DENTAL ADVISOR™

Product insights you can trust.

JULY-AUG, 2021
Vol. 38, No. 04

2021 Clinical Problem Solvers

DENTAL ADVISOR
Product insights you can trust.

JULY/AUG 2021
VOL. 38, NO. 4

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

As a member of the editorial board and clinical evaluator at DENTAL ADVISOR, I feel fortunate to be well-versed in a broad range of dental products that reach the market. Because of this unique position, I look forward to offering this issue of Clinical Problem Solvers each year to our subscribers. This issue allows us to recommend products which we have found solve very specific problems or address previously unresolved issues in dentistry.

We know that individual practicing dentists face an over-abundance of products (new and old) to choose from on a daily basis and limited time and resources can hinder the ability to thoroughly investigate the claims of manufacturers. It is gratifying to be able to combine our experiences as practicing dentists and clinical evaluators to offer you this list of go-to products that truly solve clinical problems.

While we all have our own opinions regarding individual products, this issue more directly offers you our advice on how these products can be utilized to overcome a specific challenge. I hope you find these suggestions useful, and please keep your own recommendations coming! As always, you may reach me at drbunek@dentaladvisor.com.

— *Sabiha S. Bunek*

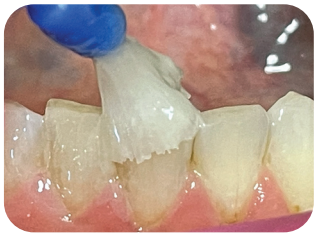
DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

Duraflor® Ultra

AMD Medicom, https://medicom.com **Clinician:** Lesley Correll, BA, BS, RDH

PROBLEM:

An increasing number of patients are reporting food allergies or dietary restrictions. If these patients are at a high risk for caries or have dentinal hypersensitivity, it is of utmost importance to choose a fluoride varnish that will not elicit an allergic reaction.



SOLUTION:

Duraflor® Ultra™ White 5% Sodium Fluoride Varnish from Medicom. This varnish does not contain gluten, peanuts, tree nuts, soy, sesame, corn, shellfish, eggs or dairy*. It is sweetened with xylitol and free of saccharin and aspartame. For patients with allergies who would benefit from a fluoride varnish, ***Duraflor® Ultra™*** is an excellent option. Knowing it does not contain common allergens, as do some fluoride varnishes, provides peace of mind to both patient and clinician.

NOTE: Caramel flavor contains milk butter acids.

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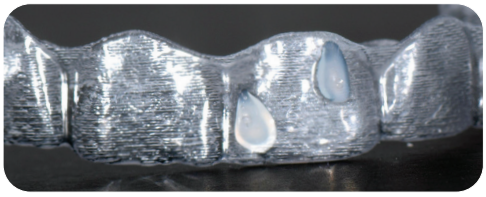
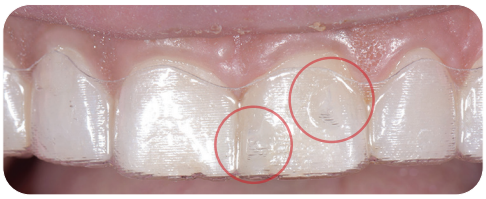
DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

OMNICHROMA Flow

Tokuyama Dental America, Inc., www.tokuyama-us.com • **Clinician:** Dr. Sabiha S. Bunek





Photos courtesy of Dr. Sabiha S. Bunek

PROBLEM:

Clear aligner cases often require the use of composite buttons that are placed on the teeth to anchor the trays and allow movement throughout treatment. These buttons are visibly noticeable if the composite does not match the shade of the patient's teeth.

SOLUTION:

OMNICHROMA Flow (Tokuyama Dental America) is a single-shade flowable composite which provides an outstanding chameleon effect. Material easily adheres to the tray and margins of the buttons virtually disappear, providing an esthetic solution for clear aligner cases where buttons are needed.

DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

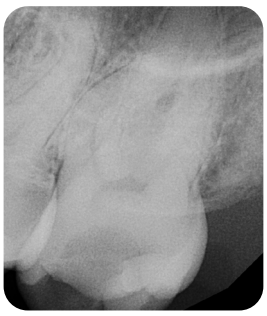
Biodentine®

Septodont www.septodontusa.com • **Clinician:** Dr. Sabiha S. Bunek

PROBLEM:

Patient presented with very large areas of decay, close to pulp on tooth #15. Patient was leaving for vacation next day so clinician placed *Biodentine®* and gave a referral to an endodontist to perform root canal. Patient delayed seeing endodontist for one year due to the Covid shutdown. At one year endodontist sent patient back and said root canal was not indicated and okay to restore.

Pre-op: Tooth #15



Pre-op: Tooth #15

Tooth #15: 1-year after placement of Biodentine

Photos courtesy of Dr. Sabiha S. Bunek

SOLUTION:

Biodentine (Septodont) is an excellent bioactive restorative material that is recommended for use in vital teeth. In the case described above, ***Biodentine*** successfully built dentin and reduced discomfort for the patient. In the end, it prevented the need for a root canal.

3M™ Versaflo™ TR-300+ PAPR Systems

3M Oral Care, www.3M.com/Versaflo300 **Clinician:** Lesley Correll, BA, BS, RDH

PROBLEM:

A dental hygienist performing Aerosol Generating Procedures is required to wear an N95 or equivalent for state mandated OSHA guidelines. Several attempts were made to find an N95 that achieved both a seal and proper fit. Quantitative fit testing failed due to the shape of her face.

SOLUTION:

3M™ Versaflo™ TR 300+ PAPR Systems provides an alternative to an N95 or KN95 respirator and meets OSHA/NIOSH requirements for personal protective equipment. These systems can eliminate the need for fit testing and provide a constant flow of filtered air when used with an approved head top. The wide field of view allows patients to see your face, improving interpersonal communication. The charged battery will last for up to 10-12 hours.

VacuVUE™ HVE Dental Mirror

Ascentcare™ Dental Products, www.ascentcaredental.com **Clinician:** Dr. Ona Erdt

PROBLEM:

Reducing aerosols in the hygiene rooms is an important concern to me; however, the hygienists are often working without an assistant. A device that allows them to work independently during any procedure would be an advantage, especially one that provides good visual field and suction.

The Wrist Assist vacuum line relief band

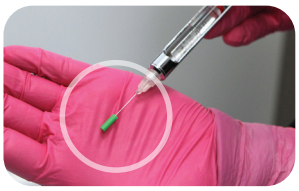
SOLUTION:

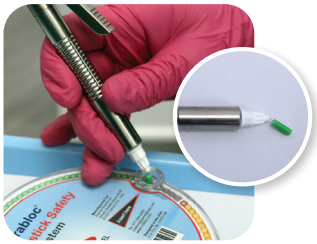
VacuVUE™ HVE Mirror is like having a second set of hands for clinicians as it is two instruments in one. It is a true HVE mirror with integrated suction. This mirror features a large bore suction port on the front and 11 smaller ports on both the rear and forward face of the mirror. It speeds up procedures, reducing the need to constantly choose between the mirror and high-volume suction. This allows the clinician to work alone without the need for an assistant to suction. It can also be used to increase suction while viewing and retracting in areas that are difficult to isolate. The Wrist Assist vacuum line relief band is designed to reduce the weight of HVE lines for easier maneuverability and less fatigue.

DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

Orabloc® Needlestick Safety System

Pierrel Pharma, www.orabloc.com/orabloc-needlestick-safety-system **Clinicians:** Lesley Correll, BA, BS, RDH, Shelby Crawford, DA





PROBLEM:

Needle recapping using the one-handed scoop technique can make securing the needle cap difficult, risking injury. If a needle cap is dropped or misplaced, there is also a potential for needlestick injury.

SOLUTION:

Orabloc Needlestick Safety System allows for simple recapping and contains 100 protective capsules. Color coding of capsules helps identify when a new system is needed; the last few caps are yellow and red in color. The circular device has a non-slip grip which eliminates the need to hold the device. As needles are capped, the system advances to the next protective capsule. It works with bent, angled, and straight needles of any gauge or size. Needles can easily be recapped once the silicone protective capsule is placed. Once a needle is disengaged from the syringe, the opposite end can be recapped as well prior to sharps disposal. ***Orabloc Needlestick Safety System*** allows for safe disposal of needles without the need to use a special syringe or needle sheath.

EVALUATOR COMMENTS:

- *"I no longer need to waste time looking for a missing needle cap; this system is great!"*
- *"It is a wonderful product. As stated on the box it redefines needle stick safety protocol."*
- *"The **Orabloc Needlestick Safety System** is a game changer and should be in all dental operatories."*
- *"It's an extra safety precaution for those wearing loupes and who may have difficulty with precision tasks."*
- *"The extra safeguard of using this on a bent needle eliminates the problem of trying to recap and possible breakage."*
- *"The non-skid rubber backing really secures it to my counter, ensuring more safety. The color coding is a great indicator that you need a new device."*

DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

Pola Whitening Menu

SDI, www.sdi.com.au/en-us/product/pola-light **Clinician:** Lesley Correll, BA, BS, RDH,

Hygienist reviewing Clinical Assessment

Hygienist using Pola Whitening Menu to discuss choices

Initial shade documentation before whitening

Instructing patient on use of Pola Light

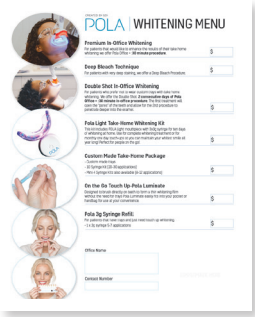
Demonstrating filling Pola Light with whitening gel

Inserting tray and instructing patient on use at home

PROBLEM:

Often patients will purchase over-the-counter products which are not regulated or assessed for the patient's specific clinical situation or expectations. As a result, patients are often unhappy with their results or have adverse effects when whitening without supervision of a dentist.

SOLUTION:



Pola Whitening Menu from *SDI* offers a complete line up of whitening products with the ***Pola Family***. Only available through dental practices, ***Pola*** products encourage patients to discuss their whitening needs and expectations with a trained dental professional. The program provided begins with a *Clinical Assessment and Control Sheet,* which allows the professional to assess patient expectations, potential clinical concerns, and assists the professional in choosing the right product for each individual patient. This increases patient loyalty and satisfaction and offers several solutions to customize results using the many ***Pola*** products available. ***Pola Whitening Menu*** lists all available whitening services and products available to patients. It is customizable for each practice and can be placed in the operatories for discussions on whitening to increase revenue and solidify the patient and practice relationship with respect to whitening procedures. ***Pola Whitening Menu*** assures that patients know that the best place to obtain treatment and products throughout the life of their smile: is their dental practice.

Pola Light

SDI SDI.com/au

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DENTAL ADVISOR ++++

47 CLINICAL EVALUATORS

1238 TOTAL USES

87% CLINICAL RATING

Key features: Professional strength, take-home whitening system
● Hydrogen and carbamide peroxide formulas available ● LED mouthpiece

Description

Pola Light is a professionally dispensed take-home whitening system that:

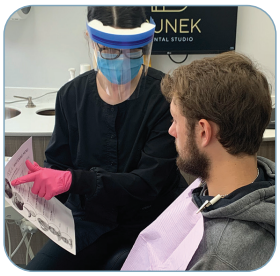
- Whitens teeth in as little as 5 days
- Is available in two options:
  - ***Pola Day*** (9.5% hydrogen peroxide)
  - ***Pola Night*** (22% carbamide peroxide)
- Includes an LED mouthpiece
- Incorporates extra hydration to minimize sensitivity
- Remineralizes to strengthen teeth

Indication

- Whitening of teeth at home with a professionally dispensed system

Unique Attributes

- ***Pola Light*** is not available direct to consumers; like all SDI whitening products, they are professionally dispensed.
- ***Pola Menu*** is provided as part of the ***Pola*** whitening line, and is designed to facilitate conversations on whitening with patients. This avoids use of direct-to-consumer products, which do not allow for cosmetic considerations with a dental professional before whitening treatments.
- Whitening assessment form is also included to gauge patient satisfaction with their smile.
- The LED mouthpiece is light and balanced, so it sits intraorally very comfortably. It does not require connection to a phone or power source.
- ***Pola Luminate*** is included for post-treatment touchups which makes this a complete kit for the patient.



Clinical Tips

- Use in conjunction with ***Pola Menu*** and the whitening assessment form provided by SDI, to discuss whitening expectations with your patients.
- Have the patient complete one supervised cycle in the office to answer any questions that may arise.

"OVERALL, I LOVE THE POLA LIGHT. IT IS SLEEK, COOL, AND COMFORTABLE."

Evaluators' Comments

"The results were great in a short amount of whitening time. Also, it was very easy to use."

"The light worked well and had a big, 'WOW' factor for the patients!"

"Comfortable wear, quick results, easy cleanup, and no sensitivity."

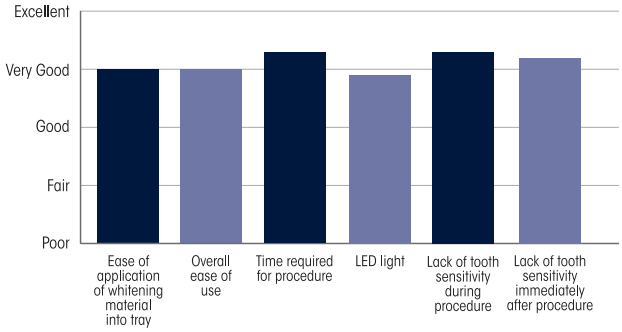
"The comfort of the tray made it easy for my teeth to fit into it. It is very easy to use. The 10-minute applications make my busy mornings more manageable."

"The trays are obviously not custom with this kind of system, and unfortunately, one size really does not fit all."

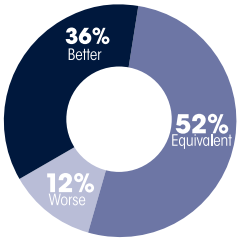
"The on/off switch for the light was very touchy."

"I liked the different percentage and material options. There was no sensitivity reported."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

80% Recommend to a colleague

Consultants who would want to stock in their office:

20% Yes, instead of current product

41% Yes, in addition to current product

18% No, but I might want to order this product for certain cases

CLINICAL EVALUATION

Dentapen®

Septodont www.septodontusa.com

++++

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

DENTAL ADVISOR ++++

10 CLINICAL EVALUATORS

322 TOTAL USES

86% CLINICAL RATING

Key features: Electronic syringe: computerized local anesthetic delivery device ● Handheld: no cords or foot pedals ● Battery operated

Description

Dentapen® electronic syringe

- Cordless and battery-operated
- 3 injection speeds for better management of your injections
  - **Fast:** 1ml/30s
  - **Medium:** 1ml/60s
  - **Slow:** 1ml/90s
- 2 modes
  - Intraligamentary mode: slower speed with maximum force
  - Ramp-up mode: gradual and constant increase of flow
- Ergonomic and lightweight (1.4 ounces / 40 grams)

Indication

- Routine administration of local dental anesthetics

Holding ***Dentapen*** in pen-style

Inserting carpule into ***Dentapen***

Two different handle styles

Clinical Tip

- Make sure you talk with your patient to let them know what is going on and the sounds you will hear is normal, as it is not something they're used to.

Unique Attributes

- Computerized local anesthetic delivery device in the palm of your hand with no foot pedals, consoles or cords.
- Two different handles allow you to hold more like a traditional syringe or with a pen-style.
- Compatible with the standard anesthetic cartridges and needles of your choice.
- Self-aspiration feature.

"I LIKED THE COMPACT SIZE AND LIGHT WEIGHT."

Evaluators' Comments

"I obtained faster, more profound anesthesia; especially using Septocaine 4% 1:100K."

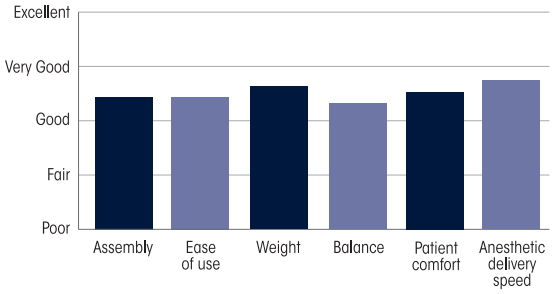
*"Everything about it is fabulous. The patients were very pleased. I have an excellent injection technique and the **Dentapen** makes it better."*

"I liked the fact that I could use whatever brand of needles and carpules that I wanted."

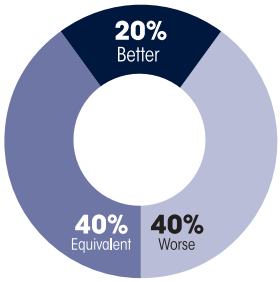
"I would have liked it to be a little quieter."

"Switching out carpules takes a bit of time as you have to wait for the computerized plunger retraction."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

50% Recommend to a colleague

50% Not recommend to a colleague

Consultants who would want to stock in office:

30% Yes, in addition to current product

CLINICAL EVALUATION

ZIPBOND

SDI sdi.com/au

++++ ½

dentaladvisor.com

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

DENTAL ADVISOR ++++ ½

29 CLINICAL EVALUATORS

862 TOTAL USES

93% CLINICAL RATING

Key features: Universal bonding agent ● Can be used for indirect or direct restorations in any etching technique ● No dual-cured activator required

Description

ZIPBOND is a light-cured, single-component universal dental adhesive that is:

- Indicated for direct and indirect restorations.
- Fluoride releasing.
- Compatible with self-etch, total-etch, or selective-etch techniques without the use of a separate dual-cured activator.

Indications

- Bonding of light, dual, and self-cured composite or compomer restorations.
- Sealing of cavity preparations prior to direct and indirect restoration placement.
- Core build ups.
- Bonding of indirect restorations when combined with a resin-based cement.
- Root surface desensitization.
- Bonding of pit and fissure sealants.
- Protective varnish for glass ionomer restorations.
- Repair of composite and compomer restorations.

DENTAL ADVISOR RESEARCH RESULTS — Bond Strength (MPa) ZIPBOND

29.7	Self-etched dentin	17.4	Self-etched enamel
24.1	Total-etched dentin	18.0	Total-etched enamel
46.1	IPS e.max CAD	48.3	IPS e.max ZirCAD

Clinical Tips

- Try it as a desensitizer, as well as for bonding.
- The light color makes it great for anterior esthetics.

"ZERO POST-OP SENSITIVITY WITH ANY OF THE PATIENTS I USED ZIPBOND ON."

Evaluators' Comments

"Light-colored, thin material. It flowed great and you could tell it got in all the crevices."

"Made even coats possible when applying multiple layers."

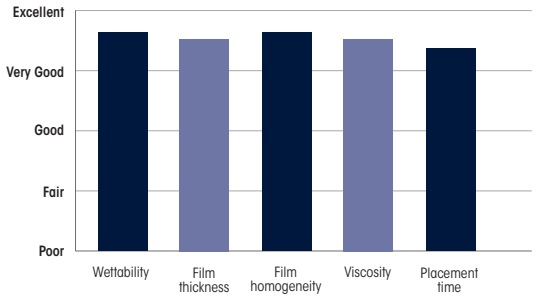
"This was a very easy and versatile bonding agent. I like to keep things simple and efficient and this material allows me to do just that."

*"**ZIPBOND** is an excellent desentizer. It is better than our current products."*

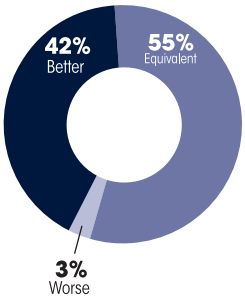
"A few times, it was very difficult to remove a sectional or circumferential matrix band due to the adhesive bond."

"It worked well in all situations in 92 restorations."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

100% Recommend to a colleague

Consultants who would want to stock in their office:

24% Yes, instead of current product

62% Yes, in addition to current product

7% I might want to order this product for certain cases

TheraBase®

BISCO bisco.com

++++ ½

DENTAL ADVISOR ++++ ½

62 CLINICAL EVALUATORS

1114 TOTAL USES

91% CLINICAL RATING

Key features: Self-adhesive base/liner material ● Dual-cured ● Mineral releasing

Description

TheraBase® is a base/liner that is:

- Calcium and fluoride releasing
- Self-adhesive utilizing MDP for dentin bonding
- Radiopaque
- Dual-cured
- Alkaline

Indication

- Base or liner under restorations

Clinical Tips

- *Use **TheraBase** for any questionable close encounter with the pulp.*
- *Press the plunger slowly with an even pressure to get the ideal flow of material.*
- *The tip can be pre-bent to better place the material in posterior teeth. I would recommend using the tips specifically designed for this material.*
- *I found it great to use in deep restorations where it was difficult to isolate the area.*
- *Use for minor block-outs during a crown prep when a full-blown core is not indicated.*
- *Great viscosity to build up areas of axial caries in deep preparations.*

"THIS IS THE BEST LINER I HAVE EVER USED!"

Evaluators' Comments

"It adhered well to dentin. I was able to build thicker amounts, and it did not wash away when I used the total-etch technique."

"This auto-mix dispensing tip makes the ease of placement superior to other light-cured liners."

"It stays where you put it and adheres very well to the tooth structure."

"Easy to dispense and flows nicely."

"Canula tip makes exact placement easy."

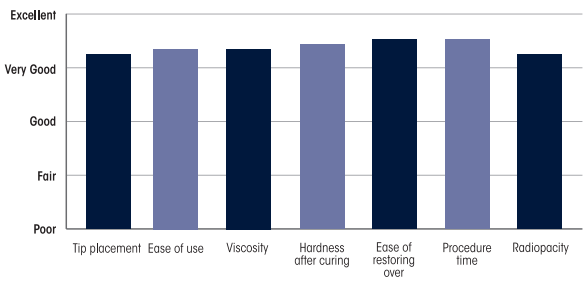
"So easy to use and my patients reported that they had no sensitivity."

"Opaqueness made for great visualization of where it was placed."

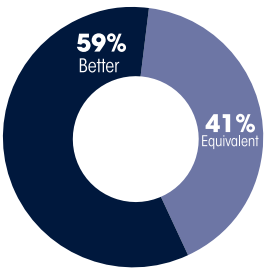
"I found it difficult to use on multiple teeth during the same visit without having to use multiple tips. The material would set quickly in the tip."

"A little thick and slightly runny to me."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

97% Recommend to a colleague

Consultants who would want to stock in office:

47% Yes, instead of current product

45% Yes, in addition to current product

5% I might want to order it for certain cases

NeoSEALER® Flo

Avalon Biomed Avalonbiomed.com

++++ ½

DENTAL ADVISOR ++++ ½

14 CLINICAL EVALUATORS

210 TOTAL USES

91% CLINICAL RATING

Key features: Root canal sealer ● Resin-free bioactive bioceramic ● Minimal waste tips

Description

NeoSEALER® Flo is a bioactive root canal sealer that:

- Contains more bioactive bioceramic cement than other premixed sealers on the market
- Can be used for both warm vertical and lateral obturation techniques
- Does not discolor teeth
- Has a resin-free formulation to maximize bioactivity and biocompatibility
- Is radiopaque
- Is anti-microbial due to its high initial pH

Indication

- Sealing of root canals during endodontic obturation

Unique Attributes

- This material is already pre-mixed, in syringe form and ready to use.
- The unique Flex Flo Tip™, not only minimizes waste, additionally the bottom half of the tip is very flexible. This allows for maximum canal penetration, even in curvy canals, if you are placing using the direct injection technique.
- The bioactive cement content is higher than other premixed sealers, to promote complete setting.
- Ideal for use with either direct injection technique or by coating gutta percha prior to insertion when using the lateral obturation technique.

Clinical Tips

- I filled the canal lightly using the stopper and still dipped my gutta percha before inserting it and heating. My results all looked really good.
- Inject slowly

"I LIKED THE DISPENSING, FLOW, AND CONSISTENCY OF THIS MATERIAL."

Evaluators' Comments

"The flex tip is amazing - how has someone not thought of this sooner?"

"I got great sealer puffs and lateral canals."

"The delivery tip is excellent and allows for precise placement in the canal."

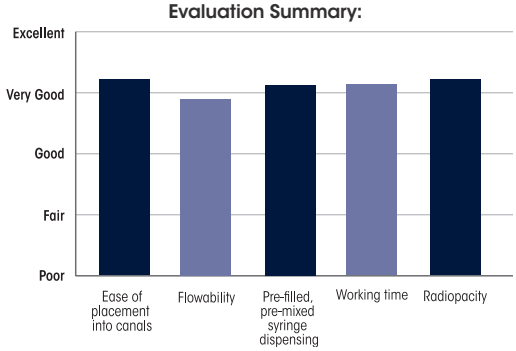
"This material was great for sealing accessory canals and irregular shaped canals."

"I experienced no post-op sensitivity when using this material."

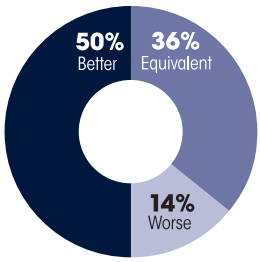
"I found it difficult to express from the tips. I would like it to be a little less viscous."

"At first, I found it a bit too stiff, but after working with it for a while, I came to appreciate the viscosity and used it to my advantage."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

86% Recommend to a colleague

Consultants who would want to stock in their office:

50% Yes, instead of current product

36% Yes, in addition to current product

14% No, however I might want to order it for certain cases

EDITORS' CHOICE

Hands-OnLine LIVE

Hands-OnLine LIVE handsonlinelive.com

+++++

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

EDITORS' CHOICE DENTAL ADVISOR +++++

DENTAL ADVISOR +++++

21 CLINICAL EVALUATORS

96% CLINICAL RATING

Key features: 2 CE credit virtual course ● Includes all materials and instruments to complete the course ● Hands-on in a clinician's office ● Live streamed course including Q&A ● On-Demand available

Description

Hands-OnLine LIVE: Live, interactive dental education delivered digitally

- Two ways to learn: Online Live and 30 Days on Demand
- Includes a technique kit with all models, materials, and instruments required to complete the course
- Is taken in the comfort of one's own operatory

Course Subject Evaluated

Mastering the Class IV Restoration

- In this course, participants are instructed on a technique designed to create a lifelike Class IV restoration that mimics the patient's adjacent teeth.
- Step-by-step layering technique demonstrated with varying layers of opacity and translucency.
- Includes polishing regimen
- Focuses on ensuring a natural esthetic result

Unique Attributes

- This is a hands-on course that is virtual, allowing you to perform the techniques in your own office.
- All materials necessary to perform the procedure are sent to your office ahead of time, including a model and composite placement instrument.
- High-quality continuing education from top-tier lecturers without having to travel.
- A variety of live courses are currently offered.

Course Instructor Evaluated

- *"Dr. Bob Margeas is a wonderful presenter and teacher. He is a subject matter expert and provides helpful tips and guidance for real world dentistry."*
- *"I appreciated the realistic perspective on materials - 'what works best for you.'"*
- *"Great narrative and pace."*
- *"Excellent pearls on placement and technique."*
- *"I have attended his lectures both in person and virtually, and he is always very engaging and a top tier educator."*

Dr. Bob Margeas

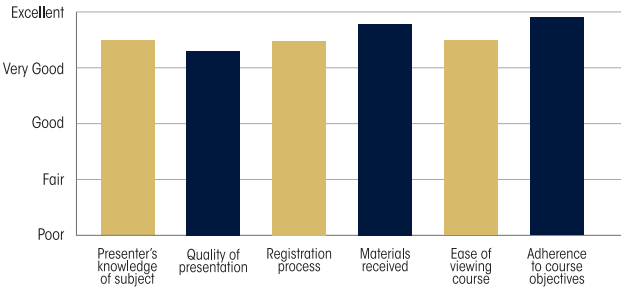
Evaluators' Comments

- *"I love being able to have all of the products sent to me and being able to work alongside a Key Opinion Leader (KOL). I get to try new products and get tips from dentists that are considered some of the best in the country."*
- *"With this format I can see and feel the process, identifying mistakes and make improvements before going chairside."*
- *"The Zoom format was actually great! I could try things in the comfort and familiarity of my own operatory, asking questions was easy, and the way he looped different steps in the demonstration and gave us some time to practice was great."*
- *"I really like the quality of the course: the lecture, materials, and ease of registration. I feel like it is a very good value."*
- *"Easy to register and good correspondence in keeping me alert and aware of the course and anything else I needed to do in preparation for it. Excellent customer service and follow up, both via email and phone to ensure I received the course materials. The packaging and layout of the course materials is well thought out."*
- *"The materials that were sent made the course extremely easy to follow along with."*
- *"Compared to in person, I don't think Zoom CE can ever match up. It is especially important to have instructor feedback with hands-on subject matter. That being said, I think this is an incredibly easy way to be introduced to great quality CE and at a great price-point."*

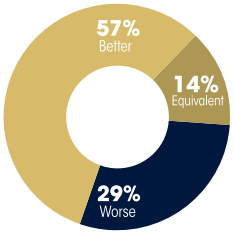
How would you compare this style of course with other courses you've taken in the past?

- *"Being able to perform these procedures in your own operatory is a huge bonus!"*
- *"It is a great format that allows participants to be engaged and have a true hands-on experience in a virtual format."*
- *"I like how there is allocated time to do the procedure without taking away from the participants ability to watch and view what the presenter is doing."*
- *"I was more comfortable using my own equipment, didn't have to use compressed air, and it was easier to make notes of any products I wanted to have ordered the next day."*
- *In some ways I liked this better, but I missed ability to have those side chats with colleague attendees, which are important for growth and networking."*

Evaluation Summary:



Compared to Competitive Programs:
(in-person and online programs)



Consultants who would:

100% Recommend to a colleague

100% Felt course was a good value

Consultants who would want to incorporate techniques into office:

72% Yes, in addition to current techniques

14% Yes, instead of current techniques

14% I may use these techniques in certain cases

DENTAL ADVISOR
Product insights you can trust.

Microbiology Research Report
J.A. Molinari, Ph.D., and D. Graham, B.A.

DENTAL ADVISOR Microbiology Research Center
3110 West Liberty, Ann Arbor, MI 48103
Number 150 – June, 2021

Air Purification and Bacterial Reduction Efficacy of the PURE BREEZE HEPA Air Purifier when used as a Whole Office Solution

J.A. Molinari, Ph.D., and D. Graham, B.A.

Purpose:

To compare the bacterial load reduction capabilities of the ***PURE BREEZE HEPA Air Purifier*** when used in a dental practice to an equal time period when no air purification is in use in the same dental practice.

Challenge Device: The ***PURE BREEZE HEPA Air Purifier*** is a portable air purifier designed to filter the air of dust, chemicals, and biological hazards. The ***PURE BREEZE HEPA Air Purifier*** has a laboratory grade, four stage HEPA air filtration system with three speed options to clean up to 1000 square feet.

Device: Bioaerosol Sampler

Device: PURE BREEZE HEPA Air Purifier

Experimental Design:

MATERIALS:

1. Four ***PURE BREEZE HEPA Air Purifiers*** (*Vaniman Manufacturing Co.*)
2. Three SAS Super 180 Bioaerosol Samplers
3. TSA with Lecithin and Poly 90 Contact Plates
4. Patient volunteers
5. Four licensed dental professional volunteers

METHODS:

Sampling occurred during normal office hours of the chosen dental practice on the Monday, Tuesday, and Wednesday of two separate weeks. During the first week of testing no air purification was utilized. During the second week of testing four ***PURE BREEZE HEPA Air Purifiers*** were utilized and set to high. Control samples were taken on the Friday of both weeks when the office was closed. For each of the six total testing days and two control sampling days, samples were taken consistently at three locations within the dental practice three times a day. The first sample was taken each day at 10 am, the second at 1pm, and the third at 4 pm. Sampling location A was at the reception desk, location B was halfway down the main hallway between the hygiene operatories and sanitation, and location C was in the back of the main hallway just outside of the dentist's operatories (Fig. 1). The number and positioning of the ***PURE BREEZE HEPA Air Purifiers*** was pre-determined through a custom air exchange analysis performed by *Vaniman Manufacturing Co.* (Fig. 2). The air exchange analysis determined the number of air changes needed per hour for the specified space. There was one week of normal operation in the dental practice between the two testing weeks. The two testing weeks were comprised of similar and comparable hours and operations within the dental practice. All sampling days were comprised of aerosol generating procedures in both the hygiene and doctor operatories. Inside and outside temperatures were recorded during each sampling time, as well as the number of personnel and patients within the dental practice. Each sample was performed using a SAS Super 180 Bioaerosol Sampler with a TSA with Lecithin and Poly 90 Contact Plate embedded inside. The bioaerosol sampler pulls in 1000L of air in 5.5 minutes onto the embedded agar plate. After each sample, the exposed TSA with Lecithin and Poly 90 Contact Plates were immediately processed and incubated at 37°C for 48 hours. Microbial growth was then quantified, analyzed, and recorded for each sampling plate.

Figure 1.

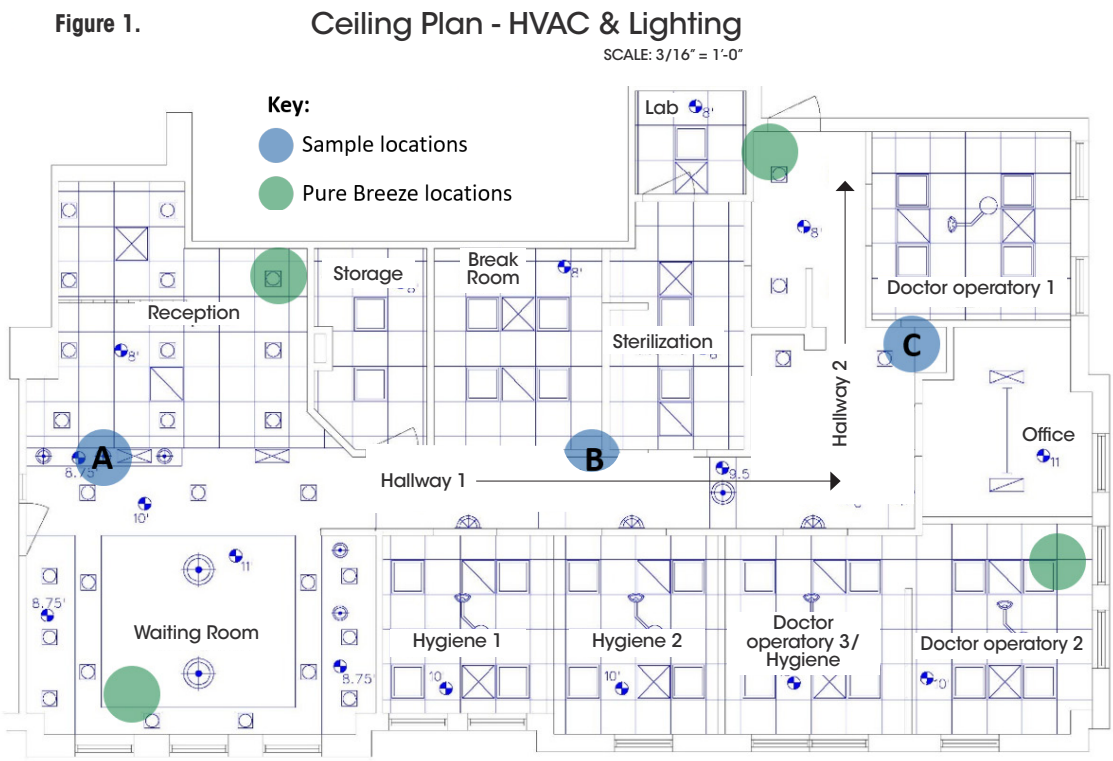


Figure 2.

Room	Total Air Volume (cu. sq. ft.)	Recommeded ACH
Waiting Room	3333	8
Reception	1612	8
Hallway 1	940	8
Storage	609	6
Break Room	875	8
Sterilization	616	10
Lab	287	6
Doctor Op 1	1215	6
Office	994	8
Hallway 2	1107	8
Doctor Op 2	1186	6
Doctor Op 3	1226	6
Hygiene 2	1064	6
Hygiene 1	944	6
Total volume of air in the entire office		**118,109**
Average recommended ACH total office		**7.14**
Pure Breeze units needed to reach this ACH:		**4**

Reception area

Waiting Room

Results:

Data was averaged by sample location within the office. On average the collected bacterial load was lower for all 3 sample locations during the week when the ***PURE BREEZE HEPA Air Purifiers*** were in use compared to the week when no air purification was utilized (Fig. 3). Averaging all 27 samples for both weeks resulted in a 40% decrease in overall collected bacterial load in the dental practice when using the ***PURE BREEZE HEPA Air Purifiers*** compared to the week when no air purification was used (Fig. 4). It is important to note that there are two high outliers in the data set of the week without air purification (week 1). Even without these two data points, the data still showed a 10% decrease in bacterial load with the use of the ***PURE BREEZE HEPA Air Purifiers***. Without air purification there was a higher standard deviation in the data and higher fluctuations in the collected bacterial loads than in week 2 when the ***PURE BREEZE HEPA Air Purifiers*** were in use. Overall, the observed trends showed a decrease in bacterial load with the use of the ***PURE BREEZE HEPA Air Purifiers***. The control samples showed low CFU (colony forming unit) counts when the office was completely empty for both weeks (Fig. 4). The number of people in the office during each sample was also a recorded variable (Fig. 5).

Figure 3.

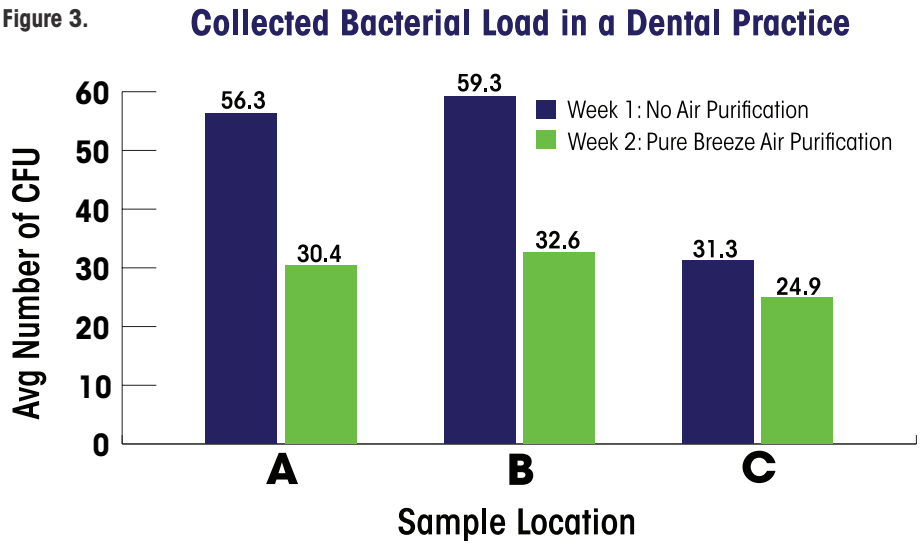


Figure 4.

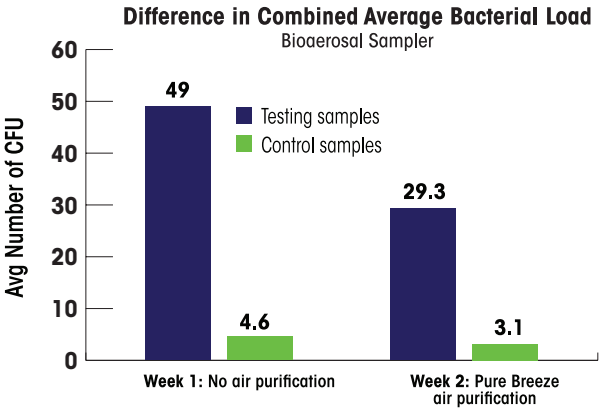
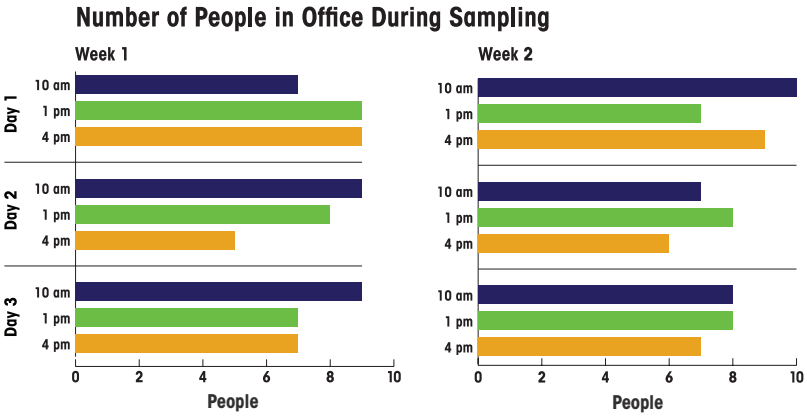


Figure 5.



Discussion:

In this pilot study, the data showed trends of overall bacterial load reduction when ***PURE BREEZE HEPA Air Purifiers*** were in use in a dental practice compared to having no air purification usage in the same dental practice for an equal time. The purpose of keeping the outliers in the data set was to emphasize that the use of ***PURE BREEZE HEPA Air Purifiers*** seemed to have an effect on keeping airborne bacterial load from fluctuating higher. It is possible that the use of ***PURE BREEZE HEPA Air Purifiers*** stopped the bacterial load in the air from dramatically spiking due to certain circumstances that would have normally caused a spike in airborne bacterial load. Bacterial counts were low overall compared to DENTAL ADVISOR'S other research studies, because the bioaerosol samplers were placed outside of the operatories rather than in the operatory in front of the patient's mouth during an aerosol generating procedure. Limitations and variables in this pilot study included a small sample size, varying aerosol generating procedures occurring during sampling, the number of patients being treated at any given time, and/or the natural flow of air in the building via the HVAC system. Future studies could account for these variables and limitations.

Conclusion:

The findings from this study showed trends of reduced airborne bacterial load when the ***PURE BREEZE HEPA Air Purifiers*** were in use during a busy practice workweek consisting of aerosol generating procedures.

Trendsetter

*DENTAL ADVISOR interviewed **Nathan Frey,** Senior Marketing Manager for **4C Air** regarding their new BreSafe Masks that utilize nanotechnology*

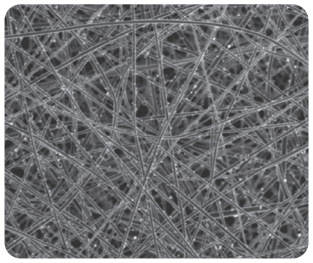
The **U.S. Food and Drug Administration** (FDA) is revoking the Emergency Use Authorizations (EUAs) for non-NIOSH-approved disposable respirators (revocation effective July 6, 2021) and the EUAs for decontamination and bioburden reduction systems.

What does this mean?

- During the pandemic FDA allowed healthcare professionals to utilize respirators that not been approved due to shortages.
- Currently there is not a shortage of NIOSH approved respirators
- Due to availablity, mask conservation strategies in effect, meaning masks and respirators are single-use disposable and should be changed after each patient.
- The FDA is no longer authorizing decontamination of respirators.

Utilizing nanotechnology to provide cleaner air

Even prior to the pandemic, 4C Air, was already working on a solution related to the shortage of personal respirators. In 2015, two Stanford University Professors, Yi Cui and Steven Chu were seeking a way to harness the power of nanotechnology to create a more effective filtration system to address two emerging crises; increased air pollution and the rise of contagious airborne viruses. Their research led them to develop a patented nanomaterial called BreSafe™ which they incorporated into the design of a new KN95 respirator that offers a 99% filtration rate with the added bonus of better breathability. Since the nanofibers are more effective at mask filtration, bacteria are trapped on the outside surface and don't permeate back to the wearer. This unique surface can also be cleaned, however, claims await research to show cleaning does not degrade performance.



Magnified image of the weave of the nanotechnology fibers used in *BreSafe™* masks.

Pandemic player

It was this expertise that led 4C Air to become an invaluable member of a global response team when COVID-19 besieged the world in 2020. The pandemic caused health professionals to quickly seek out masks that were effective for both airborne and droplet contamination. They were tapped by the World Health Organization (W.H.O.), Center for Disease Control (CDC), National Institutes of Health and the National Institute for Occupational Safety & Health (NIOSH) to provide guidance during the pandemic with regard to identifying counterfeit PPE that didn't meet the 95% standard effectiveness rate against airborne disease.

The *AireTrust Nano Mask* designed using BreSafe™ nanotechnology

Spotting counterfeit masks

Although some masks are assembled and packaged in the U.S., most production occurs in American factories located in Asia. As with many goods, most Americans are wearing masks that were originally made in China but inspected by NIOSH for adherence to a strict health standard. When masks became scarce, China became a critical supplier during the pandemic, but unfortunately China also became a mass exporter of counterfeit KN95 masks.

Questions to ask:

- **Do other distributors sell these particular masks?**
- **Are there markings on the mask?**
- **Is there an FDA logo on the box or packaging?**
- **Are there typos or misspellings or changes in fonts or any alterations on the packaging?**
- **Is the company listed on the FDA or CDC website as a reputable manufacturer?**

KN95 is the designation given to regulatory standard certified for masks in China which are similar to the requirements for the N95 respirators sold in the U.S. KN95 masks are supposed to provide a 95% protection rate against all particles including bacteria and viruses and were designed for one-time use only (in contrast, N95 masks have a 97% protection rate).

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SPECIAL THANKS TO:

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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

Laboratory Consultants: Apex Dental Milling, MI