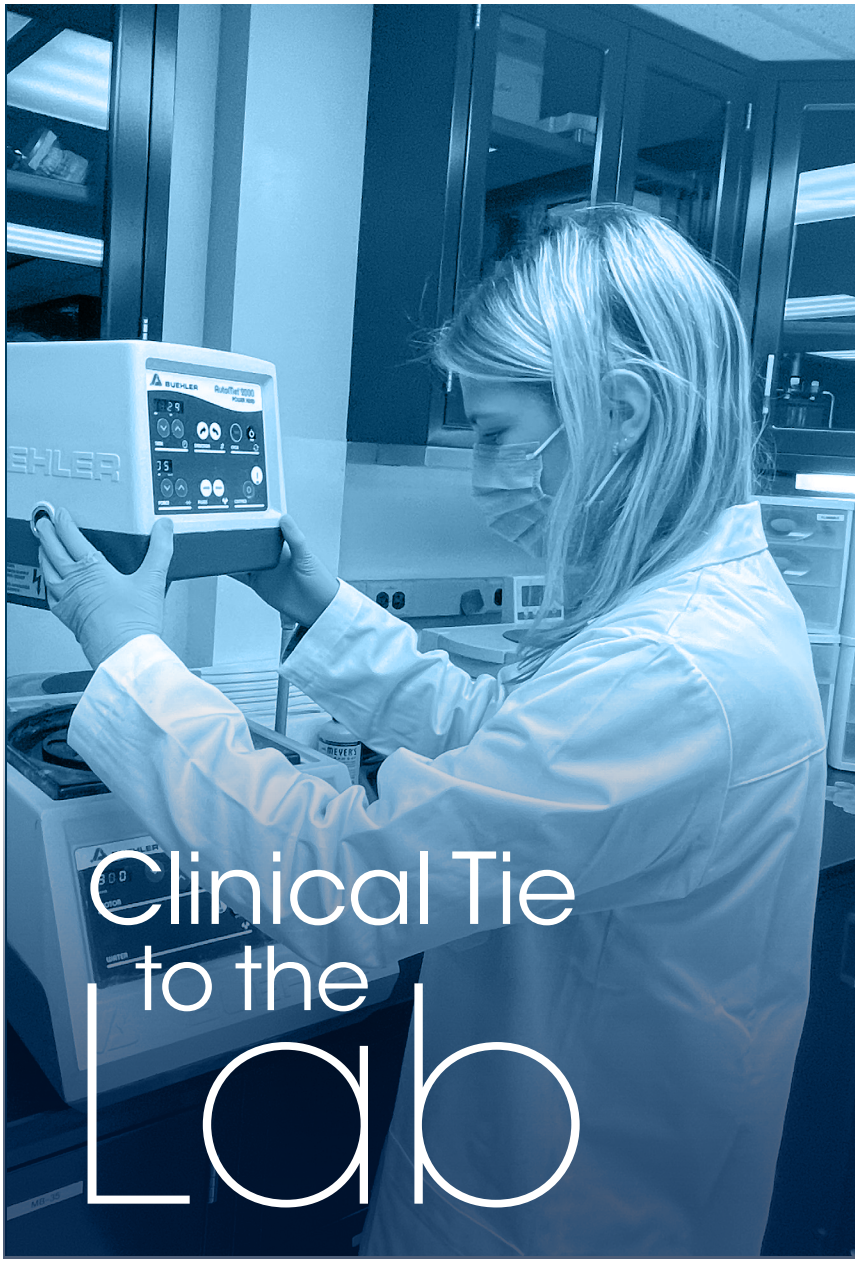
SEPT-OCT 2022
Vol. 39, No. 05

DENTAL ADVISOR™

Product insights you can trust.



Clinical Tie to the Lab

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SEPT-OCT, 2022
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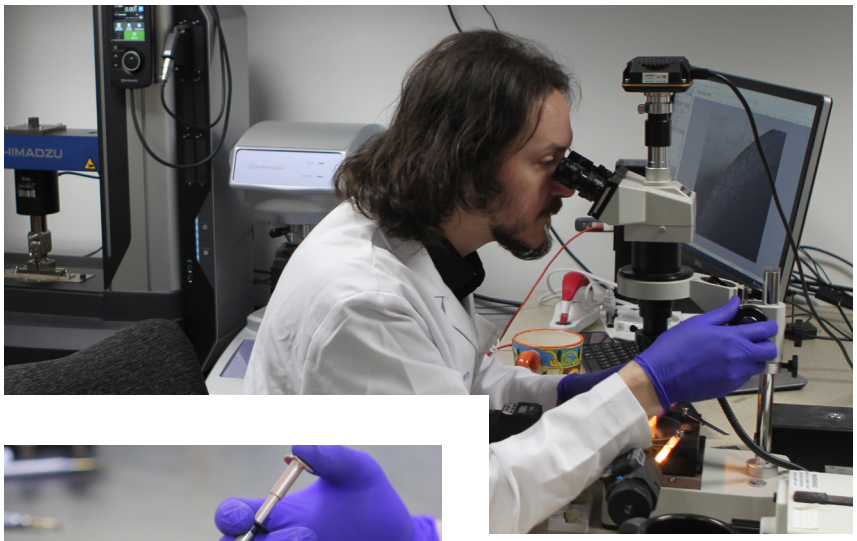
FROM THE DESK OF
Dr. Sabiha S. Bunek
CEO & Editor-in-Chief

Prior to incorporating any dental materials or equipment into your practice, every dental professional needs to see the relevant scientific evidence and clinical validation. In this issue, we will give the behind the scenes look at the various types of biomaterials and microbiology testing conducted by DENTAL ADVISOR, and what it means for your clinical practice. You may come across some surprising finds, but more importantly, you will gain confidence in knowing the importance of the scientific testing that's accomplished to validate these quality materials and equipment. As always, we thank you for reading, and we welcome you to reach out to us with any questions at connect@dentaladvisor.com, or to me personally at drbunek@dentaladvisor.com.

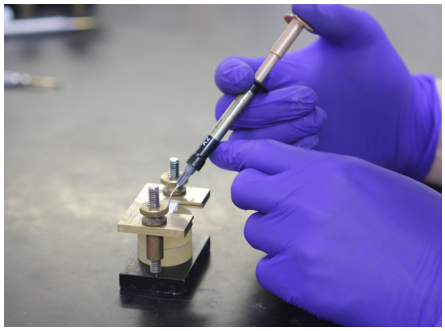
— Sabiha S. Bunek

Example of laboratory testing



Assessing machining damage of a standardized crown

Counting colony forming units (CFU)



ISO 29022 bond strength testing

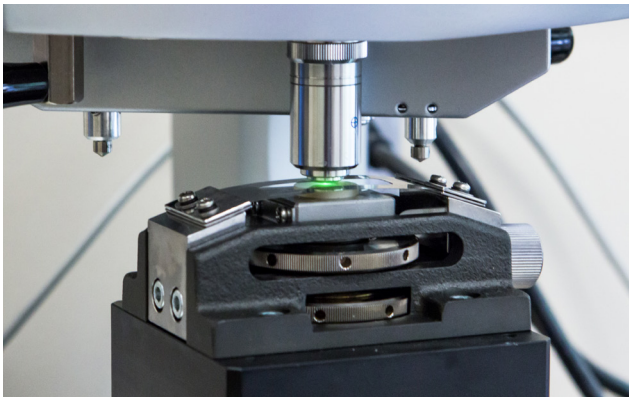
Measuring consistency of impression material

ATP sampling on disinfected surfaces

Please send inquiries and address changes to:

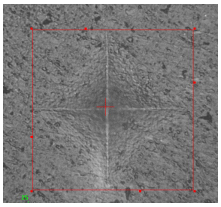
DENTAL ADVISOR
Ann Arbor, MI 48103
Call: 800.347.1330 - 734.665.2020
Fax: 734.665.1648
Email: connect@dentaladvisor.com
Website: dentaladvisor.com

Lab metric: What it means and why is it important?



Shimadzu Vickers Hardness Tester

HARDNESS TESTING:

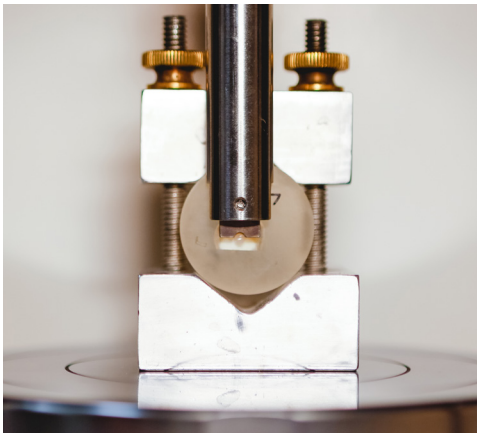


Square indent created by Vickers indenter

What it does: Hardness can be measured with different indenters. The Vickers indenter has a pyramidal shape which creates a square indent. The Knoop indenter has a rhombohedral shape which creates a long diamond indent. The indenter is pressed into the material using a set load. The hardness of the material is then calculated based on the size of the indent that was created with the given load.

Clinical Relevance: Hardness of materials is correlated to several properties, such as the wear of restoratives and the polymerization of light-cured materials. This can indicate which materials can be used on occlusal surfaces.

Research Report: *Comparison of Important Properties of Ecosite Bulk-Fill and Competitive Materials (October 2018)*



BOND STRENGTH:

What it does: Bond strength measures the force needed to seperate a material from a substrate which assesses the strength of adhesion. Testing is most commonly performed in the shear or tensile mode, with many different variations performed globally.

Clinical Relevance: Bond strength testing is a useful way of screening adhesive systems for compatibility with different combinations of materials. Testing can also be combined with accelerated aging (most commonly thermocycling) or long-term storage to assess the durability of the adhesive system. An important consideration when reading bond strength results from different sources is that the test methods often vary, which can change the scale of the results (the same material may be 60 MPa in one method and 25 MPa in another).

Research Report: *Bond Strength of G2-BOND Universal (March 2022)*

CURING LIGHT TESTING:

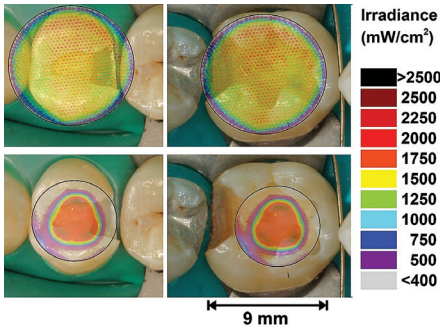
Beam profile: A curing light's beam profile shows the intensity of the light, the diameter of the effective curing area and the uniformity of the beam. This can also be used to measure the effective curing intensity at a distance.

Clinical Relevance: The width of the effective beam diameter doesn't necessarily equate to the apparent size of the lens or outer casing. Care should be taken to cover the entire restoration, with overlapping exposures if necessary.

Emission Spectra and Power: Since the photoinitators used in dental resins only respond to specific wavelengths of light, it is important to measure and report the wavelengths of light emitted by the curing light. These wavelengths and total power from the curing light are measured with a spectrophotometer.

Clinical Relevance: Clinicians can use this data to determine the relevant power exposure for their light and material combination. Each composite, and even variations of shade can change how much light each composite requires for sufficient polymerization, with ranges from 8 J/cm^2 to 24 J/cm^2 of energy required.

Research Report: *Comparative Curing and Thermal Properties of Demi Ultra LED Curing Light (February 2014)*



Beam profiles from two curing lights over a premolar and molar tooth.

Dr. Richard Price recently visited DENTAL ADVISOR to show us his methods of examining curing light performance. We recorded a lecture and podcast which can be found on our website.

Clinical Tie to the Lab

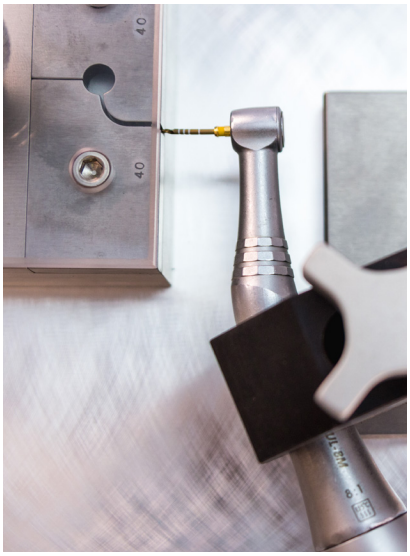
Rhopoint Novo-Curve Glossmeter

GLOSS:

What it does: Gloss measures the specular reflection (shiny appearance) of the surfaces of materials. This property generally relates to the smoothness of the surface finish or coating. Gloss can be measured to determine how long a material or polishing instrument takes to achieve a sufficient gloss. Gloss can also be used to measure the degradation of the surface after wear testing or exposure to acids such as soda.

Clinical Relevance: Gloss is primarily used to measure the polishing characteristics of materials which is an important aesthetic property in dentistry. Gloss is also directly correlated with the surface roughness of a material which can impact the material's bacterial adhesion and propensity to stain.

Research Report: *Laboratory Evaluation of FIT SA/Shofu Dental (November 2019)*



CYCLIC FATIGUE

What it does: Cyclic fatigue measures the longevity of an endodontic file while being held in a curved canal, which concentrates tensile and compressive forces at a single area of the file.

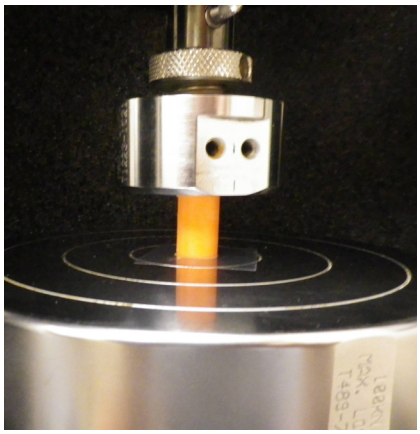
Clinicial Relevance: Cyclic fatigue is one of the most important properties for assessing the lifetime and reliability of an endodontic file. Newer heat treatment techniques of files have drastically improved the lifetime of file systems while reducing file seperation.

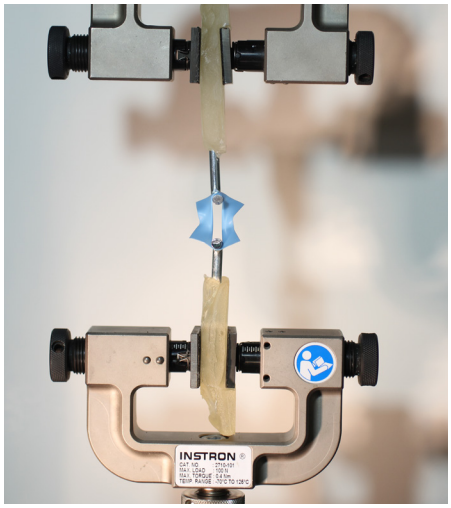
Research Report: *Multiple Property Comparison of NiTi Endodontic Files (April 2018)*

IMPRESSION ELASTIC RECOVERY AND STRAIN IN COMPRESSION

What it does: Elastic recovery measures an impression material's ability to bounce back to its original formed position after a load has been applied. Strain in compression testing measures an impression material's resistance to deform once a load has been applied.

Clinical Relevance: These are important properties to ensure that an impression is still accurate once it has set. Impressions have the potential to deform while removing the impression tray from the patient's mouth, from general handling, and during model pouring.





TEAR STRENGTH:

What it does: Tear strength measures a material's resistance to tearing. This testing is commonly used for impression materials and dental dams.

Clinical Relevance: If tear resistance is low, the impression material will tear when removing it from the mouth or when seperating it from models. Similarly, dental dams may tear when stretching during placement. It is always important to check the impression integrity before the patient leaves, so they do not have to return for a reimpression.

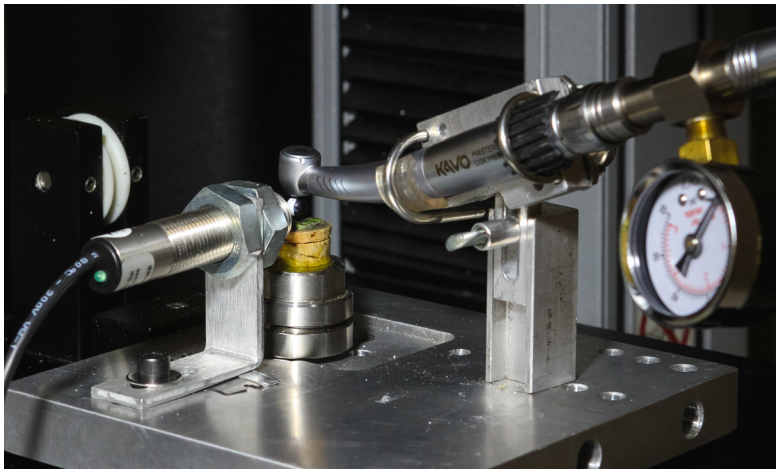
Research Report: *Non-Latex Dental Dam Tear Testing Comparison for Isodam (4D Rubber) (August 2020)*

HANDPIECE PERFORMANCE *(TORQUE & SPEED)*

What it does: Handpiece performance can be measured for both air and electric handpieces by measuring the torque and speed (RPM) while applying various loads to measure the full range of the torque vs speed curve.

Clinical Relevance: The cutting rate achieved with handpieces is a combination of the peak power the handpiece is capable of and the cutting instrument being used. The peak cutting rate of air-driven handpieces is generally achieved at around half of the full RPM and is usually reported as the Power in Watts (W). For the clinician, higher power usually means a larger head which can impede visibility. However, a higher RPM usually indicates a more noisy handpiece.

Research Report: *HVHA RH-Pro 11 Sterilization Effect on Handpiece Performance (January 2020)*



FLEXURAL STRENGTH AND MODULUS:

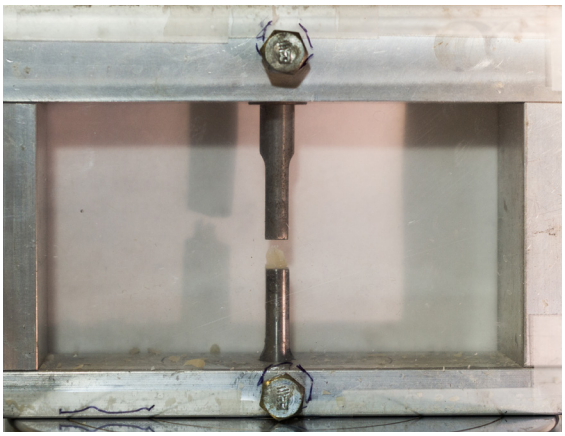
What it does: Flexural strength measures the stress (force over area) that materials can withstand before breaking while bending. Flexural modulus measures the stiffness of the material by measuring how much the material bends while a load is applied.

Clinical Relevance: Flexural strength testing is a way to compare all restorative materials by measuring how much force can be absorbed as the material flexes from mastication or impact. This is critically important for stress bearing areas like posterior restorations. The modulus or stiffness of the material is related to how much give the material has on occlusal forces. A higher modulus is usually desirable for occlusal surfaces. Lower modulus materials are ideal for cavity liners and class V restorations in particular, but a low modulus won't necessarily preclude a material from being used in other indications based on the other properties.

Research Report: *Milling Evaluation of Amber Mill® (November 2021)*

Instron 5866

Instron Biaxial Flexural Strength Device



COMPRESSIVE STRENGTH:

What it does: Compressive strength measures the maximum stress a material can withstand while being compressed before breaking.

Clinical Relevance: This property is important for restoratives in regards to occlusal forces, especially in posterior regions, as well as load bearing restoratives such as core materials. This is also measured for other materials, such as dental stone, as the material must be strong enough to resist compressive forces when flasking and making models.

Research Report: *Laboratory Evaluation of BRILLIANT EverGlow (August 2021)*

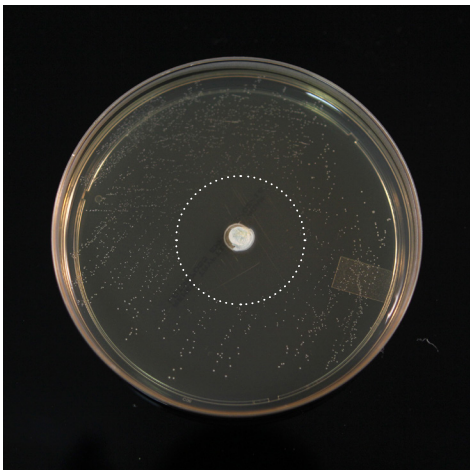
Clinical Tie to the Lab

MASK FIT- QUANTITATIVE & QUALITATIVE:

What it does: The quantitative mask fit testing measures the fit capability of a negative-pressure half-facepiece respirator or mask to a voluntary standard. The qualitative mask fit testing uses a pass/fail method that relies on using one's sense of smell to determine if a respirator or mask fits properly.

Clinical Relevance: Dental professionals need to have fit testing done yearly to ensure that the respirator and/or mask they are wearing during clinical procedures fits them appropriately. Wearing a respirator or mask that is sealed to the face and passes the standard for fit capability helps to ensure a high level of safety for both the dental professional and the patient.

Research Report: *Fit Capability of Differing N95 Duckbill Surgical Respirators in Relation to NIOSH Standard Face Sizes and Shapes (March 2022)*



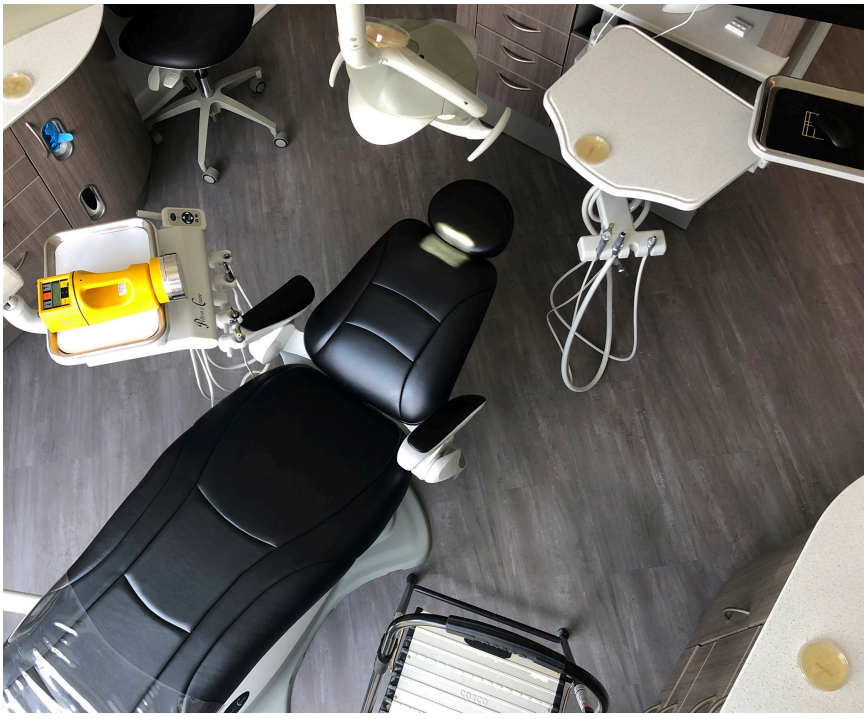
Zone of inhibition (outlined) created by each test substance when challenged to S. mutans.

ZONE OF INHIBITION

What it does: Testing the zone of inhibition for any antibacterial product, typically desensitizers and cavity cleansers, allows for a measurement of antimicrobial activity to be found and assessed.

Clinical Relevance: Areas within the mouth in need of desensitizing or cavity cleansing tend to be vulnerable to oral bacteria. Utilizing a product with sufficient antimicrobial properties can help prevent source infections.

Research Report: *Zone of Inhibition Test Against Three Desensitizers (May 2019)*



AEROSOL & SPATTER REDUCTION

What it does: This form of testing assesses the aerosol and spatter reduction abilities of various devices including barriers, intra-oral suctions, and external suctions.

Clinical Relevance: Many dental procedures emit high levels of aerosols and spatter. Bacteria and viruses are known to travel via aerosols floating in the air. Using specific equipment and accessories to reduce the load of aerosols and spatter created during an aerosol generating procedure can create a safer environment for both the dental professional and the patient.

Research Report: *Bacterial Reduction Efficacy of Nederman FX2 (February 2021)*

DISINFECTANT & ENVIRONMENTAL WETNESS EFFICACY:

What it does: Evaluates the ability of a surface disinfectant to clean and kill representative bacteria on contaminated surfaces. This test also ensures that the surface being disinfected remains wet long enough to activate the appropriate bacterial kill time for the disinfectant.

Clinical Relevance: Cleaning and disinfecting takes place between patients to reduce the spread of harmful bacteria and viruses. It is critical to know that the disinfectant being used for various surfaces within the operatory is working as it should when the appropriate directions are followed.

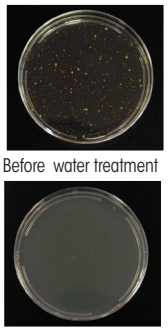
Research Report: *Optim 1 Cleaning and Disinfection Surface Investigation (July 2018)*

WATERLINE TREATMENT EFFICACY

What it does: Evaluates the cleaning efficacy of varying waterline treatments that are used in dental waterlines. This testing can also validate water testing kits used in the office.

Clinical Relevance: Maintaining clean waterlines is neccessary to ensure that the water being used in a patient's mouth is clean and free of harmful contaminants. Having clean waterlines also supports the connected dental equipment (handpieces, scalers, water syringe, etc.) to continue to run smoothly.

Research Report: *Crosstex Dentapure Dental Waterlines Study (December 2013)*



Before water treatment

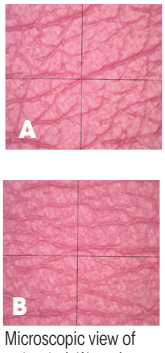
After water treatment

LONG-TERM EXPOSURE ON UPHOLSTERY

What it does: Replicates long-term exposure of any disinfectant on typical upholstery materials used for the patient chair in an operatory.

Clinical Relevance: Some disinfectants have been found to cause damage and/or color changes to upholstery materials and other surfaces when used consistently over a long period of time. Determining that a disinfectant is safe to use on various materials and surfaces within an operatory can save materials and equipment from exposure damage.

Research Report: *Effect of Accelerated 5-Year Exposure to Monarch Disinfectant Wipes on Tensile Properties of Dental Chair Fabrics (October 2016)*



Microscopic view of untreated (A) and treated upholstery (B) in Monarch Disinfectant Wipes study.

iBond® Universal

Kulzer www.kulzer.com

DENTAL ADVISOR +++++

38 CLINICAL EVALUATORS

1000 TOTAL USES

98% CLINICAL RATING

Key features: Universal bonding agent ● One-bottle system

Description

iBond Universal is a universal, light-curing adhesive that:

- Has a unique moisture control system for dentin penetration
- Is an acetone base which quickly evaporates water making this material easier to air dry, reduces technique sensitivity and supports a homogeneous bonding layer
- Is a versatile universal material
- Does not require dual-cure activator
- Can be used in self-etch, total-etch, or selective etch modes
- Has an exclusive drop control bottle

Indications

- Bonding of direct restorations for all cavity classes using light-curing, dual-curing or self-curing methacrylate-based composites/compomers.
- Bonding of light-curing, dual-curing or self-curing core build-up materials.
- Sealing of hypersensitive tooth areas.
- Bonding of fissure sealants.
- Sealing of cavities and core preparations prior to temporary cementation of indirect restorations (according to the immediate dentin sealing technique).
- Cementation of indirect restorations with light-curing, dual-curing or self-curing adhesive resin cements.
- Sealing of cavities prior to amalgam restorations.

Unique Attributes

- Many evaluators commented on the lack of sensitivity they experienced with this material.
- Color of the material was near clear, making it more versatile as there was no concern when placing restorations in the esthetic zone.

Clinical Tip

- A ceramic primer is necessary for repairs and when using for indirect restorations

"EASY TO USE, ONE BOTTLE SYSTEM AND NO POST-OP SENSITIVITY."

Evaluators' Comments

"Spread so thinly and evenly."

"I liked the lack of residual color."

"Excellent dispensing."

"Variety of uses in one adhesive."

"Wets the tooth surface well."

"The application was faster and easier because the film thickness and viscosity were thinner than my current bond. The excess was also easier to thin out and remove."

"10-second curing time is great."

Consultants who would:

92% Recommend to a colleague

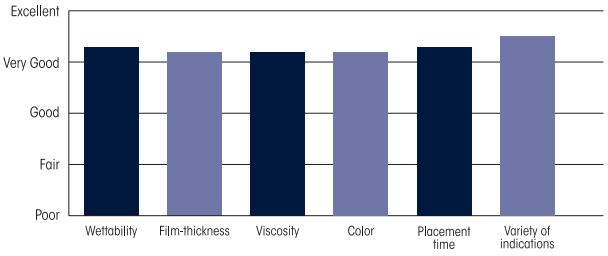
Consultants who would want to stock in office:

29% Yes, instead of current product

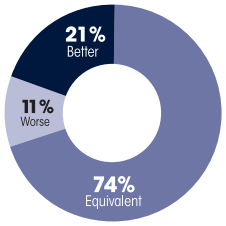
47% Yes, in addition to current product

13% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



Bulk EZ® PLUS

Zest Dental Solutions www.Zestdental.com

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DENTAL ADVISOR ++++

44 CLINICAL EVALUATORS

979 TOTAL USES

86% CLINICAL RATING

Key features: Bulk-fill flowable composite ● Dual-cured ● Unlimited depth of cure

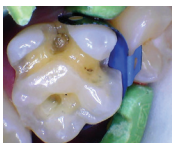
Description

Bulk EZ® PLUS is a dual-cured, bulk-fill flowable composite:

- Unlimited depth of cure
- Enhanced esthetics
- Single-layer application, no capping layer required
- High radiopacity
- No intermittent light-curing
- No dual-cure activator or primers needed

Indications

- Direct restorations (ideally Class I and Class II)
- Cavity liner
- Core build-up
- Provisional crown fabrication and post cementation



— Photos courtesy of Dr. James Johnson

Unique Attributes

- A big plus with this material is that a dual-cure activator is not required with your adhesives. This instills confidence that regardless of the bonding agent chosen there will be a good bond.
- The waste reducing mixing tip with the metal cannula can be adapted to reach around matrix bands in the posterior.

Clinical Tips

- The material sets quickly in the tip. If you are doing multiple restorations, it is beneficial to have multiple tips ready.
- Keep syringe in the base of prep as you extrude...using snowplow technique.
- Great for iffy spots that the curing light may not be able to properly reach.

"NO CAPPING LAYER NEEDED AND UNLIMITED DEPTH OF CURE MAKES THIS A VERY VERSATILE MATERIAL."

Evaluators' Comments

*"**Bulk EZ® PLUS** was handy in a case where isolation was hard to achieve - quick and easy placement of **Bulk EZ® PLUS** made it a perfect restoration."*

*"Easy placement with less steps. **Bulk EZ® PLUS** has been an amazing addition to our composite armamentarium."*

"So nice to know composite is completely cured with the dual-cure. That is always a question with deep light-cured bulk fill composites."

"This is my go-to product to restore deep interproximal restorations. Great for geriatric root caries too."

"Saves time by being able to flow material into the prep in larger increments."

"I felt like the long tip wasted a lot of material."

"Would prefer it to be a little less viscous."

Consultants who would:

83% Recommend to a colleague

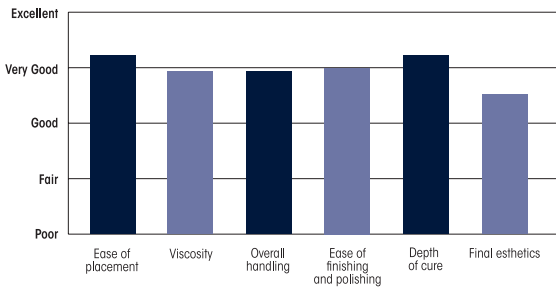
Consultants who would want to stock in office:

24% Yes, instead of current product

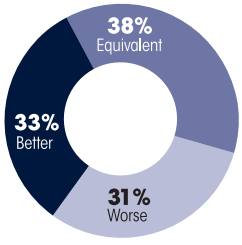
52% Yes, in addition to current product

12% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



Sleep Image Ring powered by VivoScore

Vivos www.vivos.com

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DENTAL ADVISOR ++++

26 CLINICAL EVALUATORS

151 TOTAL USES

86% CLINICAL RATING

Key features: Home evaluation system for sleep disorders.

Description

Sleep Image Ring powered by VivoScore is a sleep evaluation tool which is:

- FDA cleared
- A home testing device without the need for invasive wires or need to go to a testing facility
- Clinically accurate
- Small and comfortable

Indications

FDA approved for :

- Determining sleep quality
- Measuring sleep duration
- Evaluating sleep disorders
- Tracking sleep-disorder treatment

Unique Attributes

- This product utilizes an app that the patient downloads on their phone long with the use of a compact and comfortable device worn on the finger like a ring to track sleep diagnostics.
- The VivoScore sleep ring is one part of a customizable program offered by Vivos that can incorporate the fabrication of dental appliances.
- A report is generated for the provider that can be easily accessed from an online portal. This can be used as a diagnostic tool in office or can be sent for a reading from a certified sleep physician.

Clinical Tips

- Have a person in the office load the app and test the ring before patient leaves. Also have a contact number available for the patient in case there are questions.
- Make sure to tell the patient not close the app on their device, otherwise the recording will not record.

"THE RING IS CONVENIENT AND EASY FOR THE PATIENT TO USE."

Evaluators' Comments

"I liked that patients can do this at home as opposed to going in for an initial sleep study at a clinic."

"Patients were generally excited to try this product. I can see it being very useful in my practice."

"The information returned is useful for patient education and discussing treatment options."

"Having a piece of technology that is given to patients and hoping they use it correctly is a bit of a liability, but the Ring is fairly robust and resilient."

"Love the fact that it synchronizes with an app that can be downloaded to Android or iOS for increased versatility."

"Easy to use the ring and compliance is high, people like the modern tech (similar to smart watch/smart rings)."

"It was nice to test patients with an OMAD in place to see how effective they are. Proof that the prescribed devices are working."

Consultants who would:

68% Recommend to a colleague

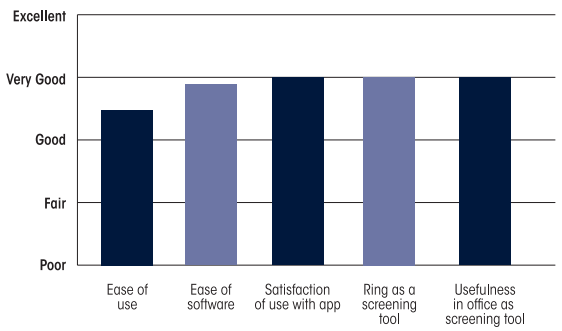
Consultants who would want to stock in office:

27% Yes, instead of current product

18% Yes, in addition to current product

27% I might want to order this product for certain cases

Evaluation Summary:



G-aenial® A'CHORD

GC America gcamerica.com

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DENTAL ADVISOR ++++½

33 CLINICAL EVALUATORS

723 TOTAL USES

94% CLINICAL RATING

Key features: Universal composite ● Simplified shade system ● Esthetic filler system

Description

G-aenial® A'CHORD is a simplified unishade universal composite:

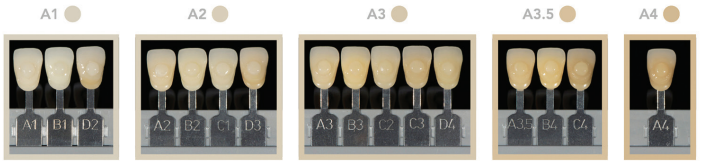
- 5 core shades to cover the spectrum of the 16 classic Vita shades.
- Unique filler technology that mimics natural light reflection.
- Non-sticky Bis-MEPP monomer and optimized filler-monomer combination to improve handling.
- Uniform nanofiller distribution and high filler load for exceptional polishing.
- Offer an extended portfolio of cervical, opaque, enamel, and bleach shades to further customize the esthetics.

Indications

- Direct restorative for Class I, II, III, IV and V cavities.
- Direct restorative for wedge-shaped defects and root surface cavities.
- Direct restorative for veneers and diastema closure.

Unique Attributes

- Simplified shade system of 5 core shades.
- Natural looking results.
- Natural fluorescence.



Clinical Tip

- Have the outline of the shade system on hand for reference to determine what shade or combination of shades you need.

"CREATES INVISIBLE RESTORATIONS."

Evaluators' Comments

"I redid anterior bonding on a bride to be and she said she couldn't tell that it was even filling material."

"Excellent composite that should be in every dentist's restorative tool kit."

"Excellent handling with predictable shade matching and esthetics."

"I really liked the handling and sculptability of the composite. It was firm yet very pliable and could spread it with a light brush like stroke."

*"In anterior situations where I would otherwise have to layer different shades, **G-aenial® A'CHORD** blended closely."*

"I felt like this was a firm material."

Consultants who would:

83% Recommend to a colleague

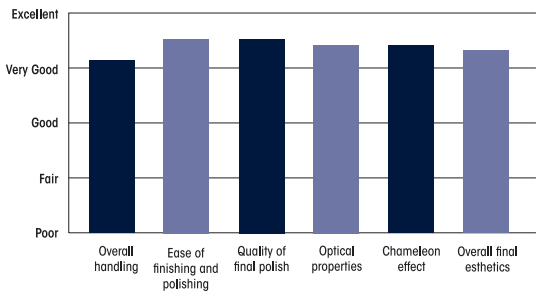
Consultants who would want to stock in office:

7% Yes, instead of current product

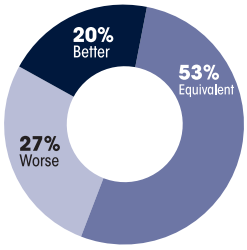
63% Yes, in addition to current product

20% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



VivaStyle LED Whitening System

voclar www.ivoclar.com

++++

DENTAL ADVISOR ++++

7 CLINICAL EVALUATORS

67 TOTAL USES

86% CLINICAL RATING

Key features: Take-home, professional strength whitening system
● LED activation light ● Pen application system

Description

VivaStyle LED Whitening System is a professionally distributed, take-home whitening system that:

- Has a pen applicator with soft brush for easy and precise application
- Features a tray with LED light
- Reportedly offers little to no sensitivity

Indication

- Take-home professional whitening system

Before

After

Before

After

Unique Attributes

- Whitening material is applied directly to the teeth via a soft, targeted brush applicator
- Waterproof, universally sized tray with LED light

"ZERO SENSITIVITY."

Evaluators' Comments

"The pen made it very easy to apply the material onto the teeth."

"The mouthpiece was very comfortable."

"Very pleased with the results."

"The whitening gel stayed on my teeth and little to none was ingested like other systems I've tried."

"While the dispensing pen was easy, the amount of gel dispensed was sometimes unpredictable with each turn."

"LED power button at times did not easily turn on/off."

Consultants who would:

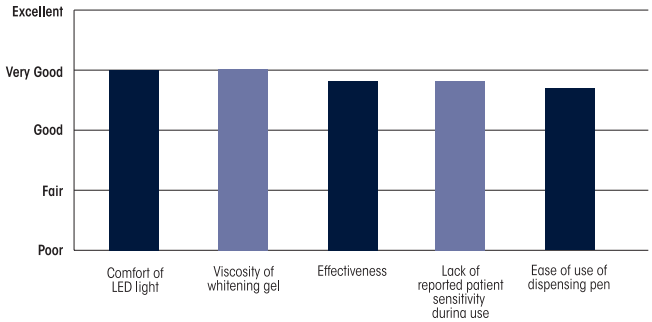
71% Recommend to a colleague

Consultants who would want to stock in office:

43% Yes, in addition to current product

29% I might want to order this product for certain cases

Evaluation Summary:



VivaStyle Whitening Strips

Ivoclar ivoclar.com

++++½

dentaladvisor.com RATING SYSTEM: Excellent +++++ Very Good ++++ Good +++

DENTAL ADVISOR ++++½

11 CLINICAL EVALUATORS

96 TOTAL USES

91% CLINICAL RATING

Key features: Whitening strips ● Professionally distributed ● Simple application ● Individual packets

Description

Vivastyle Teeth Whitening Strips:

- Offer a once per day treatment with a 30-minute wear time
- Contain 6% hydrogen peroxide strips
- 14 days of treatment

Indication

- Take-home whitening

Photos courtesy of Dr. Ona Erdt

Before

After

Photos courtesy of Dr. Anthony Valentine

Before

After

Unique Attributes

- These whitening strips adhere well to the teeth

Clinical Tip

- Make sure the teeth are not too wet prior to application

"ADHERED WELL WITHOUT SLIPPING."

Evaluators' Comments

"Comfortable to wear without need for a tray at all."

"I had a result already in a few days."

"The whitening gel started foaming, which made me feel like it was working."

"Taste was good, it seemed like it was coconut."

"Did not burn my gums."

"I did not like waiting 1 hour after to eat."

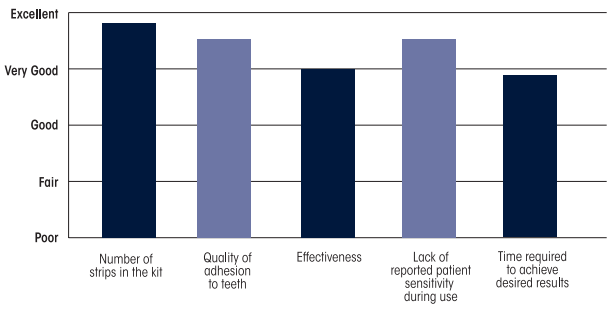
Consultants who would:

70% Recommend to a colleague

Consultants who would want to stock in office:

70% Yes, in addition to current product

Evaluation Summary:



CLINICAL EVALUATION

VivaStyle Whitening System

Ivoclar ivoclar.com

++++

DENTAL ADVISOR ++++

37 CLINICAL EVALUATORS

392 TOTAL USES

86% CLINICAL RATING

Key features: Take-home whitening ● Professional strength ● Tray whitening system with 3 steps

Description

VivaStyle Whitening System is a comprehensive professional whitening solution that is a:

- Three-step take-home tray system with:
  - A pre-procedural stain removal cleaning paste
  - Three carbamide peroxide whitening strength options
  - A post-procedural conditioning gel
- **Three whitening options are available:**
  - 16% Carbamide Peroxide
  - 22% Carbamide Peroxide
  - 32% Carbamide Peroxide

Indication

- Take-home professional whitening

Photos courtesy of Dr. Ona Erdt

Before After

32% Carbamide Peroxide

Before After

16% Carbamide Peroxide

Unique Attribute

- Three-step system to optimize results and minimize sensitivity

"NO REPORTED SENSITIVITY."

Evaluators' Comments

"I liked the post whitening gel."

"The kit presented well. It would be especially appealing if giving as a gift."

"Very effective."

"Pre-paste and post-gel had a very pleasing taste."

"Quite a few steps compared to what my patients are used to which made compliance an issue."

"Bulky packaging but it's a wow factor for patients."

Consultants who would:

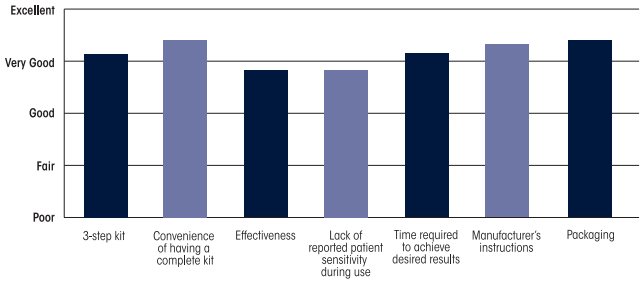
73% Recommend to a colleague

Consultants who would want to stock in office:

60% Yes, in addition to current product

13% I might want to order this product for certain cases

Evaluation Summary:



BioRoot® Flow

Septodont www.septodont.com

++++½

DENTAL ADVISOR ++++½

23 CLINICAL EVALUATORS

229 TOTAL USES

93% CLINICAL RATING

Key features: Endodontic root canal sealer ● Bioactive bioceramic ● Pre-mixed, ready to use syringe

Description

BioRoot® Flow is an endodontic sealer designed for use with any endodontic technique

- Compatible with the warm and cold techniques
- Ready-to-use syringe with easy extrusion
- Can be used directly intra-canal with 20-gauge bendable tip
- High radiopacity at 5 mm Al making it easily visible on radiographs
- High pH to limit bacterial growth
- Penetrates radicular canals by seeking residual water
- Biocompatible high purity calcium silicate
- Bioactive by releasing calcium to form hydroxyapatite

Indications

- Permanent root canal filling in combination with gutta-percha points in case of inflamed or necrotic pulp or following a retreatment procedure.

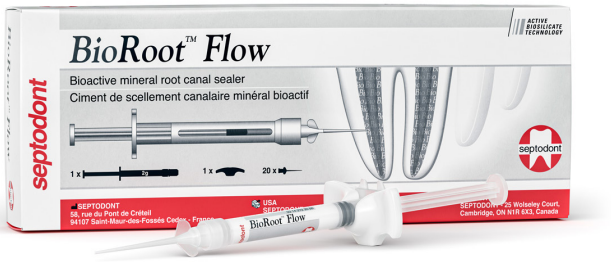
Unique Attributes

- Less force required on plunger to extrude into canals than other brands.
- Flexible 20-gauge diameter tip for intra-canal placement.

Photo: Dr. Mina Kim

Photo: Dr. Heather Cadorette

Photo: Dr. Rachna Surana



Clinical Tips

- "In addition to using the flexible tip, I also used a paper point and master cone gutta percha to get the sealer all the way into the canal."
- "I measure the tip and put a slight bend in the tip at working length, so I have an idea where the tip is in relation to the apex."
- "A little goes a long way - use the measurements on the side of the syringe to help guide how much is used."

"THE VISCOSITY MAKES IT EASY TO USE WITH THE FLEXIBLE TIP."

Evaluators' Comments

"The ease of placement, viscosity and radiopacity were unparalleled!"

*"A couple cases where the long-term periapical abscess showed a blurred apex, **BioRoot® Flow** worked like magic to show radiographic seal."*

"I like that it is non-reactive to tissues and has biocompatibility."

"Injecting sealer to get expression into lateral and accessory canals is great."

"No messy cement mixing needed which increases efficiency during the root canal procedure."

"This is the easiest RCT sealer."

"I would like an additional tip that is pre-bent at approximately 45°."

Consultants who would:

87% Recommend to a colleague

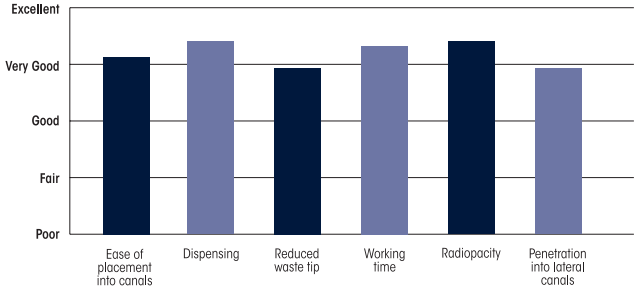
Consultants who would want to stock in office:

52% Yes, instead of current product

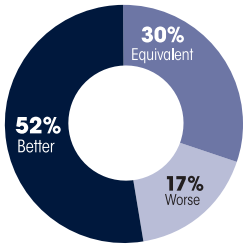
26% Yes, in addition to current product

9% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



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Biomaterials Research Report

Matt Cowen, B.S., John M. Powers, Ph.D.
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Number 156, September, 2022

DeltaFil Glass Ionomer Restorative Remineralization and Acid Erosion In-Vitro Evaluation

M. Cowen, J.M. Powers

Introduction:

DeltaFil (DMG America) is a new fluoride releasing glass ionomer restorative with micelle technology which gives it increased strength, fracture toughness and improved wear characteristics. This study measured the remineralization characteristics and ISO 9917-1 Acid Erosion values compared to another glass ionomer restorative in ***Ketac Universal*** (3M).

Acid erosion is a test that measures the potential in which glass ionomer cement materials dissolve due to low pH environments, in this case by Lactic Acid which is produced by cariogenic bacteria. It is one of the benefits of glass ionomer materials that they dissolve during cariogenic challenges to release ion that buffers the acid and releases fluoride to the surrounding tissues. Previous generations of glass ionomer cements were prone to dissolve to the point that they reduced the physical properties in low pH environments.

Remineralization of tooth tissues and caries arrest potential is the main selling point for choosing to use a glass ionomer restorative. This material can be used in the ART (atraumatic restorative treatment) to promote remineralization, hardening carious lesions and halting decay while requiring less tooth structure to be removed. Newer glass ionomer restorative materials like this one have increased strength and esthetics to be useful in an increasing number of cases. This study used a combination of µCT scanning to measure the mineral density of extracted teeth in an in-vitro model combined with measuring the surface hardness.

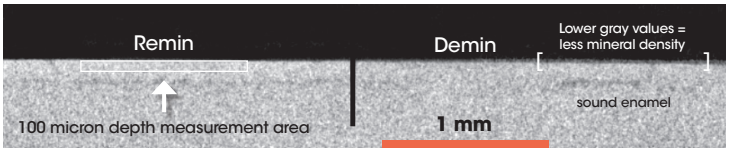
Conclusion:

DeltaFil has more acid erosion resistance than ***Ketac Universal***, and both were better than required by ISO 9917. Both materials exhibit similar and effective remineralization

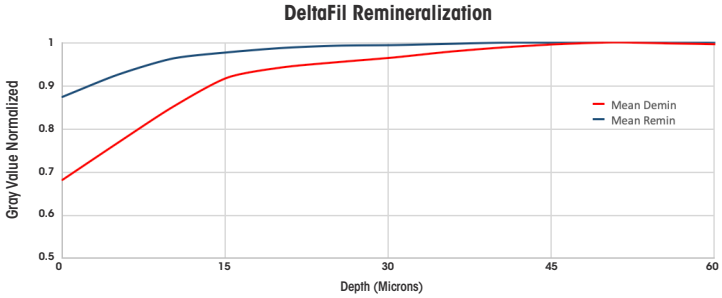
Methods and Results:

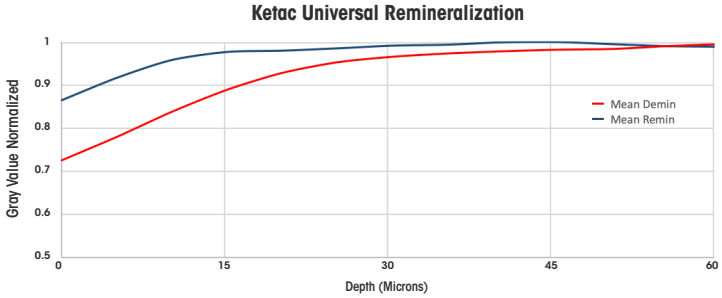
Remineralization: Enamel specimens (n=5) were mounted and screened to have a Vickers microhardness (Shimadzu HMV-G21, 200 g, load 15s dwell time) over 340 HV. Specimens were then submitted to a pH-cycling protocol based on Featherstone et al., 2011 in which blocks were kept at 37°C in a demineralizing solution (2.0 mM calcium, 2.0 mM phosphate, 0.03 ppm F, 75 mM Acetic Acid, pH 4.3) for 3 hours and in a remineralizing solution (1.5 mM calcium, 0.9 mM phosphate, 150 mM KCL, 0.05 ppm F, in 20 mM cacodylic buffer, 7.4 pH) for 21 h and rinsed between cycles. This was repeated for 5 days and then placed in the remineralized solution for a further 2 days. Surface hardness measurements were taken and were largely above the desired 200 HV. A 2 x 2 mm window was painted on the specimens using a chemical resistant varnish (Revlon Black), and glass ionomer restorative was placed on the enamel surfaces according to manufacturer instructions (mixed with ProMix (Dentsply) at 4200 RPM), which for ***DeltaFil*** included the cavity ***DeltaFil Conditioner***. Specimens were stored in distilled water at 37°C for 3 weeks with daily immersion in 1100 ppm fluoride solution to simulate toothpaste use. After this period, the varnish and material were scrapped off. Surface hardness measurements were conducted before specimens were scanned with a ZEISS Xradia 520 Versa X-ray microscope with a 5-micron voxel resolution. Scans were processed with Dragonfly Pro (ORS) and transverse images analyzed with ImageJ (U.S. NIH Bethesda, Maryland, USA) to determine change in radiographic density levels vs depth every 5 microns. Radiographic density which is correlated to mineral density was measured and averaged in a 1 mm x 0.1 mm depth along the surface by the ImageJ Plot Profile function. The gray values were normalized for each image, with the maximum intensity set to 1. The area under the curve for the area that was remineralized and demineralized was calculated to measure the change in overall mineral density. The relative remineralization was calculated with the formula RelΔA = (A(remin)-A(demin))/A(demin) *100, or the difference in the area under the remineralization curve and demineralization curve.

ZEISS Xradia 520 Versa X-ray microscope

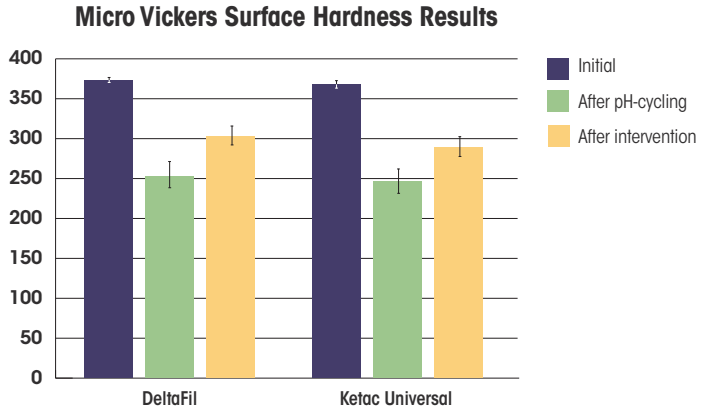


Transverse cross-section of a demineralized enamel specimen, the left had glass ionomer applied, the right was covered by a varnish as a control

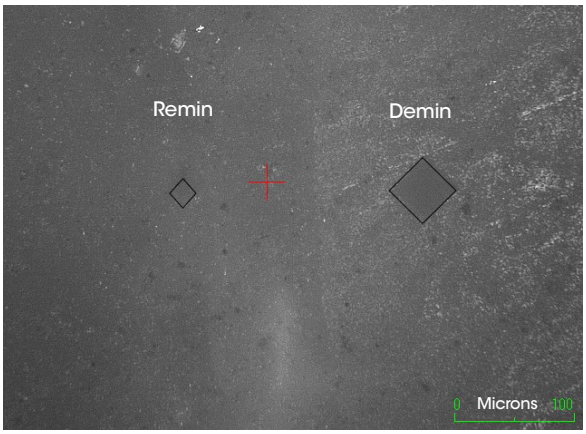




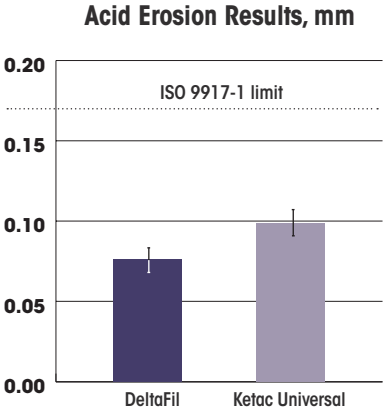
Lesion depth created by the pH cycle was approximately 50 microns averaged over 5 replications. The relative change in remineralization was 6.3 ± 2.9 % for DeltaFil and 6.5 ± 2.9 % for Ketac Universal. For context, the pH cycling removed approximately 8% of the mineral density of the 50 microns closest to the surface, and the intervention of the glass ionomers restored approximately 6.5% of that mineral density.



The surface hardness of the enamel specimens improved with both products to similar degrees.



(Left) Surface hardness indent after demineralization and intervention by ***DeltaFil.*** (Right) Surface hardness indent after demineralization and covered by a chemical resistant varnish.



The ISO 9917-1 limit for glass ionomer restorative erosion depth is 0.17 mm, which both materials easily passed. DeltaFil has less acid erosion than Ketac Universal, which was similar to DMG's listed internal testing of 0.067 mm.

Acid Erosion was tested using the ISO 9917-1 method which uses 5 specimens with the products cured in a 5 x 2 mm cavity, mounted in acid resistant PMMA, cured for 24 hours at 37°C before being finished with 1200 grit paper to produce a smooth surface. Specimens were immersed in a lactic acid solution at pH 2.74 for 24 hours and then rinsed. Measurements of the height of the specimen to 0.001 mm with a micrometer (Mitutoyo 293-831-30) are compared before and after the acid challenge to determine the eroded depth.

DENTAL ADVISOR
Product insights you can trust.

Biomaterials Research Report

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Number 157, September, 2022

RH-Pro11 Sterilization Validation of Handpiece Performance with Expanded Testing

M. Cowen, J.M. Powers

Introduction:

This study evaluated a dry heat sterilizer having a 21-minute, waterless processing cycle which can reduce or eliminate instrument corrosion by employing high-velocity hot air (HVHA™), a significant advance in sterilizing dental instruments. Elevated sterilization temperatures of 375° F (191° C) used in this process could potentially affect handpiece components or decompose some hydrocarbon-based oil lubricants specific to handpiece reprocessing. In the first phase of our validation of the ***RH-Pro11*** (CPAC Equipment Inc.) sterilization system (see RR#131, January 2020), we measured the performance of new and used handpieces before and after 250 sterilization cycles using a synthetic lubricant to validate its compatibility with the sterilization process and handpiece function. In this study, we further validated handpiece compatibility with the ***RH-Pro11*** by expanding testing to 500 sterilization cycles, while also applying load to the handpieces via Stall-Torque measurements every 50 cycles to give an increased challenge to the handpieces.

RH-Pro 11

Conclusion:

Handpieces evaluated from 4 different manufacturers showed no decrease in performance through 500 cycles of sterilizer use.

EXPERIMENTAL DESIGN:

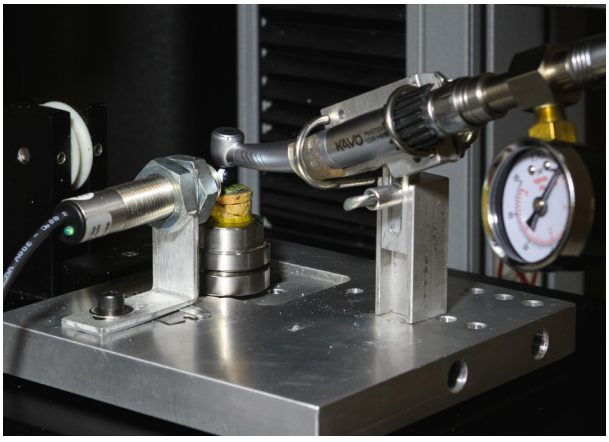
Equipment: DENTAL ADVISOR Handpiece Torque Test Platform and Instron 5866 universal test machine

Handpieces: ***EXPERTtorque LUK E675 L*** (KaVo) @41psi, ***Midwest Phoenix PK*** (Denstply Sirona) @43.5 psi, ***430 SWL Torque Flex*** (Star Dental)@43 psi used with lubricant, ***Synea TA-97 LM*** (W&H) @43.5psi

Tests: Noise (dB), Speed (RPM), Stall Torque(N-mm), Power (W)

Methods:

Performance Testing: The handpiece was attached to the test platform in a handpiece holding assembly including an air pressure gauge connected just prior to the handpiece and coupler. A spindle with a brake sphere was inserted into the chuck of the handpiece and the holding assembly adjusted so that the spindle was aligned with the torque sensor. The speed of the spindle was measured with a Monarch Infrared speed sensor and ACT 3 Electronic Tachometer. The torque sensor was connected to the load cell of the Instron 5866 system on which the test platform was mounted. During the testing, the handpiece was pressed downward along the axis of the spindle shaft with varying loads so that the brake sphere was pushed against the brake, which was attached to the torque sensor. The friction of the brake sphere against the brake produced a torque, which was registered by the load cell as a force while the speed was measured. Several torque versus speed points were taken to define the torque versus speed curve for each handpiece and used to calculate power in Watts. The stall torque was determined as the torque produced at the point during loading when the rotation of the spindle running at maximum speed was braked to zero RPM. Noise level was measured according to ISO 14457 methods by measuring the A-weighted sound pressure 0.45 meters from the handpiece with a type 1 precision sound level meter (DSM403SD, General Tools & Instruments).



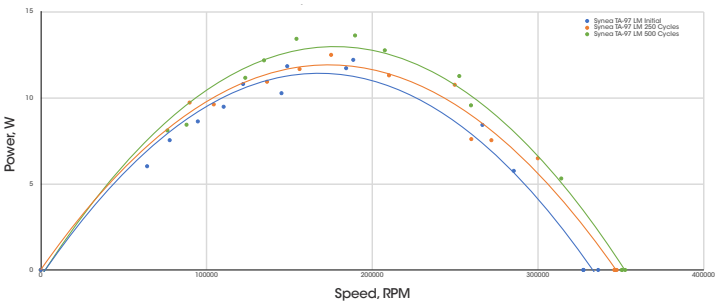
Sterilization: Unwrapped handpieces were subjected to 500 sterilization cycles using the ***RH-Pro11*** sterilizer at 375°F under the "handpiece" cycle setting. At every ten cycles, the handpieces were removed, lubricated with ***Lubrifluid*** (Bien Air) using a ***Lubrina*** (Morita) dental handpiece maintenance unit, and operated for at least 120 seconds with bur insertion before proceeding to the next ten sterilization cycles. At every 50 cycles, handpieces were operated and braked until stalling for over 2 minutes to simulate aggressive clinical use and to measure interim performance. Full performance testing was conducted in the initial condition, after 250 sterilization cycles and after 500 sterilization cycles.

Results:

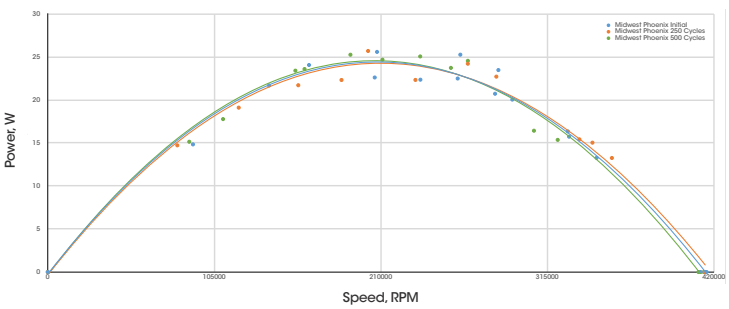
Results Summary												
Manufacturer	KaVo			Dentsply Sirona			Star Dental			W&H		
Handpiece	***EXPERTtorque LUK E675 L***			***Midwest Phoenix PK***			***430SWL Torque Flex***			***Synea TA-97 LM***		
Test	Initial	After 250 Cycles	After 500 Cycles	Initial	After 250 Cycles	After 500 Cycles	Initial	After 250 Cycles	After 500 Cycles	Initial	After 250 Cycles	After 500 Cycles
Average Max Power, W	15	15.5	15.6	24.5	24.4	24.6	23.8	24.1	24.8	11.2	11.8	12.8
Free Running Speed, RPM	428300	436400	429900	413500	414300	411900	392200	422900	432100	330400	346800	351400
Average Noise, Decibel	67.6 (0.5)	68.2 (0.6)	67.9 (0.5)	64.4 (0.4)	64.9 (0.6)	65.4 (0.3)	67.4 (0.7)	68.4 (0.6)	68.3 (0.5)	55.6 (0.4)	56.6 (0.5)	56.8 (0.4)

There was no detectable decrease in performance when measuring noise generation, speed, stall torque or power output after 500 reprocessing cycles with the ***RH-Pro11*** sterilizer for the 4 tested handpieces. As can be seen on the plot of the handpiece power measurements, the average performance measurements either lie along the same curve with nearly identical peak power or were higher after subsequent cycles than the initial condition. The noise level difference before and after reprocessing was less than a decibel difference for all handpieces and was considered equivalent to small ambient noise changes and differences in actual speed of operation.

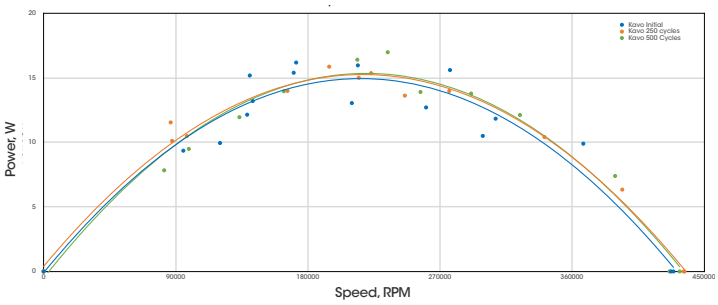
Synea TA-97 LM Power Curve



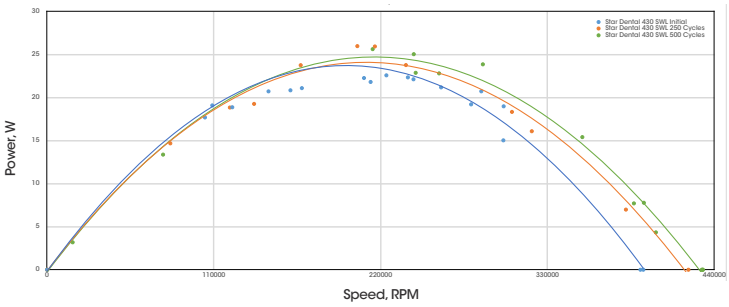
Midwest Phoenix PK Power Curve



KaVo EXPERTorque Mini LUX E675 L Power Curve



Star Dental 430SWL Torque Flex Power Curve



SPECIAL THANKS TO:

Select Senior Clinical Evaluators (Over 20 years):

R. Fisher, OH · E. Katkow, MD · J. Lockwood, MI · G. Poy, MI · R. Trushkowsky, NY · P. Yaman, MI · K. Baker, TX · F. Berman, PA · J. Bostic, OH · L. Brimhall, MT · M. Briskin, NY · W. Brownscombe, MI · R. Ciccone, MI · C. Colbert, MI · M. Conrad, PA R. Dost, VA · J. Doueck, NY · M. Eannaccone, NY · K. Fairbanks, MI · M. Feinberg, NY · K. Fischer, IN · G. Franco, NY · N. Garlisi, OH · S. Graber, IL · P. Grandsire, NY · E. Gutman, NY · D. Haas, Ontario · K. Hamlett, TX G. Hart, OH R. Herwig, KS · J. Kaminski, MI · R. Kaprielian, NJ · M. Kastner, OH · D. Keren, NY · M. LaMarche, WA · J. Leitner, MI · S. Lever, MD · R. Lezell, MI · M. Man, NY · B. Manne, FL · N. Mansour, MI · N. Markarian, CA · C. McLaren, MI · J.W. Mikesell, IL R. Mizrahi, NY · G. Mosso, PA · E. Mosso, PA · J. Nash, MI · A. Nazarian, MI · R. Oshrain, NY · J. Paris, TX · D. Parris, GA · M. Patel, MI · D. Peterson, MD · T. Pieper, WY · D. Pitak, MI · V. Plaisted, NY · D. Qualliotine, NC · G. Raichelson, Ontario G. Reskakis, NY · K. Schwartz, FL · J. Shea, MO · B. Shumaker, NJ · B. Sims, NY · P. Symeonides, NY · H. Tetalman, OH · C. Trubschenck, CA · S. Ura, NH · W. Walcott, MI · M. Waranowicz, MI · L. Wee, MI H. Yeung, CA · P. Zanetti, MI · S. Zimmer, MI

Clinical Evaluators (19 years or less):

D. Aaron Matatiaho, CA · A. Albright, NY · B. Argersinger, NC · R. Arif, OH · P. Arsenault, MA · G. Ash, MI · S. Baker, GA · M. Bannan, NC · B. Barricklow, OH · L. Bartoszewicz, MI · B. Bauer, IL · J. Bechtel, MI · J. Bechtel, MI · M. Best, MI · L. Bishop, MI · T. Bizga, OH G. Bloomfield, MI · G. Bonior, MI · C. Brown, LA · E. Brust, MI · S. Bunek, MI · J. Bunek, MI · J. Bush, PA · H. Cadorette, MI · M.Capalbo, RI · M. Caligiuri, CA · P. Campo, NY · P. Cracchiolo, MI · D. Chacko, TN · P. Chaiken, IL · R. Cherry, FL · R. Chuang, CA M. Connelly, MI · S. Crawford, MI · J. Curley, NC · W. K. Dancy, GA · S. Dillingham, NY · K. Dobracki, MI · S. Doniger, IL · J&E Duski, MI · A. Dutko, MI · M. Egbaria, IL · M. Elford, MI · O. Erdt, MI · K. Evanoff, MI · M. Evers, OH F. Facchini, MI · F. Falcao, FL · L. Feldman, NJ · G. Fink, DE · M. Frankman, SD · M. Glovis, MI · C. Goldin, MI · M. Grant, MI A. Green, MI · R. Green, MI · B. Greenwood, UT · J. Griffin Jr., MO · K. Grindling, MI · P. Gronet, KY · R. Grossman, PA H. Gulati, MA · F. Haddad, MI · G. Haddad, CA · J. Haddad, MI · A. Hakhamian, CA · J. Hamerink, MI · W. Hanna, MI · A. Harris, OH · J. Hastings, CA · A. Hodges, NC · C. Huang, CA · M. Huberty, WI · J. Ireland, MI · S. Irwin, NJ · C. Jaghab, MI · J. Jaghab, MI W. Jenkins, MI · T. Jolly, TN · R. Juluri, IL · M. Kachi-George, MI · D. Kapp, NY · J. Kane, MI · Y. Kang, MA · J. Karam, MI · G. Karaouzas, MI · E. Kelly, GA · J. Kelly, GA · L. Kemmet, MN · M. Koczarski, WA · L. Knowles, MI · B. Kolb, MI · GA Krishnan, CA · E. Kuns, OH C.Laird,OR·T.Lam,CA·R.Le,NC·I.Levine,NY·E.Lowe,BC,CAN·J.LueYen,GA·A.Malkis,NY·C.Manduzzi,MI·J.Mangutz,MI·K.Mantzikos,NY·B.Mayday,MI·T.McDonald,GA·J.McLaren,MI·M.McMullin,MI·G.Meylan,MI·M.Migdal,MI·M.Miller,NC·J.Mills,MI·J.Minsky,CA L. Montes, NY · A. Moore, NC · L. Motyl, MI · M. Murphy, MI · M. Murrell, MI · L. Musgrave, MI · M. Nasif, MI · B. Neren, NY · J. Neuman, MI · J. Olitsky, FL · J. Olsen, MI · E. O'Niel, MI · F. Orlando, NY · S. Owens, MI · A. Paal, TX P. Panchal, NC · R. Parikh, IL · J. Parrott, MI · U. Patel, CA · D. Perkins, MI · N. Pelachyk, MI · B. Peterson, MD · W. Phillips, MI · S. Picazio, NJ · B. Picot, NC · C. Pike, MI · C. Piontkowski, MI · B. Pittsley, MI · J. Poskozim, IL · B. Pournaras, SC · A. Prince, UT D. Radtke, MI · G. Ramos, NY · C. Ramsey, FL · G. Rashall, TX · S. Reddy, MI · N. Rego, CA · J. Riggs, MI · M. Rojas, IL · J. Rowe, AR · J. Rubin, DC · A. Saddy, MI S. Salhadar, MI · P. Saurer, OH · P. Scalia, MI · C.Scanlon, MI · J. Schau, MI K. Schier,MI · A. Schraner, NY · V. Scola, CA · L. Seluk, MI · R. Selvan, NJ · Y. Shaheen, MI · M. Shapiro, MI · A. Shemesh, IN · E. Simanian, CA · S. Simos, IL · J. Slatkoff, FL · J. Smith, MI · C. Stevens, OK · B. Stieper, MI · R. Surana, CA · G. Sutton, CA G. Tarantola, FL · T. Teel, IN · C. & L. Thorpe, MI · L. Trost, IL · S. Uchil, MI · A. Valentine, MI · H. Vann, MS · C. Vinkovich, OH · J. Weinfield, MI · B. Wilk, PA · K. Wilson, MI · D. Wolf, MA · W. Wright, CA · Y. Yi, MA · D. Young, MI · S. Yun, MI M. Yurth, WA J. Zanetti, MI · A. Zucker, OH

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