

2013 IN REVIEW: THE PRODUCTS, QUOTES AND HOW-TOS THAT DEFINED THE LAST YEAR

December 2013

dental**lab**products®

INNOVATIONS ADVANCING PRODUCTIVITY, PROFICIENCY, AND PROFITABILITY

Vol. 38 No. 11

dlpmagazine.com

dlp's top 50

Top Quotes of 2013

Top 25 New Products

Top 5 Most-Viewed How-To Articles

The Benchtop Editor's Picks for **Products of the Year**



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PRODUCTS IN APPLICATION

The Year in Review

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dlp's
top 50

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**CLICKS
AND
Picks**

What lab owners and technicians were searching for and savoring in November
[@dipmagazine.com](https://dipmagazine.com)

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03 Untangling the Confusing World of CAD/CAM
by Ryan Hamm

What Hurricane Sandy taught the dental industry

One year after Superstorm Sandy hit, Dental Products Report and Dental Lab Products teamed up to bring you four powerful stories of disaster, recovery and how to prepare, including the story of Town & Country Dental Studios on Long Island, N.Y., which was hit hard by the disaster. Don't miss this look at a lab that rose above adversity, and their advice on how you can make sure your lab is ready for the unthinkable.

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About this issue

A snapshot of 2013.

Over the past 12 months, we've seen plenty of change around the dental laboratory world. CAD/CAM is becoming ever more prevalent—even as its cost-of-entry gets lower all the time; emerging technologies like 3D printing are shifting how labs think about “traditional” lab work; products and tools are released each month that make the creativity of lab technicians faster and more esthetic; and a changing economy and global marketplace have presented new challenges and opportunities to dental labs everywhere.

This issue of *Dental Lab Products* is an attempt to take a snapshot of some of those shifts. Our Top 25 Products are the products that you told us you were most interested in by viewing them online. Our top technique/step-by-step articles were the ones you engaged with most on our site, DLPMagazine.com. And you've told us you value hearing from innovators within the dental lab industry, so we compiled some of the best quotes we heard from lab technicians, lab owners, material developers and company insiders to remind us of all the ways products have shifted laboratory work over the last year.

As one year ends and another begins, we want to know: How can we make *Dental Lab Products* even better in 2014? What did you see in 2013 that you want us to keep, or want us to change? How can we better serve you over the next 12 months? Let us know, however is easiest for you: Twitter, Facebook, email or even letter. We love hearing from you.

The answers to these questions will drive our efforts in the next year. New products will release, new advances will change how you work and do business and new trends will become popular. But we'll be here, doing our very best to bring you product news, helpful techniques, advice and whatever else will help you navigate the way forward.

The DLP Editorial Team



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Call Kevin Henry at
918-613-1188 **or email**
khenry@advanstar.com



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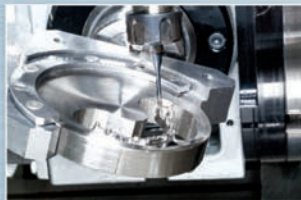
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1

1 DentMILL

The new, dedicated versions of DentMILL dental milling software are designed specifically to create dental restorations on the Datron D5 and Digital Dental Lab desktop machining systems. “DentMILL for Datron” and “DentMILL for DDL” only present the user with machine kinematics, fixtures and materials that are relevant and available, plus the programs include machine-specific templates to automatically generate 3-axis and 5-axis toolpaths for particular pieces of equipment.

Delcam

877-DELCAM 1 | delcam.com

CIRCLE RS NO. 16



2

2 CAMbridge 2013

Offering expanded automation and support for a wider range of desktop manufacturing machines, CAMbridge 2013 is said to make restoration manufacturing more efficient and affordable. It supports a larger variety of manufacturing options, as well as direct support and dedicated milling and grinding options for materials like Ivoclar Vivadent IPS e.max®, 3M ESPE™ Lava™ Ultimate Restorative and VITA® VITABLOCKS® MARK II. Designed for full integration with the 3Shape Dental System™, CAMbridge 2013 offers a simple, smooth and highly automated workflow that begins with order creation and ends with 3D printing or milling. The restructured user interface offers an improved overview of multiple machines and jobs.

3Shape

908-867-0144 | 3shape.com

CIRCLE RS NO. 17



3

3 Celtra Duo

Celtra Duo's threefold functional zirconia-reinforced lithium silicate microstructure offers a balance of opalescence, fluorescence and translucency, plus reduced crystal size that increases flexural strength. The material's increased glass content is said to visibly increase translucency and facilitate opalescence and fluorescence, while 10% dissolved zirconia strengthens the glass matrix without clouding. The glass ceramic crystals' ultrafine microstructure allows for fast, simple processing of the zirconia-reinforced lithium silicate. It uses the same furnaces and CAM units as conventional C and B porcelain, allowing labs to expand services without any additional investment. Post-mill, single-unit crowns and inlay and outlay restorations are correctly shaded, eliminating additional crystallization steps.

DENTSPLY Caulk

800-243-1942

prosthetics.dentsply.com

CIRCLE RS NO. 18



4



6



5

4 EOSINT M 270

Unlike traditional casting processes, which produce about 20 dental frames per day, the EOSINT M 270 direct-metal laser-sintering system (DMLS) creates up to 450 dental units per day using CAD data. The EOSINT M 270 system also makes removable partial dentures that are stronger than a conventional model cast and have a lower clamp-breakage risk. Additionally, the increased level of details allows for the reproduction of pitted structures, plus the finished products meet relevant EN 1641 and EN ISO 22674 standards. Also, a fiber laser that melts fine metal powder allows technicians to build products layer by layer, reportedly ensuring that components are produced in high, reproducible quality.

EOS

248-306-0143 | eos.info.com

CIRCLE RS NO. 19

5 Evident

Designed to be ideal for any size dental laboratory, Evident cloud-based software allows technicians to manage cases through every production step, including planning and delivery. Also, Evident offers inexpensive digital connections for dental practices to laboratories, comprehensive reporting, integrated marketing solutions, material disclosure compliance, as well as exception reporting to ensure cases cannot be missed. Compatible with PC or Mac computers, the Web-based software also supports touch screens, bar code scanning, iPads and smartphones.

Evident Labs

877-909-7770 | evidentlabs.com

CIRCLE RS NO. 20

6 GC FUJIROCK Bulk

GC FUJIROCK, GC FUJIROCK FAST SET, and GC FUJIROCK IMP are available in 50 pound bulk packaging. GC FUJIROCK Bulk contains the same physical properties and workability made available in the new bulk packaging. Benefits include: the material is easy to mix and flows well, yet runs less from the impression when pouring; it exhibits optimal handling characteristics; increased compressive strength results in no fractures during removal of impression; and low setting expansion provides accurate models with smooth surfaces.

GC America Inc.

800-323-7063 | gcamerica.com

CIRCLE RS NO. 21



7 Callisto CPG

Callisto® CPG is a new entry in controlled price noble alloys. With a controlled alloy price, labs can establish a fixed fee schedule for PFM or press-to-metal restorations, without being affected by the current precious metal market. Callisto® CPG features a low density of 9.3, enabling labs to process more units at lower fabrication costs. It is a cobalt-chrome-based ceramic alloy containing palladium and gold that demonstrates excellent physical properties. It is well suited for layering and press techniques and can be used for onlays, crowns, 3/4 crowns, ceramic crowns, short- and long-span bridges, telescope and conus crowns, root canal posts, implant superstructures, partial dentures and model casting.

Ivoclar Vivadent Inc.
800-533-6825 | ivoclarvivadent.com
CIRCLE RS NO. 22

8 InSync FC Stain and Glaze

InSync FC Stain and Glaze System is said to improve cases involving full-contour, layered and pressed restorations. While this system was developed for Lava™ Plus High Translucency and Jensen HT Zirconia, it offers an efficient, reliable method for shading, staining and glazing all full-contour restorations. The system includes 15 fluorescent paste stains that are easy to apply, fire true to application shade, and deliver esthetic results. The one-coat application eliminates puddling and streaking, so technicians can create clear, high luster results after one firing.

Jensen Dental
800-243-2000 | jensendental.com
CIRCLE RS NO. 23

9 Primopattern

Clear Primopattern offers the same benefits as the original red gel, but provides an additional option for cases in which clear material is preferable. The gel is said to flow easily out of the syringe and reliably stays in place. Plus, Primopattern has a lengthy working time of greater than 20 minutes, quickly cures in most conventional curing units and displays no clinically relevant shrinkage. Modelations are easily cast, as the gel burns off cleanly and completely.

Primotec USA
866-643-3129 | primogroup.net
CIRCLE RS NO. 24

10 NobelProcera 2G

The NobelProcera® 2G Scanner features advanced automation and new capabilities to help laboratories reduce set-up time by up to 50% and speed overall workflow, enabling technicians to produce more cases in less time with fewer re-scans or re-designs. The Smart Motorized Holder quickly positions models to obtain optimal scan data, while the system's dynamic scan strategies automatically apply the right scan algorithm to the specified object, providing the fastest solution without compromising accuracy. The NobelProcera 2G Scanner is part of a larger overall digital workflow network from Nobel Biocare designed to facilitate greater clinician and laboratory collaboration for more efficient treatment planning and restoration design.

Nobel Biocare
800-322-5001 | nobelbiocare.com/2g
CIRCLE RS NO. 25

11



InSync Zr
ceramic system zirconia



13



12

11 DWX-50

The DWX-50 dental mill now comes with additional accessories and tools, including the Pin-Type material adapter, the 50 Main Clamp 2 and more. The new tools and accessories are said to allow laboratories to work with a broader range of materials and address a larger number of applications.

Roland DGA
800-542-2307 | rolanddga.com
CIRCLE RS NO. 26

12 Super Clear PMMA discs

Super Clear PMMA discs are reportedly easy to mill and burn out clean, plus they polish to a glass-like finish. Indications for use include clear nightguards and implant surgical guides, as well as long-span bridgework in which warping becomes an issue while using wax.

Talladium
800-221-6449 | talladium.com
CIRCLE RS NO. 27

13 InSync ZR Ceramic Layering System

Although developed for Lava™ Plus High Translucency and Jensen HT zirconia, the InSync ZR Ceramic Layering System offers an efficient, reliable method for shading and layering all framework restorations. The system includes a wide range of fine grain naturally translucent and fluorescent powders that are easy to grind and polish, yield low shrinkage, provide the esthetics of a multi-powder build up with two powders, and match the VITA shade guide. The liners are translucent and shaded, so technicians can match white as well as shaded zirconia frameworks.

Jensen Dental
800-243-2000
jensendental.com/insync
CIRCLE RS NO. 28

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14

14 Programat P310

The re-engineered Programat P310 is equipped with advanced furnace features and QTK2 muffle technology. The furnace distributes the temperature in the firing chamber more evenly than preceding models and is more user friendly. The required program can be selected quickly via the touchscreen or the proven membrane-sealed keypad. The clearly structured menu contains modern icons, which can be click-activated. Users have a variety of maintenance programs at their disposal as well as 300 individual firing programs. The Programat P310 has a straightforward, color-coded Optical Status Display (OSD) and is equipped with double-valve vacuum technology to reduce the noise level of the pump during operation. The vacuum pump evacuates moisture from the vacuum hose and the firing chamber.

Ivoclar Vivadent
800-533-6825 | ivoclarvivadent.com
CIRCLE RS NO. 29

15 VITA YZ Disc HT

The VITA YZ Disc HT is well suited for efficient fabrication of fully anatomical restorations. VITA YZ Disc HT offers an economical, yet attractive alternative to non-veneered or partially-veneered metal restorations. It can be processed in all open CAD/CAM systems that can accept discs with a diameter of 98 mm and heights of 14 mm and 18 mm.

Vident
800-828-3839 | vident.com
CIRCLE RS NO. 30



15

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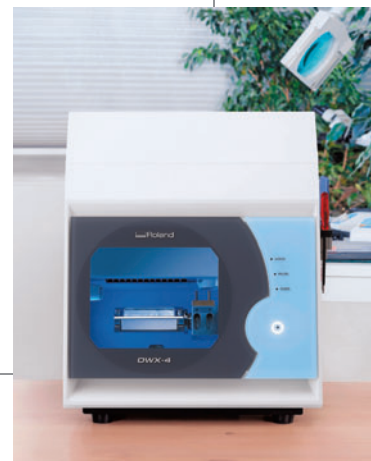
16



17



18



19

16 **Objet30 OrthoDesk**

The Objet30 OrthoDesk 3D Printer is designed for smaller orthodontic labs and clinics. It is said to help significantly shorten delivery times, increase production capacity and eliminate model storage. Affordable and easy-to-use, the printer fits on a desktop in any lab. It comes with specialized dental printing materials in convenient sealed cartridges. Stone models, orthodontic appliances, delivery and positioning trays, clear aligners, retainers and surgical guides can all be produced significantly faster and much more accurately than before. Based on patented PolyJet® 3D Printing technology, Objet30 OrthoDesk jets ultrafine layers of material for smooth, accurate models. As many as 20 models can be created with every print run.

Stratasys Ltd.
952-937-3000 | objet.com
CIRCLE RS NO. 31

17 **lay:art mixing trays**

Designed to provide style, quality and functionality, lay:art mixing trays offers eight different, high-quality mixing trays. All trays fit into the ergonomically designed chassis with a protective and removable top. The range starts from the glass tray with moistening stripes over self-moistening ceramic trays to natural agate or stylish glass trays.

Renfert USA
800-336-7422 | renfert.com
CIRCLE RS NO. 32

18 **TRIOS Color**

The TRIOS® Color digital impression taking solution scans and captures intraoral images in realistic-looking color. RealColor™ Technology helps to create scanned images in the appearance of real teeth and gingiva. The natural looking colors provide an excellent scanning experience, and make it easy for clinicians to distinguish between the different types of restorative materials, recognize bleeding areas, see color transitions on teeth, and easily identify margin lines with enhanced detail and share highly accurate images with lab technicians. It can be used in combination with TRIOS® Ultrafast Optical Sectioning Technology.

3Shape
908-867-0144 | 3Shape.com
CIRCLE RS NO. 33

19 **DWX-4**

The DWX-4 was designed to combine a small footprint with easy operation and was engineered to function with a simple workflow. After installing the material and milling tools in the machine, lab technicians use Roland's intuitive Virtual Machine Panel (VPanel) to configure settings from a computer workstation. An automatic calibration feature calibrates the mill at the touch of a button. Then, VPanel automatically sends milling data to the DWX-4 to begin production. With a four-axis configuration that includes three axes (XYZ) and a rotary axis, the DWX-4 features an automatic tool change. Prosthetic parts such as crowns and bridges can be produced using standard block and pin-type dental materials. The system comes with its own CAM software and also works with commercially available CAD/CAM software. Other features include a status light that displays the progress of each job; a tool-life management system that monitors tool usage and automatically notifies the user when a tool replacement is needed; an air blower that prevents dust buildup; a negative ion generator that reduces static electricity when milling PMMA; and an automatic diagnostic system that sends users an email when an error occurs or when a job is completed.

Roland DGA
800-542-2307 | rolanddga.com/dwx4
CIRCLE RS NO. 34



20



21

20 3Z™ PRO

With one-touch simplicity, the fully automated 3Z™ PRO 3D printer brings the power of 3D high precision printing to the desktop. Users of any technical level can produce their own high precision wax parts, ready for casting by using the printer. The intuitive touch screen uses icons as a common language and has features including self-testing and auto-calibration functions, wireless connectivity and the ability to load and manage jobs from a remote desktop. User-friendly software enables operators to select incremental printing options using an on-screen slider bar.

SolidScape Inc.
603-429-9700 | solid-scape.com
CIRCLE RS NO. 35

21 VITA In-Ceram YZ Disc Color

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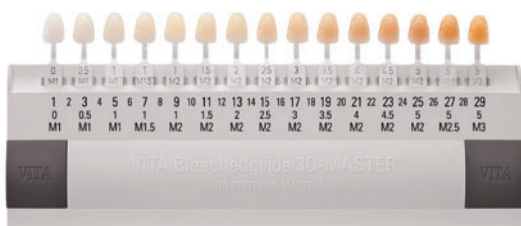
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22



24



23



25

22 Fuego SCS

The Fuego SCS Series provides maximum safety and convenience for all flame-related applications in the lab. The new comfort functions provide: zero-pressure shut off; gas consumption display; cooling reminder for inoculation loops; temperature regulation for heating media; user account selection; graphical installation instructions; and acoustic signals as operating aids. The Fuego's design reduces air flow disturbances in laminar flow hoods. The Safety Control System, SCS, demonstrates new safety technology that constantly analyzes potential hazards and, if necessary, initiates safety measures, such as an interruption of the gas supply. To protect users from burns, passive safety features include a residual heat display that will signal the burner head is still hot.

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23 Bleachedguide 3D-Master

Now integrated with the 29 shade levels defined by the ADA, the enhanced Bleachedguide 3D-Master also offers additional numerical designations said to support clear communication between dentists and patients. The numerical designations are based on the brightness levels defined by the ADA, which allows dentists to discuss desired results of the tooth bleaching procedure with their patients prior to treatment.

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Luke S. Kahng, CDT

An alternative to dentures

A look at the All on 4 Denture Procedure using GC's Nature-Cryl.

By Luke S. Kahng, CDT, LSK121 Oral Prosthetics

Patients with dentures almost always will become tired of the re-lining process. It has to be done frequently, and gets to be a nuisance. The ever-increasingly popular alternative to dentures, known as the All on 4 Implant System, has alleviated this problem to a large extent for patients who have suffered with dentures. Some labs fabricate All on 4 dentures

but some do not. It's a very difficult restoration to outsource because it still has to be delivered to the doctor's office for try-ins and adjustments quite a few times, depending on the fit. In my opinion, it is wise to learn how to fabricate these restorations because they are becoming more and more prevalent within the dental community.

This article illustrates the procedure for the All on 4 technique, involving the laboratory side. It also addresses using the new GC's Nature-Cryl Super Hi Impact, a denture based resin for the edentulous area. This product makes the technician's job much easier because the product is strong, durable and esthetically beautiful, too.

ALL ON 4 DENTURE PROCEDURE

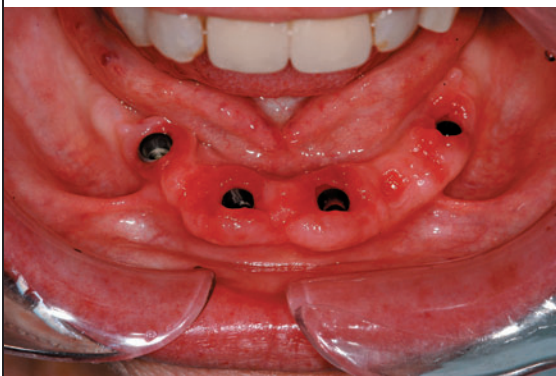


Fig. 1 Four implants post healing cap uncovering.

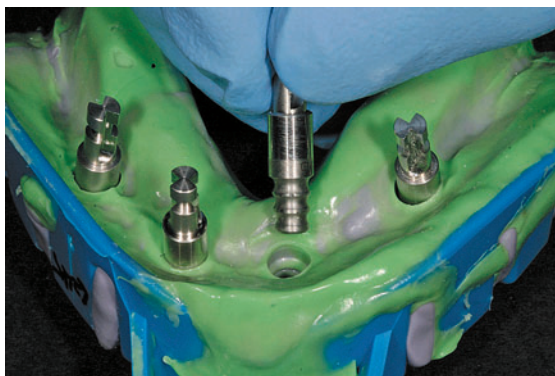


Fig. 2 Open tray technique.

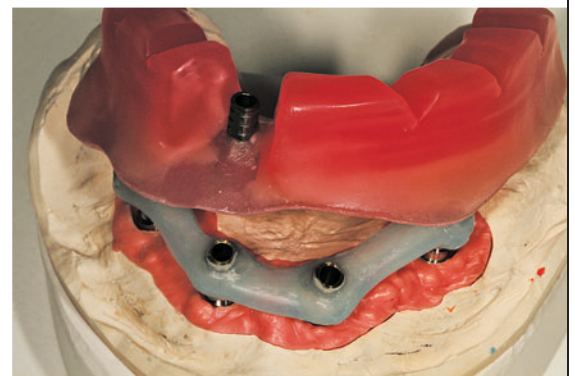


Fig. 3 Bite block with verification index.

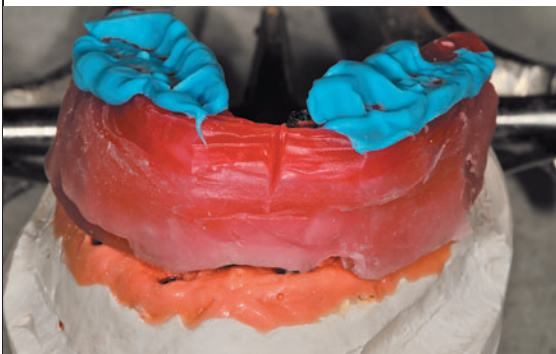


Fig. 4 Bite check.



Fig. 5 Wax teeth on model.



Fig. 6 Try-in the mouth.



Fig. 7 GC Putty material as a guide.



Fig. 8 Nature-Cryl from GC.



Fig. 9 Gum tissue color samples.



Fig. 10 Denture sample.



Fig. 11 All on 6 denture.



Fig. 12 Mandibular denture finished.



Fig. 13 Flipper for four teeth.



Fig. 14 All on 4 finished product, 2-piece detachable.



Fig. 15 All on 6 one-piece restoration.

THE CASE

01 After taking off the healing caps, the mandibular 4-unit implant site was exposed before the impression was taken (**Fig. 1**). The doctor can use four temporary abutments and floss material to engage the implants together. The clinician used an open-tray technique to take this impression.

02 The lab technician put the lab analogs into the impression tray and created the soft tissue and poured up the model (**Fig. 2**).

03 The bite block was pre-made with the verification index (**Fig. 3**) from Primotec USA's primopattern light-cured wax.

04 After curing with the temporary abutment it was ready to send to the doctor for verification in the patient's mouth. The doctor then sends back the bite block after verifying the patient's bite. Then it is tried and verified on the model (**Fig. 4**).

If everything fits properly, the clinician sends it back as is. If for any reason it doesn't fit properly, he must fix it by cutting and patching it with resin. If it is cut and patched because it does not fit, the lab will fix it on the model, then send it back to the doctor again for a wax try-in. The wax try-in is tried on the model (**Fig. 5**).

05 The lab's next step is to send the wax teeth to the doctor for a try-in in the patient's mouth (**Fig. 6**) to re-check the bite.

06 For the final teeth production, the lab used a GC Putty Guide material, based on the wax teeth (**Fig. 7**) to act as a template. At this stage, it is also necessary to look at the frame design for guidance with the final restoration. GC's Nature-Cryl resin material (**Fig. 8**) is high impact and convenient to use. It requires two hours of heat curing and is available in seven different shades. The material is easy to finish and polish, and resists fracturing. I created some samples of the various colors available with Nature-Cryl, demonstrating how easy it is to create special characteristics and mimic the gum tissue aspect (**Fig. 9**). The colors in this image are: COE-LOR Moderate (#21) and COE-LOR Heavy (#22). In the next image (**Fig. 10**) there is another denture sample, from a true patient's case, this time to demonstrate frame design and the mesh metal in a light color (#34). With the All on 6 denture pictured next (**Fig. 11**) the finished product is a light reddish pink in color (#35) and in the next (**Fig. 12**) we see a mandibular denture in the original color (#36).

07 The flipper for the four missing mandibular teeth (**Fig. 13**) was completed in COE-LOR Moderate (#21).

08 Finally, we see the All on 4 finished restoration with a hybrid bar as a two-piece detachable appliance (**Fig. 14**) or an All on 6 one-piece restoration (**Fig. 15**).

CLOSING THOUGHT

As a dental technician working primarily as a ceramist, I understand and create beautiful esthetics with my porcelain layering technique. However, things are changing rapidly in the dental industry and I began to realize it was important to expand my knowledge and keep up with the newer product offerings. To that end, it is always advantageous to experiment with new dental materials as they are offered.

We have all seen cases where the patient has an upper or lower denture only, but then find that he or she needs to have the opposite denture placed as well. The two should match in tooth color or the effect will be displeasing in appearance. For this reason and many others, technicians should learn how to fabricate All on 4 cases using denture or ceramic teeth. It is my hope that by sharing this knowledge we can expand our product bases and serve our clients better, too. There is a whole world of new creations out there for us to take advantage of. We should learn as much as we can! [lab](#)

How to spot quality in denture teeth

How the ^{SR}Phonares II line sets a new standard in composite denture teeth.

Compiled by DLP editors based on information provided by Ivoclar Vivadent Inc.

The introduction of ^{SR}Phonares[®] Nano Hybrid Composite denture teeth represented true innovation in the dental market. Manufactured with Nano Hybrid Resin chemistry, this denture tooth line was designed to offer additional features over traditional resin teeth. The intent was to capture the virtues of composite resin esthetics and resistance to wear to meet patients' demands and expectations for high end removable prosthodontics (Figs. 1A and 1B).

The success of the Phonares line of teeth combined with evolutionary enhancements of the composite chemistry have allowed for the introduction of ^{SR}Phonares II Expressive Denture Teeth. ^{SR}Phonares II sets new standards

in removable prosthetics with optimized shape, shade and strength. The latest scientific knowledge has been implemented in the development and production of Phonares II to create a truly innovative tooth line (Figs. 2A and 2B).

HOW TO IMPROVE AN INNOVATOR

^{SR}Phonares II builds on the successful mold selection of Phonares with the addition of two new mandibular anterior molds, L54 and L55 (Figs. 3A and 3B). Each mold uses the "set and fit" design to ensure a natural proximal contact is achieved (Fig. 4).

These new molds provide greater setup options and deliver a more patient specific prosthesis.

Additionally, they are particularly suited for partial and combination cases. The updated mold combination table available from Ivoclar Vivadent makes mold integration easy by suggesting the appropriate lower mandibular mold based on the maxillary anterior selection (Fig. 5).

^{SR}Phonares II also uses advanced shading techniques in the manufacturing process to deliver a warmer, more vital look. This new shade protocol matches the A-D shade standard and provides for optimized shade matching for partial and combination cases (Fig. 6). Additionally, two new shades have been added to the existing Phonares offering, BL1 and BL2. These two new bleach shades



^{SR}Phonares II

Ultra-premium ^{SR}Phonares II composite denture teeth are said to have optimized shape, shade and strength.

- The existing range of 22 anterior tooth molds has been expanded to include two new mandibular molds: L54 and L55.
- Teeth shades for the removable prosthetics have been matched to the A-D shade guide and include 16 A-D and 4 bleach shades.
- The nano hybrid composite material has been optimized for enhanced durability and esthetics.

Ivoclar Vivadent Inc.

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905-670-8499



Fig. 1A



Fig. 1B



Fig. 2A



Fig. 2B



Fig. 3A



Fig. 3B



Fig. 4

soft	S63	L54, L55
Large	S73	L54, L55
	S83	L54, L55
	B63	L54, L55
bold	B73	L54, L55
	B83	L54, L55

Fig. 5



Fig. 6

- UDMA matrix
- High-density silanized SiO₂ nano-particles
- Inorganically filled UDMA polymer
- Silanized SiO₂ nano-particles
- PMMA clusters



Fig. 7

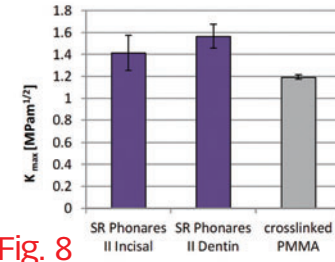


Fig. 8

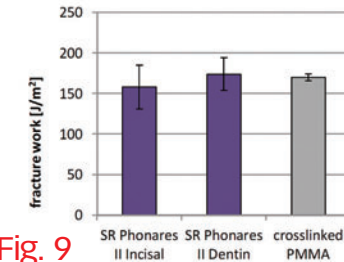


Fig. 9

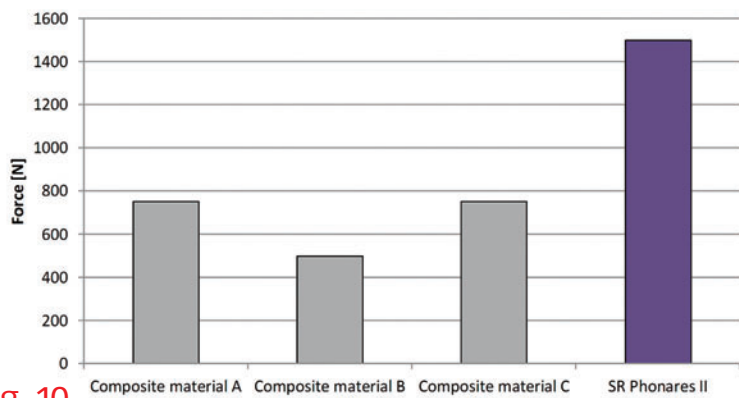


Fig. 10

extend the range of existing bleach options, while satisfying patient demands for a more natural bleach appearance.

The most exciting addition of the new ^{SR}Phonares II tooth line is the evolutionary advancement of the composite chemistry. This new generation Nano Hybrid Composite provides improved strength or “toughness” without sacrificing the esthetics and

wear characteristics of the original formulation (Fig. 7). Composite resin chemistry by its nature is harder and therefore less resistant to fracture when compared with the softer and more resilient traditional polymethylmethacrylate (PMMA) denture tooth materials, especially when the teeth are compromised by excessive grinding because of insufficient restorative space.

^{SR}Phonares II has improved properties that will help not only to sustain the teeth in challenging restorative conditions but to also make them more tolerant to laboratory handling procedures.

Several investigations on fracture behavior were carried out during the development of ^{SR}Phonares II denture teeth (Figs. 8, 9).

Based on the results in Figs. 9 and 10, it has been proven that ^{SR}Phonares II has similar fracture resiliency to that of the proven cross-linked PMMA material in terms of fracture behavior.

Additional testing was conducted on crack propagation. Test samples measuring 20 mm in diameter and 5 mm in height were loaded with a spherical metal indenter (5 mm diameter) at a speed of 5 mm/min in a universal testing machine (Zwick). The minimum load at which cracks were detected was recorded (Fig. 10).

The results show the ^{SR}Phonares II composite chemistry is considerably more resistant to crack formation than composite

materials of earlier generations.

The ^{SR}Phonares evolution is similar to other new innovations in dentistry including CAD/CAM technology that has had several generations of development. Leading scientists have studied the adverse events of chipping and tooth fracture issues with composite resin denture tooth chemistry and have designed new experimental technologies to improve our understanding and prevention of these issues. Although there is not a bullet proof answer to many of the restorative challenges, we feel quite confident that ^{SR}Phonares II will provide a successful alternative that will have improved esthetics and improved resistance to wear over traditional PMMA based denture teeth, while having similar fracture and chipping resistance.

^{SR}Phonares II truly represents innovation for the dental professional and the patient. The enhancements to shape, shade and strength deliver a tooth line that provides the best possible prosthetic outcome both functionally and esthetically. **lab**



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Luke S. Kahng, CDT

Efficiency, esthetics aided by technology

Technological advances assist laboratory technicians as shown in this screw-retained full zirconia restoration.

By Luke S. Kahng, CDT, LSK121 Oral Prosthetics

As everyone in the dental industry knows, technology is moving at a rapid pace and helping dental technicians work faster as well. We were not able to fabricate restorations as quickly or accurately in the past but we have greatly surpassed what we used to be able to do with the invention of CAD/CAM and other technologically advanced equipment.

The case study in this article illustrates a screw-retained full zirconia restoration and our attempt to match the custom color while using a milling machine. This is an efficient and effective method that betters our production line by giving our dentists an economical solution to their restoration questions.

THE CASE

01 A Nobel Biocare implant was placed in the model without soft tissue (**Fig. 1**). This was in preparation for the scanning design.

02 Using the MAP 400 scanning system, the model was placed in the scanner

COLOR MATCHING WHILE MILLING

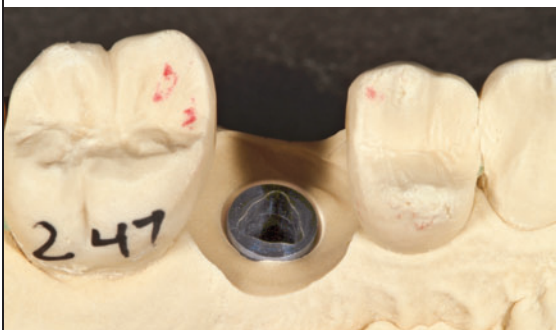


Fig. 1 Nobel Biocare implant was placed in the model.

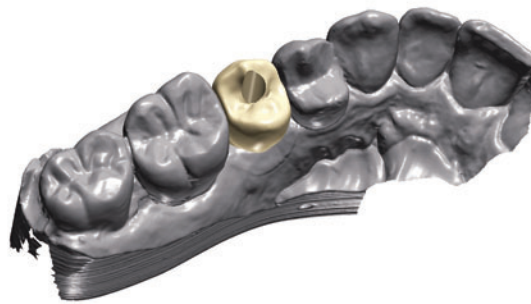


Fig. 2 MAP 400 scanner.



Fig. 3 Amann Girrbach Ceramill Motion 2 milling machine.

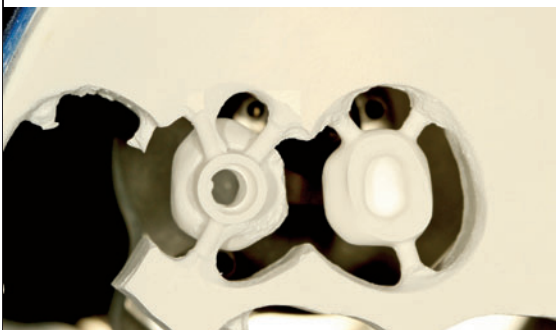


Fig. 4 Underside view of the implant coping.

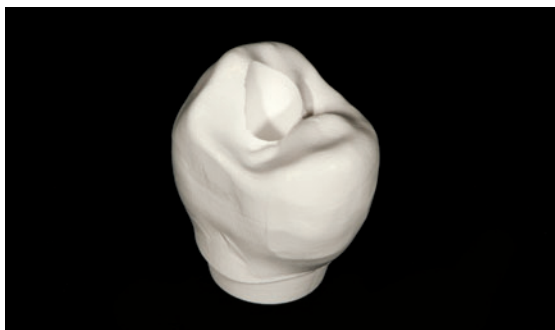


Fig. 5 One-piece full-contour coping.



Fig. 6 Coping was pre-shaded.



Fig. 7 Mirrored image.



Fig. 8 GC Lustre Paste application.



Fig. 9 Enamel color incisal 1/3.



Fig. 10 Metal primer application.



Fig. 11 GC G-Cem Cement.



Fig. 12 Completion of cementation.



Fig. 13 Light curing all four of the exposed areas.



Fig. 14 Removal of excess cement.



Fig. 15 Photo upon completion.

and the design compared to the adjacent teeth (Fig. 2). The goal with the design was to create broad, wide contact.

03 After the scan was completed, the model was moved over to the Amann Girschbach Ceramill Motion 2 milling machine for milling (Fig. 3). An underside view of the implant coping follows (Fig. 4).

04 After removal, the one-piece, full-contour coping was smoothed

over in the connection area (Fig. 5). Before sintering, the coping was pre-shaded (Fig. 6) for two minutes in the Amann Girschbach stain. A large variety of shades are offered for this process to provide a correct match in the mouth. After staining, the coping was dried for 30 minutes at 80°C. It was then placed in the sintering oven.

05 The mirrored image of the implant coping demonstrates its appearance in the next stage (Fig. 7).

06 With an application of Lustre Paste from GC America, the technician can create a life-like and natural appearance for the final restoration (Fig. 8). In this case, he created enamel color for the incisal 1/3 area using a white stain (Fig. 9).

07 For the implant to be completely integrated, it is necessary to use a metal primer on the titanium and zirconia areas and let it dry before continuing (Fig. 10).

08 To cement the abutment to the crown, the technician used G-Cem cement (Fig. 11). This process was completed (Fig. 12) before moving forward.

09 Next, the technician light cured the restoration for 20 seconds in all four of the exposed areas (Fig. 13).

10 Immediately after cementation the dentist flossed the area to remove any excess material (Fig. 14). The final shot follows (Fig. 15).

CLOSING THOUGHT

We have several options for implants: with screw-retained (one-piece) or cement-retained (two-piece) being two of those possibilities. In the past, we had to use titanium and PFM or a UCLA abutment for a screw-retained implant crown. This created extra effort for the wax/metal technician and required more time to work with the metal and then apply the porcelain. With this new method of fabricating restorations, we have eliminated the extra steps, with a metal-free material as the final prosthesis. This alternative option is time and money saving for the clinician, the patient and the lab. [lab](#)

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Simplified restorations

Ivoclar Vivadent's IPS e.max System provides strength with esthetics.

By Matt Roberts, AAACD, CMR Dental Lab, Idaho Falls, Idaho. Clinical images by Chris W. Campbell, DMD, Palmetto Dental Associates, Pa, Lexington, S.C.

The design of this case was complex. By using digital design it was possible to design the implant abutments at the same time as the final restorations.

THE IPS E.MAX SYSTEM

IPS e.max is an all-ceramic system that covers all indications ranging from thin veneers to 12-unit bridges. The IPS e.max concept comprises lithium disilicate glass-ceramic (LS2)—suitable mainly for single-tooth restorations—and a high-strength zirco-

nium oxide for long-span bridges. One single layering ceramic for the entire system enables a uniform layering diagram and precise shade match.

The combination of IPS e.max CAD (LS2) and IPS e.max ZirCAD (ZrO2) used in the innovative IPS e.max CAD-on technique now enables the fabrication of 4-unit posterior bridges that feature outstanding overall strength and high esthetics.

CASE PRESENTATION

A fully retracted pre-op photo was

provided by the clinician to assist the ceramist in creating a diagnostic wax-up with proper midline position and avoiding a maxillary cant (Fig. 1). The photo also shows the edentulous areas requiring implant treatment.

A diagnostic wax-up was completed idealizing form and function and formed from Z-enotec wax to be pressed out of the IPS e.max system (Fig. 2). A silicone matrix of this wax-up was used to fabricate provisional restorations.



IPS e.max System

- All-ceramic system
- Indicated for cases from thin veneers to 12-unit bridges
- 4-unit posterior bridges can be fabricated
- Optimal overall strength
- High quality esthetics
- Lithium disilicate glass ceramic for single-tooth restorations
- Zirconium oxide for long-span bridges

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Fig. 1 Pre-operative view.



Fig. 2 Diagnostic wax-up.

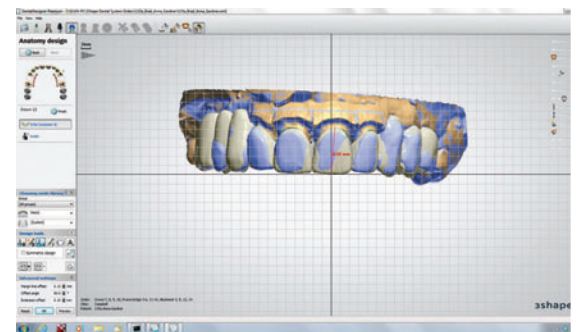


Fig. 3 Digital scan of the restoration.

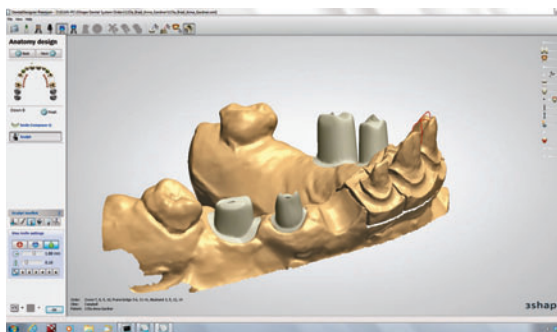


Fig. 4 Implant abutment design.

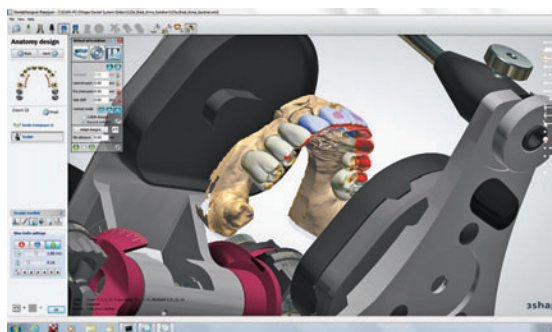


Fig. 5 Virtual articulator.



Fig. 6 Abutments in place on master model.



Fig. 7 Restorations fitted on master model.



Fig. 8 Zir liner applied to bridges.



Fig. 9 Full contour IPS e.max Ceram buildup of the bridges.

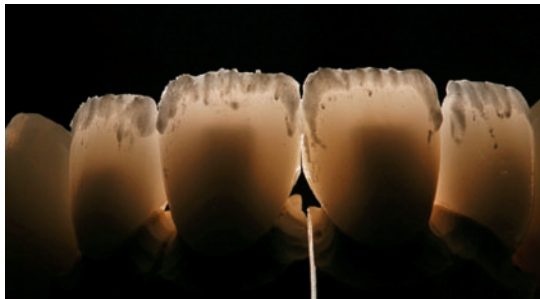


Fig. 10 IPS e.max Ceram effect powders are in place on the crystallized restorations.

Note the tissue discrepancy in the edentulous areas, the need to replace the space occupied by gingiva was part of the material selection and planning process.

02 The provisional restorations were photographed and impressed to provide models to the lab that showed the shape and position of the temporary restorations in the mouth. The model was digitally scanned with 3Shape 3D CAD Design software at the same time as the prepared tooth model and the mandibular models were scanned (**Fig. 3**). All three models can be used interactively. The provisional restorations are represented in blue superimposed on a preliminary design of the definitive restorations. The cross hairs can be oriented with a full-face photo to aid with facial orientation. The design was then refined to more closely follow the shape and position of the provisional restorations.

03 A full-contour design was completed with 3Shape software. The Zenostar full-contour zirconia comes in six shades of translucent and one more opaque white shade that we use for abutments to prevent show through of the screw or titanium chimney within the abutment. Both the translucent and opaque zirconia are shaded with Wieland coloring liquids to create color gradient within the zirconia. Coloring is done after milling but before sintering.

04 Hybrid titanium zirconia implant abutments were designed within the full contour design, allowing proper shape and position of the abutments relative to final tooth position (**Fig. 4**). The ovate pontic preparation for the cantilevered pontic is visible in the No. 11 position.

05 The virtual articulator is used to check excursive and protrusive movements (**Fig. 5**). The mandibular model is turned off to allow the viewer to see the collision areas in the design. These were adjusted to allow anterior guidance without posterior working or balancing interferences.

06 The master model with the zirconia abutments in place (**Fig. 6**). Titanium sleeves support the zirconia and provide metal seats for the screws, greatly increasing the overall strength and reliability of the abutments without sacrificing the trans-illumination potential of the zirconia.

07 Digital design for the anterior lithium disilicate crowns was outsourced to Wieland Precision Technology for milling (**Fig. 7**). The zirconia bridges were milled



Fig. 11 The completed restoration.

in-house on a Wieland Zenotec mini mill. All restorations were fit to the master model. Contacts, occlusion and surface morphology were verified on the IPS e.max restorations prior to crystallizing.

08 Zirliner was applied to the bridges in areas where IPS e.max Ceram layering was planned (**Fig. 8**).

09 The full contour IPS e.max Ceram buildup of the bridges was completed (**Fig. 9**). The degree of transillumination possible with zirconia abutments and translucent zirconia bridges is visible. The bridges were only cut back 0.6 mm on the facial for esthetic layering. All occlusal, lingual and gingival surfaces were left in zirconia. With the higher translucency exhibited by Wieland's new zirconia, very minimal layering is needed for esthetics. A much stronger final restoration than more conventional substructure design is achieved. The strength gained by minimal layering vastly increases the use of zirconia as a restorative material.

10 Prior to crystallizing, the IPS e.max HT restorations were cut back 0.2 mm-0.4 mm for incisal effect layering (**Fig. 10**). The initial IPS e.max Press Ceram effect powders are in place on the crystallized restorations. The color control in the HT zirconia provides nice esthetics while reducing the need for layering ceramic. Monolithic posteriors are possible with acceptable esthetic results and minimal layering produces exceptional results.

11 The final restoration shows excellent shade transition from IPS e.max to Zenostar from laterals to cuspid, even with minimal cutback of zirconia. Note the ideal incisal edge position following contours of lower lip (**Fig. 11**).

CONCLUSION

The combination of good restorative treatment planning, good clinical execution, gathering appropriate models, bites and photos and having a systematic, sequential approach to the final outcome of the case is what's really important. All of the technology and great material in the world won't result in a successful result for the patient if the restorative process isn't completely visualized and planned prior to starting the case. The plan should then be followed, step-by-step, to provide the final result the patient desires. [lab](#)

This article has been slightly edited (for length) from its original form. Abutment design and zirconia bridge fabrication provided by Brad Lyman and Tracy Egbert.

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Tom Zaleske

Low cost, high value

Two cost-effective solutions from Dental Creations can provide terrific value for your lab.

The theme of many of my articles involves projecting quality and value in the dental restorations we fabricate. In many instances, obvious ways to enhance the value in our work can come from very low-labor and low-cost enhancements. Dental Creations out of Texas offers low cost products that allow for obvious but neglected ways to enhance the value of our restorations.

In many dental laboratories, model work is one of the most neglected procedures in regard to value projection. What many owners don't realize is the value of our work—even at the most rudimentary level—begins to establish the way in which our businesses are perceived in comparison to our competitors by our dental

clients. Simple things like model polish; neatness of the mounting; and condition of the models in regard to abrasions, bubbles and strength set a bar that others must conform to if they want to remain equal in comparison.

Dental Creations offers several products that not only provide better model accuracy, but also provide a higher level of presentation quality without costing an arm and a leg.

Wondergloss and Wonderadmix are two products that I have found help project a higher quality in my work, and also enhance the workability of the models used in the case fabrication.

In my laboratory, Wondergloss (Fig. 1) is a model glossing agent that I paint onto opposing models, or master models that are used to fit

finished provisional and flexible partials on. The application of the product provides not only a glossy surface, but also fortifies and provides a smooth surface on models that I will repeatedly fit and remove frames from (Fig. 2). Additionally, brushing Wondergloss over identification numbers, names or model base markings—such as alveolar ridge tracings (Fig. 3)—provides a smudge-free, water-resistant, low-cost way to preserve them during the repeated handling of the models (Fig. 4). To get around the necessity to dry models before application of Wondergloss, I have found that, by constructing a low cost drying box made from a dollar store storage container and an inexpensive hand held hair dryer, I have shortened the process of model

MAKING MODELS FASTER AND MORE COST EFFECTIVELY



Fig. 1 Use Wondergloss straight from the bottle and do not shake before using. Ideally, proportionate a smaller amount into a container and add when needed from main bottle. This will limit air exposure of the larger amount. Thin coats work better than sloppy dripping ones.

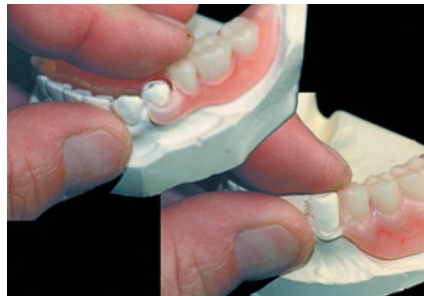


Fig. 2 Used in conjunction with Wonderadmix, Wondergloss provides a smooth, abrasion and chip resistant surface ideal for repeated fit adjustments over abutments on master models. Using Wonderadmix alone for reinforcing models used in processing flexible resin partials provides a stronger, smoother, working model.

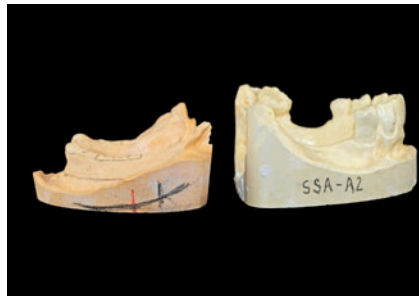


Fig. 3 A quick wipe of Wondergloss over names, tooth mold numbers, and landmarks such as ridge tracings, provides an economic, neat and smudge-free way to preserve reference information needed at your fingertips.



Fig. 4 Once Wondergloss is dry, the coating provides a water resistant sealing of information penciled on the model surface.



Fig. 5a A drying box constructed from a dollar store box and a hair dryer shortens the drying time of models and the coatings of Wondergloss to 10-15 minutes. Holes cut on sides allow for air flow through and also prevents the dryer's thermal sensor from overheating.



Fig. 5b A food dehydrator also is an easy, economic way to speed up model and Wondergloss drying. It also comes in handy for drying separator coated denture flask molds.



Fig. 6 Wonderadmix is supplied in the syringe. The bottle is empty but holds the correct amount of water when filled for the correct ratio for the syringe amount. It also means the shipping charges do not reflect a gallon of liquid in weight but rather a syringe and an empty bottle. Shake well each time before measuring out liquid to make a model.



Figs. 7a and 7b Measurements for an average model are 150gr of stone to 50 mL of Wonderadmix. Consistency of stone when mixed for models or capping is smooth, creamy and easy flowing. Slight vibration immediately causes it to flow.

drying, and the drying of multiple coats to a 10-15 minute chore. Similarly, I have also used an inexpensive food dehydrator for the accelerated drying processes as well (**Figs. 5a and 5b**).

Wonderadmix is another product I use to enhance and fortify my model work. This product replaces plain water with a formulated additive that is mixed with water to enhance existing properties of the stone.

The large bottle supplied with Wonderadmix comes empty, as the product is actually contained in the syringe and is added to the bottle along with regular tap water. This saves greatly on the cost of shipping premixed gallons of the product (**Fig. 6**). There are noticeable improvements in the flowing property of the stone without the use of debubbler, the smoothness of surface texture and the reflection of detail

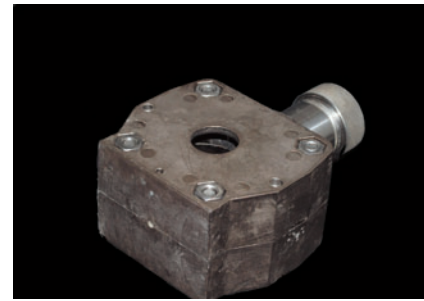


Fig. 8 Bolted injection flask necessitating a capping pour made through a hole in the top. Because you cannot see inside the flask, it is critical that the pour is smooth, flowing and bubble-free to provide a complete and accurate fill.

when compared with models made with plain water (**Figs. 7a and 7b**). I also use this product when capping or performing a secondary pour of stone into a closed, bolted flask, such as the ones used in injection and some microwave systems. I fabricate my partial denture models with stone fortified with Wonderadmix because I want to protect models against chipping and breakage during the numerous handling steps involved in the



Fig. 9 The value projection for every case starts with boxed, smooth, clean and accurate models. It doesn't take a fortune in products, just the correct products.

fabrication of alloy and flexible resin frames.

With two simple and inexpensive products, I not only improve the presentation quality of the work my lab produces, but also—and more importantly—enhance the overall quality of the work by eliminating factors that cause remakes and lower quality, by fabricating on smooth, strength-fortified, master models for just pennies a case (**Fig. 9**). [lab](#)



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—JOSH OLSON, co-owner of Ceratek Dental Lab in Roswell, N.M., on Roland DGA’s DWX-50 milling machine (from the February 2013 issue)

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—MATT BARRETT, owner of AXIS Dental Milling in La Grange, Ga., on the Zubler DC5 Mill (from the May 2013 issue)

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—DWAIN TURNER, owner of Turner Dental Lab in Texas, on the time savings provided by the anaxFORM system and Acryline denture material, both from anaxdent (from the October 2013 issue)

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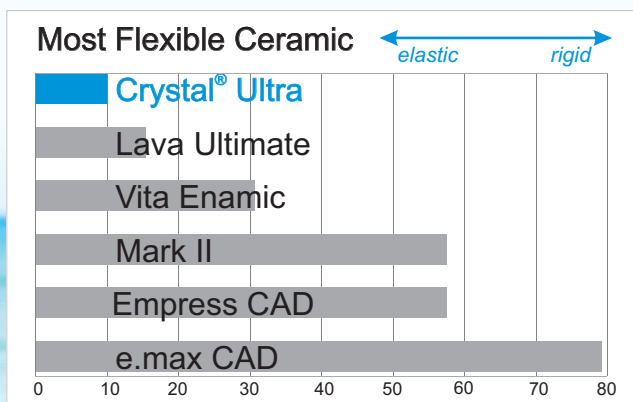
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Top Products of 2013

Benchtop Editor Tom Zaleske picks his favorite products and companies from the last year.



Tom Zaleske

When I was asked to submit an Editor's Choice list for 2013, I wanted to select products or services that not only improved my outcomes, but also warranted mention because of the commitment each company makes to providing excellent service and technical support.

My first choice is Preat, a company I have used for more than 27 years for several different services and products. Even after all this time, Preat continues to stay on the leading edge of dental technology and technical support, offering a variety of implant borne attachments, E-Fiber, Perma Mesh E-Glass reinforcement and digital solutions through their Prism design and manufacturing center. The center offers Selective Laser Melting (additive manufacturing) and the accuracy of 5-axis CNC milling for all of your implant bars, bridges and removable partial denture frameworks. The service and technical support I have experienced for the last 27 years remains the cornerstone of Preat, and gives me confidence in recommending them as an "Editor's Choice" to any lab looking for a source that provides digital, or attachment technology products or services.

My second choice, the Waxelectric II digital waxing unit from Renfert, comes with "must have" ergonomic features like cork handles and a unique heating element design that keep the whole instrument cool to the touch and the temperature consistent. The anti-kinking cables, three preset temps per handpiece and simple but well-placed holders are icing on the cake. When used with the Waxprofi, their digital temperature controlled waxpot, a consistently maintained bulk of wax at its optimal temperature for wax transfer and base veneering can be expected. The large pot design allows for melting full sheets of baseplate wax and provides a larger than usual target to remove wax from. Renfert also cinches the deal for me with outstanding technical support provided on their website in the form of downloadable "how-to" manuals and videos.

Recommending products doesn't always involve the most expensive or sophisticated. My next choice

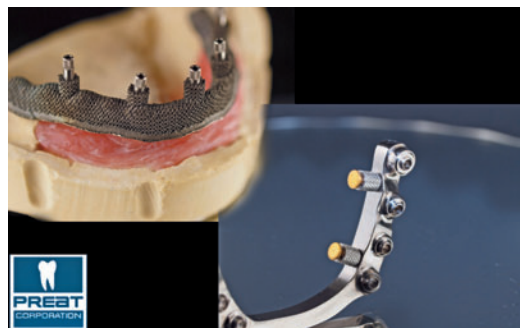


Fig. 1 Two Preat Prism Design and Manufacturing Center products: laser additive technology with Pearl texture (left); milled CNC technology (right).



Fig. 2 Features compliance to the fire codes, creates environmentally friendly work area, and controls wax properties by not overheating.

is a product that saves 75 percent of my labor time in constructing boxed and beaded models by reducing fabrication time from 20 minutes to 5 minutes. Dental Creations, a small company near Waco, Texas that produces a variety of specialty products enhancing model work **makes my next choice, the Wonderfill system**. It consists of the Wonderform, a ring former, and water soluble boxing putty, Wonderfill. The system is simple, yet extremely efficient in reducing the time to provide a necessary service, producing master models that reflect clinical time to replicate denture borders molded by hand. Like all the choices in this article, it's a great product backed by service and technical support. I also appreciate the liberal sampling policy Dental Creations provides.

The backbone of any dental laboratory producing dentures is the acrylic they use. Outstanding strength, both in flexibility and impact, color stability, several cur-



Fig. 3 I buy 15 minutes every time I box this way over the conventional method. Box 4 impressions, gain an additional hour a day.



Fig. 4 Optimal flexural strength, color matched shades regardless of curing options, and can be used with subsurface or surface colorization.

ing options, and a wide range of shades are only a few of the reasons **my next "Editor's Choice" is the GC America Naturecryn family of denture base acrylics**. Naturecryn possesses all of the features I was looking for and a few bonuses. Because polymer technology is ever changing I decided to take a closer look at the curing options other acrylics in the Naturecryn line offer.

Naturecryn MC, the microwave version of this acrylic family, offers huge time savings with the benefit of heat curing. Time hogging fabrications using cold cure or pour resins have been replaced with the MC version. A three minute "molecular level" cure cycle, low startup cost, no real change in conventional pack pressing technique and shade match to other products in the line, confirms my choice is a sound one. The strength of my recommendation is again fortified by GC America's well-known level of customer support. [lab](#)

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Dental Laboratory Product Promos October 1 - December 31, 2013

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