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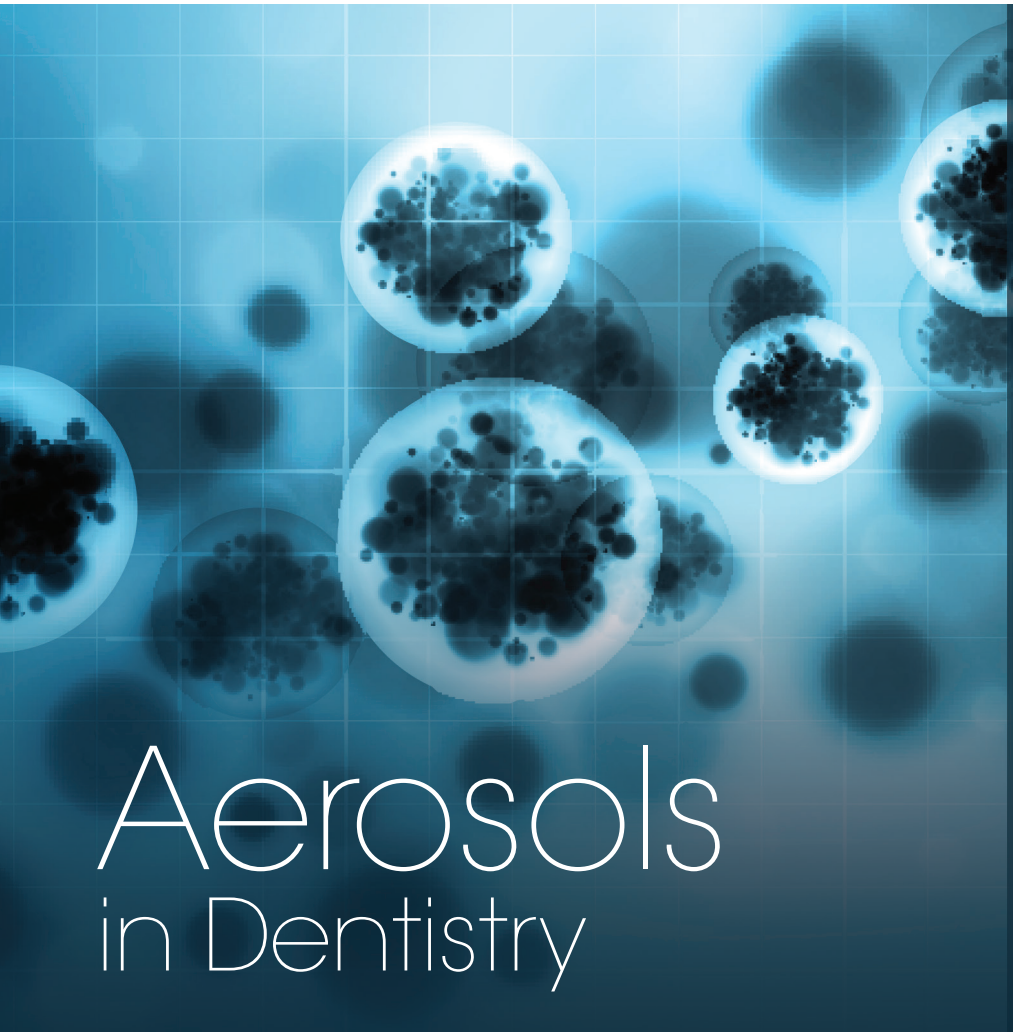

Aerosols in Dentistry

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

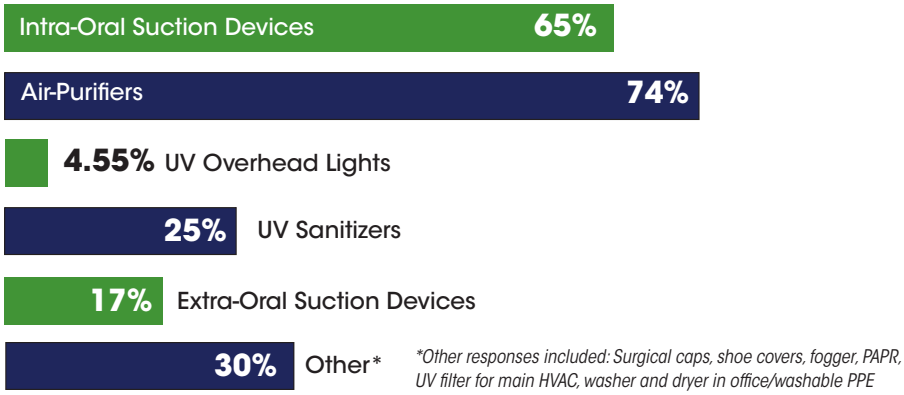
The onset of the pandemic affected dental professionals throughout the world. Although clinicians have always been on the forefront of infection control, the new virus surfaced concerns about the way we practice, effects on our team and patients and the workflow of our dental offices. During the shutdown, most of us had to make decisions about what to purchase and which new protocols to implement so we could open up our doors and ensure a safe environment for our patients and team members. Personally, I invested in medical grade air purifiers, additional PPE, and extraoral suction devices. For someone like me, making these purchasing decisions was a difficult because there was no real research or guidance specific to dentistry pertaining to COVID-19. As a result, I had to purchase things based on the little knowledge I had about the virus. Since March, our team at DENTAL ADVISOR has been working around the clock conducting preliminary testing on aerosol and spatter mitigating products and factors that influence it. We performed initial testing that mimicked everyday clinical procedures so that we could come to some conclusions and make recommendations for our readers. In my time here with DENTAL ADVISOR, I could not be prouder of our team and how hard they worked to get this research done so that we could help the dental community. Again, this is preliminary data but you can be sure we will continue to keep you up to date as more information is gathered. As always, we look forward to hearing from our readers and welcome your comments and suggestions; you can reach me at drbunek@ dentaladvisor.com, or our team at connect@dentaladvisor.com

— Sabiha S. Bunek

Our clinical evaluators and webinar attendees have provided us with valuable information to focus our research and clinical testing during the pandemic. Since March, we have interacted with thousands of dental professionals who have posed important questions regarding COVID-19, Aerosols, PPE, and what the best products and practices are.

From the FIELD: *We asked our evaluators what they have purchased for their practice during the pandemic*

In returning to practice after shutdown, what devices have you implemented?



**Other responses included: Surgical caps, shoe covers, fogger, PAPR, UV filter for main HVAC, washer and dryer in office/washable PPE*

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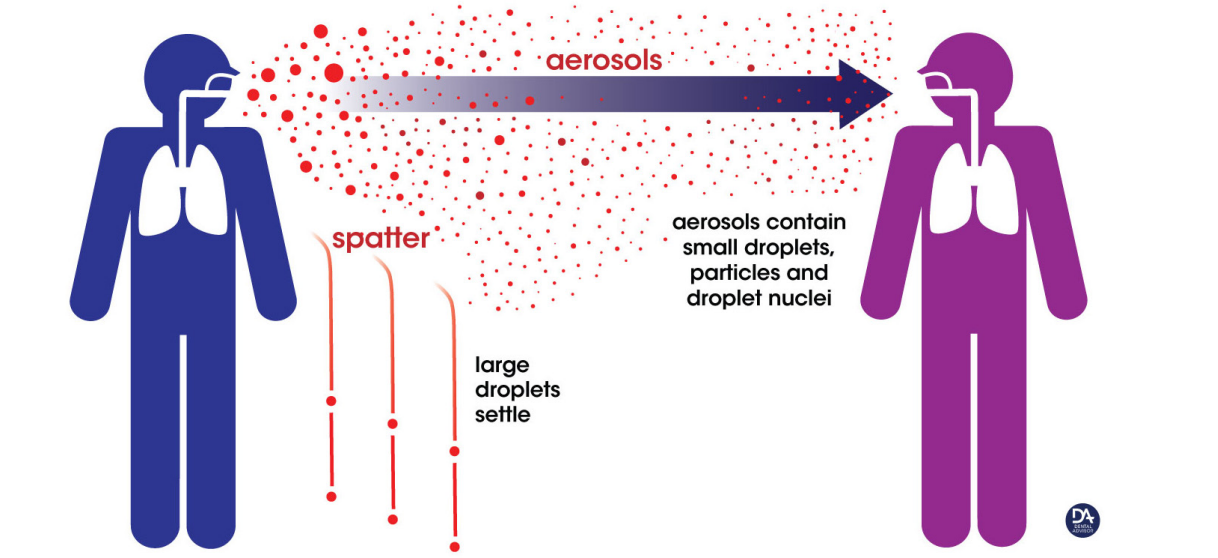
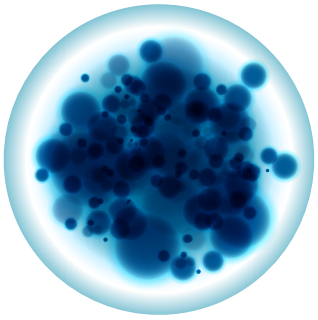
How is airborne disease spread?

Spatter and aerosols occur when an infected person coughs, sneezes, or talks during an aerosol generating procedure.



Spatter settles closer to the source individual

Aerosols travel further from the source individual



Large droplets in spatter typically fall and settle within a short distance from the source.

Aerosols travel further. They contain small droplets and particles, and droplet nuclei.

Close range inhalation occurs when a droplet containing microorganisms is breathed in close to the source.

Small droplets, particles and ***droplet nuclei*** (< 10 µm) contained in aerosol are breathed in.

Routes of transmission vary by microorganism. Some are ***contact transmission*** only, ***bloodborne transmission,*** or can be transmitted predominantly by one of several methods but possible by another.

During the recent pandemic, it has been found that transmission of SARS-CoV-2 can occur by contact, close range droplet, and airborne modes of transmission.

Basic principles for ***minimizing the spread of infection***

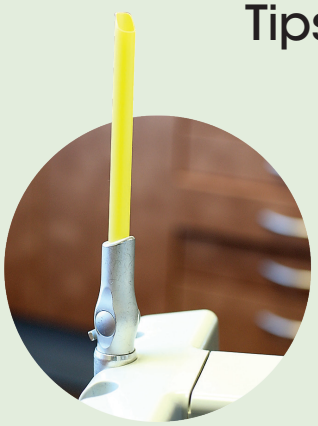
During the pandemic, follow the CDC Interim Infection Prevention and Control Guidance for Dental Settings

Recommended strategies include:

- Always perform the recommended ***screening health checks for all patients, visitors and dental team members*** during the pandemic. Triage patients
- ***Limit the number of total individuals in the office*** by spacing out appointments
- ***Maintain social distancing*** in the waiting area
- Perform ***hand hygiene as recommended by CDC,*** and use products containing emollients
- ***Patients and visitors should wear their own facemask*** covering during their visit. If they do not have one, they should be offered a facemask or cloth face covering
- Clinical team members should ***wear recommended PPE that is FDA cleared as a medical device,*** including single-use, disposable gloves, N95 respirators or surgical masks, face shields or goggles, and gowns
- Outside of the operatory, all ***dental team members should wear a face mask*** or cloth face covering at all times. Follow CDC guidance regarding use, reuse, extended use and alternative PPE
- ***Minimize the number of clinical team members present*** in treatment rooms
- Consider the use of a ***pre-procedural mouth rinse*** for patients
- When performing an aerosol generating procedure, ***use HVE***
- Practice ***excellent surface disinfection and sterilization methods***, refer to List N on the EPA website to research approved products, and ***establish a system for checking effectiveness*** of practice methods
- ***Maintain your vacuum system***

The importance of a ***strong Evacuation system***

One of the most overlooked areas in equipment maintenance is that of the main vacuum system. ***High Volume Evacuation can significantly reduce the amount of spatter and aerosols exiting the oral cavity.*** Typically, when an office is built or remodeled, a suction system is chosen for the number of operators expected to be utilizing HVE and SE (saliva ejector) simultaneously. Often, suction systems are not thought about again until a problem occurs. In recent years, dry vacuum systems have become increasingly popular due to water savings, the strong suction pull they provide, no need for backflow prevention devices, and the low amount of maintenance needed.

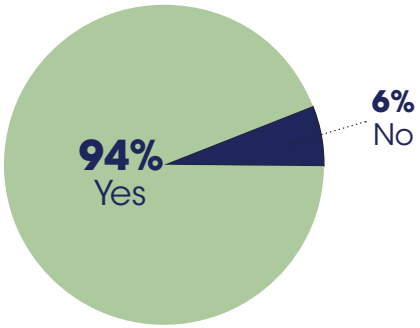


Tips for maintaining your vacuum and suction lines

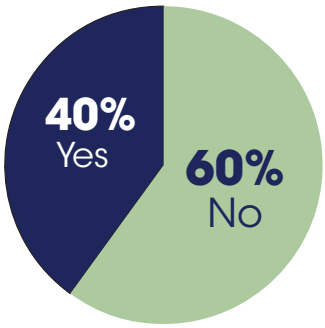
- **Flush all lines every day with a non-foaming evacuation line cleaner.** Start with the room furthest away from the main vacuum, and leave all lines open until the last room's lines have been flushed
- **Clean or change out each chairside operatory trap daily.** Note: If your office uses or removes amalgam, traps should not be rinsed, and should be properly disposed of
- **Check the main trap at least weekly.** Empty the main trap as needed and clean filter
- **Monthly: If using a dry vacuum, check lubrication levels** and maintain as necessary
- **Periodically inspect hoses, valves, and connectors** in all operatories to check for leaks that could affect overall suction power
- **At least annually, contact a qualified service technician** for an overall equipment check

From the FIELD: *We asked our evaluators about using HVE in hygiene rooms*

Are your hygiene rooms equipped with HVE?



Are you planning on purchasing any type of HVE device for hygiene?



How do you know if your Evacuation system is performing optimally?

Measuring the health of High Volume Evacuation lines is an important step in maintenance. A qualified service technician can perform a system check using a specific measurement device. We reached out to Dental EZ for a recommended method to measure a baseline for High Volume Evacuation.

Normal vacuum flow for HVE is 7.25 SCFM. Depending on elevation, your gauge reading should be at least -1.5. Any flow less than 5 SCFM will provide poor performance and usually indicates an issue in your evacuation line or vacuum system.

Essential guidance from the CDC regarding PPE

OSHA has also provided temporary enforcement regulations. Check for dental specific guidelines on their website.

COMMUNITY RISK	ACTIONS
No to minimal community transmission	Follow Standard Precautions for PPE - and Transmission-Based Precautions if required (suspected diagnosis of COVID-19)
Higher levels of transmission	**N95** for aerosol generating procedures or another respirator* **A surgical face mask** and **face shield** are acceptable for procedures that do not generate aerosols **Eye protection**: Use a face shield protecting the front and sides of the face or goggles **Surgical gown and single-use, disposable gloves** **Acceptable alternatives to N95 respirators include powered air-purifying respirators (PAPRs), disposable filtering facepiece respirators, or elastomeric respirators*

Q. What if there is a shortage of PPE? Can we extend or reuse what we have?

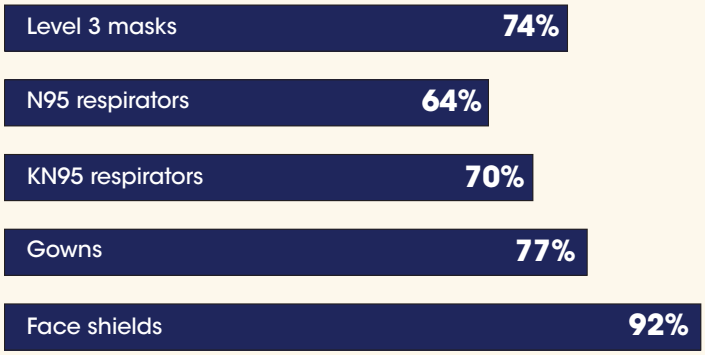
A. Yes, you can reuse or extend use of PPE under CDC Guidelines of contingency and crisis situation strategies.

However, be sure you have already addressed the following:

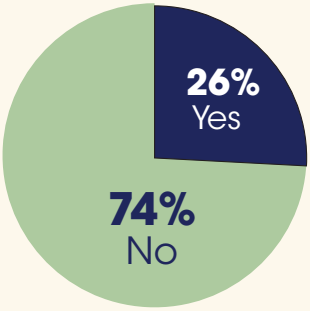
- Calculate your PPE usage and conserve wherever possible
- Identify sources of credible supplies through authorities and partners
- Prioritize care, selectively cancel elective and non-urgent care
- Use engineering controls to further minimize exposure
- Ensure dental team members have received full training and education on PPE

From the FIELD: *We asked our evaluators about PPE usage*

What PPE is your office currently using?



If you are using N-95 respirators, has your team been fit tested?



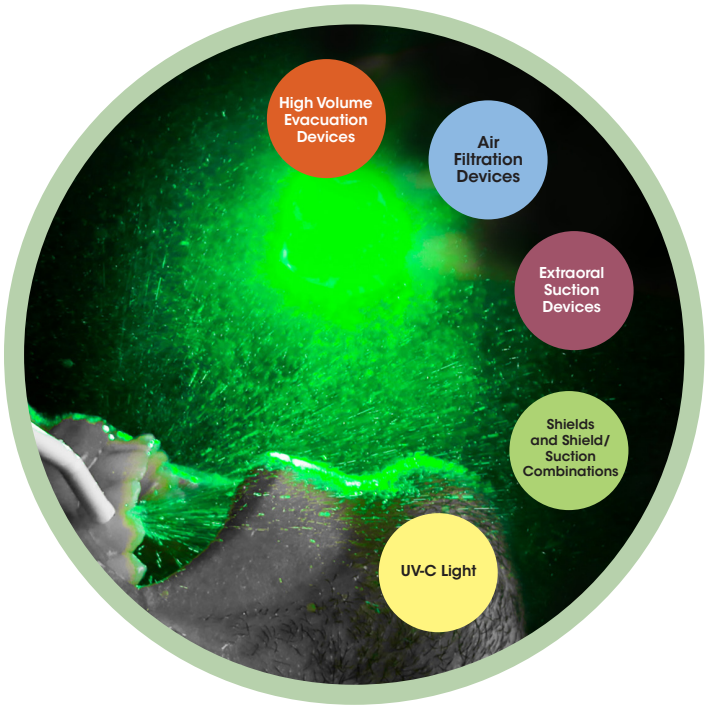
Note: Under OSHA, medical evaluations and initial fit testing are still a requirement. If you have a State OSHA Plan, check that for your State.

Aerosol & Spatter Mitigating Devices:

How they work and considerations before purchasing

High Volume Evacuation Devices

HVE is recommended by the CDC to capture aerosol and spatter. Standard HVE is over 90% effective. Originally only straight, wide-bore tips with or without flaring were available. Others now include those with an adjusted angle or shorter tip, and a modified design combining mirrors and HVE. Hands-free options include tongue retraction and a bite block,and connect to the HVE system. These are popular with single operators.



Air Filtration Devices

The CDC interim guidance suggests considering a HEPA air filtration unit. HEPA-13 filters are tested to remove at least 99.97% of particles 0.3 µm particles. An evaluation of air exchange per hour is important to assess for each individual dental office. The operatory dimensions, position of the unit, quietness of the unit and the Clean Air Delivery Rate are among the other considerations. Note that a 'HEPA-like filter' is not the same as a HEPA filter. Before purchasing, ask for independent testing of the device in a dental practice setting.

Extraoral Suction Devices

Often comprised of a capture box and poseable neck, extraoral devices are designed to capture aerosol not captured by the use of intraoral HVE. Most available extraoral suction devices offer portability and can be utilized from any position chairside. Their size, shape and suction capacity varies. Some include a HEPA filter to treat the captured air before exhausting it. Others include a UV-C light; Note that minimum times and specific wavelengths are required to offer any efficacy. If you are considering purchasing one, ask for information and the results of independent testing on the capacity, considerations, limitations, and the actual efficacy of any treatment before exhaust air is released, for that specific unit.

Shields and Shield/Suction Combinations

Several adjunctive devices designed to shield the operator and assistant from spatter are available. There are differences between devices both in the shield configuration, size, shape and type of suction. Ask if independent testing has been performed and results for the specific one you might be considering. Remember to take into account other factors in your operatory, such as type of connection, available suction lines and size of shield in relationship to your type of delivery system.

UV-C Light

Ultraviolet germicidal irradiation employing UV-C is being used to decontaminate air and surfaces in larger healthcare settings, and effective when properly used. In dental operatories, units can be ceiling-mounted, portable standing units, or UV-C can be used in suspended air filtration units. The length of exposure time and wavelength must be sufficient to kill microorganisms. The size and volume of the operatory, distance to objects (for surfaces), wavelength, length of time, potential degradation of equipment and other factors need to be considered. UV-C light does not penetrate obstructions and surfaces require cleaning prior to UV-C disinfection. Avoid direct exposure. When considering adjunctive UV-C Light, ask for specifications, independent testing results and safety data for any device(s) you are considering, as well as the needs of your specific operatory and available support.

Genius.Shield

BriteHive Solutions
(brighthivesolutions.com)

Genius.Shield (BriteHive Solutions) is an innovative combination shield and vacuum with an inverted design. It is designed to shield dental professionals from overspray and spatter generated by AGP (aerosol generating procedures).

Patient comment: "The suction power seemed very effective, I was very surprised! I didn't notice any droplets or spatter on my face. The shield is large enough where I did not feel contained or claustrophobic."

Hygienist comment: "I expected this to get in my visual field and complicate things. It didn't. I also was concerned for my patient but he didn't experience any issues at all."

Vanguard Gold Mobile

Vaniman
(vaniman.com)

The Vaniman ***Vanguard Gold Mobile*** is an extraoral aerosol suction system that utilizes HEPA filtration to safely capture biological aerosols during dental procedures. It utilizes a long flexible tubing system which can be adjusted as needed to work with any delivery system. It features 23kpa of suction power and operates at a quiet 53dB. It is made in the USA.

Initial clinician comment: Quieter than I expected for an external suction system.

Mr. Thirsty One-Step

Zirc Dental Products
(zirc.com)

Mr. Thirsty® One-Step provides hands-free retraction, isolation, and high-volume suction all in one device. It can be easily trimmed as needed without compromising power. By connecting directly to an existing HVE valve, it requires no extra hosing or adapters. An optional comfort hose allows the existing HVE Valve/Tubing to stay mounted to the equipment and reduces the amount of weight near the mouth. The device is single-use disposable and eliminates the need to clean and sterilize a device. ***Mr. Thirsty® One-Step*** is available in small and large sizes and an optional comfort hose.

shieldVAC™

TBS Instruments
(shieldvac.com)

shieldVAC™ by TBS Dental is a combination of shield and vaccum which is designed to capture expelled dental aerosols in advance of personal protective equiment (PPE). In three simple steps, ***shieldVAC*** is connected to the chair using a clamp, a selected shield is attached (three sizes are provided) and secured to existing HVE. ***shieldVAC*** utilizes an adjustable arm attached to a shield that stays steady where positioned, making two-handed hygiene possible without an additional assistant to hold HVE.

DENTAL ADVISOR Aerosol Studies

Our pilot studies have helped to show some trends. They are by definition small studies offering preliminary data, and raise additional questions and future directions for research. Larger studies can be completed to obtain data from which statistical significance and proof can be determined. Our goal is to combine scientific information with clinical data and we will be updating our reporting. The following studies were performed by our DENTAL ADVISOR team over the past several months in a dental practice on patients. Standardized laboratory data could also be obtained. Currently, there is no method available to us to quantify and measure viral load in aerosols. We are still experiencing the pandemic and urge everyone to follow the CDC interim guidance for the dental setting.

Purevac HVE System

Dentsply Sirona
(dentsplysirona.com)

Purevac HVE System enables a one-handed approach to evacuating fluid and debris while facilitating retraction, visibility, and illumination during the ultrasonic scaling procedure.

This innovative system handles multiple procedures and includes a fog-free mirror for indirect vision and illumination to the work site. Its rounded, smooth edges are designed for retraction of the oral mucosa, and the mirror tip is autoclavable up to 100 cycles. The 360° swivel connection for the HVE mirror tip connects to the flexible, lightweight and kink-resistant hose, while ports in the mirror tip provide continuous airflow, reducing mucosal aspiration and risk of back flow.

JADE

Surgically Clean Air
(surgicallycleanair.com)

Surgically Clean Air's Jade model employs a 6-stage filtration and sterilization process to remove viruses, bio-aerosols, odors, gases, mold, allergens, and more. It achieves six air changes per hour at a reported 50 dB noise level. No installation is inquired; the compact unit simply plugs into the wall.

Key features:

- **6 filters:** Ultrafine particulate HEPA-Rx filter, activated carbon filter, Germicidal UV-C+ bulbs, hydroxyl radical reactivity chamber, revitalizing negative ION chamber
- HEPA-Rx filters were independently tested to remove 99.998% of particles at 0.1 microns.
- Noise-canceling, sound dampening design compact: 33.5″ x 12″ and 31 lbs.
- **Power:** 120V, 60Hz

VacuVUE

Ascentcare Dental Products
(ascentcaredental.com) (616) 600-4505

VacuVUE is an innovative mirror and suction device which reportedly assists with aerosol reduction, clear clinical views, retraction and saliva control.

11 high-volume evacuation ports: Greatly reduce aerosols, spatter and liquids while viewing or retracting with front and rear evacuation ports.

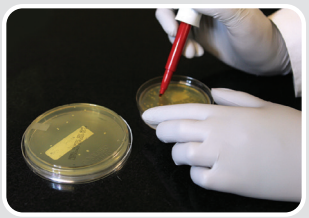
Free-rotating HVE valve connection: Simply plug and play with your existing HVE valve or use an optional Whisper Lite hose extension kit.

PureHD mirror faces: Diagnose confidently with a mirror head that is positioned at 45 degrees, has 75 layers of front mirroring, a reported 99% color accuracy and is 40% brighter than rhodium mirrors.

Tool-free mirror face replacement: Easily replace mirror faces when scratches and natural wear inevitably occur.

Autoclavable: Type II anodized aerospace-grade aluminum construction designed for long-term durability.

Lightweight: Reduce fatigue with the optional wrist assist vacuum line relief band.



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Microbiology Research Report

**Sabiha S. Bunek, D.D. S., Fiona Collins, B.D.S, M.B.A., M.A.
Ona Erdt, D.M.D., M.S., M.S.H.S. and Delaney Graham, B.A.**

DENTAL ADVISOR Microbiology Research Center
3110 West Liberty, Ann Arbor, MI 48103

Number 135 – July, 2020

Aerosol and Spatter Reduction Efficacy of shieldVAC™

Purpose:

A pilot study to assess the amount of bacterial load derived from aerosol and spatter when using ***shieldVAC™*** compared to a high-volume evacuation system (HVE) and low-volume evacuation (saliva ejector; SE).

Challenge Device:

shieldVAC™ is a circular shield and suction device which is clamped to the dental chair headrest and uses the existing HVE valve and hose as an added external suction. The arm can be adjusted to a desired position, between six and eight inches from the patient's mouth. Simply turn on the suction as you would normally use it and work underneath any of the 3 provided shields: 8 inch, 10 inch, and 12 inch. ***shieldVAC™*** is designed to protect the dental professional from spray and spatter generated during dental procedures.

Experimental Design:

Controlled Variables: Volume of air flowing onto contact plates, the air-driven low-speed hygiene handpiece used at a consistent PSI, RPM, and water spray level with HVE for all conditions, prophy paste all fine grit, ultrasonic scaler set to 60Hz.

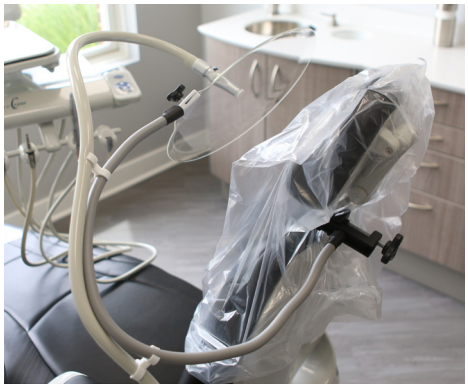
Materials:

shieldVAC (TBS Dental), ***Cavitron*** ultrasonic scaling unit with 30k 10s ***FSI*** (Dentsply Sirona), ***Prophy Star 3 Hygiene Handpiece*** (Dental EZ), ***Sparkle Soft Disposable Prophy Angle*** (Crosstex), ***Enamel Pro Prophy Paste*** (Premier Dental), standard HVE and SE with suction tips, SAS Super 180 Bioaerosol Sampler, TSA with Lecithin and Poly 90 Contact plates, TSA Settling plates, patient volunteers (A, B, and C), licensed dental professional, PPE including an N95 respirator.

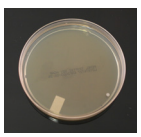
Methods:

Each ultrasonic scaling and polishing procedure was completed while the office was closed, and all procedures were completed in one designated operatory. Prior to the first patient, HVE lines were cleaned with an evacuation line cleaner and traps were changed. Additional SE and HVE lines were running in all four operatories during the study to simulate simultaneous treatment in each operatory. The dental professional wore PPE, including an N95 respirator for all procedures. No face shield was used. The same dental professional performed all ultrasonic scaling and polishing procedures in this study. The ultrasonic scaler was consistently set to 60Hz and operated at the highest water spray level. An air-driven, low-speed hygiene handpiece was used at a consistent PSI, RPM, and water spray level for all conditions. Fine grit prophy paste was used for all polishing procedures. A control sample of the operatory air was taken for 5 minutes while patient A and the dentist were in the room, prior to any aerosol generation, using the SAS Super 180 Bioaerosol Sampler with a TSA with Lecithin and Poly 90 Contact Plate (SAS CP) placed 18 inches from the patient's mouth, a TSA

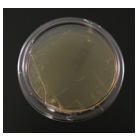
Device



Control



Control: Chest (CFU = 1)

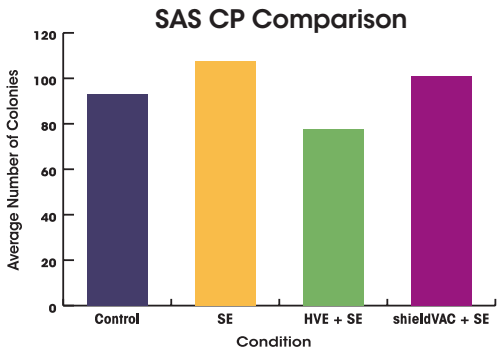


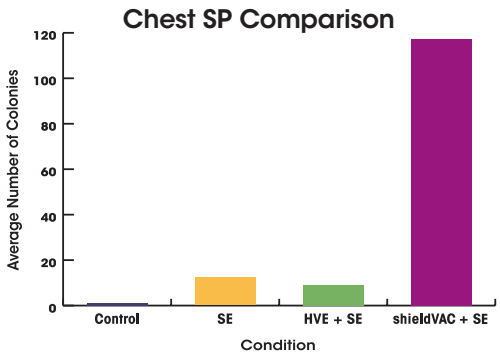
Control: Mask (CFU = 0)

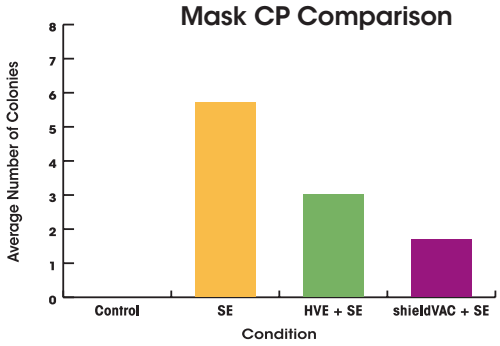
Control: SAS (CFU = 93)

Settling Plate placed on the patient's chest 8 inches from their mouth (Chest SP), and a second TSA with Lecithin and Poly 90 Contact Plate to culture the N95 mask worn by the dentist (Mask CP) following 5 minutes of contact time with the patient where no aerosols were generated. The positioning of each plate was consistent for all testing for the duration of the study. For each procedure, all quadrants of the mouth were treated. This consisted of 2.5 minutes of ultrasonic scaling and 2.5 minutes for polishing using a prophy angle and prophy paste. The SAS CP in the bioaerosol sampler and the Chest SP were used to routinely collect air quality samples for 5 minutes during each procedure. Both plates were replaced after each 5-minute interval and after each procedure a new Mask CP was used to culture the N95 respirator worn during aerosol generation.

Three separate conditions were utilized for comparison purposes on each of the three patient volunteers. The first condition utilized SE, the second condition utilized standard HVE together with a SE, and the third condition utilized the ***shieldVAC™*** together with SE. The positioning of the SE was consistent throughout all testing and the ***shieldVAC™*** was consistently placed 7 inches from the patient's mouth. There was a 20-minute room turnaround time between each patient, during which appropriate clinical contact surface cleaning and disinfection protocols were followed. After each test run, the exposed plates were immediately processed and incubated at 37°C for 48 hours. Microbial growth was quantified, analyzed and recorded for all plates. All testing procedures were repeated on all three patient volunteers. Before testing, all volunteers agreed to participate in the study and to having their photos taken.





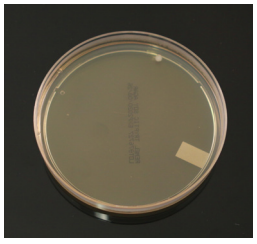


Results:

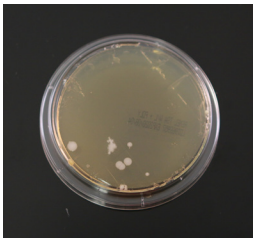
The bacterial load collected on the SAS CPs decreased by 5.9% when using the ***shieldVAC™*** compared to only using a SE and increased by 29.9% when compared to HVE. The bacterial load collected on the Chest SPs increased by 853.7% when using the ***shieldVAC™*** compared to only using a SE and increased by 1203.3% compared to use of HVE. The bacterial load collected on the Mask CPs decreased by 70.1% when using the ***shieldVAC™*** compared to the SE and decreased by 43.3% when using ***shieldVAC™*** compared to the HVE. The results for each of the three patients varied are shown below.

Patient A

Patient A: SE



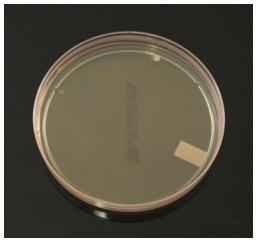
SE: Chest (CFU = 3)



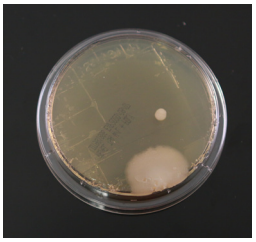
SE: Mask (CFU =13)

SE: SAS (CFU =127)

Patient A: HVE + SE



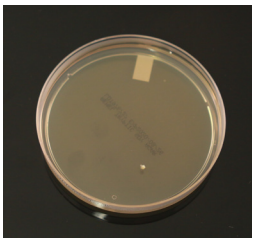
HVE + SE: Chest (CFU = 3)



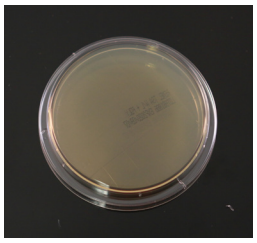
HVE + SE: Mask (CFU = 2)

HVE + SE: SAS (CFU =116)

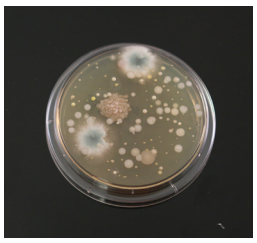
Patient A: shieldVAC + SE



shieldVAC + SE: Chest (CFU = 3)



shieldVAC + SE: Mask (CFU = 0)



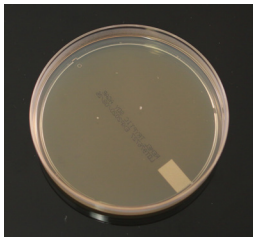
shieldVAC + SE: SAS (CFU = 133)

Patient A Summary:

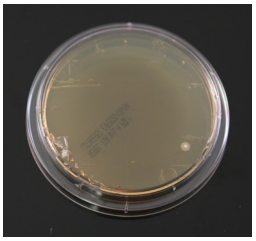
Containment of bacterial load spatter showed no difference on chest plates between ***shieldVAC***, HVE, and SE.

Patient B

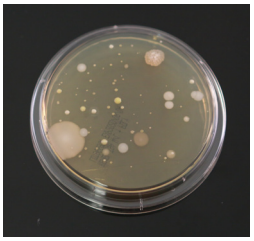
Patient B: SE



SE: Chest (CFU = 2)

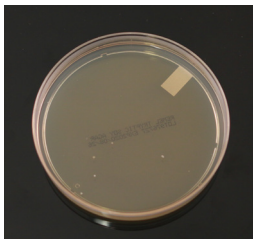


SE: Mask (CFU = 2)

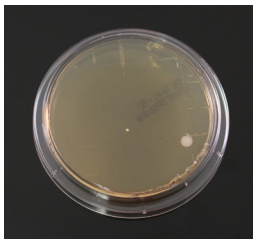


SE: SAS (CFU = 76)

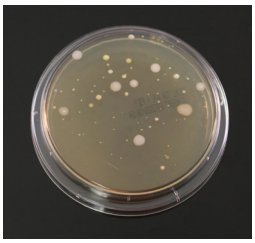
Patient B: HVE + SE



HVE + SE: Chest (CFU = 11)

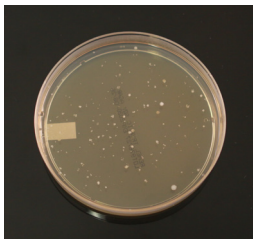


HVE + SE: Mask (CFU = 2)

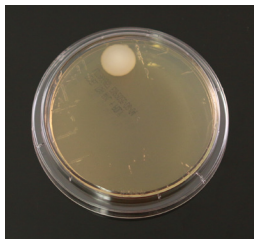


HVE + SE: SAS (CFU = 74)

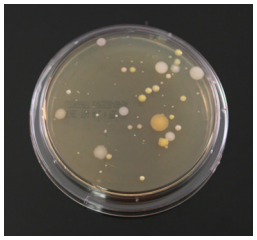
Patient B: shieldVAC + SE



shieldVAC + SE: Chest (CFU = 284)



shieldVAC + SE: Mask (CFU = 1)



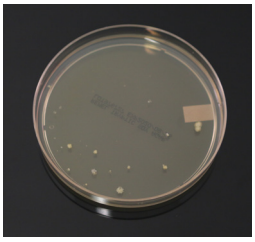
shieldVAC + SE: SAS (CFU = 70)

Patient B Summary:

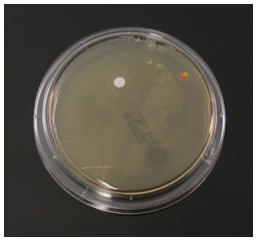
shieldVAC contained 142x more collected bacterial load spatter on chest plates compared to SE and 26x more than HVE.

Patient C

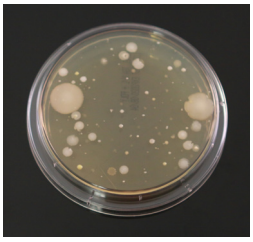
Patient C: SE



SE: Chest (CFU = 32)

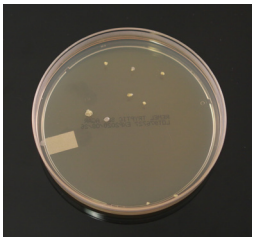


SE: Mask (CFU = 2)

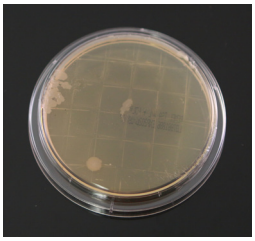


SE: SAS (CFU = 119)

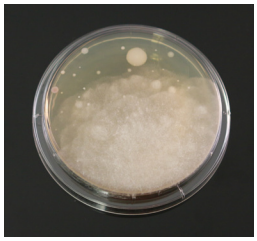
Patient C: HVE + SE



HVE + SE: Chest (CFU = 12)

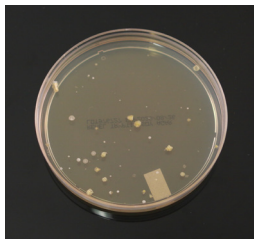


HVE + SE: Mask (CFU = 5)

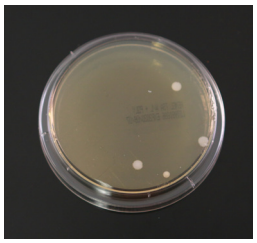


HVE + SE: SAS (CFU = 43)

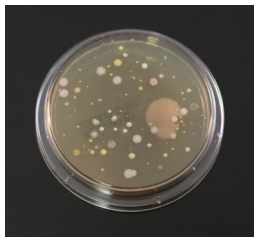
Patient C: shieldVAC + SE



shieldVAC + SE: Chest (CFU = 65)



shieldVAC + SE: Mask (CFU = 4)



shieldVAC + SE: SAS (CFU = 100)

Patient C Summary:

shieldVAC contained 2x more collected bacterial load spatter on chest plates compared to SE and 5x more than HVE.

Discussion:

The data show that the use of the ***shieldVAC™*** and SE together reduced the amount of bacterial load from spatter on an N95 respirator worn by a dental professional during an aerosol generating procedure, but increased the bacterial load found on the patient's chest during the same procedure. The data also show that the ***shieldVAC™*** decreased the bacterial load found in aerosols when compared to using only a SE, but increased the bacterial load found in aerosols when compared to a HVE. The increase in bacterial load on the patient's chest while using the ***shieldVAC™*** could have been due to the build-up of spatter on the shield causing bacteria to ricochet or fall back onto the patient, thus protecting the dental professional. This is also supported by the decrease in the bacterial load found on the dentist's respirator while the ***shieldVAC™*** was being used in comparison to during use of a SE alone of with HVE. The increase in the bacterial load found in aerosols while using the ***shieldVAC™*** system in comparison to an HVE could be due to the unequal comparison of an intraoral suction device to an extraoral suction device. There were some limitations in this study, including the limited number of patients. A larger sample size could provide a better representation of the population and would enable determination of statistical significance.

Conclusions:

Preliminary data showed that ***shieldVAC™*** provided the dental professional protection from spray and spatter during ultrasonic scaling and polishing.

DENTAL ADVISOR
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Microbiology Research Report

Sabiha S. Bunek, D.D. S., Fiona Collins, B.D.S, M.B.A., M.A.
Darlene Finnerty, B.S., RDH and Delaney Graham, B.A.

DENTAL ADVISOR Microbiology Research Center
3110 West Liberty, Ann Arbor, MI 48103

Number 138 – September, 2020

Aerosol Reduction Efficacy of Vanguard Gold Mobile

Purpose:

A pilot study to assess the amount of collected bacterial load derived from aerosol and spatter when using ***Vanguard Gold Mobile*** (Vaniman Manufacturing Co.) compared to a high-volume evacuation system (HVE) alone.

Challenge Device:

Vanguard Gold Mobile is a mobile extraoral suction device. The flexible hose attaches to a high-suction turbine motor vacuum unit. The capture mouth on the end of the hose is placed next to the patient's head and the suction then vacuums the surrounding air. The air is then filtered using two filters, including a HEPA filter, and then exhausted back into the operatory. ***Vanguard Gold Mobile*** is designed to help protect the operatory from airborne contaminants.

Experimental Design:

Materials:

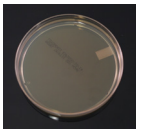
Vanguard Gold Mobile (Vaniman Manufacturing Co.), Cavitron ultrasonic scaling unit with Cavitron FSI 10S 30K insert (Dentsply Sirona), standard HVE with suction tips, SAS Super 180 Bioaerosol Sampler, TSA with Lecithin and Poly 90 Contact plates, TSA Settling plates, patient volunteers (A, B, and C), licensed dental hygienist volunteer wearing PPE, including a face shield and a level 3 mask.

Methods:

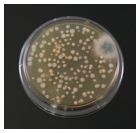
Each ultrasonic scaling procedure was completed while the office was closed, and all procedures were completed in one designated operatory. Prior to the first patient, HVE lines were cleaned with an evacuation line cleaner and traps were changed. The dental unit waterlines are routinely maintained and tested. A ***DentaPure™ DP365B*** cartridge (HuFriedyGroup) was utilized in a closed system (water bottle). Additional SE and HVE lines were running in all four operatories during the study to simulate simultaneous treatment in each operatory. The same dental hygienist performed all ultrasonic scaling procedures in this study. The ultrasonic scaler was consistently set to 60Hz and operated at the highest water spray level. A control sample of the operatory air was taken for 5 minutes while patient A and the dental hygienist were in the room, prior to any aerosol generation, using the ASP Super 180 Bioaerosol Sampler with a TSA with Lecithin and Poly 90 Contact Plate (ASP) placed 18 inches from the patient's mouth, a TSA Settling Plate was placed on the patient's chest 8 inches from their mouth (Chest SP). The positioning of each plate was consistent for all testing for the duration of the study. For each ultrasonic scaling procedure, all quadrants of the mouth were treated, anterior and posterior, buccal and lingual. The ASP in the bioaerosol sampler and the Chest SP were used to routinely collect air quality samples for 5 minutes during each procedure. All three plates were replaced after each new condition. Two separate conditions were utilized for comparison purposes on each of the three patient volunteers. The first condition utilized a standard HVE alone and the second condition utilized the ***Vanguard Gold Mobile*** together with an HVE. The ***Vanguard Gold Mobile*** was consistently placed 4 inches from the patient's mouth on the opposite side of the clinician. A decibel (dB) measurement was taken during each condition to compare combined noise levels. There was a 10-minute room turnaround time between each patient, during which appropriate clinical contact surface cleaning and disinfection, and other recommended protocols were followed. After each test run, the

Device

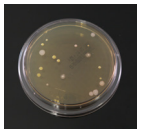
Control



Control: Chest
(CFU = 0)



Control: ASP
(CFU = 156)

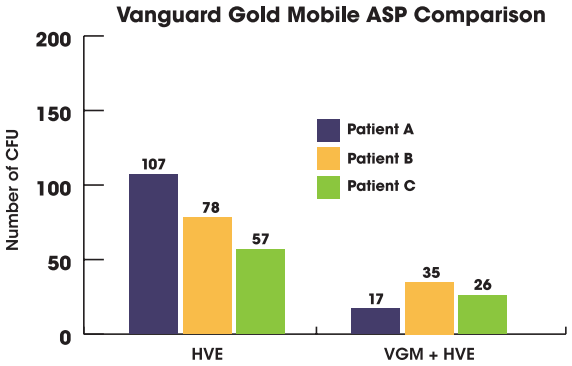


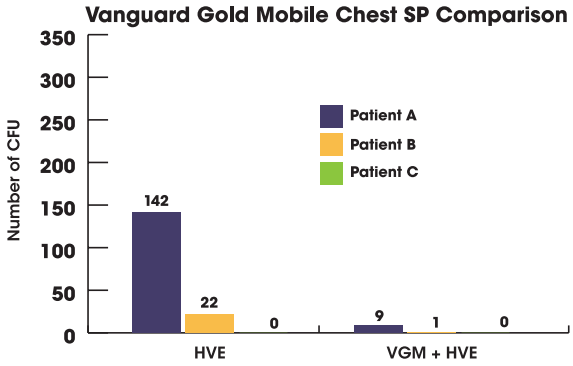
Control: Exhaust
(CFU = 18)

exposed plates were immediately processed and incubated at 37°C for 48 hours. Microbial growth was analyzed and recorded for all plates. All testing procedures were repeated on all three patient volunteers. Before testing, all volunteers agreed to participate in the study and to having their photos taken.

Results:

Observed trends showed that the use of ***Vanguard Gold Mobile*** in conjunction with HVE resulted in lower, or equal to, collected bacterial loads on the ASPs and Chest SPs during the procedure for all three patients compared to using HVE alone. The reductions on the ASPs for ***Vanguard Gold Mobile*** in conjunction with HVE compared to HVE alone were 84%, 55% and 54%, respectively, for patients A, B and C. The reductions on the Chest SPs for ***Vanguard Gold Mobile*** in conjunction with HVE compared to HVE alone were 94%, 95% and 0%, respectively, for patients A, B and C. For all three patients the lowest collected bacterial load levels were found when using ***Vanguard Gold Mobile*** in conjunction with HVE. The difference in sample decibel levels was negligible at 1dB higher when ***Vanguard Gold Mobile*** was added.

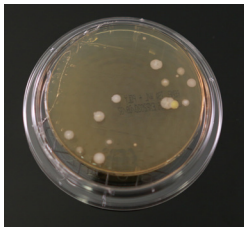




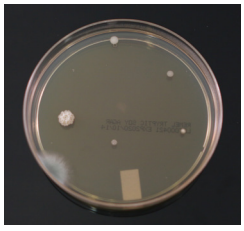
Patient A

Patient A: Vanguard Gold Mobile + HVE

Vanguard Gold Mobile + HVE:

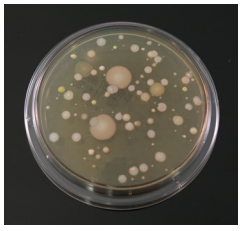


ASP (CFU = 17)

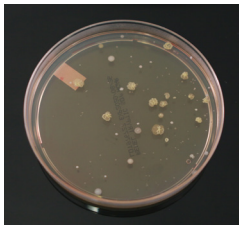


Chest (CFU = 9)

HVE Alone:

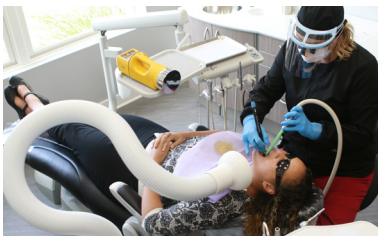


ASP (CFU = 107)



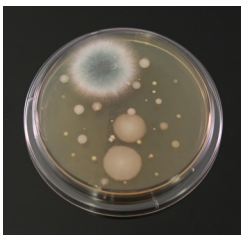
Chest (CFU = 142)

Patient B

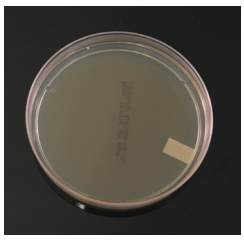


Patient B: Vanguard Gold Mobile + HVE

Vanguard Gold Mobile + HVE:



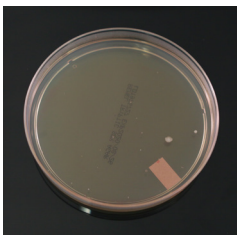
ASP (CFU = 35)



Chest (CFU = 1)

HVE Alone:

ASP (CFU = 78)

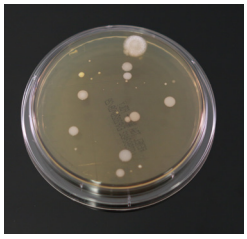


Chest (CFU = 22)

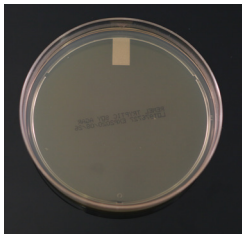
Patient C

Patient C: Vanguard Gold Mobile + HVE

Vanguard Gold Mobile + HVE:

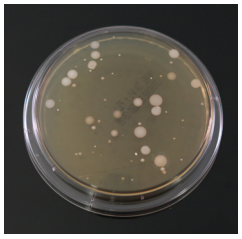


ASP (CFU = 26)

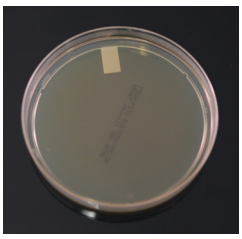


Chest (CFU = 0)

HVE Alone:



ASP (CFU = 57)



Chest (CFU = 0)

Discussion:

Based on the data in this pilot study, there were trends showing reduced bacterial loads with adjunctive use of ***Vanguard Gold Mobile*** and HVE. When ***Vanguard Gold Mobile*** was used adjunctively, minimal difference in noise level was found compared to use of HVE alone. This difference may have been due to normal variations during use of all devices; the reported noise level for the device itself is 53 dB. There were some limitations in this study, including the limited number of patients.

Conclusions:

Based on the preliminary data from this pilot study, adjunctive use of ***Vanguard Gold Mobile*** would be helpful in reducing microbial contamination during an aerosol generating procedure.

Future Directions for Research:

A larger sample size would be beneficial, provide better representation in providing data comparing conditions and would permit identification of outliers and determination of statistical significance. Standardized laboratory in conjunction with clinical testing would also be useful in future research. Future studies could include use of an isolation box to measure bacterial load in the exhaust air from the ***Vanguard Gold Mobile*** after capture, filtration and release.

Clinician and Patient Feedback on External Suction Devices

Patient Comments:

- *"Felt like a nice cool breeze, even though it was suctioning."*
- *"When I walked in the room and saw it, I expected it to be loud and get in the way, but it was not obtrusive."*

Clinician Comments:

- *"Quieter than I expected for an external suction system."*
- *"Finding the ideal position for each patient takes some practice."*
- *"Easy-to-use interface. Just plug it in, turn it on and select your suction power level."*
- *"Footprint is not large and it's easy to move the device around."*

DENTAL ADVISOR
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Microbiology Research Report

**Sabiha S. Bunek, D.D.S., Fiona Collins, B.D.S, M.B.A., M.A.
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3110 West Liberty, Ann Arbor, MI 48103

Number 140 – September, 2020

Aerosol and Spatter Reduction Efficacy of Mr. Thirsty® and Alternative Products

Purpose:

A pilot study to compare the aerosol and spatter reduction efficacy of various hands-free high-volume evacuation (HVE) systems during an ultrasonic scaling procedure.

Challenge Device:

Mr. Thirsty®, an intraoral hands-free high-volume evacuation (HVE) suction device.

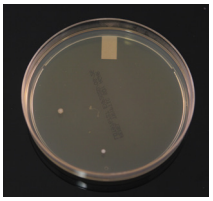
Experimental Design:

Independent Variables: Use of a standard HVE, ***Mr. Thirsty***®, ***Isodry***® (Zyris), ***Dry Shield***® (DryShield), or ***Ivory***® ***ReLeaf*** ™ (Kulzer)

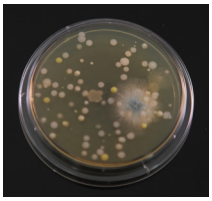
Materials:

Mr. Thirsty® (Zirc Dental Products), ***Isodry***® (Zyris), ***Dry Shield***® (Dry Shield), ***Ivory***® ***ReLeaf*** ™ (Kulzer), Cavitron ultrasonic scaling unit with Cavitron FSI 10S 30K insert (Dentsply Sirona), HVE with standard suction tips, SAS Super 180 Bioaerosol Sampler, TSA with Lecithin and Poly 90 Contact plates, TSA Settling plates, patient volunteers (A, B, and C), licensed dental hygienist volunteer wearing a face shield, and Level 3 mask.

Control



Control: Chest
(CFU = 2)



Control: ASP
(CFU = 94)

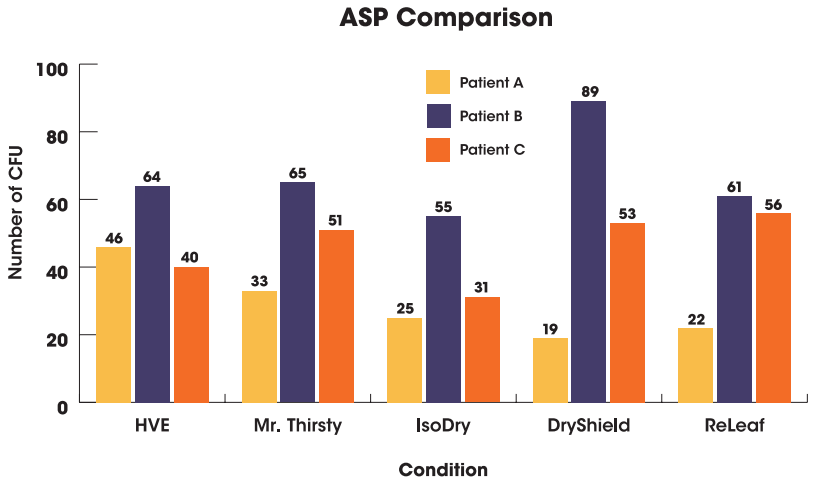
Methods:

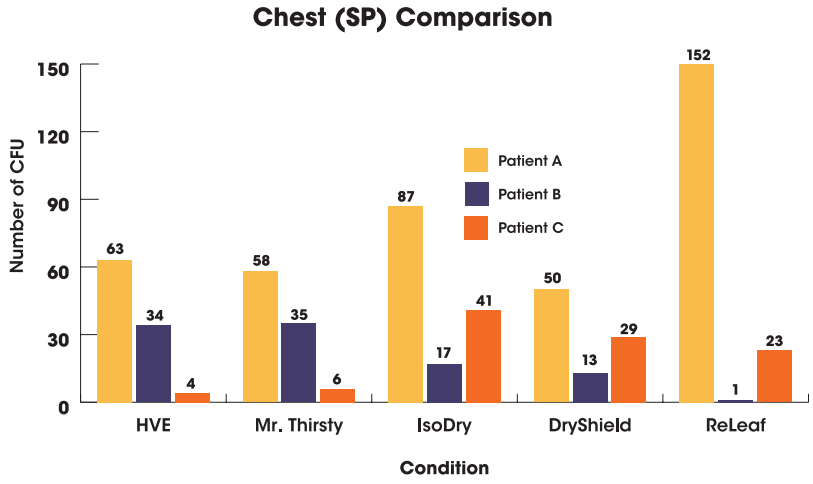
Each ultrasonic scaling procedure was completed while the office was closed, and all procedures were completed in one designated operatory. Prior to the first patient, HVE lines were cleaned with an evacuation line cleaner and traps were changed. An additional saliva ejector line plus two HVE lines were running during the study to simulate a four operatory practice using a dual vacuum pump. The same dental hygienist performed all ultrasonic scaling procedures in this study. The ultrasonic scaler was consistently set to 60Hz and set to the highest water spray level. A control sample of the operatory air was taken for 5 minutes while patient A and the dental hygienist were seated in the room, prior to any aerosol generation. The control air sample was taken using the SAS Super 180 Bioaerosol Sampler with a TSA with Lecithin and Poly 90 Contact Plate (ASP, air sampling plate) placed 18 inches from the patient's mouth and a TSA Settling Plate placed on the patient's chest 8 inches from their mouth (Chest SP). The positioning of each plate was consistent for all testing for the duration of the study. For each ultrasonic scaling procedure, all quadrants of the mouth were treated, anterior and posterior, buccal and lingual. After 2 minutes, 30 seconds the devices were used on the opposite side of the mouth. An ASP in the SAS Super 180 Bioaerosol sampler and HS Chest SP were used to routinely collect air quality samples for 5 minutes during each procedure and were replaced between each new condition. Five separate conditions were utilized for comparison purposes on each patient volunteer.

The first condition utilized a standard HVE, the second condition utilized ***Mr. Thirsty®***, the third condition utilized ***Isodry®***, the fourth condition utilized ***Dry Shield®***, and the fifth condition utilized ***Ivory® ReLeaf™***. There was a 10-minute room turnaround time between each patient, during which appropriate clinical contact surface cleaning and disinfection and other recommended protocols were followed. After each test run, the exposed plates were immediately processed and incubated at 37°C for 48 hours. Microbial growth was analyzed and recorded for all plates. All testing procedures were repeated on a total of three patient volunteers. Before testing, all volunteers agreed to participate in the study and to having their photos taken.

Results:

Air sampling plate (ASP) data and chest settling plate (Chest SP) data is presented below, showing individual data for the three patients.





Discussion:

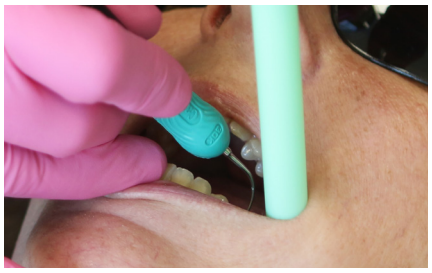
Overall, the data show a trend that the use of ***Mr. Thirsty®*** performed most similarly to HVE when considering both ASP and Chest SP results. It should be noted that all HVE devices used in this study reduced air sample bacterial counts when compared to the control air sample. With respect to the Chest SP, an outlier was observed for ***Ivory® ReLeaf™***. Among the remaining hands-free devices, more variability was seen across the three patients with ***IsoDry®*** than for the other devices. Use of ***IsoDry®*** resulted in lower ASP CFU and the greatest variability was found for ***DryShield®***.

Use of any HVE device holds clinical advantage; hands-free devices seem to be preferred by hygienists. There were some limitations in this study, including the limited number of patients. A larger sample size could provide a better representation of the population, may reduce variability, and would enable determination of statistical significance. In addition, standardized laboratory testing in conjunction with clinical testing would be useful in future research.

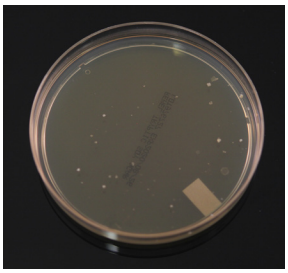
Conclusion:

Preliminary data in this pilot study showed ***Mr. Thirsty®*** to perform most similarly to a standard HVE in both air sampling and chest spatter plates while also giving the dental professional the advantage of utilizing a hands-free high-volume suction.

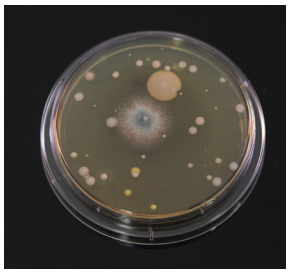
Patient A



Patient A: HVE

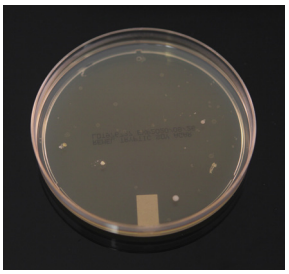


HVE: Chest (CFU = 63)

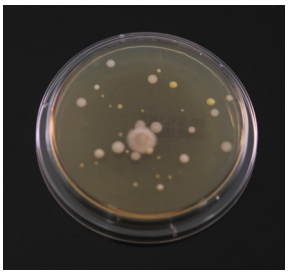


HVE: ASP (CFU = 46)

Patient A: Mr. Thirsty®

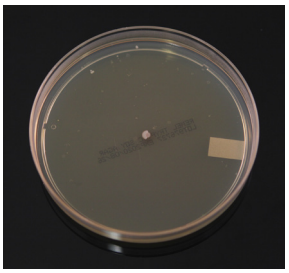


Mr. Thirsty®: Chest (CFU = 58)

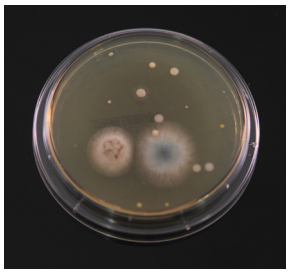


Mr. Thirsty®: ASP (CFU = 33)

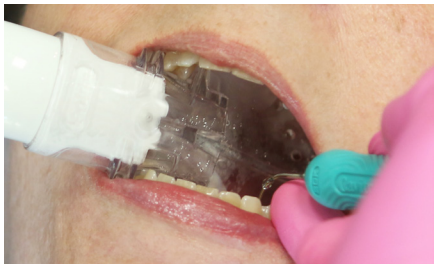
Patient A: DryShield



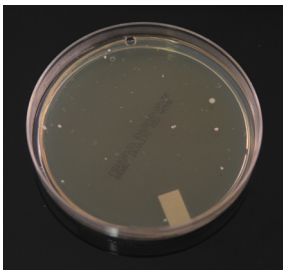
DryShield: Chest (CFU = 50)



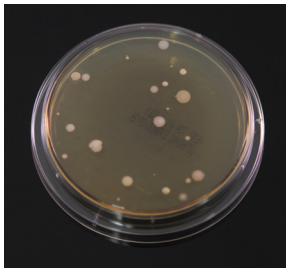
DryShield: ASP (CFU = 19)



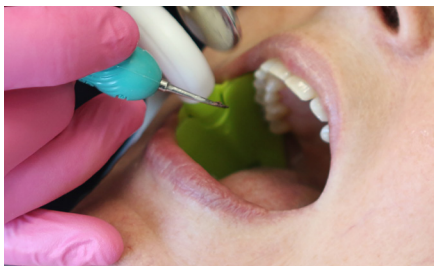
Patient A: IsoDry



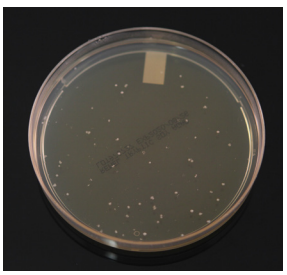
IsoDry: Chest (CFU = 87)



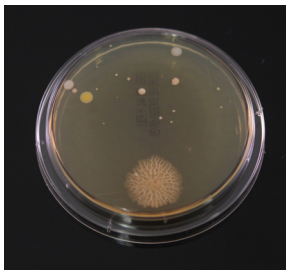
IsoDry: ASP (CFU = 25)



Patient A: ReLeaf



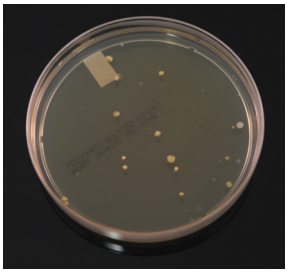
ReLeaf: Chest (CFU = 152)



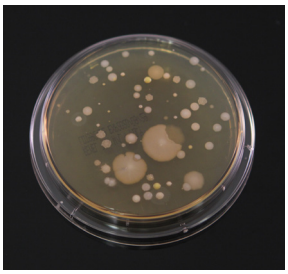
ReLeaf: ASP (CFU = 22)

Patient B

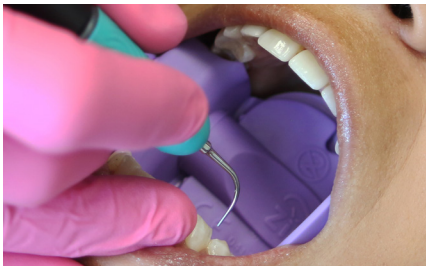
Patient B: HVE



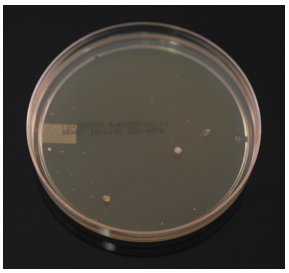
HVE: Chest (CFU = 34)



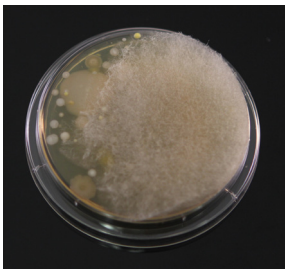
HVE: ASP (CFU = 64)



Patient B: Mr. Thirsty®

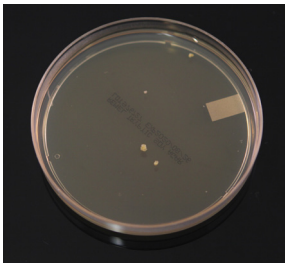


Mr. Thirsty®: Chest (CFU = 35)

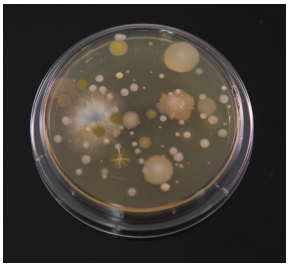


Mr. Thirsty®: ASP (CFU = 65)

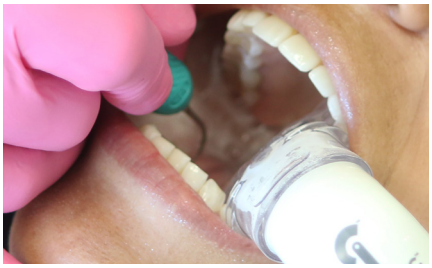
Patient B: DryShield



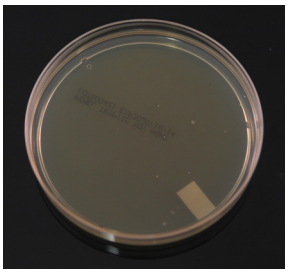
DryShield: Chest (CFU = 13)



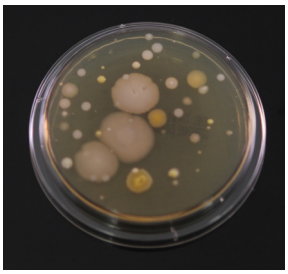
DryShield: ASP (CFU = 89)



Patient B: IsoDry

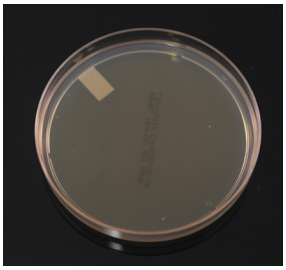


IsoDry: Chest (CFU =17)

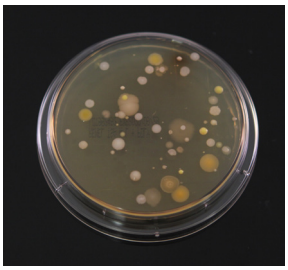


IsoDry: ASP (CFU = 55)

Patient B: ReLeaf

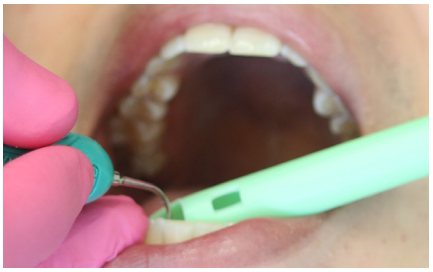


ReLeaf: Chest (CFU = 1)

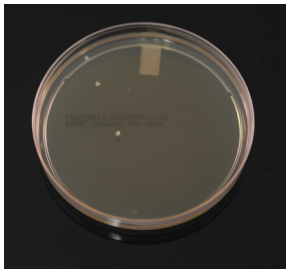


ReLeaf: ASP (CFU = 61)

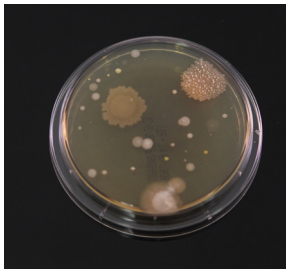
Patient C



Patient C: HVE

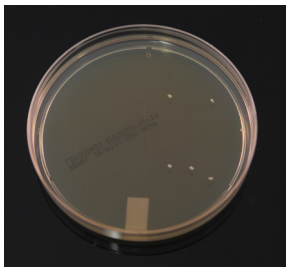


HVE: Chest (CFU = 4)

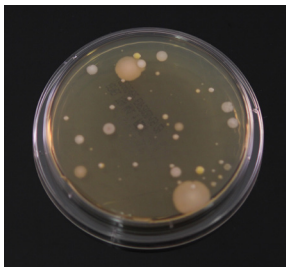


HVE: ASP (CFU = 40)

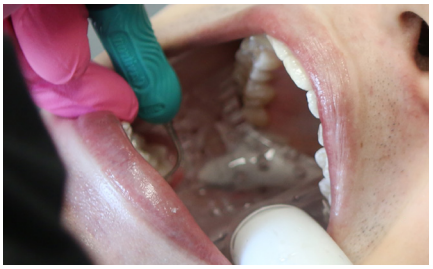
Patient C: Mr. Thirsty®



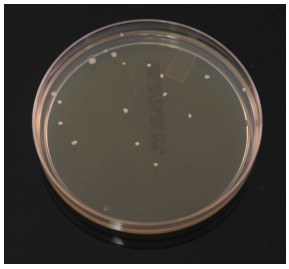
Mr. Thirsty®: Chest (CFU = 6)



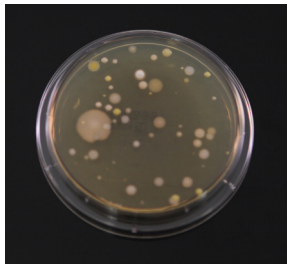
Mr. Thirsty®: ASP (CFU = 51)



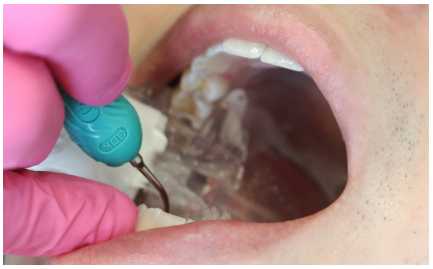
Patient C: DryShield



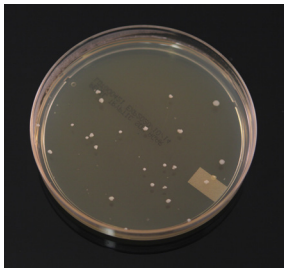
DryShield: Chest (CFU = 29)



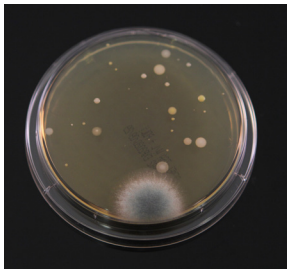
DryShield: ASP (CFU = 53)



Patient C: IsoDry

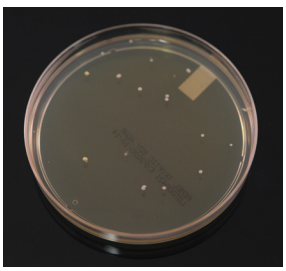


IsoDry: Chest (CFU = 41)

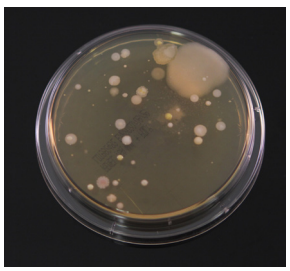


IsoDry: ASP (CFU = 31)

Patient C: ReLeaf



ReLeaf: Chest (CFU = 23)



ReLeaf: ASP (CFU = 56)

Clinician and Patient Feedback on Hands-Free HVE Devices

Clinician Comments:

- The use of ***Mr. Thirsty®*** seemed to reduce aerosol and spatter. It also gave me the advantage of utilizing a hands-free high-volume suction."
- "I feel that the angle of the hose on ***Isodry®*** is too hard and rigid. Compared to ***Dry Shield®***, it is hard to work around."
- "***Mr. Thirsty®*** was easy to move during procedures, and kept the patient dry. I love it because it provides clear vision and holds the tongue back well. It takes a little practice to place it correctly for the first time."
- "We usually don't use HVE; we use Saliva Ejector and hang it on the patient's cheek. Having a hands-free device is awesome and much less awkward than using traditional HVE. I can still use my mirror."
- "***Ivory® ReLeaf ™*** works well but it is positioned on one side of the mouth. The visual field is good with it and I'm able to use the mirror more easily."
- "There is definitely more water and saliva pooling with ***Ivory® ReLeaf ™***."
- "Many of the hands-free devices may not be appropriate for patients with a gag reflex."

Patient Comments:

- "For ***Isodry®***, we were using the small mouthpiece and it was pressing quite a bit, causing discomfort. Saliva seemed to pool in the back of my mouth and it definitely did not keep me as dry as ***Mr. Thirsty®***."
- "For me as a patient, ***Mr. Thirsty®*** was initially a little rigid and a bit much, but once it was a little wet seemed to fit better. I have a small size mouth and the small size was a little large but not uncomfortable or pressing anywhere like other devices."
- "I did not feel with ***Mr. Thirsty®*** that I was drowning. It kept me very dry and was comfortable."
- "***Ivory® ReLeaf ™*** was definitely more comfortable than the other HVE devices; however, I was completely splashed on my chest and face."
- "I was able to bite down with ***Ivory® ReLeaf ™*** and it increased suction. It was the most comfortable but not comparable to an HVE as an evacuation device. Honestly, as a patient, ***Mr. Thirsty®*** was the most comfortable and kept me the most dry. If I had to pick between ***DryShield, IsoDry*** and ***Mr. Thirsty®*** I would pick ***Mr. Thirsty®*** hands down. It worked and I didn't have a hose pressing on my face."
- "I did not like traditional HVE, it did an ok job suctioning, but I did not love the water all over my face; I felt like I was drowning and it seemed much messier."
- "***Isodry®*** was a little bulky around the connector near my face."
- "***Mr. Thirsty®*** was more comfortable, but as a patient, I think it is important to tell the patient to bite down. It makes it much more comfortable."
- "When having ***Ivory® ReLeaf ™*** in my mouth, I missed the ability to bite down on something. I definitely felt more spatter on my face."

DENTAL ADVISOR
Product insights you can trust.

Microbiology Research Report

Sabiha S. Bunek, D.D. S., Fiona Collins, B.D.S, M.B.A., M.A.
Ona Erdt, D.M.D., M.S.H.S., Anne Patrias, DA and Delaney Graham, B.A.

DENTAL ADVISOR Microbiology Research Center
3110 West Liberty, Ann Arbor, MI 48103

Number 141 – September, 2020

A Comparison of Aerosol and Spatter with Genius.Shield and HVE or HVE used alone

Purpose:

A pilot study to compare aerosol and spatter generated during use of a high-speed handpiece when using a new adjunctive extraoral device, designed to contain aerosol and spatter, when used with high-volume evacuation (HVE) compared to using HVE alone.

Challenge Device:

Genius.Shield is a transparent protective shield connected to a flexible arm that attaches to the headrest of the dental chair and a hose which integrates into the operatory suction. Using the provided adapter, the end of the hose attaches to a shield which is arched over the patient's face. The shield can be disinfected and replaced as necessary.

Experimental Design:

Materials:

Genius.Shield (Brite Hive Innovations), standard HVE with suction tips, SAS Super 180 Bioaerosol Sampler, TSA with Lecithin and Poly 90 Contact Plates, TSA Settling Plates, patient volunteers (A, B, and C), licensed dentist volunteer, licensed dental assistant volunteer, face shields, PPE including a Level 3 surgical face mask and a face shield.

Device

Control

Methods:

Each aerosol generating procedure was completed while the office was closed, and all procedures were completed in one designated operatory. Prior to the first patient, HVE lines were cleaned with an evacuation line cleaner and traps were changed. The dental unit waterlines are routinely maintained and tested. A ***DentaPure™ DP365B*** cartridge (HuFriedyGroup) was utilized in a closed system (water bottle). Additional SE (1) and HVE (2) lines were running in all four operatories during the study to simulate simultaneous treatment in each operatory. The dentist and dental assistant wore PPE for all procedures, including a Level 3 mask and face shield. New face shields were used for each patient and each condition (total 3 per patient). Before testing, all volunteers agreed to participate in the study and to having their photos taken. The same dental professionals performed all procedures in this study. For each procedure, all quadrants of the mouth were treated; anterior and posterior, buccal and lingual. For each of three patients, the sequence of tested conditions was ***Genius.Shield*** without the curtain together with HVE, ***Genius.Shield*** with the curtain together with HVE, then HVE alone. Additionally, the positioning of each plate was consistent for all testing for the duration of the study.

Prior to any aerosol generation, an initial control sample of the operatory air was taken for 5 minutes while patient A, the dentist, and the dental assistant were in the room. This was performed using the SAS Super 180 Bioaerosol Sampler with a TSA with Lecithin and Poly 90 Contact Plate placed 18 inches from the patient's mouth (ASP; air sampling plate). For patients B and C, the last ASP sample in the previous series served as the baseline. During the 5-minute aerosol generating procedure in patient A, which included use of the ***Genius. Shield*** without the curtain together with standard HVE, a new ASP was used for the Bioaerosol Sampler, a TSA Settling Plate was placed on the patient's chest 8 inches from their mouth (Chest SP). At the end of the 5-minute procedure, the ASP and Chest SP were collected, and separate samples taken of the face shields worn by the dentist (Dentist Shield CP) and dental assistant (Assistant Shield CP). These were cultured separately using two additional TSA with Lecithin and Poly 90 Contact Plates.

Following use of the high-speed handpiece, the patient, dentist, and dental assistant remained in the operatory for 2 minutes. During these 2 minutes, for tested conditions involving ***Genius.Shield,*** the device was left on in the same position as during the procedures, before then being switched off.

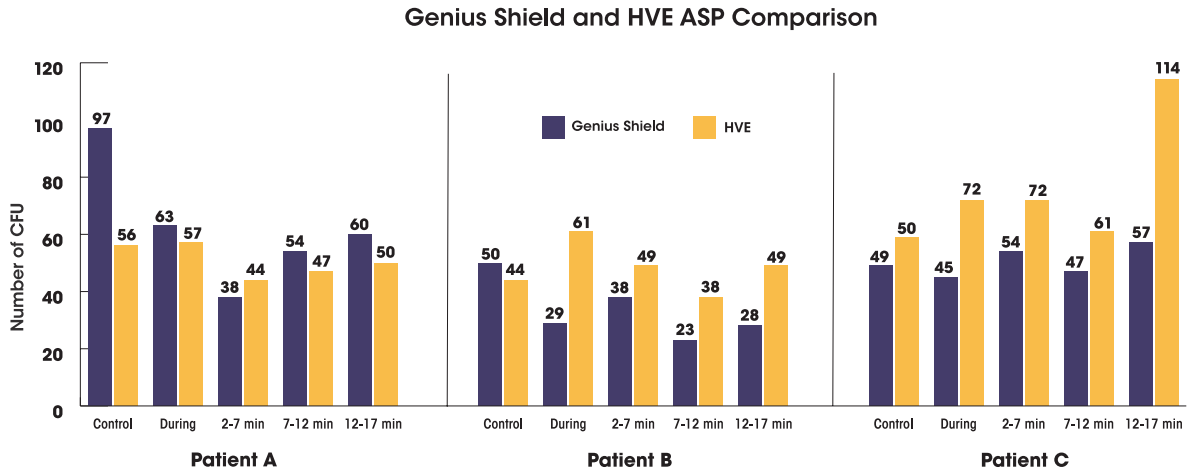
At the conclusion of the 2-minute waiting period, another bioaerosol sample was taken for 5 minutes, utilizing the SAS Super 180 Bioaerosol Sampler and a new ASP and again placed 18 inches from the patient's mouth (ASP 2-7 min). At the conclusion of this 5-minute sample, additional bioaerosol samples were taken for two subsequent 5-minute periods in the same manner, each time using a new ASP (ASP 7-12 min; ASP 12-17 min). The same procedure and sampling protocol was then repeated twice in patient A, first utilizing the ***Genius.Shield*** with the curtain together with HVE, then utilizing HVE alone. Operatory turnaround was then performed, including appropriate cleaning and disinfection. Subsequently, the exact same procedures were followed in the same sequence for patients B and C. After each test run in each patient, the exposed plates were immediately processed and incubated at 37°C for 48 hours. Microbial growth was quantified, analyzed and recorded for all plates.

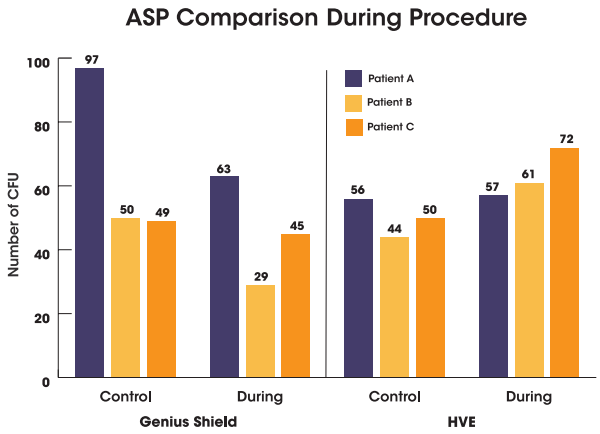
Results:

ASP samples taken during the procedure showed reduced bacterial counts compared to the control ASP bacterial counts in all three patients with the use of ***Genius.Shield.*** The reductions were 35%, 42% and 8%, respectively, for patients A, B and C. When utilizing HVE alone, a slight increase was observed in the ASP bacterial count sampled during the procedure in one of three patients, and a larger increase was observed in the other two patients. The observed increases were 2%, 39% and 44%, respectively, for patients A, B and C. No trends were observed for the ***Genius.Shield*** with the curtain.

When utilizing ***Genius.Shield*** with HVE, the bacterial loads from the first post-procedural ASP samples taken for 5 minutes after stopping the use of the device were lower than prior to the procedure for two of the three patients and slightly higher for the third patient. The reductions were 61% and 24%, respectively, in two of the three patients, while a 10% increase was observed for the third patient. When utilizing HVE alone, the bacterial loads from the comparative ASP samples were higher than prior to the procedure for two of the three patients and slightly lower for the third patient. The differences showed a 44% and an 11% increase in two of the three patients, respectively, and a 21% decrease in the third patient. There was variability at other time points post-procedurally for both conditions, including an outlier for patient C for HVE at the last time point.

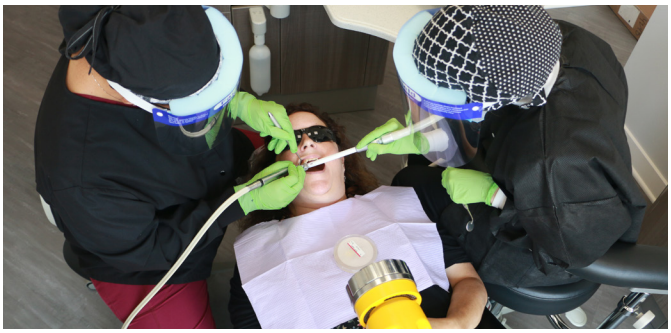
The data from the bacterial load collected on the Chest SPs was inconclusive due to high variability between patients. No trends were observed. In addition, almost no CFU were observed from the samples cultured for either the Dentist Shield CPs or the Assistant Shield CPs for any of the procedures or conditions.





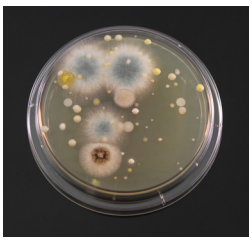
Genius.Shield + HVE

HVE used alone



Patient A: ASP

Genius.Shield + HVE: Control
(CFU = 97)

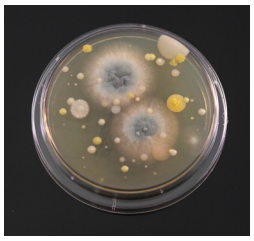


Genius.Shield + HVE: During
(CFU = 63)

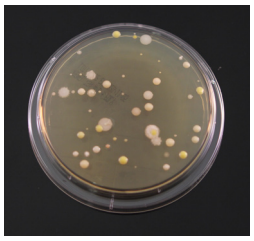
Genius.Shield + HVE: 2-7 min
(CFU = 38)

Genius.Shield + HVE: 7-12 min
(CFU = 54)

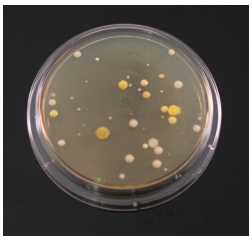
Genius.Shield + HVE: 12-17 min
(CFU = 60)



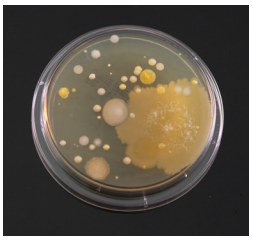
HVE: Control
(CFU = 56)



HVE: During
(CFU = 57)



HVE: 2-7 min
(CFU = 44)



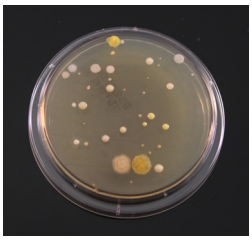
HVE: 7-12 min
(CFU = 47)

HVE: 12-17 min
(CFU = 50)

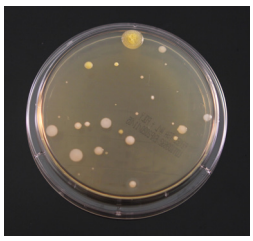
Patient B: ASP

Genius.Shield + HVE: Control
(CFU = 50)

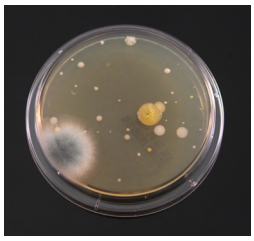
Genius.Shield + HVE: During
(CFU = 29)



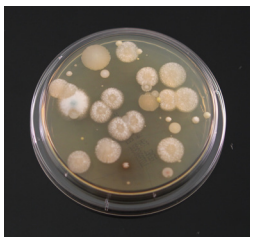
Genius.Shield + HVE: 2-7 min
(CFU = 38)



Genius.Shield + HVE: 7-12 min
(CFU = 23)

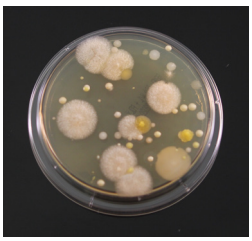


Genius.Shield + HVE: 12-17 min
(CFU = 28)

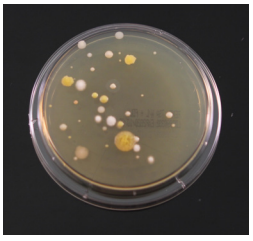


HVE: Control
(CFU = 44)

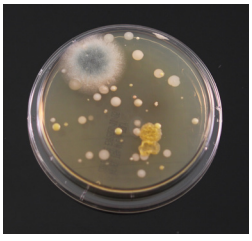
HVE: During
(CFU = 61)



HVE: 2-7 min
(CFU = 49)

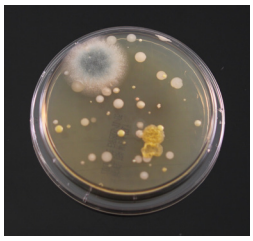


HVE: 7-12 min
(CFU = 38)

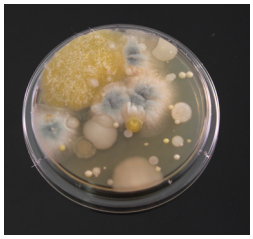


HVE: 12-17 min
(CFU = 49)

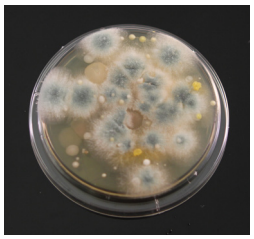
Patient C: ASP



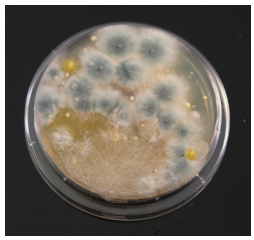
Genius.Shield + HVE: Control
(CFU = 49)



Genius.Shield + HVE: During
(CFU = 45)

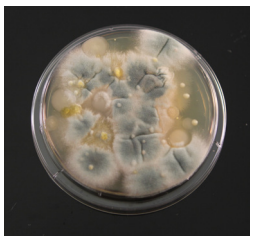


Genius.Shield + HVE: 2-7 min
(CFU = 54)

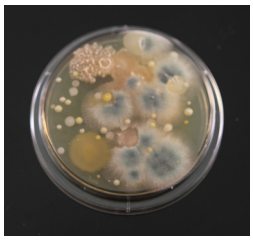


Genius.Shield + HVE: 7-12 min
(CFU = 47)

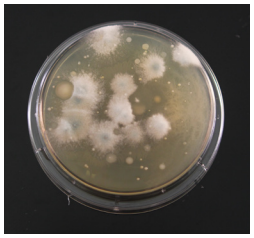
Genius.Shield + HVE: 12-17 min
(CFU = 57)



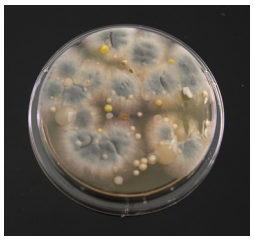
HVE: Control
(CFU = 50)



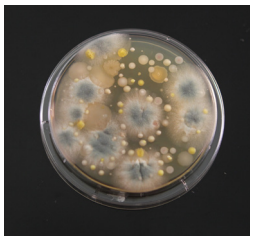
HVE: During
(CFU = 72)



HVE: 2-7 min
(CFU = 72)



HVE: 7-12 min
(CFU = 61)



HVE: 12-17 min
(CFU = 114)

Discussion:

The preliminary data from the pilot study showed that ***Genius.Shield*** used in conjunction with standard HVE could contribute to reduced bacterial load from aerosols collected on the ASPs during an aerosol generating procedure when compared to the use of HVE alone. In all 3 patients, decreases were observed for ***Genius.Shield*** and increases for standard HVE. There was variability across patients. The bacterial spatter on the Chest SP, however, varied greatly, allowing no conclusions to be drawn. Cultures from the face shields consistently showed no or negligible CFU, suggesting that spatter and aerosol was not reaching the face shields. It is possible that the lack of trends for the ***Genius.Shield*** with the curtain were due to the limitations of the curtain, since operators found this difficult to work with and the curtain may have shifted during use. Limitations in the pilot study included the small sample size. Results for chest plates and face shield cultures are shared in the Appendix.

Conclusion:

Based on preliminary data, the use of ***Genius.Shield*** contributed to a higher reduction in bacterial counts when used in conjunction with HVE than when HVE was used alone. Fewer Colony Forming Units were found during the procedure when using ***Genius.Shield*** compared to the control, indicating that ***Genius.Shield*** could make a difference. It should be noted that there was a small sample size; a larger sample size would permit determination of statistical significance.

Future Directions for Research:

- A larger sample size would enable determination of statistical significance for differences observed between devices.
- A laboratory test would also be interesting as supplemental data comparing the test device and standard HVE.
- Since no testing was performed with saliva ejector alone, a comparison between ***Genius.Shield*** and saliva ejector cannot be made. It would be interesting to perform an assessment of this, since the test device incorporates a suction line and might aid solo operators.
- In addition, HVAC air exchange analysis would be helpful to determine any variations in environmental quality.

EDITORS' CHOICE

Filtek™ Supreme Flowable Restorative +++++

3M www.3m.com

DENTAL ADVISOR +++++

51 CLINICAL EVALUATORS

1033 TOTAL USES

96% CLINICAL RATING

Key features: Innovative syringe design ● Esthetic flowable ● Virtually no bubbles or run-on

Description

3M™ Filtek™ Supreme Flowable Restorative has 3M's newest dispensing technology:

Same ***3M™ Filtek™ Supreme Ultra Flowable*** composite, with a new name and syringe

- Low viscosity
- Nine shades offered that are designed to correspond with all shades of ***Filtek™ Universal and Filtek™ Supreme Ultra Universal Restorative*** composite lines
- Dispenser has ergonomic design that is easy to hold and inject
- Composite has excellent adaptation, polish retention, and wear resistance

Indications

- Class III and V restorations
- Restoration of minimally invasive cavity preparations (including small, non-stress-bearing occlusal restorations)
- Repair of small defects in indirect esthetic restorations
- Pit and fissure sealants
- Undercut block out
- Repair of resin and acrylic temporary materials

Unique Attributes

- New tip designed to reduce bubbles and stop material "run-on" during and after dispensing
- Bendable cannula up to 90° without kinking
- Blue syringe barrel indicates remaining material volume
- Triangle finger plate makes it easy to hold and inject

Clinical Tips

- It is excellent to place at the base of a proximal box to create a bubble-free seal.
- Good for minimally invasive Class 1 and V restorations.
- Flows well over all irregularities - tiny cavities tend to fill or wet better.
- It can be used to block out Class V lesions where the dentin is very dark.

"VISCOSITY ALLOWED FOR BETTER CONTROL."

Evaluators' Comments

"With predictably no bubbles, I realized how much time and frustration I dealt with when using my previous flowable. It now makes me more efficient and productive."

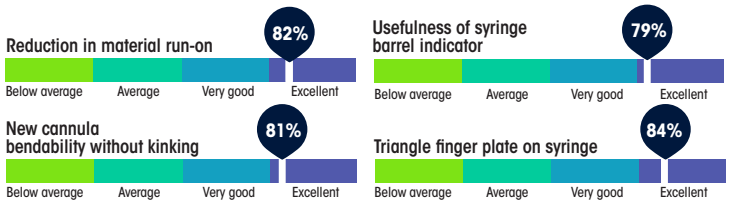
"Syringe design is an improvement from the current one and made it easier to dispense."

"I like to warm the composite, and this one had good viscosity when warmed."

"Easy to adapt to the preparation."

"I did not get bubbles and it has a good consistency."

Syringe Design: Filtek Supreme Flowable Restorative



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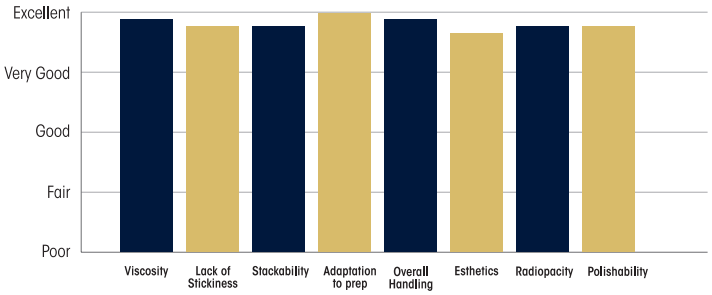
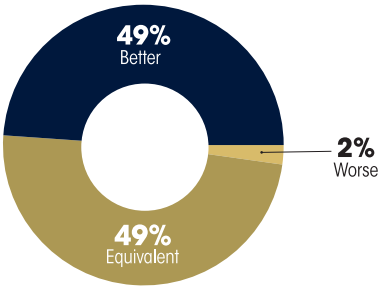


Compared to Competitive Products:



Consultants who would:

98% Recommend to a colleague

Consultants who would want to stock in office:

37% Yes, instead of current product

49% Yes, in addition to current product

12% No, however I might want to order it for certain cases

CLINICAL EVALUATION

Avalon Biomed™ NeoMTA® 2

Avalon Biomed www.avalonbiomed.com

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DENTAL ADVISOR ++++

29 CLINICAL EVALUATORS

332 TOTAL USES

87% CLINICAL RATING

Key features: Root and pulp treatment material ● Powder and gel system ● Highly versatile ● Predecessor is NeoMTA Plus

Description

Avalon Biomed NeoMTA 2 is a a bioactive bioceramic root and pulp treatment material:

- Consists of an extremely fine, inorganic powder of tricalcium and dicalcium silicate
- Powder & Gel system for easier mixing
- Non-staining
- Radiopaque
- Bioactive bioceramic forms hydroxyapatite on its surface to support healing through the release of calcium and hydroxide ions

Indications

- Indirect Pulp Cap
- Direct Pulp Cap/Partial Pulpotomy
- Cavity Liner/Base
- Pulpotomy
- Apexogenesis
- Perforation Repair
- Resorption
- Sealing
- Obturation/Apexification
- Root-End Filling

Unique Attributes

- Very versatile material with over 10 root and pulp treatment indications
- Washout resistant, allowing restoration to be placed over the material immediately
- Increased radiopacity by 30% over previous versions
- Highly visible white colored material

Clinical Tips

- *Make sure to etch the tooth and not the MTA - this includes self-etching adhesives.*
- *If using as a liner, mix to a putty consistency to get the benefit of the wash-out resistance. As a result, you can place your restoration immediately.*

"THE SCIENCE BEHIND THE BIOACTIVITY IS SOLID."

Evaluators' Comments

"Very flexible material that you can mix to your desired consistency based on the indication."

"Less grainy than other forms of MTA I have used in the past."

"Patients I have used this material on had a noticeable lack of post-op sensitivity."

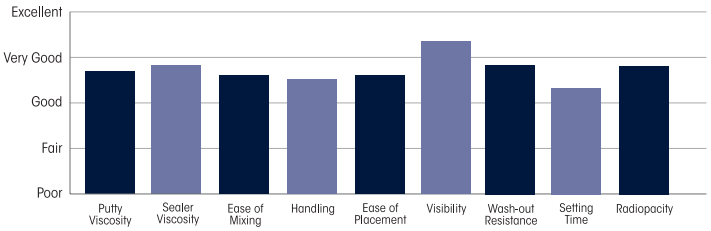
"Works as advertised to keep the pulp quiet."

"The white color made it easy to visualize."

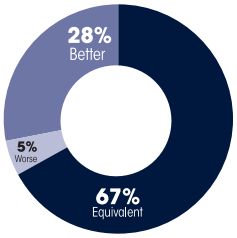
"I did not find it easy creating a putty consistency. There is a learning curve to mixing to the right consistency."

"Placement was a little tricky."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

95% Recommend to a colleague

Consultants who would want to stock in office:

19% Yes, instead of current product

76% Yes, in addition to current product

Visalys® CemCore

Kettenbach Dental www.kettenbach-dental.us

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DENTAL ADVISOR ++++

27 CLINICAL EVALUATORS

522 TOTAL USES

89% CLINICAL RATING

Key features: Combination adhesive cement and core material ● Five shades and matching try-in pastes ● Tooth and restorative primers are part of the system

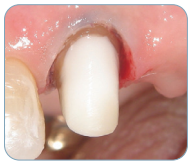
Description

Visalys® CemCore is an adhesive cementation and core build-up material.

- Dual-cured material
- Free of bisphenol A
- Radiopaque
- Active-Connect-Technology (ACT) provides an optimized adhesive bond
- Available in 5 shades: bleach, universal (A2/A3), translucent, dark, & opaque
- Try-in pastes available for all 5 shades

Indications

- Cementation of all restorations, including highly esthetic anterior restorations
- Core build-ups

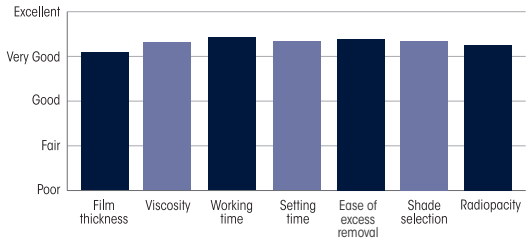


Clinical Tip

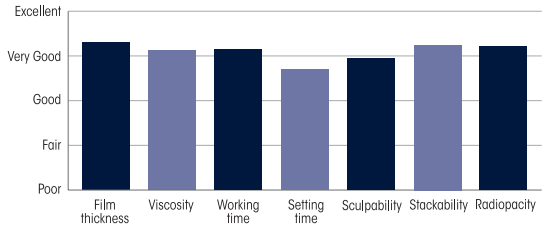
- Utilize the self-curing option for core-buildups during tough treatment situations.

**Photo courtesy of Dr. Guy Sutton. Tooth #11 core-buildup.*

Evaluation Summary: Cement Indication



Evaluation Summary: Core-Buildup Indication



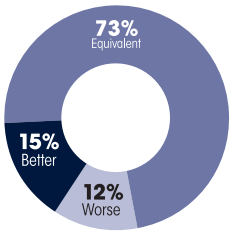
DENTAL ADVISOR RESEARCH RESULTS — Bond Strength (MPa) VISALYS CEMCORE

Substrate	Bond Strength, MPa
Self-Etched Dentin	26.7
Self-Etched Enamel	28.9
IPS e.max CAD	30.1
IPS e.max ZirCAD	46.4

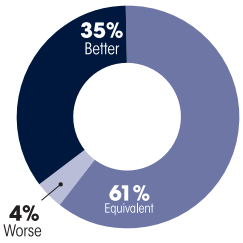
Unique Attributes

- Easy to remove excess when used for cementation
- Has outstanding stability thanks to the special network former, even without matrices
- Tooth and restorative primers do not require light curing

Compared to Current Cement



Compared to Current Core Material



"EASY TO WORK WITH TO CREATE AND CONTOUR A CORE BUILDUP."

Evaluators Comments

- *"Minimal steps for bonding."*
- *"Cuts close to tooth feel on preps."*
- *"I liked the dispensing tip that allows for placement into tight areas."*
- *"The material has just enough consistency that it stays where it is placed rather than running into other areas of the prep."*
- *"I really liked the variety of shades and the ease of excess material removal."*
- *"Very convenient to have such a universal material that can be used as both a cement and buildup."*
- *"For cementing crowns, it was a little too viscous for me."*
- *"I would prefer a shorter self-curing time."*

Consultants who would:

96% Recommend to a colleague

Consultants who would want to stock in office:

27% Yes, instead of current product

61% Yes, in addition to current product

8% No, however I might want to order it for certain cases

CLINICAL EVALUATION

Transcodent™ Luer Lock Handpiece for Suction Needles

++++½

Sulzer www.sulzer.com

DENTAL ADVISOR ++++½

26 CLINICAL EVALUATORS

648 TOTAL USES

92% CLINICAL RATING

Key features: Precision suction handpiece ● Attaches to existing saliva ejector hose ● Multiple sizes of suction needles available, making this handpiece very versatile

Description

The ***Transcodent™ Luer Lock Handpiece*** for suction needles is a precision suction device:

- High quality steel
- Autoclavable
- Fits in existing saliva ejector valve (adaptor available)
- Ergonomic design and convenient handling
- Precise thread for easy handling

Indications

- Passive irrigation techniques / endodontic treatment
- Precision suctioning during restorative treatment, surgery, etc.

Unique Attributes

- Connects to existing saliva ejector valve on your suction hose
- When combined with the suction needles (4 sizes available), can be used for precise evacuation with maximal field of view
- Variety of uses

Clinical Tips

- Use the largest sized needle tip for oral surgery (Green - 2.1 mm).
- Put one of these on every set up. Once you start using it, you will soon see that you find more applications for it in operative, endo, and surgery.
- It works well to retrieve loose root tips.
- Use it below the matrix band while placing bonding agent to prevent leakage.
- This handpiece can be paired with traditional endodontic irrigation needles for very precise canal drying during Endodontics.
- If using for oral surgery, periodically run water through the tip to keep it from clogging.
- Good for keeping internal aspect of implants and cover screws clean while grafting.

"GETS INTO HARD-TO-REACH PLACES SUCH AS SLOT-PREPS AND EXTRACTION SITES."

Evaluators' Comments

"I used the larger sizes for suction in surgery - they exposed broken root tips better than anything I have used previously. They were also useful in endo in helping drain an infected tooth."

"This suction is designed well. It was out of my way when I was trying to remove root tips."

"It was quiet, effective and sterilizable."

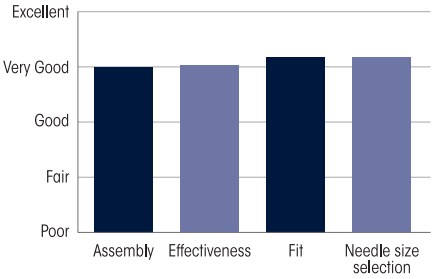
"I could see around it well to get to smaller access areas."

"Bendable tips with different size needle options, make it usable for many different procedures."

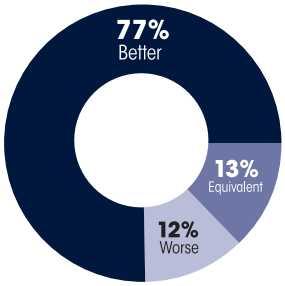
"It does not evacuate very much fluid at a time due to small size."

"Uses a saliva ejector that you may want to use at the same time."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

88% Recommend to a colleague

12% Not recommend to a colleague

Consultants who would want to stock in office:

73% Yes

27% No

Cavex Bite&White In-Office Whitening System

++++

Cavex Holland BV www.cavex.nl/en

DENTAL ADVISOR ++++

22 CLINICAL EVALUATORS

52 TOTAL USES

86% CLINICAL RATING

Key features: In-office whitening ● Unique brush applicator ● No light and no refrigeration required

Description

Cavex Bite&White In-Office Whitening System is a professional dental whitening system:

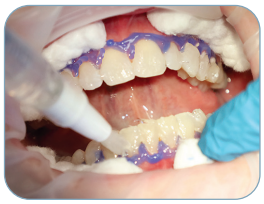
- For in-office whitening
- Fast, easy to use brush on system
- 25% Hydrogen Peroxide Superior whitening agent
- Pre-mixed
- Tissue barrier included
- 10 to15-minute applications (2-3 recommended per session)

Indications

- In-office whitening procedures
- Lightening the color of natural teeth

Unique Attributes

- Applicator pen with brush tip
- The patented Hydrogen Peroxide Superior technology keeps the 25% gel stable. As a result, the product is immediately ready for use, without pre-mixing.
- No activation light required
- Thick consistency gel for controlled application
- No refrigeration required



Clinical Tips

- Make sure the tissue barrier seals off the tissue from the whitening material well.
- Provide the patient with realistic expectations.
- For best results, place thin applications multiple times.
- Take advantage of the consistency of this material to target placement, such as around white spots.

"I WAS ABLE TO TARGET AREAS EASILY WITH THE BRUSH APPLICATOR."

Evaluators' Comments

"Noticeable lack of sensitivity both during and after the procedure."

"Stable without refrigeration."

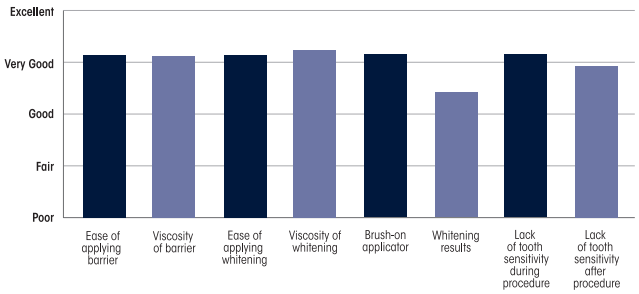
"Easier to apply than my normal in-office materials."

"Simple use and good whitening results."

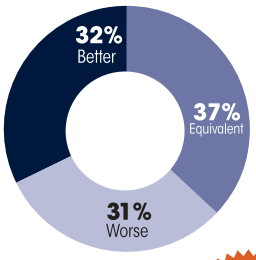
"I get better whitening results with my current material, but I like the delivery and stability without refrigeration from this Cavex material."

"My patients needed at least two separate applications to achieve good results."

Evaluation Summary:



Compared to Competitive Products:



Consultants who would:

81% Recommend to a colleague

19% Not recommend to a colleague

Consultants who would want to stock in office:

24% Yes, instead of current product

33% Yes, in addition to current product

29% No, however I might want to order it for certain cases

Coming soon!

Cavex Oral Pre Rinse Cavex Holland BV *(cavex.nl)*

Cavex Oral Pre Rinse is a pre-procedural mouthwash with 1.5% stabilized hydrogen peroxide. It contains a bio-adhesive for the ideal viscosity and foam condition. ***Cavex Oral Pre Rinse*** has a pleasant, slightly sweet mint flavor that makes rinsing pleasant for the patient. **Features:** Contains 1.5% stabilized hydrogen peroxide, ready for use, no dilution required, rinse for 30-60 seconds, content of 500 ml for about 50 rinses, bottle with an integrated dosing cup

Currently available in Europe, coming soon to North America. Look for a future Clinical Evaluation in DENTAL ADVISOR.

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