# dentala productivity, Proficiency, and Profitability Drouble 18 No. 09 October 2013 O

### CAD/CAM EVOLUTION

#### **KAHNG ON SHADE MATCHING**

How to handle challenging cases involving teeth that are transparent in nature.

#### **REALTIME ROIS**

See how one lab is using Anaxadent to help its bottom line, while another lab is thriving with help from Custom Automated Prosthetics.

#### **TECH BRIEFS**

See how Ivoclar Vivadent's Programat P510 furnace and Straumann's CARES Variobase Abutment are making waves in the industry.

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#### **GO BEHIND THE ARTICLE**

On page 24, you'll see how one lab used Anaxdent's anaxFORM and Acryline denture material. Head to bit.ly/18V8N6Z to check out the lab's story on video!







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DISC COLORS

#### **VITA In-Ceram YZ Disc HT**

These new discs contain a highly translucent material that is distinguished by natural light refraction properties, which can be processed on many CAD/CAM systems.





#### **True Definition Scanner Software**

Version 4 of this software is said to improve the scanning handpiece's focal range for improved image capture.

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# FROM THE Editor



RYAN HAMM rhamm@advanstar.com

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Dental Lab Products provides dental laboratory owners and managers with unbiased, clear, and concise insights into optimal uses and best applications of new products. Integrating original research, continuing education, and international industry trends, we support laboratory decision-makers in their commitment to deliver optimum patient care through advancing their proficiency, productivity, and profitability.

# Anticipating the future of CAD/CAM

**I remember** when I bought my first laptop. It was filed with cutting edge technology—a DVD player, Windows ME and an incredible 16 GB hard drive. *How*, I wondered, could a computer get better than this?

Well, six months later, I realized exactly how. Windows XP was released. All of my friends had laptops with CD burners. My graphics card was soon outpaced by any game that was released. A new technology called "Wifi" came along. In short, my computer was outdated soon after I bought it.

Chances are, you've had this experience with technology, too. You invest in a new technology, and then watch as new innovations make it obsolete. Technology changes, faster than most of us can possibly anticipate.

So what does that have to do with the dental lab industry? Well, you know that technology is rapidly changing the laboratory—and will continue to do so, particularly in the area of CAD/CAM. What's next for this important growth area? What can labs do to make sure their investment today won't be outdated tomorrow? How will CAD/CAM continue to shift and innovate, and what will that mean for the lab?

These important questions led to our feature story this month, "The Future of CAD/CAM." Read it, and then tell us—via email, Facebook or old-fashioned letter—how you're using this rapidly growing technology in your lab.

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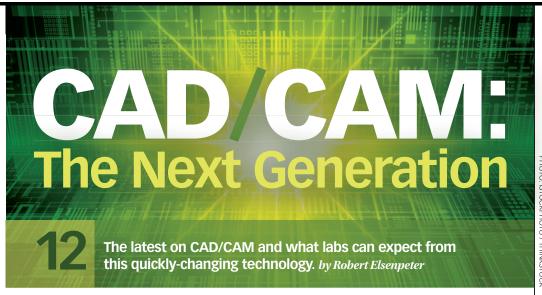
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The Straumann CARES Variobase Abutment offers quality you can depend on.

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Compiled by Carol Pilmer and Ryan Hamm



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by DLP Editorial Team

7 reasons you should revisit removables by DLP Editorial Team

O3 Super clear PMMA from Talladium said to offer numerous advantages by DLP Editorial Team

Picks

What lab owners and technicians were searching for and savoring in September @ dlpmagazine.com

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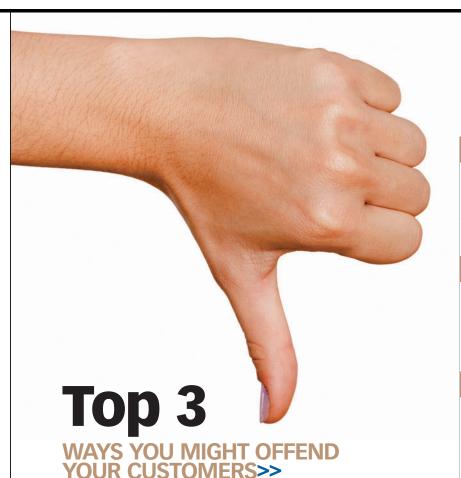
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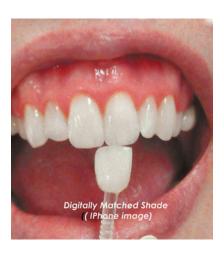
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Version 4.1 software for the 3M True Definition Scanner is said to improve the scanning handpiece's focal range, allowing for easier full-arch scans and improved capture of challenging areas of the oral anatomy. Practitioners who tested the new software in a clinical setting reportedly praise its enhanced scan speed and the ease with which it captures incisal edges and interproximal spaces, ultimately providing greater user control and less chair time for the patient.

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**CIRCLE RS NO. 16** 

# PREMIUM METAL FRAMES

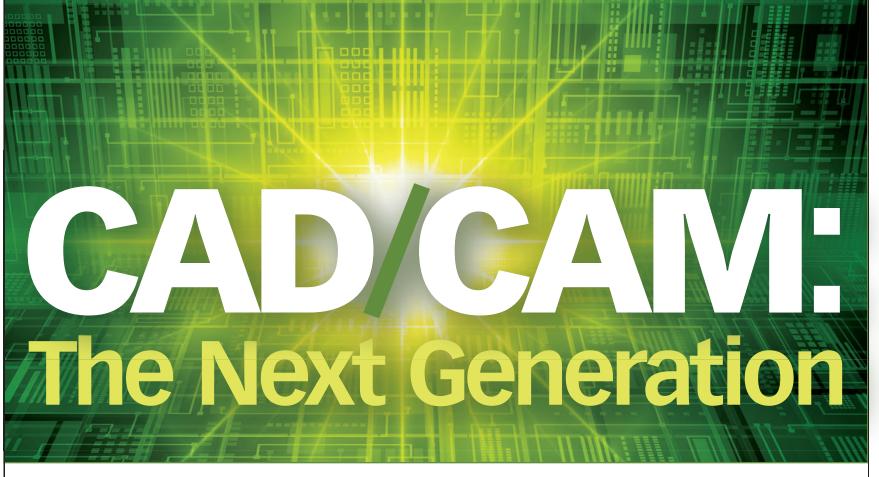


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As CAD/CAM technology moves into its third decade, what can labs expect from this fast-changing technology?

by Robert Elsenpeter, Contributing Writer

Sitting on Matt Robert's workbench are two restorations: One's a ten-unit upper anterior case containing a few zirconia units; the other consists of two arches opposing each other. While these two cases would have taken a few days to complete by hand, because he used computer-aided design/computer-aided manufacturing (CAD/CAM), Roberts was able to complete them one Friday after lunch.

"As it was, I had to design the lower arch twice," laughs Roberts, owner of CMR Dental Lab in Idaho Falls, Idaho. "I had a bug pop-up in the software and I lost the design once."

But even with the computer snafu he wasn't done for the day. Roberts continues, "When I finished designing that full-mouth case after starting at 1 p.m., I also finished another 14-unit single arch."

It's no secret that CAD/CAM has changed the world of dental lab work. What used to take days to accomplish by hand can now be done in a few hours with a computer and a milling machine. But while CAD/CAM has meant a huge improvement in labs' workflow, it's not perfect yet. If everything that has been done in the past can be considered CAD/CAM 1.0, CAD/CAM 2.0 promises even more.

"Digital technologies, and CAD/CAM in particular, represent a wonderful advancement that has enabled

dental technicians to do things they never imagined doing before," says Dr. Michael Gaglio, Vice President of Marketing at Ivoclar Vivadent.

#### **EVOLUTION OF CAD/CAM**

CAD/CAM is not unique to dentistry. In fact, its roots can be traced back to the 1950s ,when the U.S. Air Force started using computer-aided design for air defense. In the six decades since, it's been used in such industries as automotive, jewelry, woodworking and musical instruments. About 30 years ago, dental labs started reaping the benefits of CAD/CAM.

"I've been involved in CAD/CAM for almost 30 years now," says Tim McKimson, Global Engineering Director and General Manager at Core3dcentres in Las Vegas. "Before dentistry I was in aerospace, and that's where CAD/CAM really started. I've seen this happen several times. If someone didn't get involved with it, usually they ended up getting out of business. I think you're seeing the same thing now, where everybody's at least getting a design system, and then sending to a milling center so that they have the flexibility to design, and then they can offer up a wide range of products, versus just what they have in-house."

While dental CAD/CAM has been used in some form or another for the past three decades, only in recent years has it really hit its stride.

"CAD/CAM was initially introduced to laboratories with just the coping, and there was a pretty big gap between what comes out of the system and what you needed to get to the final product," says Rob Nazzal, CEO of Custom Automated Prosthetics (CAP) in Stoneham, Mass. "What I've seen as the most rapid acceleration in

the last three years has been moving from restorations that need some follow-up work to finalize the restoration by hand, versus full-contact restorations."

"In the last five years there's been a dynamic switch with the improvement in software," Roberts adds. "We're now at a point where most of the cases sitting on my bench were designed on 3Shape, and if they were pressed ceramic, they were milled and waxed first, and then the ceramic was pressed, or they were milled in lithium disilicate or milled in zirconia. So not only are we metal-free, we are mostly digital in many aspects of what we're doing."

Labs are making changes to both their work processes and the strategic positioning of their companies to ensure better offerings from their CAD/CAM systems.

"Ivoclar Vivadent recently advanced our position in the digital technology and CAD/CAM market by acquiring Wieland Dental and Wieland Precision Technology," Dr. Gaglio notes. "We are committed to working with dental laboratories to provide outstanding technical support, customer service, along with education and training to alleviate challenges and facilitate the leap of dental laboratories to embrace working with new materials and new technologies."

Dental labs are able to benefit from the experiences of all the industries that have adopted CAD/CAM over the years. And, in many ways, the hurdles that dental labs are facing are the same sorts of obstacles that other industries have already negotiated.

"Dental is not the first [industry] going through this change," says Mark Ferguson, Assistant Manager at Core3dcentres. "It's kind of followed the same type of a line: It starts where the progressive people are doing it, and

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#### W TECHNOLOGY FORWARD Trends

in the end, if you don't have it, you are suffering in your own business plan."

#### THE OLD AND THE NEW

Adopting CAD/CAM technologies isn't usually a complete move away from established techniques. While CAD/CAM offers more efficient, precise ways to work, there are still some things that must be done by hand.

"It's really hard to transfer all of dental to CAD/CAM," Ferguson says. "For what we would call bread-and-butter dentistry, that could be moved to CAD/CAM, and for some labs it has, but when you look into more comprehensive dentistry—full-arch to full-mouth type dentistry, the CAD systems are still evolving. The really cutting edge labs can do it, but it's not really available to the masses now."

"We're still waxing and pressing some cases," Roberts notes, "but there are some specific shapes and thicknesses that are easier to hand wax and to mill, and there's specific applications in the software that are still awkward, but we're seeing that, as a tool, the digital design world has caught up with the analog design world, and it is now becoming more efficient."

Dr. Gaglio says it isn't just the equipment and computer software that matter when it comes to CAD/CAM—it's also important for the materials to be optimized.

"There is a strong link between materials and the processing of those materials," Dr. Gaglio says. "In product development for all of our portfolios, we balance materials with the processes, and create advanced technologies for both. Whether you press, mill in-house, or outsource production, all options provide a full complement of production choices that can meet the needs of any size laboratory. It is critical to support our laboratory partners by giving them a choice of multiple material options and multiple production options so they can find the best solution for their business."

And in some cases, just by virtue of what the lab does, they are at different places on the work spectrum. Nazzal relies mainly on CAD/CAM to deliver his restorations.

"CAP is a provider for laborato-

ries," Nazzal notes. "We don't take any of the fabrication work to the final stage. So there is some manual work that is done on the CAD restorations, but there's nothing that we fabricate fully by hand within CAP. Everything is done, every product we offer, is based on a digital process."

#### **OPENING CLOSED SYSTEMS**

As CAD/CAM has developed, one of the biggest evolutionary steps was moving from closed systems in which you had to buy everything—equipment, software and even materials—from one supplier, to systems in which labs could pick and choose the best components from different vendors. In the past, pieces from different systems didn't work and play well with each other. Now, thanks to industry-wide standards, that's

Integration of different layers of data will improve treatment and really expand the quality of dentistry.

- Matt Roberts, lab owner

become the norm.

"You wouldn't have been able to design on one system and send it to someone else's machine," McKimson says. "That was in the past. Four or five years ago the systems became open systems, which means that I can buy software from one vendor, buy a machine from a separate vendor, buy the material from a third vendor, and still make it all work."

Open systems have meant better efficiency and productivity, along with a better return on investment, following equipment purchases.

"We'd see a lot of family-run labs that all had the same graveyard of worthless machines that they had paid a lot of money for based on promises from the vendors," Ferguson says. "The vendors didn't come through. That's what we do at Core3d. We do our own templates to manufacture. We use certain design software for certain applications. So we're a little bit flexible, but that's because Core3d was based on that flexibility."

For Nazzal, quick access to equipment for smaller shops is key.

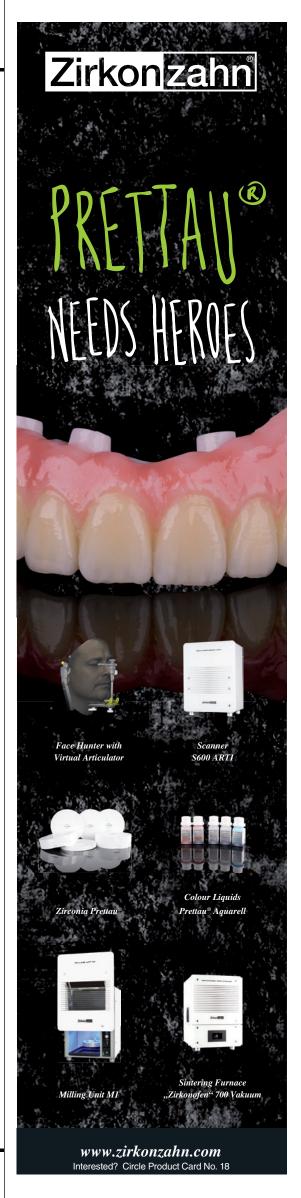
"I think the big surprise that's occurred in the last couple of years has been around the adoption of technologies into the laboratory directly," he says. "Whereas milling centers really bridged that gap between what a small laboratory needed to do and what they could afford to buy, in terms of equipment. The idea of having to buy a quarter-million dollar machine to mill zirconia, which was the case five or six years ago, was impossible for most laboratories. With the technology that's brought about, it's really about making in-house CAD/CAM fabrication accessible to most dental laboratories."

And while equipment—like computers and mills—have changed to accommodate easier, less expensive CAD/CAM work, so too have the materials used on those machines. The end result is a faster, more efficient process.

"Developments in computer design technology and implant prosthodontics have led to the creation of new materials and techniques," Dr. Gaglio says. "Perhaps no area of dentistry has undergone as many changes in recent years as the restorative and prosthetic disciplines in relation to the restorative team. As the dental technical industry aggressively converts to CAD/CAM technology, the present is evolving in front of our very own eyes. This is very exciting and promising, since restorations that used to take many visits take fewer; those that seemed problematic are easier; and those where quality was inconsistent and accuracy difficult to achieve are now predictable. Even what was expensive is now more affordable."

#### **NEXT ITERATION**

If we look at the world of consumer electronics, there have been noth-



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▲ Milling at Wieland Precision Technology. Photo courtesy of Ivoclar Vivadent.

ing but amazing offerings for the past few decades. But 30 years ago, no one would have predicted the rise of smartphones and tablet computers. The world of CAD/CAM seems poised to make the same sorts of advances, and many companies and lab leaders have their own visions of what is in store for CAD/CAM 2.0.

"The future of the digital workflow is exciting," Dr. Gaglio says. "With more than 100 years of commitment and passion to the dental profession, Ivoclar Vivadent is excited to work toward a fully integrated digital CAD/CAM solution. By merging our expertise in material science with CAD/CAM experts, the future of CAD/CAM for the laboratory will represent a new revolution."

Moving even further away from analog operations is something Roberts anticipates.

"I expect digital impressions as an input device for not taking an analog impression, and then pouring it out of stone and then copying it into a digital machine," Roberts says. "Integration of different layers of data will improve treatment and really expand the quality of dentistry."

Nazzal expects to see work being totally machine-finished so that it is ready for the patient, with very little handling by technicians.

"In the past, you either had a lot of work to do to get the restoration finished, or you accepted that it was going to be ugly," Nazzal notes. "That gap is really what I'm seeing a lot of focus on. There are materials that bridge the gap a little

bit. Right now, we're dealing with solidcolored materials, for the most part. I think what we'll be seeing more of is higher strength ceramics with multiple colors in them, more representative of natural teeth. That would reduce the labor costs of finalizing those restorations, and increasing the consistency and quality for the restorations coming off the mills."

#### 2.0 WISHLIST

While there are some predictive advances to CAD/CAM, there are other advances that the professionals hope will materialize.

"Digital impressions are very underutilized in the field right now," Roberts says. "That's an area that we'll probably see the most growth and business from. With that comes the need to print models and all the other accessory needs, but it completely compresses the delivery cycle and the predictability, so it makes it easier for the dentist to take a full-arch impression. If he misses the margin on one tooth, he doesn'thave to take another complete impression. He can simply rescan that area and pick the data up, so I think it's going to improve the quality of dentistry once the bugs are ironed out."

And while open systems are helping make workflows less expensive and more efficient, they aren't perfect.

"Right now probably the one area that needs more development is streamlining the different systems to where they work and play together," Roberts adds. "It's still not a well-integrated area of dentistry where each brand or system or software can provide output that goes to someone

else's milling machine or printing machine. It's getting better and better, but there's still some roadblocks that need to be lifted."

Adopting a CAD/CAM solution is a machine with many moving parts. Labs will be more or less involved in a CAD/CAM solution depending on their needs.

"Laboratories can integrate a digital strategy into their workflow at a pace and level that meets their needs," Dr. Gaglio says. "This digital landscape encompasses a continuum of digital technology. Over time, a laboratory can move back and forth across this digital landscape. Our commitment is to enable laboratories to move across that landscape with full confidence and reliability, choosing from the most innovative materials and processing options available.

Nazzal sees intraoral scanning technology as a component that would be a major enhancement for labs.

"The intraoral scanning side is the piece that needs to plug in on the front end to really make it truly an end-to-end digital workflow," Nazzal says. "One of the places I'd like to see it is on the clinical side, getting to the point where they evolve to become better, cheaper and faster for the dentists to be able to adopt those and plug into the laboratory infrastructure."

To get to that point, there are some major technical issues that must be resolved

"Some of the things it's going to take to get there are things like being able to see through blood and tissue," Nazzal adds. "That is a little bit of a pipe dream, but there is some science that's going on right now that is pointing in that direction, and that's going to take care of a lot of clinical challenges."

And some things might not even be realistic for CAD/CAM 2.0—but be patient.

"I'd love to see printing technologies evolve to the point where they're accessible for laboratories to be able to fabricate restorations. We're talking about CAD/CAM 2.0 right now, but I think printing will be in the third generation, but we'll get there," Nazzal says.

#### **THE FUTURE**

While recent years have seen great growth and development of CAD/CAM, there is even more on the horizon.

"Integrating new materials and new fabrication processes into a laboratory is always difficult and intimidating," Dr. Gaglio notes. "This is amplified with digital dentistry, since there are so many options, and new options are presented daily. With the large capital investment required and the necessary change in a laboratory's workflow, this makes choosing the right digital solution a daunting task. At Ivoclar Vivadent, we believe that the digital workflow is the laboratory workflow of the future. An integrated CAD/CAM solution with multiple materials and multiple processing options from a company you can trust is essential for the future success of any laboratory."

But Ferguson warns that CAD/CAM is not a turnkey solution—a certain level of knowledge, experience and expertise is still required.

"As people are looking into it, they should make sure that they know what they're getting into," Ferguson says. "I've spoken with a few labs that bought machines and didn't understand the true cost per unit—they look at the disc and the number of units they could potentially get from a disc. They think that that's their cost per unit, but generally materials are just a part of it, not the whole thing."

And once a lab knows what it's getting into—and has the requisite skills set—it opens new doors to efficiency and quality.

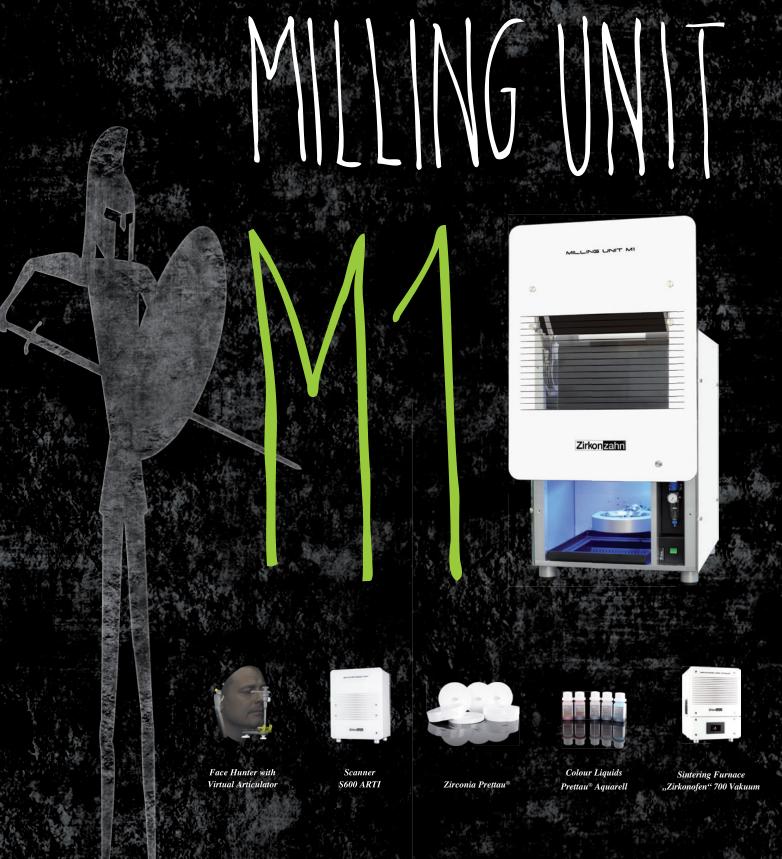
"The productivity potential within the digital world takes people that have good dental knowledge of shape, form and function and what a tooth should look like, and gives them the tools to be more productive—with a lot of training and a lot of experience," Roberts says. "It's not easy to get faster at it. It's not immediately something that someone can run out and buy a system and be faster at tomorrow. Once they do get it integrated, I think that we'll see it being the way that most dentistry is done in the future. I don't think there's any question about that."

Nazzal says this is one of the most exciting times in the dental laboratory industry.

"I've been in the industry for about seven years now, but even talking to people who have been in this industry for 30 or 40 years have said they've never seen it change as much as it has in the last three or four years," Nazzal says. "As a technology person, I love exactly the point that we're at in this industry. I think it's one of the most exciting times in this business, and I'm really looking forward." [ab]



### Machines for heroes



#### **600 KAHNG ON SHADE MATCHING**



Luke S. Kahng, CDT

# How to successfully match a single central

How to handle challenging shade matching cases involving teeth that are transparent in nature.

By Luke S. Kahng, CDT, LSK121 Oral Prosthetics

**Our patient, a woman in her mid-30s,** was unhappy with an old restoration her dentist had placed on her No. 9 central many years ago. She was interested in a more esthetic appearance and a color match with her adjacent teeth.

The patient came into the laboratory for a custom shading appointment, and was matched with ceramic shade tabs, taking into consideration her incisal and body color. It was not an easy color to match. The technician discovered the gingival to the mid-line was A1, with an overlay of light enamel. In addition, 10% of her body and

incisal 1/3 were transparent, with a gray line in between her teeth. Her teeth also had noticeable mamelon and an orange line throughout, but were translucent in nature. There were obviously many characteristics to consider with her teeth coloration.

A zirconia coping in A1 shading was a good beginning, using the in-house Amann Girrbach Milling Machine to produce the coping. After that was accomplished, further steps were taken to complete the restoration using a behind-the-scenes porcelain formula I created for her case.

#### **CASE STUDY**

Fig. 1 illustrates use of porcelain shade tabs, already fabricated using 1/3 incisal mamelon for comparison. The colors involved are from GC: IN 44 (light brown or sand) and for the incisal 1/3 I used an orange translucency color. Upon checking, I noted I needed to add CT 25 to match with her complicated coloration.

Next, I used TM05, gray in color, with CF on the incisal tip but TM01, blue, for the incisal edge. I arrived at this particular

#### **999 SHADE MATCHING TRANSPARENT TEETH**



Fig. 1 Porcelain shade tabs for custom shading appointment



Fig. 2 Amann Girrbach Milling coping, pre-stained



Fig. 3 A1 shade and then cut back



Fig. 4 Enamel color variations



Fig. 5 Before color application



Fig. 6 Silver painting



Fig. 7 Body area, horizontal lines



Fig. 8 E04 Incisal area



Fig. 9 TN and TO for blue line effect

# bench MASTERY OO KAHNG ON SHADE MATCHING



Fig. 10 TN and TO for blue line effect



Fig. 11 Create halo effect



Fig. 12 Red line application



Fig. 13 Apply TN



Figs. 14 White color, crack line



Fig. 15 After grinding, see internal color



Fig. 16 Before glazing



Fig. 17 Immediate insertion



Fig. 18 Smile view

combination after comparing and using the colors to try and match with the adjacent tooth No. 8. This was when I noticed I wanted more CL porcelain added to the formula to perfect the harmony between the two teeth. These three components were applied for a good result with the restoration color. In Fig. 2, the Amann Girrbach A1 coping was pre-stained with LA (light orange) stain, and then fired.

Before adding the 3 or 4 components, I cut back on the dentin (Fig. 3), then applied TM01, TM05, CT25 and TN. This is an extremely important stage. I built up the dentin with A1 entirely, then cut it back—with carvings into the porcelain (Fig. 2), then used a multi-layering technique to apply the enamel, cervical translucency and translucency neutral. A1 has high value but no translucency so the incisal area had to be cut heavily to produce the correct results. However, I knew if we cut back too much, we would have too much translucency. If we cut back too little we would not have enough.

In Fig. 4, we see the GC Color Wheel 58, 59 and 60 enamel color variations. Inside the dentin, there is less opacity and 2 mm thickness, which changes everything. 5/10 mm thickness will tell us the correct color application to use.

Before the mamelon application, green, orange and pink colors were layered in between the teeth. The CT 25 color was used for the mamelon, with TM05 orange color as well (Fig. 5). Silver paint TM01, a bluish color, was next applied (Fig. 6).

For the body area, I placed a horizontal line (Fig 7). A black line added a dimension for the EOP4 application. E04 was applied to the incisal area (Fig. 8). TN and TO were next layered together for a blue line effect (Figs. 9, 10). To create a halo effect, B1 and EN 59 were mixed together (Fig. 11). For high effectiveness, I painted a red line, E114, in the areas shown (Fig. 12).

I next applied TN (Fig. 13) then a white color to create a crack line (Fig. 14).

After grinding, I applied glaze (Fig. 15). Note the internal

color in the image shown here.

After glazing, I placed the restoration in the porcelain oven to bake (Fig. 16).

This view is directly after insertion in the mouth (Fig. 17). Another shot of her smile (Fig. 18) to check the color match.

#### **CONCLUSION**

As technicians, we have to be honest with ourselves about a patient who presents for a shade match but has a color that is transparent in nature. It must be carefully written down, and we must also note what tools we will use, what kind of colors we will mix, and how. We need this when we begin working on it, or we won't be able to match it when we head to the laboratory to create it. We have to figure out the adjacent tooth color and the incisal, body, gingival and depth of layering between the teeth. If we can narrow down all of these components during our custom shade appointment, we will have a very happy patient when she receives her final restoration. lab



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**OOO STEP-BY-STEP AMANN GIRRBACH** 

# **Extreme situation, extreme solution**

Using Amann Girrbach's Ceramill system to solve multiple problems.

by Alexander Wunsche, Zahntechnique Dental Lab, Miami, Florida

In dental technology, we often face extreme clinical situations for which we need to find the best possible functional and esthetic solutions. In the following case, the patient presented with numerous failing crowns and missing teeth in the maxilla (Fig. 1). Both patient and clinician expressed the desire for an all-ceramic solution.

To begin, two implants were placed in the upper left quadrant. Following the implant healing phase, preparations were completed and the impressions were delivered to our dental laboratory, Zahntechnique. We selected Ceramill Zolid as our restorative material, a non-veneered translucent zirconia from Amann Girrbach America. Zolid has exceptional esthetics with a high translucency and life-like coloring.

O2 Using the Ceramill Map400 scanner, we scanned the working model and opposing, including a vestibular scan of both models mounted in a transfer jig. The transfer jig replaces the articulator during scanning and provides the most accurate articulation scan with the best occlusal relation. After scanning the models the implant analogs were scanned with scan bodies from NT-Trading GmbH & Co.

Next we started the design process. We aligned the scan body scan with the library of different implant platforms to give the software the right direction for the implant location. Because it was difficult to get a reliable bite because of the fragile pretreatment situation, a bite splint for bite verification was necessary. The scanned opposing was used for creating an occlusal table on top of the designed splint.



#### **Ceramill CAD/CAM System**

Amann Girrbach's Ceramill system is a fully integrated, modular, open platform CAD/CAM solution that includes the Map400 scanner, the Mind CAD software, the Artex® virtual articulator, the 5-axis and 4-axis Motion 2 mills, a wide range of restorative materials and two sintering mill options.

#### Features:

- Modular approach allows labs to expand their existing system to meet the evolving needs of their customers
- Open architecture gives owners the flexibility to work with a choice of open hardware and design files
- Can also process a broad array of advanced materials

#### Amann Girrbach America

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Fig. 1 Patient's missing teeth in maxilla



Fig. 2 Implant try-in and bite verification



Fig. 3 Viewing with the virtual articulator

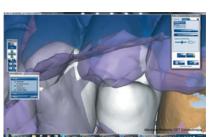


Fig. 4 The Ceramill Mind software at work

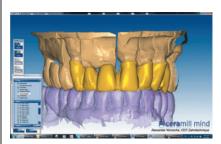


Fig. 5 Connectors placed. Final framework design (facial view) shown.

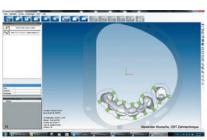


Fig. 6 Ceramill CAM Match software nests virtual framework in blanks



Fig. 7 The results after milling in the 5-axis Ceramill Motion 2



Fig. 8 The milled restoration, post-sintering



Fig. 9 The finished restoration, maxillary view



Fig. 10 Mandiubular view of restoration



Fig. 11 Finished impressions



Fig. 12 Patient try-in: Excellent fit, esthetic result



# The Beauty of Precision. The Power of Partnership.

With a combined 100-year history of service to dental laboratories worldwide, we've built the Amann Girrbach name on a legacy of commitment to unsurpassed precision and support for dental technicians pursuing accurate, aesthetically pleasing restorations.



The Ceramill system's Motion 2 five-axis mill, Map400 scanner, and Mind software – with the Ceramill Artex® virtual articulator – deliver unrivaled precision, aesthetics, and efficiency.



#### Ready to Take Your Lab to the Next Level?

Find out how Amann Girrbach's Ceramill CAD/CAM system can increase your lab's precision and profitability at a free Ceramill Live Event in your area. Register today at **www.CeramillLiveEvents.com**, or call us toll free at **866.587.3498**.

#### **Upcoming Ceramill Live Events:**

October 8 - Charlotte, NC
October 10 - Irvine, CA
October 17 - Indianapolis, IN
October 8 - Chicago, IL
October 15 - Riverside, CA
October 17 - San Diego, CA
October 8 - Santa Monica, CA
October 16 - Buffalo, NY
October 23 - Boston, MA
October 9 - Charleston, SC
October 16 - Orlando, FL
October 10 - Barrie, ON
October 17 - Charlotte, NC
October 24 - Melville, NY

Today you can see this commitment in our CAD/CAM philosophy, which is based on a set of core principles that directly address the financial and operations challenges facing today's dental laboratories.

#### Modular Design

Expand - don't replace - your CAD/CAM system to meet your customers' growing needs.

#### Open Architecture

Seamlessly share files and hardware between open systems to maximize efficiency and flexibility.

#### **Direct Partnerships**

Deal with one company for all of your needs, including sales, service, support, and training.

#### **Exclusive Focus**

Benefit from the knowledge and commitment of a partner focused on dental laboratories.



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### bench**MASTER**

Next we designed a perfect occlusal relief giving the clinician a tool to verify the bite during the try-in appointment. Using the Ceramill tooth library, we selected the appropriate tooth morphology and inserted the teeth in the right order on our virtual model to build the two implant crowns. Using the virtual tools, we made adjustments to the tooth shapes until we had exactly what we wanted. The Ceramill Mind software, with its flexible and free structure, works as a digital wax knife.

Finally we shrank the design by a factor. Normally 1 mm gives us enough room for the porcelain in the thickness we select. The implant crowns were then nested in the match software in preparation for milling. We put both of our Ceramill Motion mills to work. The Motion 1 milled the implant crowns while the 5-axis Motion 2 milled the PMMA bite splint.

After milling, the crowns were colored and placed into the Ceramill Therm sintering furnace overnight. The next morning, the crowns were removed and fit to the NT-Trading titanium bases.

After try-in of the implant crowns and bite verification, the rest of the restoration was completed (Fig. 2). The design file was easily retrieved in the Ceramill Mind software without complicated browsing.

After setting path of insertion and the final shape of the restoration, the function was viewed with the virtual articulator, which is built into the design software (Fig. 3). Using the Mind software, we eliminated high occlusal spots with an occlusal cut, as well as the interproximal contact areas. It is also possible to set up a specified distance to the opposing and the framework to have the same space on the occlusal area to the opposite arch. Finally, the connectors were placed in proper size and adjusted for the proper shape (Figs. 4,5).

When everything was designed to satisfaction, the virtual frameworks were transferred to the Ceramill CAM Match software and nested in the Ceramill Zolid blank (Fig. 6). The blanks are available in different sizes, from 12 mm to 26 mm. We selected the 16 mm blank, which, after correcting the tilting of the bridge, was the perfect size to help save both material and milling time.

We used the 5-axis Motion 2 to mill the Zolid blank. Once the milling was completed, the restorations were colored using Ceramill liquids for an A2.

The restorations were then placed in the sintering furnace (Figs. 7,8). The following day the restorations were seated and only very minor adjustments were needed. The Map400 scanner with its precision, camera ac-

tion and wide angle, captures the greatest detail so adjustments at the end are minimal or completely unnecessary.

Next, porcelain was applied and the restorations and implant crowns were finished with a stain and glaze bake. Typically, we stain and glaze in one bake to minimize stressing the porcelain. The restorations were checked for function and esthetics.

We cemented the screw-retained crowns with Multilink (Ivoclar Vivadent) onto the NT-Trading titanium bases. The surfaces were sandblasted, then Monobond® Plus (Ivoclar Vivadent) was applied to the titanium bases and to the inside of the implant crowns. After drying for 60 seconds, a layer of Multilink Implant cement was applied on the titanium bases and to the inside of the crowns. After setting for two minutes, excess cement was removed. Using a white rubber wheel and diamond paste, we polished the transition between the zirconia and the titanium to a high glaze without affecting the implant (Figs. 9,10,11).

The restorations were cleaned and returned to the dental office for patient delivery. No adjustments were necessary at the patient visit and the patient was extremely happy with his new smile (Fig. 12). lab

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# Helping unpack CAD/CAM

exocad's goal is to help explain why a CAD/CAM system can help any lab, without being confusing.

by Ryan Hamm



Larry Bodony

Anybody who's ever researched investing in a digital workflow solution for their dental lab knows all of the different terms. They also know how confusing these

terms can be—how does one even begin to navigate the myriad of options on the market for scanners, mills, software and everything in between? What if you get something that doesn't play nicely with tools you already own? Is there a way to make sense of all the different features and system differences?

exocad is hoping it can provide some answers—or at least some guidance—through these thorny questions. "exocad is the only Dental CAD software company which offers true freedom of choice," exocad America president Larry Bodony says. "exocad doesn't make scanners or production equipment, so 100 percent of our company's focus is to develop dental software to enable open scan, fabrication and material manufacturers to create systems that advance digital dentistry.

"[We] sell to resellers, who have complete freedom of choice to package, sell and support dental systems for labs and dentists," Bodony continues. "End users have the freedom of choice to select any exocad reseller that best meets their technical, business and ongoing support requirements."

#### **OPTIONS**

Of course, the reason so many choices exist is because there are so many different needs from dental labs. Some labs might have a full digital workflow already up and running and are simply looking for a new software solution, while other

labs might be exploring an initial entry into digital work—not to mention all of the labs somewhere in-between.

Bodony says exocad's focus is to provide a way forward for labs, no matter what their needs are, which is why they work with a large number of resellers.

"There are three ways that labs can adapt [our software]," Bodony explains. "The first and most important is selecting the right reseller. Some labs want a complete turnkey solution, and many excellent exocad systems are available at incredibly low prices. Other labs want open, flexible solutions, and are willing to do some process engineering themselves, or utilize an existing scanner, CAM or mill. We have resellers that support one or both models. Second, all exocad systems can support scan-only, scan/design and scan/design/CAM software configurations, which allow labs to grow incrementally as business picks up. The third way is by purchasing add-on modules from your reseller, providing features as-needed by the lab. These reasonably priced modules include implants, bars, virtual articulation, bite splints, provisionals and next year, dentures. End users should shop for the right reseller, with the right level of support, for the options that they will need now and in the future."

#### **OPEN OR CLOSED?**

Bodony also sees the need to help explain to lab decision makers what exactly everyone means when they talk about "open" and "closed" systems. The terms are regularly used to describe CAD/CAM systems, but they can be very confusing. Bodony says exocad makes its software to fill the needs of labs who want "open" systems and labs who want "closed" systems. And he says knowing the difference will be the key in working with an exocad reseller to identify just what

exocad

your lab needs. "'Open' means that your system accepts and operates on, and generates publicly defined non-encrypted data files," Bodony says. "There is also the distinction of 'input,' which refers to scan data, and 'output,' which refers to the restorations produced by the CAD system.

"The answer for exocad is that we develop our system to be 100 percent open on input and output. However, this doesn't mean fully open is the right solution for everyone. Labs that want a verified process or trust a particular brand or reseller may be happier with a turnkey system. Since there are so many business options available, it again comes down to making sure your reseller has the same business philosophy you do."

#### **USERS ARE KING**

It's all well and good to talk about the ins and outs and interoperability of software and CAD/CAM systems. But how does exocad actually work from a practical, ground-level, user's perspective?

"In exocad, you don't have to worry where the case comes from," Bodony says. "You simply fill out the 'database' form, which describes the case. No matter what the situation, the database system works for all indications, even on both arches, and in many cases even for modules you don't own."

This means exocad prides itself on being a system that is user-friendly for all lab workers, no matter what their digital experience level might be.

"exocad's 'secret' is software that cre-

ates a custom step-by-step wizard tool for any case you can describe," Bodony notes. "The result is, we believe, the most intuitive program out there for beginner and intermediate lab technicians. For advanced users, they can bypass the wizard, to do daily tasks like fixing broken mesh, overriding specific parameters or even re-sculpting previously designed restorations after the fact."

exocad also is committed to ensuring its software doesn't quickly become out-of-date, a real concern in a time when technology advances so quickly that something can be cutting edge one day and obsolete the next. "exocad is committed to advancing digital dentistry," Bodony says. "First of all, our licenses are perpetual, meaning that you actually own your exocad-based system and it will continue to function for as long as you own the system without additional cost. However, we do need to be profitable as we continue to develop features, so, after the one-year warranty period expires, exocad users can choose to pay an update fee to their reseller to receive the latest release."

Bodony says, in the end, exocad is all about user experience, and he's confident current users will help you know if an exocad system will be the right fit for your lab. "If you're curious if exocad is for you," Bodony suggests, "users can review our website, exocad.com, browse the various boards like Dental Lab Network, view Youtube videos (search for 'exocad') or read the actual user documentation at wiki.exocad.com."





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# Edge ||

**REAL TIME ROI }}** 

# A system that lets you work a normal day

The anaxFORM system and Acryline denture material work together to save this lab owner time and money.

by Ryan Hamm



Dwain Turner (left) and Kyle Harrison (right)

#### **THE LAB**

Turner Dental Lab is a small, two-man lab located in Kerrville, Texas. The lab is family owned and operated by the two employees, Dwain Turner, the owner, along with his grandson, Kyle Harrison, a recent dental lab school graduate. Turner Dental Lab (TDL) primarily focuses on removables, making dentures and doing acryrlic work on partials. They serve 27 dentists in the Kerrville and Fredericksburg area.

#### **THE PRODUCTS**

Acryline denture base material is a cold-cure PMMA available in various colors and translucencies. Light pink, pink and dark pink shades are for implant overdentures with more opacity (60-80 percent) to better mask frameworks. Anaxdent's "regular" shade of Acryline has 30 percent opacity and the company suggests it is best suited for regular overdentures

Anaxdent's anaxFORM system consists of a simple, adjustable metal flask and silicone putties (anaxdent's Matrix Form silicones). The system is said to be faster and cleaner than using traditional stone, and the matrix can be used multiple times, in contrast to stone or hydrocolloid. The flask is processed in a pressure pot, and the system can be used to create removables, pro-



Acryline denture material

visional crowns and bridges, surgical guides, scanning

appliances, or to duplicate any work into any injectable

THE RESULTS

material.

"I put in a lot of hours," says Dwain Turner, owner of Turner Dental Lab. By his own estimate, Turner works about 15-18 hours per day, and frequently comes into the lab on the weekend. So when he's considering a new system that will maintain his commitment to quality while boosting efficiency, he's most interested in one thing: time.

"When I was investigating [anaxdent] and the materials, my biggest thing was trying to save time, [while] putting out a quality product like we usually do," Turner says. "The biggest issue in the dental laboratory seems to be trying to put in a normal work day, which seems impossible if you want to produce what you need to or want to. [So time savings] was the biggest factor that I

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looked at—and the quality of the materials."

Turner has been using the anaxFORM system with the Acryline denture base material since mid-summer. He started working with the system soon after taking a training course with anaxdent. "The courses we attended were full of information you can take back to the lab and it's been a real easy transition," Turner says. "There's a little bit of a learning curve with it; one of the biggest paradigm shifts we had to do was going from a heat-cured material to a self-cured material. [But] once we started using the system and we started finishing and polishing the material, you can't even tell it's self-curing. It's just a high-quality material."

"It's beginning to help a tremendous amount," Turner says. "We're just now experiencing the results of using this system; it's now paying off." And, of course, it's paying off in the ways that matter most to Turner: time and quality.

"We've actually have been able to save anywhere





The anaxFORM system

from an hour and a half to three hours of working time using this system, per case," Turner says. "So it's been a great asset to the business. When I say a normal business day, that typically means I only have to work 12 hours a day instead of

15-18! I'm also going to start retrieving my weekends. [And] the dentures come out really clean. I don't have to pick stone out from between the teeth like I've typically had to do for 30 some odd years."

Turner says the quality of the anax-

FORM system and the Acryline material has been such that he's been able to keep up the excellent results his clients have come to depend on. "My clients really have no idea I've made the switch," Turner notes. "I've only had comments from a couple of doctors and they've had real favorable things to say. They really have no idea I've gone from a heat-cured to a self-cured acrylic because the acrylic is such high quality and it acts real similar to my injection system I was using prior to this. In fact, one of my clients called me after I delivered a F/F and told me how well they fit and how he was able to get suction on both the upper and the lower!"

The time savings and continuing quality has enabled Turner to see a real return on his initial investment in the anaxdent products. "Aside from the courses we attended, I've had to spend a little over \$2,000 for the materials and the acrylics and the flasks involved," he says. "As far as return on investment, I've gotten my money back in about 45 days. Which is a big surprises, because I have close to \$10,000 on equipment and most guys know it takes you a while to recoup that money in the lab."

Overall, Turner is so happy with his decision to invest and what the return has been for him that he's giving it the highest praise a lab can give: repeat business. "We're going to the direction of exclusively using this system for all of our processing," Turner says. "It's really a fun system to work with because of the amazing results that we're getting. I really have nothing but good things to say."



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**REAL TIME ROI** 

# More than a seller— CAP is a partner

Why Town & Country Dental Studios chose to work with Custom Automated Prosthetics as its digital collaborator.

by Ryan Hamm



The milling room at Custom Automated Prosthetics

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Joseph Apap CDT/ MDT

#### **THE LAB**

Town & Country Dental Studios is a 52-year-old dental laboratory started by Barry Lampert, CDT. Based in Long Island, N.Y., Town & Country began as a two-man lab, and having grown significantly, they now employ 100 people, including three generations of Lamperts. Serving hundreds of dentists in the region, Town & Country is the area's leading provider of custom dental restorations. For decades, this laboratory has embraced change and routinely invests in many new and innovative

technologies. Town & Country is also a founding member of TEREC (Technical Research Consortium), a strategic alliance of leading regional dental laboratories across North America. They meet every few months to discuss industry trends and share information on technical, marketing and management topics. Town & Country strongly believes, when considering a decision to purchase any new technologies, the more information you have, the better choices you make.

#### THE PARTNER

Custom Automated Prosthetics (CAP) is a dental laboratory solutions company located just outside Boston. CAP's goal is to help dental labs make the transition to a digital workflow. To do so, they offer multiple solution options, depending on the needs of the individual lab. CAP offers outsourcing services, including scanning, designing and fabrication; offers scan and design software for labs that are ready to invest in such technology; and sells fabrication equipment. With each solution, CAP



"With any technology, [no matter how] good the tech is, support is a premium consideration [...] We were looking for someone a cut above that because we know what our needs are. CAP proved that and they continue to prove that."

—Joe Apap, CDT/MDT, General Manager of Town & Country Dental Studios

offers extensive training and education assistance, emphasizing customer service along the way.

#### **THE RESULTS**

In keeping with its commitment to technological progression, Town & Country recently invested in several Roland DWX-50 five-axis milling machines to expand their offerings and capabilities. In making such an important decision, it was critical for Town & Country to find a vendor who was prepared and able to offer more than just a good price—T&C wanted a real partner. Getting more involved in digital dental technology required resources beyond their current levels. They needed a partner willing to go the extra mile and they decided that Custom Automated Prosthetics was the right choice.

"Of all the companies we interviewed, we felt that CAP was a right fit for our laboratory and our culture," says Joe Apap, CDT/MDT and General Manager of Town & Country Dental Studios. "With any technology, the support before—and more importantly, after—the sale is a critical component. As you know, in a dental lab, we are bound by due dates. There is a patient, dentist and staff waiting for the case to arrive. CAP understood this clearly. CAP provided resources both by phone and in person, allowing us to quickly get production going and our knowledge growing. Even their website has many good resources and video clips. In addition, we intend to participate in the upcoming training course at their facility to learn about the Izir Bridge offering."

When a laboratory is considering making an expensive purchase of any kind, they need to determine what will be the "real" ROI. It would be easy to just focus on the price of the purchase, but that is not the proper perspective. There are considerations like support, training, response time, problem solving, product knowledge and pleasant people that also add to the overall ROI calculation. Apap points out that's what Town & Country looks for and this is what CAP

delivered: real value, tangible and intangible.

"Dental lab technicians [are always] looking for different ways to use the tools we have at hand," Apap says. "Our lab is no different. From milling wax, to zirconia, to PMMA, to nano composites; we want the maximum output and best quality. So far, the results are better than expected and we are very excited about the future. We feel now that we have a partner in CAP who's going to help us through trying to reinvent our process digitally."

That cooperative approach also suggests an even more vital component of T&C's partnership with CAP. "[We get an] immediate response from support," Apap continues. "Something's down, they're here. Not that we've had many problems with the machinery, but when we've called, we've gotten immediate responses. There's great value in that. "

CAP's approach to customer service and partnership has certainly left an impression with Town & Country. But, of course, T&C is a large lab. Would CAP's approach be different to a one- or two-man lab? How would they partner with a much smaller lab?

"There are the obvious differences between a 100-man lab and a one-man lab, but we're still confronted with one main hurdle that we have to jump over every day: cases have to get out by a certain date," Apap says. "For all dental laboratories and technicians, this is what they do, whether you're a small lab or a large lab. That immediate response is so important. We see CAP giving an immediate response. We see CAP really caring about the laboratories.

"We kicked the tires and did a thorough review," Apap says. "We know who's out there. CAP is a relatively newer company, and they had a fresh approach—they were very enthusiastic and willing to go that extra mile. It's not just with us they're doing this. We've seen them do this with other labs as well. Any lab, whether it's small or large, would benefit from doing business with CAP."





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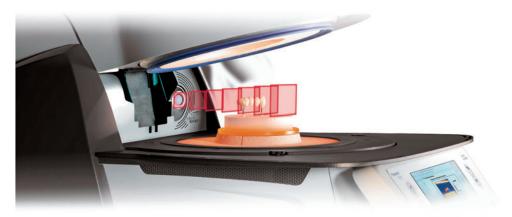
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Compiled by Ryan Hamm. Information provided by Ivoclar Vivadent.

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Proprietary engaging mechanism between CARES Variobase Abutment and Coping.



Proprietary engaging mechanism between CARES Variobase Abutment and Coping. (Alternate view)

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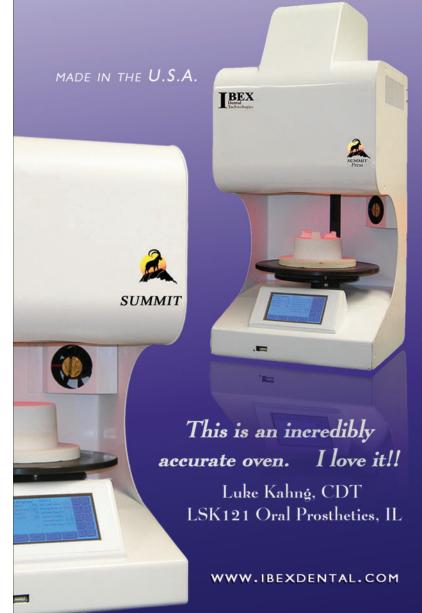
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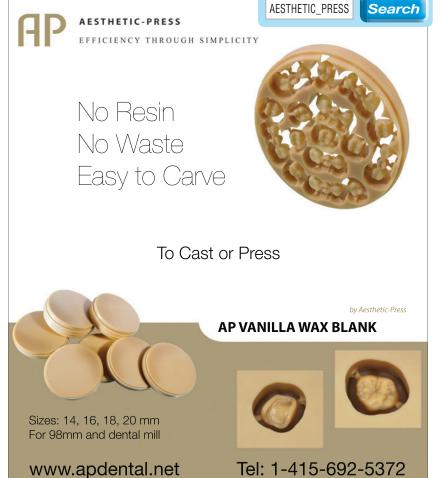
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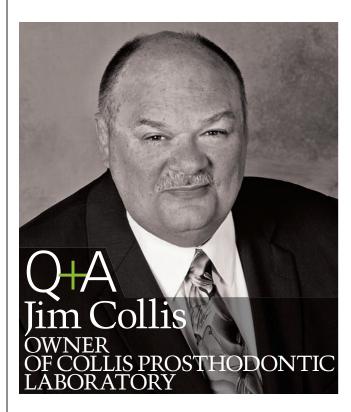
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# **TENQuestions**



You were one of the people who helped Shofu with their decision to bring Veracia denture material and OneShot Uni-layer porcelain to the U.S. What was it about Veracia SA that made you say "yes, this is great for the U.S. lab market"?

The Veracia SA has a simplified mould chart. I have yet to find a case where I couldn't find a mould to fit. They're glass reinforced, but it's a homogenous mixture with shade layers. It's a very esthetic tooth; very hard-wearing. The key factor that I really like about the posteriors is they have pre-milled/pre-worn wear facets. It allows patients to move into excursions a little easier. There's less wear of the tooth during mastication because they're pre-worn. Another thing I like is the space that is built into the occlusal surface. When the teeth are in complete occlusion there's still room for food to come off the occlusal table. In most brands, the occlusion fits together so tightly that the food can actually become a dislodging force.

# What makes Veracia SA different from other denture systems?

The Q3 Pack is the thing that stands out—Q3 stands for "quick quality quadrant." It's not just a tooth holder—it's a built-in occlusal template with individual teeth set into it. If you analyze your model correctly, and you align the occlusal templates evenly, you have a perfect curve of Spee and curve of Wilson. The opposing arch

just drops right into place. You have a perfect set-up in less than half the time. There have been other companies that have teeth that are connected. The problem is they're connected—you have to slice the teeth if you ever want to adjust them. The Q3 Pack is a time-saver. Even if the doctor is off on the bite, (which happens quite a bit), remount the case, reset the Q3 Pack and you're done. It's such a time saver. But more than time, it's a quality enhancer. That sets them apart from almost every other tooth on the market. It's so simple; it's genius.

# With both the Veracia SA and the OneShot, who is Shofu's target customer? Why should someone switch to the Veracia SA from the system they're currently using?

We're in tough economic times. Veracia SA teeth are premium products but because Shofu is dealing direct, they're able to offer these at an extremely fair price. You've got production in mind for a bigger laboratory with quality and consistency. It's a learning tool, too, for technicians who don't know much about setting teeth. You can make a beginning technician into an expert.

# How has Shofu made strides in the U.S. denture market specifically with Veracia SA?

We're trying to be on the podium a little more, to show people how easy it is. I've been at shows and I'll be at the booth and I'll do hands-on demonstrations. The sales team is willing to go into the laboratory and do a demonstration. I think by going out and educating people and showing it and explaining it, we're getting more and more people to appreciate it. Dental technicians are smart—they get it right away. Denturists understand this as well—they see it one or two times and they've got it.

# What about Veracia SA makes sense for a big lab? For a small lab?

For a big or small lab, it saves a great amount of time. You're always in a hurry, you're always working late. Maybe with a tooth like this you won't have to work as late! It's great for quality and production and it's a time-saver. If this saves the average technician half the time, you're going to set up three extra cases—in a small or a big lab, that's a lot of extra cases. You're not rushing the technique—you're applying the technique.

# What is it about the OneShot that you feel fills a need in the U.S. lab landscape?

For me, I've done ceramic work before, but I'm not a 9-layer build up guy; OneShot made it easier for me. In crown and bridge, I'm not that experienced. Just one bottle, that's it. The bigger the build up, the more transparent you get. It's very simple to use. The first time I picked it up I did a 3-unit bridge and it looked beautiful.

#### What have you seen as the primary benefit with OneShot?

I think the primary benefit is ease of use and its consistency. Whenever you do an A2, it looks like A2. When you do an A3, it looks like an A3. It's just the one bottle—you're not having to mix-up shades. You can stain with Shofu's Basic or Vintage Art Effects Set paste stains. It's just such a simple production technique.

### How have you seen OneShot change workflows for labs?

It's such a simple method. You apply a masking paste; then apply a shade opaque; and you use one bottle of porcelain, that's it. The workflow is just so much easier.

# What is it about Shofu the company that you think helps them serve the dental lab community?

Shofu is a very close-knit company—everyone keeps in touch with each other. They're up on everything. They all communicate. They're steady and methodical—when they come out with something, you know they haven't done anything halfway. I know everyone at the company, and I know they stand for quality. They have a lot of great products and it's got a very good name.

#### What can we expect from Shofu in 2013 and beyond?

Shofu is a progressive company. They're always looking to do things better. They're looking at carrying more products, but Shofu will not just bring out more products for the sake of it. They're going to bring out new products in the next year, and they are going to be quality. The company is careful and methodical and they plan things very well.

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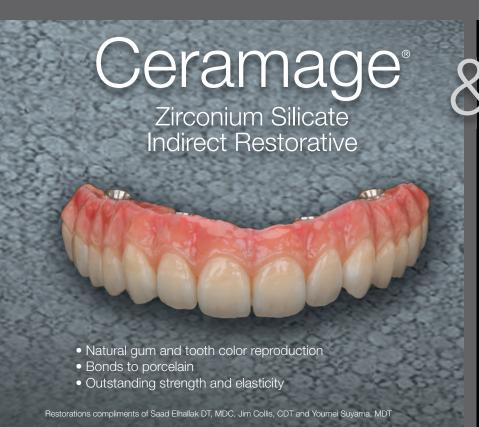


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