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Pediatric Dentistry

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FROM THE DESK OF
Dr. Sabiha S. Bunek, Editor-in-Chief

This month we have the pleasure of hearing from several pediatric dentists that were kind enough to speak with us. As someone who sees a lot of families and has kids of my own, I know pediatric dentistry is changing and evolving into new areas. Keeping up to date on any trends in dentistry for specialty areas is important to keep serving our patients in new and different ways. We will dive into concepts recommended by four doctors with varying perspectives, and I think we will all be better positioned to treat children of all ages after our update. As always, we welcome your ideas, suggestions and feedback. Reach out to me anytime at drbunek@dentaladvisor.com, or to our team at connect@dentaladvisor.com. Thank you for your continued support and reading!

— *Sabiha S. Bunek*

Joel H. Berg, DDS, MS

Joel H. Berg DDS, MS is a consultant in the dental industry and practices Pediatric Dentistry part time in the Phoenix, AZ area. He is former Dean at the University of Washington. Dr. Berg is a board-certified pediatric dentist and is a Past-President of the American Academy of Pediatric Dentistry, and Past-President of the AAPD Foundation. He is also a Past President of the American Academy of Esthetic Dentistry. He is an editor of the book *Early Childhood Oral Health*, and has published extensively on subjects including dental restorative materials for children, and medical management of dental caries. His current research interests include the development of dental caries prevention programs using risk assessment models to manage dental caries as a disease. He lectures to dental professionals regularly on *"Medical Management of Dental Caries."*

Chris Powell, DDS

Dr. Chris Powell is a board certified pediatric dentist currently practicing in West Michigan. While attending dental school in Ann Arbor at University of Michigan, Dr. Powell discovered a passion for advocacy and served as the Legislative Liaison for the University of Michigan chapter of the American Student Dental Association, and was active in lobbying for oral health at the state and federal levels. Combining a love of working with children and a desire to advocate for under-served populations, specializing in Pediatric Dentistry was a natural choice. After dental school Dr. Powell completed his specialty training at New York University, where he worked in both clinical and hospital settings treating patients from all walks of life. While living around the country and working with a large variety of people was extremely fulfilling, Dr. Powell returned home to Michigan and entered private practice. He is am a member of the American Dental Association, Michigan Dental Association, West Michigan District Dental Society, and the American Academy of Pediatric Dentistry. Dr. Powell is am also a diplomate of the American Board of Pediatric Dentistry. His practice philosophy focuses on incorporating dental health, physical health, and emotional well being in all his treatment plans.

Swati M. Rastogi, DDS, MS

Dr. Rastogi graduated from the University of Michigan in 2002 , and the U of M School of Dentistry in 2006. In 2008, she completed a Master of Science from the University of Michigan, Ann Arbor with her thesis, "General Dentist and Infant Oral Health Exams - An Interventional Study." She also completed sub-specialty training in pediatric dentistry receiving a Certificate in Pediatric Dentistry from the University of Michigan School of Dentistry. Dr. Rastogi practiced and taught pediatric dental residents as a clinical lecturer at the University of Michigan School of Dentistry upon graduating in 2008. She had a joint appointment as she also practiced as clinical staff at the Mott Children's Health Center in Flint, MI, providing dental care to an under-served population. She was presented with the Straffon Teaching Award in December 2011.She has active memberships in the American Dental Association (ADA), Michigan Dental Association (MDA), American Academy of Pediatric Dentistry (AAPD), and the American Board of Pediatric Dentistry (ABPD). Dr. Rastogi is a Diplomat of the American Board of Pediatric Dentistry, the American Academy of Pediatric Dentistry and the Michigan Academy of Pediatric Dentistry.

Jessica Rubin, DDS

Dr. Jessica Rubin grew up in Maryland and graduated from the Honors and Gemstone programs at the University of Maryland, College Park, Phi Beta Kappa with a B.A. in History. She was awarded a Recruitment Scholarship and a State Senatorial Scholarship to the University of Maryland Dental School, where she earned her Doctorate of Dental Surgery in 2005. Following dental school, Dr. Jessica completed a residency in general dentistry at MetroHealth Medical Center in Cleveland, Ohio, and a pediatric dentistry residency at the University of Maryland Dental School. In addition to private practice, Dr. Jessica is an Assistant Professor of Pediatrics at Georgetown University Medical Center and served for five years as an attending in the Department of Dentistry at Childrens National Medical Center in Washington, DC. Dr. Jessica founded Capital Kids Dentistry, a pediatric dental practice located in Washington DC, where she also lives with her husband and three young children.

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Q What advice would you give referring dentists as to what the most important considerations are in treating children?

A

DR. BERG: Kids are not "young adults." They are evolving, they don't possess the cognitive and decision-making skills. They are dependent on their caregiver. They must be given extra attention in "tell-show-do". They are growing and there exists the biggest chance to prevent chronic disease and establish habits for good oral health.

DR. POWELL: Aside from clinical techniques and appropriate treatment planning, the most important considerations for treating children are understanding how kids think and understanding your own strengths.
Children who are anxious in a dental setting won't typically attempt to hide their anxieties. They may cry or refuse to comply, or they may just be slightly apprehensive and have to look at a parent for reassurance every few seconds. Some children will talk a lot when they are nervous, others will be very quiet and still. By looking for the signals a child sends I can (usually) predict how they will behave during treatment.
This allows me to make the appropriate recommendations and avoid difficult behavior challenges before they start.

It is also important to understand that kids are extremely adept at reading non-verbal cues from adults. This often manifests when a mother is scared of the dentist and a child picks up on her fear and becomes afraid as well, but kids can also pick up cues from you and your team. A warm greeting directed to the child sends the message that they are welcome and puts them at ease, while the team ignoring the child and only talking to a parent makes them feel like their feelings aren't being considered. This is where it is important to know your own strengths. If you are nervous speaking to a child, they will pick up on that and might become uncomfortable. For that reason, it is really important to be yourself when you talk to kids. You don't need to use baby talk to be successful, just being confident and friendly will go a long way in making them more comfortable.

DR. RASTOGI: Important considerations for referring dentists would be to start seeing children early. They should be seen six months from when the first tooth erupts or at the age of one. This will allow the dentist to provide anticipatory guidance to the parents or guardian as well as develop a dental home for that child. Another consideration is to take radiographs when the contacts are closed to evaluate for interproximal caries.

DR. RUBIN: A child's ability to tolerate treatment and how the child's experience will impact their outlook on dentistry and behavior at future appointments are one of the most important factors when treatment planning for children. For example, for a cooperative child with dental caries treatment in the office with or without nitrous oxide may be appropriate. In contrast, a child with dental anxiety may benefit from sedation with a more definitive treatment plan, including potentially more aggressive restorative treatment with crowns. Silver diamine fluoride (SDF) is also a great treatment option for children with smaller or incipient carious lesions, especially for those who cannot yet cooperate for traditional restorative therapies due to its limited invasiveness A child's dental age and the extent of the carious lesion are also important factors. If a tooth is near exfoliation, one may lean towards monitoring a tooth. If the tooth is not near exfoliation, the size of the cavity may help determine the best treatment approach (i.e. SDF, composite or glass ionomer restoration, stainless steel crown). If the caries extend into the pulp of the tooth, the dentist must also consider whether pulp therapy or extraction with space management will offer the best outcome for the child.

WORDS OF WISDOM:

- **Know your strengths and weaknesses when treating children.**
- **See children early and establish good dental experiences.**
- **Understand the role of the caregiver and involve the child in their own care.**

The waiting room of Capital Kids Dentistry, the practice of Dr. Jessica Rubin

> *A child's ability to tolerate treatment and how the child's experience will impact their outlook on dentistry and behavior at future appointments are one of the most important factors when treatment planning for children.*
>
> ***— Dr. Jessica Rubin***

Q From a preventive perspective, what procedures, products, and technologies do you recommend for pediatric patients?

A

DR. RUBIN: In recent years, I have become a big proponent of silver diamine fluoride (SDF) as a treatment option. SDF has been shown to be very successful in arresting caries both small and large. Glass ionomer restorations have the benefit of releasing a reservoir of fluoride over time. Sealants are known to greatly reduce the incidence of occlusal caries on permanent molars on our young patients. Additionally, on a basic level, oral hygiene instruction is a must for young patients and their parents! Many parents appreciate visual demonstrations of how to brush their child's teeth, the proper amount of fluoride toothpaste to use, and how frequently to brush. To this end, a semi-annual prophylaxis and application of fluoride varnish are very useful for prevention and patient education. Additionally, dietary counseling on bottle use, sugar-sweetened beverages and refined carbohydrates is enlightening for many people.

DR. POWELL: For most children my recommendations include the typical twice daily brushing with fluoridated toothpaste, flossing, and regular cleanings with fluoride varnish application. While I only recommend primary molar sealants on a case-by-case basis, I recommend them universally for permanent molars. For a child with low-caries risk this is typically enough. If I find that a child has increased caries risk, I will recommend a more intensive preventative regimen. The first step will always be supervised brushing. We simply don't have an in-office preventative agent that is better than effective home care. Most parents don't realize that their children are doing a poor job brushing, so having mom or dad supervise will often help a lot. For teenagers, the embarrassment alone will usually get them in gear. Depending on the child's specific risk factors, I often recommend a three-month fluoride varnish interval. This is especially helpful in young kids as it can reduce caries risk while also desensitizing them. I also find 5000 ppm fluoride toothpaste (e.g. ***Prevident***) and CPP-ACP toothpaste (e.g. ***MI Paste***) to be helpful in older children with high-caries risk.

DR. BERG: Many. Specifically, OTC fluoride-containing products at home. Frequency of fluoride is everything, and small quantities used twice daily is preferred. For professional services, sealants are strongly recommended for most children who have permanent molars (and some premolars). Fluoride varnish treatment during dental checkups is the preferred method of professionally applied fluoride. Parents must assist kids in brushing until they are at least eight years old and must be supervised after that to check in occasionally.

DR. RASTOGI: Prevention is a big part of pediatric dentistry. Start with anticipatory guidance when the child is young. For high-risk children, an adjunct fluoride is helpful. For younger children a fluoridated gel, ***Just for Kids*** (3M), is available and for older children a toothpaste, ***Clinpro*** (3M) or Prevident, can be a great tool to help remineralize or decrease sensitivity. Silver Diamine Fluoride is a procedure we use in Pediatric Dentistry to help stop the caries progression. We use it on teeth that are getting ready to exfoliate or on children that are uncooperative or children that are unable to sit in the chair to get dental work done.

A regular application of fluoride varnish can help decrease caries risk.

WORDS OF WISDOM:

- **Fluoridated toothpaste and fluoride treatments remain critical in caries prevention.**
- **Silver Diamine Fluoride and Glass Ionomer are excellent for treating and arresting caries.**
- **Supervised brushing is the best method of prevention. Develop good brushing habits early.**

What's new?

MI Paste® ONE Kids

(GC America Inc.)

MI Paste® ONE Kids is the newest member of the ***MI Paste®*** family, which is a toothpaste with ***MI Paste Plus®*** that contains *RECALDENT® (CPP-ACP)* and fluoride, in three delicious flavors: Bubblegum, Cotton Candy, and Blue Raspberry. When fluoride is used with *RECALDENT® (CPP-ACP)*, the peptide preferentially combines with, and stabilizes, fluoride to create the ideal source for building fluorapatite. Using bio-available calcium and phosphate, the full potential of fluoride to help protect and repair teeth can be achieved. This allows ***MI Paste® ONE Kids*** to offer the same clinical benefits of ***MI Paste Plus®*** in a single step. ***MI Paste® ONE Kids*** features low abrasivity, fights caries, does not contain sodium lauryl sulfate, and is a great way for your patients to remineralize and rebuild enamel!

Media Link: https://bit.ly/3kjqv3C

Riva Star Aqua (SDI North America)

Riva Star Aqua is a non-invasive 2 step patented SDF system. It uses a breakthrough silver fluoride (AgF) solution that removes the ammonia base of traditional SDF systems.

Benefits include:

- No gingival barrier is necessary as the new formulation does not irritate soft tissue.
- Lack of odor and taste; the ammonia-free solution does not have the same odor as traditional SDF materials.
- No refrigeration is necessary due to the more stable aqueous base.
- Antibacterial Effect: When combined with potassium iodide (step 2), it has a higher inhibition zone against four different bacterial species compared to sodium hypochlorite.
- Lack of stain: The two-step globally patented procedure minimizes the risk of staining the tooth black. By applying the KI solution over the AgF, a silver iodine precipitate is formed which does not stain teeth in comparison with other products.
- Conditions dentin: ***Riva Star Aqua*** may assist in tooth preservation using a minimally invasive approach.
- Increased bond strength: Pre-treating the tooth surface with ***Riva Star Aqua*** is a great way to enhance bonding of glass ionomers to dentin.

For more information: www.sdi.com.au

Q From a restorative perspective, what procedures have you found the most success with?

A

DR. RASTOGI: Restorative procedures have a wide range of success due to the patient's oral hygiene and diet. However common successful procedures are restorations with composite or amalgam, stainless steel crown, and pulpotomies using MTA. These all can be permanent solutions with primary dentition, if proper measure are taken at home.

DR. RUBIN: I love providing conservative, minimally invasive treatment. This is one of the reasons I like SDF. I find that children are more comfortable during those appointments. This can mean slow-speed caries excavation and a glass ionomer restoration, like ***Equia Forte HT*** with or without SDF as a base layer. SDF may also be a permanent solution, depending on its success in arresting the decay and the child's dental age. An eight- or nine-year old could easily have a small carious lesion that is treated annually with SDF and then monitored until exfoliation, without the need for a more invasive restorative visit. For younger kids, applying SDF and monitoring carious lesions can buy time until the patient matures and can tolerate more traditional restorative treatment as needed.

DR. POWELL: The gold standard in pediatric dentistry remains the stainless steel crown. While resin and RMGI materials have improved drastically, none can match the simplicity, longevity, and cost effectiveness of a stainless steel crown.

DR. BERG: The most important learning here is that stainless steel crowns have stood the test of time and evidence when there are large carious lesions on primary molars. In young children who have larger that "very small" proximal lesions, only SSCs have been shown to preserve space and to be retained and keep the tooth healthy until its natural exfoliation stage. Separately, the same restorative materials that are useful for permanent teeth are useful for primary teeth. For older children in the late primary dentition or mixed dentition stage, glass ionomer restorative materials are useful for both proximal and Class I lesions in primary molars.

TOP PEDIATRIC RESTORATIVES:

- **Glass Ionomer, Resin-Modified Glass Ionomer, Composite and Amalgam Restoratives**
- **Silver Diamine Fluoride**
- **Stainless Steel Crowns**

*The gold standard in pediatric dentistry remains the stainless steel crown. While resin and RMGI materials have improved drastically, none can match the simplicity, longevity, and cost effectiveness of a stainless steel crown. — **Dr. Chris Powell***

TheraCal PT (Bisco)

TheraCal PT is a biocompatible, dual-cured, resin-modified calcium silicate designed for pulpotomy treatment.

FEATURES & BENEFITS:

- **Calcium Release:** The ***TheraCal PT*** chemical formulation consists of synthetic Portland Cement calcium silicate particles in a hydrophilic matrix which facilitates calcium release.*
- **Alkaline pH:** ***TheraCal PT*** promotes pulp vitality[1] by generating an alkaline pH of 11.5 at 7 days.*
- **AutoMix Syringe Delivery:** Manual mixing is not required with ***TheraCal PT***. The dispensing tip creates a uniform mix allowing for direct placement.
- **Short Working and Setting Time:** ***TheraCal PT*** is quick and efficient with a minimum working time of 45 seconds and a maximum setting time of less than 5 minutes.
- **Moisture Tolerant:** ***TheraCal PT*** has a unique hydrophilic resin matrix that allows for ion exchange and calcium release, but is not water soluble.

Media Link: https://www.therafamily.com **Bisco has data on file.*

[1] T. Okabe, M. Sakamoto, H. Takeuchi, K. Matsushima. Effects of pH on Mineralization Ability of Human Dental Pulp Cells. Journal of Endodontics. Volume 32, Number 3, March 2006.

ReLeaf™ Minis (Kulzer)

ReLeaf™ Minis keep your dental patients safe and comfortable, and keep your hands free by providing 280° of continuous HVE suction for a clear working field and reduced aerosols in the operatory. 25% smaller than the original ***ReLeaf™*** HVE solution that started it all, ***ReLeaf™ Minis*** are the perfect size for smaller arches.

FEATURES & BENEFITS:

- 25% smaller for small & sensitive mouths
- Compatible with original ReLeaf hoses
- Minimizes aerosols
- Works with your HVE system
- Hands-free convenience
- 280° field of suction
- Soft and flexible

Media Link: kulzerus.com

Q What areas of pediatric dentistry are the most overlooked by the general population, including referring doctors, parents and caregivers?

A

DR. POWELL: I think it is still overlooked that baby teeth are not just smaller versions of adult teeth, and children are not just small adults. I frequently see failed restorations that were done beautifully by a general dentist but really should have been crowns. Likewise, referring doctors (and even more frequently parents) often overestimate a child's capability to understand planned treatment and their ability to cope with their anxieties. These misunderstandings can lead to sticky situations where a child becomes combative and treatment has to be stopped.

DR. RASTOGI: Pediatric Dentists have limitations in their office. The child may not be able to have the work done in our dental chair and may need other means to have it get completed like sedation or general anesthesia. Also, we have training on what to do to for caries or trauma on immature permanent teeth.

DR. BERG: The need for space maintenance. The need to manage caries lesions early and not allowing them to proceed to cavitation. The need to use full-coverage (SSC) restorations in young children with decay on primary molars. The need for parent to supervise and be champions of oral care. The need for early intervention on the prevention front. To promote the first visit by the first birthday for all children.

DR. RUBIN: The importance of good oral health practices and diet! There are multiple factors that play into early childhood caries, but many of them are preventable. Parent and patient education about prevention is essential and are best had while the child is an infant. Often the first time a child is referred to a pediatric dentist is for the management of caries. In that case, the conversation has already turned from prevention to treatment. If we had seen the patient earlier and discussed hygiene and health, caries could have been prevented. I've heard many parents and even a few dentists state that it doesn't matter if a child gets cavities because the teeth will fall out. This is a misconception that can have serious health consequences for the child, including pain and infection. Key to a good pediatric visit is instructing parents on proper brushing and flossing techniques. This will empower them to help their kids maintain good oral health and decrease their caries risk. As I tell patients and parents, it is important to brush your child's teeth at least until they are eight – and I still check my own nine-year old daughter a few times a week. As a parent of young kids, I know most parents, are overwhelmed with juggling their own busy work schedules and their children's schedules. Brushing and flossing often seems like an afterthought when trying to get the kids to bed. It should not be! A few minutes every night can make a world of difference for oral health.

Application of ***Ionolux***, a resin-modified glass ionomer restorative material in a pediatric patient during cavity preparation.

FREQUENTLY OVERLOOKED AREAS:

- Managing carious lesions early
- Primary teeth are as important as adult teeth
- Nutritional education is a key component in a child's oral health

> *I've heard many parents and even a few dentists state that it doesn't matter if a child gets cavities because the teeth will fall out. This is a misconception that can have serious health consequences for the child, including pain and infection.*
>
> — ***Dr. Jessica Rubin***

Q Is there research or clinical data that you would like to see for pediatric dentistry that you haven't seen enough information on?

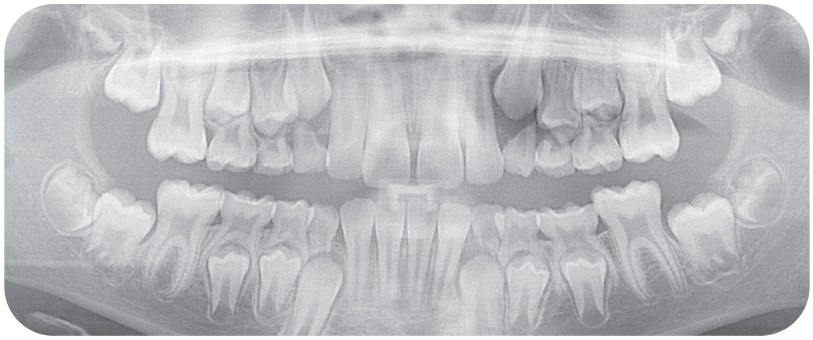
A

DR. BERG: More intervention studies showing the power of good home care. More clinical studies showing the importance of active surveillance of caries and its management to prevent lifelong problems.

DR. POWELL: I have always been extremely interested in the buffering and protective capabilities of saliva and how much they vary between children. Every day I see teeth covered in plaque with bright red gums without so much as a white spot lesion. Likewise, I have families who care deeply about their child's oral health and still can't keep them cavity free. I would love to understand more about what leads to these types of variations and their underlying causes.

DR. RASTOGI: I would love to see more research on products for hypoplastic or hypomineralized teeth, especially the 6- or 12-year molars. For example, what products would have a better bonding strength to these teeth or if there is a procedure to allow increase in bond strength. Is there a product to help decrease sensitivity besides a full coverage restoration? Also, are there temporary options for "white" crown for permanent crowns on immature permanent posterior teeth?

DR. RUBIN: I would love to see randomized, longitudinal studies on SDF application to interproximal lesions on primary and permanent molars. Additionally, I would like to see further research on resin infiltration and other treatment options for hypomineralized incisors and molars. Finally, I would like to see more studies on the Hall technique for Stainless Steel Crowns.



Q Have you been excited or enthralled by any new treatment modalities, products, or technology in relation to pediatric dentistry?

A

DR. RUBIN: There are several newer treatment modalities that I employ frequently: Hall technique, SDF, and CO2 laser. These treatment modalities have allowed me to practice safely during the COVID-19 pandemic as they minimize aerosol. The Hall technique is useful for children with larger carious lesions who cannot cooperate for a traditional crown preparation. While the SSC may not be as aesthetically desirable as composite restorations, Hall crowns may be appropriate for kids who cannot tolerate lengthy treatment times with caries excavation or local anesthesia. SDF has enabled us to delay traditional restorative treatment and offer a safe and feasible way to manage childhood caries. I purchased a ***Solea CO2*** laser during COVID as another way to limit aerosol spray and have used it for both hard tissue (caries removal) and soft tissue treatments such as frenectomies. This has been extremely beneficial for my patients with anxiety and allows me to provide treatment without with local anesthesia.

DR. POWELL: I am most excited by current trends in atraumatic restorations. Between Hall crowns, silver modulated atraumatic restorative technique (smart restorations) and silver diamine fluoride, I can complete a full-mouth rehabilitation without a drop of local anesthetic. These procedures aren't for everyone but can be life changing for young children.

RESEARCH WISH LIST:

- Active surveillance of caries prior to progression
- Protective capabilities of saliva
- SDF or Resin infiltration studies on interproximal lesions

> *SDF has enabled us to delay traditional restorative treatment and offer a safe and feasible way to manage childhood caries.*
>
> — ***Dr. Jessica Rubin***

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Biomaterials Research Report
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Number 155 – November, 2021

Milling Evaluation of Amber Mill®

M. Cowen, J.M Powers

Introduction:

Important properties evaluated in this study that may be affected by the combination of mills and materials while producing restorations include flexural strength, machinability (chipping), milling accuracy, and initial surface roughness. This study used a five-axis mill, the ***VersaMill 5X400*** with a lithium disilicate milling strategy to evaluate the machinability of a recently released lithium disilicate block, ***Amber Mill®*** (Hass Corp). ***Amber Mill*** has a unique feature that allows the material to be very transparent before heat treatment, and the temperature of the heat treatment modulates the translucency from high translucency to opaque reducing the need for multiple blocks of different translucencies for any given shade.

Polishability and surface roughness:

Flexural strength specimens were used to examine the initial surface condition of the materials after milling. The specimens were evaluated with a scanning electron microscope under various magnifications and a *Bruker Dimension Icon Atomic Force Microscope* for qualitative and quantitative evaluation of the surface topography. The initial gloss was measured with a *Novo-Curve Glossmeter,* with three measurements per specimen every 120° and the surface roughness with a *Bruker Dimension Icon Atomic Force Microscope* with an 80 x 80 µm area scanned to generate a 3D topographic map and calculate the average surface roughness (Ra). The specimens were polished with a ***Luster Twist Polishers*** (Meisinger) for 20, 40 and 120 seconds and the change in gloss and roughness measured for a time dependent polishing measurement.

Polishing, means (standard deviations)				
Parameter	Milled	20s	40s	120s
Gloss, gu	3.0 (0.3)	52.6 (4.6)	82.9 (2.3)	99.0 (1.5)
Roughness, Ra, nm	1580 (260)	410 (300)	109 (33)	9.0 (6.4)

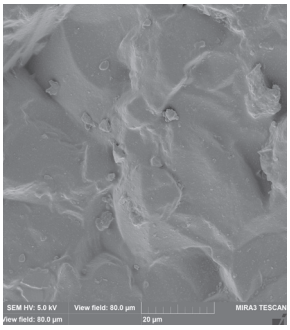
The polishing rate is similar to other glass ceramics, and extended polishing time can achieve an almost glass like appearance with a surface roughness of less than 10 nm. The total peak to trough height after milling was 10.4-11.4 mm. Adequate polishing with an Ra below 200 nm (or 0.2 µm) to minimize bacterial adhesion was achieved within 40 seconds of polishing.

MATERIALS:

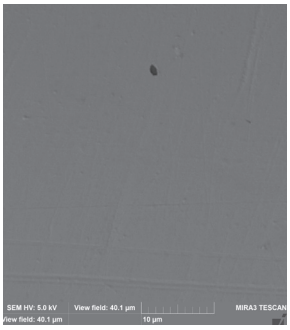
CAD/CAM Materials: ***Amber Mill*** block A1 (Hass Corp.)
Mills: ***VersaMill 5X400*** with Lithium Disilicate milling strategy
Burs: 2.5 mm, 1.5 mm and 1.0 mm OEM diamond burs (Versamill Part Number: DG-52, DG-53, DG-54)
Oven: ***Ivoclar Programat 300*** using the MO heat treatment profile

TESTS:

Flexural Strength, Milling Accuracy, Chipping of Machined Blank Specimens, Surface Roughness, and Polishability.

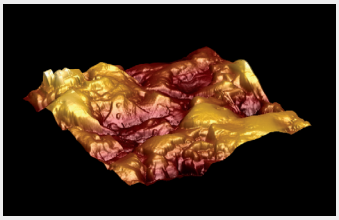


SEM image of the representative appearance of an 80 x 80 µm area of initial surface evaluated by AFM

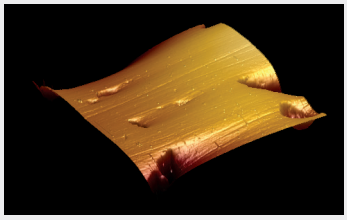


SEM image of a highly-polished surface showing a mirror-like image

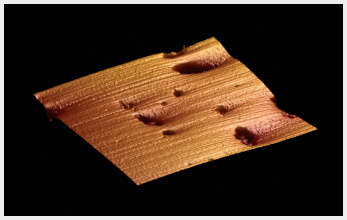
Atomic Force Microscope Scans over 80 x 80 µm



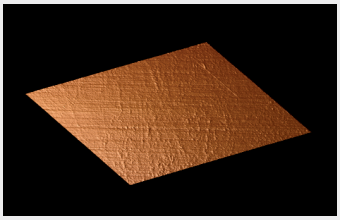
Initial roughness



20s polishing



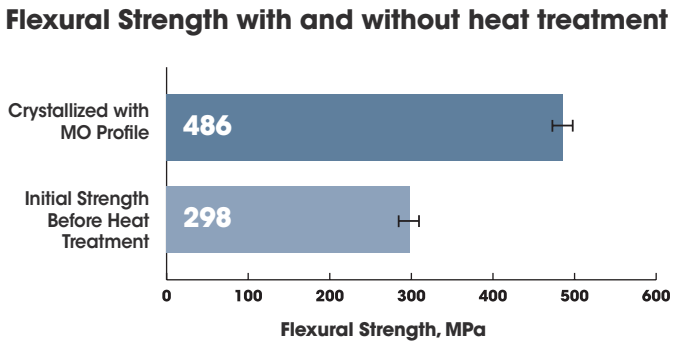
40s polishing

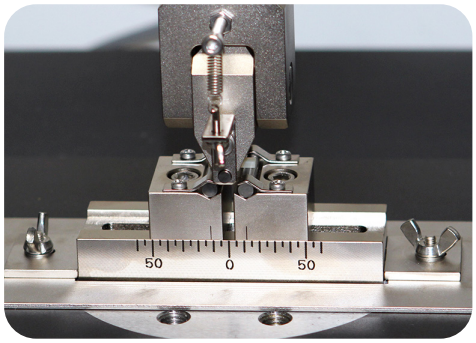


120s polishing

Flexural Strength:

Flexural strength bars (n=10, 14 x 2 x 4 mm) were tested according to ISO 6872:2015 methods. One group was tested after heat treatment according to the MO profile and one group was not heat treated to test the initial strength during milling. The bars were cut with a slow-speed wafering saw and finished through 600-grit SiC paper before crystallization. Bars were loaded in 3-pt bend with a 12-mm span and 1 mm/min crosshead speed in a *Shimadzu AGX-V Universal Test Machine.*

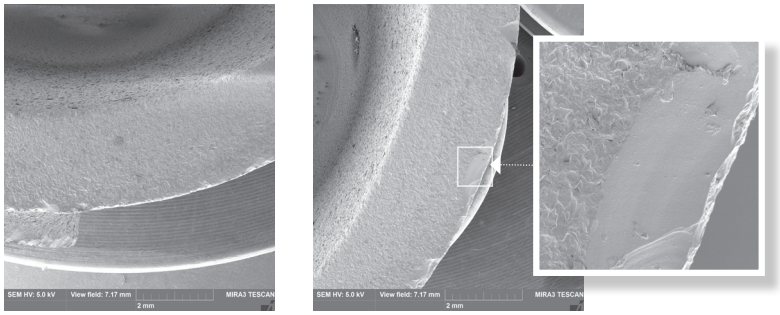




The initial flexural strength of the material was 298 MPa before heat treatment which increases up to 486 MPa after heat treatment.

Machinability:

Chipping of Machined Blank Specimens: Five standardized crowns with a 2-mm occlusal thickness and 1-mm axial thickness with a shoulder margin finish line were milled with each material. The margin was examined under magnification to detect defects with a minimum size of 0.1 mm and the margin thickness measured with a digital micrometer. The total length (L) of the chipped areas and total perimeter (P) of the crowns were measured and the chipping factor for each crown was calculated (CF = L/P) and presented with means and standard deviations. The measured thickness of the margin with a calibrated digital micrometer *(Mitutoyo Absolute Digimatic)* ranged from 1.00 mm to 1.03 mm.



The chipped flakes were all less than 0.2 mm of the margin thickness and cannot be easily seen without magnification.

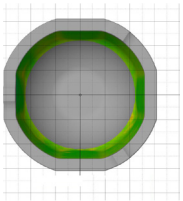
Chipping Factor, chipped area/circumference		
Material	CF	CF, %
Amber Mill	0.035 (0.020)	3.5 (2.0)

Overall, 96.5 % of the margins were fully intact and results are typical of milling of hard ceramics. Shallow chips were visible around approximately 3.5% of the circumference of the margin. Approximate depths of the chips were between 30-100 microns.

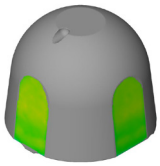
Machining Accuracy:

Machining Accuracy (ISO/TR 18845:2017): Standardized crown shape specimens with a 12-mm diameter, 10-mm height, 1-mm wall thickness were milled, scanned with a ***3Shape E3*** model desktop scanner to 7µm accuracy and analyzed with *Geo-Inspect 2018* software according to ISO/TR 18845:2017 methods. Means and standard deviations were calculated of the lateral discrepancy, Z-direction discrepancy and prep-line discrepancy.

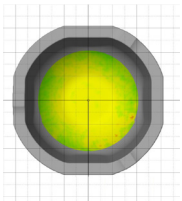
Machining Accuracy Discrepancy					
Material	Intaglio Lateral, µm	External Lateral, µm	Intaglio Z-Direction, µm	External Z-Direction, µm	Prep-line, µm
Amber Mill	31 (25)	42 (20)	89 (22)	89 (26)	20 (50)



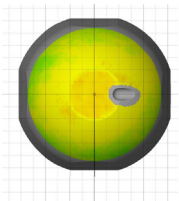
Specimen intaglio surface plane in the lateral direction.



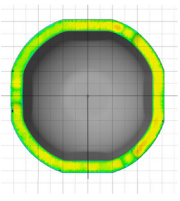
Specimen external surface plane in the lateral direction.



Specimen intaglio surface plane in the Z-direction.



Specimen external surface plane in the Z-direction.



Specimen prep-line surface in the Z-direction.

The results of the milled specimens were scanned and compared to the original design file. The mean value of the machining accuracy gives an idea of how much over/under milling there was as the comparison can give positive or negative numbers. The standard deviations describe the range of values around the mean. In comparison to the results from RR 126 using an ***inLab MC XL***, the ***VersaMill 5X400*** had similiar or better accuracy for the Intaglio Lateral, and Prep-line areas. There was less variability (smaller standard deviations) in 4/5 areas examined. The Intaglio and External Z-direction both registered higher discrepancies than the other areas, highlighting an aspect that could potentially be improved in the milling control software, or could be compensated during designing the restoration.

EDITORS' CHOICE

QuickPass® In-Office Water Test +++++

ProEdge Dental Water Labs Proedgedental.com

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

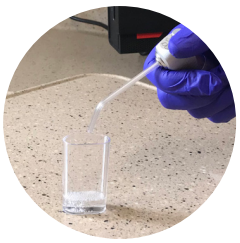
21 CLINICAL EVALUATORS

76 TOTAL USES

96% CLINICAL RATING

Key features: In-office dental water test ● 48-72 hours for results ● Simple and easy to use

Description



The ***QuickPass® In-Office Water Test*** waterline test is a simple, microbiological analysis of the water used for the procedural water for dental treatments that:

- Provides an estimated heterotrophic plate count
- Aids in measuring compliance with the CDC standard for safe water of ≤500 CFU/mL
- Has a simple three-step procedure
- Has support available for interpreting results and next steps, if a failure is obtained
- Is complete with a recommended protocol and testing log for continuous waterline safety

Indication

- Microbiological testing of dental procedure water

QuickPass used in clinical setting over a three-day period.

Unique Attributes

- Simple paddle design
- Bacterial colonies are made visible in easily identifiable red and orange colors
- Straightforward chart makes determination of bacterial range very easy
- Support available from waterline specialists to help read results, learn best practices, identify probable causes of failure, and improve results

Clinical Tips

- Keep each test in the particular operatory to expose the test to the same temperature variable as the waterline.
- The log is extremely easy to maintain and once established its one of the easiest water line tests we've used.

"SO EASY TO USE AND TO OBTAIN QUICK RESULTS."

Evaluators' Comments

"This is a very good visual indicator of water line safety."

"A quick and easy way to verify that our treatment was working."

"I like that this is something quick I can do at regular intervals in the office and if there are any questionable results, I can seek out more information and support."

"We had a patient ask us what it was, and when I explained he was really impressed that we took extra precautions for patient protection. He then went on to refer his whole family to us."

"Even though I understand that you have to wait for bacterial growth, it would be great if the results could be determined sooner then 48-72 hours."

Consultants who would:

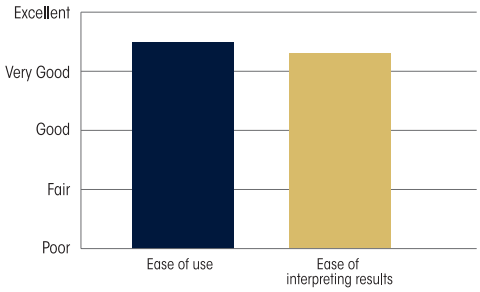
100% Recommend to a colleague

Consultants who would want to stock in office:

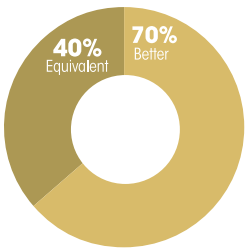
95% Yes, instead of current product

5% I might want to order this product for certain situations

Evaluation Summary:



Compared to Competitive Products:



CLINICAL EVALUATION

BluTube® Dental Unit Water Purification Cartridge

ProEdge Dental Water Labs Proedgedental.com

++++

DENTAL ADVISOR

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

DENTAL ADVISOR ++++

17 CLINICAL EVALUATORS

25 NUMBER OF DENTAL UNITS

72 TOTAL NUMBER OF WEEKS EVALUATED

90% CLINICAL RATING

Key features: Waterline treatment ● In-unit water bottle cartridge system ● Two-cartridge system

Description

BluTube® Dental Unit Water Purification Cartridge is a continuous waterline treatment for safe, compliant dental unit water quality. ***BluTube® Dental Unit Water Purification Cartridge*** was designed with the latest research in treatment efficacy and specifically engineered to be safer patients and have better compliance from testing results.

- Controls microbial contamination by eluting non-allergenic and elemental iodinated resin.
- Two-cartridge system ensures effective protocol for up to one year
- Two-cartridge system treats waterlines with 40% greater power.*
- Safe for patient contact, non-toxic, non-allergenic, and non-corrosive.
- Includes 6-month automatic replacement indicator for convenient reminder and "dummy straw" for easy shocking.
- Installs in minutes and can be used with tap or distilled water.

Indication

- Water purification for dental units with water bottle systems

*There were seven units with failures as measured by **QuickPass** and no reported failures after the treatment (there was only an average of 4.2 weeks per unit)**

Unique Attributes

- Continual treatment of dental unit waterlines
- Two-cartridge (aka straw) system:
  - Cartridges are replaced every six months
  - 40% more active ingredient released over a one-year period than traditional one-year straws.

"EASY TO USE AND EFFECTIVE."

Evaluators' Comments

"I was not treating my waterlines before and now I feel like I am doing something for the overall health of the practice and patients."

"Install once and you are done for 6 months."

"I like the peace of mind from it being an iodine-based treatment."

"Extremely easy to install!"

"They seem to work better than our current treatment. We definitely had better results after testing."

"I was not previously using a straw system and did not like that you have to permanently adjust the size of your bottle tubing to accommodate a straw."

"Shocking the system is an extra step in the system."

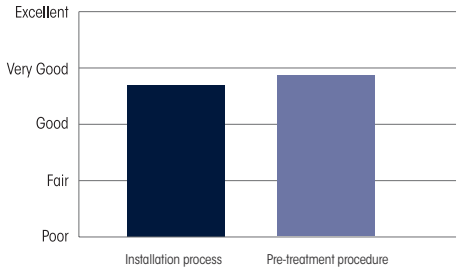
Consultants who would:

82% Recommend to a colleague

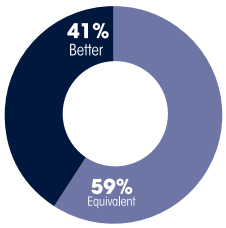
Consultants who would want to stock in office:

71% Yes, instead of current product

Evaluation Summary:



Compared to Competitive Products:



CLINICAL EVALUATION

CaviWipes™ 2.0

Kerr kerrdental.com

+++++

dentaladvisor.com

RATING SYSTEM: Excellent + + + + + Very Good + + + + Good + + +

DENTAL ADVISOR +++++

56 CLINICAL EVALUATORS

2156 TOTAL USES

96% CLINICAL RATING

Key features: Multi-purpose disinfectant • 2-minute contact time

Description

CaviWipes™ is a surface disinfectant with the following features:

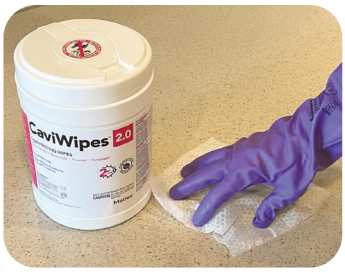
- Qualifies for the EPA's Emerging Viral Pathogens claim for all virus types.
- On the EPA's List N.
- 2-minute contact time for bacteria, viruses, and pathogenic fungi.
- Effective against over 40 pathogens.
- Enhanced material compatibility.

Indication

- Cleaning and disinfection of non-porous, hard surfaces, inanimate surfaces, and non-critial instruments commonly used in clinical settings.

Unique Attributes

- 2-minute contact time that is universal for bacteria, viruses, and pathogenic fungi that is kinder to clinical surfaces.
- Highly effective, low alcohol, and quaternary ammonium formula.
- Attention to material compatibility.



Material compatibility listing on canister

"COMPATIBLE WITH MOST HARD SURFACES AND DOESN'T STAIN."

Evaluators' Comments

"More friendly to the treatment room and patient chair than its predecessors."

*"My office has always used **CaviWipes**. **CaviWipes 2.0** are the same wipes that we love but with improved features. The 2-minute efficacy is especially helpful as every minute counts with a busy work day. The wipes also seem to be more wet than the previous version which seems to allow for more surface coverage."*

"Cleans better and is not as sticky."

"Effectiveness in the healthcare environment with the new emerging pathogens is important to the future of patient care."

"I would like to see the efficacy over time on surfaces like plastic."

"It took multiple wipes to disinfect a room."

Consultants who would:

96% Recommend to a colleague

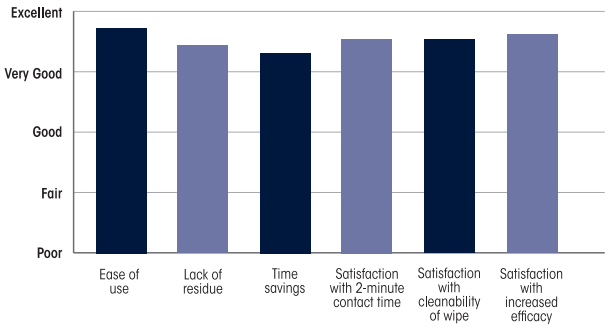
Consultants who would want to stock in office:

51% Yes, instead of current product

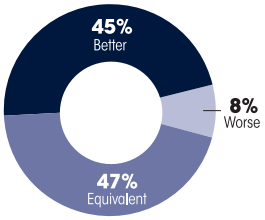
37% Yes, in addition to current product

8% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



Cervitec® Plus

Ivoclar Vivadent www.ivoclarvivadent.com

++++ ½

DENTAL ADVISOR

++++ ½

43 CLINICAL EVALUATORS

656 TOTAL USES

91% CLINICAL RATING

Key features: Targeted application ● Reduces bacterial activity where placed ● Effective for hypersensitive cervicals ● Chlorhexidine and thymol varnish

Description

Cervitec® Plus varnish contains a combination of the active ingredients, chlorhexidine and thymol. Chlorhexidine diacetate is an antimicrobial that has long been used in dentistry to reduce bacteria known to cause plaque formation, inflammation, and caries. Thymol, derived from oil of thyme, is a common ingredient found in oral mouth rinses because of its antiseptic characteristics.

- Allows for selective placement to targeted areas for both reduction of bacteria and for desensitization of hypersensitive dentin.
- Available in a 20-count box of 0.25 g single dose packets or in a 7 g tube.

Cervitec Plus is ideal for use:

- After temporary restoration placement
- After root planing and scaling
- In areas susceptible to caries
- Along the margins of implants, crowns and bridges
- Around orthodontic brackets to prevent white spot lesions
- Cervical hypersensitivity

Indications

- Protection of exposed root surfaces
- Treatment of hypersensitive cervical areas

Unique Attributes

- After varnish has been applied and dried, the concentration of chlorhexidine and thymol increases to 10%.
- Wide variety of uses because of antimicrobial properties.
- Low film thickness and clear application ideal for patient acceptance.
- No discoloration of tooth structure after application.

Clinical Tips

- Proper isolation is recommended for best results.
- Use for orthodontic patients with poor oral hygiene that have already started developing decalcifications.
- Have readily available in hygiene appointments for high caries-risk patients.
- Apply directly onto tooth structure and/or appliances for maximized efficacy.

"SUPER EASY AND QUICK APPLICATION."

Evaluators' Comments

"Tissue responds very well and quickly."

"No taste, so even kids didn't object."

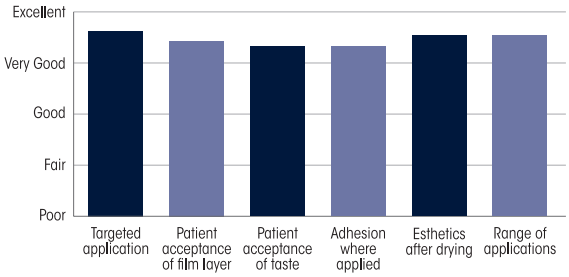
"It was very effective against sensitivity."

"Patients did not notice the film as much as they do with fluoride varnish."

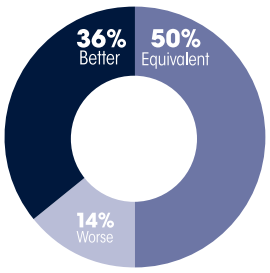
"Inconvenient that it needs to be refrigerated."

"Lower viscosity than fluoride varnish."

Evaluation Summary



Compared to Competitive Products:



Percentage of Consultants Who Would:

86% Recommend to a colleague

63% Purchase in addition to product they currently use

23% Purchase instead of product they currently use

D-Lux+

DiaDent® diadent.com

++++

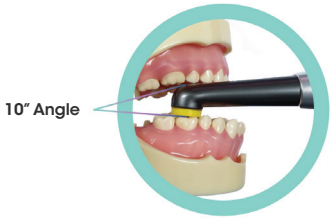
DENTAL ADVISOR ++++

15 CLINICAL EVALUATORS

595 TOTAL USES

87% CLINICAL RATING

Key features: LED curing light ● Dual-wavelength ● Five curing modes ● Inductive charging system



Description

D-Lux+ is an LED curing light with the following features:

- Cordless with a wireless inductive charging system
- Dual-wavelength
- Designed with a 10° angled tip to easily reach posterior surfaces
- Five curing modes:
  - Standard: 900 mW/cm2
  - Soft Start: Gradual increase to 1,300 mW/cm2
  - High Power: 1,300 mW/cm2
  - Orthodontic: 1,800 mW/cm2
    - Orthodontic (Pulse) mode: light turns on for 2-seconds and then off for 1-second, eight times.
  - Max Power: 2400 mW/cm2
- Broadband spectrum of 385nm ~ 515nm

Indication

- The dual-wavelength of this light can uniformly polymerize all light-cured dental materials.

Unique Attributes

- Light weight
- Easy to switch modes
- Large, easy to read display
- Nice sized light tip that is angled to easily reach tough posterior, buccal, and lingual surfaces

"THE DIFFERENT CURING OPTIONS ARE A NICE FEATURE."

Evaluators' Comments

"Even though the tip is larger than my current one, the size covers more of the tooth surface, decreasing the need for multiple curing cycles."

"The light weight makes for less fatigue when holding it in an awkward position."

"Looked great on the shelf. Very modern, clean, and neat appearance."

"Soft start is very advantageous for a lot of composites. This light has curing options for a variety of materials."

"The size of the tip was perfect for curing the entire surface of a veneer."

"The buttons were not raised and difficult to find, if I was not directly looking at the handle."

"Felt like it was too big to get to posterior areas in small mouths."

Consultants who would:

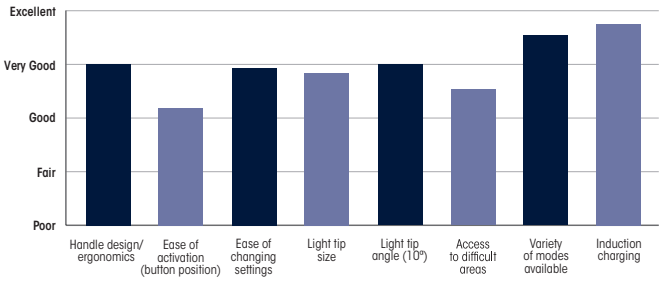
64% Recommend to a colleague

Consultants who would want to stock in office:

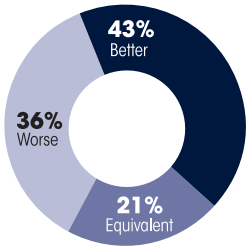
43% Yes, instead of current product

29% Yes, in addition to current product

Evaluation Summary:



Compared to Competitive Products:



FluoroDose®

Centrix centrixdental.com

++++ ½

DENTAL ADVISOR ++++ ½

34 CLINICAL EVALUATORS

832 TOTAL USES

95% CLINICAL RATING

Key features: Fluoride varnish with Xylitol ● Five flavors ● Newly designed packaging

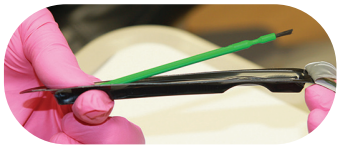
Description

FluoroDose® fluoride varnish with Xylitol:

- Contains 5% sodium fluoride (NaF) or 22,600 ppm of fluoride
- Each unit contains one single dose plus one ***Benda® Brush*** applicator
- Dries in seconds upon contact with saliva
- Remains on the tooth for 4 to 6 hours
- Available in 5 flavors: Caramel, Bubble Gum, Mint, Cherry and Melon

Indications

- FDA-cleared for treating dentinal sensitivity
- Caries prevention



Unique Attributes

- Applies smooth, not stringy or clumpy.
- Stays clear after drying.
- Newly designed and patented ***LolliTray™*** delivery system.

Clinical Tips

- Works great to get into interproximal regions of periodontal patients and on root surfaces.
- Gently dry surfaces before application. Even though it can be used on moist teeth, you obtain better engagement with drier teeth.
- Stir it thoroughly otherwise it's too thick and it appears that it will not be enough for the entire mouth.
- Explain that it contains Xylitol. While I had a few patients that did not want Xylitol, for most it is a great opening to explain its benefits.

"THE DELIVERY SYSTEM WAS EXCELLENT."

Evaluators' Comments

"It applied very thin and didn't stick to my patient's lips like most fluoride varnishes do. Also, it was helpful that it worked well in a semi-moist environment and didn't get too messy."

"The flavors tasted like what they were advertised as, and my pediatric patients did not complain - for a change!"

"It has a very thin viscosity and flows well on the teeth. This provided better coverage than other products I've used."

"With this varnish's viscosity, I was able to better apply to tight interproximal spaces, root exposures, around crown margins and other tough to reach spaces."

"The new design of the tray allowed me to use my fingers for retraction while applying."

"It is not fully hypoallergenic, as it contains red dye."

"This varnish doesn't have a yellow tint like some other brands."

Consultants who would:

97% Recommend to a colleague

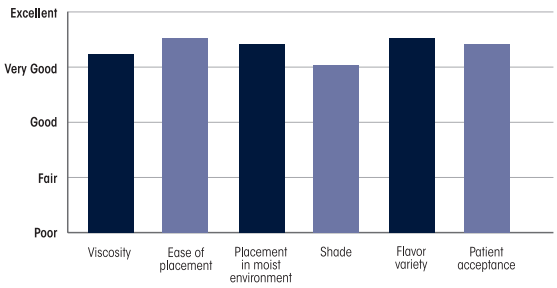
Consultants who would want to stock in office:

58% Yes, instead of current product

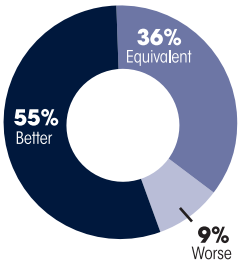
27% Yes, in addition to current product

3% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:



COVID-19 Vaccination:

Addressing the Challenge of SARS-CoV-2 Disease

LECTURE SUMMARY

Dr. John Molinari

Full webinar available on VIVA LEARNING™ interactive web-based training

LECTURE SUMMARY POINTS:

- ***The Covid-19 vaccine is a highly effective vaccine*** in comparison to vaccines in the past.
- ***Vaccines for SARs viruses have been around since 2003,*** which is why we were able to develop the vaccine as quickly as we did.
- ***Vaccines are always continuously monitored*** for safety. Safety is the top priority.
- ***Vaccine effectiveness does not need to be high*** for the vaccine to be helpful.
- ***Vaccines are designed to prevent severe illness, not infection.*** Breakthrough cases will happen, but they are in the minority.
- ***The Covid-19 vaccine has been found to be 80% effective,*** and is mainly helping to keep people out of hospitals.
- ***We are still seeing vaccine hesitancy*** in the US.
- ***For herd immunity to effectively take place, 70%*** of the population needs to have immunity.
- ***Boosters are needed due to the nature of SARs viruses*** and their ability to mutate.

Q Have they ever mass mandated vaccines before?

A No, it wasn't needed because people were more willing to participate in personal responsibility of preventing spread.

Q Do we need boosters?

A Yes, boosters are recommended and will likely be required regularly. We need to slow down viral spread whenever possible.

Q Will this virus continue to mutate?

A Yes, SARS COV 2 is an RNA virus, which has a high rate of mutation. SARS COV 2 is not seasonal like the flu, it will always be around. This virus can affect every organ in the body and cause much more damage during and after infection.