

DENTAL ADVISOR™

Product insights you can trust.

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CLINICAL PROBLEM SOLVERS



LABORATORY EVALUATION OF
OPTIBOND™ UNIVERSAL 360

DENTAL DAM COMPATIBILITY
WITH CHLOROFORM

2-YEAR RETROSPECTIVE:
3M™ SCOTCHBOND™
UNIVERSAL PLUS ADHESIVE





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As clinicians, we come across several products that we can't live without in certain clinical conditions. This month's issue focuses on products from a problem solving perspective. Many times, products that we use have indications that are perfect for a given clinical circumstance, and really solve a challenge. We highlight those products this issue, as well as feature some tried and true products from the past that remain strong in clinical problem solving. Not all products are awarded a clinical problem solver; these products highlighted are special designations that practicing clinicians have found to be perfect in a tough situation. You'll see in this issue how and why products have been chosen. We hope that the information is helpful to you when you find yourself in similar situations. As always, we appreciate your support and reading. Feel free to reach out to me at drbunek@dentaladvisor.com or to our team at connect@dentaladvisor.com.

— Sabiha S. Bunek

CLINICAL EVALUATOR PROFILE



Dr. Matthew Miller is a national and international lecturer and has been published in DENTAL ADVISOR, Inside Dentistry, and has written multiple white papers on the subjects of endodontics and restorative dentistry.

He received his undergraduate degree from the University of North Carolina at Chapel Hill in 2003, and his Doctorate of Dental Surgery with High Distinction from New York University College of Dentistry in 2007. While at NYU, he was selected into the Honors Aesthetics Program in the Rosenthal Institute of Cosmetic Dentistry. As a result of his efforts, he won the American Academy of Aesthetic Dentistry Award and the Northeastern Society of Periodontics Award. He has been voted by his peers as one of the "Top 50 dentists" in the Charlotte metro area several years in a row.

Dr. Miller has been named a Key Opinion Leader in the industry and plays an important role in the development of dental materials, equipment, and technology. He also consults and lectures on 3D imaging technology, intraoral scanners and advancements in endodontic and restorative therapies. Dr. Miller is a long standing member of the Kerr Endodontic and Restorative Advisory Boards. He has been designated as a KaVo Master and featured in the KaVo Master Series. Additionally, he is a Clinical Ambassador, consultant, and evaluator for The Dental Advisor and works with companies in the areas of product inception, development, and improvement. Dr. Miller serves as a clinical trainer for dentists and dental professionals and is an advisor for the local chapter of the Seattle Study Club.

Dr. Miller maintains a private group practice in Huntersville, NC, where he focuses on cosmetic restorative and complex reconstructive dental treatment.

2024 CLINICAL PROBLEM SOLVERS



Medicom® SafeMatrix™ Clear Contour

Medicom, www.medicom.com/ Clinician: Dr. Ashton Prince

PROBLEM:

Matrix bands and Tofflemire systems have a long and successful history of creating quality barriers when isolating adjacent teeth during restorative treatments, especially when using composite resin materials. Due to metal being the primary material making up these systems, one of the main concerns we run into is not being able to have full confidence that our materials are curing completely as we place our layered composites. We are also unable to physically see or critique our restoring abilities while also trying to prevent potential voids or bubbles. Most often, we are unable to fully know what our restorations look like until we remove these systems and then look to determine our clinical success.

SOLUTION:

The **Medicom SafeMatrix Clear Contour** matrix system utilizes a 360 degree clear mylar material with a finger-turn tightening and loosening attachment. Now you are able to see exactly where your materials have reached as well as giving a clear and direct curing ability from all external angles of the restoration. The use of the mylar material provides the very high level of transparency we have come to enjoy when using individual mylar strips in our anterior restorations. With this direct view, we can have greater confidence in the success of our treatments prior to removing the isolation system. As we gain the ability to better see our materials during all aspects of our treatments, we are better able to critique ourselves and increase the clinical quality we all search for as restoring dentists. Additionally, as a ready-to-use matrix solution, you can save time and improve workflow efficiency by eliminating the need to reprocess and assemble a reusable solution.



Photos courtesy of Dr. Ashton Prince



Tetric EvoCeram® Aligner

Ivoclar, www.ivoclar.com/ Clinician: Dr. Ashton Prince

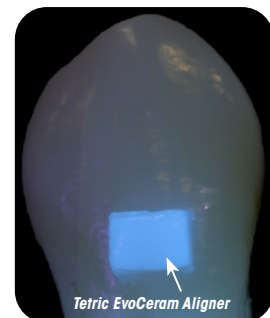
PROBLEM:

Following aligner therapy, it can be difficult to make sure you have removed all of the resin that was used to create the appliance attachments. This can lead to an uncomfortable and rough surface being left behind for the patient and may even lead to future unesthetic staining of the material. To make the materials easier to locate, products of the past have been either too opaque or altered shades have been used to differentiate tooth from material. However, if we do try to make these materials "disappear" on the tooth surface, the lack of filler and resulting translucency previously has led to a faster wear over the surface that is experiencing constant abrasion.



SOLUTION:

As clinicians, our desires are for a strong, wear-resistant, invisible material that can then become extremely detectable when the blessed day of aligner therapy completion arrives. **Tetric EvoCeram Aligner** is a high-quality, fluorescent composite with a filler content of 76% by weight. When combined with a UV light, the material immediately brightens to give the clinician an unmistakable view of what material has been left behind and what still needs to be removed. To aid in the esthetic desires of the patient during treatment, the 15% translucency of the composite creates the "chameleon effect" all hope for in a universal shade. **Tetric EvoCeram Aligner** truly gives clinicians an easier path and simplified guide to patient comfort and success during both the treatment period and the clean-up phase.



Best of CLINICAL PROBLEM SOLVERS

Over the past 40+ years, DENTAL ADVISOR has evaluated countless products and materials, offering unbiased research-driven insights into the latest and greatest dental innovations. Amidst this extensive analysis, certain products have distinguished themselves by addressing the everyday challenges that clinicians face, earning the prestigious title of **Clinical Problem Solvers**. These products exemplify innovation, effectiveness, and reliability, making a significant impact on dental practices worldwide. In this special feature, we are excited to present our top 10 favorite **Clinical Problem Solvers** from the past decade, each selected for its outstanding ability to enhance clinical practice and improve patient outcomes.



TheraCal LC®

Bisco, www.bisco.com/theracal-lc/
Clinician: Dr. Matthew Miller

PROBLEM:

Most regenerative liner and capping materials are not packaged in an easy to deliver syringe and are not usually light curable. Those that are light curable typically are not indicated for direct pulp capping. This can slow down treatment time and the setting of the material can also become an issue when performing resin restorations.

SOLUTION:

TheraCal LC (Bisco) is a hydrophilic, light curable, flowable resin modified calcium silicate that comes in an easy to deliver syringe. It releases fluoride and calcium and can be used for both direct and indirect pulp capping procedures and as a protective liner beneath restorations. These features allow the clinician to have precise placement of the material and immediate set time with a light-curing unit while maintaining ease of placement due to thixotropic properties.



Teeth #4-5 deep caries removed and **TheraCal LC** applied over the pulp.



OMNICHROMA® Flow

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

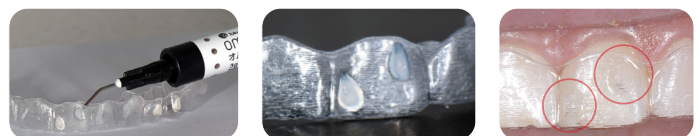
PROBLEM:

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



SOLUTION:

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



Photos courtesy of Dr. Sabiha S. Bunek

Best of CLINICAL PROBLEM SOLVERS

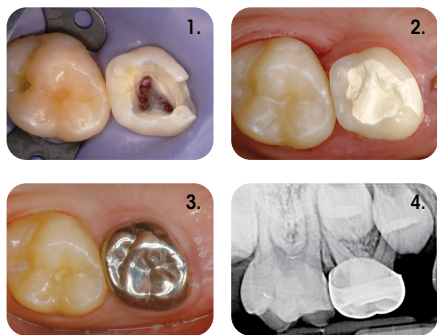


Biodentine® XP

Septodont, www.septodontusa.com/
 Clinician: Dr. Lucile Goupy, France

PROBLEM:

Patient presented with large area of decay on tooth #a. Pulp exposure during caries curettage necessitated a cervical pulpotomy. Biodentine XP was bulk-filled from the pulp chamber to the occlusal surface and then capped with a stainless steel crown. An x-ray follow-up at 3 months showing the absence of any periodical lesion.



Photos courtesy of Dr. Lucile Goupy, France

SOLUTION:

Biodentine XP is an excellent bioactive restorative material. It can be directly placed in the tooth using the ergonomically-designed gun and capsules. In this case, **Biodentine XP** successfully sealed the tooth and provided a stable, bioactive foundation for the stainless steel crown in this pediatric case.



OptraSculpt® Pad

Ivoclar, www.ivoclar.com/
 Clinician: Dr. Edward Lowe

PROBLEM:

Composite sticking to the instrument during placement and shaping of anterior restorations.



SOLUTION:

The **OptraSculpt Pad** is an instrument with non-stick foam pad attachments used to place and contour composites, particularly Class III, IV, or V restorations. I personally like the **OptraSculpt Pad** because I can spread the composite on the tooth easily without it adhering to the instrument, and it creates a smooth surface. I have also found the **OptraSculpt Pad** useful to hold veneers in place during cementation. The kit comes with two sized pads (4 mm and 6 mm) that can be inserted into a handle. Definitely a must-have product!



Accutron™ ClearView™ Nasal Masks

HuFriedyGroup, www.hufriedygroup.com
 Clinician: Shelby Crawford, DA

PROBLEM:

Nitrous is utilized in our office quite a bit with anxious and pediatric patients. One issue I have encountered with traditional nasal hoods is the inability to know whether or not the patient is breathing properly.

SOLUTION:

Accutron ClearView Nasal Masks have a transparent outer shell that overlays the inner hood, allowing you to see the condensation so you can verify if the patient is breathing through their nose. You have clear evidence of the patient receiving the nitrous rather than relying on their perception. The transparent outer hood also expands the clinician's field of vision. Scented or unscented versions of the latex-free hoods are available, and samples can be requested via the company's website.



Antivet

MDC Dental, www.antivet.com
 Clinician: Dr. Lawrence Kotkow

PROBLEM:

Patients desire conservative treatment options to help mask fluorosis stains.

SOLUTION:

Antivet is a cost-effective dental stain remover especially formulated for removal of pigmentation (brownish stains) on the enamel surface caused by dental fluorosis and any extrinsic stain. After a rubber dam is applied, the solution is scrubbed on the stain, and an acid neutralizer placed when complete. The acidic solution allows for fluoride ions absorbed into stain (apatite crystals) to separate forming soluble salts which are easily removed.



Before treatment



After treatment

Best of CLINICAL PROBLEM SOLVERS



Maxcem Elite™ Chroma

Kerr, www.kerrdental.com/
Clinician: Dr. Sabiha S. Bunek

PROBLEM:

It's hard to know when the ideal time is to start removing excess cement after seating a restoration. If you wait too long, clean up can be a nightmare.

SOLUTION:

Maxcem Elite Chroma is the first self-adhesive resin cement with color changing chemistry that lets you know when the cement is ready for clean up. The cement dispenses pink but fades in color when it reaches its gel state, indicating the most ideal time to remove excess material. Once it is ready to remove, the excess cement peels off in one motion. This results in less discomfort to the patient and saves time.



OraVerse™

Septodont, www.septodontusa.com/
Clinician: Dr. Ona Erdt

PROBLEM:

Patients complain about the unnecessary lingering anesthesia that follows a dental appointment, in some cases lasting 3-4 hours. It is uncomfortable and interferes with daily activities.

SOLUTION:

OraVerse is a local anesthesia reversal agent that accelerates the return to normal sensation and function for patients after routine dental procedures. It is a formulation of phentolamine mesylate and is recommended for adults and children ages 6 and older and weighing 33 lbs or more. Cartridges are well marked with a green label to differentiate them from anesthetic. Simply administer via the same injection site and reversal of anesthetic effect will occur.



MI Paste® ONE

GC America Inc., www.gc.dental/america
Clinician: Dr. Fiona Collins

PROBLEM:

Adult patients who present with dental caries can also have exposed areas of dentin following gingival recession. These root areas can be sensitive and are at risk for root caries.

SOLUTION:

MI Paste ONE is a fluoride toothpaste containing RECALDENT Technology, which has been shown to help remineralize white spot lesions. It acts as a two-in-one product, by also helping to clean teeth during brushing. General fluoride protection against dental caries and desensitization of areas of exposed dentin are added benefits.



EyeSpecial C-II Digital Camera

SHOFU, www.shofu.com
Clinician: Shami Tamber, CDA

PROBLEM:

DSLR cameras are expensive, heavy, and difficult to operate on your own. In the past our doctors took all their own photos while an assistant retracted and positioned the mirrors. The process is stressful at times, and always takes two people; consuming valuable clinical chair time.

SOLUTION:

EYESPECIAL C-II DIGITAL CAMERA is a game changer. Designed specifically for the dental practice; it is intuitive, user friendly, produces high-quality images, light weight, and only requires one person to operate. I found it very easy to learn with this camera and was able to use it efficiently within a couple hours; it has since replaced our more complicated camera.





45 CLINICAL EVALUATORS

1349 TOTAL USES

96% CLINICAL RATING

Key features: Improved delivery system • “Less yellow” color
 • Dark-cure technique • Universal compatibility

Description

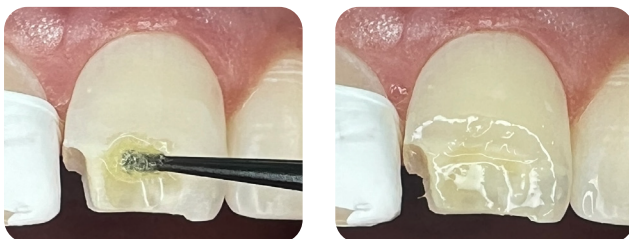
OptiBond™ Universal 360 involves Kerr’s patented GPDM technology (now including MDP) that functions as a universal bonding agent to all surfaces and substrates.

Indications

- Use as a single-coat application for self-etch, selective-etch, and total-etch techniques.
- May be used with all surfaces of direct or indirect restorations.

Unique Attributes

Includes Kerr’s patented Ternary Solvent System and optimizes the hydrophobicity and hydrophilicity to deliver excellent penetration into dentinal tubules. This increases bond strength and protects against microleakage and post-op sensitivity. It also has a low film thickness to provide a better fitting restoration. Delivery options include a bottle system or unidose delivery. It has a “less yellow” appearance as opposed to many others with a yellow tone.



Images courtesy of Dr. Ashton Prince



Clinical Tips

- Shake bottle before use.
- Do not dispense into well until ready to use as it does evaporate quickly. Be sure to keep it well covered when not in use.
- Agitate into dentin as directed, air thin as directed.

“THE BOTTLE DESIGN ALLOWS FOR BETTER DISPENSING OF THE ADHESIVE.”

Evaluators’ Comments

“The viscosity of the material allows me to see where it was placed.”

“It was just my type! Better viscosity, great handling.”

“Did not set up prematurely. The ability to dark cure is nice.”

“The wettability of tooth and ability to air thin. Low odor.”

“Spring-loaded flip top bottle is a clever design element.”

“It is drippy with dispensing and the brush often has a little too much material on it.”

Consultants who would:

91% Recommend to a colleague

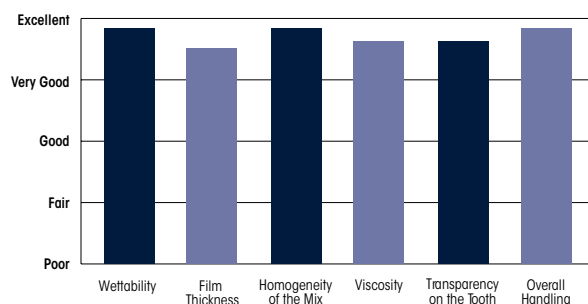
Consultants who would want to stock in office:

22% Yes, instead of current product

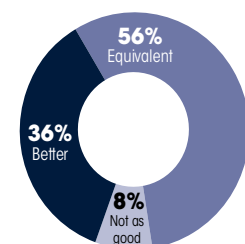
49% Yes, in addition to current product

11% I might want to order this product for certain cases

Evaluation Summary:



Compared to Competitive Products:





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Laboratory Evaluation of OptiBond™ Universal 360

M. Cowen, M. Gilmartin, J.M. Powers



INTRODUCTION:

OptiBond™ Universal 360 is the next generation of universal adhesive from Kerr which combines a ternary solvent system with their patented GPDM monomer and a new addition of the MDP monomer. The ternary solvent includes water, ethanol and acetone in order to lower sensitivity, rewet dry dentin to lower technique sensitivity, and make it more compatible with dual- and self-curing cements to create a truly universal adhesive. MDP and GPDM are both in the same class of monomer known as functional phosphate ester monomer, but they have different strengths. MDP has more active chemical bonding sites meaning for each monomer it can create a slightly stronger chemical bond, while GPDM is more efficient at etching tooth structure for better performance without using a phosphoric etching treatment. Combined they may produce a stronger, more durable bond to tooth structure.

With the addition of MDP adhesive monomer technology to this product line, the bond performance of **OptiBond Universal 360** with artificial aging to the challenging substrates of dentin and zirconia were compared to competitive universal adhesives on the market. The main clinically relevant outcomes for bond studies of this nature are the measurements of the initial bond strength compared to the results after accelerated aging to get an idea of the bond durability over a period of time. This is an important screening test to make sure all of the components of these universal adhesives work in harmony as intended.

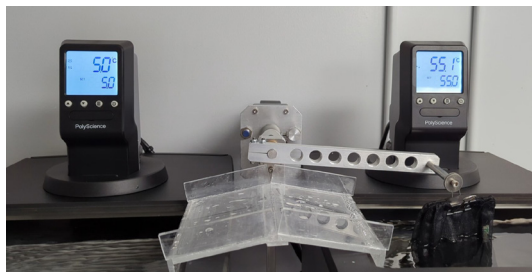
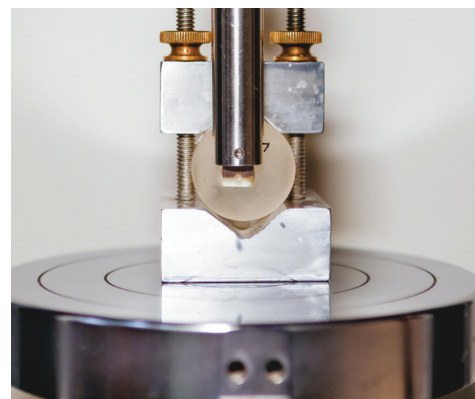
RESULTS SUMMARY:

- There was no drop in bond strength after artificial aging to dentin or zirconia with **OptiBond Universal 360**.
- High bond strengths were achieved to dentin and zirconia with **OptiBond Universal 360**.

STUDY DESIGN:

Test methods for ISO 29022 also known as the Ultradent method were followed where a 2.38 mm cylinder of composite is placed on the treated surface. This creates a simple interface for evaluation where we create a defined area of bonding, and when the composite cylinder is debonded with a universal testing machine, we can measure the force divided by the surface area (N/mm²) to define the bond strength in terms of MPa.

We used the same composite, **Herculite™ XRV** as a control for each, as different strengths and modulus of composite can impact the results when comparing different adhesives. Dentin and Zirconia surfaces are prepared by grinding up to 600-grit SiC paper until surfaces are flat to simulate the surface texture left by a fine rotary bur. The **Katana™ Zirconia STML** (Kuraray Noritake Dental, Inc.) was sandblasted with 3 bar (0.3 MPa) pressure and 50 µm particles as one of the most common surface treatments for zirconia. The dentin in this case was not etched with phosphoric acid so it is considered to be the self-etched mode for the adhesive. Testing these adhesives in the self-etch mode to dentin is important to evaluate the ability to penetrate the smear layer after preparation and create a stable adhesive interface.



Thermocycling:

Thermocycling of dental materials simulates the oral environment of the range of temperatures experienced when consuming hot and cold food and beverages. This also creates stress at the interface as the materials shrink and expand at different rates on either side of the interface creating cyclic fatigue over time. The 5,000 cycles in this study were performed over 2 weeks and simulate approximately 6 months of intraoral use. This is an important screening method to determine if there are any problems with the stability of the adhesive as the combination of hydrolytic degradation from water and stresses can accelerate debonding for some products.

RESULTS:

Optibond Universal 360 achieved over 30 MPa in bond strength to dentin and zirconia initially and with no decrease in bond strength after thermocycling. The goal for adhesive resin bonding is to have over 25 MPa for the most challenging indications which **Optibond Universal 360** surpassed.

In comparison to the other universal adhesives on the market, there was no statistical difference between the different groups, meaning they all performed at a high level. In fact, after an analysis of what we call the failure mode to dentin of the adhesives shows that in many of these tests that a mixture of failures in either the dentin or composite occurred. This means that the adhesive strength at the interface created such a unified structure that the fracture during debonding took place somewhere other than the adhesive interface. **This indicates that the adhesive bond strength to dentin is near the maximum achievable in this test.**

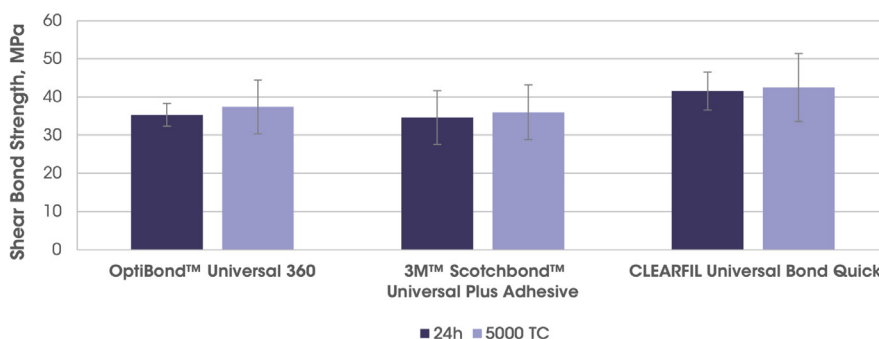
Optibond Universal 360 now includes both MDP and GPDM monomers which can bond to both tooth structure and zirconia. The GPDM monomer itself has been shown to be more effective at etching tooth structure than MDP alone, while MDP has more active sites for enhanced chemical bonding. Together, they may prove to be more effective than either alone to effectively prepare the surface, seal, and bond to tooth structure.

CONCLUSION:

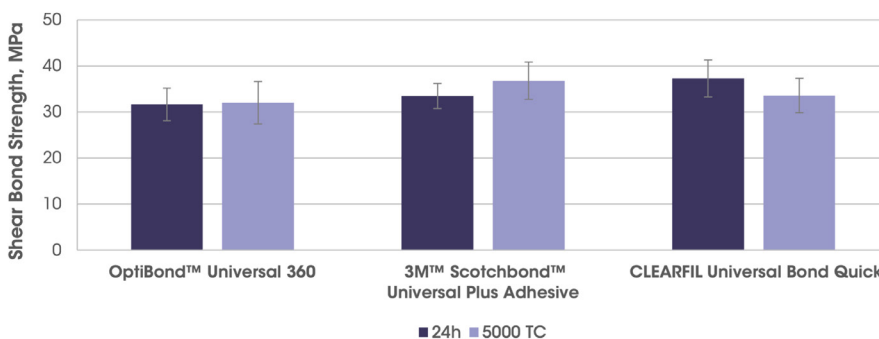
OptiBond Universal 360 has excellent bond strength to dentin and zirconia, with no decrease in strength after thermocycling highlighting a durable bond. OptiBond Universal 360 performed as well as other competitive universal adhesives on the market to these substrates.

Research supported by Kerr Corporation.

Dentin:



Zirconia:



Dental Dam Compatibility with Chloroform

M. Cowen, M. Gilmartin, J.M. Powers

INTRODUCTION:

Dental dam isolation during endodontic procedures is an essential standard of care to prevent contamination of the root canal system from oral bacteria, prevent aspiration of dental materials and provide a clean operating field. One common procedure for retreatment of root canal treatment (RCT) involves chemically softening gutta percha placement using a chemical agent such as chloroform. A common complication with the use of chloroform is the incompatibility with the materials used in dental dam sheets which are essential for isolation as chloroform contact with human soft tissues must be avoided. The incompatibility can result in distortion causing leakage around the isolated tooth, or weakening of the sheet resulting in tearing of the placed rubber dam. As chloroform is toxic at high doses, any use should be limited to as small a volume as possible.

In this study, we tested the dental dam compatibility with chloroform of a latex dam (**BIODAM**, 4D Rubber), a non-latex thermoplastic elastomer dam (TPE) (**Flexi Dam**, Coltene), and several non-latex polyisoprene dams with medium and heavy gauge thicknesses (**ISODAM**, **True Dental Dam**, **EdgeDam**). We tested the dental dams in a simulated use case on a first molar RCT, and examined the surface changes after short and long exposures.

RESULTS SUMMARY:

All polyisoprene dental dams survived both exposure during a simulated endodontic procedure on a first molar and long-term immersion. The latex and non-latex TPE dam immediately failed during a simulated procedure and after long term immersion. The polyisoprene dams which included **ISODAM**, **True Dental Dam**, and **EdgeDam** all were shown to be very compatible with the use of chloroform.

MATERIALS:

Polyisoprene:



ISODAM® Medium
(FourD Rubber)



ISODAM® Heavy
(FourD Rubber)



True™ Dental Dam Medium
(Clinician's Choice)



True Dental Dam Heavy
(Brasseler)



EdgeDam™ Medium
(EdgeEndo)

Latex:



BIODAM® Medium
(FourD Rubber)

Non-latex TPE:



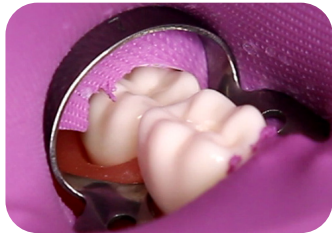
Flexi Dam Medium
(Coltene)



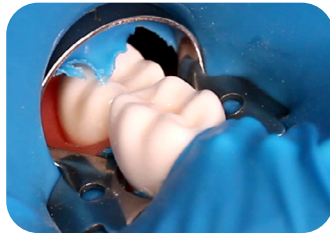
Chloroform is a clear, colorless liquid commonly used as a powerful solvent for resin, rubber, oil and gutta percha. When used in clinical dentistry, all precautions should be followed to prevent accidental exposure including high volume suction, syringing as little as possible, removing pressure from the syringe away from the patient before use to prevent any leakage before use. Chloroform should only be used if mechanical removal is unsuccessful or for more complete removal of difficult to reach canals, with care to prevent apical extrusion. Use of absorbent points are a good option to remove excess before mechanical removal of gutta percha.

SIMULATED DENTAL DAM CHLOROFORM EXPOSURE:

To simulate use of chloroform during a root canal retreatment, we placed dental dams on a lower right first molar, and syringed undiluted chloroform on various sides of the dental dam. Starting with a small volume, and increasing the amount until the entire area around the tooth was exposed, the procedure was recorded, and the dams removed to examine the integrity of the punched hole.



Flexi Dam (TPE)



BIODAM (Latex)



ISODAM (Polyisoprene)



True Dental Dam (Polyisoprene)

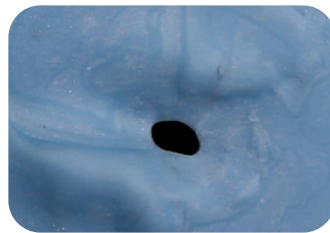
Both the latex dam and thermoplastic elastomer dam immediately tore after minimal exposure. All polyisoprene dams showed no evidence of tearing, even after excessive contact around the entire perimeter of the tooth.



Flexi Dam (TPE)



BIODAM (Latex)



ISODAM (Polyisoprene)



True Dental Dam (Polyisoprene)

Representative samples of dental dams after removal immediately after exposure, the polyisoprene dams had much more exposure to chloroform without significant distortion of the punched hole. There was no visible difference between medium and heavy gauge dams in performance. Small distortions of the shape of the hole seen with the Polyisoprene dams are not due to chloroform exposure, and relax into a round smooth hole within minutes.

SURFACE EXAMINATION AFTER EXPOSURE:

Dental dams were also exposed to chloroform for 2 minutes and one-hour immersions to test the limits of chemical compatibility.

TPE Dental Dam:

After less than a minute of exposure, the **Flexi Dam** showed physical distortion of the surface, with near instantaneous melting as demonstrated by transferring material to a wipe. The **Flexi Dam** completely dissolved in less than 30 minutes of immersion. The **Flexi Dam** initially has channels which both cause any chloroform exposure to take longer to evaporate, and the surface shows complete loss of the features after a short exposure.

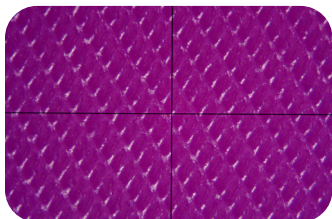


Flexi Dam after short exposure transfers material to a wipe.

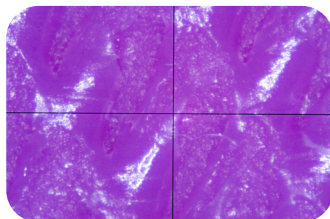


Flexi Dam after one hour immersion dissolved into a formless gel.

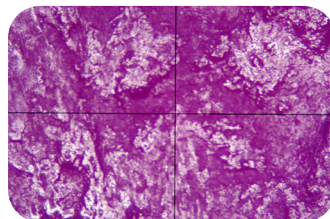
Control Low Mag (8 mm fov)



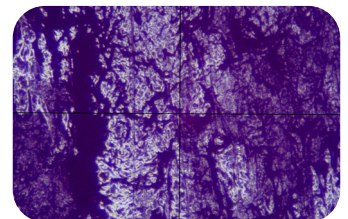
Control High Mag (1.2 mm fov)



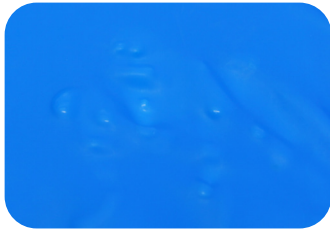
2-minute exposure Low Mag



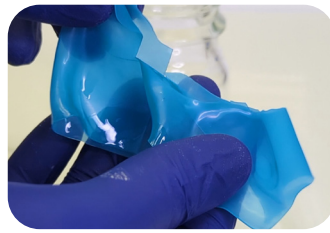
2-minute exposure High Mag



The surface of TPE **Flexi Dam** melts after short exposures to chloroform causing significant damage to the surface.



The latex dam shows localized distortion when contacted with chloroform which persists for over 10 minutes.

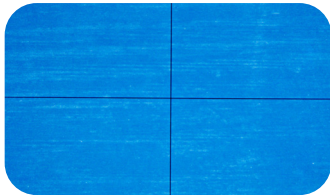


The latex dam after 1 hour immersion falls apart.

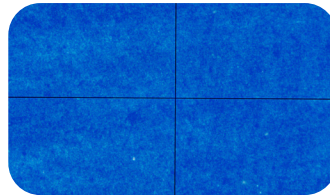
Latex Dental Dam:

The latex dam fared a little better in the short contact test, though it showed a significant distortion where chloroform made contact resulting in a bubbling appearance which persisted for several minutes. After a longer immersion, the latex dam lost all physical strength, and would fall apart with minimal contact. The distortion combined with the loss of physical strength helps explain the results of the clinical simulation, as the immediate area around the tooth, which is already under tension, stretches while also weakening the material leading to an immediate tear after chloroform exposure.

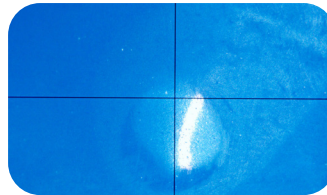
Control Low Mag (8 mm fov)



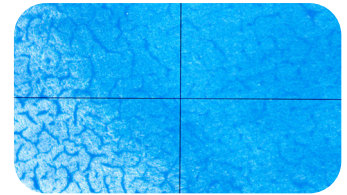
Control High Mag (1.2 mm fov)



2-minute exposure Low Mag



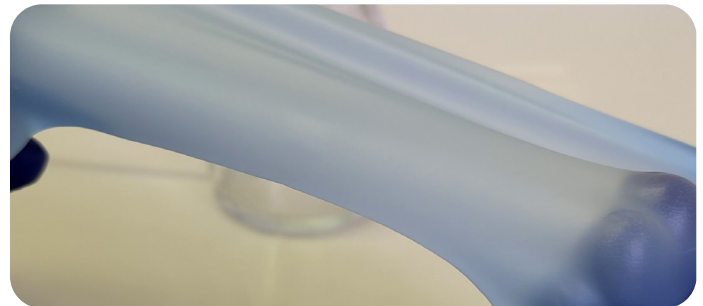
2-minute exposure High Mag



The surface of the latex dam is damaged after short exposures to chloroform.

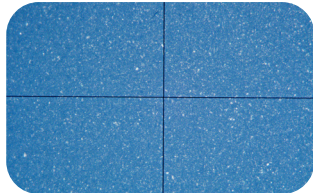
Polyisoprene Dental Dam:

The polyisoprene dams **ISODAM**, **True Dental Dam**, and **EdgeDam** showed a small amount of bulging after contact with an excessive amount of chloroform which quickly relaxed back to the initial state when dry. Even after a one-hour complete immersion, all polyisoprene dams still retained enough strength to significantly stretch without tearing. These polyisoprene dams demonstrated a very high compatibility with chloroform with no significant difference when viewed under microscopy after chloroform exposure.

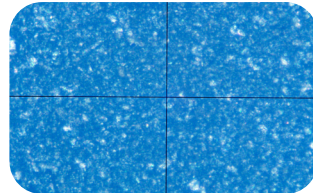


Polyisoprene **ISODAM** after 1 hour immersion survives stretching.

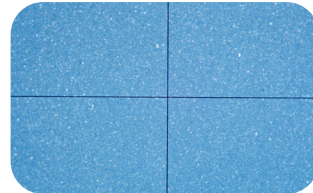
Control Low Mag (8 mm fov)



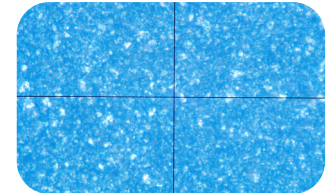
Control High Mag (1.2 mm fov)



2-minute exposure Low Mag

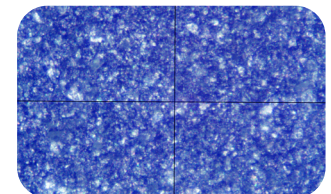
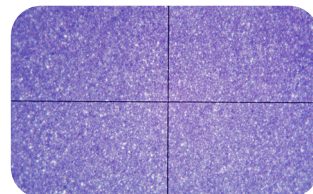
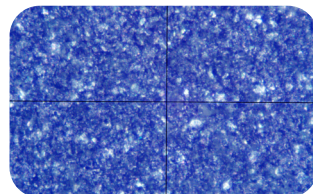
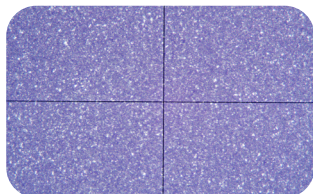


2-minute exposure High Mag



ISODAM
Medium

True Dental Dam
Medium



The surface of the polyisoprene dams including **ISODAM**, **True Dental Dam** and **EdgeDam** show no damage after exposure to chloroform under magnification. These dams are very compatible with chloroform exposure.

Research supported by FourD Rubber.



3M

3M.com/ScotchbondUniversalPlus

Description

3M™ Scotchbond™ Universal Plus Adhesive is a light-cured, single-component dental adhesive:

- Next generation of 3M™ Scotchbond™ Universal Adhesive.
- The first radiopaque, universal adhesive available on the market.
- Compatible with light-, dual-, and self-cured composite materials, cements, and core-build-up materials.
- Can be used with self-etch, selective-etch, and total-etch techniques.

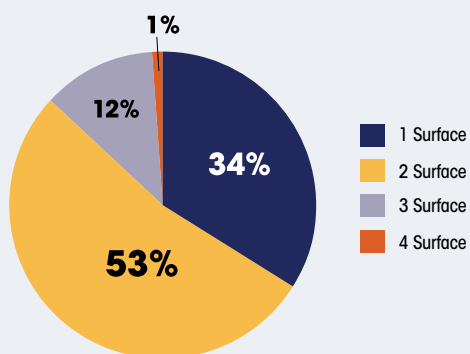


Clinical Evaluation Protocol

Scotchbond Universal Adhesive Plus was used to bond a total of **2,425** composites, crowns and veneers over two years. Of these restorations, 2,005 were one - to two-years old and available for recall. Areas for consideration and evaluation were retention, lack of post-op sensitivity, and lack of marginal discoloration.

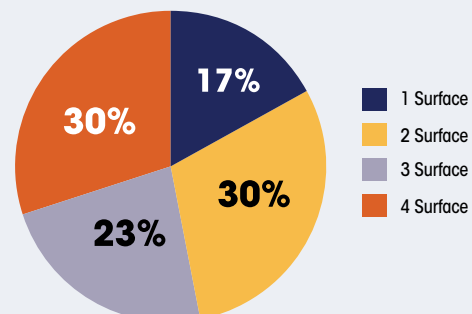
Total Direct Restorations Placed

Fig. 1: Posterior: Total 1,843



| | |
|-----------------|------------|
| 1 Surface | 634 |
| 2 Surface | 969 |
| 3 Surface | 222 |
| 4 Surface | 18 |

Fig. 2: Anterior: Total 582



| | |
|-----------------|------------|
| 1 Surface | 98 |
| 2 Surface | 176 |
| 3 Surface | 135 |
| 4 Surface | 173 |

Fig. 3: Age of Direct Restorations in Function

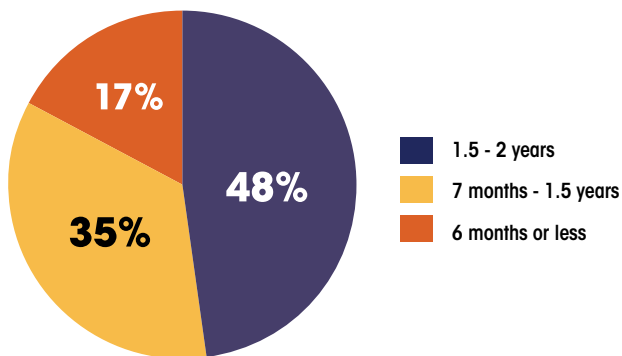
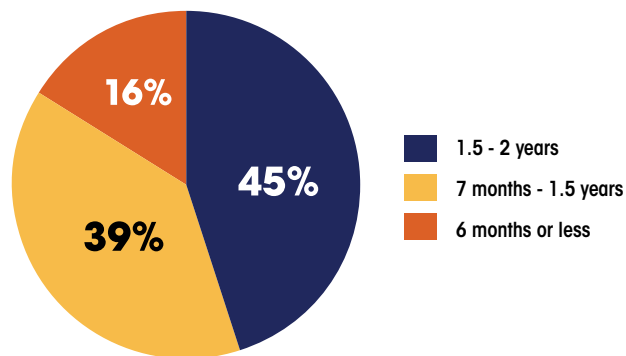


Fig. 4: Age of Indirect Restorations in Function



Clinical Summary and Observations

Retention

No restorations placed using **Scotchbond Universal Plus Adhesive** debonded during the two years of service (Figure 4). There were three anterior restorations that had to be replaced because of chipping due to bruxism.

Lack of Postoperative Sensitivity

No patients reported any long-term sensitivity in the teeth where **Scotchbond Universal Plus Adhesive** was used.

Lack of Marginal Discoloration

One-hundred percent of restorations evaluated at recall show no signs of marginal staining (Figure 4).

Summary

A total of 2,425 restorations were placed over the past two years, using **Scotchbond Universal Plus Adhesive** as the bonding system. 2,005 restorations were one - to two-years old and available for recall. All restorations received excellent ratings for resistance to marginal discoloration, lack of postoperative sensitivity and retention. None of the restorations debonded over the two-year period. **Scotchbond Universal Plus Adhesive** received a 100% clinical performance rating at two years.

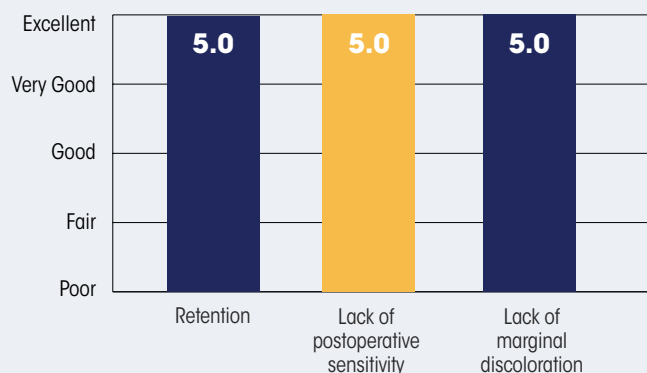


2-year post-op, #4-13 lithium disilicate veneers/crowns

Evaluators' Comments

- *"Scotchbond Universal Plus Adhesive allows us to stock one product to bond anything in the office."*
- *"The combination of the dispenser and the viscosity of the product give me assurance that I am fully coating the restoration. The material is not runny."*
- *"I've had zero issues with debonds or sensitivity with this adhesive — it's the best!"*
- *"You can use it with many more bonding procedures without the need for a separate activator."*

Fig. 4: Results of **Scotchbond™ Universal Plus Adhesive** at 2-Years



Restorations were evaluated on a 1-5 rating scale: 1= poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

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