current software for making drill guides is also easy to use,



"There was a long pause on the phone and the placing surgeon went, 'Oh, wow,'" Fohey said.

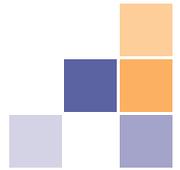
In another instance, the implant representative, placing dentist, and general dentist all called Fohey on his cell. "I'm thinking, this is either going to be really good or its going to be really bad," he said. Fohey contacted the placing dentist first. The first thing the dental

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surgeon said was: “Unbelievably easy, I can’t believe this.” The surgeon went on to say that this procedure was the best he and his team had ever done, according to his assistant, who could clearly see and irrigate the gum line.

Fohey got the same reaction from every team, many disbelieving of the functionality of the stent before realizing the custom-made snap-fit guides are “the best they’ve ever used,” says Fohey. “That’s the reaction we’re getting.”

“Without the guides, there is no chance of having a good collaborative effort between the restoring dentist, the lab technician and the placing surgeon,” Fohey said. “If we’re not all of us collaborating at the highest possible level, we’re shortchanging the patient.”

Fohey plans to take a 3 day course in Zurich for guided surgery in September -- he’s bringing along with him 26 American dentists. NuCraft Dental Arts has commissioned over 100 stents that have gone on to be used in successful guided drill surgeries.

## The Future of Digital Dentistry

Six months later when the implants are osseointegrated and the patient is ready for restorations, Fohey says he can take the drill guide once more, and snap it back in place over the model. “It fits perfectly. It shows the accuracy, and stability, and it shows that if you put the implant in there, you’re going to get a beautiful restoration,” he said.

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### About NuCraft Dental

NuCraft Dental Arts is a high-production dental laboratory servicing dentists and surgeons nation-wide. The lab is located in Atlanta, GA.

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