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2nd Quarter 2020

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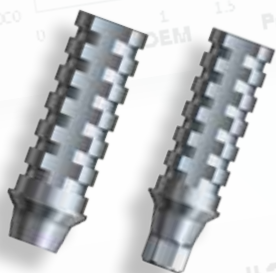
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Great news for dental technicians. The Florida Legislature approved legislation that authorizes dental laboratory technicians to be onsite for chairside services during dental procedures. The bill is headed to Gov. Ron DeSantis for approval and is the first of its kind in the U.S.

Because of the COVID-19 pandemic, we are sad to announce that we've had to cancel the 2020 Southern States Symposium & Expo. We realize that the Symposium & Expo is one of the highlights of the year, but we had to consider the safety of the hundreds of dental laboratory professionals and service providers who come from all parts of Florida and the country to attend. At this moment, we are not planning to reschedule the Symposium & Expo because of the fluidity of the current situation. However, we are very much looking forward to seeing all of you at the 2021 Southern States Symposium & Expo May 6-8, 2021 at the Renaissance Orlando at SeaWorld. If you were registered for the 2020 event, you can receive a full refund for registration fees or apply them to the 2021 event. Registration staff will be in touch with specific instructions about both options.

To maintain consistency within FDLA and its operations during this time, I've agreed to continue to serve as your president. It is an honor and amazing experience to work with all of you and see all the work this incredible team is doing. Getting to see the passion of my fellow board members is heartening. All of the technicians and laboratory owners in Florida can be proud to have such a strong association.



Yours,

Alexander Wünsche, CDT, ZT

FDLA President

*It is an honor and
amazing experience to
work with all of you
and see all the work this
incredible team is doing.*

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
- Innovation

The 2020 Southern States Symposium & Expo has been Cancelled

The 2020 Southern States Symposium & Expo has been cancelled due to risks presented by the COVID-19 (Coronavirus). This is the first time the Symposium & Expo has been cancelled. The Southern States Symposium & Expo is the highlight of our annual offerings and the largest of our live meetings, bringing together hundreds of dental laboratory professionals and service providers from across the nation. Thus, the decision to cancel was not taken lightly or without careful consideration and consultation.

The FDLA Board of Directors and staff monitored the COVID-19 situation closely leading up to the cancellation. FDLA's priority in making this decision is the health, safety, and well-being of our members, our staff, our exhibitors, sponsors and speakers. At this time, there are no plans to postpone or reschedule the Symposium & Expo in 2020, due to the uncertainty we are all facing at the moment and the inability to set an accurate timeline. The 2021 Symposium & Expo is planned for May 6 – 8, 2021 at the Renaissance Orlando at SeaWorld.

To all of our attendees who were planning to attend, we apologize for the inconvenience this cancellation has caused and will offer full refunds for all paid registration fees. You may also roll over your registration fees to the 2021 Symposium & Expo at no additional charge and you will be automatically registered. Our registration staff will contact you with specific instructions on how to request a refund or roll over your registration. Due to the circumstances, we are currently working on how we will do this most efficiently. We ask for your patience as we process a large volume of refunds.


Exhibit, Sponsorship and Advertising fees can also be applied to the 2021 Symposium & Expo. Our exhibit manager will be in contact regarding the options available for securing your

company's exhibit, sponsorship and advertising location for the 2021 Symposium & Expo.

If you or your company is currently registered as an attendee, exhibitor, sponsor or advertiser, a separate notice will follow within the next few days with directions on how to roll over your registration for the 2021 Symposium & Expo or request a refund. All refunds should be requested by April 30, 2020. Past April 30, 2020, we will take in good faith that you would like to extend your payment to cover your fees or deposits at the 2021 Symposium & Expo.

FDLA will work to preserve the hard work its presenters poured into preparation for this Symposium & Expo and look to provide educational opportunities to our members to assist in the maintenance of CE requirements mandated by the State of Florida and the National Board for Certification for CDT's.

Hotel Reservations and Cancellations: The Renaissance Orlando at SeaWorld will cancel all reservations made under FDLA's room reservation block. A notice of cancellation will be sent to the email address used when making the reservation. In the event that you do not receive a cancellation notice or you made your hotel reservations outside the FDLA reservation block and/or through a third party hotel booking site, you are encouraged to contact the hotel to cancel your reservation. If you need to contact the hotel regarding your reservation, please call: 407-351-5555.

We at FDLA feel a deep appreciation for our members and the outpouring of support we have received in the wake of this news. FDLA is a member-run, not-for-profit organization that exists to serve its members, so we appreciate your continued support. Please do not hesitate to contact us with questions, concerns, or requests for topics. 

General Questions: Please contact the FDLA Office 850-224-0711 or membership@fdla.net

Attendee Registration Questions: 1-866-873-3352 or fdlareg@mcraemeetings.com

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Sponsorship Questions: Please contact Christina Welty, 850-224-0711 or cwelty@executiveoffice.org

Symposium Advertising Questions: Please contact Maureen Turner, 850-224-0711 or mturner@executiveoffice.org

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Florida Dental Laboratory
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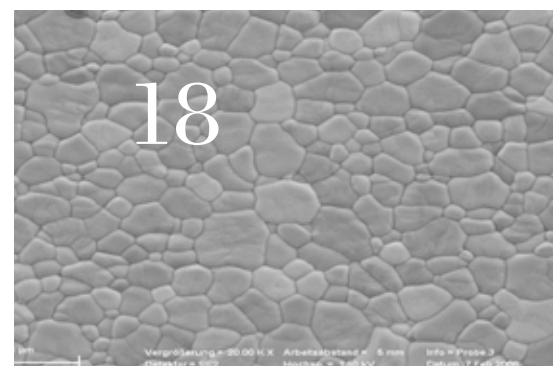
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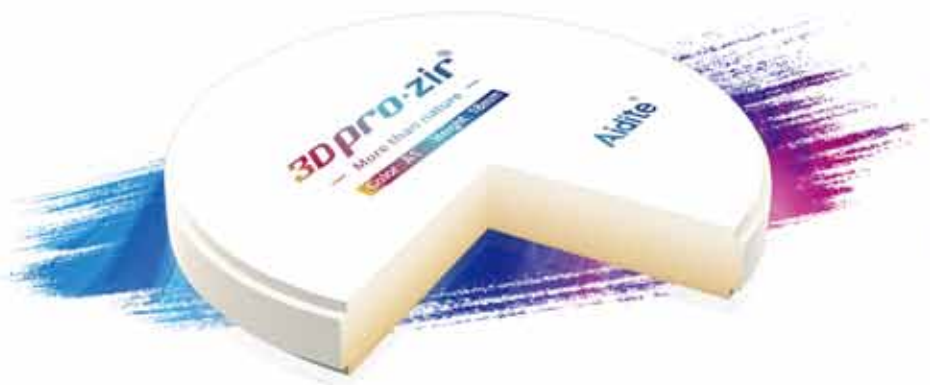


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The *Why* Behind OCCLUSAL APPLIANCES

Do you ever wonder why dentists make occlusal appliances (AKA nightguards)?

Is it just because we have a crazy patient that is grinding their teeth or is it just about money? I hope that after reading this article you may realize that an occlusal appliance is much more than a piece of plastic that goes between the teeth.

Our muscles like balance, and when we are not in balance the muscles have to work harder to adapt and equilibrate the system.

Fabricating an occlusal appliance is part of a diagnostic and therapeutic process. It requires extra-oral photography, excellent models mounted in centric relation, understanding the excursions of the functional and parafunctional movements and spending time investigating whether the joints, muscles and teeth are exceeding their adaptation capabilities. The data collected and the review of findings discussed and shown to our patients then encompasses an experience of co-discovery. Co-discovery is not just for the dentist to learn about the patient and deliver a treatment plan. Co-discovery is about allowing the patient to learn about themselves.

An occlusal appliance is a great tool for the dentist. Discovering why we may prescribe an occlusal appliance not only opens the gates to relationship-based dentistry, but it allows for relationship-based laboratory practices. Simon Sinek, the author of the book *Start with Why* explains that it is important to start with why and the how and the what will follow. Sharing some insight into our whys may help you, the laboratory technician, understand our requests, allow you to partner with us in providing a seamless experience for our patients and improve the restorative work we prescribe to deliver superior and predictable outcomes for the high-risk patient. We know you know how to fabricate an occlusal appliance. In shedding some light on our why, I hope to reveal how important our working relationship with the laboratory is in order to provide for our patients.

Humans are meant to be adaptive creatures. However, if the occlusal trauma exceeds its adaptive and reparative capabilities, signs of damage will occur. Occlusal appliances can do three main things:

1. Perform as a diagnostic tool to evaluate.
2. Diagnose occlusal disease.
3. Develop a sequence of treatment that promotes stability to the stomatognathic system by leading us to recommendations of equilibration, orthodontics and restorative care to diagnose and treat muscular dysfunction that causes pain, and act as a maintenance device to protect occlusal restorations that a patient invests.



**APPLIANCE THERAPY
AND EQUILIBRATION**

Establish the
Relationship



Kelley D. Brummett, DMD

First, relationship-based dental care is in the business of being proactive. We are graced with the opportunity to see our patients at least two times a year and help acquaint our patients with their risks and benefits. The goal of these visits is to engage our patients with the diagnostic information gathered to help them make choices about how to manage their dental health. When we communicate and create an experience with our patients to see and understand the signs of damage we see and that lead to the symptoms they live with, we can provide our patients with a tool to investigate the "why" behind the signs and symptoms.

An occlusal appliance can be as similar as buying custom inserts for your shoes. Our muscles like balance, and when we are not in balance, the muscles have to work harder to adapt and equilibrate the system. To name a few, this typically leads to maladaptation and potentially results in sensitivity, pain, loose teeth and/or broken teeth. The occlusal appliance allows the dentist to investigate, diagnose and create an ideal occlusal scheme on the appliance in the most conservative and reversible manner. The occlusal appliance can become the map to experiment in the discovery of how to create an ideal function.



DISCOVERY PROCESS

Adjustments
Reversible process

The ideal function includes three things:

1. Centric relation
2. No posterior interferences
3. Anterior teeth that guide the back teeth apart

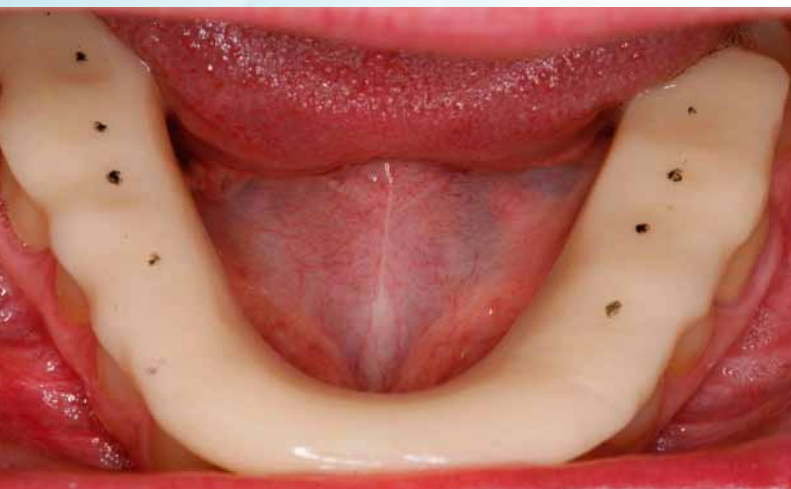
When the patient closes their jaw, the condyle seats in its most anterior, superior position and muscles relax. For example, if you identify a hit and slide in the patient's natural occlusion, designing the occlusal appliance with an ideal occlusion will allow the patient to find CR and allow the back teeth to touch evenly and at the same time. This provides balance and allows you to visualize a new map of occlusion.

When the jaw moves forward, back, right and left, the back teeth come apart. Excursive movements are guided by the anterior teeth. Conservatively, placing the joints, muscles, and teeth back in harmony allows you to identify what the patient notices, how you can change the tops of teeth and improve the overall predictability of treatment, and patient satisfaction.

Second, occlusal appliances, if we are lucky, can provide therapeutic benefits for our patients. Let's take the hit and slide scenario again. If a patient is closing their jaw, and the joints cannot set and allow the muscles to decrease in work, the masseter, temporalis and lateral pterygoid have to hold the jaw down and forward to get away from the interference. When these muscles get tired, they recruit other muscles of the head and neck region and increase the symptomatic response of the muscular dysfunction. To combat this dysfunction, the patient will move the jaw to find MIP causing the muscles to flex, build up lactic acid and increase the inflammatory states of our patients. This can lead to headaches, trigger points in teeth, unneeded dental treatment, exhausting pain and behavioral frustration for our patients. The outcome of pain is to try and get out of pain and often the system responds by maladapting and risks now rise.



GOALS OF THERAPY | Balance



When a patient has spent years in a state of occlusal disease, restoring the dentition to health does not mean that the parafunctional habits will stop.

If the occlusal appliance can act like an orthotic we put in a shoe to create balance to our legs, knees and back, we just might allow our patients to experience relief from the pain to their joints, muscles, and teeth, and allow their mind to clear to understand the cause and effect relationship. This further allows them to make choices to minimize the pain and potential destruction that the maladaptation has created.

Lastly, an occlusal appliance can be considered a protective device after the completion of complex comprehensive dentistry. It is a way to ensure the protection of the restorations from potential parafunctional damage when they are wearing the appliance. An occlusal appliance becomes a maintenance device to ensure the potential longevity of the restorations or change in the occlusal scheme during parafunctional activity. When a patient has spent years in a state of occlusal disease, restoring the dentition to health does not mean that the parafunctional habits will stop.

The why behind the destruction typically does not magically disappear, but we hope it is minimized and the patient is now aware. When we take a patient through the comprehensive process of restorative care, they can then own the functional challenges they may have developed. Sharing this insight with the laboratory technician can remind us of these challenges. It is like if I bought a car that was sexy, sleek and fast and I never took it in for maintenance care, the brake pads and the tires would wear and become bald, and that beautiful car would begin to break down. A beautiful rebuild of a worn-out dentition requires protection, maintenance, and follow-up to increase the longevity of the treatment.

Why does all of this matter? When we diagnose our patients and recommend occlusal therapy, this is where we want you to partner with us. I believe and hope that you, the laboratory technician, can be involved in our why's and hear how valuable you are to the treatment process of our patients. Our responsibility to you is to

continued on page 12



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More patient satisfaction can then lead to more profitable dental practice and laboratory.

provide you the information and supplies you need to fabricate the occlusal appliance. The clearer we are in our comprehensive evaluation the more predictable we all can be in the treatment outcome.

Occlusal appliance therapy can sometimes lead us to other treatments. The laboratory with a clear understanding of our why can help partner and walk with us to experience fewer disappointments and re-dos. Improved communication generally can lead to more patient satisfaction. More patient satisfaction can then lead to more profitable dental practice and laboratory.

Do you know why? If not, pick up the phone and discuss it. Every dentist should be excited to partner with you, rather than work in a vacuum. Our patients, our time, and your time are worth it. [i](#)

About the Author:

Dr. Kelley D. Brummett was born and raised in Missouri. She attended the University of Kansas on a full-ride scholarship in springboard diving and received honors for being the Big Eight Diving Champion on the 1 meter springboard in 1988 and in 1992. Dr. Brummett received her BA in Communications at the University of Kansas and went on to receive her Bachelor of Science in Nursing. After practicing nursing, Dr. Brummett went on to earn a degree in Dentistry at the Medical College of Georgia. She has continued her education at the Pankey Institute to further her love of learning and her pursuit to provide quality individual care. Dr. Brummett is a Clinical Instructor at Georgia Regents University and is a member of the American Academy of Cosmetic Dentistry.

Dr. Brummett and her husband Darin have two children, Sarah and Sam. They have made Newnan their home for the past nine years. In her free time, she enjoys traveling, reading and playing with her dogs. Dr. Brummett is an active member of the ADA, GDA, AGDA, and an alumni of the Pankey Institute.





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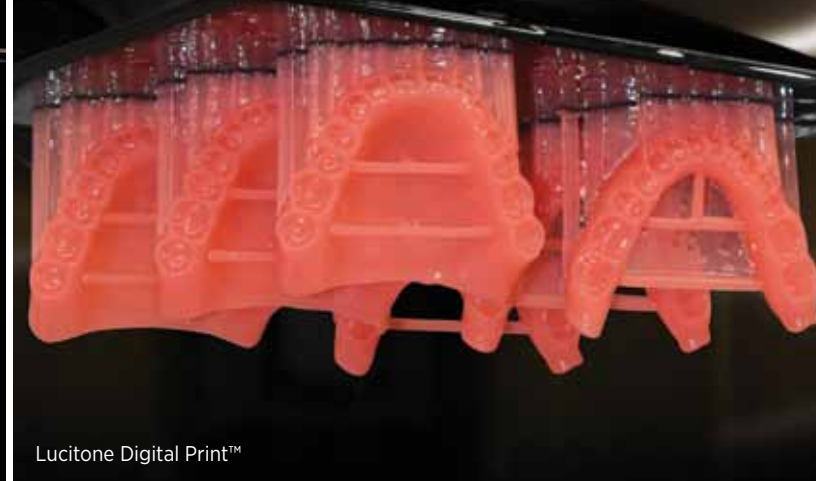
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Rising Tide of Zirconia:

A Balancing Act of Esthetics and Strength to Fit the Patient Needs

Over the past five years or so, restorations made completely from ceramic materials have become the dominant type of indirect restoration. Within that category, zirconia is the primary type of ceramic restoration, with zirconia-based restorations making up about 50 percent of all the ceramic restorations fabricated. This is not pure zirconia; it is partially stabilized by the addition of small amounts of other metal oxides and should more correctly be called yttria partially stabilized tetragonal zirconia.

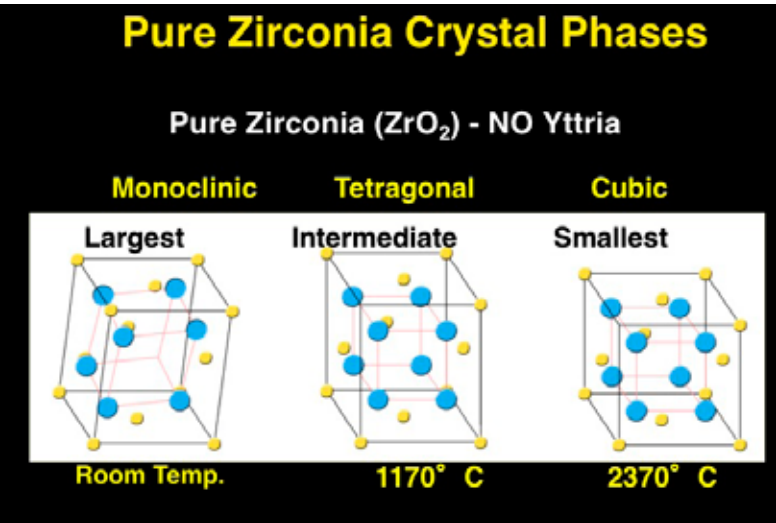


Figure 1: (Above)
Pure Zirconia Phases

Partially stabilized zirconia allows the production of reliable multiple-unit all-ceramic restorations for high-stress areas. Zirconia may exist in several crystal types (phases) depending on the addition of minor components, such as calcia (CaO), magnesia (MgO), yttria (Y₂O₃), and ceria (CeO₂), (Figure 1). Specific phases are said to be stabilized at room temperature by the minor components. Typically for the standard white zirconia and what we all initially became custom to using, has about three-mole percent of yttria added to pure zirconia. However, as this material became more popular, an attempt to improve esthetics by increasing translucency was in part accomplished by increasing the yttria content as well as altering minor component concentration such as alumina.

One issue that needs clarification is how yttria content is described. This may be in terms of weight percent or mole percent. Weight percent is simply the percent of the total material weight that is the yttria additive. Mole percent is a bit more complicated. One mole represents 6.022 x 10²³ atoms or molecules of substance (Avogadro’s number). You calculate the number of moles by dividing the mass of substance by the substance’s atomic or molecular weight. You then find the mole fraction by dividing the moles of one substance in a mixture by the total number of moles of all substances in the mixture. There has been confusion as to what the yttria content means and what type of zirconia a dentist might be requesting for a specific restoration (Table 1).

The original 3Y zirconia has unique characteristics that make it the strongest and toughest of most of the ceramics used for restorations. The tetragonal phase is partially stabilized at room temperature and under stress can transform into a larger monoclinic

TABLE 1.
Weight and Mole Percent of Yttria in Zirconia

Weight Percent Yttria	Mole Percent Yttria	Translucency
5.5 wt%	3 mol%: (3Y)	Standard, Low
7 wt%	4 mol%: (4Y)	Intermediate
9.4 wt%	5 mol%: (5Y)	High
14.5 wt%	8 mol%: (8Y) Cubic	“Fake Diamonds”

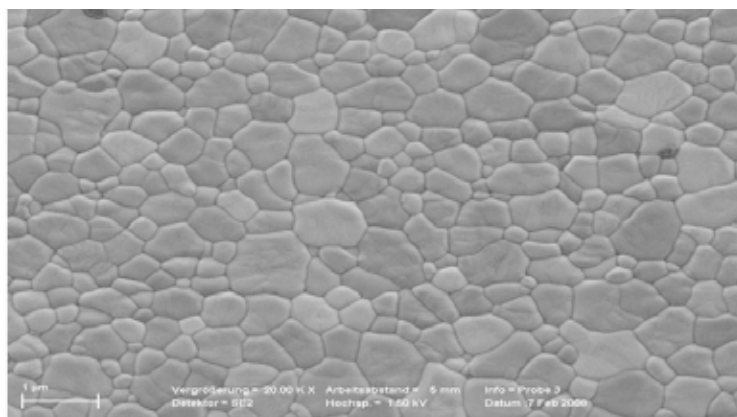
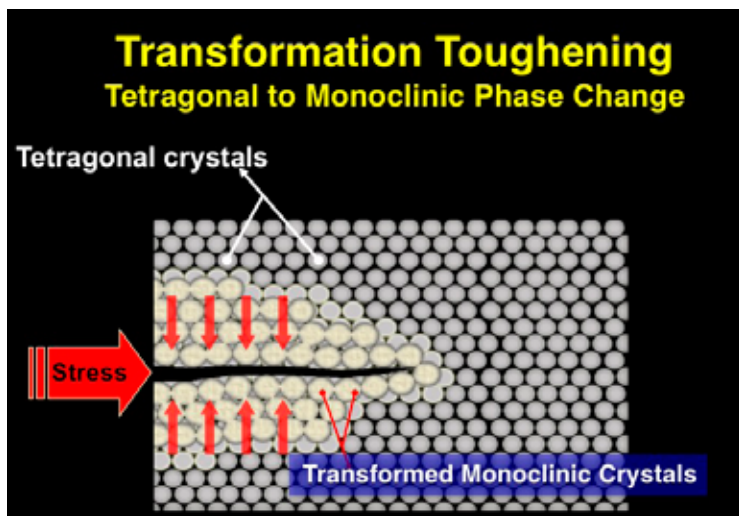


Figure 2: (Left)
Transformation Toughening

Figure 3: (Above)
Dense Vita YZ Zirconia

phase that can prevent crack propagation by taking energy away from the crack as the crystal expands, creating compressive stress, and crack deflection by some micro-cracking (**Figure 2**). While there are claims of strength values up to 1400MPa, typically values for flexural strength range from approximately 900MPa to 1100MPa.¹⁻⁴ There is no direct correlation between flexural strength and clinical performance as this also depends greatly on tooth preparation, thickness, luting agents and, of course, oral conditions. Another important physical property is fracture toughness, which has been reported between 8MPa.m^{1/2} and 10MPa.m^{1/2} for zirconia. This is significantly higher than any previous dental ceramic. Fracture toughness is a measure of a material's ability to resist crack growth. Therefore, the 3Y zirconia has been used for full-contour large multi-unit restorations.

High quality, properly fabricated zirconia materials should be pore-free with a fine microstructure of around .5 – 1 micron as seen with Vita YZ T (**Figure 3**). Although the starting powder might be the same, processing into a block requires careful pressing procedures as well as partial sintering to produce a homogeneous block that machines well and shrinks to full density uniformly. Our laboratory has tested many zirconia blocks and has found numerous blocks that lack uniform density causing warping and materials with large porosity. Strength is also

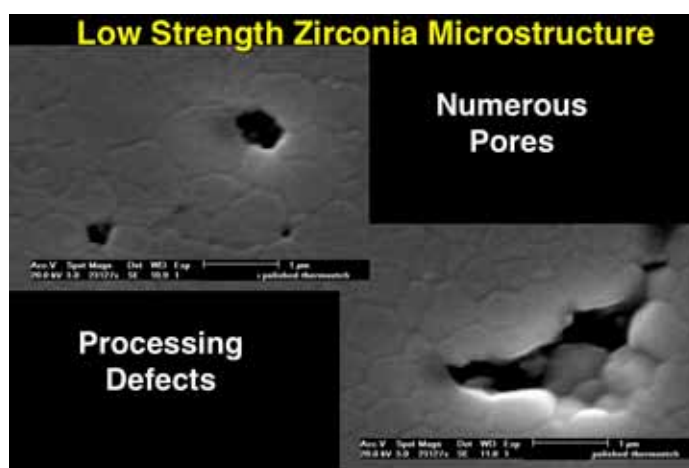
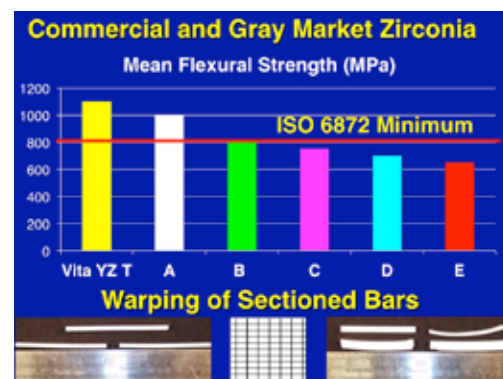


Figure 4: (Left)
Porous Zirconia

Figure 5: (Below)
Strength and Warping
Gray Market Zirconia

significantly lower than anticipated for this type of zirconia (**Figures 4 and 5**).

The higher yttria content translucency materials do not exhibit the same fracture resistance as 3Y zirconia. There are two types of 3Y – the standard low translucency and a higher translucency 3Y with less alumina. Increased translucency is achieved with 4Y and 5Y. As the yttria content increases, the material is more susceptible to surface damage and has lower fracture toughness and strength. More cubic crystal content is developed that decreases or might eliminate transformation toughening. In a study conducted in our laboratory, it was found that the 5Y material had a flexural strength of about 800MPa, but when the surface was ground (diamond wheels) on or sandblasted (50-micron alumina, 10 seconds), unlike the 3Y material, strength dropped dramatically to as low as 300MPa. When selecting



zirconia materials with high translucency, it is extremely important to recognize the limitations for use, particularly in high-stress areas. Additionally, greater tooth reduction is required as compared to 3Y materials.

In all cases, after any adjustment, the zirconia should be carefully polished to eliminate defects that might propagate and cause fracture while in use. The

transformation toughening is clear with the 3Y materials as the tetragonal transforms to the larger monoclinic creating compressive stress. The lack of transformation toughening is seen with the 5Y material as the strength drops dramatically with surface damage (**Table 2**).⁵

In addition to these studies, a number of reports have compared the mechanical properties of various 3Y, 4Y, and 5Y zirconia. **Table 4** shows how the mechanical properties tend to trend lower as the yttria content increases. A good compromise might be the 4Y material. However, it is important that rules for minimum thickness be followed. Furthermore, when using any type of zirconia, the dentist must pay attention to preparation design. Adequate thickness is needed no matter how strong the material is being used. Furthermore, if a non-bonding cement is used, the traditional retention and resistance form must be followed. Glass ionomer or resin-modified glass ionomers require proper retention form. However, if this is not possible, bonding cements with MDP bonding agents specifically designed to adhere to zirconia should be used. A number of manufacturers have cements that bond to zirconia: 3M/ESPE RelyX Ultimate, Ivoclar Multilink, Kuraray Panavia V5 and SA, Dentsply-Sirona Calibra Universal. Separate bonding agents are also available, such as Z-Prime Plus from Bisco.

Other methods of improving esthetics include liquid colorants, intrinsically colored zirconia, zirconia with gradations in chroma, and, lastly, zirconia with gradations in translucency within a single block. Our laboratory has examined the effects of liquid colorants, specifically Vita YZ zirconia colorants on the mechanical properties of Vita YZ T 3Y zirconia. Standard three-point bend bars were fabricated according to ISO 6872:2018. These were then applied to the zirconia and tested for effects on strength. Multiple coatings were applied with a brush (4, 8 and 12 coats) or bars were soaked for various times (two or four minutes). There was no effect on the

TABLE 2.

Effects of Surface Treatment on Biaxial Strength of Tosoh Zirconia

Condition	3Y	3Y Low Alumina	5Y
As Fired	1161 ± 87	1067 ± 98	817 ± 77
35 µm wheel	1357 ± 110	1267 ± 120	807 ± 73
125 µm	1368 ± 129	1304 ± 89	460 ± 91
240 µm	1369 ± 87	1265 ± 93	307 ± 86
SB µm, 50	1478 ± 96	1461 ± 88	354 ± 79

TABLE 3.

Manufacturer Types of Zirconia By Yttria Content

3Y Original	3Y Low Alumina	4Y	5Y
Vita YZ T	Vita YZ HT	Vita YZ XT	Vita YZ ST
Katana LT	Katana HT	Katana UTML	Katana STML
Incoris	Cercon HT	-	Cercon XT
IPS e.max ZirCAD MO	IPS e.max ZirCAD LT	IPS e.max ZirCAD MT	IPS e.max ZirCAD Prime (3Y-5Y)
3M/ESPE Lava Plus	-	-	Lava Esthetic

TABLE 4.

Mean Flexural Strength of Zirconia with Various Yttria Concentrations

Material	Flexural Strength	Minimum Thickness	Use
3Y Original	900 – 1200 MPa	0.4 – 0.6	All Areas
3Y Low Alumina	800 – 1100 MPa	0.5 – 0.7	Up to 4 unit Posterior Bridge
4Y	700 – 800 MPa	0.6 – 0.8	Up to 3 Unit Posterior Bridge
5Y	600 – 700 MPa	0.8 – 1.0	Anterior

mechanical properties of the zirconia using these colorants (**Table 5**). No significant difference in strength was found between the control group and the colored group.⁶

With respect to gradations in chroma, there was some concern that the mechanical properties might be adversely affected due to the colorants and the fabrication methods to create these layers. A number of studies, including

those in our lab, have shown this not to be the case.^{7,8}

The most recent variation of a block is the use of gradations in translucency in which layers have different concentrations of yttria. Ivoclar Zircad MT Multi has two layers: a 5Y in the occlusal and 4Y in the body. Ivoclar Zircad Prime has three layers; 5Y occlusal (3mm), 5Y-3Y transition in the middle 4mm, and a 3Y cervical (9mm – 12mm). Ivoclar Zircad MT Multi has

TABLE 5.
Three Point Flexural Strength of VITA
YZ T Zirconia with Colorants

Group	Strength	Signifi- cant Dif- ference
Control	904.3 ± 46.7	A
2M2 2 mins	888.6 ± 95.9	A
2M2 4 mins	806.3 ± 118.0	A
2M2 4 coats	853.3 ± 186.6	A
2M2 8 coats	929.2 ± 138.2	A
2M2 12 coats	866.3 ± 113.8	A
3M2 2 mins	860.6 ± 148.1	A
3M2 4 mins	812.5 ± 136.6	A
3M2 4 coats	898.9 ± 84.8	A
3M2 8 coats	911.9 ± 103.6	A
3M2 12 coats	836.8 ± 146.9	A

two layers a 5Y in the occlusal and 4Y in the body. According to the manufacturer, the 3Y is 1200 MPa, the middle is in between and 5Y is 650 MPa. Additional manufacturers include Aksys dental Axzir with a 6 layer gradation and Upcera with five layers. There are limited publications on these materials. An abstract from Ivoclar examined load to failure of various zirconia materials machined into 1 mm thick crowns showing that the multi-layer crown has the highest load to failure compared to other non-layered and non-layered materials.⁹ A study presented at the IADR 2019 meeting contradicts this finding, showing that the flexural strength of the layers is lower than what is claimed in the product literature.¹⁰ Our own in-house initial data supports that of the abstract, in our study, all layers were included in the strength test bar specimens. The overall strength is lower than expected for the corresponding yttria concentration in a non-translucency graded zirconia.¹¹

While full-contour zirconia is becoming more widely used, veneering frameworks are still popular to create the most esthetic restoration possible. The problems initially seen were with chipping and

cracking of porcelain. This was widely reported by CRA, and also in the literature. After widespread study, the low thermal conduction of zirconia was determined to be the primary cause of these failures.¹²⁻¹⁴ Two problems might occur.

1. During the heating phase, especially with a thick abutment or pontic and low firing veneer, the porcelain never reaches full density.
2. During the cooling phase, large stresses occur because the zirconia remains hot while the porcelain cools much faster.

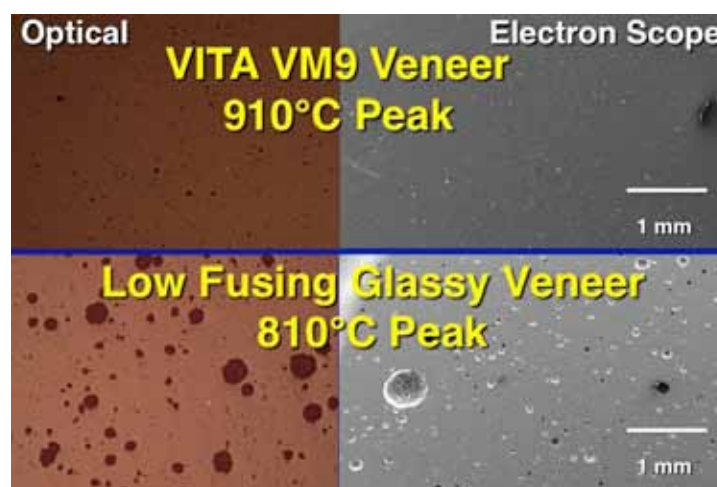


Figure 6:
Veneer Porosity

TABLE 6.
Load to Failure of Translucency Graded and
Non-Graded Zirconia

Material	Load to Failure (Newtons)
Katana UTML (5Y)	3307 ± 1023
Katana STML (4Y)	4008 ± 840
IPS e.max ZirCAD MT Multi (4Y to 5Y)	4802 ± 876
PS e.max ZirCAD Prime (3Y to 5Y)	6611 ± 1226


TABLE 7.
Flexural Strength of Each Layer of a Translucency
Graded Zirconia

Zircad Prime	Flexural Strength (MPa)
5Y Layer – “Enamel”	386.7 ± 59.8
Intermediate Layer	429.8 ± 54.0
3Y Layer – “Dentin”	744.2 ± 103.8

There are a number of veneer porcelains with a range of firing temperatures. Our laboratory examined low firing veneer versus a high firing veneer porcelain and discovered that the low firing material never fully densified using the manufacturer’s cycle (**Figure 6**). Higher firing veneer materials, such as VM9 also have thermal conductivity close to that of the zirconia that allows for densification and decreased stress during the firing cycle.

However, in general, it is important to slow cool and to adjust the sintering cycle relative to the zirconia thickness

and mass. A thicker framework requires a slower heat rate as well as an increased peak temperature to fully densify the veneer porcelain.¹⁵ This is particularly true of low fusing veneer materials that demonstrated the highest chipping using a standard manufacturer recommended cycle.¹⁶

In summary, zirconia is no longer a single material that can be used anywhere in the mouth. Careful attention must be paid to the composition as more variations are released to the marketplace. While gradations in chroma within a single block do not affect mechanical properties, gradations in translucency/yttria content may not provide the expected mechanical properties and should be used with caution until their clinical behavior is fully proven. 

About the Author:

Dr. Russell Giordano received specialty training in prosthodontics at Harvard School of Dental Medicine and performed research at the Ceramics Processing Research Laboratory at the Massachusetts Institute of Technology leading to a D.M.Sc. degree in 1991 and a Certificate in Prosthodontics. Dr. Giordano's research involved novel ceramics processing techniques as well as analysis of stress developed during finishing procedures. His research paper won the Arthur R. Frechette Award presented by International Association of Dental Research Prosthodontic Group. Before being appointed at Boston University, Dr. Giordano was an Instructor at Harvard in the Department of Prosthodontics where he served as Associate Director of Complete Denture Prosthodontics and Course Director of Dental Materials.

TABLE 8.

Full Thickness Flexural Strength of Translucency Graded and 3Y Zirconia

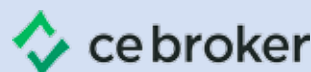
Material	Mean Flexural Strength (MPa)
Zircad Prime, 3 Layers	800
Axzir, 6 Layers	620
Cercon, 3Y NON -Layered	1100

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The Key to Finishing Zirconia Restorations in the Green State: SIMPLICITY

This Tech Tip has to do with finishing zirconia in the green state. I have found in talking with technicians that they all have a better way. But, the one thing that I have learned in during 40 years as a dental technician is the need for simplicity. The objective becomes, how do I achieve the result that I am looking for with the least number of tools? I like to think that I am establishing a specific protocol for every task. So the following is my general protocol for finishing zirconia in the green state. Of course, depending on the case, this may vary.

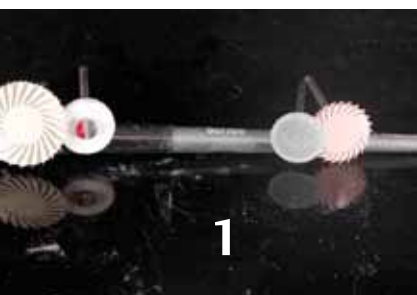


Figure 1 shows the five tools I use. From left to right, they are a gray twisty (DT6125-250-1), a white rubber wheel (G4), a mounted flexible green disc (GSW-3), and a red twisty (DT6209-170-1) from Cardinal Rotary and in the background, is a MPF scribe from U.S. Dental Depot.

I begin after the restorations have been removed from the puck. I prefer to use a carbide (SHP) at slow speed. Using air, gently blow all zirconia dust from the inside and outside of the restoration. If you do not, the dust will discolor the restoration after sintering and it is very difficult to remove afterwards.

Using the white rubber wheel, remove and smooth the sprues that connected the restoration to the puck. I have found that the white rubber wheel is not suited for refining the surface of the crown because it is too coarse and leaves scratches. If you are refining a crown with contacts, the contacts are often lost because the white rubber wheel reduces drastically.

I will be focusing on finishing an anterior case, because these are the cases that cause the most concern. Finishing posteriors may be the subject of another Tech Tip.

Begin with a blue/red pencil. Draw the line angles, developmental grooves, dentin wear, etc. Begin the refinements with the mounted flexible green disc. It is difficult for some of the mills to make adequate interproximal embrasures. The green disc does a





beautiful job of separating the teeth and smoothing the interproximal surface. I do not use a diamond disc.


The scribe has become an indispensable part of my everyday work. It has so many applications. It exemplifies simplicity. With a scribe, draw characterization such as perikymata, incisal dentin wear, fracture lines, etc.

The fear may be that the marks from the scribe will be too sharp, but that problem is overcome by using the mounted twistys. The twistys come in different grades of coarseness. Red is medium coarse. For my purposes, it is adequate. With this wheel, I make sure to smoothen the scribe marks. Keeping the final restoration in mind will help you judge how extensively to use the red twisty. Also, keep in mind when using the red twisty that even though it will not make gross adjustments, it will remove material. Take care with proximal surfaces.



Probably the greatest feature of the red twisty is that it does a great job in finishing margins in the green state.

Finally, I use the gray twisty. Its purpose is to give the restoration a smooth, polished appearance after sintering. The gray twisty removes very little material, so it is safe to use on all surfaces. **Figure 5** shows the bridge straight from the sintering oven.

Now use whatever method you use to prepare for stain and glaze. 

About the Author:

Bart Cothran, CDT, is a seasoned lab professional with 43 years of experience, 28 of those years spent as a lab owner. A respected high-end ceramist, Bart is a hands-on trainer for gingival composites and Celtra Ceram. Bart is a member of the FDLA and NADL, and a graduate of Florida Technology University.

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Florida Legislature Passes Authorization for Chairside Services

The Florida Legislature approved legislation that provides the authorization of dental laboratory technicians to be onsite for chairside services during dental procedures. This is the first language of its kind in the U.S. and takes into account that dentists are seeking the dental laboratory technician to be onsite for complex cases, such as full mouth

reconstructions and training of Intraoral Scanning Systems, etc. The language is heading to the desk of Governor Ron DeSantis with the passage of House Bill 713 on Friday, March 13, 2020. House Bill 713 and its companion, Senate Bill 230, were sponsored by Representative Ana Maria Rodriguez, R- Parts of Broward, Collier and Miami-Dade, and Senator Gayle Harrell, R-Stuart.

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SBA Disaster Assistance Available for Florida Small Businesses Impacted by Coronavirus

For small businesses, small agricultural cooperatives, small businesses engaged in aquaculture and most private nonprofit organizations, the SBA is offering Economic Injury Disaster Loans to help meet working capital needs caused by the Coronavirus.

All 67 Florida counties are included in the disaster declaration for Coronavirus.

SBA Resource Partners information can be obtained on the SBA website at www.sba.gov/local-assistance/find/.

SBA Economic Injury Disaster Loans offer up to \$2 million in economic assistance to help small businesses overcome the temporary loss of revenue resulting from the disaster. These loans may be used to pay fixed debts, payroll, accounts payable and other bills that can't be paid because of the disaster's impact.

Interest rates offered are as low as 3.75 percent for businesses without credit available elsewhere; businesses with credit available elsewhere are not eligible. The interest rate for non-profits is 2.75%.

To apply, visit the SBA Disaster website at <https://disasterloan.sba.gov/ela/>.

For additional information, please contact the SBA Disaster Assistance Customer Service Center. Call 1-800-659-2955

(TTY: 1-800-877-8339) or e-mail disastercustomerservice@sba.gov

HR Resource available through Seay Management Consultants

As a valued association member of the FDIA, you have access to a complimentary HR & Employment Hotline provided by our partner, Seay Management Consultants.

While specific guidance for employers on how to navigate the spread of the coronavirus (COVID-19) is challenging with the evolving situation, Seay Management Consultants are able to remind employers that there is still a lot of autonomy to create new policies and procedures (i.e. allowing/ requiring employees to stay home). Toll Free: 888-245-6272

Reemployment Assistance Resources through the Florida Department of Economic Opportunity

If your employees have been negatively impacted as a result of the mitigation efforts in Florida to stop the spread of COVID-19, they may be eligible to receive reemployment assistance through the Florida Department of Economic Opportunity. The Reemployment Assistance (RA) program provides temporary, partial wage replacement benefits to qualified workers who are unemployed through no fault of their own. It is funded solely by employers who pay federal and state payroll taxes and is provided at no cost to the workers who receive the benefits. <http://www.floridajobs.org/Reemployment-Assistance-Service-Center/reemployment-assistance/claimants/apply-for-benefits>

Temporary Layoff Program

The Florida Department of Economic Opportunity's Temporary Layoff program is for employees that are temporarily laid off from work. A temporary layoff occurs when the employee is separated from their job due to lack of work and the employee has a return-to-work date within eight weeks of the separation.

<http://www.floridajobs.org/Reemployment-Assistance-Service-Center/reemployment-assistance/employers/temporary-layoff>

Foundation for Dental Laboratory Technology Makes All Online Courses Free Through May 31, 2020

The Foundation for Dental Laboratory Technology, a 501(c)(3), not-for-profit educational foundation, dedicated to furthering dental laboratory technology education, is announcing that it is making all of its Foundation Learning Library courses available to the dental laboratory community at no charge through May 31, 2020. The Foundation Learning Library offers almost 100 on-demand courses, available 24/7/365, covering topics such as occlusion, esthetics, implants, sleep apnea, digital dentures, CAD/CAM, 3D printing and much more. Most courses are approved through the National Board for Certification in Dental Laboratory Technology for CDT/RG credits and courses are available to stream for 90 days once purchased.

Use coupon code DLTFoundation at checkout through May, 31, 2020 to access all online courses for free through the Foundation Learning Library at www.dentallabfoundation.org/courses.

Questions? Visit the Foundation for Dental Laboratory website at www.dentallabfoundation.org or contact The Foundation at (866) 627-3990 or email foundation@dentallabfoundation.org.



CDT Continuing Education Requirements for 2020 Renewals

Given the developments of COVID-19, NBC is extending the grace period for CDTs and RGs to complete their continuing education to 90-days from a CDTs renewal deadline. This provides an additional three months beyond a CDTs or RGs given deadline to complete all continuing education requirements.

For example, CDTs and RGs, whose deadlines to renew are March 31, 2020, should renew as they normally do by the deadline of March 31, 2020. NBC will grant a 90-day grace period for CDTs and RGs, whose deadlines to renew are March 31, 2020, to get their remaining credits to NBC, giving them until June 30, 2020 to submit their continuing education.

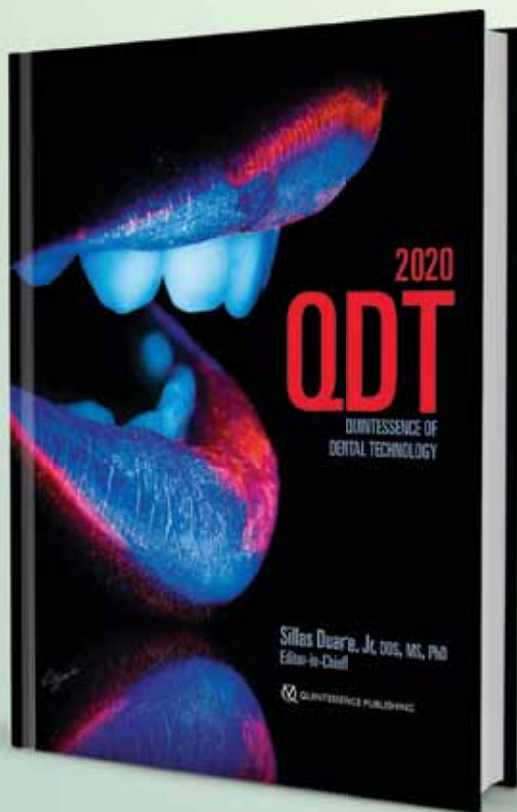
This 90-day continuing education extension is being extended to all CDTs and RGs through the remainder of 2020. Additionally, any CDTs that need additional time to obtain their continuing education requirements beyond this initial 90-day grace period can contact NBC to discuss individual circumstances and receive an additional extension.

Questions regarding CDT Renewals and Continuing Education can be emailed to certification@nbccert.org or you can contact the NBC office by calling 1-800-684-5310.



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QUINTESSENCE OF DENTAL TECHNOLOGY 2020

Editor: Sillas Duarte, Jr

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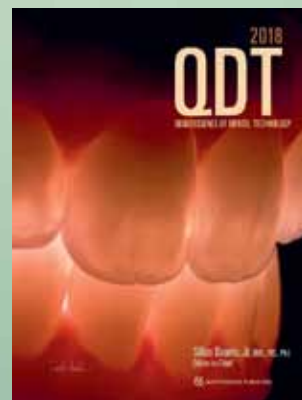
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The Final Touch

Recently, we sat down with Edward McLaren, DDS, MDC, to talk about bonds between dentists and laboratory technicians as well as what excites him most about the future of dentistry. With decades of experience in the dental community, he always brings an interesting take on that special relationship between dentists, technicians and patients.



*The absolute
next
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is going to
be in 3D
printing
with layered
colored
technology.*

As a prosthodontist and master dental ceramist, you get to see our industry from both perspectives. How has being a ceramist influenced you as a prosthodontist and vice versa?

I ran two programs at UCLA, one for ceramists and one for dentists. I started them in 1999 and saw a huge benefit to having ceramists (take) a prep and design course that a dentist would take and vice versa. Once the person walks in the other person's shoes, they understand that person better. Technicians have such a difficult time sharing with a dentist because they're afraid of losing an account.

What is going on in dentistry today that has you most excited?

I love the regenerative aspect of what we can do with implants and bone augmentation. I love the concepts of improvement in ceramics. I love the concepts of being able to print. I love the evolution of 3D printing. I have a hard time delegating. I just like doing everything myself. What I'm excited about is the improvement of 3D printing so I can delegate model making and

concentrate on the things I like doing the most. Also, I like what I'm seeing with the changes in zirconia and the translucency of it.

What do you think is going to be the next big development in dental laboratory technology?

I think you'll see improvements in all of those areas. The absolute next revolution is going to be in 3D printing with layered colored technology. Another thing is the next generation of 3D printers that will have the same resolution as a type-4 dental stone. Then we'd be able to eliminate dental stone.

If you could change one thing about how dentists and dental technicians interact, what would it be and why?

The most important person on the dental team is the dental technician/dental ceramist. Really, the technician is the one who helps the dentist the most. Everyone sees their work in the mouth. Dentists see the lab as part of their overhead that they need to cut. They don't see an orthodontist that way. The more dentists look at technicians as their partners in treatment, the better off it's going to be. ❶

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