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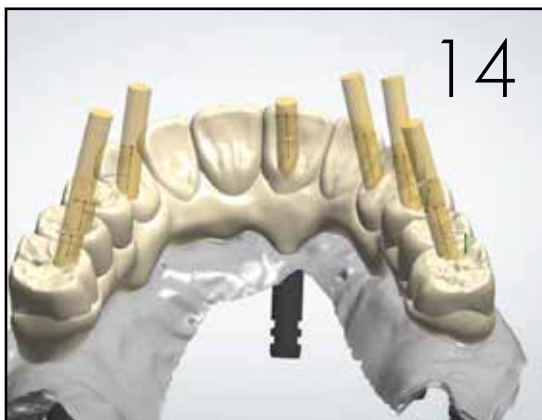
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Together We Thrive



By Danielle Wuensche
FDLA President

My name is Danielle Wuensche and I am elated to say that I am the president of the Florida Dental Laboratory Association. I am one-half of the husband-and-wife team who owns and leads Zahntechnique, Inc., located in Miami.

I was born and raised in Allentown, Pa. You may be familiar with the city based on the song by Billy Joel,

however, the song was really about Bethlehem, Pa., a once-roaring steel town that ended up in despair as Bethlehem Steel closed due to multiple market pressures. The market had changed and less expensive materials were replacing steel, and foreign suppliers and smaller firms were offering lower-priced options. As I reflect on this history of my hometown, I would be remiss not to see the parallels to our industry. Today, Bethlehem is a bustling town that pivoted and re-branded to become home to a major casino and entertainment venue.

When I first started in the industry in 2014, there were over 6,700 dental laboratories in the country. Today, we have approximately 5,200 dental laboratories. Certainly, consolidation has led to decline. Our industry also experienced increased competition from foreign laboratories. The latest concern is artificial intelligence and the potential for dentists to design and produce crowns without the dental laboratory. Change has the potential to elicit the sense of fear, yet with this uncertainty, also has potential for opportunity.

COVID-19 was certainly a threat that no one imagined would bring the world to a halt. As we were forced to shutter our doors and stay home, it was an incredibly isolating time when we felt far from our loved ones and colleagues. I was very fortunate to be part of a small text group of dental laboratory owners who discussed funding options and ways to pivot to offer new ser-

You are not alone in this journey.

vices and solutions. The sharing of information not only aided our business recovery efforts, but also proved that dental laboratories are stronger together.

The FDLA was also challenged during this time. I would like to give a special thanks to our vendors who made concessions to help us financially bridge the gap as we cancelled the Southern States Symposium in 2020. Our amazing management team, Partners in Association Management, assisted as the FDLA held its first virtual symposium, and continued to support us as we resumed in-person meetings the following year. How were you personally and professionally affected by the pandemic? Did you have to pivot to sustain your business? Has your business bounced back or even exceeded pre-pandemic levels?

You are not alone in this journey. The FDLA, the largest and most influential state association, is here to guide you when the times are good and through uncertainty. Through your membership, you have access to many resources that include:

- Updates to legislation/government to ensure you stay abreast of changes that may affect your business
- Human Resource Hotline to guide you through challenging employee-related matters
- Collection agency to assist you in recovering your aging receivables to increase cash flow

During my term as president, I plan to bring back in-person continuing education and hold regional courses across our great state. I want all technicians to have access to programs offering the potential to grow their knowledge and skills. In addition to dental laboratory technology courses, I also want to focus on curating courses geared toward increasing business acumen to help labs thrive.

As I close my first president's message, I would like to say thank you to the members for instilling their trust in me to guide the association this year. I feel honored to have the opportunity to lead the organization to greater heights, together with you. 📍



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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MANAGING YOUR LABORATORY FOR FINANCIAL SUCCESS

By Travis Zick



As a dental laboratory owner or manager these days, it seems the outside forces are conspiring to make our lives as difficult as possible. The challenges we face are numerous! Let's start with our workforce. As a country, prior to 2020, we knew we had an impending labor shortage, particularly in the manufacturing sector. The Boomers were starting to exit the workforce, and the latest generations were not providing enough workers to take their places. Even prior to 2020, our Labor Force Participation Rate (LFPR) had dropped from 67 percent in the early 2000s down to the low 60s. Then the pandemic hit, which exacerbated the Boomer exit with no replacements. In the spring of 2020, our LFPR dropped to 60 percent and still has not reached pre-COVID levels through May of this year. That lower participation rate resulted in fewer total workers participating in the workforce through much of 2022 despite our workforce eligible population increasing by over four million people since early 2020.

Of course, that is speaking of the overall workforce. Specific to our industry, for many years we have discussed the concern over our loss of accredited education programs for dental technicians. In recent years, "hire and train" was the only way for labs to gain qualified technicians. When the labor market is extremely tight, however, and every employer in the country is desperate to staff their businesses, even "trainees" who are typically not productive in the lab setting become extremely expensive. The evidence shown in recent Department of Labor statistics revealed average wages in the dental laboratory space increased nearly 8.5 percent in 2021 and another 8.8 percent in 2022!

With labor challenges impacting every industry in the United States, combined with near-record inflation for consumer goods and cost of living, it also means our "inputs" are increasing rapidly in cost. Our suppliers and manufacturing partners are forced to raise prices to cover their costs, our shipping companies are battling labor and fuel expenses, our

energy and utility expenses are higher, and our employee benefits are even more expensive than before.

Outside the lab, we also face challenges within the industry. After a pandemic-related dip in offshore work, the prevalence of competition from restorations coming in from other countries is back to high 30 percent to low 40 percent based on declared import value, which means it's a little higher than that. We continued to face consolidation within the industry as we approached 5,000 labs with a payroll at the end of 2022, which is the 18th year in a row our industry has contracted. Finally, in addition to the consolidation within dental labs, we now face vertical integration within the industry. Our suppliers have become competitors with many companies trying to go direct to the dentists in some fashion.

There are even more challenges we face today that didn't exist a few years ago, but that's enough for now! The GOOD news is despite these challenges, dental laboratories that can adapt and operate efficiently still have tremendous

Numbers don't provide answers; they lead to questions.

opportunities to operate successfully and profitably. In fact, over half of all labs responding to the NADL's 2023 Cost of Doing Business Market Survey reported net profit of over 15 percent for 2022. The key to weathering today's challenges and continuing to operate your lab profitably is managing your laboratory for financial success through ongoing and active oversight of financial and productivity Key Performance Indicators (KPIs).

KPIs are specific pieces of data that can paint a bigger picture of the likely success or failure of your business. When most of us get a set of financial statements, the first thing we look at is the bottom-line profit (or loss) in dollars to determine whether we had a good month. In many cases, that monthly statement is the first time we have had a real "scorecard" to tell us how we did. Active KPI management means that every single day we look at some form of KPI information that gives us an ongoing scorecard throughout the month. When the month is closed, and we get the financial statements, we should not be surprised by those final numbers.

In any manufacturing business, the gross profit margin is perhaps the most important KPI. Gross profit is the difference between the cost of producing the products we sell versus how much we sell them for. This is the first section on our income statement, and it is the place where the battle for profitability is most often lost. If we are not able to produce enough margin selling the products we are making, then we're basically sunk before we even get to our other costs. This is also where we look and evaluate how we set our prices. The prices we charge must be determined by our cost to make those products, and our desired return. They should never be set based on what our competitors charge. If our costs of production are higher, or our desired returns are higher than our competitors, then it's up to us to add value to justify a slightly higher price point for our clients. If we can't, we won't be in business long, which would also be the case if we try to compete on price and accept insufficient margins!

The main components of gross margin are sales, direct labor, and material purchases. These should be monitored constantly throughout the month to make sure the gross margin stays on track. The good news is that the costs are variable, meaning they can be adjusted as sales fluctuate. Your laboratory should have controls and procedures in place to monitor and control direct labor and material purchases. On a daily or weekly basis, compare the sales and labor expenses, and manage the labor for the actual work in the lab. The result should be a consistent gross margin from month to month regardless of whether you have a good or bad sales month.

Gross profit should always be evaluated as a percentage of total sales, as should all areas of our income statement. The

actual dollar amounts mean nothing without context, and evaluating the numbers as a percent of sales provides the context. The percentages allow us to benchmark our numbers against industry averages, other laboratories, or even just against ourselves or our budget/plan.

There are many other KPIs that should be monitored on an ongoing basis or checked periodically. Obviously, there are additional expense items that should be monitored to keep in check. On the production side, remakes (both internal and external), and revenue per technician, can help tell the story of our efficiency in the lab. On the sales side, tracking revenue per client, new account acquisition, and overall client retention rates will all help explain what is currently happening with your income statement as well as potential opportunities to improve.

As I constantly tell our team, numbers don't provide answers; they lead to questions. If our bottom line is not where we want it to be, why is that? The typical answer is we need more sales! Most of the time, however, that's not the case. By utilizing KPI management throughout our labs, we can put together an overall picture of what's happening and where we need to improve. I'm personally a strong believer in the future of our industry, but I also believe we must be active in managing our businesses so that we can capitalize on the opportunities that present themselves going forward. [🔗](#)

About the Author

Travis Zick is co-founder and director of finance and acquisitions with Apex Dental Laboratory Group, a multi-laboratory holding company based out of Waco, Texas with 19 labs in 12 states. For Apex, Zick oversees all merger and acquisition activity, including diligence, structure, and integration. After earning his finance degree from Winona State University, he worked as a financial analyst and commercial banker before becoming involved in the lab business. In 2015, he founded Apex Dental Laboratory Group with his partners, which has grown from four labs to 19 in eight years. Zick has served as a transition consultant for lab owners looking to prepare their business for succession, and he has spoken and written many articles on this and numerous business topics related to dental laboratories. He has also served on several national committees, and served as president of the NADL in 2019.



OVERCOME THE Hurdles

By Matt Travis


In the current economic climate, it simply makes sound business sense to use a professional to recover your money. If you do not, then another lab will.


Learn more about your FDLA membership benefit with Burt and Associates at www.burtcollect.com.

When you use a third party like Burt and Associates to recover your money, the dentist will realize that the delinquent receivable has now been escalated and the lab is now preferred over another creditor. The dentist

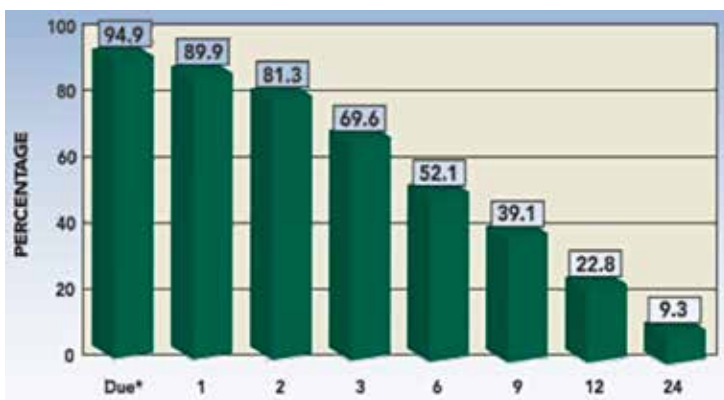
will want to remove the party that is applying the most pressure. If that's you, then you will get paid.

Carrying AR balances negatively impacts potential growth. We have all experienced the dreaded, "there was an issue with the work six months ago but, we never returned it, and we were unaware of the remake policy..." routine. My personal favorite is the discounted work for a family member of the dentist that was half price and didn't pay you anyway. Lately, there also seems to be an increase in lab hopping.

Burt and Associates can help labs to overcome these hurdles. We can run background checks on potential new accounts, allowing the lab to mitigate risks and set credit limits. We also offer many additional services, some of which include debtor investigation, bankruptcy watch, diplomatic arbitration, certified field collectors and a myriad of repayment solutions for debtors. FDLA has partnered with Burt and Associates and discounts are available for FDLA members to utilize Burt and Associates services. Please reach out to Matt Travis at (469) 368-6402 for more information. 

Time is of the Essence

Collectability of Delinquent Commercial Debts at Time Intervals After the Due Date



Length of Delinquency in Months Since Due Date

Source: Collection Trends: Commercial Collection Agency Association of the Commercial Law League of America

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THE 2023 SOUTHERN STATES SYMPOSIUM & EXPO WAS A HUGE SUCCESS!

Everyone was excited to be back at the Signia by Hilton Orlando Bonnet Creek, where approximately 600 dental laboratory technicians, dentists, dental team members, manufacturers and suppliers gathered together. Everyone thoroughly enjoyed the education, workshops, expansive exhibit hall and networking. The FDLA Board of Directors and staff would like to thank everyone who attended and the many sponsors and exhibitors who helped make this year's Symposium & Expo a reality. We look forward to next year's event!

Right:
FDLA Board
of Directors
installation
ceremony



Above: Anton Woolf, CEO of Argen Corporation, during the opening keynote presentation



Above: Recognition of FDLA past presidents

Below: Panos Papispyridakos, DDS, MA, PhD, from Tufts University, School of Dental Medicine



Above: Lecture with Chucri Chemali, TPAD, DTG

Below: Expo Hall





Above: Danielle Wuensche, FDLA president presents Panos with a token of appreciation



Above: from left to right – Chris Peterson, CDT; Danielle Wuensche; Alexander Wünsche, CDT, ZT, and Rick Sonntag, RDT



Above: Rick Sonntag, RDT, helps lead the afternoon interactive panel



Above: Alexander Wünsche with FDLA members as they contribute to the interactive panel



Above: Chris Peterson, CDT, FDLA immediate past president, receives a gavel plaque from Heather Voss, CDT, NADL president, (left) and Danielle Wuensche, FDLA current president (right)



Left: Danielle Wuensche, FDLA president, welcomes special guest Dr. David Boden, FDA past president



Right: Danielle Wuensche, FDLA president, with Anton Woolf, CEO of Argen Corporation



Above: Congratulations to anax USA, 2023 Southern States Symposium & Expo Best of Show Winner



Above: Table clinic in Expo Hall



Above: Heather Voss, CDT, gives NADL/NBC/FDLT update



Above: Expo Hall



Above: Dr. David Boden, FDA past president

Below: Outstanding Student Delivia Duncan



Above: FDLA team



Above: Lecture with Nick Alonge



Left:
Outstanding
Student Ana
Almagro



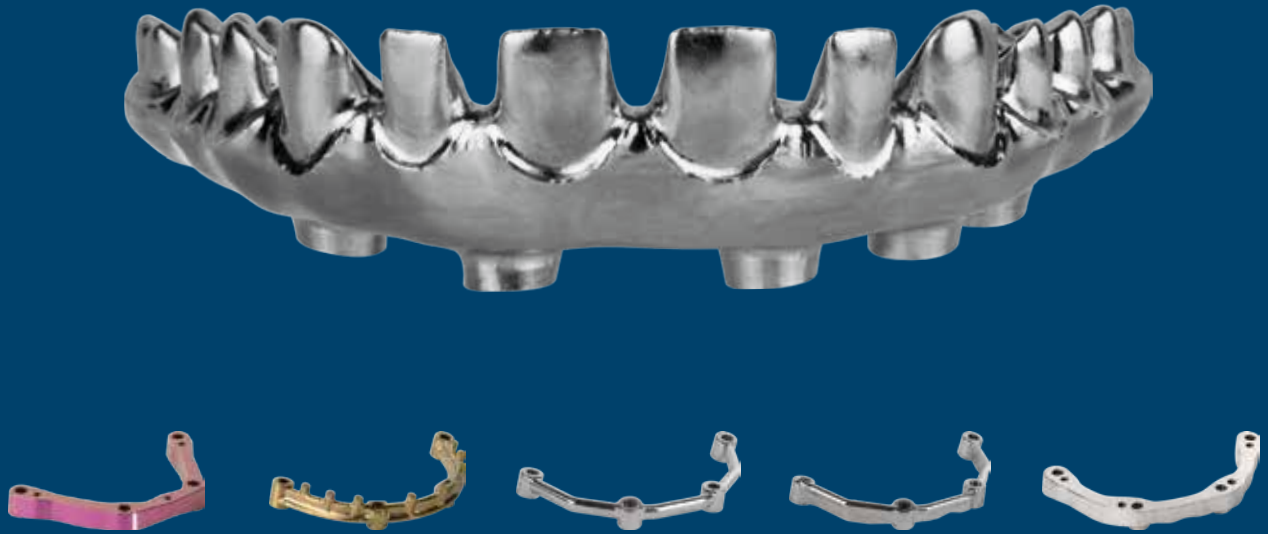
Right:
Outstanding
Student Viktor
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Left:
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Student Amalia
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The Game Plan: ALL ON X

When I was hired to be the director of CAD/CAM and implantology at Aurora Digital Technology Center, I was given one goal: streamline the entire implant restorative workflow and make it as simple as possible, all while supporting the widest array of implant systems.

My motto is: bring them all together while keeping it as simple as possible.

Having worked in the dental laboratory industry for 17 years, I experienced the evolution of digital dentistry and implant restorative dentistry. We evolved from utilizing UCLA cast cylinders to make custom abutments, to creating milled custom abutments, and now, finally, we are entering a new age of screw-retained restorations. My goal has always been to restore every single implant case while making it extremely easy for the clinician and the patient.

Achieving this goal required finding an implant components solution that supported a wide variety of different restorative options. This included angulated screw channels, engaging and non-engaging parts, gold anodization, etc. All of those needed to support implants ranging from the ones surgeons placed 20 years ago, to the latest ones today.

Let's take a company like Nobel Biocare. They made Brenemark External hex, and then moved on to Replace Select, and further created Conical Connection, which still dominates many surgical offices today.

How about Straumann? There were bone level implants, tissue level implants, and now the BLX.

AstraTech evolved from Osseo Speed implants to the current AstraTech EV, which has a very robust connection size availability.

As this evolution was happening, opportunity was created for third-party manufacturers to introduce, at varying success rates, quality products that improved and expanded on the offerings from the OEMs (Original Equipment Manufacturers). Even today, OEMs can still give very limited restorative options for more complex cases.

For example, take a patient who may have received many different implants over the course of the last 20 years. A Brenemark RP might be seated right next to Straumann BoneLevel Rc, and on the adjacent side of the arch, a few Astra Evs might finish things off. Quite the party! How does this happen? The patient has moved over the course of their life, and as they needed more restorative work done, different surgeons

with varying preferences delivered different implants. One might say, 'Milos, that's quite a stretch. Those scenarios are really rare.' To which I would say, 'Hmm, I get about one every day and the demand is growing.'

Why is the frequency of such cases increasing? Well, the next ten years brings the largest retiring population in U.S. history. Their implants are still quite well integrated, but unfortunately, the restorative on top fails, so they need a new sparkly set of Continental tires slapped on a classic 1964 Mustang.

As for your restorative dentist clients, and as dental technicians, you are faced with a major challenge on how to restore this single patient. Some OEMs wouldn't support competitor's implants. Some might not support angulated-screw channel, and maybe some support local milling of zirconia, while others only support centralized milling at their facility. There are many different variations on what is supported.

To top it all off, each manufacturer has had different scan-bodies developed over the course of the last 15 to 20 years. There were different revisions of their scan bodies (also referred to as scan flags or scan abutments). There were also different library files released for those revised scan bodies, which might not be compatible with a particular CAD/CAM design software. So now, you're hoping that the dentist has used the right revision of the scan body, for the right type of implant, from the right manufacturer! You can foresee how this can create a logistical nightmare for the lab, the restorative dentist, and ultimately, the patient. My motto is: bring them all together while keeping it as simple as possible.

All of these challenges led us to Dess and Zahn Dental. They provided a one-stop shop for both the laboratory's restorative parts, such as titanium bases, screws and analogs, and for the dentist's clinical parts, such as impression copings, multi-unit abutments and screw drivers. Not having a game plan on how to restore some of these complex cases by utilizing a streamlined implant production can result in many phone calls, re-scheduling and frustration for the whole team. I get phone calls from lab owners, both large and

small, on how to restore these cases and I hear their frustration.

One must first understand the concept of screw-retained restorations in order to take full control of an All-On X game plan. Why do we as a milling center encourage screw retained versus cementable restorations? I will list several major advantages to doing screw-retained restorations:

- Retrievability
- Servicing over time
- Angulated screw channel
- Less moving parts and significant ease of use during insertion and removal on large cases
- No leftover cement in mouth and cementation done in a controlled dry and contaminant-free environment

Retrievability:

It allows for the entire restoration to be removed with a simple unscrewing (**Fig. 1**). A removal of a cementable restoration would result in excessive cutting, significant time utilization, and prolonged discomfort for the patient.



One must first understand the concept of screw-retained restorations in order to take full control of an All-On X game plan.

We coined a term, clinically friendly screw channels.

Servicing over time:

The doctor has the ability to assess implant integrity, interproximal access, and tissue health by being able to easily retrieve the crown. A cementable restoration without screw channel access always involves destructive protocols for the restorative part.

Angulated screw channel:

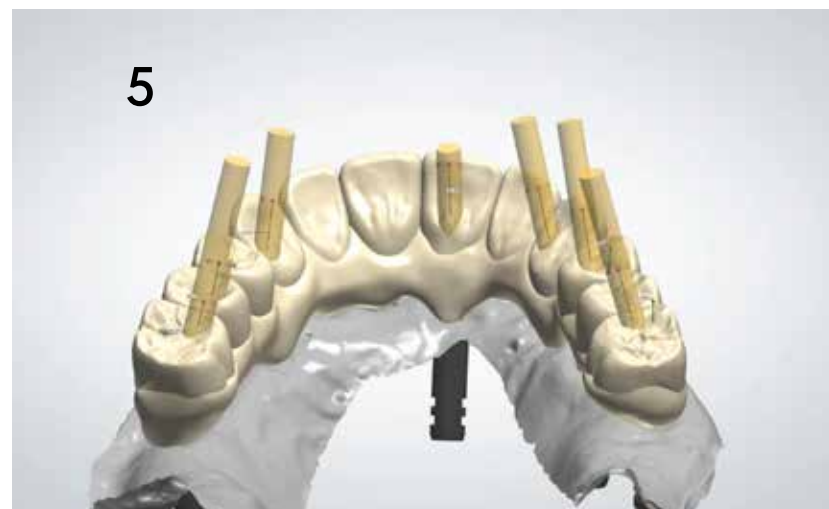
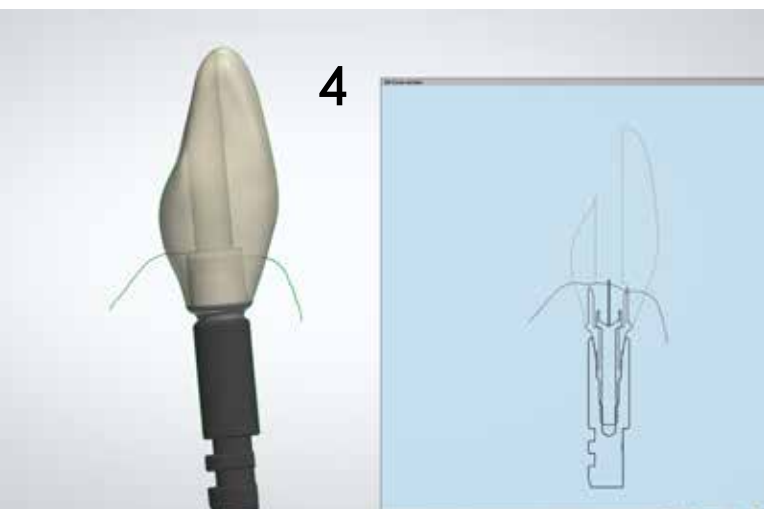
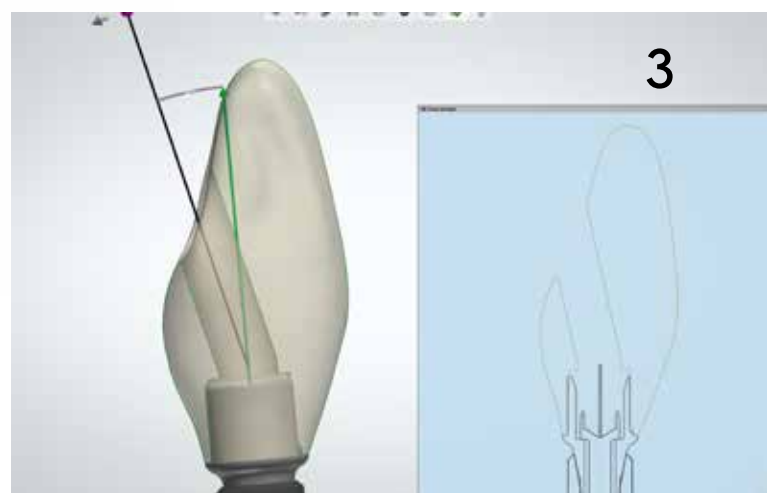
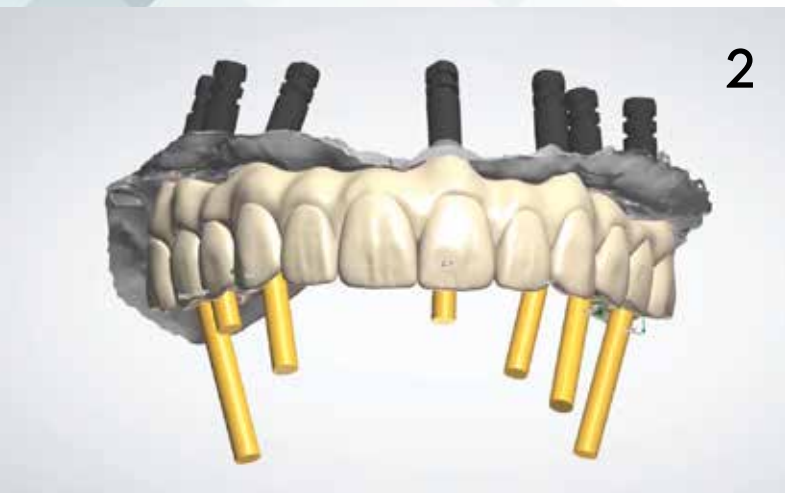
It allows us to switch many typically cementable restorative solutions to a screw-retained option. The channel allows for 25 degrees correction, which really benefits an anterior esthetic zone. Previously, if a screw channel was going through the labial side, clinicians and labs opted for a cementable option (Figs. 2-3)

Less moving parts and significant ease of use during insertion and removal on large cases:

We coined a term, clinically friendly screw channels, which ultimately means that we can position a screw channel in a way to allow the clinician to easily insert and/or remove the restoration. We can achieve this by having 25 degrees of freedom to move the channels more toward the midline so that the screw drivers have easier access (Figs. 4-5).

No leftover cement in mouth and cementation done in a controlled dry and contaminant-free environment:

Cementation is done extraorally in a controlled clean environment without saliva and contaminants.



No Leftover Cement Left in the Mouth

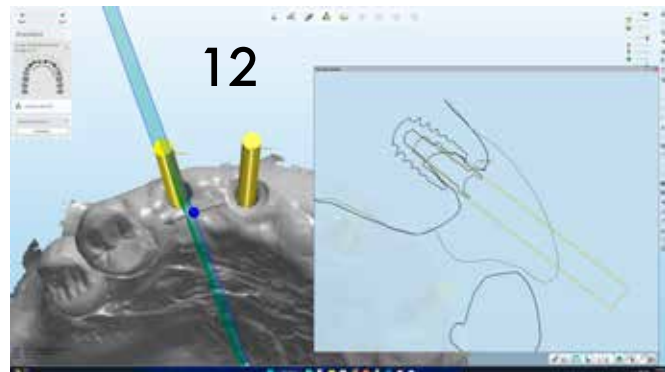
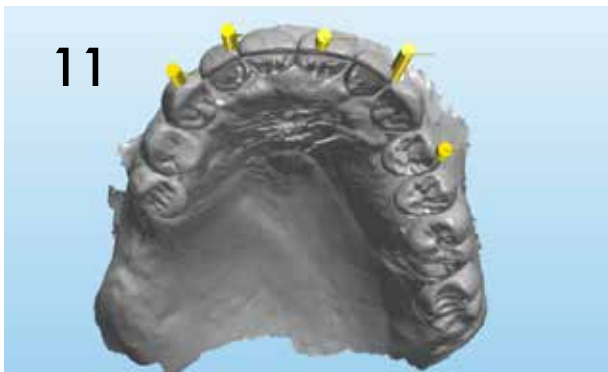
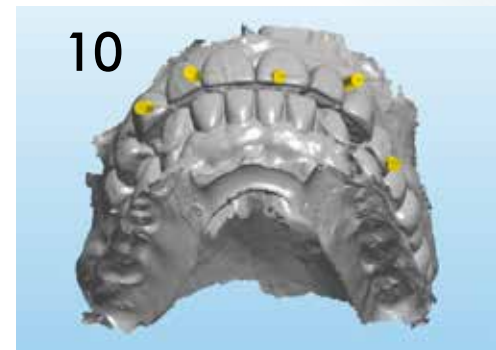
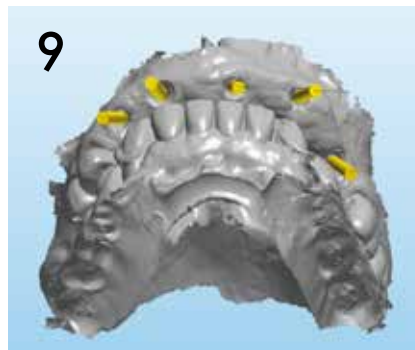


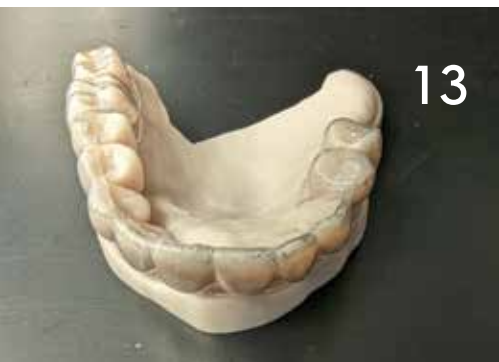
Extra cement is removed and polished outside the patient's mouth. The alternative would involve extra cement subgingivally getting stuck, and its clean-up causing frustration for both the clinician and the patient. Such leftover cement can cause potential problems for the longevity of that implant (**Fig. 6**).

Now that we recognize some benefits of screw-retained restorations, let's take a look at this challenging case. The patient presented an old acrylic restorative with an extremely protrusive profile and poor esthetics (**Fig. 7**). She did not show much of her gingival profile and had obvious VDO collapse (**Fig. 8**). The surgeon had finished placement of implants without any guides or diagnostic setup, which became very obvious from the initial review, when it was established that we needed to get creative with how to use implant components in a way that allowed us to create a screw-retained prosthesis.

The restorative dentist made an initial scan at implant level with scan bodies in place. This allowed us to evaluate and do several things:

1. Create an ideal diagnostic digital setup for the new restorative
2. Evaluate how subgingival are the implants (which dictated multi-unit abutment gingival height)
3. Determine what angulation of the abutments is necessary (17 or 30 degree)
4. Recognize potential material integrity and esthetic problems (i.e., screw channel position, interproximal thickness)
5. Decide the best trade-offs in terms of esthetics and function (**Figs. 9-12**)





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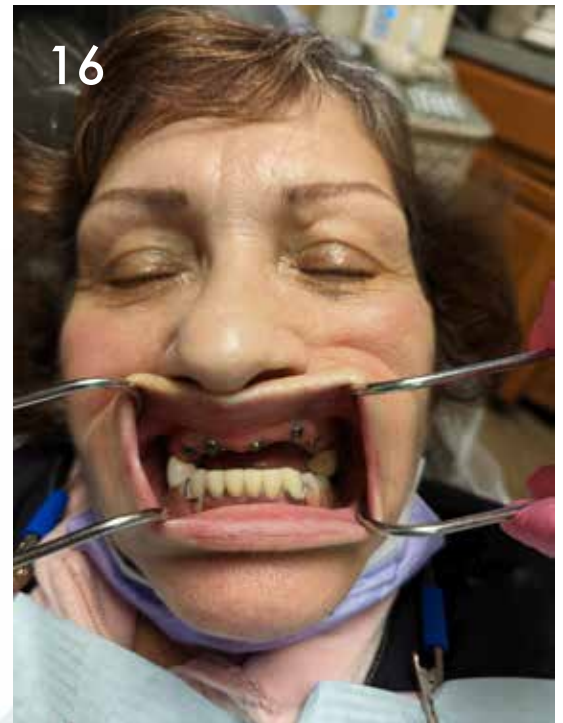


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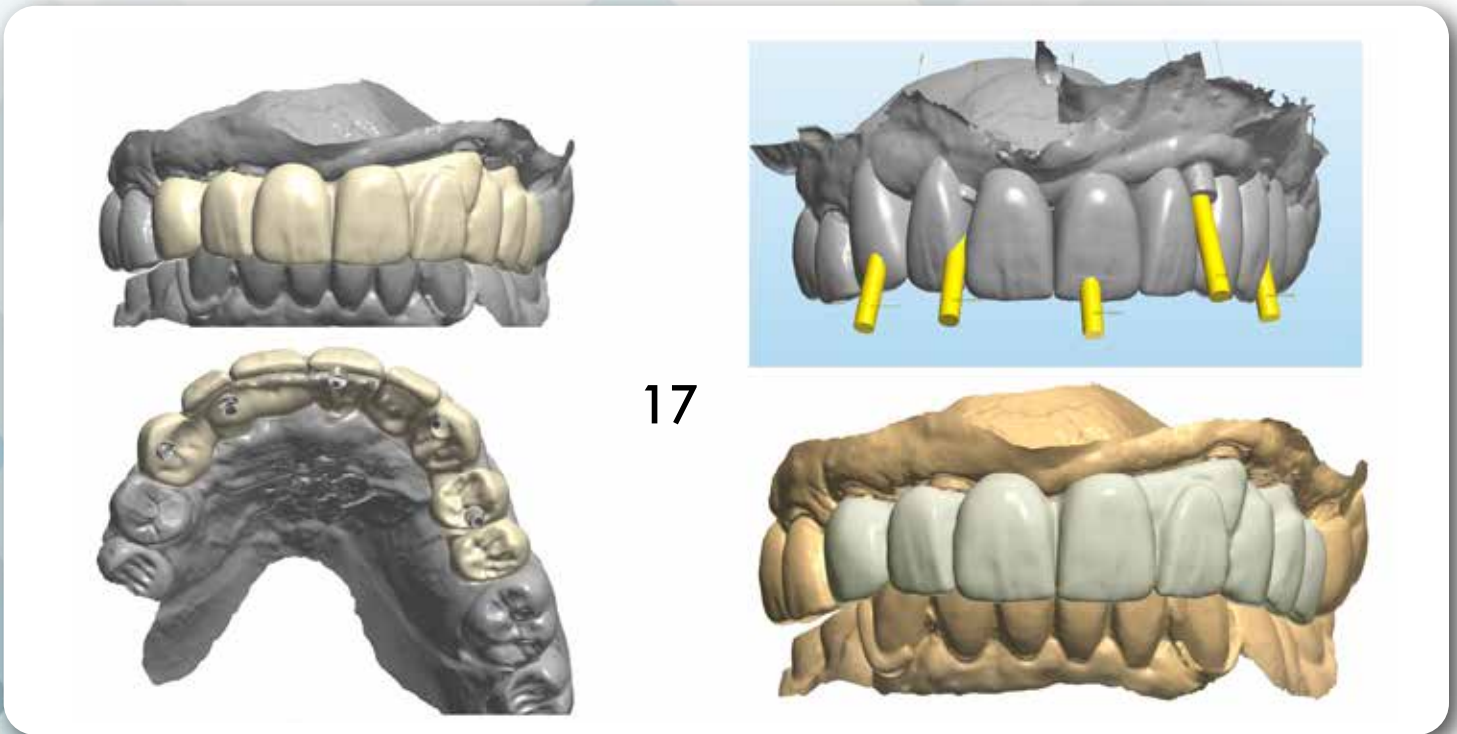
We designed the restoration with MU Anglebase titanium bases.

Dess has both laboratory and clinical components, so we ordered Dess 17-degree MU abutments, along with MU analogs and Dess Angle base MU ti bases and scan bodies. We also printed a 3D model of our diagnostic setup and created a vacuum form so that the restorative dentist could position the MU abutment in the most optimal orientation, aka "timing." After he positioned the MU abutment, he took an intraoral scan with Dess MU scan bodies (Figs. 13-16).

We designed the restoration with MU Anglebase titanium bases and moved our screw channels 25 degrees lingually. The tradeoff was the interproximal area of Tooth 9, 10, and 11. Even with corrected angulation, the gingival profile had to meet minimum material thickness requirements. We were lucky that the patient naturally did not show significant gingival profile (Fig. 17).



16



17

The PMMA restoration was finished on the 3D printed model in order to communicate with the patient ahead of the insertion on what to expect (Fig. 18). I cannot overstate how important it was to keep the patient actively involved during the process. It made sure that ALL parties were accountable and credited for what was being done.

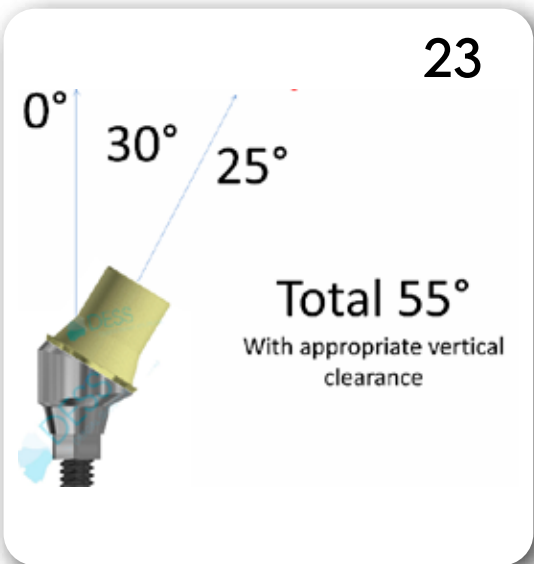
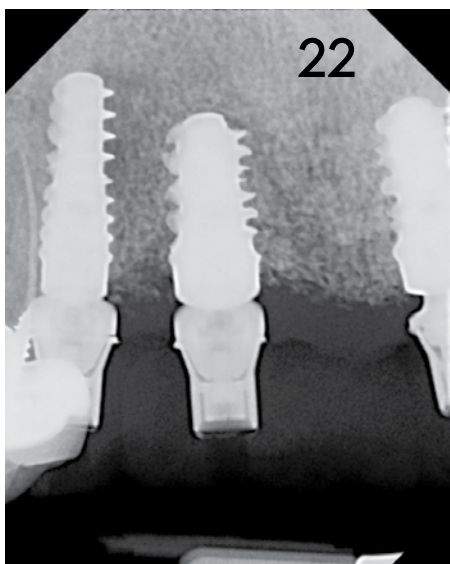
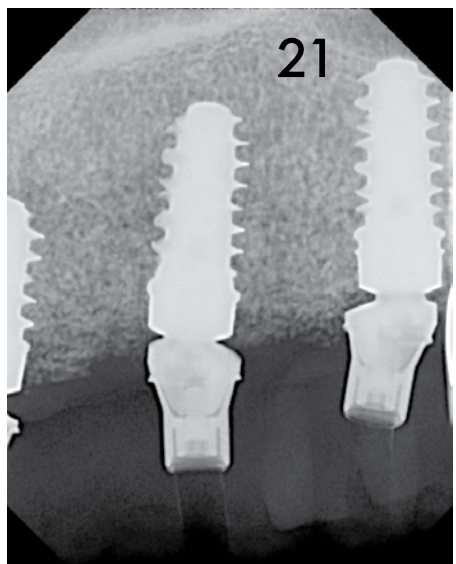


The effect seen in Figures 19 and 20 was achieved by taking full advantage of Dess components and its technology, which allowed great results while still providing the benefits of a screw-retained restoration.

The ti bases were fully seated and verified via x-ray (Figs. 21-22).




What are the restorative component limits and what can be theoretically achieved with these components? Let's start with an implant (that is zero degree). On top of our implant, we can use a 30-degree MU abutment, and then place a MU Anglebase ti base, which allows us up to 25-degree angulation correction. That's a total of 55 degrees of freedom with appropriate vertical clearance to stack those components (Fig. 23).





I cannot overstate how important it was to keep the patient actively involved during the process.

We also have peace of mind that all of these components are 510k FDA cleared and Dess has a lifetime warranty that includes the implant itself. Their rigorous testing and innovation allow us as a milling center to grow, knowing we have their entire restorative portfolio at our disposal. Ultimately, their partnership with Zahn Dental makes them both perfect restorative partners for Aurora Digital Technology Center.

At the end, I will leave you with the patient's before and after smile that makes it all worth it (Fig. 24). 



About the Author

Milos Markovic, CDT, has over 17 years of dental technology experience. He graduated medical high school for dental technology in Serbia 2004, and is a New York City College of Technology CUNY graduate, who was at the top of his class in 2009. He has worked at some of the largest implant manufacturers and dental labs in the country and frequently collaborates on research and development projects. Markovic has many years of complex case restorations within surgical clinics and dental offices.

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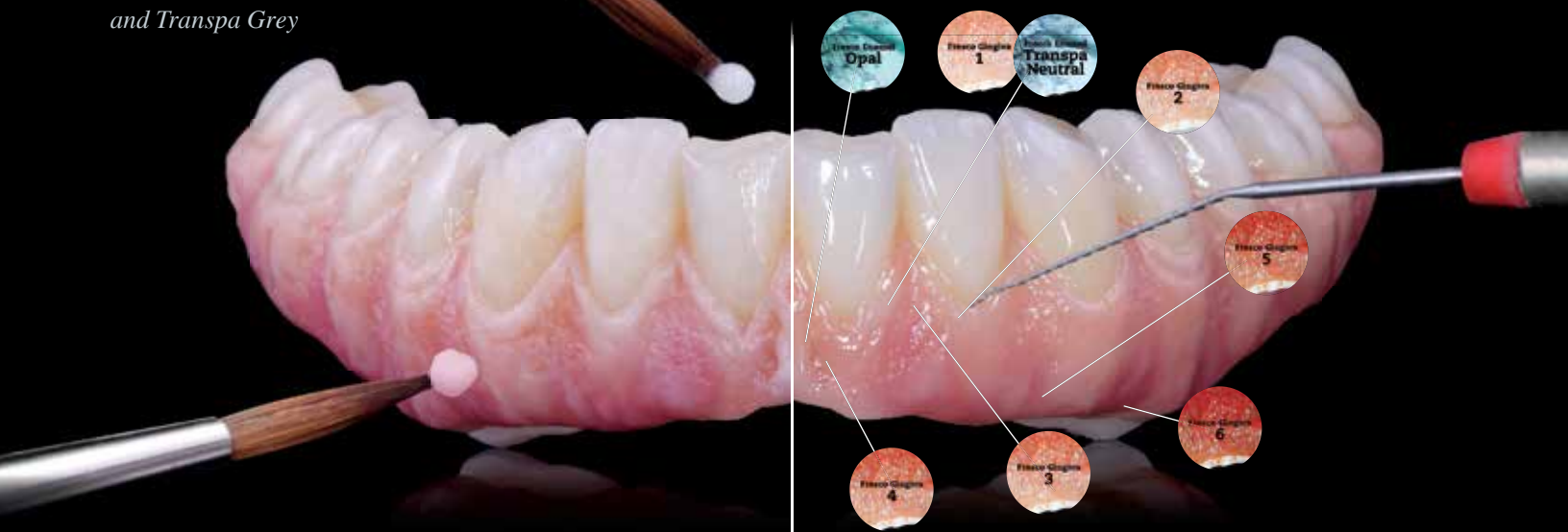


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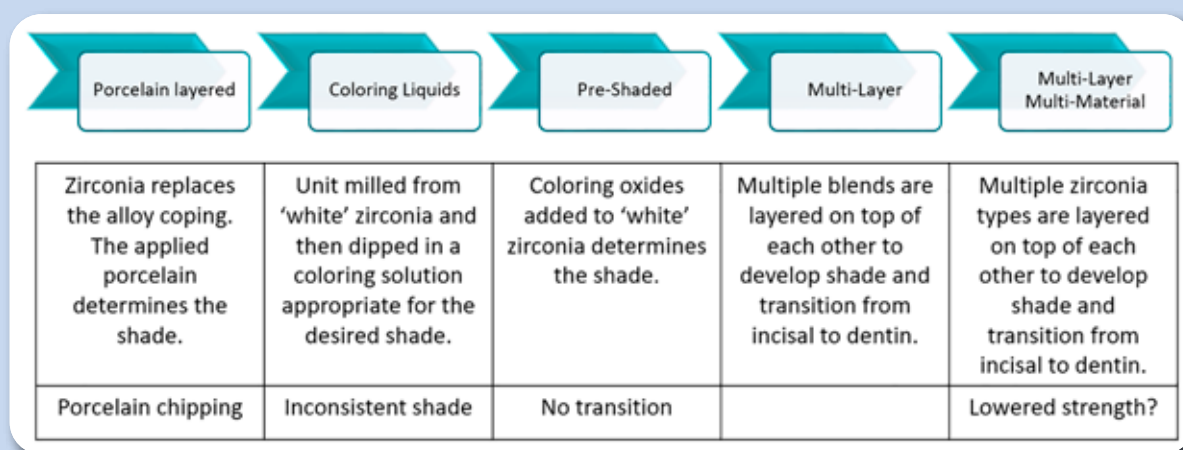
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HOW TO SINTER ZIRCONIA: Let Me Count the Ways!

By Paul Cascone

Very few materials have influenced the dental industry as much as zirconia. The development of zirconia products for dental restorations has been rapid, and the proliferation of different zirconia types has been widespread (Fig. 1). Each iteration of zirconia has required the dental technician to modify processing in some way. What appears to remain constant, however, is that all of the materials require sintering. Problems sometimes occur when one tries to adapt the sintering cycle of one zirconia for another. For example, the translucency of 3Y zirconia may benefit from overheating since cubic phase zirconia forms at the higher temperatures, but 4Y and 5Y zirconia will become less translucent from overheating.

Figure 1. The evolution of dental zirconia



This article explains the sintering process for zirconia in order to understand what is occurring when the milled units are in the sintering furnace and how to choose the best cycle for the particular restoration.

What do we accomplish by sintering zirconia?

1. In order to mill the zirconia, the disc is pre-sintered to about 60 percent dense since fully dense zirconia is not easily milled. Upon heating, the zirconia particles begin to coalesce and eliminate the internal porosity. This continues until the material is fully dense.
2. The zirconia shade develops only at a high temperature. Whether the coloring elements were added by dipping or via pre-shading by the manufacturer, the color of zirconia is not established until the material is kept at a high temperature for some time. How much time this takes is dependent upon a number of factors, the most important is the thickness of the restoration. This is why fast sintering does not always result in attainment of the proper shade.

Which features of zirconia introduce problems in sintering?

1. Zirconia conducts heat very slowly. This creates a problem when sintering restorations.
2. Zirconia has three forms: cubic, tetragonal and monoclinic. The tetragonal form of zirconia, which is the desired strong form, is metastable and has a tendency to transform into the larger monoclinic form, which can lead to the development of cracks. The cause for the conversion can be a fast cool or a temperature gradient in the restoration.

Knowing these facts about zirconia leads us to a general rule of thumb for sintering the material:

Thin units can sinter fast while thick units require more time. In other words, single units can sinter in a matter of minutes while bridges require hours. This scheme is modified by adding more time as the furnace load is increased. Table 1 shows a general guideline.

Table 1.

SINTERING CYCLE	RECOMMENDED USE	TIME
Super Speed	3 to 5 single standard thickness units. Single tray	90 minutes
Speed	5 to 7 single standard thickness units. Single tray	105 minutes
Short	10 to 12 single standard thickness units. Single tray	4.5 hours
Standard	Full tray(s) in full oven. Single and short-span bridges	7.5 hours
Long	Large bridges and/or thick-walled units	14 hours

Heating and cooling rates are important; the faster the rate, the greater a chance there is for a fracture. This is especially true for the cooling cycle. 500°C is a critical temperature and all units should be slow-cooled in this temperature region. Cooling under controlled conditions to 200°C is best. This leads to the second rule of thumb:

As the restoration thickness (or length) increases, the cooling rate must decrease. Large span zirconia restorations, especially thick implant bridges, should always be heated and cooled slowly (i.e. 4°C/min).

Some issues seen after sintering:

1. White or yellowish spots on the inside of the zirconia units. This is due to a metal oxide gas produced by the heating elements at high temperatures. Upon decreasing the furnace temperature, the metal oxide will deposit within the zirconia crowns. Prevention is easy; just put a lid on the sintering tray.
2. White spots on the outside of the zirconia crowns (**Fig. 2**). This phenomenon may be due to water in the furnace. How does water get in the furnace? There are several ways:
 - a. If coloring liquids were used on the zirconia, but the units were not dried thoroughly before being placed in the sintering oven.
 - b. Steam cleaning the un-sintered zirconia. This is never a good practice. Please do not steam clean zirconia.
 - c. The furnace was not properly dried before the first use. Most furnaces have a break-in program used to eliminate any condensed water in the refractory material.

3. Small white spots can also occur if the units are touching one another or the walls of the sintering tray.
4. Cracks anywhere on the restoration. Cracks seen after sintering or glazing are due to cooling the restoration too fast. Anytime the zirconia cannot lose heat fast enough, the extra energy will go into transforming the tetragonal phase to the monoclinic phase, resulting in a crack.
5. Shade too light (insufficient chroma). After sintering, if the shade is too light, then there was insufficient time spent in the furnace. This is generally seen when using the speed cycles. The chroma develops only at high temperature and after enough energy (heat) has been absorbed by the zirconia.
6. Shade too dark (or grey). The zirconia restoration was exposed to too high a sintering temperature or too long a sintering cycle. Most of the newer zirconia products are sensitive to over firing, unlike the early zirconia products. Similarly, for instance, a three-unit bridge does not need to be in the furnace for 14 hours. Use the sintering cycle that is appropriate for the restoration.
7. Unusual coloration on the zirconia. The zirconia must not be sintered by placing the units on the refractory brick of the zirconia furnace. Some strange discoloration reactions can occur.

In summary, taking into consideration the number of units in the furnace and the length of the restorations, the optimal sintering cycle will provide maximum productivity. [i](#)

About the Author

Paul Cascone, BE MetE, MS Ceramic Science, is senior vice president of Research and Development at The Argen Corporation. He's developed numerous dental alloy products and zirconia ceramics. He holds patents on dental alloys, materials and processes and has published articles on dental zirconia, alloy development, computer modeling of material systems and computer simulation material processes.



Figure 2.
White spots on the outside of zirconia crowns.





Above: FDLA Board of Directors installation ceremony

Welcome New FDLA Board Members

DIRECTORS



Grady Crosslin, CDT

Crosslin's Creative Ceramics

What would you like to accomplish during your term on the FDLA Board of Directors?

In my now 20 years of owning a dental lab, I have only been center focused on my own business, team members, our clients and the local communities we serve. I wish I would have prioritized further the dental laboratory community as a whole, especially the states where we have locations in. Moving forward, we not only plan to participate, but advocate for and support our fellow dental technicians, dental technology and our state associations to maximize our impact as a key player in dental health.



Enja Dorjchuluun

Sakr Dental Arts, Inc.

What would you like to accomplish during your term on the FDLA Board of Directors?

My goal is to contribute to our dental technology industry. I would love to help the new generation of technicians become the best yet, and strengthen our industry as a whole. What we do and our technical expertise is very important. Educating not only our fellow technicians, but also the doctors willing to listen and work together with their labs is an important task that FDLA and other associations are striving for. I would love to create equity in our industry.



Andrew Perricone

GPS Digital Dental Lab

What would you like to accomplish during your term on the FDLA Board of Directors?

I hope my knowledge in digital workflows and CAM equipment can be a benefit to labs that struggle with that concept, and I also want to help younger generations get into this industry and make a solid career in digital dental technology.



Barbara Warner, CDT, AAACD

Knight Dental Group | Leixir Dental, CDL

What would you like to accomplish during your term on the FDLA Board of Directors?

My goal is to give my time and experience in any way I can to help make the FDLA a stronger organization. We have the largest organization in the country and the best meeting. I hope to bring about positive change and great content for all Florida technicians to benefit from.

SUPPLIER REPRESENTATIVE



Jeremy Bonner

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What would you like to accomplish during your term on the FDLA Board of Directors?

I would like to work with our board and association staff to get more laboratories involved through creativity and innovation.



Congratulations to the 2023 CDT Milestones!

Congratulations to the 2023 CDT Milestones! The following CDTs have maintained their status for 25 or more years and were presented with a certificate during the 2023 Southern States Symposium & Expo.

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Ruben Rodriguez, CDT

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John Pearson, CDT
Thomas Pyritz, DDS, MAGD, CDT
Benson Shulman, CDT, TE
Bernardo Sosa, CDT

45 YEARS:

Douglas Baker, CDT

50 YEARS:

Howard Cosner, Jr., CDT, TE
John Hagler, CDT
Darrel Kendall, CDT

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John Porter, CDT



Above: 50-year CDT milestone recipient John Hagler, CDT, with Danielle Wuensche



Left: Recognizing 35-year CDT milestone recipient Ruben Rodriguez, CDT, (center) and 30-year CDT milestone recipient Charles Anderson, CDT (right)



Right: Recognizing 40-year CDT milestone recipients Bernardo Sosa, CDT, (left) and Thomas Pyritz, DDS, MAGD, CDT (center)



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➔ A suggested format is 1,500-2,000 words with 10-15 photos, but this is flexible.

➔ Editing and writing assistance can be provided upon request.

Please contact FDLA focus Editor Kristi Demuth at editor@fdla.net for more information.



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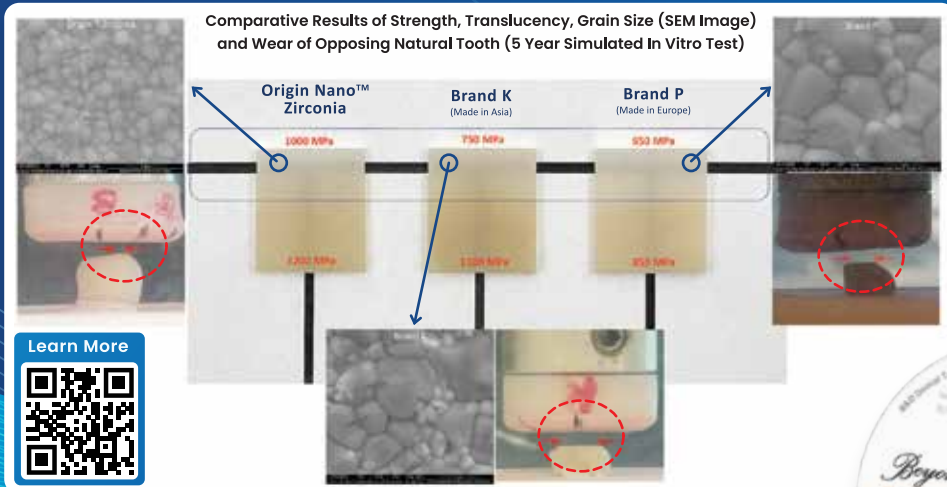
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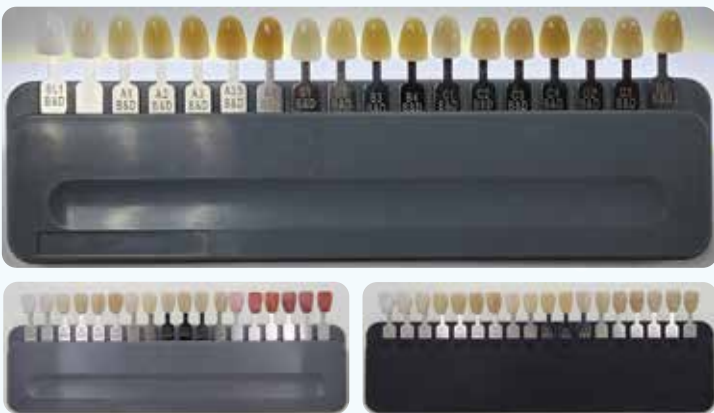
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Felix Chung, CEO, shares his thoughts on the industry and why they decided to invest.

While we provide digital solutions to both the lab and the clinic, where we excel and stand out is the lab side.

How does Imagine help dental laboratories be successful?

We focus on equipping laboratories with the newest and most available CAD/CAM technologies, including equipment, software, consumables, and implant components. We also help to educate laboratories on utilizing the newest technologies by offering in-person sessions at Imagine Academy located in California, and online courses as well.

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

In terms of the dental laboratory industry, I would say within the next five years that most cases will be received via intraoral scan, so a lab's operations will drastically change. Although I know today's lab still receives impressions, whether it be a single or a full-arch, we are trying to better equip labs for digital transfers, whether it be through a portal, email, or online platform. The dental industry doesn't typically change drastically or very quickly, but this would be the one thing that will happen.

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

For a laboratory to stand out and stand differently, I would focus on quality. When CAD/CAM was introduced ten years ago, it was all about output; labs could produce quickly and cost effectively with more affordable materials. Since then, the focus has shifted to quality. We work with dentists selling intraoral scanners, and



they are all about quality. A clinician can get their own mill and have a faster turnaround with lower cost. When it comes to working with a lab, dentists need high-quality restorations for their patients.

Why is being an FDIA Business Partner valuable to you?

We want to be one of the premier lab partners. You will see Imagine at a lot of lab shows across the country, as we invest most of our marketing resources into the lab industry. While we provide digital solutions to both the lab and the clinic, where we excel and stand out is the lab side. We feel at this point that labs are better equipped to handle digital technology. Once we decided to invest in lab shows, we knew that FDIA was a great opportunity for us. 📍

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