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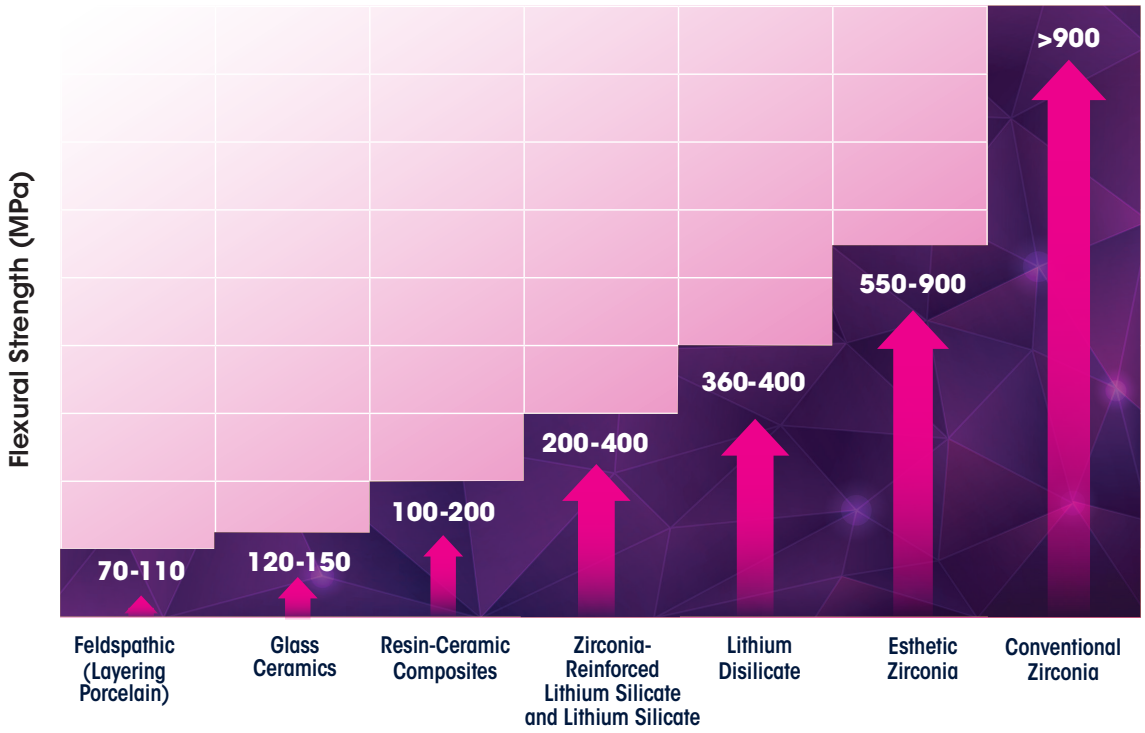
FROM THE DESK OF
Dr. Sabiha Bunek, Editor-in-Chief

As zirconias move from a layered restoration to monolithic, their evolution is similar to glass ceramics. Zirconias are now highly translucent, multi-shaded, and layered for a more custom cosmetic appearance. The rise in CAD restorations has also simplified fabrication and as such, characterization of material becomes more and more important, rather than relying on the art of a technician's hands. In this issue we sort through the evolution of ceramics (including the newest categories of creamics), their indications, and some of the advantages and disadvantages in selecting a particular material for a clinical situation. We also discuss surface treatments and their role in ensuring a better bond. As always, we look forward to hearing from our readers and welcome your comments and suggestions; you can reach me at drbunek@ dentaladvisor.com.

— Sabiha S. Bunek

Strength of Resin and Ceramic Materials By Classification



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Ceramic Choices

Modern all-ceramic systems can be categorized based on their glass and crystalline content. A ceramic with high glass content will exhibit excellent esthetics, whereas a ceramic with high crystalline content will provide superior strength. Ceramics can be classified into three categories based on composition: **porcelains** (feldspathic), **glass ceramics** (leucite-reinforced, lithium silicate, and lithium disilicate), and **polycrystalline ceramics** (zirconia and alumina).

Feldspathic porcelains

(containing mostly glass) are composed of potassium feldspar, quartz, and kaolin. Because of their high glass content, they have superior translucency and esthetics. They have the lowest flexural strength among ceramics, ranging from 70 to 110 MPa, making them highly fragile. Feldspathic porcelains are processed using a powder-liquid slurry that is "stacked" and fired in layers to form a custom layered crown or veneer. These materials are most commonly used as a veneering porcelain over metal and ceramic substructure.

Brand examples:

- ***VITA VM13*** (VITA)
- ***Vintage Halo*** (SHOFU)
- ***Initial*** (GC America)

Indications:

- Veneering porcelain on metal & ceramic substructures
- Veneers

Advantages:

- Highly esthetic
- High translucency
- Little to no reduction required

Disadvantages:

- Low flexural strength
- Difficult to fabricate

Glass ceramics

offer excellent esthetics and translucency. The addition of leucite crystals to the glass matrix slightly improves mechanical properties, making these ceramics ideal for veneers, inlays/onlays, and anterior crowns.

#20 IPS Empress onlay

Brand examples:

- ***IPS Empress*** (Ivoclar Vivadent)
- ***Straumann® n!ce®*** (Straumann)
- ***VITABLOCS Mark II*** (VITA)

Indications:

- Anterior crowns
- Veneers
- Inlays/Onlays

Advantages:

- Highly esthetic and translucent
- Blocks are fully crystalized; therefore no extra time needed for firing
- Little to no reduction required

Disadvantages:

- Low flexural strength
- Resin cement required

Straumann® n!ce® Fully Crystalized Glass Ceramic

Straumann®

Have you tried ***n!ce®***? ***Straumann® n!ce®*** fully crystallized glass-ceramic milling blocks combine biocompatible and esthetic materials to create natural-looking, high-gloss CAD/CAM restorations. No additional crystallization firing is required - just mill, polish and seat. With its smooth surface finish and margin lines, ***Straumann n!ce*** can be ground, polished, and seated immediately using adhesive or self-adhesive cementation, saving time and money.

Build confident smiles with ***Straumann n!ce*** glass ceramic for crowns, partial crowns, inlays, onlays and veneers.

Online: Straumann.us/nice

Resin-ceramic composites

are largely comprised of ceramic-infused resins, combining the best characteristics of a high strength ceramic and a composite. This new class of CAD/CAM materials has a modulus of elasticity and surface hardness very close to natural tooth structure, is less brittle than glass ceramic, and has excellent milling properties guaranteeing restorations can be fabricated quickly with minimal wear and tear on milling equipment. Because the hybrid ceramic already features its final strength, it can be seated immediately after milling.

#5 Camouflage NOW

Brand examples:

- ***CERASMART*** (GC America)
- ***Camouflage NOW*** (Glidewell)
- ***Enamic*** (Vita)
- ***Grandio blocs*** (VOCO)

Indications:

- Anterior/Posterior Crowns
- Veneers
- Inlays/Onlays
- Implant supported crowns

Advantages:

- Easy and efficient milling
- Requires no sintering after milling
- Repairable in mouth
- Less abrasive to opposing dentition than glass ceramics

Disadvantage:

- Confusion about bonding protocols and surface treatments

Grandio blocs

VOCO

Grandio blocs is the new 86% filled nano-ceramic hybrid CAD/CAM block for crowns, inlays/onlays, veneers and implant supported crowns. Possessing optimal tooth-like physical properties, category leading compressive strength, extremely low water absorption, and natural esthetics with enhanced color stability, ***Grandio blocs*** provide a new time-saving solution for practitioners that want to streamline their CAD/CAM processes and deliver high quality restorations. Available in multiple shades, two translucencies and two sizes, ***Grandio blocs*** are processed using standard chairside or lab based milling devices without the need for firing.

Ceramic Choices

Zirconia-reinforced and lithium silicate (ZLS)

Obsidian PFM #23-26

ZLS ceramics contain lithium silicate as the main crystalline phase with the presence of dissolved zirconia dioxide (10% by weight). ZLS are marketed by two companies; Vita Suprinity (Vident) and Celtra Duo (DENTSPLY Sirona). ZLS materials can be processed with or without sintering. Flexural strength of pre- sintered ZLS is lower (~200 MPa) than its sintered counterpart (300-400 MPa). Another member of the "lithium" family is lithium silicate ceramic (Obsidian, Glidewell Laboratories). The material is reported to have an average flexural strength of 373 MPa and can be used for full-contour crowns, 3-unit anterior bridges, veneers, inlays, and onlays. Additionally the material can be used a stronger veneering ceramic for metal restorations.

Brand examples:

- ***Obsidian*** (Glidewell)
- ***VITA Suprinity*** (VITA)
- ***CELTRA Duo*** (Dentsply Sirona)

Indications:

- Anterior/ Posterior Crowns
- Inlays
- Veneers
- Onlays

Advantages:

- Mill faster than lithium disilicate
- Superior polishabiity due to smaller crystal sizes in microstructure
- Good optical properties

Disadvantage:

- Need more long-term clinical data

Lithium Disilicate Ceramics

e.max #9

This ceramic consists of approximately 70% lithium disilicate crystals that are embedded in a glass matrix, resulting in a relatively translucent material that is 2 to 3 times stronger than glass leucite-reinforced ceramics (360–400 MPa). The combination of strength and esthetics makes them one of the most versatile materials on the market, allowing them to be used for veneers, inlays/onlays, anterior/posterior crowns, three-unit anterior bridges, and implant restorations.

Brand examples:

- ***IPS e.max*** (Ivoclar Vivadent)
- ***Initial LiSi Press*** (GC America)

Indications:

- Veneers/ Inlays/ Onlays
- Anterior/ Posterior Crowns
- 3-unit bridge up to 2nd Premolar
- Implant abutment

Advantages:

- Excellent translucency
- Blends well with surrounding dentition
- Moderate-High Strength
- Can be Monolithic or Veneered
- Can be bonded or cemented

Disadvantages:

- Needs to be milled & fired
- Requires more tooth reduction than other glass ceramics and monolithic zirconia

DID YOU KNOW?

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Esthetic Zirconia

The newest class of zirconia is more translucent than the original monolithic zirconia crown materials; however, the flexural strength has decreased, ranging from 550 to 900 MPa. Esthetic zirconia materials provide a more translucent alternative to full-contour zirconia and a stronger alternative to glass-ceramics.

#28 and #29 with NexxZr T @ 3 years

Brand examples:

- ***NexxZr Plus & NexxZr T*** (Sagemax)
- ***Lava Esthetic*** (3M)
- ***IPS e.max ZirCAD Multi*** (Ivoclar Vivadent)
- ***BruxZir Esthetic*** (Glidewell)
- ***Katana UTML/STML*** (Kuraray)

Indications:

- Anterior/ Posterior Crowns
- 3- Unit Bridges
- Implant Abutments

Advantages:

- More translucent than conventional zirconia
- Biocompatible
- Minimal reduction
- Low cost

Disadvantages:

- Translucency is inferior to glass ceramics
- Lower flexural strength compared to conventional zirconia
- More brittle than conventional zirconia due to higher cubic phase

Conventional Zirconia

The orginal form of this ceramic offers high strength and high fracture toughness due to the composition of polycrystals. The lack of a glass component within the matrix results in an opaque restoration, compromising esthetics in some cases. Its use is indicated for anterior and posterior crowns, 3- to 6-unit bridges, Maryland bridges, and implant abutments. Newer zirconias have improved translucency.

BruxZir Solid #30 @ 6-years

Brand examples:

- ***Lava Plus*** (3M)
- ***BruxZir Solid*** (Glidewell)
- ***NexxZr S*** (Sagemax)
- ***Katana*** (Kuraray)
- ***IPS e.max ZirCAD*** (Ivoclar Vivadent)

Indications:

- Anterior/ Posterior Crowns
- 3-6-unit bridges
- Maryland bridges
- Implant crowns & abutments

Advantages:

- Highest strength ceramic
- High fracture toughness
- Biocompatible
- Minimal reduction
- Low cost

Disadvantages:

- Inherently opaque
- Can be considered "too" tough
- Hard to remove

IPS e.max® ZirCAD Multi

Ivoclar Vivadent

IPS e.max® ZirCAD Multi is a new multi-translucent zirconia from Ivoclar Vivadent that provides a whole new level of strength and durability. Designed for both the anterior and posterior region, the integrated progression of shade and translucency in the material maximizes the appearance of monolithic crowns and bridges. This provides you with a restoration that boasts the premium esthetic results you expect from a layered restoration with the strength and reliability you demand of a full contour case. Ivoclar Vivadent reports up to 30% higher flexural strength and 50% higher fracture toughness compared to other common translucent zirconia materials. ***IPS e.max ZirCAD*** only requires 0.8 mm of tooth reduction in the anterior and 1.0 mm of tooth reduction in the posterior, allowing for conservative preparations without compromising the longevity of the restoration. When prescribing zirconia restorations, don't settle for less than the brand you trust.

Summary

As dental materials evolve, there is a continual push toward ***strong yet esthetic restorations.*** Just in the last decade, we have witnessed tremendous progress in terms of both strength and esthetics. Where once low-strength, silica-based ceramics were the only option for esthetic restorations, we now have ***all-ceramic options that provide us four times the strength.*** With the success of lithium disilicate ceramics, it is clear that the dental industry is moving toward acceptance of monolithic restorations. As such, full-contour zirconia-based crowns and bridges are being manufactured, offering higher translucency and strength. We will continue to see full-contour zirconia restorations grow in popularity because of their lower cost, higher strength, and conservative preparation.

When and where is a surface treatment beneficial?

Clinicians are often confused regarding the best way to treat the intaglio surface of silica- and zirconia-based restorations before cementation. Surface treatments of indirect restorations are a ***crucial step in adhesion as they improve the bond strength at the ceramic-cement interface by micromechanical and chemical bonding. Micromechanical interlocking*** is achieved by increasing the surface area of indirect restorations. This can be done by etching with hydrofluoric (HF) acid or sandblasting with 50-um alumina. ***Chemical bonding*** is achieved through the use of silane or ceramic primers with MDP.

When bonding ceramic restorations with ***a resin cement, chemical surface treatments offer the highest bond strength.***

Silica-based glass ceramics
(i.e. IPS e.max)

STEP 1: **Apply hydrofluoric acid to intaglio surface** *(performed by your lab unless milling in office)*

+

STEP 2: **Apply silane primer**

Zirconia
(i.e. BruxZir)

STEP 1: **Sandblast with 50-um alumina**

+

STEP 2: Primer not required if prep is retentive; use a ceramic primer to ensure a better bond

DENTAL ADVISOR | CLINICAL PROBLEM SOLVER

Monobond® Etch & Prime
Ivoclar Vivadent

Conventional pre-treatment method with hydrofluoric acid. Simplified pre-treatment method eliminating hydofluoric acid.

Formulated for use with *IPS e.max CAD*, this product was awarded as an innovation in dentistry! It eliminates a step— no more hydrofluoric acid gel etch! Pretreatment of glass-ceramic restorations can now be done by applying one coat of ***Monobond® Etch & Prime*** liquid on the internal surface of the restoration, agitating the applied liquid for 20 seconds, and allowing it to react for 40 seconds. The liquid is then thoroughly rinsed and air-dried. Lab testing performed by DENTAL ADVISOR confirmed excellent bond strengths when using this new primer with lithium disilicate ceramics.

Z-Prime™ Plus
Zirconia-Alumina-Metal Primer, *Bisco Dental*

Bisco's ***Z-Prime™ Plus*** is a single-component priming agent used to significantly enhance adhesion between indirect restorative substrate materials and composite resin cements. ***Z-Prime Plus*** significantly enhances bond strengths to Zirconia, Alumina and Metal substrates due to its unique combination of two active monomers, MDP, a phosphate monomer, and BPDM, a carboxylate monomer. This combination of primers gives ***Z-Prime Plus*** a synergistic effect, resulting in its high bond strengths.

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Biomaterials Research Report
Amer Tiba, Ph.D., Matt Cowen, B.S.
DENTAL ADVISOR Biomaterials Research Center
3110 West Liberty, Ann Arbor, MI 48103

NUMBER 114 – APRIL 20, 2018

Multiple Property Comparison of NiTi Endodontic Files

M. Cowen, A. Tiba, J.M. Powers, D.J. Raghavan

Introduction:

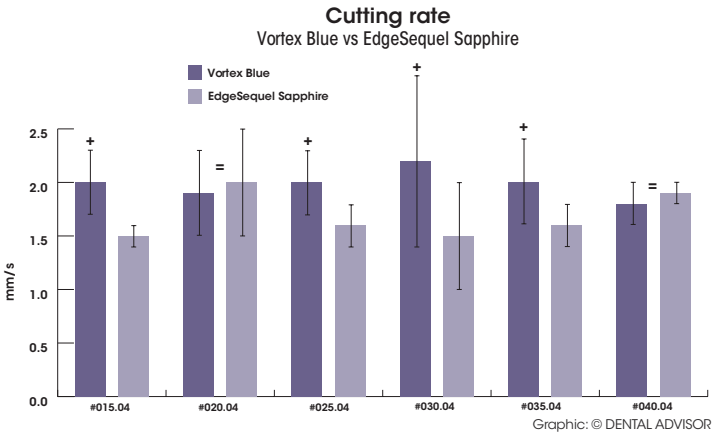
Like many dental product categories, endodontic files are often heavily marketed as excelling in a particular property of that product. Often cyclic fatigue, torque resistance, or flexibility is hyped as the most important parameter that clinicians should be most concerned with, when the combination of these traits is what translates into endodontic treatment success. **Recently, DENTAL ADVISOR completed testing of four endodontic files from *Dentsply Sirona* and *EdgeEndo* across a range of sizes to compare cyclic fatigue resistance, torque resistance, cutting efficiency, durability and apex locator compatibility.**

Conclusions:

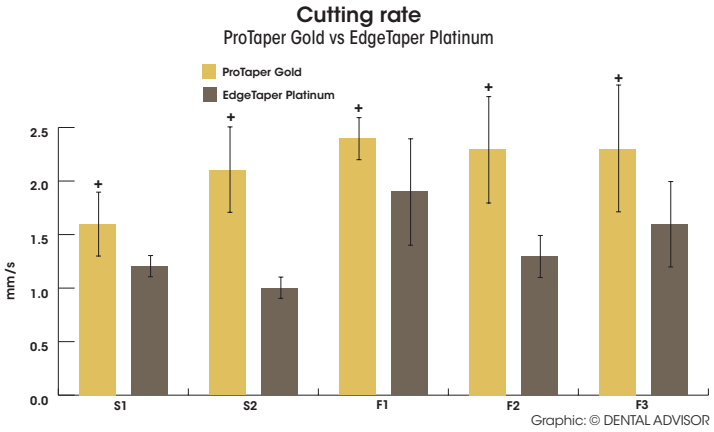
Vortex Blue overall has 12% more torque resistance, and an 18% higher cutting rate than ***EdgeSequel Sapphire.*** Cyclic fatigue resistance was similar to ***EdgeSequel Sapphire*** taken as a whole. ***Vortex Blue*** lasted 4.8 times longer than ***EdgeSequel Sapphire*** files in simulated testing before failure. ***ProTaper Gold*** measured a **55% higher cutting rate** and instrumented over four times as many canals before failure than ***EdgeTaper Platinum. EdgeTaper Platinum*** measured a significantly higher cyclic fatigue for all file sizes and higher torque resistance in 3/6 file sizes, while ***ProTaper Gold*** has higher torque resistance in the S1 file size. ***EdgeTaper Platinum*** and ***EdgeSequel Sapphire*** were found to have significant glue present on the file after cleaning and sterilization which interfered with use of an apex locator.

CUTTING EFFICIENCY AND DURABILITY

Initial cutting rate was measured by timing the instrumentation of curved endo training blocs sequentially with each file size by a clinician with light water irrigation between each step to remove excess debris under torque control. The same files were used until failure by unwinding or separation to compare the durability of the files while cutting. Used files were compared under magnification to an unused file to determine file failure. It is generally recommended to cease using files after visual signs of distortion such as unwinding or edge wear.

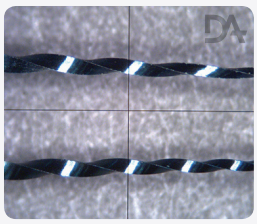


Vortex Blue was measured to have an overall cutting rate that was 18% faster, though this wasn't obvious to the clinician. ***Vortex Blue*** files lasted an average of 4.8 canals instrumented before any unwinding was detected. ***EdgeSequel Sapphire*** files unwound in file sizes 30, 35, and 40 after only 1 canal and in all file sizes after 2 canals. The unwinding was much more pronounced for the ***EdgeSequel Sapphire*** files and the cutting rate was severely reduced after the first canal.

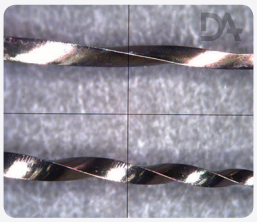


ProTaper Gold had a statistically significant higher cutting rate for every file size and was overall about 55% faster. There was a clear difference in cutting efficiency reported by the clinician. ***ProTaper Gold*** files lasted an average of 4.2 canals instrumented before failure, primarily in the F3 file size. ***EdgeTaper Platinum*** failed after 1 canal instrumented in sizes F1-F3 and in all files sizes after 2 canals were instrumented.

Representative samples of failed files (top) compared to unused files (bottom).

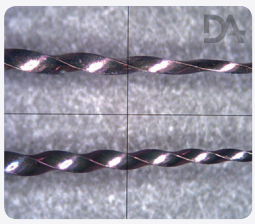


Vortex Blue #20 after **FIVE** canals

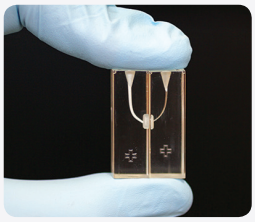


EdgeSequel Sapphire #40 after **ONE** canal

ProTaper Gold F3 after **FIVE** canals



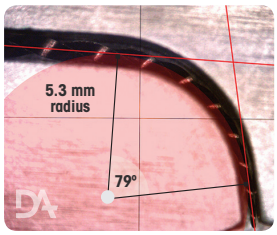
EdgeTaper Platinum F1 after **ONE** canal



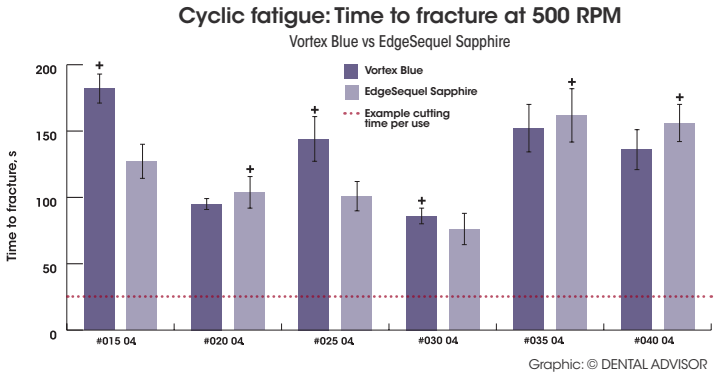
Used and unused endodontic training blocs

CYCLIC FATIGUE RESISTANCE

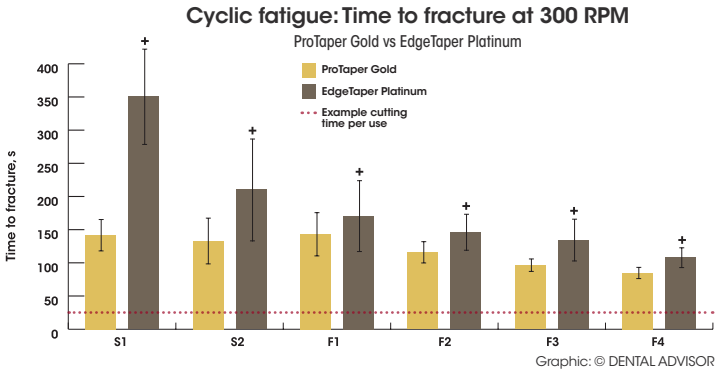
Often the most quoted property for NiTi files is the resistance to cyclic fatigue, yet this is also technique sensitive and dependent on study design. This property has no current accepted standard method but is often regarded as clinically relevant to the dreaded phenomenon of file separation. Generally, the test is conducted by inserting a file into a static curved canal and rotating the file until fracture. The file undergoes repeated tensile and compressive forces concentrated on a small portion of the file until it breaks, often lasting for minutes before succumbing to failure. If the test allows the file to move, either intentionally by dynamic moving of the file, or due to poor conformation of the file in a large test canal, then the stresses are distributed to a larger area of the file and should last longer before breakage. In our fatigue testing device, the canal shape is adjustable to allow a close conformation of the file to the canal shape shown to the right. The common descriptors for this test are the canal curvature in terms of the angle and radius of curvature. Our test was designed to a nearly worst case 80 degree curvature and common 5 mm radius. A smaller radius or greater angle will result in less time until fracture, while a larger radius, or straighter angle will result in the file lasting longer. As can be seen from the graphs, all files lasted longer in this worst case static test than is typically used clinically (shown with a dashed line), however cumulative fatigue can increase the chance of failure by other mechanisms.



ProTaper Gold **F2: Measured 79° with 5.3 mm radius**



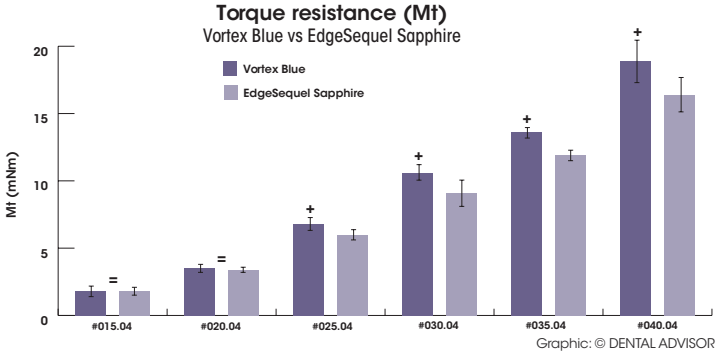
Vortex Blue measured a 9% overall greater cyclic fatigue resistance across all file sizes compared to ***EdgeSequel Sapphire.***



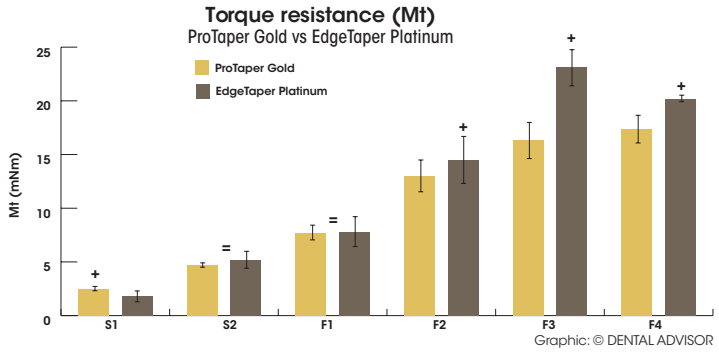
EdgeTaper Platinum overall had a 56% greater cyclic fatigue resistance compared to ***ProTaper Gold.***

TORQUE RESISTANCE

Torque resistance of files is the other important parameter that dictates whether a file is prone to separation. Studies of files that have failed clinically indicate that a combination of torque and fatigue failure contribute to file separation. Generally, as a file increases in diameter, the torque resistance increases while the cyclic fatigue resistance decreases. In other words, torque resistance is probably more important for smaller file sizes in gauging whether a file may separate due to torsional failure. In our study, we used the ISO 3630 method of measuring maximum torque resistance in which files are fixed 3 mm from the tip and rotated at 2 rpm until fracture.



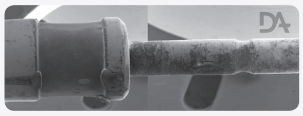
Vortex Blue has significantly higher torque resistance in 4 out of 6 file sizes, and approximately 12% more torque resistance overall.



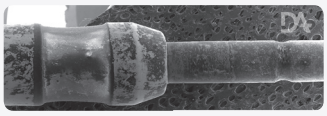
ProTaper Gold has higher torque resistance for the smallest size, and lower torque resistance for the 3 largest sizes tested.

SEM INSPECTION AND APEX LOCATION COMPATIBILITY

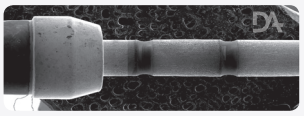
Files were inspected with a scanning electron microscope after cleaning and sterilization prior to use to evaluate the appearance of the files. A large buildup of glue on *EdgeEndo* files was observed around the connection of the handle and the shaft, with some resin detected along the file's cutting surfaces. This was suggested to potentially affect the ability of apex locators to maintain an electrical connection to function properly. We then tested 10 files of 3 different sizes with several random placements with a *Root ZX II* apex locator. The files were inserted into a prepared human incisor immersed in a 0.9% NaCl solution. For 3 file sizes, approximately 17% of the *EdgeEndo* files registered no connection, and fluctuations in readings were noted for over 25% of all *EdgeEndo* files, indicating an incomplete connection. The connection was generally worse for the larger file sizes, and the closer the apex locator probe was located to the handle. No problems were found in connecting with either the ***Vortex Blue*** or ***ProTaper Gold*** files.



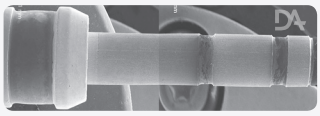
EdgeSequel Sapphire: note surface layer of glue



Edge Taper Platinum: note surface layer of glue



Vortex Blue: note lack of surface contamination



ProTaper Gold: note lack of surface contamination

3M Filtek™ Supreme Plus and 3M Filtek™ Supreme Ultra

96% rating at recall

3M
www.3M.com/Dental

Introduction

3M Filtek™ Supreme was launched in 2002, ***3M Filtek™Supreme Plus*** in 2005 and ***3M Filtek™ Supreme Ultra*** in 2009. Since the introduction of ***3M Filtek Supreme*** brand, DENTAL ADVISOR has clinically placed and monitored over 3000 restorations. Some of these restorations date back more than 15 years with the initial launch of ***3M Filtek Supreme.***

3M Filtek Supreme Plus and ***3M Filtek Supreme Ultra*** are indicated for both anterior and posterior composite restorations. The Dentin, Enamel and Body shades are filled 63% by volume with a combination of 4-20 nm particles and 0.6-20 micron clusters. The Translucent shades are filled 56% by volume. ***3M Filtek Supreme Ultra*** is fluorescent, opalescent and radiopaque and available in 36 shades and 4 opacities (dentin, body, enamel and translucent).

Clinical Evaluation Protocol

Fig. 1. Distribution of ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** at recall.

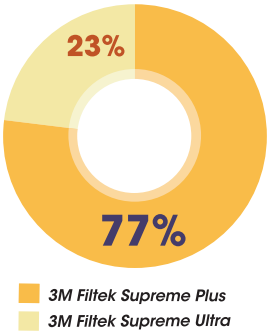


Fig. 2. Distribution of ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** Anterior and Posterior Restorations at recall.

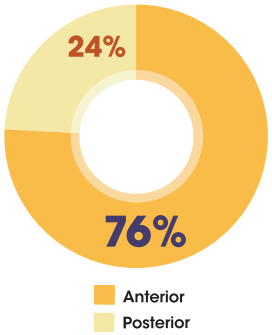
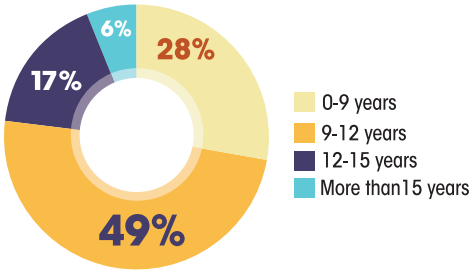


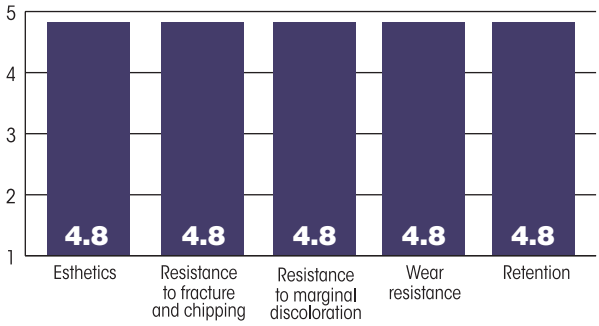
Fig. 3. Years in service of ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** at recall.



More than 3000 restorations were placed since the year 2000. Twenty-three percent of the restorations were not recalled due to patient attrition. Of the 2310 remaining restorations, 77% were ***3M Filtek Supreme Plus*** and 23% were ***3M Filtek Supreme Ultra*** (Figure 1). Both anterior and posterior restorations were evaluated (Figure 2). The distribution of the recalled restorations by years of service is shown in Figure 3. These restorations were evaluated in the following categories: esthetics, resistance to fracture and chipping, resistance to marginal discoloration, wear resistance and retention. Each parameter was rated on a 1-5 scale:

1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent

Fig. 4. Results of ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** at recall.



FIFTEEN-YEAR CLINICAL PERFORMANCE

Results at 15 years

Esthetics

The many shades of ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** blended very well with the surrounding enamel and dentin. Eighty-eight percent of the restorations received an excellent or 5 rating, while 10% received a very good or 4 rating, and only 2% received a rating of good or 3 (Figure 4). The improvement in fluorescence achieved with the new formulation of ***3M Filtek Supreme Ultra*** is noticeable. There has also been an improvement in shade stability over time. Only a handful of the restorations were replaced due to lack of esthetics. Many of the recalled restorations exhibited a very shiny and smooth surface texture, making it almost impossible to distinguish from the actual tooth.

Resistance to Fracture/Chipping

Ninety-five percent of the recalled ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** restorations exhibited no chipping or fracture (Figure 4). Five percent of the restorations chipped or fractured. Only 2% required replacement; the remaining restorations were smoothed, re-contoured or repaired with flowable composite.

Resistance to Marginal Discoloration

Ninety-two percent of the recalled ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** restorations had no visible staining at the margin and received a rating of 5 (Figure 4). Six percent had minimal staining at the margins not requiring replacement with a rating of 3 or 4. Only 2% of the restorations needed to be replaced due to marginal discoloration. Marginal discoloration is often the result of compromised bonding or excessive stress resulting in weakening of the bond and subsequent micro-leakage.

Wear Resistance

Ninety-six percent of the recalled ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** restorations exhibited no wear, while 2% exhibited minimal to moderated wear with a rating of 4 or 3 (Figure 4). Another 2% required replacement due to excessive wear. Half of these replaced restorations were anterior restorations with wear on the incisal edges due to bruxism. The remaining replaced restorations were in second molars.

Clinical Observations

- There were 80 debonds (3.5%) recorded. Most of these debonds were associated with Class V restorations. These failures are most often related to the bonding agent and placement technique.
- Fourteen percent of the restorations were replaced due to decay. These failures are most likely due to the bonding agent or even the clinician's technique.
- Five percent of the restorations were on teeth that were crowned at a later date. It is likely that the composite restorations were placed as interim restorations.

"GREAT LOOKING RESTORATIONS AFTER YEARS OF SERVICE."

Consultants' Comments

- *"In 15 years of using **3M Filtek Supreme Plus** and **3M Filtek Supreme Ultra,** they have proven to be reliable and very esthetic restorative composite materials."*
- *"This composite holds up really well, even in large four-surface posterior restorations."*
- *"Great selection of shades to meet all my needs."*
- *"On rare occasions, I have noticed some staining and microleakage at the composite-tooth interface."*

DENTAL ADVISOR

3M Filtek Supreme Plus and 3M Filtek Supreme Ultra 15-Year Clinical Performance

Conclusion

Over 2300 ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** were placed and monitored since 2000. The performance of these restorations has been exceptional, regardless of the size of the restoration. Excellent esthetics, low rate of fracture/chipping, minimal marginal discoloration and wear have been instrumental to the long-term success rate of these restorations.

At 15 years, ***3M Filtek Supreme Plus*** and ***3M Filtek Supreme Ultra*** received a clinical performance rating of **96%** +++++

ONE COAT 7 UNIVERSAL

+++++

Coltene Whaledent, Inc.
www.coltene.com

Description

ONE COAT 7 UNIVERSAL is a light-cured, single-component bonding agent that can be used with the self-etch, selective-etch and total-etch technique. Nanofiller technology is incorporated into the bonding agent to produce a perfectly homogenous bond layer and to provide improved mechanical properties. Thanks to combination with MDP no additional primer is needed to bond all direct and indirect restorations, such as dentin, enamel, metal, ceramics, zirconia and composite. It is formulated to offer high shear bond strength and excellent marginal integrity, which helps reduce the risk of post-operative sensitivity. In addition, it has been shown to have an antibacterial effect*. ***ONE COAT 7 UNIVERSAL*** is delivered either in unit doses or an ergonomic bottle containing sufficient bonding agent for up to 300 applications. It is available in a kit containing one 5 mL bottle of the bonding agent, one 2.5 mL syringe of Etchant Gel S, 20 application tips, 50 brushes and a mixing well. Activator kits contain one 3 mL bottle of ***ONE COAT 7 Activator*** together with 50 black brushes. In addition, individual 5 mL bottles and unit doses in packs of 50 together with 50 brushes are available.

Unique Features

- Outstanding bond strength and marginal sealing
- Contains nanofiller technology for a homogenous bond layer
- Ergonomic bottle with dropper (up to 300 applications) and unit doses
- Antibacterial*

**Proliferation test for antimicrobial activity with S.epidermidis (QualityLabs, Germany)*

Clinical Tips

- Be sure to follow the directions when using the activator as there are extra steps for this.
- Don't dispense too early to avoid it gelling before being used.

"GREAT BOTTLE DESIGN. IT DISPENSES ONE DROP AT A TIME WITHOUT ANY WASTE."

Consultants' Comments

- *"Easy to apply in a very thin layer. The viscosity is good."*
- *"Great versatility. Multi-purpose and I like that it bonds to all types of surfaces."*
- *"No offensive odor."*
- *"One drop is plenty. This bonding agent goes a long way and coats the area well."*
- *"I like that it's clear, antibacterial and can be used as a self-etch."*
- *"I really liked the laminated instruction card - I referenced it when using the activator."*
- *"The drops were not always uniformly dispensed."*

Indications

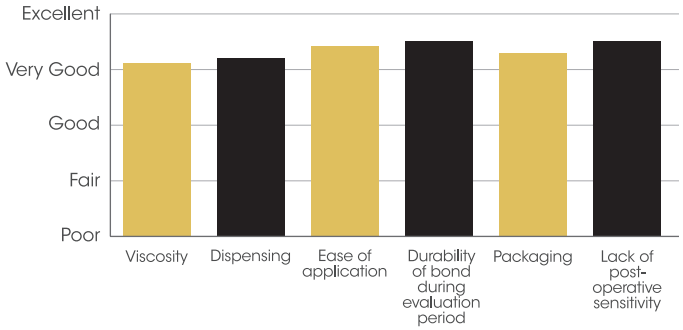
- Adhesion of composite materials, compomers and ceramic materials to enamel and dentin
- Adhesion of composite material on ceramic, composite material, zirconium oxide, metal and amalgam
- Dentin sealing

Evaluation Highlights

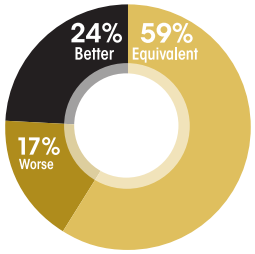
ONE COAT 7 UNIVERSAL was evaluated by 29 consultants, with a total of 693 uses.

- Easy to dispense and apply
- Thin film layer
- Use with self-etch, selective-etch and total-etch techniques
- Multi-purpose
- Adhesion to all surfaces
- Antibacterial
- Lack of post-operative sensitivity

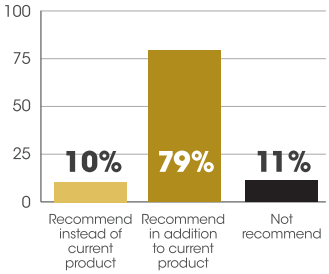
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



Enhance® mini Finishing System

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DENTSPLY Sirona
www.dentsplysirona.com

88% overall rating

Description

Enhance® mini Finishing System is a single-use, pre-mounted finishing system containing cups, points and discs fabricated with cured urethane dimethacrylate resin and impregnated with aluminum oxide. They are designed for finishing composite surfaces and preparing them for their final polish. ***Enhance® mini Finishers*** are smaller than regular *Enhance®* to offer improved access to all anatomical areas. The system is designed to deliver a smooth, contoured surface with a pre-polished surface luster in a single step. ***Enhance® mini Finishing System*** is available in an introductory kit containing 60 finishers (20 cups, 20 discs and 20 points), and one ***Enhance® PoGo® Polishing System*** sample pack containing three cups, discs and points each. Refill packs are also available containing 40 cups, discs or points.

Unique Features

- Smaller finishers for improved access and versatility.
- Modified shapes, adapt well to anatomical profile.
- One-step (finishing).
- Single-use, versatile and efficient.

Indication

- One-step finishing of direct composite and compomer restorations.

Evaluation Highlights

Enhance mini Finishing System was evaluated by 33 consultants, and used 844 times in total.

- Efficient
- Easy to use
- Single-use, versatile system
- Removal of excess composite, finishing and polishing
- Good adaptability, size and easy access

"EASY TO USE, VERSATILE AND ADAPTABLE. LOVE THE NEW SHAPES, ESPECIALLY THE CUPS."

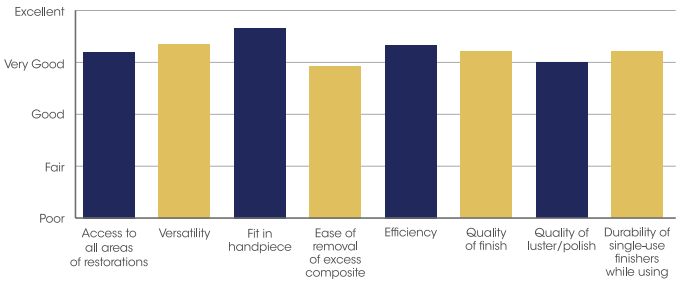
Consultants' Comments

- *"The design and shape of the finishing cups are the best! They fit the anatomical profile far better than traditional cups, discs and points."*
- *"Removes flash very well - there is a polisher for practically every possible crevice."*
- *"We used the system to finish provisionals and received positive feedback from patients."*
- *"Great system, especially if you do a lot of anterior composites."*
- *"Smooth running and minimal vibration."*
- *"Not thin enough to access narrow proximal areas. Would like the flame shape more pointed."*
- *"Some of the cups had extra tags on them."*
- *"Finishers are 'out of round' and created excessive vibration."*

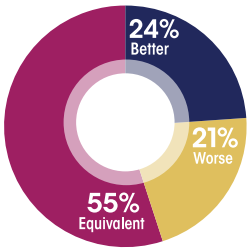
Clinical Tips

- Pressure needs to be varied for effectiveness. Apply light, rotating pressure for smooth surface.
- You can use both the internal and external sides of the mini cup shape! The concave cup shape on the exterior fits nicely over the rounded, convex facial surface of the teeth and the thin edge fits into the cervical and proximal line angles.
- ***Enhance minis*** are not as aggressive as regular *Enhance* - they put a higher gloss on the composite even before using *PoGo*.
- On its side, the barrel-shaped cup contours, shapes and finishes occlusal surfaces perfectly.
- Apply water and air spray while finishing for improved visibility of the surface texture/contour.
- Remove most excess with finishing burs before using the system.

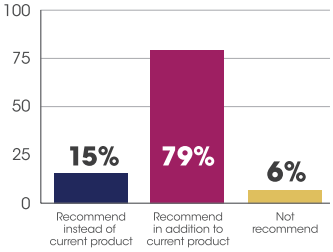
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



Dia-X Rotary File System

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88% overall rating

DiaDent
www.diadent.com

Description

Dia-X Rotary File System consists of a series of flexible, heat-treated, nickel-titanium (Ni-Ti) rotary files used for debris removal and shaping of root canals. The files are designed for effective instrumentation of calcified and curved canals and incorporate a flat non-cutting tip to efficiently remove debris and soft tissue. The progressively decreasing taper enhances their flexibility, and the convex triangular cross-section reduces rotational friction and contact with the canal wall. In addition, the 11 mm handle provides for accessibility. The files are coated for corrosion resistance and autoclavable. ***Dia-X Rotary File System*** consists of a box with a DX file 19 mm in length, and ***Dia-X*** files in sizes D1 through D5 in 21 mm or 25 mm lengths. DX files are used for coronal shaping and ***Dia-X*** D1 through D5 files are used to shape the canals. *Dia-ProT ™* gutta percha points and *Dia-ProT ™* paper points are available that match the D3, D4 and D5 files.

Indication

- Good centering ability, following the original canal shape

Clinical Tip

- Use for cases with canal curvature.

"THE BEST FILES I HAVE EVER USED TO NEGOTIATE CURVES."

Consultants' Comments

- *"The files shaped and prepared canals with ease. They are very flexible in the apical third."*
- *"This system has enabled me to increase the overall quality of my endodontics."*
- *"Files cut smoothly and efficiently and are fracture-resistant."*
- *"Easy instrumentation and numbered file sequence. I liked the simplicity."*
- *"Files have notches every mm which engages the stopper and is a base for the apex locator."*
- *"Gutta percha points are an excellent fit in the prepared canals."*
- *"A relatively small number of files are required to get the job done."*
- *"The gutta percha points are numbered differently than the files - confusing."*
- *"This is a different nomenclature for file usage - I really had to think about how to use it the first couple of times."*

Unique Features

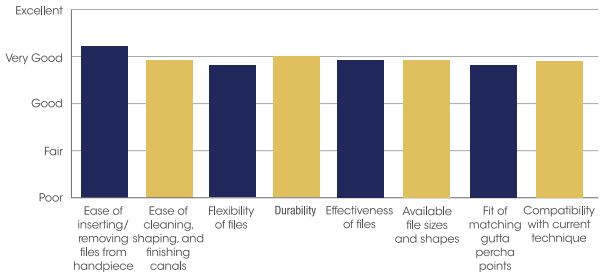
- Matching gutta percha points
- Flat non-cutting tip
- Convex triangular cross-section, reducing rotational friction and contact with the canal wall

Evaluation Highlights

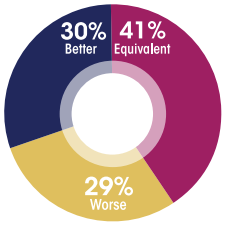
Dia-X Rotary File System was evaluated by 27 consultants, with a total of 328 uses.

- File system for shaping and preparing root canals
- Sequentially numbered files
- Flexible files
- Shapes curved and calcified canals
- Files are corrosion-resistant and autoclavable
- Matching gutta percha points

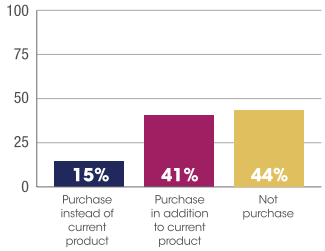
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



Reflection® Sapphire™ Sensitive Nitrile Gloves

+++++

EDITORS' DA DENTAL ADVISOR +++++ CHOICE

96% overall rating

SmartPractice
www.smartpractice.com

Description

Reflection Sapphire Sensitive Nitrile Gloves offer superior fit, feel and performance. They're thin, yet strong and stretchy. The exclusive formula makes this glove a great alternative for those sensitive to latex and many of the chemicals commonly used to manufacture latex and non-latex gloves. These gloves are not manufactured with natural rubber latex, carbamates, thiurams, thioureas, dithiocarbamates, benzothiazoles, or guanidines that may cause allergic reactions. There are 12 boxes to a case.

Indication

- Non-surgical patient procedures

Unique Features

- Textured for tactile sensitivity
- Latex- and powder-free
- Fabricated to fit hands' natural contours
- Free of other chemicals that may be associated with allergies and skin sensitivity

"VERY STRETCHABLE, STRONG AND RESISTANT TO TEARING."

Consultants' Comments

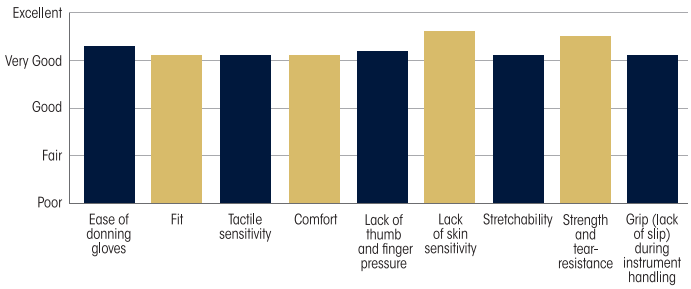
- *"This is a fantastic glove! It is easy to put on, very comfortable, great tactile sense."*
- *"Compared to what I have been using, they are a godsend."*
- *"These gloves grip instruments well."*
- *"I liked the lack of chemicals. They didn't irritate my hands."*
- *"The fit was better than other gloves. Great finger fit, without sagging or extra material."*
- *"My hands did not perspire."*
- *"Comfortable. No hand fatigue or pressure."*
- *"Removing them from the box was easy. They did not come out all bunched up."*
- *"Seem to be a little more slippery when handling instruments."*
- *"They made my hands very dry, I had to use more lotion."*

Evaluation Highlights

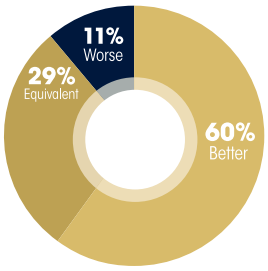
Reflection Sapphire Sensitive Nitrile Gloves were evaluated by 45 consultants, with a total of 2254 uses.

- Easy to don
- Latex-free and free of other irritating chemicals
- Excellent stretchability
- Good tactile sensitivity
- Wide range of sizes

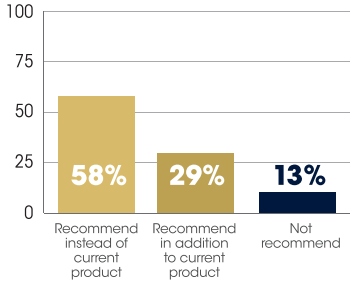
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



Clorox Healthcare® Fuzion™ Cleaner Disinfectant

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Clorox Healthcare
www.cloroxhealthcare.com

Description

Clorox Healthcare® Fuzion™ Cleaner Disinfectant is an EPA-registered, one-step, fast acting, ready-to-use cleaner disinfectant spray. This next-generation product combines the trusted efficacy of bleach with surface compatibility and low odor. It contains a neutralizer that breaks down sodium hypochlorite within three to six minutes of use to minimize residue and eliminate lingering odor. The spray is formulated to offer broad-spectrum antimicrobial activity. The spray bottle is ergonomic in shape, has trigger technology to optimize spraying and features dual-chamber technology, combining the bleach and neutralizer at the nozzle. ***Clorox Healthcare Fuzion Cleaner Disinfectant*** is available in one-quart spray bottles.

Unique Features

- Ergonomic bottle shape
- Intermediate level healthcare disinfectant
- Kills 52 microorganisms within one minute including TB, blood borne pathogens, norovirus, and MRSA. Kills C.difficile spores in two minutes
- Dual-chamber technology combines bleach solution and neutralizing solution at the nozzle
- New trigger technology delivers even surface coverage with 60% larger droplets that cling to vertical surfaces with minimal dripping compared to traditional swirl nozzles
- Neutralizer breaks down the bleach to significantly reduce residue and eliminate lingering odor

87% overall rating

Indication

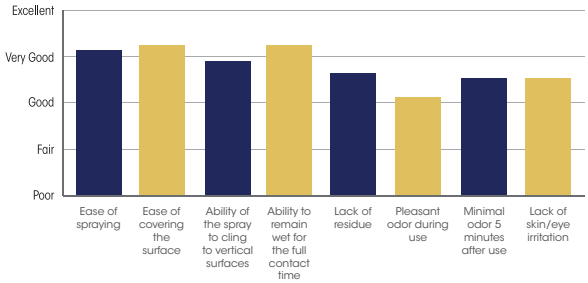
- Cleaning and disinfecting clinical contact surfaces and non-critical instruments/devices

Evaluation Highlights

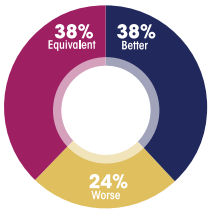
Clorox Healthcare Fuzion Cleaner Disinfectant was evaluated by 37 consultants, with a total of 1423 uses.

- Broad-spectrum and fast-acting
- Easy to use, with broad spray coverage
- Contains neutralizer to minimize residue and lingering odor
- Ergonomic spray bottle design

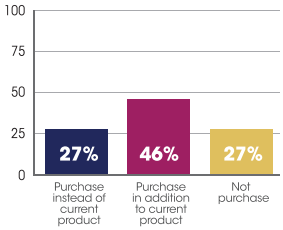
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



Consultants' Comments

"EFFECTIVE, BROAD SPECTRUM AND RAPID ACTING, WITHOUT ANY ODOR."

- *"Easy to use - I liked the dispenser and the disinfectant stayed where it was sprayed."*
- *"A nice clean smell without being overpowering."*
- *"I like the ergonomic bottle, sturdy trigger, and wide and effective spray coverage."*
- *"The fast kill time is the best feature."*
- *"No streaking or staining after it dries."*
- *"Staff loved the product - it did a great job."*
- *"It works on surfaces without discoloring them. I was concerned that it might stain my uniform because of the bleach component."*
- *"It was difficult to initially 'unlock' the bottle.*
- *"It has a strong odor and a residual odor of bleach that I do not like."*

SPECIAL THANKS TO:

Ease of spraying · Ease of covering the surface · Ability of the spray to cling to vertical surfaces · Ability to remain wet for the full contact time · Lack of residue · Pleasant odor during use · Minimal odor 5 minutes after use · Lack of skin/eye irritation

Select Senior Clinical Consultants (Over 20 years):

R. Fisher, OH · E. Katkow, MD · J. Lockwood, MI · J. Mayer, OH · W. Nagy, TX · G. Poy, MI · J. Shamraj, MI · R. Trushkowsky, NY · P. Yaman, MI

Senior Clinical Consultants (15-19 years):

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

Clinical Consultants (14 years or less):

A. Albright, NY · B. Argersinger, NC · P. Arsenault, MA · G. Ash, MI · M. Bannan, NC · B. Barricklow, OH · L. Bartoszewicz, MI · J. Bechtel, MI ·A. Becker, MI · C. Bhatti, MI · L. Bishop, MI · T. Bizga, OH · G. Bloomfield, MI · G. Bonior, MI
C. Brown, LA · E. Brust, MI · S. Bunek, MI · J. Bunek, MI · T. Burns, MI · J. Bush, PA · H. Cadorette, MI · P. Campo, NY · A. Cates, MI · P. Cracchiolo, MI · D. Chacko, TN · P. Chaiken, IL · D. Chenevert, MI · R. Cherry, FL · M. Connelly, MI
S. Crawford, MI · W. K. Dancy, GA · C. Dietz, OH · S. Dillingham, NY · K. Dobracki, MI · J&E Duski, MI · A. Dutko, MI · M. Egbaria, IL · M. Elford, MI · O. Erdt, MI · K. Evanoff, MI · M. Evers, OH · F. Facchini, MI · F. Falcao, FL
L. Feldman, NJ · D. Finnerty, MI · M. Frankman, SD · M. Glovis, MI · C. Goldin, MI · M. Grant, MI A. Green, MI · R. Green, MI · B. Greenwood, UT · J. Griffin Jr., MO · K. Grindling, MI · P. Gronet, KY · R. Grossman, PA · H. Gulati, MA
C. Gutierrez, MI · G. Haddad, CA · J. Haddad, MI · J. Hastings, CA · J. Hengehold, MI · B. Herrmann, CA · A. Hodges, NC · C. Huang, CA · M. Huberty, WI · P. Indianer, MI · J. Ireland, MI · S. Irwin, NJ · C. Jaghab, MI · J. Jaghab, MI
R. Juluri, IL · M. Kachi-George, MI · D. Kapp, NY · J. Kane, MI · Y. Kang, MA · J. Karam, MI · G. Karaouzas, MI · E. Kelly, GA · J. Kelly, GA · L. Kemmet, MN · D. Kinra, MI · M. Koczarski, WA · B. Kolb, MI · GA Krishnan, CA · C. Laird, OR
R. Le, NC · I. Levine, NY · E. Lowe, BC, CAN · J. Lusby, MI · A. Malkis, NY · C. Manduzzi, MIK. Mantzikos, NY · B. Mayday, MI · E. McCarty, MI · T. McDonald, GA · J. McLaren, MI · M. McMullin, MI · G. Meylan, MI · M. Migdal, MI
J. Minsky, CA · L. Montes, NY · L. Motyl, MI · M. Murphy, MI · L. Musgrave, MI · M. Nasif, MI · N. Nealis, IL · J. Neuman, MI · A. Newman, MI · J. Olitsky, FL · J. Olsen, MI · E. O'Niel, MI · F. Orlando, NY · S. Owens, MI P. Panchal, NC
M. Paquette, MI · J. Parrott, MI · D. Perkins, MI · N. Pelachyk, MI · S. Picazio, NJ · C. Pike, MI · C. Piontkowski, MI B. Pittsley, MI · T. Poirier, MI · B. Pournaras, SC · D. Radtke, MI · G. Ramos, NY · C. Ramsey, FL · G. Rashall, TX
S. Reddy, MI · T. Reeves, TN · N. Rego, CA · J. Riggs, MI · J. Rowe, AR · J. Rubin, DC · D. Ruhlig, MI · A. Saddy, MI · S. Salhadar, MI · P. Scalia, MI · C.Scanlon, MI · J. Schau, MI · L. Seluk, MI · R. Selvan, NJ · Y. Shaheen, MI
M. Shapiro, MI · E. Shaw, MI · A. Shemesh, IN · S. Simos, IL · B. Silver, MI · S. Simpson, MI · J. Smith, MI · C. Stevens, OK · B. Stevenson, MI · B. Stieper, MI · G. Sutton, CA · S. Tamber, MI · G. Tarantola, FL · T. Teel, IN · C. Thompson, MI
C. & L. Thorpe, MI · S. Uchil, MI · A. Valentine, MI · Lyn. Vandelaar, MI · H. Vann, MS · K. Vaught, MI · C. Vinkovich, OH · J. Weinfield, MI · H. Whitt, MI · L. Williams, MI · K. Wilson, MI · D. Wolf, MA · W. Wright, CA N. Yaeger, MI · S. Yun, MI
D. Young, MI · J. Zanetti, MI

Laboratory Consultants:

Apex Dental Milling, MI · Bullinger Dental Lab, MI · Centric Dental Laboratory, TX · Cornerstone Dental Studio, Inc., MI · David's Dental Laboratory, NY · Expertec Dental Lab, MI · Heritage Dental Laboratory, IL
Technique Crown and Bridge, Inc., NC