

# focus

*Success of Digitally Designed*

## **SCREW-RETAINED** IMPLANT

*Restorations*



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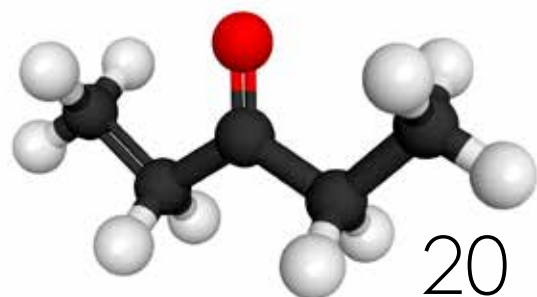
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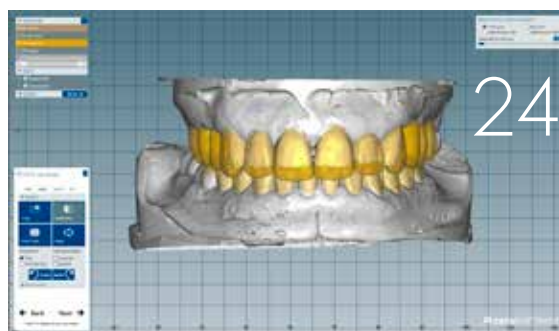
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## *focus*

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# Diving Head First

**By Dory Sartoris**


**FDLA President**

*Please  
help our  
association  
by  
encouraging  
your fellow  
peers to join  
the FDLA.*

**A**s I write my first president's message to the dental laboratory community, I cannot help but feel overwhelmed with gratitude. I am extremely honored for the opportunity to serve as your 2021-2022 FDLA president! I am also grateful for many other things; one being to have a laboratory still operating. If you are reading this, chances are you have similar sentiments. It's no secret that the number of dental labs continues to decline year after year due to acquisitions and labs closing for various reasons. Plus, the pandemic brought many trials and tribulations for the entire dental industry. I believe those of us remaining have all become stronger by overcoming it; this is one more thing for which to be grateful.

When I dove head first into the lab industry at age 21, I knew nothing about dentistry. I remember attending my first FDLA Symposium & Expo in 2014, less than a year after I had acquired ownership of my lab. The FDLA Symposium & Expo was my first exposure into this ever-changing field. I was pleasantly overwhelmed with education and excitement for this industry that so few understood or appreciated. I met many other lab owners and technicians, all who were extremely kind and genuine. Technically, we are all competitors. Very few people I have met in the industry, however, act as such. Everyone is open and helpful about products, marketing and just day-to-day operations. Some peers have even welcomed me into their lab to observe and learn how they operate! At the end of the day, we are all in this together. These are just a few reasons why the FDLA holds a special place in my heart.



Thank you again for the opportunity to serve as your FDLA president. On behalf of the entire board of directors, we are honored to serve you and are excited to see what the future holds. The FDLA remains one of the strongest state associations in the country and we plan to do everything in our power to keep it as such. There are currently 716 active dental laboratories in the state of Florida. Even though our association is strong, only 15 percent of the active dental labs in the state are FDLA members. Please help our association by encouraging your fellow peers to join the FDLA. If there is anything we can do to better support you, please let us know! 



### **FDLA Mission**

Serving Florida's dental technology professionals as a valued part of the dental team enhancing oral health care.

### **FDLA Vision**

Advancing the individual and collective success of Florida's dental technology professionals in a changing environment.

### **Values Statement**

FDLA's board of directors and professional staff are guided by these principles: Integrity, Leadership, Recognition, Safety, Acceptance and Innovation.



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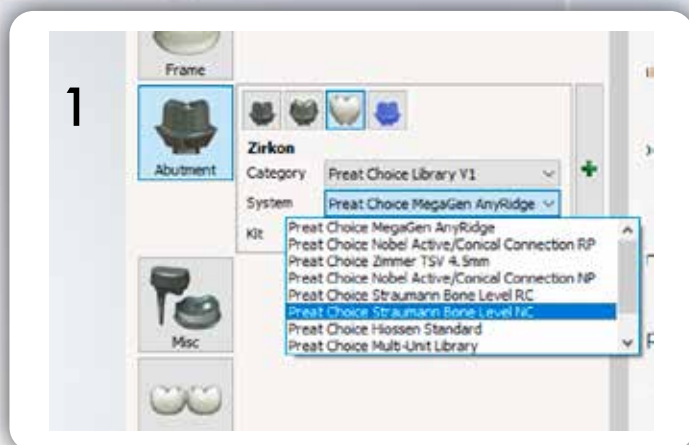
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# *Success of Digitally Designed* **SCREW-RETAINED** **IMPLANT** *Restorations*

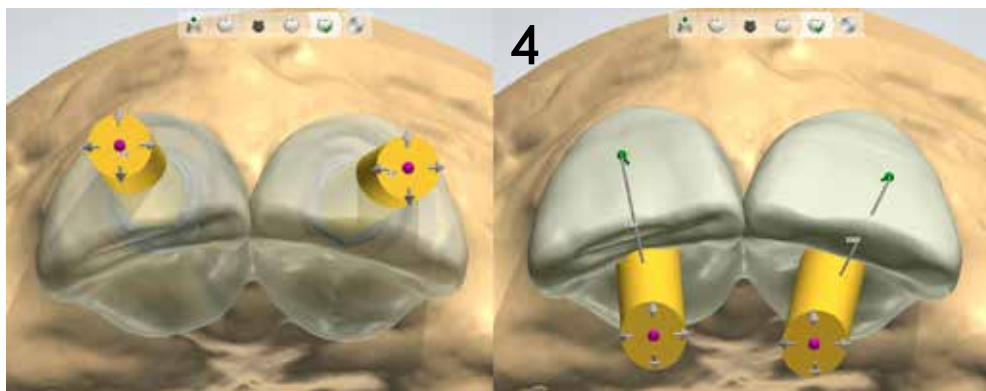
**By Sevan Pulurian**

**T**wo factors have a great influence on the success of the digitally designed screw-retained implant restoration. The first is the availability to select the best implant component for the individual restoration. We must understand that the components available for the restoration are driven by the scan body used and library that is tied to the scan body. The other factor of success is the cemented bond of the Ti Base to the zirconia crown. It is never a good day when you receive the dreaded phone call from the doctor saying a Ti Base that you cemented debonded from your restoration.



The first step, as with all restorations, is proper planning and quality evaluation. After determining that a screw-retained restoration is best, the next step is entering the digital workflow. The restorative control of these implant cases is largely determined by the scan body and library options connected to any given scan body. I have worked with many different libraries and many different implant companies. Sometimes I do not have a choice of what library or Ti Base to use. This can be because the dentist has completed an intraoral scan





with a scan body they chose or the dentist prescribes a specific component be cemented in the restoration. Many times, though, my clients ask for my input and guidance. I have created relationships with my dentists and want to communicate restoration expectations before we enter a workflow. One thing I stress to my clients is maintaining flexibility. Preat Corporation's library has been one of the best resources for maintaining flexibility on implant cases in a digital workflow.

The Preat Choice Library (**Fig. 1**) makes my job easier by creating workflow flexibility while allowing the restorative team to select the best implant component for the specific restoration I am working on. My dentists can scan intraorally with a Preat scan body or take an analog impression and I can scan the model in the laboratory. It does not matter to me. My goal is allowing my dentists to be comfortable and confident in the process. After scanning, I can use 3Shape to evaluate the patient and design the restoration as it should be for best results. This is why I dig the Choice Library. If my clients want a provisional, the library has temporary cylinders (**Figs. 2-3**) for that type of material selection. The best part is the height variations available in the library. I get cases with minimal vertical space and cases where I need the tallest implant component possible. Because I have three height selections, I can choose what is best without having to rescan, or worse, ask the dentist to bring the patient in and perform another intraoral scan.

If we are working on a zirconia screw-retained crown or bridge, using the software for a diagnostic communication device ensures that my dentists will not have any surprises when the case is delivered to the office. I can show dentists the expected results of the restoration with a straight screw access channel versus using an angled access channel (**Fig. 4**). The difference between the Ti Base selection can be the difference from a disappointed patient and a patient that receives a life-altering restoration.



At the laboratory, we are also operating a business, and want maximum return from a limited investment. This is how I view the Dynamic X 9mm Ti Base (**Fig. 5**). With one Dynamic X 9mm Ti Base, I can design a restoration with a straight access channel to an access channel angled up to 30 degrees. I can evaluate the intraoral space and choose between a 5mm tall base, 7mm tall base, or 9mm tall base (**Fig. 6**). I can get all of the solutions from the use of the library and by altering the height of the Dynamic X 9mm Ti Base to any of the markings (**Fig. 7**).

After I have completed the design, it is off to the mill. I will stain the restoration and then sinter the crown or bridge. Now it is time to bond the Ti Base to the restoration.

Ti Base debonding seems to be a frequent topic of discussion in the industry. With so many materials and techniques out there, it is hard to know the good from bad and which cements work and which ones do not. At one point, I had no idea and used cements that I thought were good. Sadly, I found out they were not. I asked my colleagues for their recommendations, finding out that most were using different materials than I was. Their choices in cements were more expensive, but I asked myself, what is worth more? Saving a few dollars on cheaper cement that did not meet the needs of the task or losing valuable client accounts? The right choice was clear; get the better cement and use a consistent technique! Some may argue this, but knowing I am using the right material and refining my techniques puts my mind at

ease. My process for cementing Ti Bases to zirconia crowns is done using Ivoclar's Multilink Implant HO 0 zirconia and Panavia's SA Cement Universal handmix white. For this case, I have designed the crown to a Dynamic Abutment Ti Base using Preat's Choice Library.

Even with the right cement, the cause of most failures is a loose-fitting relationship between the crown and Ti Base. Make sure that the Ti Base and the crown seat fully; the space between them should be minimal. After the crown is properly fitted, proceed to clean up and polish/glaze with no overglaze in and around the seating area of the Ti Base (**Figs. 8a-b**).

Now we are ready to prep for cementation. Sand blast the inside of the zirconia crown (**Fig. 9**), and if you like, sand blast the mating surface of Ti Base as well. Since the Dynamic Abutment Ti Bases have horizontal grooves to provide a retentive surface, I leave them untouched. If choosing to sand blast the Ti Base for an added retentive surface, I like to apply White Effect 2 from Origin to the milled zirconia while still in the green state. This applies a white opaque layer on the inside of the zirconia crown, masking out the greyness of the abutment and keeping the value of the crown the same. Next, steam both surfaces and dry with an air hose. If you like to anodize your Ti Bases, feel free to do so at this time. One of the things I like about the Preat Ti Bases, besides the screw access channel correction, is that they are already anodized and this saves me valuable time.

Lay out all of the needed items at your workstation so you are not in a panic trying to find things in the middle of cementing. You will need the crown, Ti Base, lab screw, implant driver, the model, your primer and cement, an application brush (available from most dental supply companies), a





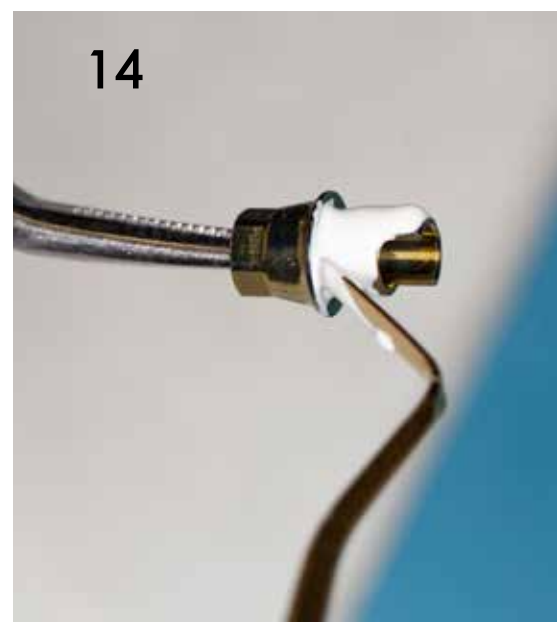
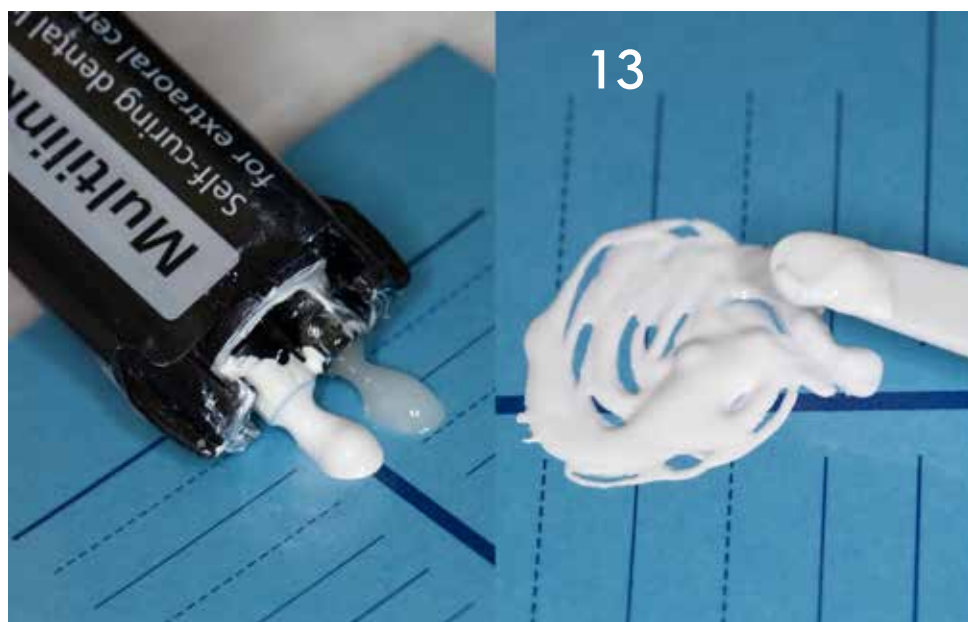
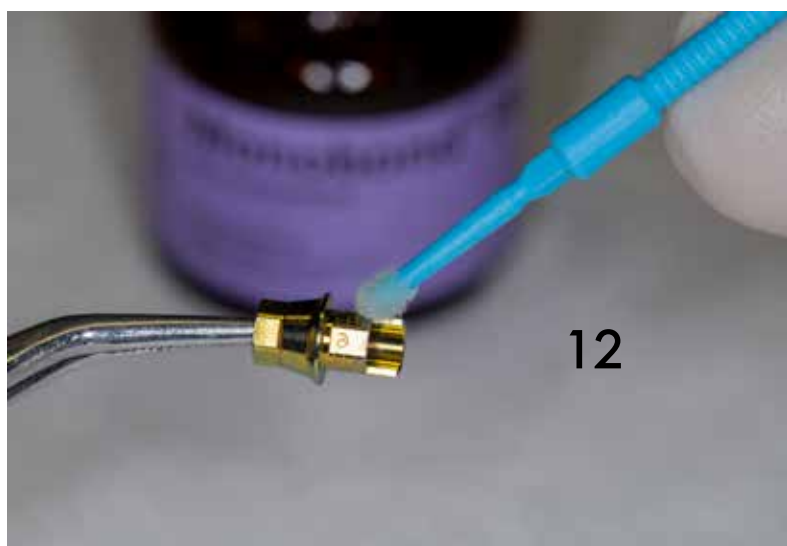
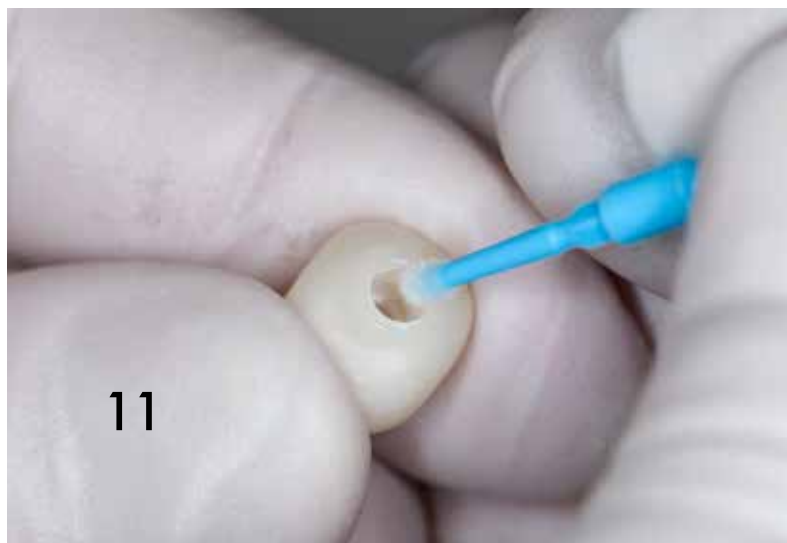
mixing slab you love and/or a mixing pad, a knife or tissues, tweezers or crown holder, and a mixing instrument (**Fig. 10**).

With the parts prepped and cleaned, you are now ready. Prime the restoration surface so that the cement will adhere as intended. NOTE: Not priming the surface will lead to a debond. Using the application brush, apply the primer to the inside of the zirconia crown and the chamfer area (**Fig. 11**).

For the Ti Base, use small tweezers to hold it while applying the primer (**Fig. 12**). Let the primer set for 60 seconds then blow with air. Side note, if you are cementing PMMA crowns, the cement will work fine, but you must use an acrylic primer like SR Connect from Ivoclar. Otherwise, cement will not adhere to the crown.

With both surfaces “primed,” you are ready to apply cement. The cement may or may not come with mixing tips. Personally, I do not use them, as in my experience they waste cement. The amount lost in one tip is the equivalent amount to cement eight crowns if not more. Because of this, I dispense equal amounts and hand mix thoroughly (**Fig. 13**).

With the cement properly mixed, use an instrument and apply cement to the Ti Base (**Fig. 14**). Applying the cement to the inside of the crown results in a messier application and a greater chance of cement going into the screw channel. Another advantage in applying to the Ti Base is that it will push the cement down and out, leaving cement in the needed areas and an easier clean up.





Once cement is applied to the Ti Base, insert it into the crown, looking for the cement to push down and out (**Fig. 15**). For now, you can leave the excess cement and simply scrape it off with a knife once it starts to cure. This is where I like to take a tissue or an application brush and quickly wipe the excess cement off. Check to make sure no cement made it into the screw channel from the top of the crown. Application brushes work well for cleaning excess cement out of the screw channel. Place the cemented crown with Ti Base on the model to assure that it is properly aligned and tighten it down with the lab screw and driver (**Fig. 16**). Applying an oxygen air barrier gel at the margin before curing will aid in a better seal at the Ti Base junction. After the crown is seated, you can cure it with a light cure gun or light box, or let it sit and self-cure if dual-curing cement. Finally, clean up and polish the restoration as desired. By knowing your materials and refining your techniques, you have achieved the best bond with a repeatable process.

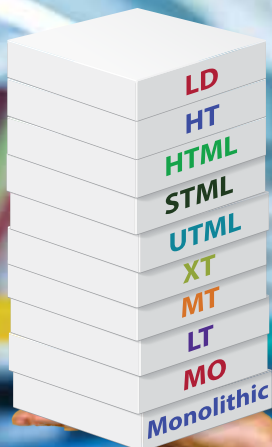
A successful relationship between dentists and technicians relies on trust, communication, and understanding each other's expectations. After discussing expectations with my dentists, we choose to use the workflows and materials that provide predictable results. By delivering a restoration I can be confident in, my dentists can have peace of mind that their patients are receiving esthetic, functional implant restorations. 📌

### About the Author

Sevan Pulurian, Director of CAD/CAM at Pacific Dental, Inc. has 20 years in the industry. He is a dedicated and innovative individual. Sevan has influenced and improved the dental CAD/CAM technology industry since early 2002. Now a 3Shape Specialist and K.O.L., Sevan manages the CAD/CAM Department at Pacific Dental, where he strives to provide doctors and their patients with high-quality work and digital craftsmanship and is always pushing the envelope to better digital dentistry.







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# AFTER THE PANDEMIC...

## Challenges and Opportunities

**T**he global COVID-19 pandemic of 2019-2020 impacted everything, and dental laboratories are no exception. All the assumptions, projections and predictions made about the lab business have been recalibrated. All of this has happened in a very short period of time and on a huge scale. Thousands of businesses have closed their doors or significantly reduced their operations, and millions of people were furloughed from their jobs (or even lost them altogether). Businesses went into survival mode to try to weather the storm. This had a massive depressive impact on the lab's ongoing competitive business strategies, sales and profits. It seems, however, that there is still a strong and growing demand for services and products provided by dental laboratories. Therefore, an opportunity is presented for expanding the laboratory and its services, or preparing for a merger or potential acquisition.

*The pandemic has caused a profound and notable change in ... the "value" of a lab.*

I was invited to make a presentation at the May 2020 FDIA Southern States Symposium & Expo, but it was subsequently cancelled because of the COVID-19 outbreak. My presentation focused on massive business challenges facing smaller dental labs due to industry consolidation, larger and more nimble competitors, foreign market entrants and price pressures, and addressed how to potentially take advantage of some emerging opportunities and developing favorable trends. In preparation for that meeting, I also authored an article which discussed the ways that private equity investors typically

value a lab in anticipation of making an offer to buy it. Fast forward to today, the pandemic has caused a profound and notable change in the manner and methodology of how prospective buyers calculate the "value" of a lab, and has reset the rules to completely change fundamental assumptions that have historically been used to formulate how a lab should be valued. Strategic buyers stopped targeting growth investments and financial buyers looked to support their existing portfolio companies, instead of making new investments. Many pending deals were delayed or dropped. Even financially strong buyers who continued to access the marketplace changed the rules. Valuation components that have historically indicated value were re-configured. For example, valuations used in comparable recent sale transactions of similar laboratories are no longer considered indicative of correct valuation. This is a HUGE change because comparables have been used for a long time as a very strong determinant of appropriate and suitable value.

Historically, a lab's value has generally been determined using two distinct but complimentary methodologies: Numerical Analysis and Market Perception. Numerical analysis includes factoring recent comparable sales of similarly sized labs, the market value of hard assets (machinery, real estate etc.), long-term customers, historical profits generated, discounted cash flow analysis, and historical growth and sales mar-





gins. Market perception components of determining value includes a lab's reputation in the marketplace, unique intellectual property, proprietary workflow processes, unique products or niche market penetration, or special access into a particular market segment. All of these have been significantly impacted by the COVID-19 pandemic and put significant downward pressure on valuations.

So where do we go from here? It's too early to know for sure, but some things can be anticipated, understood, and prepared:

- **Demand for high-quality dental products remains high.** As the economy restarts, laboratories are once again assessing emerging opportunities, which range from product portfolio supplementation, to regional expansion, to technological gains in order to enhance their ability to successfully compete in the marketplace.

- **Letter of Intent and Term sheet commitments are currently being withheld** until the buyer has performed specific incremental due diligence on the degree to which the COVID-19 pandemic has adversely affected the seller's ongoing business operations, financial condition, customers, suppliers, workforce, and business prospects. The length of this period of incremental due diligence will depend upon the seller's particular circumstances and the parties' relative bargaining power.

- **Buyers are seeking longer periods of exclusivity** than in the recent past since the pandemic poses new due diligence challenges. Until now, sellers in many instances had been successful in keeping exclusivity periods to 30-45 days or so (and sometimes even less). Now, it will be more common to see buyers insisting upon at least 60-75 days, with the ability to extend, in anticipation of COVID-19 fallout interfering with or delaying the buyer's due diligence investigation.


- **Sellers need to take control of the process** by negotiating a quick COVID-19 due diligence process. This will properly manage the standstill period restricting the Seller's ability to assess competing offers and seek provisions terminating exclusivity at the first sign that the buyer

may be unwilling to proceed with the transaction on the terms set forth in the letter of intent or term sheet.

- **Sellers should plan and prepare for a sale at least two years out.** Think through the mechanics of a proposed sale. Prepare and update a current P&L statement that reflects recovering business operations and resumed market penetration.

- **Anticipate due diligence questions** and prepare adequate answers that have been reviewed by legal, tax and accounting advisors.

- **Prepare all of the documentation** that will be needed for due diligence well in advance of a transaction.

In summary, there continues to be numerous opportunities to optimally position your dental laboratory for success regardless of your goal. They include gaining access to new technology to better compete, deciding that the time is right to sell your lab, merging with a complementary partner to better compete, actively looking for investment opportunities for stimulating growth or moving into a new business segment in the dental manufacturing or service space. 

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Saburnlawgroup.com

## About the Author

Joseph M. Saburn is a senior lawyer with broad domestic and international corporate, M&A, benefits, and executive compensation expertise. He has substantial experience providing comprehensive corporate governance and risk management counsel to public and private companies and has specialized expertise in Executive Compensation, ERISA, Mergers and Acquisitions, employee benefit plans and programs, health and welfare matters and operational human resource issues, as well as Board of Director and Committee counsel related to such matters. He has extensive experience helping companies develop coordinated employment, corporate, M&A, compensation and benefit strategies to better manage their corporate, executive and employee issues.

*There continues to be numerous opportunities to optimally position your dental laboratory for success regardless of your goal.*



# Found Money:

## *Creating New Revenue Streams Through Your Current Digital Outfit with 3D Printing*

**W**e presently live in a time where the profession of dental laboratory technology is experiencing a significant paradigm shift, further fostered by the unfortunate events of the global COVID pandemic. As a result, forward-thinking dental laboratories focus the attention on digital and technological opportunities in order to best capitalize on their respective advances that occur at lightning speed in and around dentistry. This thereby produces new business opportunities, products and services, business models and tools that ultimately lead to growing their laboratory and truly differentiating the services they provide among the competition. There are hidden gems, fabrication processes and strategies previously unthought-of, which incorporate computer aided design (CAD) and additive manufacturing (3D printing), that make available the immediate growth of the dental laboratory's business, strengthen the relationships with the laboratory's clientele, as well as bolster the laboratory's competitive footprint, locally and nationally.

Most progressive dental laboratories are presently engaged with some means of digital fabrication, but all too often those technological strategies are limited to the crown and bridge arena. Expanding the breadth of manufacturing protocols to include implantology, digital dentures and orthodontics, however, will produce significant and lucrative results for all involved. All are value-added propositions, which not only increase the laboratory's revenues, but also expand dentist clientele of the laboratory, whereby they too can grow their revenue and case conversions by offering additional treatment options to their patients. The best part, most dental laboratories currently have the hardware and software to facilitate these enhanced services.

When it comes to restoring dental implants, there are significant opportunities a dental laboratory can benefit from while engaging in guided surgical planning. There are two strategic approaches a dental laboratory can take to increase their dental implant restorative revenue streams. The first

is to help their existing dentist clients place simple implants through the use of digitally planned and manufactured surgical guides and subsequently restore them. This opportunity is recommended due to a large and growing population of general practitioners who are currently placing or desire to place implants, thereby offering their patients complete oral care under one provider. This trend has been further catalyzed with greater predictable surgical and restorative results due to the use of digitalization that offers easy connectivity, enhanced precision and fit, and an overall better workflow than previously. In a laboratory's existing clientele list, there are either clients who do not offer such a service and could greatly benefit from the laboratory's help and support, or a dentist client that is merely using a different dental laboratory for those needs, simply because they are unaware that the laboratory they have a great relationship with can fulfill and support their desire and practice with dental implants. The global dental implant market size was valued at USD 3.6



billion in 2020 and is expected to expand at a compound annual growth rate (CAGR) of 11.0 percent from 2021 to 2028.<sup>1</sup>

An additional strategic opportunity which should be deployed in conjunction with the first, would be to connect with oral surgeons and provide them with digital surgical planning and surgical guided manufacturing. Oral surgeons have a robust network of general practitioners who refer patients to them in order to place implants. Providing such a service makes their surgical practice superior and will elevate their patients' experience. This naturally leads to the oral surgeon recommending the laboratory to their referring dentists considering that the laboratory has already figured out the nuances of the case and they are confident that the restorative outcomes will work out as planned. These strategic approaches are elements the lab could implement to grow revenue with existing clientele, as well as attract new clients to enjoy the services and products their business provides.

Digital dentures and orthodontic aligners can too be great value-added propositions for the dental laboratory and its dentists. These treatment modalities have unique digital manufacturing solutions that enjoy enhanced precision and fit, as well as offer the capture of data to reproduce, simply and easily, while also offering an ancillary assessment mechanism for the treatment modality. Digitization extends the ability to capture data and utilize it as needed in the future. Once a digital denture is fabricated, future dentures for the patient can be remanufactured with ease via a timely merge of a simple intraoral scan in order to capture the critical anatomical areas. The software will append to the new anatomical oral environment while maintaining the esthetic tooth arrangement and biologic envelope of occlusion previously attained. Furthermore, the dentist and laboratory can track over the course of years and multiple scans, the wear incidence of the denture and the underlying natural mucosa, to identify any occlusal or biological abnormalities that need to be further examined.

Orthodontic appliances are generating noteworthy revenue for dental offices and dental laboratories engaging in such digital treatment modalities. A patient can present with a certain orthodontic malalignment situation, where the dental designer can then align their teeth to their ideal positions and apportion how many segments are needed to achieve the intended results. The software will then create individual model outputs, according to the amount of phases allocated, and the dental laboratory 3D prints the sequence of models and produces orthodontic aligners through the use of a specialized aligner vacuum and pressure forming machine. The global 3D printing in the dentistry market is projected to reach USD 6.5 billion by 2025 from 1.8 billion in 2020, at a CAGR of

28.8 percent during the forecast period.<sup>2</sup> These projections include the mentioned revenue generating opportunities and a means for laboratories to align themselves properly in order to achieve the greatest level of return and growth.

Understanding these opportunities and the ease of engagement will lead forward-thinking dental laboratories to generate substantial revenue streams with their current hardware and software. It may necessitate the addition of a software module or 3D printing resin, but the benefits significantly outweigh the minimal costs involved and capture this large and quickly growing segment of the dental market. Please note, that both the surgical planning and orthodontic treatment workups are facilitated in the laboratory with specific-compliant software and require the signature of a licensed dental practitioner and approval prior to the manufacturing of any appliance. Nevertheless, understanding these revenue generating opportunities is the key; examine your laboratory's digital set-up and establish a means and strategies to capture these large revenue streams previously unthought-of. ●

## About the Author

Daniel Alter's experience and repertoire is comprised of more than 25 years in the dental profession; with more than ten years of owning and operating a successful mid-sized dental laboratory, coupled with a Master's degree in Business Management and Organizational Leadership, and a respected stellar educating record as a Professor of Restorative Dentistry at the City University of New York. Daniel is a recognized published author, presenter and consultant on various relevant subjects, and is continually active in learning and sharing his knowledge with like-minded professionals. Daniel continuously serves the profession as the Executive Editor of Inside Dental Technology (IDT). Daniel holds the designation of a Master Dental Technologist (MDT), as well as a Certified Dental Technician (CDT) in two disciplines. He has been providing valuable consultation services for businesses large and small, ranging from start-ups to global multi-national enterprises.



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2. <https://www.prnewswire.com/news-releases/dental-3d-printing-market-worth-6-5-billion-by-2025--exclusive-report-by-market-sandmarkets-301216957.html>

# Southern States Symposium & Expo REVIEW

FDLA is happy to announce that the 2021 Symposium & Expo in Orlando, held in person, was a big hit! Approximately 400 dental laboratory technicians, dentists, dental team members, manufacturers and suppliers attended the “Face to Face” meeting and everyone thoroughly enjoyed the education, workshops, expansive exhibit hall and networking. Thank you to everyone who attended and the many who helped make this year’s Symposium and Expo a success. We look forward to next year’s event!



Above: Newly elected FDLA President Dory Sartoris with FDA President Elect Dr. David Boden



Above: Dr. David Boden, FDA president elect (left) with Alexander Wünsche, FDLA past president



Above: Keynote Jessica Birrell, MOM, CDT, MUA with FDLA President Dory Sartoris



Above: FDLA congratulates Dewey Parnell, Argen sales representative, on his recent retirement.



Left: Chris Bormes, MICOI presents a removables lecture



Above: Friday Panel Presentation, “Facing the Future” with Moderator Chris Peterson, CDT and panelists (left to right) Jessica Paulen Goldich, Danielle Wünsche and Shawn Nowak



Above: Felix Pages, CDT shares his knowledge during a table clinic at the VITA North America booth





Above: 2021-2022 FDLA Board of Directors participate in the expo ribbon cutting



Above: Congratulations to Wagner Precision Rotary Instruments, 2021 Southern States Symposium & Expo Best of Show Winner!



Above: Dory Sartoris, FDLA president and Dennis Urban, CDT, NBC chair with Barry Singer, CDT (center), 30-year CDT Milestone recipient



Above: Dory Sartoris, FDLA president and Dennis Urban, CDT, NBC chair with (left to right) Gary Gann, CDT, Morris Fucarino, CDT and Lenny Herrera, CDT



Above: Networking and learning at the busy Expo Hall



Above: Outgoing board member Sherry Altman with Alexander Wünsche, CDT, FDLA past president



Above: Dennis Urban, CDT, NBC chair presents Alexander Wünsche, CDT with his President's Gavel plaque



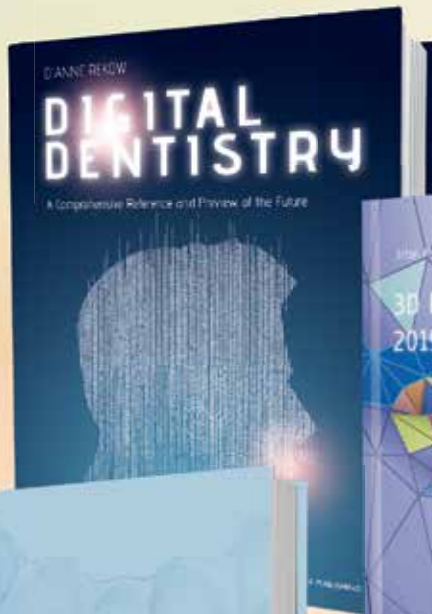
Above: Dory Sartoris, FDLA president and Dennis Urban, CDT, NBC chair with Maria Baxter (center), 25-year CDT Milestone recipient

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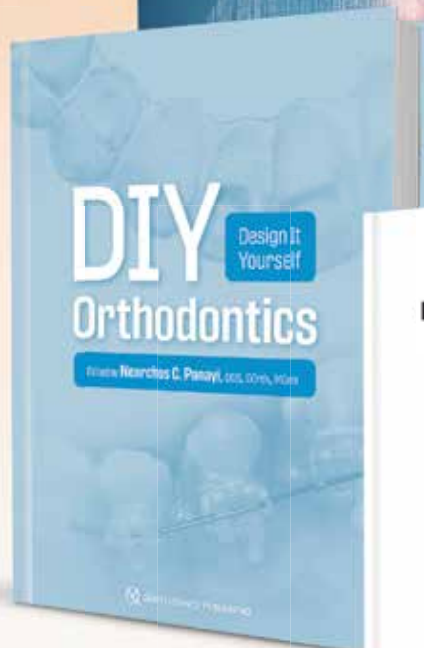
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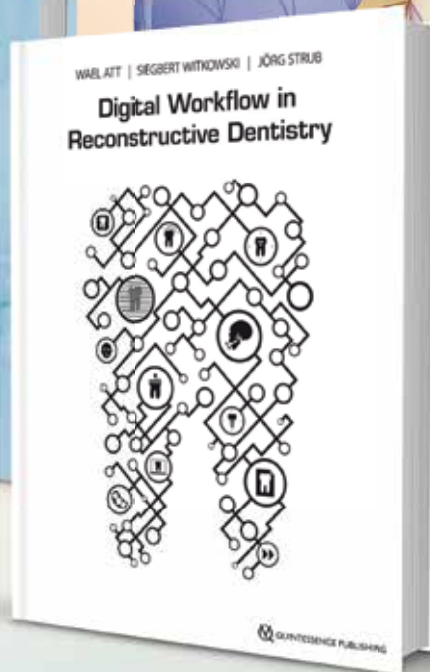
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# 3D PRINTING

## is Only as Good as the Resins You Use

**B**y now, most dental laboratories are aware of the ways that 3D printing is changing our industry. Whether your lab is fixed, removable, or full service, the buzz around this new technology has likely reached your ears. 3D printers that utilize liquid resins in their manufacturing process as the dominant method are plentiful and abundant. There are more LCD, laser SLA, and DLP printers than we can count. It's easy to get lost in the marketing lingo that they all use, but there is one often overlooked variable that is critically important to the success of any 3D printer: the resin.

There is a wide range of quality that exists between various 3D printers on the market, and this is also true of the resins that these machines require. It is critical for any lab to ensure that the resin used to manufacture their parts is of the highest caliber possible. What makes a “good” resin? There are many factors to consider when selecting a resin, from the raw materials used at the start, to the quality control process at the end.

Let's start at the very beginning before the resin is even prototyped. The formula is the building block, the foundation upon which the resin will succeed or fail. There are a few main components that most dental resins have in common. First, there are pigments. These are what create, and ultimately determine, the color and opacity of the resin. Pigments play a large role in how easy – or difficult – it is to work with some 3D print resins. More pigment in a resin leads to more settling over time. Resins that are heavily pigmented have to be mixed more often and require more time for the end-user than those that are not.

The next component in the resin formula is photo initiator. These reactive molecules are what convert the liquid resin into a solid when exposed to a certain wavelength of light. The most common photoinitiator used in dental materials today is called camphorquinone.

The success of the conversion depends on ensuring that the part of the light spectrum used to cure the resin is compatible with the requirements of the photoinitiator. Printers using a 385 nanometer light source use fewer photo initiators than those with a 405 nanometer light source. Other things that affect the material's ability to achieve its maximum conversion include the type of filler that is used in the resin (if any), the filler particle size, the thickness of the printed resin piece, and the shade of the restorative material (darker shades do not allow as much light infiltration as lighter shades do).

In addition, the length of time the light source is used to cure, and the distance it is from the resin, can have a bearing on the percentage of the final conversion.





*When choosing a resin, it's critical to go with a company that employs chemists that understand the formulation behind these liquids.*


how this radical chain polymerization will continue until there is no longer energy (UV light) being applied to radicalize the photoinitiators.

When choosing a resin, it's critical to go with a company that employs chemists that understand the formulation behind these liquids. Many inexpensive brands use improper proportions of monomers, crosslinkers, and photoinitiators, which result in an inconsistent and inaccurate printed object. Many manufacturers also use fillers as a cost-saving tactic which has the same effect. Another key factor when choosing a resin is the purification of the mixture. Combining these chemicals leads to unwanted by-products in the resin. A dental resin should always be purified before bottling. An easy way to determine if the resin has been purified is the odor. Resins that have a strong odor have typically not been purified before the bottling process.

Consistency in manufacturing is another critical component when choosing a resin. Incredibly small variations in the resin's formula can greatly affect the accuracy of the printed object, and in the dental industry, accuracy is the name of the game. While it may be tempting to try out that cheaper resin, if that manufacturer doesn't have a rigid and precise quality control process, you're likely going to get inconsistent results. In our industry, inconsistent results equals remakes. Remakes equal time and money.

Another key factor to consider is the material file. Every resin will have a unique material profile for each 3D printer. Choosing a manufacturer that has the proper research and development technicians to ensure that the material file is optimized is critically important. A bad material file can lead to print failures and difficulty in troubleshooting.

The final critical question that needs to be asked when selecting a resin is in regards to technical support. Will the company you purchase from support you? Will their technicians be available if you have issues or questions? Will the technical support for your 3D printer help you with third-party resins? Tech support will make or break any situation, and it's essential to choose a company that will take the necessary steps to ensure your success with their product.

There are many factors to consider when choosing a resin. A good formula, high standards for manufacturing and quality control, and world-class technical support will set you up for consistent success in your laboratory. 

## About the Author

Bryce Hiller has an Associate's Degree in Information Sciences from Indiana Wesleyan University and received his lab experience in his family lab, where he was instrumental in transitioning the lab from analog to digital. Originally a technician at Ford's Dental Lab in Nelsonville, Ohio, he now specializes in 3Shape design, 3D printing, and milling. With a passion for helping labs and practices transition from analog to digital workflows, Bryce's goal is to foster innovation and empower professionals in the dental industry with various CAD/CAM and digital manufacturing technologies.



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# PROVISIONALIZATION AFTER the Digital Smile Evaluation

In modern dentistry, there is no way around digital treatment planning. We are getting digital impressions, analog impressions and CT-scan records as photographs. All of these records allow us to treatment plan complex cases with a streamlined protocol. CAD software is very helpful and is already an advanced tool used to accomplish this task.

*I hope sharing my workflow will help treat more patients successfully with full arch or full mouth rehabilitations.*

What happens after successful treatment planning? Once we are finished with designing a digital smile in 2D and in 3D, possibly with an implant and tooth-borne combination, how are we able to bring to “life” what we planned so accurately and keep track of aesthetic and function?

This article is going to show how I accomplish most of my full-arch rehabilitations after a treatment planning session.

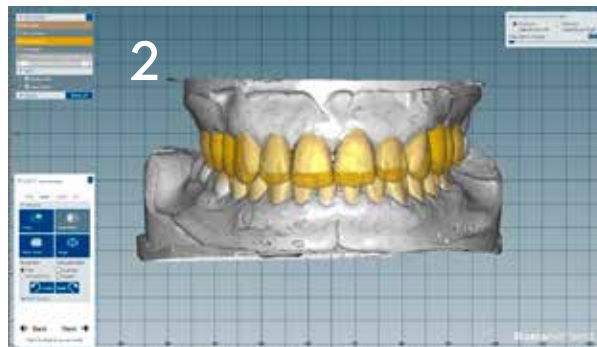
The patient presented with a totally collapsed occlusion due to missing maxillary posterior teeth. Over the years and due to no treatment of the maxillary deficiency, the mandibular teeth were extremely worn (**Fig. 1**). The treatment plan I established with the patient and clinician included a maximally posterior implant for a three-unit implant bridge on each side, anterior crowns from #6 - #11 and mandibular anterior crown lengthening for crowns in the anterior and posterior areas. The plan was to open the occlusion about 5mm, split equally in maxillary and mandible.

Due to economics for the patient, a decision was made to start with the maxilla first and follow up with the mandible at a later date. The challenge was keeping the vertical and position of all of the restorations the same way as initially planned.

After the initial smile design in 3D, which included the anatomical planning of all future restorations in the maxilla and mandible, I digitally removed the existing teeth of the model but still kept all gingiva portions as a reference. Then I saved the new design merged with the model as a new stl (**Fig. 2**). This stl was used to design a stent, which was the seating jig for all provisionals in the maxillary.

The same stl was used to digitally design the temporary shells of the anteriors #6 - #11 and was utilized as a pre-op to design the posteriors implant bridges after importing the implant scan into the case.

The occlusal plane and occlusal scheme were therefore kept to 100 percent.






All provisional restorations were milled in a high-strength multi-layered PMMA. Also, the pre-op merged design and opposing model were 3D printed, so the clinician always had something in hand to compare with. At last, I printed the seating jig in a surgical guide resin. I used surgical guide resin because it was transparent for better visibility and it was sturdy enough to not bend and maintain accuracy (**Fig. 3**).

In the dental office, the maxillary anterior teeth were prepped with the help of silicone indexes made from the merged model of the restorative design. The next step was the uncovering of the implants and seating of the provisional implant bridges. The advantage of utilizing the implants first was that implants were not moving and we always kept the position of the seating jig (**Fig. 4**).

With the help of the seating jig and the anterior provisional shells, the preparations were refined so the shells fit passively with the jig over the preparations. After the passive fit of the shells was achieved, the clinician filled temporary acrylic into the shells to reline them on to the preparations. These were now seated with the help of the seating jig and an accurate fit and alignment were secured with the help of the implant bridges (**Figs. 5a-5c**).

Next, the anterior provisional was cleaned up and the excess material was removed and polished (**Fig. 6**). The mandible treatment was next. It was achieved the same way the maxillary treatment was accomplished.

I have treatment planned and executed many cases this way and it has proven itself as a very successful treatment approach to keep all restorations aligned. I hope sharing my workflow will help treat more patients successfully with full arch or full mouth rehabilitations. 

## About the Author

Alexander Wünsche is the President of Zahntechnik Dental Laboratory located in Miami, Florida. Alexander completed a 4-year multidisciplinary program at the Otto Umfried school of dental technology in Nuertingen, Germany. He attained accreditation as a CDT Germany and also attained a accreditation as a U.S. CDT in Ceramics. Today, Alexander fabricates a wide variety of case types and also specializes in cosmetic and complex implant restorations. He has been published in dental journals such as *Compendium*, *Inside Dental Technology*, *The Journal of Dental Technology*, *Lab Management Today* and *ACP Messenger*. Alexander speaks internationally regarding innovations in dental technology.





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## New FDLA Board Installed

Congratulations to the 2021-2022 FDLA Board of Directors, who were sworn in during the 2021 Southern States Symposium & Expo. Thank you for your willingness to serve!



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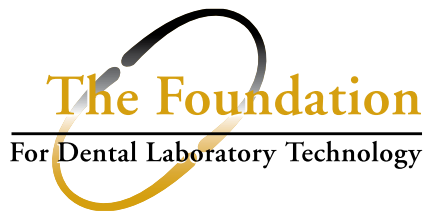


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## FDLA Supports the Foundation for Dental Laboratory Technology

At the 2021 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. Members and vendors were encouraged to donate to the FDLT. A check in the amount of \$1,320 was given to the Foundation for Dental Laboratory Technology.

## Members' Retirement News

**Dewey Parnell**, sales representative, has announced his retirement after 17 years with Argen. Dewey has been a true professional that embodies Argen's core values. Argen would like to thank him for the many years of dedicated service. He has consistently gone the extra mile for his customers and will be truly missed in the field by many who have become trusted friends over the years.



**Patrick Pellett, CDT, MEd**, recently announced his retirement from PRIDE Dental Laboratory. He has been in the dental laboratory prosthetics field for more than 60 years and a certified dental technician for 50 years. Fred Honeyman will be the new Manager of PRIDE Dental Laboratory.



Above: Patrick Pellett, CDT, MEd (center) with Dory Sartoris, FDLA president and Dennis Urban, CDT, NBC chair, receiving his 50-year CDT Milestone recognition



## Congratulations to the 2021 CDT Milestones!

The following CDTs have maintained their status for 25 or more years and were presented with a certificate and pin during the 2021 Southern States Symposium & Expo.

### 25 YEARS:

Mario Abreu, CDT  
Tony Awad, CDT  
Maria Baxter, CDT  
Jeffrey Brabbs, CDT  
Fausto Catena, CDT  
James Free, CDT  
Deborah Garber, CDT  
Jerry Messick, CDT  
Paul Robert, CDT  
Carol Ruset, CDT  
Glynn Watts, CDT

### 30 YEARS:

John Callahan, CDT  
Charles Schutza, Jr., CDT  
Barry Singer, CDT  
Pamela Williamson, CDT

### 35 YEARS:

Elizabeth Ashcraft, CDT  
Adrian Hall, CDT  
Antonio Ochoa, CDT  
Steven Trimble, CDT

### 40 YEARS:

Gregory Curtis, CDT  
Terry Dudley, CDT  
Robert Hollander, CDT  
Henry Michael Howard, CDT  
Melissa Jayne, CDT  
David Johnson, CDT  
Robert Mueller, CDT  
E. Philip Munoz, CDT  
Edward Slusser, III, CDT  
Ellen Toombs, CDT

### 45 YEARS:

Mark Devery, CDT  
Morris Fucarino, CDT  
Gary Gann, CDT  
Harvey Glick, CDT  
Leonard Herrera, CDT

### 50 YEARS:

Gary Evans, CDT  
Patrick Pellett, MS Ed., CDT  
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## Dental Laboratory Advanced CAD CAM Technician

We are looking for an advanced technician skilled in all areas of the dental laboratory for this highly sought-after position in the CAD CAM department. The CAD/CAM department team members are the hands that move the majority of our cases through the facility. Responsibilities include scanning and designing different types of restorations; abutments, implant bridges, full contour crowns, hybrids, screw-retained crowns, model builder, and implant studio. This demanding and fast-paced team is responsible for almost all restorations in our facility. Fast turnaround times and high-quality restorations are required in the CAD/CAM department processes, making this position both challenging and rewarding.

### Qualifications:

- Attention to detail
- Experience in CAD/CAM software 3Shape (a plus), Exocad, Dental Wings, Surgical Guide planning
- Understanding and experience of operation of milling machines.
- Ability to work well with deadlines
- Ability to work under pressure
- Ability to follow and understand doctors order forms and preferences
- Certified Dental Technician (CDT) certification preferred but not required
- PTC Certifications preferred
- GED/High School Diploma or better
- Ability to speak and understand English (Bilingual English/Spanish)
- Computer aid literate, MS Office package (Excel, Power Point, Word)
- 5+ years' experience

**Job Type:** Full-time

**Salary:** Pay: \$20.00 - \$28.00 per hour

**Benefits:** Health Insurance, 401k plan and PTO

To reply, please call Sasha at 561-272-6662 \*114 or email us at [Info@PetersonDentalLab.com](mailto:Info@PetersonDentalLab.com)

## Dental Laboratory Advanced Removable Technician

This position is familiar with all occlusal schemes and removable restorative techniques (dentures, implant hybrids and Implant Bar overdenture) and including but not limited to set-ups, waxing, Ivobase processing, PMMA Try-in appliances, acrylic, and implants.

The Removable Department team is one of our company's core teams. They are responsible for diagnostic set-ups prior to implant surgeries, diagnostic set-ups for full all fixed and removable appliances and final steps prior to restoration being delivered to the customer. Attention to detail, hard work, and the artistic talent of our team allows our products to stand out among our competitors. The efficiency and quality of our Peterson Technicians are prized and valued by the supporting team and patients.

### Qualifications

- GED or High School Diploma or better
- 5 years' experience in removable
- Minimum of 2 years' set-up experience
- Ability to work well with deadlines
- Certification preferred but not required

**Job Type:** Full-time

**Salary:** Pay: \$20.00 - \$35.00 per hour

**Benefits:** Health Insurance, 401k plan and PTO

To reply, please call Sasha at 561-272-6662 \*114 or email us at [Info@PetersonDentalLab.com](mailto:Info@PetersonDentalLab.com)

## Dental Laboratory Model Technician

Peterson Dental Laboratory is looking for a capable Model Technician to join our team! A successful candidate will be very attentive to detail have some experience with Pindex, Artimax and Stratos articulators. This person will focus primarily on articulations and jump into other areas of production as the supervisor sees fit. He or she will report directly to the Model Department Supervisor and work closely with the Laboratory Manager

### Job Responsibilities:

- Trimming and Pouring
- Adjusting Fixed and Removable Cast
- Plaster Mounting
- Duplication (Hydrocolloid and Alginate)
- Department Cleaning schedule.

### Technical Skills Required:

- 1+ years' experience in model department or dental technology school completed
- Excellent hand eye coordination
- Understanding of basic dental laboratory terminology

### Required Job Qualifications:

- 1-year experience in dental laboratory and or dental technology school completed
- Available to work Monday through Friday
- Gets along with others
- Works hard and deals with pressure well

**Job Type:** Full-time

### Salary:

No Formal Lab School: \$11-13.00/hr.

Lab School Completed: \$12-15.00/hr.

**Benefits:** Health Insurance, 401k plan and PTO

To reply, please call Sasha at 561-272-6662 \*114 or email us at [Info@PetersonDentalLab.com](mailto:Info@PetersonDentalLab.com)

## Experienced Technicians

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If you've been thinking about making that next move in your career but are not sure which direction to go, let's talk about it! Send your resume to: Melissa Parziale, HR Director at [melissa.p@tsdlab.com](mailto:melissa.p@tsdlab.com)

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## Renfert USA

**Phone: 800-336-7422** [www.renfert.com/usa-en](http://www.renfert.com/usa-en)

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## Smart Dentistry Solutions, Inc.

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Smart Dentistry Solutions was established in 2019 to provide premium digital CAD/CAM solutions to Dental Laboratories. Our flagship products LayZir (All Indication Layered Zirconia Discs) and LitZir (All Ceramic Finishers) are manufactured in state-of-the-art OEM facilities throughout Japan. Additionally, we are proud to serve as authorized distributors of select products for a growing list of prestigious manufacturing partners such as: Shofu Inc., Merz Dental, Canon, and Dekema in the United States.



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# Meeting Needs

**Anthony Circelli**, *Director, Scrap Refining at Kulzer, LLC in South Bend, Ind., talks about the importance of collaboration in 2021.*

*Owners need to ask themselves, what need are they trying to meet?*

**What measures did Kulzer take in order to overcome the challenges from COVID-19? Did your business strategies change?**

In 2020 after the shutdown, we reached out to all of our customers to let them know that we were there to support them in any way we could. We listened when the doctors were concerned about the safety of themselves and their staff and we either had, or developed, products that helped them through this critical time. When it came to businesses reopening, we got the message out that our refining plant had never closed, and if they had any precious metal scrap refining available, that we would turn it around as quickly as possible. We knew

money was tight and people were trying to survive. A lot of labs were doing a thorough clean up, ripping up rugs and sending in central suction units, and the high price of precious metals really helped labs and the dental industry through a hard financial time.


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

The most obvious is the growth of digital workflows in all areas. We are going to see more metal-free restorations with zirconia and in cosmetic dentistry. Although less metal may be used, if the precious metal prices stay up, and I believe they will, the value will still remain at an all-time high. Less scrap is worth more money. For instance, if a certain amount of scrap was worth \$5,000 five years ago, today, half of that amount would go for \$7,500. The market and the industry is changing every day, and it's changing fast.

**What advice would you give to laboratory owners to survive and thrive in today's environment?**

Owners need to ask themselves, what need are they trying to meet? What need do they have? Then invest as much money as possible into the digital wave of the future and listen to their dentist partners about what they need.

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