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MAXIMIZING

Monolithic Zirconia

ESTHETICS

Through Green State Preparation

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 Laboratory Association**
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Published quarterly
 by the Florida
 Dental Laboratory
 Association. The FDLA
 is not engaged in
 legal, accounting,
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 professional
 counseling and
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 information from
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Small World

By Kevin Krumm, CDT, TE
FDLA President

One thing that has always been a constant is my ardent belief that we need to treat each other with kindness and respect.

The FDLA board of directors is working diligently to ensure that our members have every opportunity to access the best of dental laboratory technology education. Even though it seems like we just wrapped up the Southern States Symposium and Expo, plans are well under way for 2025's meeting. This event is known nationally for being one of the best state association meetings out there, and we promise not to disappoint. As we select the speakers and sessions, we are always looking for ways to stay in tune with our members' needs and what they are looking for in continuing education.

Please reach out to the FDLA office at membership@fdla.net or call (850) 224-0711 to share thoughts, feedback, and suggestions for the meeting as well as membership value. The Board is here for you, and is comprised of owners and technicians, just like you. We need to know what you are looking for!

As a new owner, I have to say one thing that has surprised me is the truth behind the phrase that things change in an election year. It's been eye-opening to see that from cycle to cycle. I have seen a downturn in sales during this election time. As an employee, I always just got paid and didn't pay much attention. Well, now I am paying attention! I'd love to hear more



stories from members on what they learned after becoming an owner.

One thing that has always been a constant is my ardent belief that we need to treat each other with kindness and respect. It is a small world, and an even smaller community. Life is all about how we treat people. You never know when you may need something one day, and someone will hopefully be there for you. Please try to be there for others. We all need to work together to build a future that makes sense. 📌



FDLA Mission

Advancing the individual and collective success of Florida's dental laboratory professionals to enhance oral health care.

Values Statement

- INTEGRITY** - being honest and open in all that we do
- LEADERSHIP** - being the guiding light in a changing environment
- RECOGNITION** - honoring those committed to our industry

SAFETY - promoting safe and quality driven manufacturing practices

INNOVATION THROUGH COLLABORATION - fostering an environment where creative and inspiring ideas are encouraged to enhance patient care



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Florida Mission of Mercy

RESTORING SMILES AND CHANGING LIVES

By R. Jai Gillum,
Director of Foundation Affairs, Florida Dental Association

Volunesia: (noun) *That moment when you forget you're volunteering to help change lives because it's changing yours.*

Patient Conrad B. attended the 2024 Florida Mission of Mercy, which was held May 30 and June 1 at the RP Funding Center in Lakeland. After receiving two fillings, Conrad shared that he had a job interview in two weeks and he felt more confident and comfortable with his smile than he had felt in years. He returned the next day as volunteers were cleaning up the clinic to deliver a card that read: "Thank you to everyone at the [Florida] Mission of Mercy. You all have blessed me so much. Dr. Paul and Heather were amazing and so nice. I don't even recognize my front teeth! Thank you for giving me my smile back. I hope I can volunteer for this program next year."

The Florida Dental Association (FDA) Foundation is Florida's largest charitable organization for dentistry and is a catalyst for uniting people and organizations to make a difference through better oral health. The FDA Foundation launched its signature philanthropic program in 2014, the Florida Mission of Mercy (FLA-MOM). FLA-MOM is the largest charitable dental clinic in the state, and the program provides free care

to underserved and uninsured patients in Florida — those who would otherwise go without care. Since its inception in 2014, FLA-MOM has provided \$17 million in donated care to more than 15,000 patients.

Each FLA-MOM clinic offers a comprehensive array of dental services, including oral health education, x-rays, oral cancer





screenings, extractions, fillings, root canals, cleanings, and a limited number of immediate dentures and partials. FLA-MOM also successfully connects patients with a dental home by providing a resource guide of local community dental programs and clinics.

FLA-MOM clinics are held in a different Florida community each year. Previous locations include Tampa, Jacksonville, Pensacola, North Fort Myers, Orlando, Tallahassee, and West Palm Beach.

The 2024 FLA-MOM in Lakeland treated 1,850 patients and provided 14,176 procedures valued at \$2.3 million. These numbers include more than 200 veterans who received \$330,000 in donated care as part of the FLA-MOM Veterans First Initiative.

Please make plans to join the FDA Foundation for the next FLA-MOM clinic in Daytona Beach on March 21-22, 2025. Volunteer registration will open in mid-October, so please join us for what will surely be one of your favorite volunteer experiences. Volunteers are the lifeline of FLA-MOM, and organizations like FDLA have stepped up each year to help make the program a success. For more information on how you can participate as a volunteer or sponsor, please visit FLA-MOM.ORG or call the FDA Foundation at 1 (800) 877-9922. 📞



MAXIMIZING MONOLITHIC ZIRCONIA ESTHETICS

Through Green State Preparation

Abstract

The aim of this article is to describe a step-by-step procedure of green state preparation for a monolithic full-arch implant bridge. This expedited protocol allows dental technicians to fabricate monolithic full-arch implant bridges at a high standard of esthetics. The first step, proper shaping of pre-sintered zirconia restoration, will finalize your design of prosthesis. In the second step, coloring liquid will be applied on both the teeth and tissue part of the prosthesis. Then, the zirconia restoration will be sintered by following the manufacturer's recommended firing cycle and will then be ready for the final step.



Step 1 (Shaping pre-sintered zirconia restoration)

Proper green state preparation on pre-sintered zirconia is a necessary step for a successful result. The main purpose of green state preparation is to define the final shape and sharp angle. Thanks to the advances of technology, CAD/CAM can do most of the time-consuming steps of the whole process. At this moment, however, milling machines do not do 100 percent of the work.

Zirconia restorations that come right out of a milling machine do not have details; the cervical line (gum line, CEJ) is not clear, embrasures are not deep enough, and the surface is not smooth enough (**Fig. 1 bottom**). After the green state preparation is properly done, the restoration will look more like what was created in design software (**Fig. 1 top**).



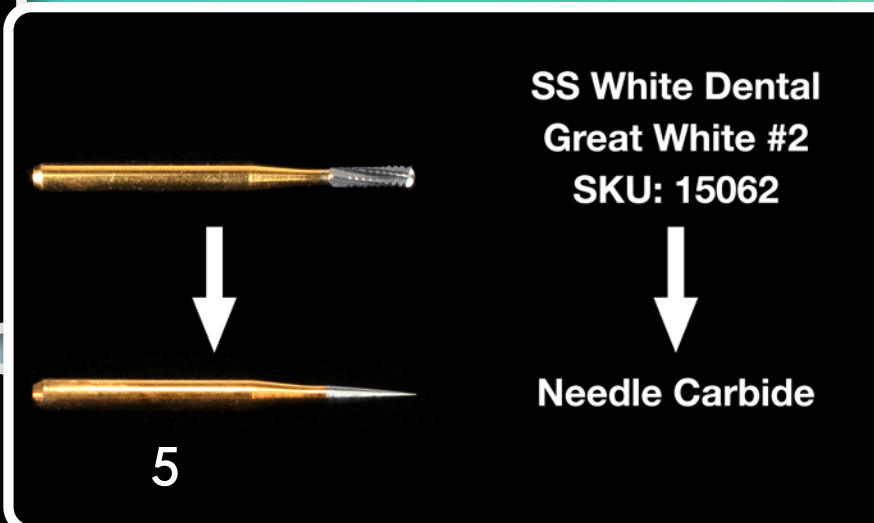
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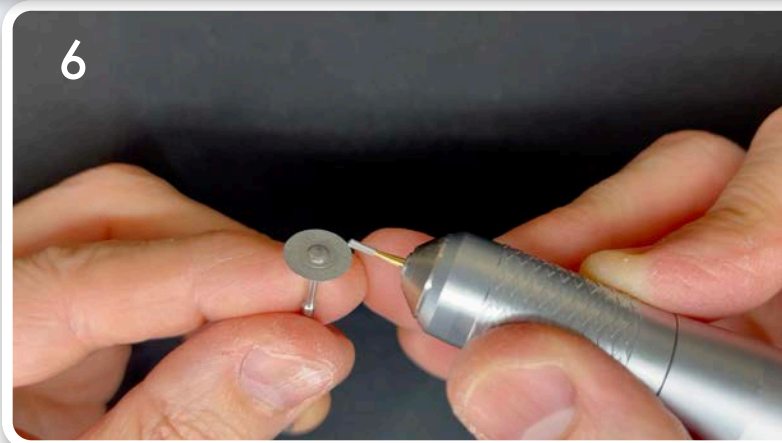
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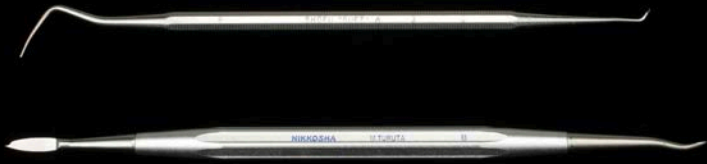
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The author uses carbide burs to remove the restoration from the zirconia disc (**Fig. 2**), and to remove supports from the restoration (**Figs. 3-4**).

After that, a smooth needle type of bur will be created by sharpening a carbide bur using a diamond disc (**Figs. 5-6**). The author uses the side of a diamond disc to remove all the edges from the carbide bur. It is very important to remove all the sharp edges from the side of the bur, because leftover edges of the bur can possibly create micro fracture on pre-sintered zirconia.

The first step of green state preparation is to define the embrasures and cervical line by using a custom-made smooth needle carbide bur (**Figs. 7-8**). The cervical line (gum line, CEJ) needs to be very clear and well defined.

9

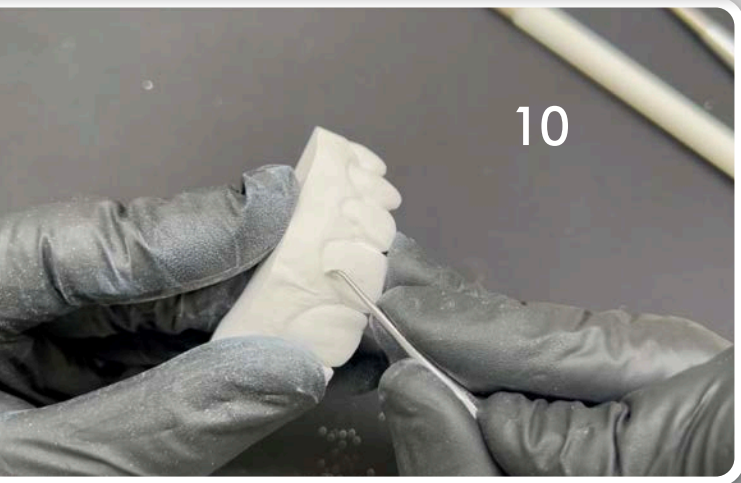


Then, start working on details by using a wax up instrument (Figs. 9-11).

To finalize embrasures and cervical line, the author likes to use surgical blades (Fig. 12).

A blade with a sharp straight tip (#11 surgical blade) can be moved vertically (for the best performance) to create the depth of embrasures (Fig. 13).

10



11



NT Cutter D-400

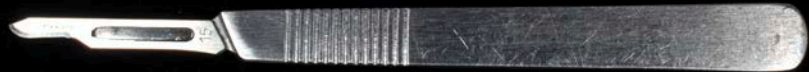
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Surgical Blade #11



Surgical Blade #15



You want to be very careful to create natural looking interdental papilla.

13





14



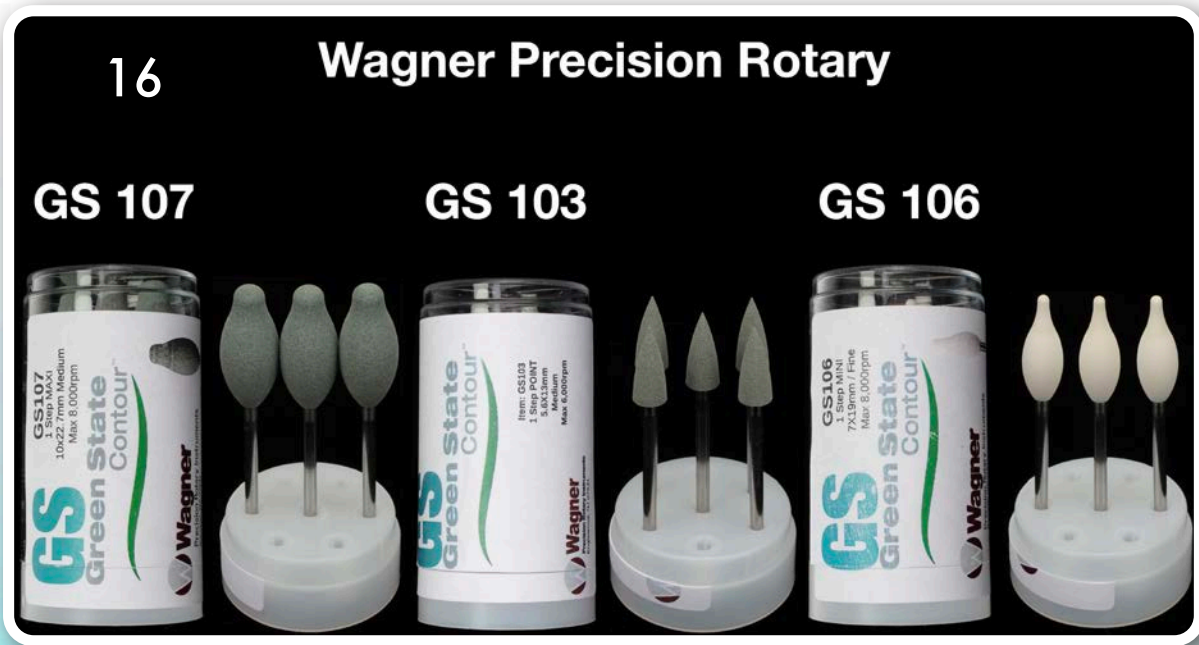
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A blade with curved tip (#15 surgical blade) can be moved horizontally (for the best performance) to define the cervical line and free gingiva area (Fig. 14). Interdental papilla is a very critical area. You want to be very careful to create natural looking interdental papilla.

After embrasures and cervical lines are well defined, the restoration would look like this (Fig. 15).

After using the surgical blades and wax up instruments, the next step is to use rotating instruments. The author uses Green State Instruments (GS107, GS103, and GS106) from Wagner Precision Rotary Instruments (Fig. 16).

The pointy instrument (GS 103) can be used to define the overall contour and line angles (Fig. 17) and to remove the scratch from the surface of zirconia (Fig. 18). It can also be



16

Wagner Precision Rotary

GS 107

GS 103

GS 106



17



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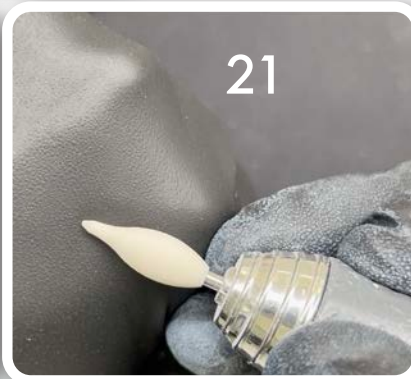


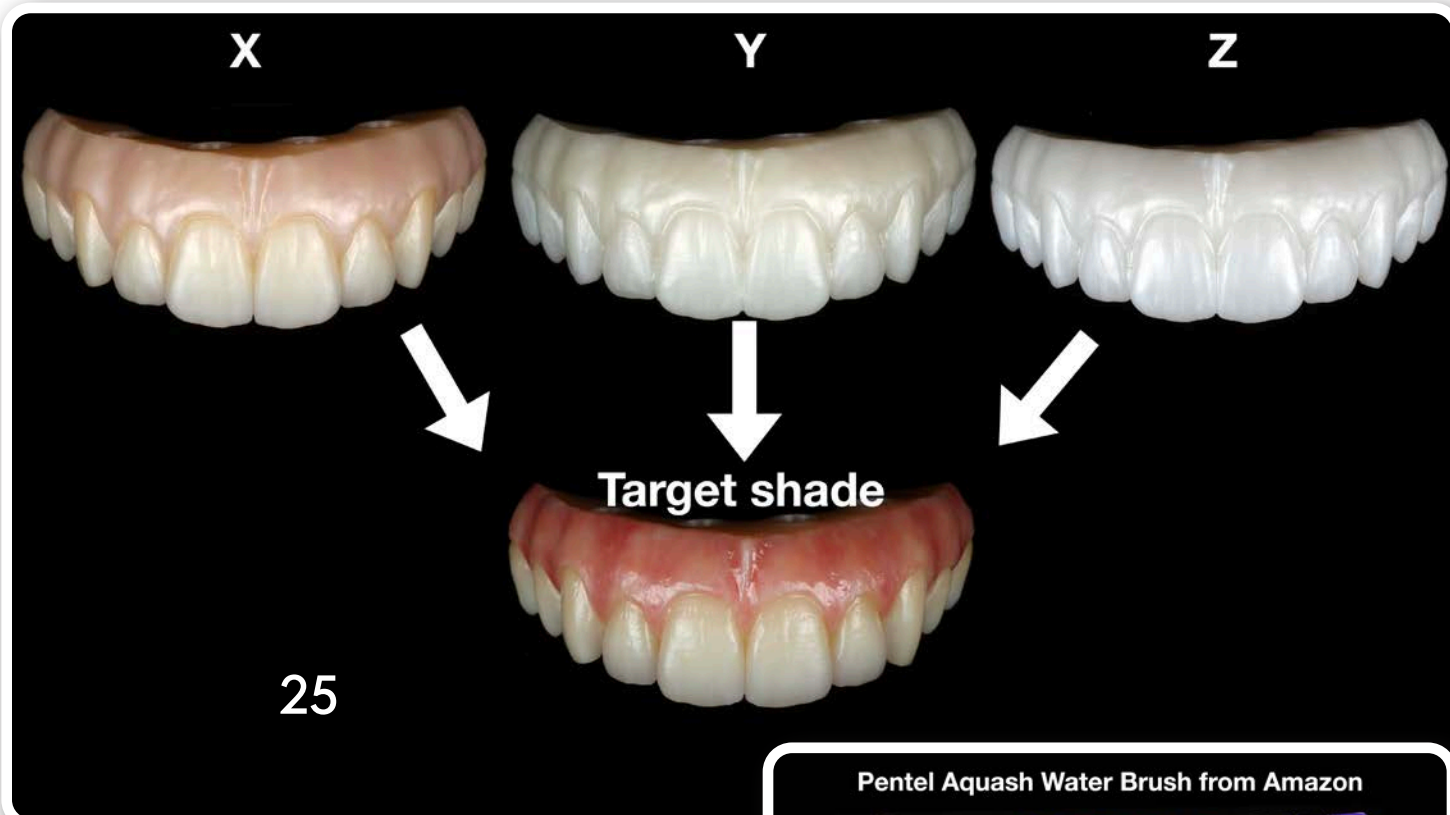
used to add some anatomy such as developmental grooves on the facial surface of teeth (**Fig. 19**). It is recommended that instruments rotate at slower speed (around 15-20 thousand RPM).

Fine pointy instruments (GS 106) can be altered to a favorable shape using Shofu Diamond Dresser (**Figs. 20-21**).

It is very important to make free gingiva very smooth and free from scratch (**Fig. 22**). This can be done by using a fine pointy instrument (GS 106).

After the shaping of pre-sintered zirconia is properly done, the restoration looks like this (**Figs. 23-24**). It is advised to look at the restoration from all different angles to ensure the final shape is there, the embrasures look natural, and the surface is free from scratches.



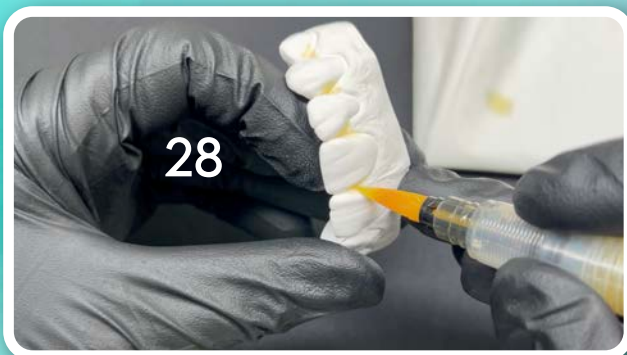


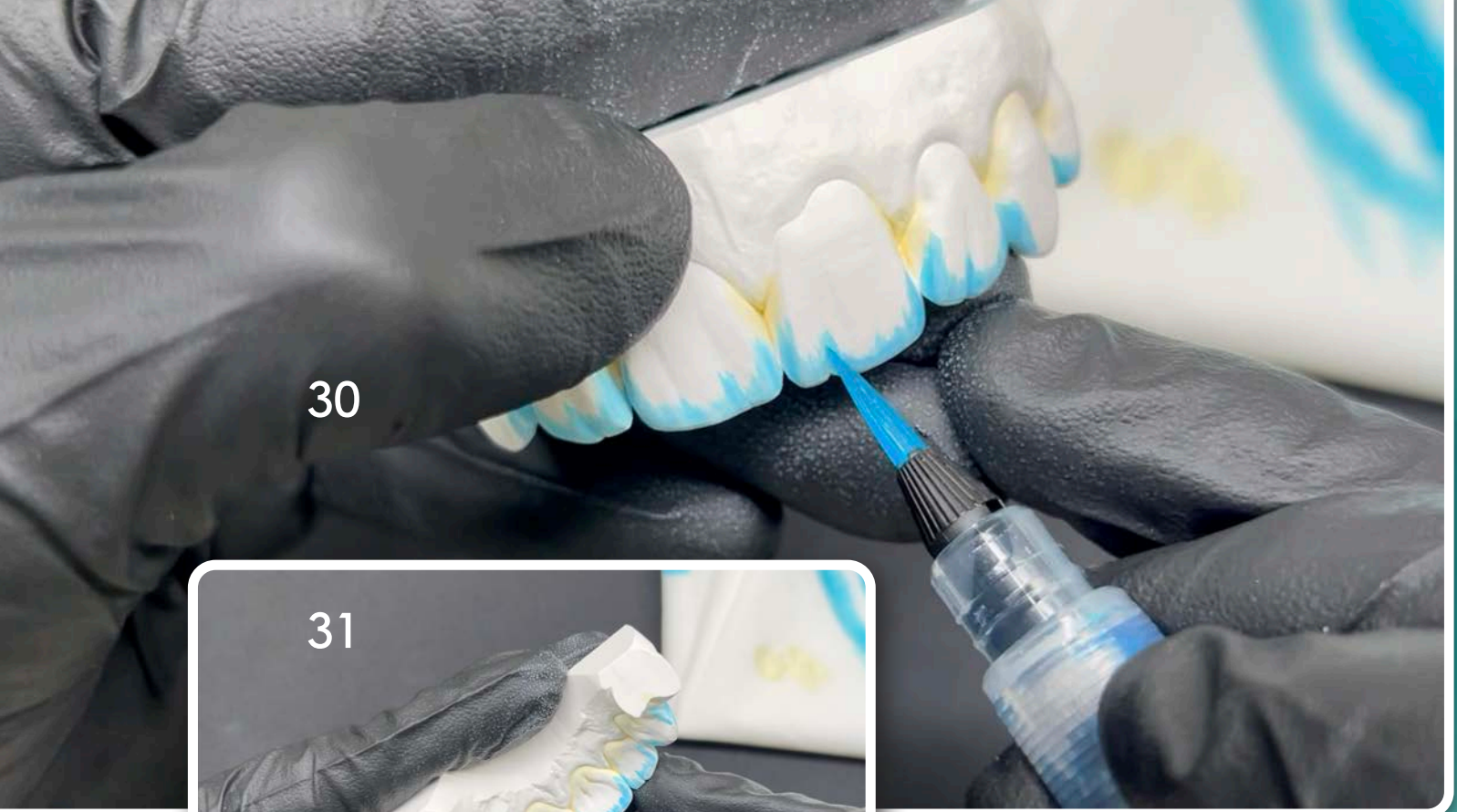
Step 2 (Applying coloring liquid on pre-sintered zirconia)

Application of coloring liquid on pre-sintered zirconia can be controversial. Some dental technicians like to use it while others do not. The author prefers to keep the use of coloring liquid as minimal as possible. To minimize the use of coloring liquid, the author likes to use pre-shaded zirconia which is closest to the target shade. **Figure 25** shows examples of pre-shaded zirconia in different shades (X is shade A2. Y is shade B1. Z is Bleach shade). In this case, the author likes to use X to achieve the target shade.

Figures 26 and 27 are examples of tools and materials that can be used for this step. Similar products from different manufacturers are also available on the market.

Coloring liquid (in this case shade B1) is applied on the interproximal of facial surface and cervical portion of canines on facial surface (**Figs. 28-29**).



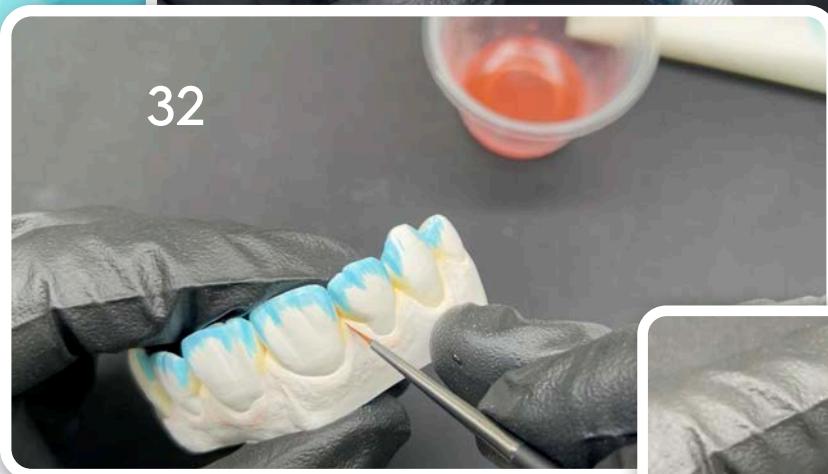


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Coloring liquid (incisal blue) is applied on the incisal third of teeth both on the facial and lingual surface (Figs. 30-31).

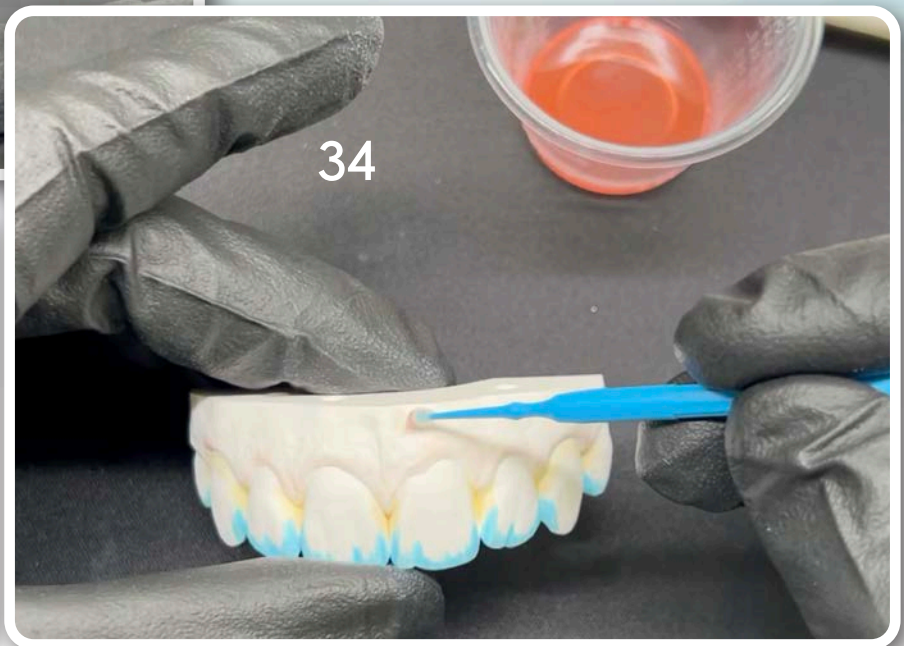


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Coloring liquid (Prettau or Aquarell Tissue B) is applied on the tissue part of the restoration (Figs. 32-34). It requires special attention when applying pink liquid. You probably do not want too much pink liquid applied on teeth.



33



34



35

After the coloring liquid is applied, the restoration looks like this (Fig. 35). Then, the restoration is sintered by following the manufacturer's recommended firing cycle.

Figures 36-38 are examples of properly sintered zirconia.



36



37



38



Figures 39 and 40 depict another example of a sintered monolithic zirconia full-arch implant bridge restoration for a clinical case (dental treatment: Panos Papaspyridakos, DDS, MS, Ph.D). Note that the final shape is already there. After this stage, you can change the shape just a little bit, not dramatically. Embasures are very critical. They need to be sharp enough and deep enough before sintering. The surfaces of the teeth are relatively smooth (author's preference) for easy application of color. The intaglio surface (bottom of the restoration where zirconia touches patient's natural tissue) is highly polished with a polishing wheel and/or polishing compound. Ideally, the intaglio surface is convex all the way and free from any concavity (or undercut) to prevent food traps. The intaglio surface is contacting the patient's natural tissue with gentle pressure.

Summary

The presented technique facilitates fabrication of monolithic zirconia restoration at a high esthetic standard. Utilizing the above technique enables dental technicians to fabricate beautiful restorations. 📌

Earn continuing education credits for this article and quiz!

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Acknowledgements

The author thanks Dean McNeel, DDS (Ozark Prosthodontics) and Lori McNeel (Ozark Prosthodontics) for all their support, Naif Sinada, DMD, MS, for his expertise in (digital) dentistry, Panos Papaspyridakos, DDS, MS, Ph.D, for sharing his digital workflow and clinical cases, Don Cornell for sharing his techniques and knowledge, Luke Hasegawa CDT, Oral Design, for sharing his technique, knowledge and inspiration, James Choi, MDC, for sharing his technique and support, and Kevin Mahan and Jensen Dental, Sheila Pesantes and Whitepeaks Dental Solutions USA for all their support.

About the Author

As a young boy growing up in Yokohama, Japan, Kite Saito, CDT, MDC, knew that he wanted to work with his hands and make people smile. In 1997, he began to pursue his dream and combined these two passions by moving to Los Angeles, California. In 2004, he completed his training in the LACC dental technology program. In 2011, Kite earned the prestigious degree of Master Dental Ceramist from UCLA. In 2018, Kite moved from California to Fayetteville, Arkansas to work with Ozark Prosthodontics. This opportunity gave Kite the ability to work with both highly capable prosthodontists and dentists, but also firsthand with his patients. Twenty years later, Kite's passion to make people smile is stronger than ever. Kite not only transforms patient's lives, but those of dental professionals through his dedication to hands-on education, training and speaking engagements around the world.



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From Design to Reality:

THE IMPACT OF DIGITAL SLM ON METAL PARTIAL FRAMEWORKS

In the 17 years I've been in this industry, one of the main struggles that I, along with many other labs, have faced is producing high-quality, consistent metal frameworks for fabricating metal partials. They're not easy to make, they're labor-intensive, and skilled frame technicians are becoming increasingly difficult to find. For years, we outsourced to local frame labs but consistently faced issues with quality. I knew this was a significant problem in our industry and wanted to address it, not just for my lab but for others struggling to produce quality metal partials.

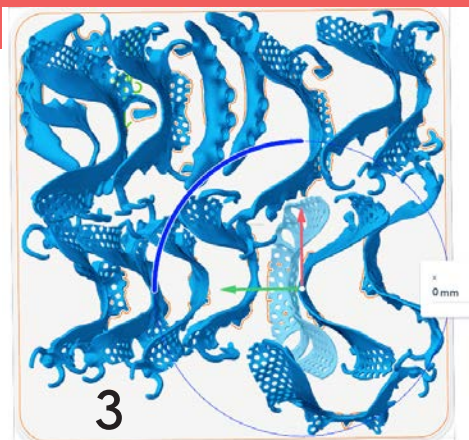


GPS Digital RPD was established in November 2022 with the goal of providing high-quality metal partial frames to support dental labs nationwide. We have an exceptional team of former analog technicians who understand how a frame should look and feel. Many of our technicians have worked on tens of thousands of frames throughout their careers. We utilize digital technology to design, SLM print, model print, and finish partial frameworks, ensuring the best results for quality-fitting and esthetically pleasing frames in the industry. This also allows us to print components that were previously challenging, such as attachment housings, single-piece swing-locks, and DE hinges. These innovations streamline the process and create valuable space in commonly limited areas (**Fig. 1**).



Many laboratories have hesitations on outsourcing and to help better inform this decision, I will outline our process from start to finish.

When cases arrive, either through our web portal at gpsdigitalrpd.com or as physical models, we enter them into our scheduling software (Magic Touch) as well as 3Shape and immediately begin designing the metal framework according to specifications. Our team of designers has extensive knowledge of RPD frame design. Our General Manager Josh Williams, who has over 15 years of experience in creating metal RPD frames, is the first to reach out to your lab if we have any questions about your models or scans. We also offer in-lab tracking through Magic Touch as well as design previews before going into production to ensure the design is perfect for you (**Fig. 2**).



After the design phase, the cases move to our nesting department. We use Oqton nesting software across all our printers. This AI-driven software ensures the most efficient and well-supported parts on the build plate, avoiding key areas and enabling our technicians to easily remove supports after printing. This system eliminates the warping of larger frames, a common issue in earlier years of SLM printing. It also allows us to fill a build plate with the maximum number of frames without sacrificing build quality. This system works across all five of our printers and has specific parameters preset by the printer manufacturer to ensure perfect prints (Fig. 3).

We use SLM printers from 3D Systems and 2One Lab, printing at a 30-micron layer thickness. The printing process is straightforward and user-friendly. We load metal powder into a powder reservoir chamber and a build plate into the build chamber. During printing, the powder reservoir rises and feeds powder while the build plate lowers in the build chamber. The coater spreads a 30-micron layer of metal powder across the build plate (using a coater or roller, depending on the machine), and then the laser "welds" the 30-micron layer in place. This process includes both the frame and supports at the specified layer height. It repeats 500 to 1,400 times, depending on the build height. The process can take as little as one hour for smaller builds or up to 12 hours for larger builds with greater height, similar to resin printing where taller objects require more layers and time (Figs. 4-6).

Once the build is complete, we clean the excess powder off the frames, remove the build plate from the printer, and brush any remaining powder into a catch container. The excess metal powder is sieved to remove particles too large for reuse, and the rest is mixed with new metal powder for reuse. This results in minimal material loss during the printing process. This stage is the most hazardous part of SLM printing and requires the use of a respirator when handling exposed powder. We have built a separate room for powder sieving with proper ventilation to ensure the process is as safe as possible. We use both ultrasonic and agitating sieves to filter the metal powder before reuse.

The build plate, with frames and supports still attached, is then ready for heat treatment in an annealing furnace. This process removes stresses caused by the rapid heating and cooling during printing, giving the frames the necessary flexibility. If the frames were cut from the plate before this step, a "spring" effect would occur, distorting the frames. We load the entire plate into a Nabertherm oven, setting it to a peak temperature of 800-1,200 degrees, depending on the metal type and brand. During heating, the frames are encapsulated in an inert gas to prevent oxidation inside the charge box portion of the oven. This process improves the finish and shine of the frames while maintaining a consistent molecular structure. Annealing is crucial for achieving a great fit and the expected flexibility of cast frames (Fig. 7).



The frames are then cut off from the plate with a band saw and placed accordingly into case pans. The supports are removed with wire cutters, and any remaining small points are finished down with a high-speed lathe. Finishing is minimal when the design is executed properly and is still completed in the traditional way. We hand-finish and fit the frames before polishing, using the age-old process of carbide burs and mounted stones on a high-speed lathe. Then, we electropolish them in an ESMA acid stripper before using our D-Lyte D100. Unlike the old tumbler-style units that often caused frame distortion, this machine holds each frame individually in a clamp. After the D-Lyte process, the frames are hand-polished to achieve a perfect finish. We continue to use rubber and felt wheels on Demco high-speed lathes to give the frames that classic handcrafted look. Once the finishers are satisfied with the fit and finish, the cases are returned to Josh for final quality control before being shipped back to our customers (Fig. 8).

This entire process takes five in-lab days to complete and is done 100 percent digitally. We don't use any stone, duplicating machines, or boil-out tanks in our SLM print lab. This results in a very clean and streamlined process, allowing for quick turnaround times. If you would like to learn more about our products (Figs. 9-11) visit gpsdigitalrpd.com.

About the Author

Andrew has been around the dental industry for as long as he can remember. Andrew's grandfather was a dentist who practiced in the DC area. Andrew spent his summers in high school working at the lab, and eventually graduated the dental technology program at Indian River Community College in 2007. With ten years of CAD/CAM management under his belt, he has transitioned into the role of owner of GPS Digital Dental Lab. He is an active member of Florida Dental Lab Association (FDLA), National Association of Dental Laboratories (NADL), and is a graduate of the NADL University Program. He enjoys spending time with his wife, and active son, James, and is an avid follower of premier league soccer. Go Liverpool!



This results in a very clean and streamlined process, allowing for quick turnaround times.



Finish Line Celebration



FDLT Race for the Future 10

It's official. The saying, "everything is bigger in Texas" is confirmed and the Foundation for Dental Laboratory Technology's 10th annual Race for the Future is proof of it! As hoped for, the Race for the Future 10 went down as the most successful fundraiser in the Foundation's history – bringing in over \$100,000.

You know what else is true about Texas? The heat! Luckily the sunrise start to race day didn't stop the near 30 Foundation racers from showing up and racing for the future of the dental laboratory technology profession. Of the 44 sponsors, we had a significant level of onsite sponsor presence including representation from Helm Dental Laboratory, Argen Corporation, Gary Iocco representing himself and IdentAlloy/IdentCeram, Nowak Dental Supplies, Barksdale Dental Lab, Hermitage Dental Lab, CDL, Lifelike Dental Studio, By Design Dental Studio, CDL, DLT Training & Education, exocad, She Designs Dental Studio, Tom Love as the sponsor himself, Voices from the Bench, and Young Dental Lab, Inc., CDL. Not to be overlooked are the sponsors who joined us the night prior for the Race for the Future 10

dinner (or carb load as we call it). A huge thank you to all our sponsors and donors!

While the logistics of the Cal Tri Fort Worth race were far different than that of the Chicago Triathlon (approximately 400 total race participants compared to thousands), the camaraderie remained equally unmatched. The smaller scale race allowed our spectators to catch every Race for the Future 10 athlete during each leg, guaranteeing no one missed out on hearing enthusiastic chanting of their name.

As a 501(c)(3) organization, every ounce of the Foundation relies on sponsorship and donations from this event and other donations made throughout the year. The revenue generated is reinvested into the dental laboratory technology industry, directly impacting the number of grants and scholarships awarded annually, and enhancing the Foundation's capacity to meet other workforce needs alongside its sister organizations, NADL and NBC, in this ever-evolving industry. 📌

For additional photos, visit www.facebook.com/nadldlt.



Racers and Cheerleaders Sunrise Crew



Post - Race for the Future Dinner (Carb Load)

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SYNRg Titanium Arches - Milled titanium thimble frame with milled KATANA YML Case contributed in collaboration with Brian Lindke, CDT and Dr. Lincoln Fantaski, DMD.

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Relief for Hurricane Victims

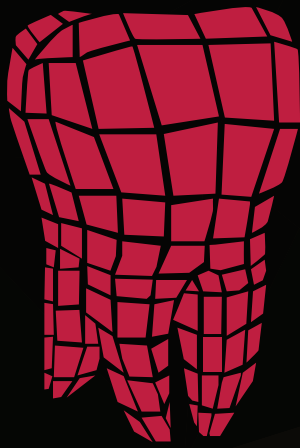
Our hearts go out to everyone impacted by Hurricane Helene and Hurricane Milton. Together, we are resilient.

If you find yourself in need of assistance, please do not hesitate to reach out to us. The NADL Disaster Relief Fund (<https://www.nadl.org/disaster-relief>) is available as a financial resource for those impacted by natural disasters.

FDLA Supports the Foundation for Dental Laboratory Technology

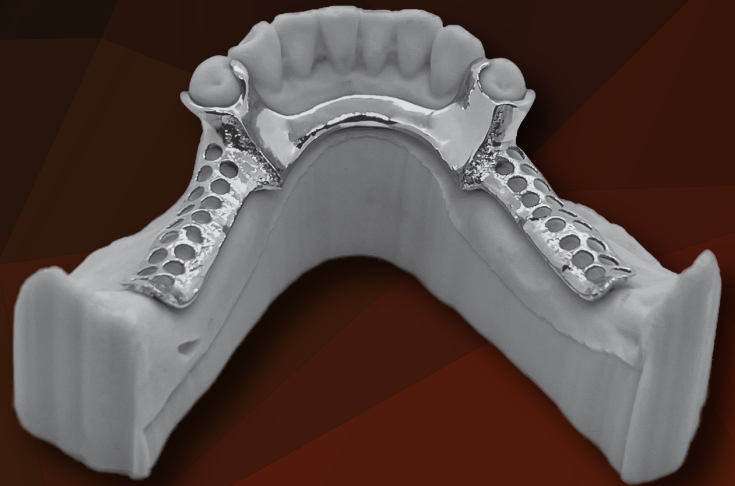
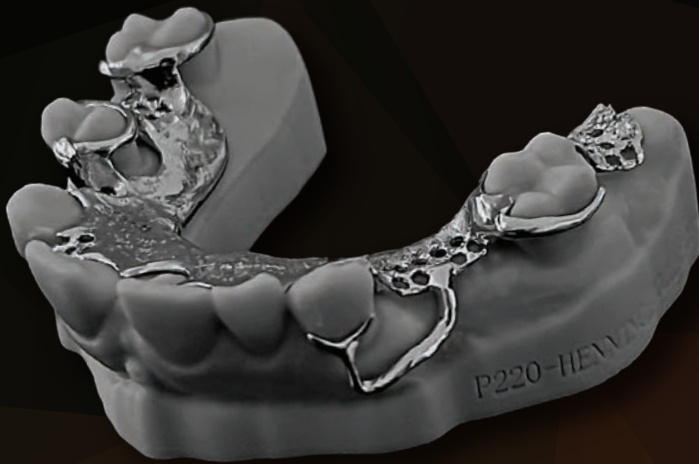
During the Southern States Symposium & Expo, FDLA joined together with the Foundation for Dental Laboratory Technology (FDLT) to increase awareness of the opportunities for enhancing education in the industry. Board members offered their time to engage with members and help with the Wine & Liquor Toss in the expo. Not only did members and vendors have fun participating in the game, but they raised funds for the FDLT. The FDLA board, members and staff are proud to support this organization and donated a check in the amount of \$2,142.79 to the Foundation for Dental Laboratory Technology after the 2024 event.





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March 21-22, 2025

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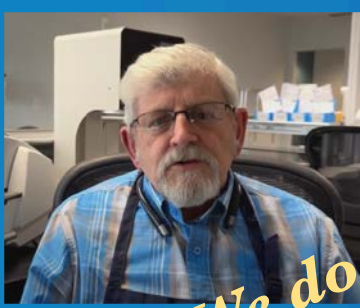
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How does VITA North America help dental laboratories be successful?

We pride ourselves on being a comprehensive material provider that prioritizes complete but open solutions. This means we are committed to offering products and services that are compatible with a wide range of dental hardware and software platforms. Our cooperative efforts with leading dental technology providers ensure that our users have all the options they need, paired with fully validated processes for seamless integration and optimal performance.

One of our stand-out achievements has been the introduction of the VITA VIONIC® DENT DISC multiColor. We have received fantastic feedback from industry leaders who appreciate how the VITA VIONIC® DENT DISC simplifies their workflow while delivering exceptional results for their patients. Lukas Wichnalek has spoken exceptionally high of the VITA VIONIC® DENT DISC saying, "The need to tediously grind out individual teeth to adapt them to framework structures is now a thing of the past in our laboratory."

Another significant highlight for us was being nominated in 2022 for IDT's Game-Changing Product of the Year award for our VITA AKZENT® LC. The VITA AKZENT LC has been praised for its versatility and ease of use, providing a reliable solution for enhancing the esthetics of all polymer-based materials, e.g. the characterization of digital dentures.

Our shade integrity and consistency have allowed us to be an integral part of any office's workflow, from digital dentures to restorative materials. This level of accuracy in product lines is something other companies strive to replicate, often resulting in multiple product line-specific shade guides, which can cause confusion and inconsistency. When you use VITA products, you can trust the shade is accurate right from the beginning – VITA PERFECT MATCH

Where do you see the industry headed in the next five years?

We are excited about the industry's advancements in digital dentistry. VITA's digital denture products meet customers exactly where they are in their digital denture journey and offer suitable products for your workflow according to individual needs. We offer next-level esthetics with the three-dimensional shade gradient of the VITA VIONIC® VIGO denture teeth or the polychrome effect of the VITA VIONIC® DENT DISC multiColor. The VITA VIONIC® DENT DISC multiColor is made of the same high-quality material as our premium teeth, making the inorganically filled PMMA discs both durable and abrasion resistant, combined with an easy polishing.

How can lab owners differentiate themselves in today's environment?

Education is the best way to differentiate oneself. That also happens to be one aspect of customer service we are most proud of – our VITA Academy. We believe that education is key to effective implementation of both new and traditional workflows. VITA offers comprehensive training and education resources for both clinical and lab through webinars, workshops, online tutorials and more.

Why is being an FDLA Business Partner valuable to you?

Being an FDLA Business Partner is valuable because it fosters a sense of community as we work together to support the growth of future dental professionals. It enables us to share educational resources and stay informed about industry changes and insights. This partnership allows us to contribute to the professional development of young leaders while staying attuned to the needs of our long-standing, loyal customers. 📍

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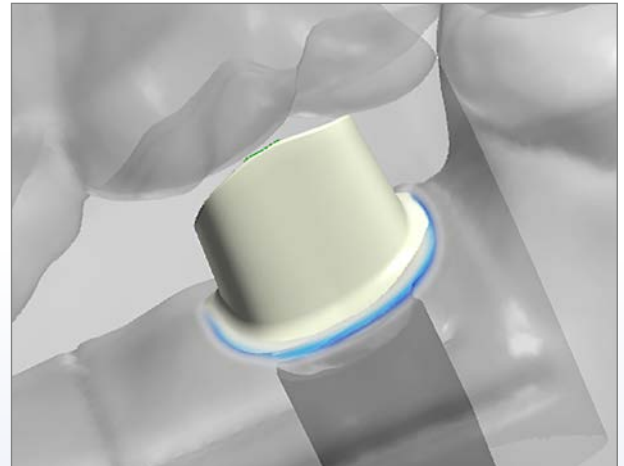
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