dentallabproducts®
ARTISTRY AND INNOVATION TO INSPIRE DENTAL LAB SUCCESS
OCTOBER 2020 | VOLUME 42 | ISSUE 3

DUCTS

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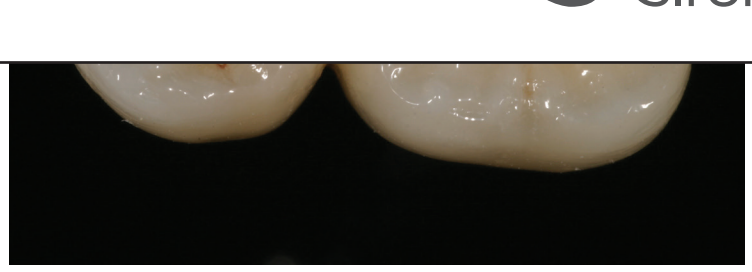
The High Translucent Zir-Perfect CAD/CAM Zirconia Disc can ensure a natural-looking restoration without sacrificing strength.

BUSINESS OPERATIONS

2 easy ways to improve communication about cases

Tips and best practices for making sure your lab stays on the same page with prescribing doctors.



CROWN & BRIDGE

The Benchmark: Speed Polish

Polish efficiently with this paste ready to support the advanced materials you use.

IMES-ICORE

CORiTEC 150i series

Compact dental mills with a range of features for an array of applications.

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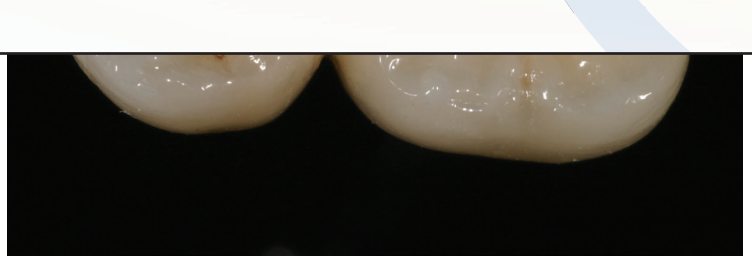

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REMOVABLES

Not your grandfather's false teeth

Digital dentures are the future, and the future is now.

CROWN & BRIDGE

The Benchmark: Speed Polish

Polish efficiently with this paste ready to support the advanced materials you use.

NEW PRODUCTS

MEDIT

T-Series

With their open system design, 4 µm accuracy, and 8-second scanning speed, these scanners are suited to any case, articulator, or custom workflow.

FORMLABS

Form 3BL

Designed for optimal throughput the latest 3D printer from Formlabs has 5 times the build volume of earlier Form printers.

IMES-ICORE

CORiTEC 150i series

Compact dental mills with a range of features for an array of applications.

MEDIT

Meet our new industry-defining lab scanner

8 seconds

4 microns

All cases

Medit T710

Contact *sales@medit.com* to connect with your local dealer.

editor's choice

Cover Products and other **EDITOR'S CHOICE** products throughout this issue are chosen based on innovation or their perceived impact on improving lab workflows and outcomes.

on the cover

T-Series

The new T-Series laboratory scanner lineup—the T710, T510, and T310—is designed to meet the needs of every dental lab. Thanks to a customizable workflow and an open system, labs reportedly profit from absolute freedom and flexibility. The Medit T710—the powerhouse of the new line-up—is equipped with four 5 MP high-resolution cameras, positioned to ensure there are no blind spots in the data, even after a single scan. Full arches are scanned in only 8 seconds and the wide scan area makes it easy to scan multiple objects at the same time.

Why the T710 stands out:

The Medit T710 can be used to scan all indications, including implant cases, impressions, post & core, and replica dentures, making your work significantly easier. The flexible multi-die function is especially useful to scan a full or partial arch with multiple dies simultaneously. The scanner also fits any articulator available on the market, allowing for maximum compatibility. With 4-micron accuracy, the T710 ensures labs can produce high-quality results and ensure clinics are satisfied with the outcome.

Medit
medit.com

Form 3BL

Designed with a large print area for larger print jobs, the Form 3BL can be used to produce biocompatible parts with the accuracy needed to produce dental aligners. Featuring a build area of 13.2 × 7.9 × 11.8 inches, which can fit approximately 24 arches in a single print run, the 3D printer is designed to operate continuously with little need for operator interaction. Still being offered at an economical price point, the printer features an intuitive workflow, straightforward software, and automatic resin dispensing. It is compatible with Formlabs' line of printer resins allowing it to be used for a range of tasks.

Why this printer is noteworthy:

Along with adding a much larger print area than earlier printers from Formlabs, the 3BL employs a Low Force Stereolithography print technology designed to provide optimal surface detail. The technology combines the custom optics contained in a specialized Light Processing Unit with a unique resin tank designed with features to reduce peel forces on the print materials. This allows the 3BL to produce parts with smooth surfaces and smaller support connections, and reduces the need for post-print processing.

Formlabs
617-702-8476
formlabs.com

CORiTEC 150i series

Designed to provide dental labs and clinics with a versatile mill without requiring significant countertop or floor space, the CORiTEC 150i series features monoblock cast bodies said to offer a high degree of stability to increase milling precision. The systems all offer 5-axis milling with intuitive software and 2 versions feature integrated computer hardware. The CORiTEC 150i PRO offers both wet and dry milling for processing of zirconia, wax, PMMA, glass ceramics, as well as titanium and CoCr. The CORiTEC 150i dry can produce a range of materials but does not offer wet milling of glass ceramics and metals. The CORiTEC 150i dry eco is an economical option without an integrated computer.

Why these mills are worth a look:

With durability and reliability in mind, the mills feature high quality parts and stand out design elements such as an integrated ionizer to prevent milled plastics from damaging the components, a temperature compensation system to keep the internal temperature stable while milling, and a high frequency spindle that can reach up to 100,000 rpm. Additionally the mills are compatible with a half-open blank holder that enables machining of restorations requiring high processing angles.

imes-icore
+49 (0) 6672-898 228
imes-icore.de

Dental Lab Products® is published six times a year by MultiMedia Healthcare LLC 2 Clarke Drive, Suite 100 Cranbury, NJ 08512.

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by Noah Levine

For more content online...

Visit **dentalproductsreport.com/lab** to find expanded versions of several articles from this issue including images demonstrating the "2 easy ways to improve communication about cases" as well as video interviews with technicians and other dental industry experts.

NEXT ISSUE: Changing Practices: The clinical shifts driving major changes in dental practices and how these new dynamics are driving transformations in how dental labs operate.

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ALIENMILLING TECHNOLOGIES

Value of relationships and communication stays high

To the patient, a dental practice looks generally the same as always. There's a reclining chair in the middle of the room and all sorts of gear and tools set up around it. But to anyone in the dental industry the modern operatory, and the ways clinicians work in those operatories, continues to evolve and change.

This is especially true with cases that require a dental laboratory to fabricate a restoration. Digital technology for storing and sharing case information, along with digital imaging and scanning, mean more and more critical anatomical and diagnostic information is now digital, but how that information is handled and used remains largely the same.

Whether a lab is using traditional techniques to fabricate fixed or removable dental restorations, or producing CAD/CAM crowns or digital dentures, the integrity, accuracy, and completeness of the case information will go a long way toward determining if a case will have a successful outcome. Still, the type of case being sent to the lab determines the extent of the information that needs to be communicated, and digital workflows require different details than analog workflows.

When it comes to digital denture workflows, the precise details needed might be new for some labs, as this strategy for removable appliance production is still an emerging frontier for many businesses. However, with the ability to produce custom dentures quickly, economically, and with a high degree of accuracy, digital dentures are becoming more common, even as the materials, workflows, and technologies powering their production continue to diversify.

This month's cover story, "Not Your Grandfather's False Teeth" (page 22) aims to help technicians make sense of this growing area of production. The article looks at the different materials and approaches, as digital dentures can be fabricated on both CAD/CAM mills and 3D printers, and there are a range of workflows for producing the teeth and affixing them to the denture base.

Regardless of whether or not your lab currently produces removables, if you invested in digital lab technology, digital removables might be a viable new service to expand into. A scanner remains a key tool for labs to make sure any submitted case can be processed using CAD/CAM technology, including full and partial dentures. However, when it comes to digital dentures, specific design software or modules for existing CAD software are required. Of course it's important to see if your production technologies are compatible with either the 3D printing resins or milling blanks used for producing denture bases and teeth.

But while getting started with digital dentures is not exactly a high hurdle, being successful with these new workflows relies on vigilance when it comes to proper case communication. Making sure you have all the details and are on the same page with the clinician about expected outcomes remains critical whether the case information is being sent via FedEx or through a digital file exchange.

So, explore new opportunities to employ technology for added efficiencies, improved accuracies, and lower production costs. Look at ways existing lab technologies can be used to expand the scope of what you do. But, whatever path you and your lab choose, be sure to keep a focus on building trusting relationships with the dentists sending you cases. Keep communication ongoing, even when not actively collaborating on a case.

Dental lab technology is not going to stop its advance through the industry. But embracing these new innovations doesn't mean abandoning your core operating principles. In fact, they make foundational parts of running a dental lab more indispensable than ever.

Technology has the power to change how we do what we do, and how we connect to and collaborate with others. What it will never do is eliminate the need for strong lines of communication and effective partnerships between dental labs and practices.

Mike Hennessy Sr
Mike Hennessy, Sr is chairman and founder of DLP's parent company, MJH Life Sciences™.

Our Mission Statement

Dental Lab Products® delivers a complete picture and in-depth coverage of the innovations transforming the U.S. dental lab industry and the technologies and materials making a difference in lab workflows, clinical capabilities and patient outcomes. *Dental Lab Products*® helps dental laboratory technicians, managers and owners understand the available products and services and how to select the best options for their businesses and the practices they work with. We are committed to asking the right questions and delivering unbiased, quality content.

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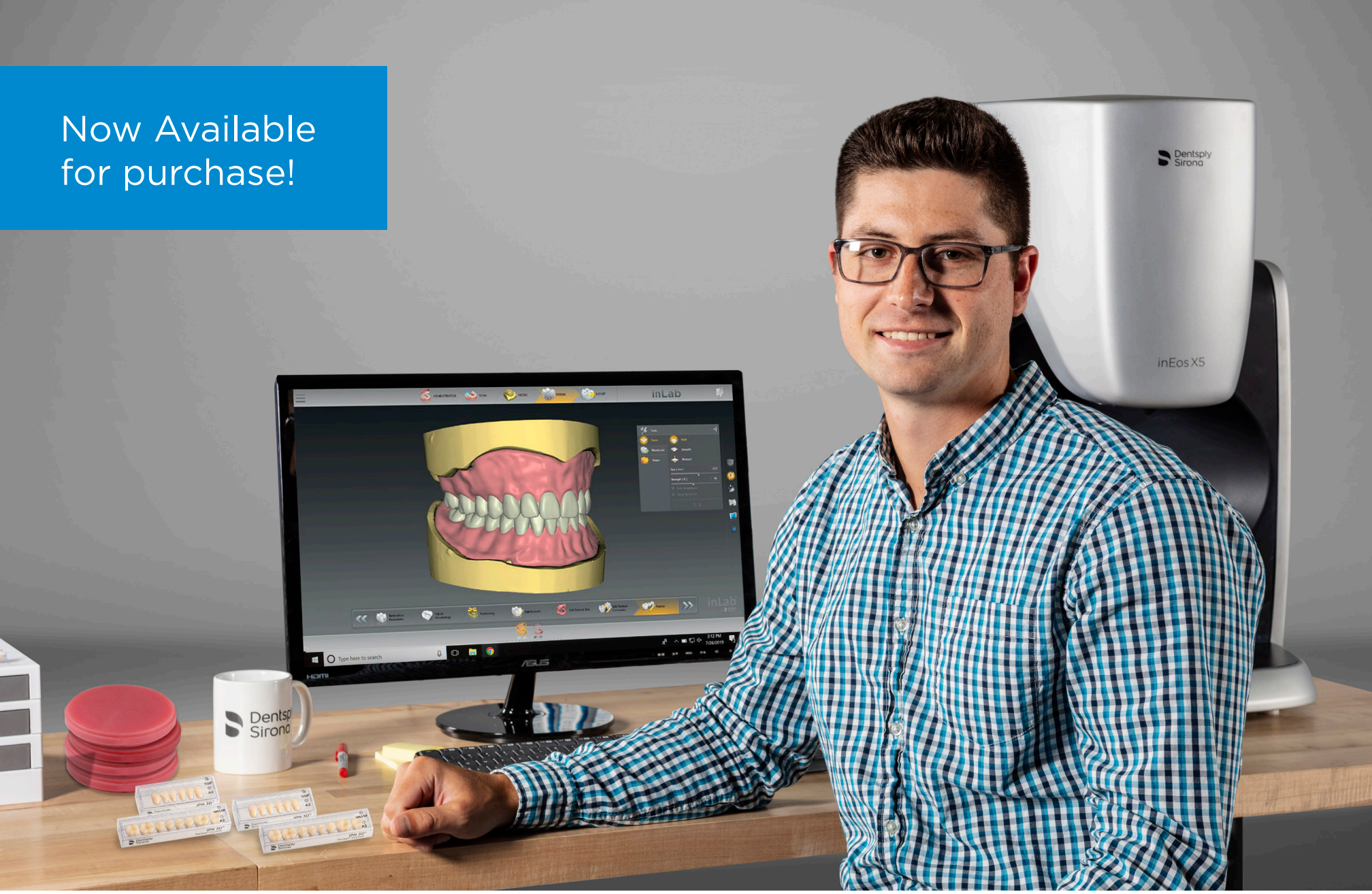

Full Digital Dentures with inLab SW 20.0

- an option for any preference

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- Seamless workflow from scan, to design and manufacturing
- Flexible design freedom in the fabrication

Learn more today at dentsplysirona.com/digital-denture

Dentsply Sirona

editor's choice

Compatible with all EnvisionTEC DLP resins for the dental industry, providing essential solutions for applications from models to full dentures and everything in between.

DESKTOP 3D PRINTER

EnvisionTec D4K Pro

The D4K Pro is said to offer the fastest print speed for a standard DLP printer, and reportedly delivers extremely accurate parts with the finest detail available. It is built on an industrial 4K DLP projector which is designed to guarantee stable performance for many years. The D4K Pro is designed for chairside and small labs, and features a build envelope of 148 x 83 x 110 mm (5.8 x 3.3 x 4.3 in.); an XY Native Resolution of 50 µm; and a Patented Enhanced XY Resolution of 25 µm.

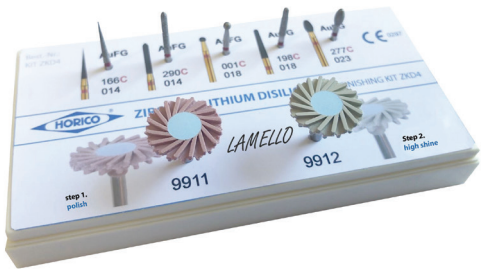
EnvisonTec
313-436-4300 | envisiontec.com

3D PRINTING RESINS

SprintRay Resins

These 3 new 3D printing resins are designed to improve the efficiency of the dental 3D printing workflow. The Die & Model 2 resins feature a reduced odor, improved mechanical properties, virtually no pigment settling, and improved color. It also has been specifically designed to be easier to separate from thermoforming materials. Study Model White draws on all of the same improvements as Die & Model 2 materials, and the new resin provides a rapid, accurate option for 3D printing models for case presentation and education to help doctors communicate the value of procedures.

SprintRay, Inc.
800-914-8004 | sprintray.com



ROTARY INSTRUMENT KIT

Horico ZDK$_4$

The Horico® ZKD$_4$ kit is assembled and organized to simplify chairside adjustment of crowns and bridges made of zirconia, lithium disilicate, and other modern ceramics. It contains 5 Lion diamonds and 2 Lamello polishers that ease final adjustment of hard-ceramic restorations. Horico Lion diamonds provide rapid, precise, cool cutting and are engineered and manufactured with close attention to detail and long-term performance. The highly durable, long-lasting polishers provide an intuitive, two-step technique for polishing and producing a high shine on hard ceramic material.

Optimu Rotary
949-813-9479 | www.optimurotary.com

ZIRCONIA BLANKS

Zolid Gen-X

With its asymmetrical shade distribution, Zolid Gen-X is a polychromatic, highly translucent zirconia suitable for complex implant-supported restorations with a gingival section. All standard shades and heights are available as 98 mm blanks. In addition to the common 16 A-D VITA shades, the portfolio also includes 2 bleach shades (BL1 & BL3). Gen-X possesses a natural color gradient that takes the blank to a new level in terms of efficiency and esthetics. Indicated for fully anatomical crowns and 4- to multi-pontic bridges, anatomically reduced crowns and 4- to multi-pontic bridge frameworks, and multi-pontic screw-retained constructions on Ti bases.

Amann Girrbach
800-851-3719 | amanngirrbach.us

INFECTION CONTROL

ERIO DEPUR20

Air purifiers and sanitizers equipped with active electrostatic filtration and negative ionization like the ERIO DEPUR20 are able to guarantee air purification and at the same time hygienic, antibacterial and antiviral effects. This unit cleans the air from suspended particles such as pollen, spores, fumes, bacteria and viruses. The system features a metal pre-filter, an electrostatic cell, UVC lamps, and activated carbon filter. The electrostatic cell allows for a high efficiency capturing particles <0.3 µm. Ideal for medical and dental surgeries, dental labs, waiting rooms etc., it is a very effective air sanitizer for limiting the spread of viruses and bacteria carried by aerosols.

ERIO System
425-307-1658 | eriosystem@gmail.com

PPE

Face Shield (Pro)

This reusable, anti-fog, *Face Shield (Pro)* is a Class I medical grade device, approved by Health Canada. It has been designed to protect the facial area from splashes, sprays, or splatters of bodily fluids. The full, top seal, side, and bottom coverage is designed to safely protect essential workers. It is adjustable and has sponge-like material that fits tight but comfortably against the forehead. It can be easily re-sanitized. Low cost replacement kits are available to ensure safety. Space has been designed to allow for better airflow, or to fit for glasses, medical goggles, and masks. Standard sanitizers are acceptable and anti-fog liquid is available for reapplication.

Tinkerine
604-288-8778 | tinkerine.com

DENTAL IMPLANTS

MPI™ and ULT™ Molecular Precision Implants

Designed to provide both high initial implant stability and a long-term anchor, the MPI implants feature a unique spherical helix chamber design that is said to capture blood and bone fragments to assist osseointegration. A beveled collar shifts the dental implant-abutment junction inward, allowing for platform switching. Additionally, the Moleculock™ biomechanical implant-abutment seal design makes the gaps too small for bacterial penetration which may reduce the risks of peri-implantitis. The ULT implants offer many of the same advantages along with a patented Reverse Concave Neck (RCN) with micro-threads that resist axial load.

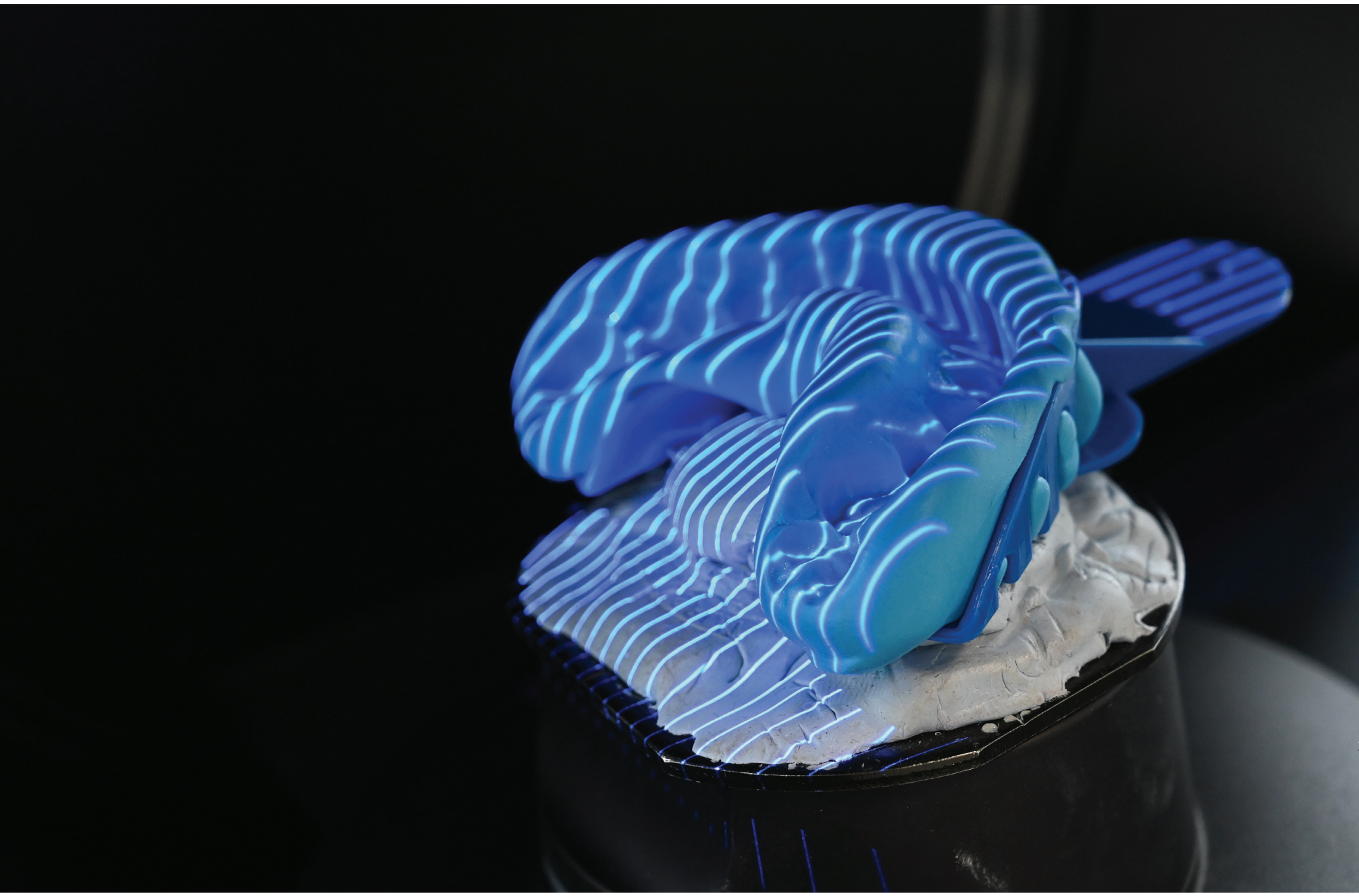
Ditron Dental
844-4DI-TRON (434-8766) | ditrondentalusa.com

ALGINATE ALTERNATIVE

SternVantage™

SternVantage Alginate Alternative provides the characteristics clinicians and lab technicians expect from a reliable alginate substitute—predictable, dimensionally stable, and easy-to-use—priced right and trusted for impression making materials. The company is offering a Buy 1, get 20% off promotion, where a purchase of 1 SternVantage Alginate Alternative at regular price gives 20% off a purchase of 1 InstaTemp® Max. This product can be a value added item to other SternVantage products: Putty, Monophase, and LightBody; as well as a complementary product InstaTemp Max.

Sterngold
800-243-4492 | sterngold.com



Surveying the Lab Scanner Landscape

compiled by Noah Levine

WHETHER A LAB IS WORKING with a full or partial digital workflow, at some point the anatomical information for the case must be digitized. Chairside intraoral scanning is gaining traction, but an efficient, reliable benchtop scanner is still an integral part of most modern dental labs.

While scanners were once fussy and somewhat sluggish, upgrades and enhancements make the latest scanning systems faster, more accurate, and easier to use. There are a wide range of sizes, designs, and even colorful styles among today's lab scanners. Some scanners are designed for optimal results with specific types of cases, so make sure the scanner you choose meets your lab's specific needs and priorities.

Read on for a round-up of some of the latest innovations in dental lab benchtop scanners. ●

JLO_FOTO / STOCK.ADOBE.COM

E4

- Featuring twice the cameras of its predecessor, E4 scans at twice the speed with double the accuracy
- Full arch scans in as little as 9 seconds
- Scans with an accuracy of 4 microns
- The 4 cameras feature 5 MP resolution and can scan dies in the model or dental impressions

3Shape
908-867-0144 | 3shape.com

7 Series

- Scans models and impressions with a high degree of precision
- Features an integrated computer with 64-bit processor
- Automatic scan function and design wizard features help keep labs productive
- With the automatic multi-die mode up to 30 elements can be scanned and designed in just 13 minutes with no user interaction

Dental Wings
888-856-6997 | dentalwings.com

T710

- Hardware and software are optimized for scans as fast as a full arch in just 8 seconds
- 4 5 MP camera array provides great scan detail and eliminates blind spots
- Auto-elevation feature makes it simple to place objects being scanned
- Accuracy of 4 microns
- An open scanner capable of connecting with a range of CAD software platforms.

Medit
medit.com

Ceramill Map 600

- Designed for efficiency and precision it features an integrated universal carrier plate compatible with common articulators
- Intelligent scan height control automatically positions the object being scanned
- The drive technology includes an automatic Z-axis for precise and quick travel movement
- The industrial 3D sensor with Blue Light technology scans to an accuracy of 4 µm

Amann Girrbach
800-851-3719 | amanngirrbach.us

inEos X5

- Features a robot arm and 5-axis scanning technology with a large working area
- Optimal depth of field combined with accuracy to 2.1 µm
- Intuitive software interface is designed to help technicians create digital models with a few mouse clicks
- Scans impressions, models, dies, and articulated models
- Scans can be exported in the open STL file format

Dentsply Sirona
844-848-0137 | dentsplysirona.com

S900 ARTI

- Automated structured-light scanner with 3 high-resolution high-speed cameras
- Scans to a precision of ≤ 10 µm
- Large scan area accommodates most articulators to scan the complete case in a single scan
- Can scan all types of models, dies, and bite records
- Easy positioning of the scan model with the help of a laser point

Zirkonzahn
678-441-9419 | zirkonzahn.com

UP360+

- Designed for scanning uncut models
- High-speed scanning of models, dies, and triple tray impressions
- Full arch implant scans can be completed in a single step
- Color and texture scanning for optimized accuracy and detail

Up3D
info@up3d.cn | up3ds.com

Autoscan-DS-MIX

- With its open design the scanner is designed for accuracy and efficiency
- A pair of 5.0 MP cameras capture edge details on abutments and implant scan bodies
- Scans to an accuracy of ≤ 7 µm
- Captures a full arch scan in 13 seconds with high efficiency scan mode
- The scanner software automatically detects and adds in unscanned surfaces

Shining 3D
415-259-4787 | shining3ddental.com

i3Dscan color

- Designed to aid lab productivity, the scanner can scan in monochrome or color texture modes and with the lid open or closed
- Automatic positioning eliminates the need to screw on spacer plates
- Controlled from an easy to use touch display
- Accuracy of 6 microns

imes-icore
imes-icore.de

Freedom UHD

- Features a UI-3280CP with Sony's 5 MP sensor
- Ultra-high definition scans capture crisp margin lines
- Interproximal scanning without random filling of holes
- Scans models, dies, articulators, and impressions
- With its moving camera, no jig is required for the model

DOF
714-600-6264 | doflab.com

L1 Series

- Developed by iMetric, the L1 series of scanners is for a range of indications
- The L1 is the base model and is suited for scanning models and impressions
- The L1m adds the capability to scan single and multi-implant cases
- The L1i is the highest resolution model with accuracy up to 5 microns for scanning passive fitting, large-span, screw-retained cases
- The L1 model can be upgraded to either the L1m or the L1i

Axsys Dental
248-926-8810 | axsysdental.com

DS Mizar

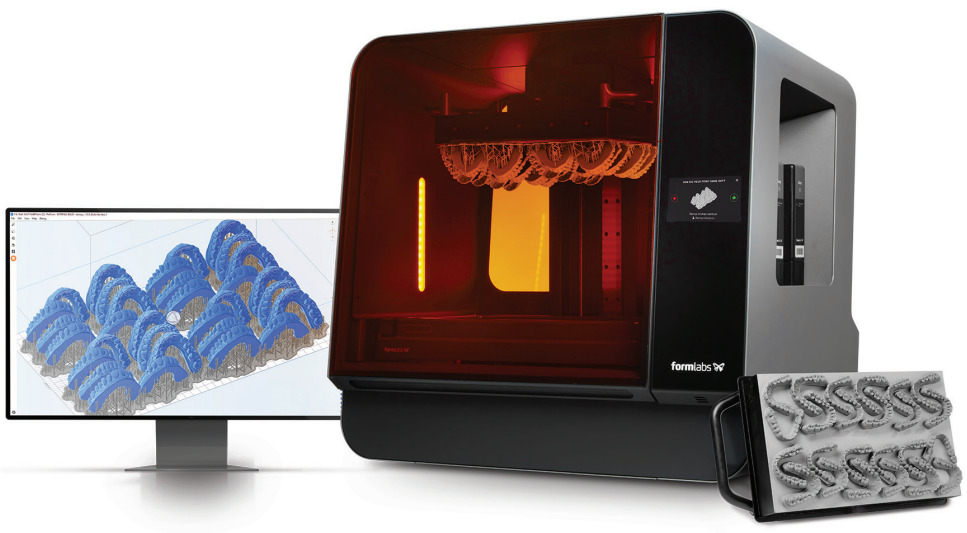
- Open design permits scanning of any impression, or dental model with or without articulator
- The scanner and software were developed together for seamless integration
- Simple to use, intuitive interface
- Supplied with pre-installed scan and design software, the system is ready to go right out of the box
- Special DS Mizar Mondrian edition features bright primary colors inspired by Piet Mondrian's paintings

EGSolutions
egs-info@egsolutions.com | egsolutions.com

Intuitive, cost-effective large-scale 3D printer

Formlabs' new dental and medical 3D printer expands the company's line of large format stereolithography (SLA) 3D printers.

compiled by Stan Goff | information provided by Formlabs Dental



Formlabs Dental
617-702-8476 | dental.formlabs.com

THE PROBLEM

Many large format printers are prohibitively expensive to purchase and maintain and don't deliver sufficiently accurate results

Balancing throughput and quality to meet the accuracy demands is difficult.

THE SOLUTION

Form 3BL

- Formlabs is offering this powerful technology to a new group of users at an accessible price while maintaining a professional quality
- The Form 3BL dental and medical 3D printer is optimized for biocompatible materials
- 3D print large-scale parts or many smaller parts in a single build, with stunning surface finish and detail
- A build volume of 33.5 × 20 × 30 cm (13.2 × 7.9 × 11.8 in), five times larger build volume than the Formlabs Form 3B desktop SLA 3D printer
- An intuitive workflow, with automatic resin dispensing, simple print preparation software, and a simple interface
- A robust end-to-end system designed for nonstop throughput with minimal intervention
- Access to Formlabs' extensive materials library, ensuring a stable supply chain and access to the resins needed for any project—including biocompatible materials
- Healthcare providers can meet the tight deliverable windows needed

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Enhancing lab capacity, performance

The Medit T710 can be used to scan all indications, is compatible with any design software, and allows for a fully customizable workflow, providing freedom from the technical limitations that plague the industry.

compiled by Stan Goff | information provided by Medit.

Medit
medit.com

THE PROBLEM

Rigid systems restricting the dental CAD/CAM workflow and limitations with scanner performance and software capabilities reduce lab efficiency

Dental lab scanners are often limited when it comes to use cases, compatibility with articulators or design software, or the flexibility of their workflow.

THE SOLUTION

Medit T710

- The scanner can be used for all possible dental indications, including implants, replica dentures, impressions, etc.
- Full arches can be scanned in just 8 seconds
- Thanks to an open system, the T710's scan data is compatible with any design software
- Full-size articulator scanning is possible for all currently available models for easy integration
- The customizable workflow guarantees supreme flexibility and performance optimization
- Thanks to four 5 MP high-resolution cameras, 4-micron accuracy, and no blind spots, the scanner delivers high quality results for increased customer satisfaction

NextDent™ 5100
Powered by Figure 4® technology, this printer facilitates high-speed 3D printing for production of dental appliances and sacrificial castings. The range of dental materials, advanced print technology and compatibility with leading dental software reportedly transforms workflows, enabling labs and clinics to produce trays, models (orthodontic/prosthodontic), surgical guides, dentures, orthodontic splints, crowns, and bridges with enhanced speed, precision, efficiency, and lower cost.

3D Systems Corp.
888-598-1438 | 3dsystems.com

A fast, accurate 3D printer that boosts production

The 3D Systems NextDent 5100 printer is helping DenMat's laboratory division see a big jump in efficiency, production. **by Stan Goff**

OSCAR BUENROSTRO
TECHNICIAN TEAM MEMBER INDUSTRY

When Oscar Buenrostro first looked into the NextDent 5100 printer from 3D Systems, he thought some of the features and benefits seemed a little too good to be true. Having worked in the laboratory division of DenMat for close to a decade, he has worked with a number of 3D printers, and some just didn't perform as well as expected, while most didn't deliver on all of their promises.

That all changed when he tested and then started working with 3D Systems' NextDent 5100. Before deciding on purchasing the technology, Buenrostro wanted to take the high-speed printer on a few test drives. He had been intrigued when he learned of the printer's speed and capabilities, but he needed to know if it could really perform that well in his laboratory.

"We tried multiple printers and noticed they didn't have the speed and accuracy we were looking for," he says. "They weren't speeding things up, and we also came across 3D printers that just didn't have the quality we were looking for. We definitely experimented a lot with 3D printers until we came across the NextDent 5100, and after a couple days our model output definitely increased."

Buenrostro who is a Model Shop, Milling & 3D Printing Supervisor, says DenMat has worked with this printer for more than a year and the results have been quite impressive. Using the NextDent 5100's high precision vertical stacked printing for orthodontic models has given the team a big boost in production. The laboratory uses the NextDent 5100 3D printer and the range and diversity of NextDent materials for the production of orthodontic dental models, crown and bridge solutions, implant models for diagnostics, and impression trays.

"They loaned us the printer and let us try it for three months, customers were really confident about the diagnostic models and the precision," says Buenrostro. "The NextDent 5100 is a very simple and easy to use solution, and offers the precision and part quality that we need for our applications."

The auto-stacking feature in 3D Sprint® for high precision vertical stacked printing of orthodontic models provides advanced productivity for a very high volume application. Integrating the NextDent 5100 3D printer, NextDent Model 2.0 material and a proprietary, high precision stacked build in 3D Sprint, the one-click automated solution has helped DenMat increase its output of orthodontic models, producing up to 96 models in an 8 hour shift. Employing this solution results in increased productivity while reducing resource consumption including materials and labor.

"With the stack option feature, it is just amazing," he says. "Now we're able to print anywhere from 96 orthodontic models to over a hundred in an eight hour shift." Buenrostro says the technology makes his laboratory team so much more efficient on a regular basis.

"With the majority of cases DenMat is able to print 36 models every two hours, which means I can assign our 3D printing technician other tasks and still have multiple jobs in the queue ready to start once the 5100 is done printing its current job," he adds.

The accuracy of the printer allows DenMat to use it for a variety of cases, including SnapOn Smile cases, and the software is easy to master, according to Buenrostro.

"Everything from the file preparation and placement is done within the software just by selecting the pre-filled prompted steps. The software truly does all the work, saving on labor costs," he says, speaking to his experience with the 3D Sprint workflow. "The software is adamantly straightforward—in such a way that models get started within 2 minutes. There's no prolonged process of having to adjust or stack the models."

The NextDent 5100 printer is performing so well that Buenrostro expects DenMat to look into new tasks to take advantage of the technology and the advanced resins.

"We actually just got some resin for dentures. So that is going to be another little project that we're going to tag on that printer, to see how that turns out on the NextDent 5100," the DenMat supervisor says. "This printer has been awesome for us and it may turn out to get even better." ●

Digital Chairside Technology's Best of Class

compiled by Noah Levine

EVERY YEAR THE CELLERANT BEST of Class Technology Awards honor the cutting edge in chairside gadgets and goops. Chosen by a panel of dentist experts who use and write about dental technology for leading clinical publications including *Dental Products Report*®, the awards serve as an important showcase for the inventions driving clinical and practice efficiencies, and the innovations changing what dental care looks and feels like.

The awards are not given out based on any specific categories, and the number of honored products changes from year to year. This is by design, as the panel seeks to recognize the most important technology developments, whatever they might look like. The awards tend to highlight dental tech trends as they're emerging, and while the focus might be on chairside technologies, those trends can make their way to the dental laboratory bench just as easily as technological movements that start in labs can ripple into operatories.

This year 20 products were named Best of Class after a long night of debate in Chicago in February. The winners include 3D imaging technologies, CAD/CAM systems, composites, practice software, diagnostic solutions, and even a pair of teledentistry platforms whose technology platforms have been put to great use during the ongoing pandemic.

Most of the 20 Best of Class products are chairside technologies, but several digital dental products with lab and collaborative applications did make the list, and here's a look at some of them.

NONGKRAN_CH / STOCK.ADOBE.COM

Primescan

Designed to enable more precise scanning, the Primescan uses high-resolution sensors and shortwave light to reportedly capture up to 1 million 3D data points per second. The scanner can capture depths up to 20 mm, making it ideal for use with subgingival or deep preparations.

Dentsply Sirona
844-848-0137
dentsplysirona.com

"The CAD/CAM space is constantly changing but the new features and software of Primescan put it in the Best Of Class. Our focus is on the scanner itself which has added accuracy, greater depth of field, ability to scan well into sulci, and speed. Even at shallow angles, Primescan is able to take highly accurate digital impressions of virtually the whole tooth surface, usually capturing in the first pass."

— PAUL FEUERSTEIN, DMD

TRIOS® 4

The 3Shape TRIOS 4 is a powerful intraoral scanner that now comes as a flexible wired and wireless two-in-one solution. Increased battery life of more than 30% optimizes the wireless experience, and a simple plug-in cord, allows you to smoothly switch to wired anytime you wish. With its instant-heat technology, the scanner is ready to capture an impression in seconds, and combined with the enhanced battery life, this allows the scanner to be used with 2 to 3 times more patients on a single charge.

3Shape
908-867-0144
3shape.com/en

"The best intraoral scanner 3Shape offers. It sets the standard for intraoral scanning. The only wireless intraoral scanner making it easy to take between ops. Wear detection gives you enhanced diagnostics to better treat your patients. One scanner with multiple use cases is why TRIOS 4 is best of class."

— MARTY JABLOW, DMD

ChairsideCAD

exocad's ChairsideCAD provides clinicians with the freedom to choose the best hardware and software for single-visit dentistry. Derived from the renowned DentalCAD platform, which has been a signature solution for the dental labs for more than a decade, ChairsideCAD includes dentalshare, a robust, open collaboration tool for doctors and labs. Third party manufacturers' products, data, libraries, and services are easily integrated. Now, dental practices can easily add an IOS with CAD/CAM and develop expertise at their own pace.

exocad
855-EXO-4CAD
exocad.com

"exocad ChairsideCAD is the first complete open-architecture CAD software platform for single-visit dentistry. Easy integration with most intraoral scanners along with step-by-step instruction for CAD design makes fabricating restorations in-house or sending to your favorite lab simple. The default standard for many mills, printers, and scanners."

— MARTY JABLOW, DMD

HOW TO

Make the Conversion from Analog to Digital

Shining 3D and Exocad allowed this dental laboratory to make a stepwise transition to a more technological approach, without an exaggerated investment and with the help of third parties. **by Joel Vega**

FEATURED PRODUCT

AutoScan-DS-EX Pro

- SHINING 3D's newest addition to its 3D dental scanner lineup, the AutoScan-DS-EX Pro, features a compact, lightweight size, a number of versatile functions, and outstanding scan speed to meet customers' demands for numerous scans.
- It is highly suitable for data capturing in restorations, orthodontics, and implant cases. It comes integrated with 2 projector options—blue light and white light.
- The scanner meets customers' different expectations for various applications. Thanks to the combination of superior scan speed and high accuracy, the AutoScan-DS-EX Pro is designed to bring the global digital dental industry to a much higher level.

Aurident
800-422-7373 | aurident.com

AFTER NEARLY 20 YEARS in the dental field and practicing in both the clinical area (expanded function dental assistant) and the laboratory (in-house and commercial lab), I have experienced the transformation of the profession.

At first the crown and bridge (C&B) departments benefited from the introduction of trends in so-called digital dentistry, but not until recently did 3D printers and design software enter the area of dentures and removable partial dentures (RPDs).

Now the RPD department in Vega's Dental Laboratory Solutions, located in Lima, Ohio, depends on the proper functioning and workflow of my scanner and printer, just as the C&B department depends on digital scans and milling machines.

Since I have 60 percent of my clients with traditional dental practices, I am allowed to make an unhurried transition in a staggered manner that permitted me to avoid a very expensive investment.

After going through an orientation process and attending several courses, I was convinced that an open system would serve best as my introduction to the digital world. An open system would give me the opportunity to benefit not only from the materials and platforms provided by a company but also let me integrate and adapt materials from other brands.

Benefits of Technology

My real intention was to get some help to manufacture my metal frameworks. During my orientation, I was attracted to the idea of scanning my models to send the files digitally and receive back an almost finished metal frame without going through the extensive work of designing, duplicating, waxing, casting, and finishing (just typing all that hurts my fingers). Even for those who send the models, a digital workflow like this could be of benefit. Travel time and shipping cost are reduced or even eliminated.

Shining 3D DS-EX would start my transition from an analog to a digital lab. The transition was made with both my new scanner and the help of third parties to manufacture for me. With that alone, I was immersed in a world of new opportunities.

After some weeks, I felt comfortable and confident, with a clear view of my next step. At the time, with a minimum investment and the help of new contacts, I observed a substantial economy of both cost and time of the process.

It was time for the second step. Until then, 100% of the production of the C&B department had been delegated: A client sent a case to me, I sent it to a third party, and they manufactured it in its entirety at a price that allowed us to win a limited profit. Making the laboratory participate in this percentage would represent an increase in production.

Now came the task of training and investing in equipment for the C&B department. Once ready, using third parties to design and mill, only staining and glazing were needed. With this new department running, more and better growth options emerged, of course accompanied by new challenges. Emptying impressions and making C&B models was not part of my plan.

The third step began with the arrival of AccuFab-D1, a Shining DLP 3D printer. This open system, in addition to having its own variety of materials, accepts the incursion of resins from other well-known brands. Vega's Dental Laboratory Solutions adds digital models and more to the digital workflow. This made me curious to design and go after the addition of digital dentures.

Following my interest in designing, I opted for exocad, which, in addition to being an open system, is compatible and fits well with my other Shining 3D equipment. exocad provides a complete software solution for digital dentistry.

Today I can confirm that if the development of a digital workflow with limited investment is possible in a staggered way, then in return, it will offer an opportunity for growth. Of course, none of this would be possible without the support of suppliers and the technical support provided by Aurident.

Today, our dental laboratory scans, designs, and prints a good percentage of our total production (See **Figures 1-6** for examples). This change to digital offers not only more opportunity, but also many more options for clients.

We are seriously considering adding a second printer and updating the scanner for the DS-EX Pro, which I used at Lab Day Chicago 2020. The fact that the camera moves to extend the scanning range and has more veils and more accurate cameras than previous

[at a glance]

1. The technology has helped significantly in 2020 in terms of producing much-needed personal protection equipment.

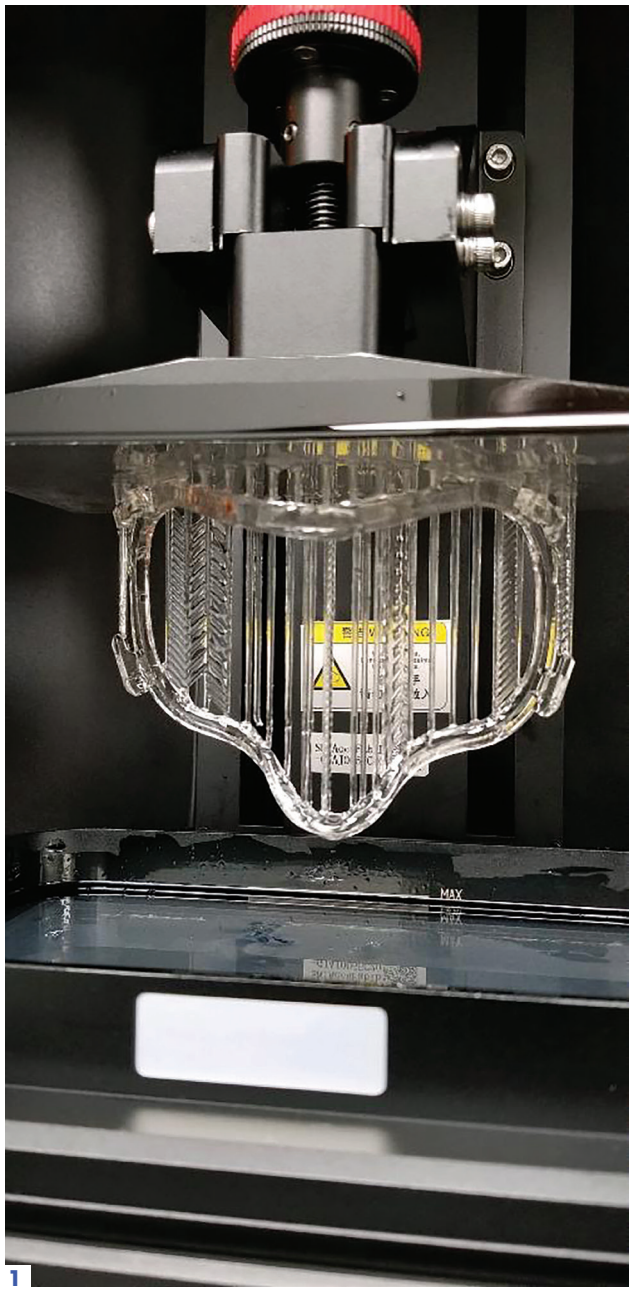
2. PPE mask being 3D printed.

3. Exocad provides a complete software solution for digital dentistry. Here, denture bases are being produced.

4. Temporary denture teeth.

5. A single unit crown.

6. Vega's Dental Laboratory Solutions scans, designs, and prints a large percentage of its total production. A model is shown here.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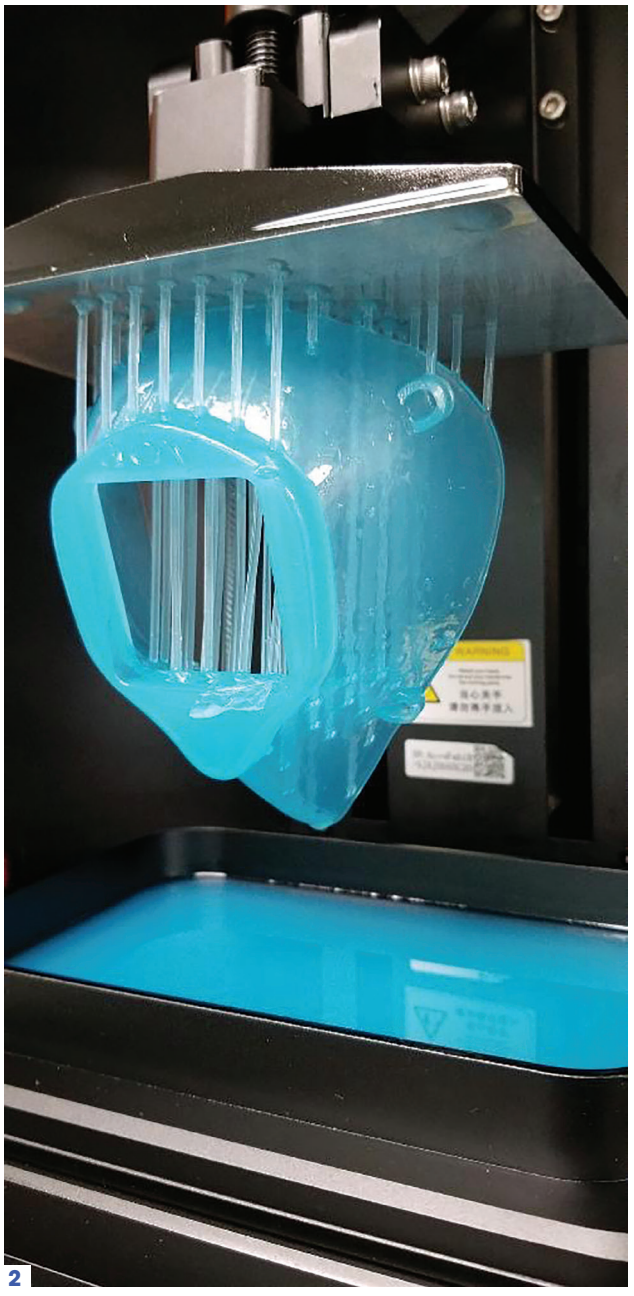
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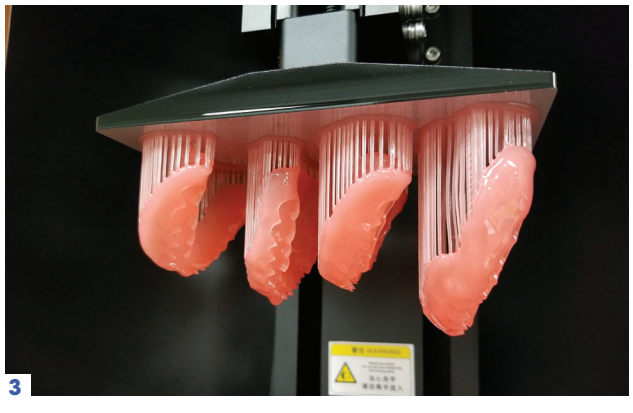
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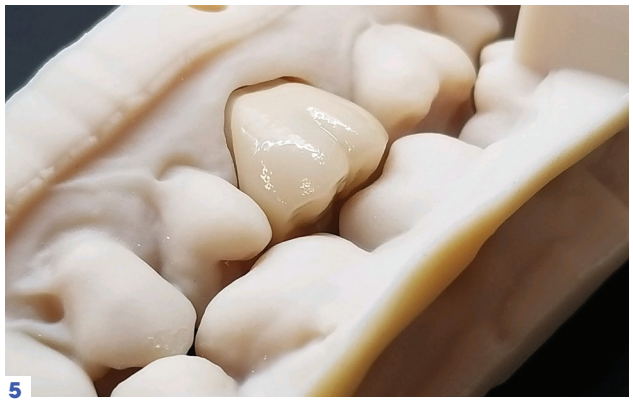
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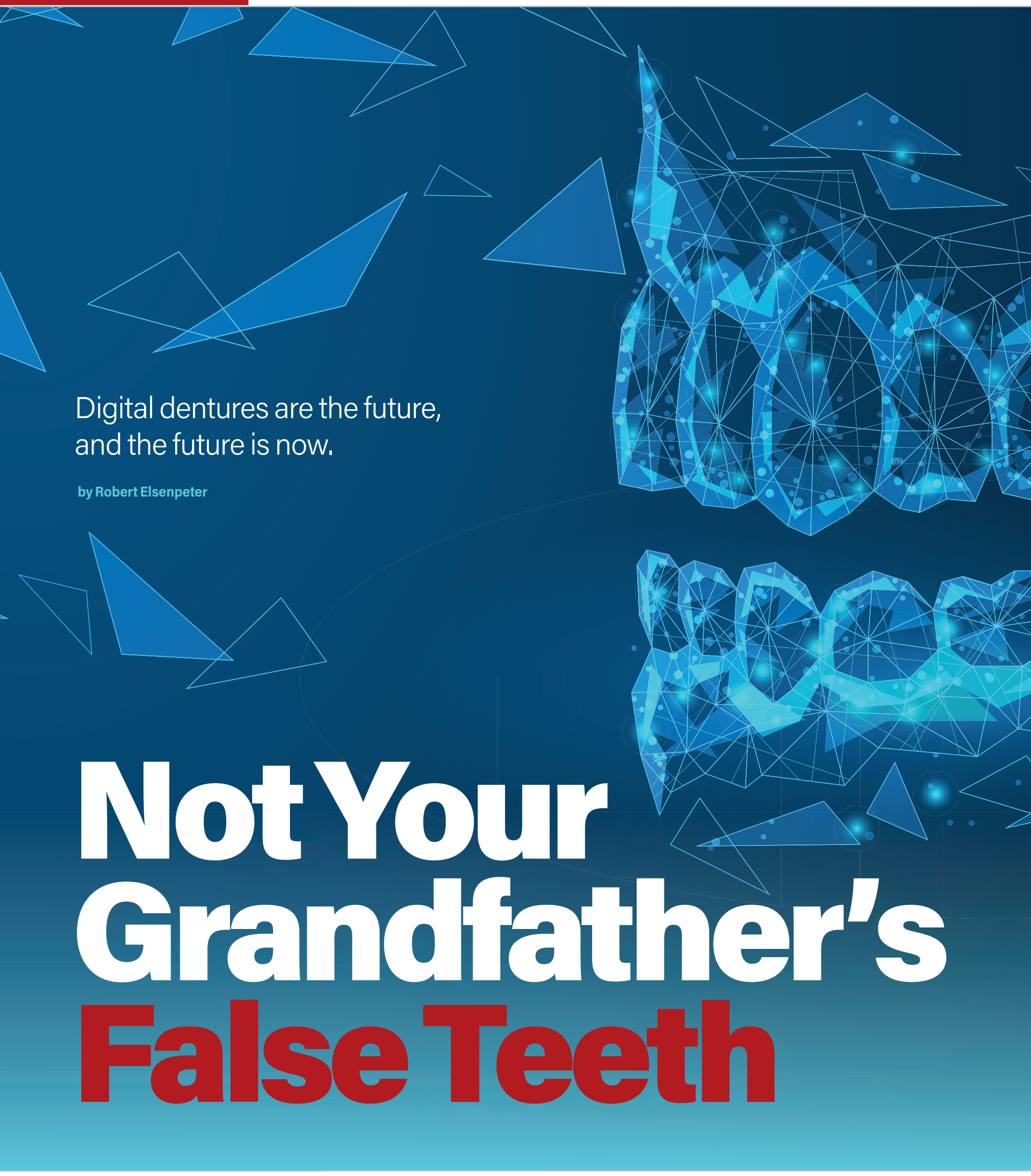
6

generations surely makes it my correct choice.

To complete the family of Shining 3D products, the first generation of IOS Aoralscan was released in 2020 and it is designed to allow dentists to easily introduce their traditional practices to digital workflow. Unfortunately, after the launch in Chicago, the coronavirus pandemic spread in such a way that it limited many dental practices.

In what is and will be a new reality of life and doing business, implementing a digital workflow is an excellent alternative. The fact that clinicians can send their dental work to their respective laboratories through an email offers not only a real economic opportunity, but also reduces the possibility of contagion by contact.

In the same way that technology allows us to remain connected with friends and family during quarantine, digital dentistry also allows us to maintain a safe and more efficient working relationship between the dentist and the laboratory. ●



Digital dentures are the future, and the future is now.

by Robert Elsenpeter

Not Your Grandfather's False Teeth

YABARSART / STOCK.ADOBE.COM

According to 1989's Back to the Future Part II, by 2015, we would have video billboards, flying cars, and hover boards. We certainly got those billboards (yay), but the film missed the boat on the airborne items. For all the technologies that it mistakenly prophesied we'd have by now, there are just as many advances it didn't anticipate, such as smartphones, global positioning systems, and digital dentistry. In fact, if the movie had predicted that dentists would be creating crowns right in the office, it might have lost some believability at that time.

Even crazier: Dentures can now be designed on a computer and materialize seemingly out of nowhere, thanks to 3D printing. CAD/CAM has made the creation of dental prosthetics less expensive, more predictable, and endlessly reproducible. In 2020, digital dentures are on the cutting edge of dental prosthetics.

Evolving Methods

Historically, dentures were made by hand. But in 2012, labs were able to use a computer to design and create dentures. The 2 methods for denture fabrication are milling and 3D-printing.

Milling is a subtractive process; that is, a block of material is loaded into a milling machine and little by little, the machine carves away bits of the block. On the other hand is 3D printing, an additive process: The 3D printer creates the denture components out of resin, just a fraction of a millimeter at a time.

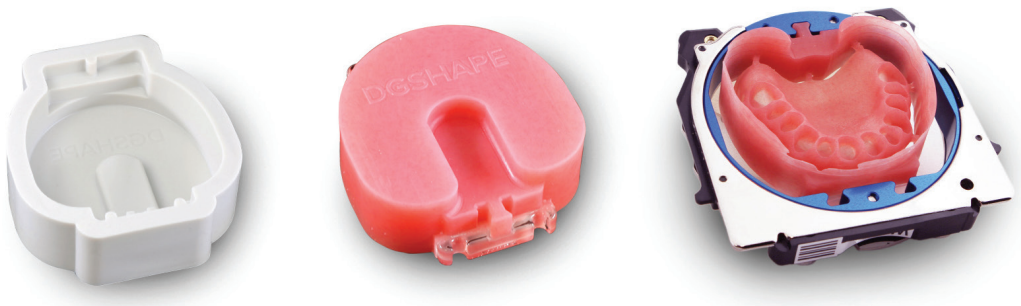
In each method, the teeth and the baseplate are created separately, and after some processing, the teeth are cemented into the baseplate. Both methods have pros and their cons.

"Over the years, the demand for dentures has increased, due to an aging population," Lisa Aguirre, product manager of dental solutions for DGSHAPE Americas, a Roland DGA company, says. "The traditional denture-making process continues to provide high-quality, predictable results; however, the process is time-consuming, messy, and labor-intensive for laboratory technicians. This lengthy process includes multiple visits for the patient and 4- to 6-week turnaround times from start to finish."

Digital fabrication techniques remove those hurdles. "It's gone fully digital, which means that you can now not only take a scan in from an intraoral scanner or an impression stone [but also] develop it using the different softwares," Todd Rutkus, CDT, support and training specialist at Benco Dental, says. "You can develop this new denture fully on the screen and then print it. And there are different ways you can print it out. One way is printing the base and then taking the teeth off a card, using a resin to cement the teeth into that printed baseplate. They can literally print the baseplate and print the teeth and put them together."

> **"The traditional process continues to provide high-quality, predictable results; however, it is time-consuming, messy, and labor-intensive…"**
>
> — LISA AGUIRRE

Nakanishi Dental Lab in Bellevue, Washington, is a great



DGSHAPE milling Time Reduction Kits (TRK) from Roland DGA *(Photo courtesy of Roland DGA).*

example of how one lab's journey toward digital dentures has paralleled the larger industry. Nakanishi has followed dental lab industry methods and trends for almost 70 years, starting with current co-owner Megan Nakanishi's grandfather and then moving to her father.

"Digital dentures have been this elusive thing for several years now," Nakanishi says. "Early on, we invested in a digital denture system, but it wasn't truly a digital denture at that point. There were some digital aspects to it, but the result was still a traditional denture. Although our company was—and still is—committed to digital workflows, we very quickly reverted back to our old ways, because we said, 'This digital denture is too expensive and takes too long to produce for something that is no better than our traditional denture.'

"We decided at that point to hold off on pursuing digital dentures until there was truly a digital solution," Nakanishi continues. "We sat on the sidelines for many years until finally Dentsply and Carbon came out with the Lucitone Digital Print [LDP] 3D-printed denture. When our team first saw that denture, we all looked at each other like 'OK, this is the real deal.' The LDP denture is a true digital denture that provides our clients and their patients with benefits that traditional dentures just cannot provide. It's 'better, faster, cheaper,' and our team is excited."

Labs that embrace CAD/CAM see a clear benefit to the method and seem eager to promote the technology, where appropriate. "Our goal is to do everything as digital as possible," Conrad Rensburg, owner and head of dental implants at Absolute Dental Services, says. "We're obviously heavily invested in Carbon with the Lucitone 3D print material. We also do very limited milling of dentures, and then we also have hand processing. We're doing about 80% digital. We're trying to transition our customer base to as much digital as possible. As soon as we have a case delivered, we have a digital archive of that file. And if that patient comes back 4 years from now, we can print out the original try-in, they refresh the intaglio, and we go straight to finish. So, it's a much smoother workflow if you do it digitally than it is by hand."

Multiple Advantages

The gee-whiz aspect aside, the creation of digital dentures offers obvious advantages for the lab technician, clinician, and patient.

"Conventionally processed dentures undergo polymerization shrinkage, so CAD/CAM-milled, complete dentures are a much, much better fit, intraorally, than the conventional ones," Nadim Z. Baba, DMD, MSD, FACP, a professor in the Advanced Dental Education Program in Implant Dentistry at Loma Linda University School of Dentistry, says. "The second advantage is that the prepolymerized acrylic resin has improved physical properties. Because the material is much stronger,…it can be milled in a thinner layer, so it makes it more comfortable for the patient. When produced, the CAD/CAM PMMA [poly(methyl methacrylate)] blocks are prepolymerized and fabricated under vacuum with 5 to 6 bars of pressure. For this reason, they have a higher degree of monomer conversion [less residual monomer], they have less porosity [and] are more dense, and the polymerization shrinkage has already taken place."

"Instead of the conventional 5 appointments for dentures, that could be shrunk. CAD/CAM dentures can offer up to 2 visits before the dentures can be delivered"

—NADIM Z. BABA, DMD, MSD, FACP

Digital dentures also involve fewer visits to the dentist, a plus for both dentist and patient. "The number of visits that the patient has to [make] to the dentist is usually less now," Dr Baba says. "Instead of the conventional 5 appointments for dentures, that could be shrunk. CAD/CAM dentures can offer up to 2 visits before the dentures can be delivered. Digital dentures can make it more cost-effective by decreasing the clinician's overhead."

Because the denture files are maintained on the lab's computer, lost dentures are easily reproduced. "The lab technician keeps the denture data in his computer while he designs your dentures," Dr Baba says. "So, God forbid the patient loses the denture—goes to the hospital and the hospital throws the denture in the garbage—what happens is that you can call the company, get these files, and make new dentures for the patient."

Technicians realize their own benefits; namely, speed. "They do require a shorter time for the production when compared [with] conventional complete dentures," Dr Baba says. "The second advantage is that the data require fewer lab steps. They don't have to use any gypsum. They don't have to use an articulator. They don't have to use wax. It's all digital. The digital software allows for a quicker analysis and faster denture teeth setup because they can flip the model and turn 60°, move the teeth with a lot of ease. It just needs a little bit of a learning curve to learn about the software. The lab technician can provide the clinician with a more accurate, high-quality, complete denture. Also, the dental technician is not exposed to monomer for the fabrication of removable prosthesis, so it makes it much healthier for [them]."

Maybe even more important is access to a fantastic tool that both crafts adventure and teaches the technician.

"It is definitely helping more, if you are driving the technician to give a superior product," Chris Love, removables department manager at Absolute Dental Services, says. "If you want to just have somebody sit there and press a button and let the teeth be where they are, the CAD/CAM can definitely do that, but we actually look at a denture setup, and we're able to follow what that doctor gave us. It's a really good tool, as long as

you're using it as a tool rather than as something to speed up the process. It will speed up the process, but you're also able to teach people a little bit easier about occlusal schemes, the way you're able to manipulate the arches. I think it's going to be a huge way to teach people more efficiency."

Areas of Resistance

Digital dentures face challenges to acceptance, such as convincing client doctors of the new process' benefits. Traditional analogue methods remain prevalent and, for some doctors, very comfortable.

"It's still very much entrenched," Rutkus observes. "Digital [has grown] at an incredible pace the last 2 years; it's probably grown by at least 50%. However, when you look at the overall picture of denture sales, it's still a drop in the bucket of what is traditionally sold, as far as materials. So it's gaining, and it's gaining because the doctor wants to do stuff in his office, which, 10 years ago, wasn't even thought of."

"It's a new way of producing dentures and educating your clients who have been doing dentures for decades in the same exact way," Nakanishi adds. "Even though it's a better product and it's a better process and it saves them time and money, that change is always something to deal with."

Another issue: Some dentists might want to just practice dentistry and not take on new roles. But Rutkus downplays that factor: "There used to be a saying, 'No doctor wants to become a technician and waste his time doing this stuff. He's always going to send it out to a lab,'" he says. "That's not the case. The doctor's saying, 'Why should I pay a lab bill when I can do this stuff in-house?'"

The systems present their own challenges, which may or may not be insurmountable, depending on the lab. For instance, the expense may be an issue, especially for smaller labs. Depending on the system, the cost of equipment can be prohibitive, with some vendors charging yearly subscription fees.

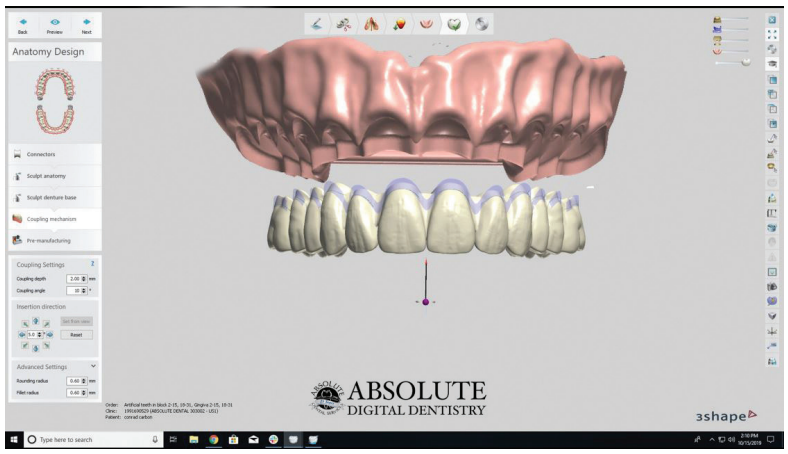
"You must be prepared to invest in the equipment and materials," Nakanishi says. "It can seem expensive at first, but the amount of time you are saving in labor can more than pay for the technology with the right amount of volume."

From a practical standpoint, digital dentures do differ from conventionally made dentures, both in form and function.

"CAD/CAM dentures present several disadvantages when you compare them [with] conventionally processed, complete dentures," Dr Baba says. "The first disadvantage is when you take manufactured denture teeth and you bond them manually to the milled denture bases, which means that even if you designed the dentures virtually and you bonded the teeth manually, they're not going to go in the same position where you designed them on the computer. For that, what the lab technician needs to do is mount the dentures on an articulator to develop a balanced occlusion."

Despite its convenience, CAD/CAM is not a turnkey solution, especially for clinicians. "Multiple CAD/CAM complete dentures need to be made before the clinician feels that they have mastered the system," Dr Baba says. "There's a learning curve, and this might cause some disappointment and less-than-ideal results. People are financially oriented, and they don't want to learn something new, because they're scared that it's going to take away from their chair time and they're never going to make enough money. But, like anything new, there's a learning curve."

Nakanishi Dental Lab team training on Lucitone Digital Print denture fabrication. *(Photo courtesy of Nakanishi Dental Lab).*



Tooth-to-base fusing picture *(Photo courtesy of Absolute Dental Services).*

The virtual nature of the dentures can pose another challenge. For some labs and clinicians, the ability to share those files electronically is a huge benefit—the files can be instantly transmitted. On the other hand, those who prefer to handle the physical device are at a disadvantage.

"Communication with the dental lab can become more challenging," Dr Baba says. "It may require multiple efforts to resolve design-related issues. If you send me a conventional denture and you're a lab technician, I'm going to look at it, and if I don't like something, I heat the wax and move the teeth or write down: 'Well, it looks like the central incisors are too long. Would you shorten them?' Here, you're going to send me a design over the computer. I can't touch it. I can't hold it in my hand. I just have to grab my mouse and move it. A lot of people are not comfortable with that, and they have difficulty communicating with the lab technician."

Constant Evolution (even still)

CAD/CAM continues to evolve; for example, early 3D-printed dentures still required an analogue component.

"Ten years ago, we weren't printing complete dentures," Jeremy Wohlers, CDT, technical

field consultant at Kulzer, says. "When it first came in, we were printing, basically, a wax version of the denture, and you still had to use traditional methods to make the denture because we didn't have FDA [Food and Drug Administration]–approved products. The technology of being able to produce something with additive technology, meaning a printer—that's now the current state that we're in. The race is the products that we can print; not necessarily the restoration itself but actual printer material that we're printing. It has to be FDA approved and designed to be used in the mouth for what we're wanting it to do. We do work pretty hard to make sure that we're part of the tip of the sword with technology when it comes to printing."

Wohlers saw the advance of CAD/CAM technologies as they benefited, first, fixed restorations. As a removable restoration technician, he hoped that one day those same methods and processes could be applied to his field. "I wanted it to be the Jetsons-era of dentures," he says. "It's fun to watch. We are in the entry stages of it. There's still so much more to come, but it's changing every day."

Even advanced milling had room for improvement. As 3D printing became a more viable option, labs realized both speed and capacity increases.

"If you look at a PM7, which is kind of the gold standard of milling dentures, you can probably mill about 2½ dentures a day because it's not a continuous printing," Rensburg says. "Ivoclar [Vivadent] just launched their Ivotion puck, which is a single puck with the teeth and base, all in one, but you're still looking at about a 2½-hour process to mill a denture in that new puck."

"You have to remember, the mill cannot mill the undercuts that the printer can print," adds Love. "So, there [are] a few advantages of printing. To give you an idea, with 1 Carbon printer, we can run about 12 bases in a 2½-hour cycle. So we can run that, in a normal 8-hour day, 4 times. We can literally do, with 1 printer, 40 or 50 bases, compared to maybe 2 or 3 with milling."

3D-printed, Lucitone Denture *(Photo courtesy of Absolute Dental Services).*

The size of the lab and how much work it does is an important determinant for the type of equipment used. "The milling unit, I would say, is more for a small lab or a small office that only wants to do 1 or 2 units of printing," Rensburg observes. "The Carbon printer is more for higher-quality production-type labs. So, if you want to do more than, let's say, 2 or 3 dentures a day, you can't really invest in milling technology."

One of the hurdles toward advancing the technology involves obtaining the FDA approvals needed for new materials and processes. "Every company has their own FDA approval process for their dentures, and, keep in mind, one thing is to have FDA-approved material, but the way that you use it—meaning that the printer, the way you cure it, all the way down to polish—that all has to be FDA approved," Wohlers says. "We're still, as an industry, constantly sending things into the FDA for approval, and it's not just the product but also the process, and that takes time."

"I believe that every single clinician needs to learn how to do them. They give them less issues, like less sore spots, less visits."

—NADIM Z. BABA, DMD, MSD, FACP

Although 3D printing seems to be on the cutting edge of digital denture creation, for some, milling remains preferable. "3D-printed dentures have become a popular option for laboratories and clinicians over the years, as it provides fast denture development with, in most cases, a minimal investment," Aguirre says. "However, 3D-printed dentures have recently received criticism over their durability, as well as the long-term health effects of resin, intraorally.

Milled dentures are becoming the preferred method of denture fabrication because of the precise, efficient digital workflows available; quick denture replication; and predictability of materials. Workflows for milled dentures, like DGSHAPE's Denture Time-Reduction Kits, allow technicians to mill dentures out of any traditional pourable acrylic material, saving time and money. Milling has proved to provide predictable, long-lasting dentures.

Peering Further Into the Future

A lot could be done with a DMC DeLorean retrofitted for time travel, including looking even further into the future of digital dentures. Unfortunately, the best we can do is ask professionals what they anticipate or would like to see.

"I expect to see the demand for digital dentures to continue to grow and evolve," Aguirre says. "Digital workflows are becoming faster and more precise, without

compromising the quality of the final prosthetic product."

The technology behind CAD/CAM is certainly an arena experts have their eyes on, but materials also matter. "The ideal technology—that, hopefully, somebody will figure out tomorrow—is how to print ceramics or a ceramic/polymer-type material," Rensburg says. "The milling technology has kind of run its course. We went through the phase where it wasn't that good. And the problem with milling is that it's slow. It's arduous. It's just as high maintenance on the machines. You lose burs, you lose your suction, units run dry, and you've got to replace those. It's a very expensive technology, and it's very limiting. Printing, on the other hand—you can print any undercuts without ever wondering about the accuracy. I'm thinking that the next big evolution in our industry is that we'll start printing zirconia or start printing some type of ceramic material with a polymer bond that's approved for long-term intraoral use."

Whatever the future face of the technology, Dr Baba believes dentists who don't embrace the technology will fall behind. "CAD/CAM dentures are the future," he says. "I believe that every single clinician needs to learn how to do them. They deliver a better service for the patient… They give them less issues, like less sore spots, less visits. And there [are] a lot of studies that have shown that post-delivery visits are reduced with CAD/CAM dentures. The patient sits less in your chair. It's more cost-effective. You make more money."

"But as far as where it's going to go, the only downfall of printing right now is time. Printing is like making a cake. . . .the problem with printing is the more detail you have the slower it gets"

—TODD RUTKUS, CDT

He also looks to the ability of milling dentures from a single piece of monolithic material. "The teeth and the base are in 1 piece," the dentist/educator says. "The teeth are not bonded anymore to the base. This makes the denture stronger, makes them more esthetic, and makes them nicer looking for the patient. So this is coming, and it's coming fast. Ivoclar has launched the Ivotion system, and I think it's going to be a very promising, phenomenal way of doing dentures."

Intraoral scanning makes the CAD/CAM process easier, faster, and more accurate than physical impressions. Dr Baba wants to see that method advance even further. "I would like to be able to have a patient sit down in a CBCT-style machine and then scan his arches and his soft tissue," he says. "Then, from there, they can design his dentures. I don't know if it's going to happen, but this is something that I would really love to see."

There is a concern for labs as the ease of prosthetics creation advances. Specifically, if it becomes too easy, will labs, ultimately, be removed from the process?

"I love how simplified and streamlined the digital denture process is," Nakanishi says. "But there is that thought [that] if it's too easy, is the lab really necessary in the process? But where labs can add value now is on the technical side, by being a great resource for dentists. Many of our clients refer dentures out, but if we can help them through the process and be the catalyst for them to add a new profit center to their practice, how valuable are we now?

"We know the demand is there," she continues. "Ten thousand baby boomers retire every single day. The demand for dentures is here. So now it's just being able to capture that demand and help our clients feel comfortable along the way."

Ultimately, the future is hazy, but whoever gets there first will likely define the shape of things to come.

"The answer is: Nobody knows," Rutkus observes. "But as far as where it's going to go, the only downfall of printing right now is time. Printing is like making a cake. Most people do 2 layers, and those layers are thick. They don't have a lot of detail to do a 4-layer cake. It's got much more detail, much more filling. So the problem with printing is [that] the more detail you have, the slower it goes, because it has to do more layers. I see that continue to get better. It has to…nobody can wait 2 hours for a denture."

He likens it to chairside milling crowns. "That whole chairside industry exploded," he continues. "And I see the same thing happening with the printing industry. They just need to get over this hump of the timing. They need a quantum leap in technology to get them through this slow, layer-by-layer printing. I think it's coming. There are a ton of companies working on it very hard, because everybody knows that whoever gets there first wins with that technology. I'm sure that patients will be there, as well."

Back to the Future Part II is a great movie, and for all the technologies and advances it got wrong, there are plenty it got right, but still some that it didn't predict. Happily, even though digital dentures weren't on its radar, this technological advance has certainly been welcomed by dentistry. ●

Dental mill from Roland DGA *(Photo courtesy of Roland DGA).*

HOW TO

Bonding Primers: The Missing Link

Understanding bonding can ensure the longevity of a hybrid treatment. by Thomas Zaleske

OF PARAMOUNT IMPORTANCE in the design and fabrication of hybrid implant retained bars is service longevity. After nearly 20 years of requests to service these types of dental prosthetics, it is now obvious that after poor design, poor surface-to-surface bonding is a big reason for in-service failure. An understanding of products that promote bonding and recommended procedures can assure the promised life expectancy of hybrid treatment (**Figures 1, 1a, 1b**).

Bonding primers specifically formulated to bond acrylic or composite to alloy, ceramic, or hybrid resin surfaces tend to be marginalized, but they should be a standard protocol in hybrid fabrication. Their advanced chemistry provides a sound anchor when applying layered top coats and prolongs or potentially eliminates the possibility of subsequent delamination due to the micro flexures that occur during prosthetic function.

Completely eliminating eventual fatigue to failure is not possible because of the individual flexural properties of the combination of material used in the overall fabrication. The aim, then, is to extend the functional life of the prosthetic beyond, if possible, the patient's life expectancy (**Figure 2**).

In a typical titanium hybrid bar, combinations of overlays to consider are the following:

- Alloy to opaque
- Opaque to polymethyl methacrylate (PMMA), or composite
- PMMA to composite
- PMMA to glazing products
- Composite to glazing products (**Figure 3**)

Products that this author uses are manufactured by GC Corporation/GC America, Inc. Other companies manufacture dental materials, but this article will explain the application techniques of GC products based on my success of use and familiarity (**Figure 4**).

Alloy to opaque

For years, prior to hybrid fabrication, GC METALPRIMER II has been the mainstay in my lab in the application of enhancing the bond of acrylic to chrome cobalt partial denture frames. I also now use an upgraded version, METAL PRIMER Z, in present metal bonding applications.

The technique

STEP 01 Use air abrasion of alloy surface with aluminum oxide to produce a satin surface. I use Cobra 50 micron, white, aluminous oxide abrasive from Renfert. After surface treatment, blow clean with air. Avoid using steam or air contaminated with oil or moisture, which can contaminate the micro textured surface, leading to possible delamination.

STEP 02 Apply a wetted but not saturated coating of METAL PRIMER Z. Avoid getting primer and/or opaque into the screw access holes on bar. Once the Metal Primer Z has air-dried, immediately apply opaque.

STEP 03 Cure using Gradia+ opaque is light curable (VLC) source. Preferred light source is either a GC Steplight or a Labolight Duo step mode. Other light sources include any VLC light box/halogen projector bulb source. A 20- to 30-second cure cycle is used with the preferred light sources. If using a nonpreferred source, this author recommends a longer 2-minute cycle and closer proximity to the light source. Also remember that several thin coats of opaque allow for better light source penetration and coverage compared with thick ones (**Figure 5**).

Opaque to PMMA

In the past, I have used several types of "air-dry" opaque products. They work well to mask, but even when dry, they dissolve when they come in contact with monomer in uncured acrylic. This reveals itself many times after curing a case as a pink swirling effect in the acrylic. This is why I switched to the light cure form of opaque. It's much more stable when contacting poured, packed, or pressed acrylic, and I feel it has a more sincere bond to the primer.

The technique

STEP 01 Once the opaque has been sufficiently cured, apply a coating of GC ACRYLIC PRIMER to the opaque surfaces that require acrylic.

STEP 02 Suggested curing is either a 20-second exposure under the Steplight mode or 3 minutes under full mode of the Labolight Duo curing unit.

STEP 03 Adapt acrylic (poured, packed, or injected) once exposed, do not touch the surface.

STEP 04 GC ACRYLIC PRIMER raises the adhesiveness to acrylic resin (**Figure 6**).

PMMA to Lustre Paste, Composite, Optiglaze

Prior to the manufacture of GC ACRYLIC PRIMER, the protocol for bonding composite to a completed PMMA denture was to use GC COMPOSITE PRIMER. Although composite primer is adequate for this application, this author recommends substituting the acrylic primer for the above-mentioned layering.

The technique

STEP 01 Apply light air abrasion to the surface to be layered, followed by a coating of cured GC ACRYLIC PRIMER.

STEP 02 Proceed with application of composite, Lustre Paste, or OPTIGLAZE and appropriate curing procedures for those products (**Figure 7**).

Although initially adding fabrication time and costs to the hybrid treatment, these bonding primer applications, coupled with sound design, are necessary additions to the hybrid bar fabrication workflow (**Figure 8**). ●

"An understanding of products that promote bonding and recommended procedures can assure the promised life expectancy of hybrid treatment."

ABOUT THE AUTHOR

Thomas Zaleske is the owner of Matrix Dental Laboratory in Crown Point, Indiana, and has more than 34 years of experience in removable prosthodontics. He regularly lectures on providing high-quality service to dentists and, most importantly, to their patients. He can be reached at matrixdental@comcast.net and at zaleske.com.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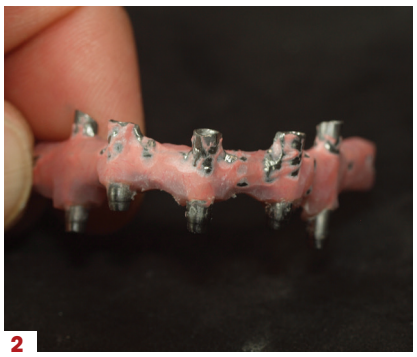
1a


1b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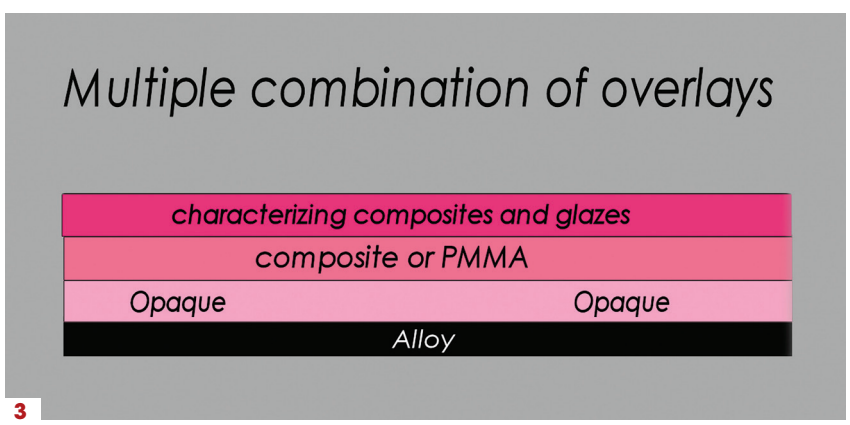

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[at a glance]

1. No primers were used in bonding. No remnant material is sticking to frame.

1a. Surface preparation of bar is missing. Design flaws are also evident.

1b. Surface reveals a brown coating on alloy. Indication of microleakage.

2. Elective stripping of bar when primers are used reveals a tenacious bond between alloy, opaque, and heat-cured polymethyl methacrylate. Removal entails cutting down into alloy. No flaking or microleakage is observed.

3. Every layer must have a complementary bonding primer.

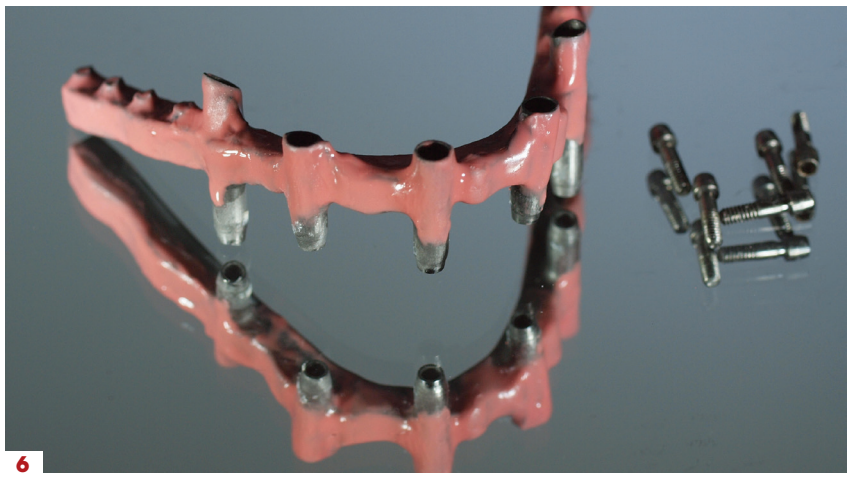
4. Specialized to complement the bonding of various materials

5. Air abrasion and METAL PRIMER Z are prepared to accept opaque.

6. Opaqued, cured, coated with GC ACRYLIC PRIMER and cured. Bar can now be replaced onto the processing model to proceed with acrylic adaptation. If composite is to be applied to bar, substitute GC COMPOSITE PRIMER or GC CERAMIC PRIMER II instead.

7. GRADIA PLUS, GC Initial IQ Lustre Pastes, and OPTIGLAZE

8. Visual step by step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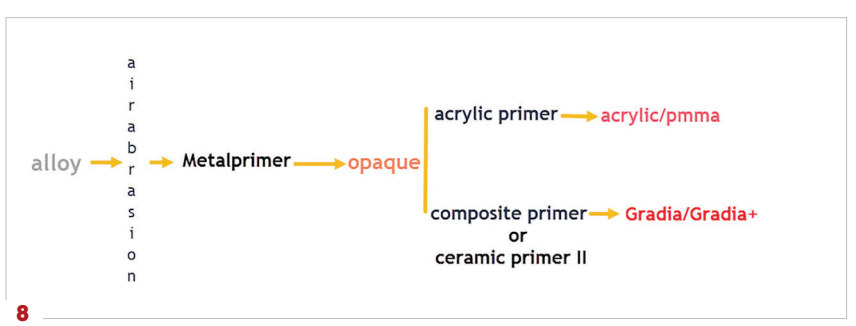

8

Milling burs built to last against the hardest materials

SS White DuraDi™ and LAZER SHARP™ for Roland® milling machines are designed for long life and superior cutting.

compiled by Stan Goff | information provided by SS White Dental.

SS White Dental
844-587-7529 | sswhitedental.com

THE PROBLEM

It can be difficult to find high quality CAD/CAM instruments that last a long time

Remakes can be required if excessive heat and cutting force are created by using lesser quality milling burs.

THE SOLUTION

DuraDi Burs for Roland Milling

- Unique coating gives users longer wear and improved efficiency, which leads to reduced milling costs
- Reduce remakes by lowering excessive heat and cutting force often required by using lesser quality milling burs
- Ample chip space guarantees efficient chip removal
- Polished flutes provide burr-free, clean milling results
- Engineered for superior cutting performance resulting in a smoother surface quality
- SS White Dura Burs for Roland milling machines are built to last against the hardest materials, including zirconium and PMMA, as well as soft materials like wax blanks. The optimal design of the bur leads to a long-life advantage compared to other competitive burs

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Speed Polish from Harvest Dental

Polish efficiently with this paste ready to support the advanced materials you use. by Jack Marrano, CDT

Over the years we have witnessed and enjoyed the benefits of CAD/CAM technology and material advancements. These advancements are now being coupled with advancements in support products that pair perfectly with today's modern materials. Harvest Dental's Speed Polish is an example of an advanced support product.

Harvest Dental released Speed Polish at this year's Chicago Mid-Winter Meeting. On the surface it appears similar to other polishes available today. It is not until the user experiences polishing a restoration with Speed Polish that its rewarding qualities shine.

Speed Polish is a proprietary combination of diamond and alumina which was developed for the efficient polishing of ZrO_2 and $LiSi_2$ restorations. Harvest Dental's products constantly not only meet, but exceed the demands of the most discerning technicians.

Application

Harvest Dental recommends using a #9 Robison short stiff brush, onto which the polish can be loaded slowly at a speed not greater than 5000 rpm. Once the brush is loaded, the technician can begin to polish the restoration using slow speed and high pressure (**Figures 1 and 2**).

Key Benefits

During the review of Speed Polish, multiple benefits of the product stood out which make it quite different than other products currently available.

Speed Polish was designed for use with ZrO_2 and $LiSi_2$ restorations which it polishes within seconds to a high luster, while not being so abrasive as to cause a loss of fine detail (**Figure 3**). The speed in which the polish performs stays true to its name. It was also noted that it performed equally well on layered ceramics (**Figures 4 and 5**).

Another tremendous benefit is the fact that Speed Polish is water soluble. This is a massive benefit and a great aid when cleaning off restorations. Comparable products that are not water-soluble lead to difficulty in removing remaining residue. With these products, a steamer is needed. This can be detrimental to ceramic restorations as the use of a steamer can introduce the possibility of thermal shock. The use of steam is completely avoided with Speed Polish, which is cleaned with water and a brush, or a simple cloth (**Figure 6**).

The proprietary blend of Speed Polish incorporates a binder into its formula, allowing it to load exceptionally well to the brush, which results in minimal wasted material.

With technicians today concentrating on their health more than ever, and the fact that keeping a healthy laboratory environment has always been challenging, this binder is a key to the most remarkable quality of Speed Polish. While it maintains the ability to efficiently polish restorations, it is dust free due to the proprietary binder. According to Harvest Dental, this is by design and possibly the trait that breaks the mold, sets Speed Polish apart from other products, and places it in front of the pack.

Previous polishing products had a tendency to create fine particulate dust which would cover a work surface and even build up on a technician's mask. Harvest Dental's Speed Polish is a great supporting product that exhibits multiple advancements and benefits, and also aids the technician and laboratory in helping to create a healthier work environment.

Harvest Dental's products constantly meet and exceed the demands of the most discerning technicians. This product is in line with all of Harvest's other offerings, which not only perform as advertised, but surpass expectations with additional benefits. Speed Polish delivers and lives up to its motto: Time is Precious! ●

ABOUT THE AUTHOR

Jack Marrano, CDT is the Director of Absolute Dental Services Signature Prosthetics Division in the Triangle region of North Carolina. Jack, a former Marine, started his ceramics career in 2002. He managed the Implant, All Ceramic and PFM Divisions of MicroDental DTI. He was director of technical artistry for Lee Culp at Sculpture Studios since 2014 before joining Absolute Dental Laboratory.

He has completed courses on advanced implant restorative dentistry with Dr Carl Misch and has received a Fellowship from the Misch Institute, as well as obtaining Fellowship and Mastership from the International Congress of Oral Implantologists. He is a member of the Academy of Osseointegration, the American College of Prosthodontists and the prestigious PEERS prosthodontic association. He was also named LMT magazine top 40 technicians in the U.S . under 40.

Jack has been an integral part in the research and development of top restorative materials. Today, he continues to work closely with restorative clinicians, prosthodontists, university graduate programs, and faculty practices from around the country. Jack can be contacted at jack@absolutedentalservices.com.

[at a glance]

A short stiff polishing brush is used at low speed to achieve a quick mirror-like finish **(Figures 1-2)**. One side of a monolithic zirconia restoration has been polished with Speed Polish. The result is a high-gloss luster **(Figure 3)**. In both examples, minor corrections to the layered ceramic have been made. Once made, the areas were polished leaving no visible signs of adjustment **(Figures 4-5)**. Clean paste with water and a brush (**Figure 6**).


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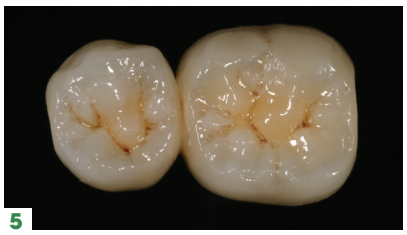
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6

Create beautiful restorations that retain natural tooth function

The High Translucent Zir-Perfect CAD/CAM Zirconia Disc can ensure a natural-looking restoration without sacrificing strength. **by Jo Donofrio**

JOEY DVORAK, CDT

TECHNICIAN TEAM MEMBER INDUSTRY

The Zir-Perfect CAD/CAM Zirconia Disc, a highly translucent zirconia, is designed to provide superb strength and durability, long-term stability, high natural translucency, and excellent esthetics to ensure a beautiful and stable restoration. Introduced in March 2020 by Dental Creations, Zir-Perfect features a 3-point flexural strength of 1200 Mpa after sintering and a natural translucency of 43%. Compatible with most CAD/CAM machines, the Zir-Perfect Zirconia Disc reportedly creates long-lasting restorations that have a beautiful appearance and function like a natural tooth.

"I currently work in conjunction with Dental Creations to help test new products," says Joey Dvorak, CDT crown and bridge manager at CenTex Dental Lab, a state-of-the-art full-service dental lab in Waco, Texas. "In 2019, Dental Creations asked me to test the Zir-Perfect Zirconia Disc to determine how it compared with other zirconia products. I was very impressed. It is a high-quality, very clean zirconia and is easy to handle. The units looked so natural that the doctors couldn't tell the difference."

Many CAD/CAM materials are susceptible to fractures, undermining a restoration's integrity. Even with its high translucency, Zir-Perfect maintains its superb strength and provides strong resistance to corrosion and long-term stability.

"There are a lot of forces in the mouth, so the flexural strength of a zirconia product is key to its durability," Dvorak says. "Zir-Perfect is the perfect blend of strength and translucency, 2 key features that both a dentist and a patient are looking for in a restoration."

Zir-Perfect comes in 98-by-14-mm discs and is available in 9 shades, including white for use with dip stains. "When I first started working with zirconia more than 20 years ago, it was very dull and only available in 1 color that didn't match natural teeth," Dvorak says. "We had to stain it to try and get a closer match, which was very tedious and time-consuming. With Zir-Perfect, we choose the closest shade and do almost nothing else to it. It's a huge time-saver, and the restoration blends so well with the patient's natural teeth that you can hardly tell them apart."

Zir-Perfect is suitable for a variety of restorations, including crowns, bridges, and implants. "I can make just about anything in the mouth out of it," Dvorak says. "[Although] posterior teeth are the bread and butter of our business, Zir-Perfect is pretty enough to use for anterior teeth too."

The process is efficient, predictable, and precise. "I can usually get 10 to 15 units out of 1 Zir-Perfect puck," Dvorak says. "We can make the product quicker and have more time to accentuate it, staining and glazing after sintering to match it perfectly to other teeth and look more enamel-like."

The result is a beautiful, durable restoration that is a perfect fit. "With digital technology, it is all done on a computer screen, and the restoration is almost always a perfect fit," Dvorak says. "We seldom do a remake anymore."

According to Dvorak, zirconia now accounts for approximately 99.9% of restorations created at CenTex Dental Lab. "Almost all dentists are using zirconia now," he says. "Occasionally, we still have a dentist request a metal restoration, but that is very rare."

The Zir-Perfect CAD/CAM Zirconia Disc offers a unique blend of strength and translucency. "There are several companies that make a zirconia product, and I have been fortunate to work with many of them," Dvorak says. "I can put Zir-Perfect next to any of my higher-priced zirconia, and there is no difference. It is a very high-quality product at a lower price point, making it a very reliable and profitable choice." ●

Zir-Perfect High Translucent CAD/CAM Zirconia Disc

The Zir-Perfect Zirconia Disc is designed for superb strength, long-term stability, high natural translucency and great esthetics. With a 3-point flexural strength of 1200 Mpa after sintering, a natural translucency of 43%, and a resistance to corrosion, this block is said to produce long-lasting, beautiful restorations that have a natural appearance and function like a real tooth. Zir-Perfect is available in 9 shades, including white to use with dip stains. It is sized at 98 mm by 14 mm and is compatible with most open CAD/CAM milling machines.

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NEXT ISSUE: 2020 – The Year in Numbers

2EASY WAYS TO IMPROVE COMMUNICATION ABOUT CASES

by Noah Levine

Success or failure, communication is a key component that can influence the outcome of every case that comes through a dental lab. Often, it's the effectiveness of this communication between the practice and your lab that determines if the case meets the expectation of the doctor and the patient. Breakdowns in communication can mean incorrect information is used while designing and fabricating the restoration, which will then lead to a restoration that doesn't provide proper fit, function, or esthetics.

Communicating is a two-way process, and it's certainly not always the lab's fault when key details get missed in the clinic-lab communication process. However, even when the communication breakdowns are clearly the fault of the practice, if the case doesn't turn out as planned, the lab is the party that will need to remake the restoration. This means making sure you receive all the information you need and a process for managing questions or problems as they arise is extremely important for dental labs. With that in mind, here are a pair of tips from members of the *Dental Lab Products®* Editorial Advisory Board to help you improve the lines of communication between your lab and the practices sending you cases.

01 Jack Marrano, CDT

"Today more than ever HIPAA-compliant communication has come front and center in dental technology. Communication with clinicians is crucial to success of a case, these communications have become difficult to do while maintaining HIPAA compliance. This is partially due to the fact that some of today's HIPAA compliance software has been difficult to communicate through, but I have found a compliant communications platform that works for me.

"Awrel (awrel.com), invented by Dr Arnie Rosen, is what we use to communicate with our clinicians. Awrel is a free, encrypted text messaging app that is HIPAA compliant. The app is simple to use and follows today's text messaging format in which you can send text messages, upload and send photos as well as files—all while remaining secure and observing HIPAA compliance."

02 Tom Zaleske

"When we speak of the need for communication in the fabrication of removable prosthetics, I take a proactive approach which not only includes the clinician, but also the patient.

"One way I do this is on specific cases that involve restoring only one arch is to provide a faux opposing appliance which is used to communicate the need for cross arch posterior support. In cases where patients are edentulous posteriorly, I place teeth which are made by duplicating denture teeth in self cure resin on a baseplate. This not only aids in the arranging of teeth on the definitive appliance to be made in ideal positions, but also illustrates the need for support to adequately provide function expected from the new prosthetic to the patient.

"Many times, this communicates to the patient the need for 'back teeth' and they move toward considering either a definitive opposing restoration, or if a definitive restoration is economically unfeasible, converting the try-in set up to a wearable provisional one."

These tips are just a few of the many ways dental labs can take charge to make sure communication with clinicians about cases includes every detail you need to complete your work, and that communication of patient health information is managed via secure, HIPAA-compliant channels. ●

To see images of both suggested communication strategies, visit the online version of this article at dentalproductsreport.com/lab.

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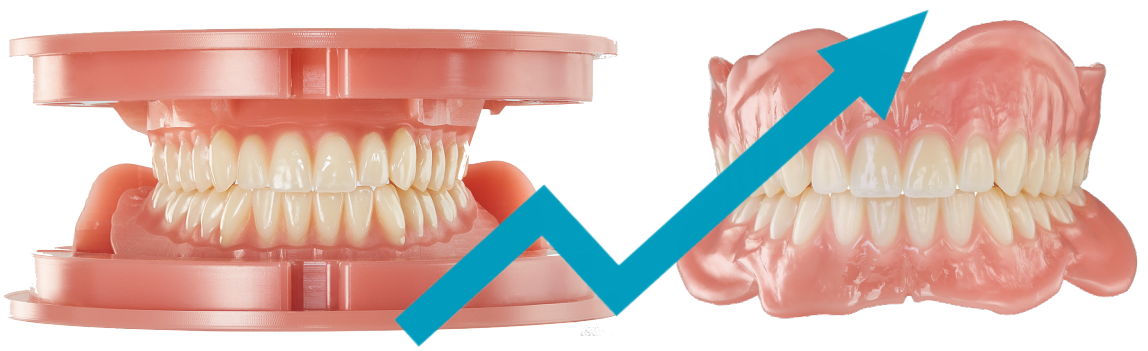
The Baltic Denture System® (BDS)

8 Reasons Why It's a Good Business Decision



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#8 Digital Dentures Today. No training? No software? No mill? No problem. Sterngold can scan, design, and mill your full or single arch case, from conventional impressions, BDKey® , existing dentures or wax rim.

Make the decision to integrate BDS into your dental laboratory today.
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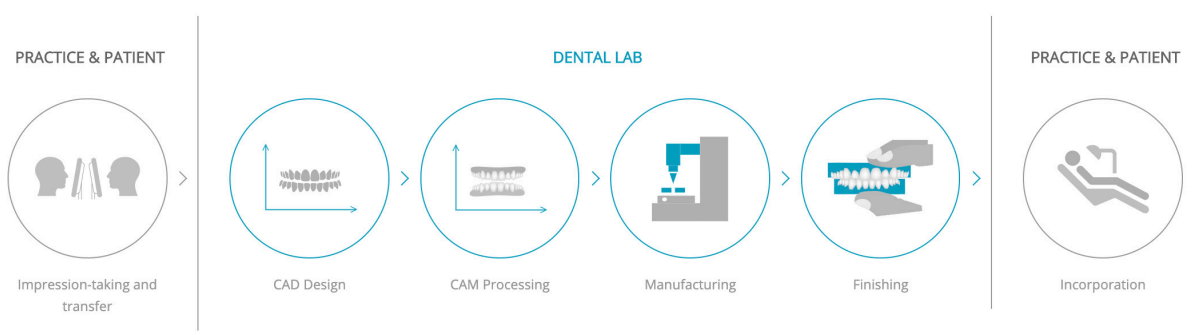

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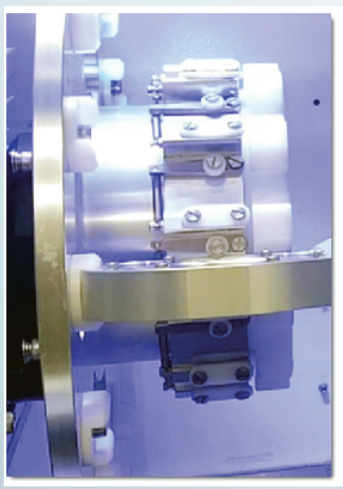

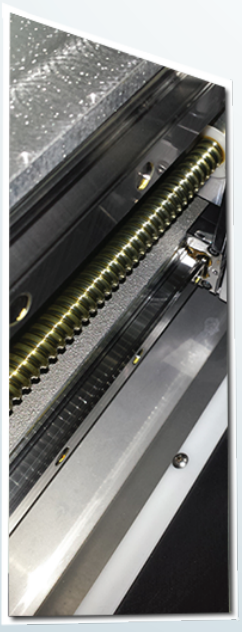

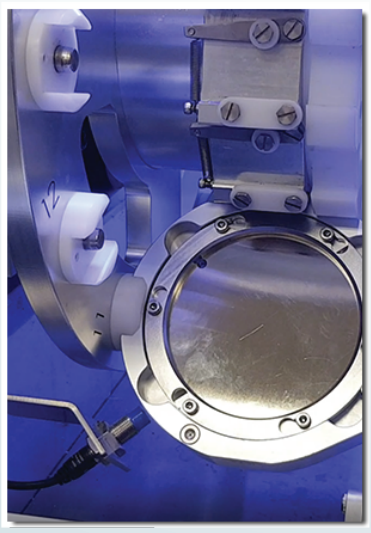

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