

THE DENTAL ADVISORTM

Improving Patient Care Through Research & Education

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Light-curing Units

The use of light-cured, resin composites is increasing and will only continue to increase with the worldwide agreement to phase down the use of amalgam. Consequently, the selection of a light-curing unit and how it is used are important factors. However, dentists and dental assistants are not well trained in the art and science of light curing. In most cases, the only instruction given is the duration of curing, e.g., "light cure for 10 seconds."

This issue of THE DENTAL ADVISOR describes important properties of light-curing units, provides useful clinical tips and reviews the properties of several light-curing units.

www.dentaladvisor.com

RATINGS:

Excellent + + + + +

Very Good + + + +

Good + + +

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From the Desk of Dr. Bunek, Editor-in-Chief



To ensure successful light curing, practitioners must understand the differences, capabilities, and limitations of the available models of curing lights. Join me in welcoming guest author, Dr. Richard Price, as he presents necessary information to select and properly utilize a curing light resulting in peace of mind that our restorations will stand the test of time.

In this article, he discusses the properties of curing lights, characteristics that differentiate premium models from basic or economy models, as well as clinical tips that are critical to successful light curing and the success of our light-cured restorations. Lab data from THE DENTAL ADVISOR Biomaterials Research Center is also provided. As always, I welcome your comments and suggestions; you can reach me at drbunek@dentaladvisor.com. Thanks for your continued support and reading!



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Curing Light considerations

Several terms describing factors in Curing Light performance.

Spectral radiant power:

Power at each nanometer of wavelength
(Power/wavelength = mW/nm)

Radiant exitance:

What comes out from the light source
(Power/area = mW/cm²)

Radiant flux or Power:

Watt = 1000 mW

Irradiance:

What is received from the light source
(Power/area = mW/cm²)

Emission spectrum:

Wavelengths in nanometers of light emitted from the curing light.

Radiant exposure:

Radiant energy applied to a given surface area over exposure time
(Energy/area = J/cm²)

Emission Spectrum

The emitted wavelengths of 'blue' light can differ among light curing units. These differences are not readily detectable using a dental radiometer, or with the naked eye. Figure 1a shows the wide range of emission spectra from contemporary curing lights. Figure 1b shows that two lights can have the same power output but very different emission spectra and curing characteristics. Although most resins use camphorquinone as the photoinitiator, some resins also include alternative photoinitiators (Ivocerin® or Irgacure) that are activated by lower wavelengths of blue light. Thus, you should know where the peak wavelength emission(s) occur from the light. Ask the resin manufacturer to provide information on which type of light-curing unit is preferred.

Figure 1a: Emission Spectra from Contemporary Curing Lights.

From: Price RB, Ferracane JL, Shortall AC. J Dent Res 94(9):1179-1186, 2015.

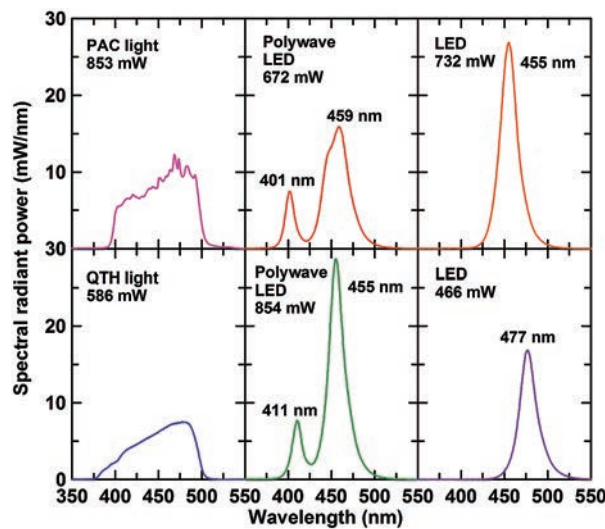
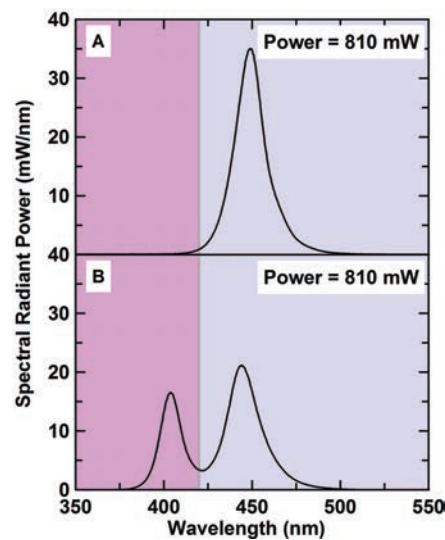


Figure 1b: Lights A and B deliver the same power. Light B emits light below 420 nm that is more effective on composites containing alternative photoinitiators.



Radiant Power Output and Active Tip Area

Although it is tempting to use the radiant exitance (irradiance) reported by the manufacturer of a light-curing unit, it is necessary to recognize that doing so is fraught with errors.

Small changes in tip diameter area can have a large effect on the radiant exitance and irradiance (*see Table 1*). While a small tip diameter may deliver a high radiant exitance, multiple exposures may be required to completely cover the restoration.

Table 1. Relationship between power, tip diameter, area and radiant exitance (irradiance)

Power (mW)	Tip Diameter (cm)	Area (cm ²)	Radiant Exitance (mW/cm ²)
600	1.0	0.79	764
600	0.9	0.64	943
600	0.8	0.50	1194
600	0.7	0.38	1559
600	0.6	0.28	2122

Radiant Power Output and Active Tip Area (cont.)

Figure 2 illustrates that some budget lights not only have small tip diameters but also deliver a non-uniform light output. Premium lights usually deliver a more uniform light distribution and have wider active light tips (8 to 12 mm in diameter). It is recommended that the active light-emitting tip should be at least 7 mm in diameter with uniform light coverage.

Premium Light

Showing More Uniform and Wider Coverage

Budget Light

Showing Non-uniform and Less Coverage

The **radiant exitance** is an averaged value of the light emitted across the entire tip and may not represent what is received by every part of the composite.

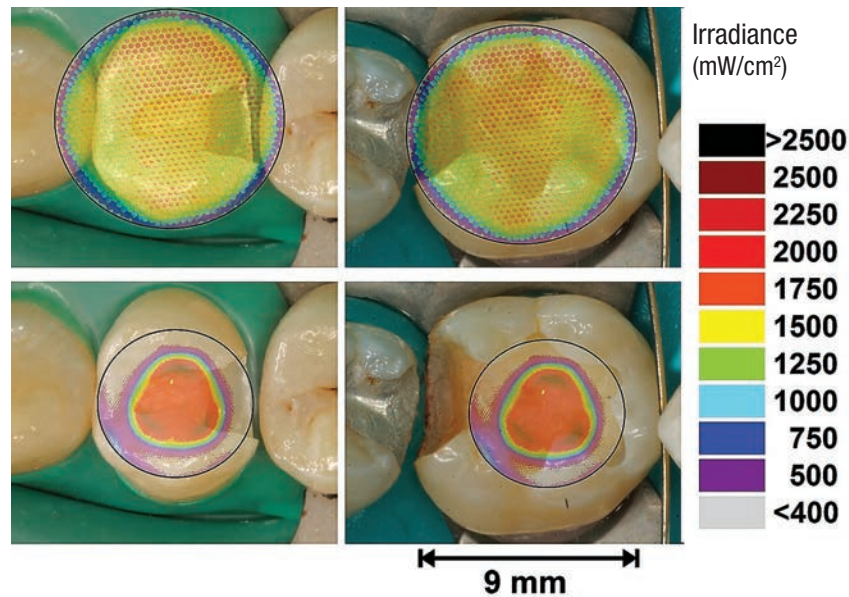


Figure 2: Beam Profiles from Two Curing Lights over a Premolar and Molar Tooth.

Unless they are matched to a specific resin system, delivering high irradiance values, above 2,000 mW/cm², to the resin and using short exposure times are not desired for direct resin restorations. For a given energy dose, exposure reciprocity may not always exist between irradiance and time to achieve equivalent polymerization of the composite; indeed, a longer exposure time at an irradiance below 2,000 mW/cm² appears to be beneficial to ensure optimal properties of the composite.

Elipar Deep Cure-S

3M ESPE Dental
(800) 634-2249
www.3m.com/dental

Product Description: The *Elipar DeepCure-S* provides confidence of a complete cure due to optimized optics. This new innovation ensures practitioners will have a deep, uniform cure even when perfect light positioning is difficult.

Improved ease of use and durability features include:

- 1,470 mW/cm² Intensity spread evenly throughout 10mm tip diameter
- Black coating of light guide reduces stray light
- Radiometer on charging base
- Light guide tip height reduced to ease access to posterior restorations
- One-piece stainless steel housing
- One second tack cure feature

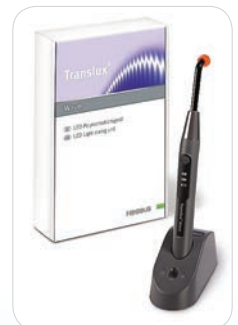


Translux Wave

Heraeus Kulzer, LLC
www.heraeusdentalusa.com

Product Description: The *Translux Wave* is a new state-of-the-art curing light that delivers optimum polymerization for all common camphorquinone-based dental materials. Its lightweight, cordless and its ergonomic design provide a safe and easy method for consistent light-curing. *Features include:*

- Pen-style body in a lightweight and ergonomic pen-style design
- One-button operation
- Cordless design for maximum freedom of movement
- Reliable performance and built-in radiometer



Battery Life

When deciding which light to purchase, remember that some batteries can only be changed by the manufacturer and may cost hundreds of dollars to replace, while others can be purchased for a few dollars at the hardware store. Unfortunately, a battery pack delivers a decreasing amount of energy as it is discharged, and the electronics in many budget curing lights do not seem to be able to compensate for changes in the battery output. This may result in a sharp decline in the output, often without warning (*Figure 3*).

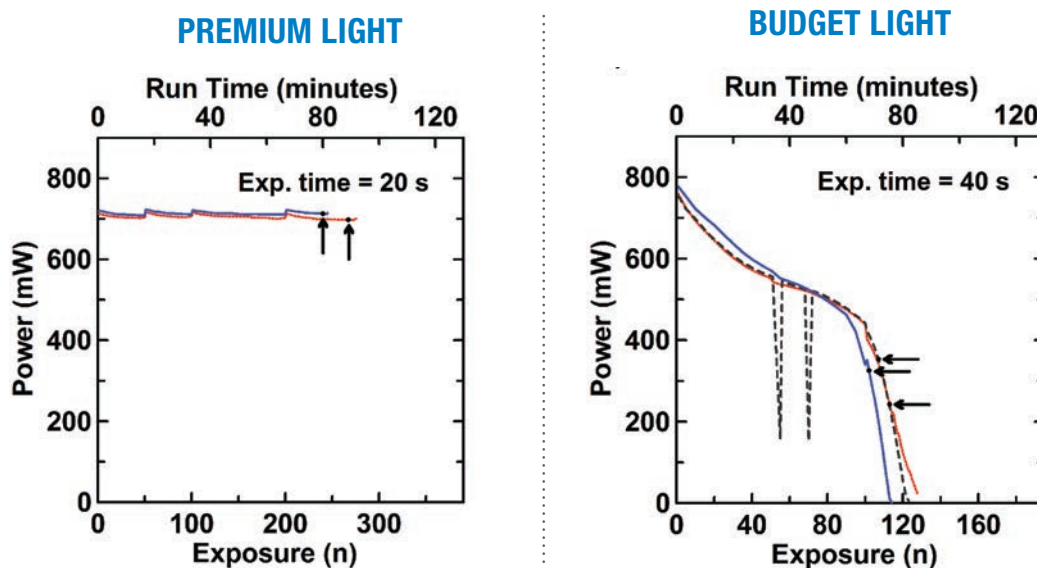


Figure 3. Output from Premium and Budget Lights Showing Decrease in Power Output with Multiple Exposures. The ↑ indicates when the curing light gave a low battery warning.



New Product Alert ►► Bluephase® Meter II

Bluephase® Style from Ivoclar-Vivadent represents the latest in LED curing light technology in a slim and lightweight design. Its patented Polywave™ technology provides a broadband spectrum of 385-515 nm, which allows you to cure all dental materials on the market today! The uniquely designed light probe makes it easier to access tight areas and steep angles like the lingual surface of lower incisors. The easy-to-use 2-button operation makes the **Bluephase Style** extremely intuitive and user friendly!

It's crucial that the light intensity of curing lights is tested on a regular basis to ensure that the polymerization of the dental materials is sufficient. The new **Bluephase® Meter II*** is the most accurate dental radiometer on the market. Due to its newly developed measuring principle **Bluephase Meter II** is the first dental radiometer suitable to check the light intensity of all available curing lights with very high precision, instantly and without restriction. Being a light-weight portable device with ergonomic design, it is the ideal solution for daily mobile use.

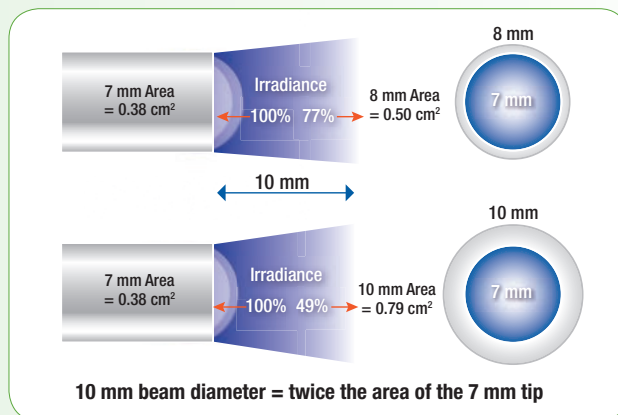


**Bluephase Meter II will be available in November, 2015.*

Effect of Distance on Irradiance

For some curing lights, even a small distance of 5 mm between the curing light and the resin can have a large negative effect on the irradiance received by the resin. Look for a curing light that emits a well-collimated light beam with minimal reduction in the irradiance at distances up to 10 mm away from the tip. A small increase in beam divergence causes a large increase in beam area which in turn produces a lower irradiance (*Figure 4*).

Figure 4: Effect of Light Beam Divergence on Area.



Surveys of dental offices have shown that many light-curing units do not deliver their intended light output. Improper use of a curing light can result in inadequate curing of the composite and inadequate physical and mechanical properties. These outcomes may be common reasons for restoration failure that include: bulk fracture of the composite, secondary caries due to adhesive failure between the tooth and composite, and breakdown of the margin at the gingival portion of the proximal box. Arbitrarily increasing light exposure times in an effort to prevent under-curing is not the answer, as this may cause unacceptable thermal trauma to the pulp and surrounding tissues.

DESIRABLE PROPERTIES:

LED curing lights

Compatible with variety of initiators (3rd-generation)

1

Light tip 8-10 mm in diameter and probe long enough (> 7cm) to reach posterior surfaces

2

Battery holds a charge for several hours of use, or can be quickly recharged - extra battery provided and has a low battery warning

3

Good ergonomics – portable, lightweight, easily accessible controls, and stable docking station/stand

4

Digital readout clearly displayed

5

Easy to disinfect with autoclavable light tip or protective barrier

6

FlashMax P3
CMS Dental
Tel: 204 891 7725
www.cmsdental.com

Product Description: *FlashMax P3* has an intensity of 5,000-6,000mW/cm², which makes 1 and 3 second curing times possible. A double sided pen grip has identical buttons for ergonomic, easy use in all areas of the mouth. Two programs of repeated activation make it faster and easier to do bulk-fill restorations, multiple teeth, veneers and orthodontics. The handpiece is lightweight and noiseless, with easy placement in a 360° docking station. A full charge will be more than enough to last an entire day. Two hours of recharging is all that is needed for a full battery. Low cost barrier sleeves are available to protect the light as an alternative to reduce wear on the surface.



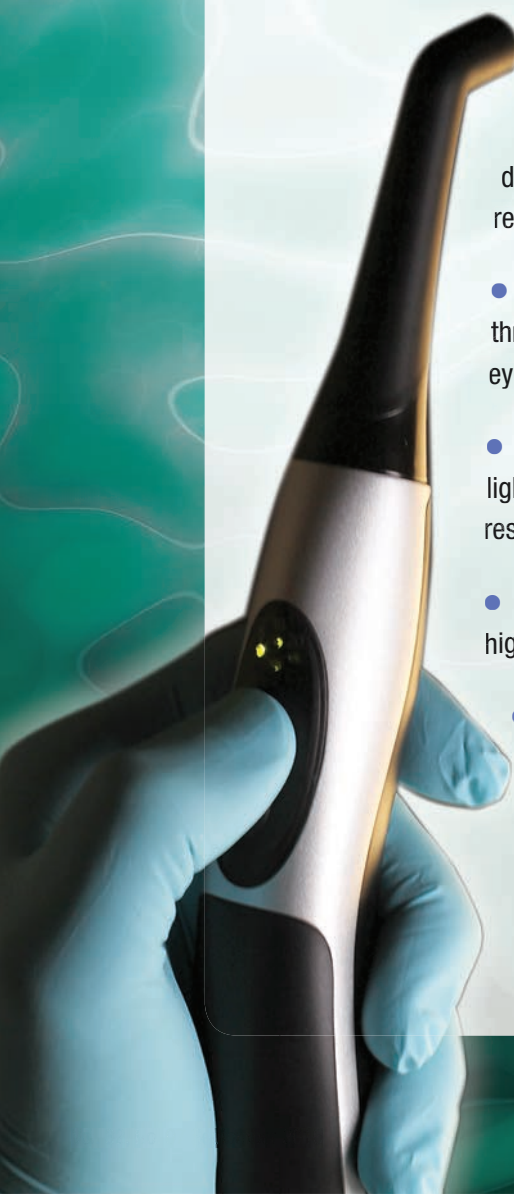
D-Lux
DiaDent International
Tel: 1-877-342-3368
www.diadent.com

Product Description: *D-Lux™* Advanced Cordless LED Curing Light is made from the highest quality aluminum. Robust and ergonomic, *D-Lux* dissipates heat quickly so that it can produce the maximum light intensity safely and consistently. *D-Lux* has 5 versatile curing modes for every indication including turbo, soft start, and pulse mode. Battery can be fully recharged in 90 minutes and a fully charged battery provides 160 x ten second cures. To ensure your satisfaction and to protect your investment, *D-Lux* has a premium 2-year manufacturer warranty.



Clinical Tips

- Use a durable, well-constructed light-curing unit from a manufacturer who provides contact information and service. Preferably the light-curing unit should have received a favorable report or certification from a reputable independent 3rd party. Beware of no-name online bargains.
- Recognize that there can be large differences among the radiant power outputs and the emission spectra from light-curing units. If unsure, ask the resin manufacturer if a single peak LED curing light is sufficient, or if a broad spectrum multi-peak curing light would be beneficial.
- Regularly monitor and record the light output over time, using the same measurement device and light guide. Repair or replace the light-curing unit when it no longer meets the manufacturer's specifications.
- Choose a curing light that delivers a uniform light output across the light tip and that covers as much of the restoration as possible. Cure each surface independently, using overlapping exposures if the light tip is smaller than the restoration.
- Follow the recommended light exposure times from the resin manufacturer and increase your curing times for increased distances and darker or opaque shades.
- Position the light tip close to the surface because the irradiance can drop dramatically as the distance increases between the light-curing tip and the restorative surface.
- Stabilize, watch, and maintain the tip of the light-curing unit over the composite throughout the exposure. Always use blue-blocking glasses or shields to protect your eyes and watch what you are doing when light curing.
- Deliver supplementary light exposures under circumstances that may limit ideal light access, such as shadows from matrix bands, intervening tooth structure, or restorative material.
- Beware of thermal damage potential to the pulp and soft tissues when delivering high-energy exposures.
- Air-cool the tooth when using longer exposure times, or when using high output light curing units.
- Avoid contacting soft tissue directly with the tip.
- Allow the tooth to cool for 6-8 seconds between each exposure.



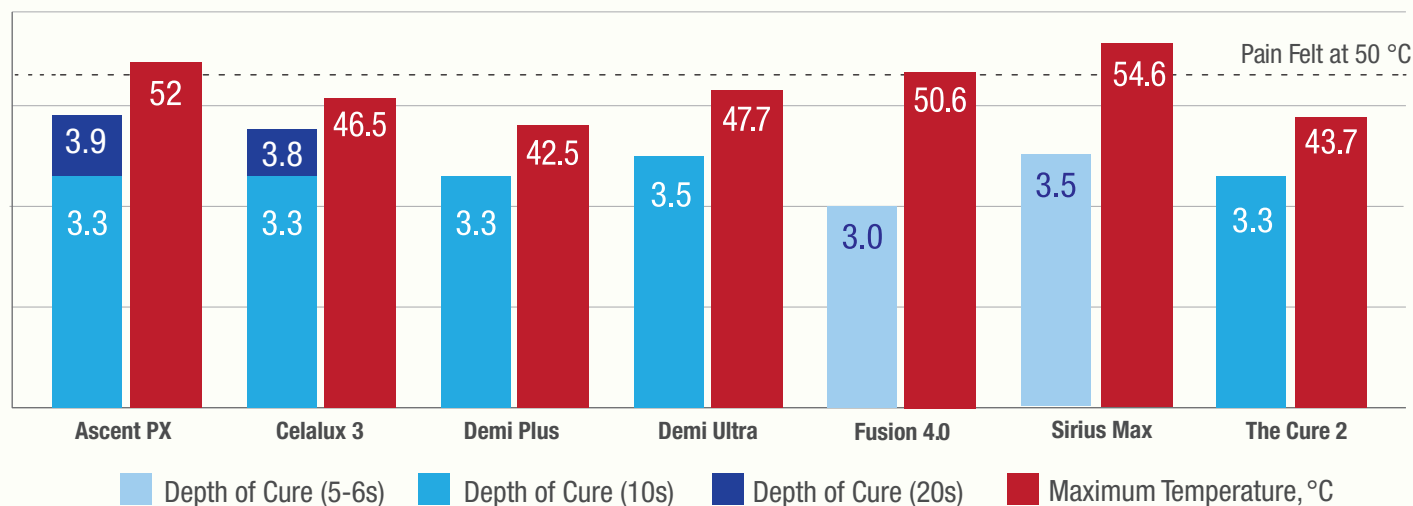
LED Curing Units

Ron A. Yapp, M.S., M. Cowen, B.S., John M. Powers, Ph.D.
Dental Consultants, Inc., Ann Arbor, Michigan

Different styles of LED curing lights have emerged since our last article (THE DENTAL ADVISOR, April, 2012, Vol. 29, No. 03). The LED curing light which uses the fiber optic light guide to channel the light from the LED source, approximately 8 cm out to the tip is still quite popular. However, there are now many more versions of the style where the LED is located just behind a focusing lens at the tip of the light. Our investigation evaluated the depth of cure, tip temperature and beam divergence for several versions of these two styles of curing light. Manufacturers were asked to recommend a single set of intensity and duration settings (when there were multiple intensity and interval settings available) which would optimize the depth of cure without causing a painful burn of the gingival tissue.

The beam divergence was more of an issue with the older fiber optic style of lights and has been remedied with most new style lensed tips and improved fiber optic light guides. Successful curing of bonding agents and especially composite restorations is a function of the light energy that can be directed into the composite material (see Price article). If the light fans out in a cone shape, the actual energy reaching the restorative material may be considerably diminished. Measurements of the diameter of the beam projected onto a white reflective background at 5, 10, and 15 mm gave us information on how the beam cross-sectional pattern dimensionally changed as the distance from the tip increased. The results of our tests are presented in the tables below.

Curing Lights Depth of Cure Vs Maximum Temperature



Depth of cure										
Product	Ascent PX		Celalux 3		Demi Plus	Demi Ultra	Fusion 4.0	Sirius Max	The Cure 2	
Company	CAO Group, Inc.		VOCO		Kerr Corporation	Kerr Corporation	DentLight Inc.	National Dental, Inc.	Spring Health Products, Inc.	
Manufacturer listed intensity, mW/cm²	1500		1300		1100-1330	1100-1330	2700	3000	1100-1200	
Cure time used, sec	10	20	10	20	10	10	5 High	2x3s Xtra	10	
Depth of cure, mm	3.3	3.9	3.3	3.8	3.3	3.5	3.0	3.5	3.3	

Tip temperature increase over time								
Product	Ascent PX	Celalux 3		Demi Plus	Demi Ultra	Fusion 4.0	Sirius Max	The Cure 2
Company	CAO Group, Inc.	VOCO		Kerr Corporation	Kerr Corporation	DentLight Inc	National Dental, Inc.	Spring Health Products, Inc.
Curing time for temperature comparisons, sec	10	10	20	10	10	5	3	10
Average rate of temperature change, °C/sec	1.8	1.3		0.8	1.4	3.3	6.9	1.0
Average maximum temperature normalized to 34°C, °C	52.0	46.5		42.5	47.7	50.6	54.6	43.7
Time when pain felt, sec	11	>20		>20	>20	5	3-4	>20

Beam divergence-tip type	Lensed	Fiber Light Guide	Fiber Light Guide	Lensed	Lensed	Lensed	Lensed
Product	Ascent PX	Celalux 3	Demi Plus	Demi Ultra	Fusion 4.0	Sirius Max	The Cure 2
Company	CAO Group, Inc.	VOCO	Kerr Corporation	Kerr Corporation	DentLight Inc.	National Dental, Inc.	Spring Health Products, Inc.
Beam diameter at 5mm, mm	11.5	10.5	8.5	8	5.5	10	19.5
Beam divergence angle, deg	17	14	15	9	9*	14	35

* Convergent beam pattern until 5-6 mm from the tip, then a divergent pattern thereafter.

Sirius Max Advanced Curing System

National Dental
(800) 392-1171
www.nationaldental.com

Product Description: The *SiriusMax Advanced Curing System* features a powerful and elegant, all-aluminum design that is built for durability and efficiency. 90 degree swivel head functionality and slim profile design means better ergonomics, easier access and more precise placement. An easy-to-set, customizable menu offers multiple output intensity and duration options from three different power levels: Normal 1200 mw/cm², High 1400 mw/cm², and Xtra 3000 mw/cm². Complete specifications upon request.



Fusion 4.0

DentLight
Call 800-763-6901
www.dentlight.com

Product Description: *FUSION 4.0* upgrades the award-winning high-performance product to the most ergonomic, versatile, powerful and easy-to-use curing light. It outputs a uniform, low-dispersion beam of 2700 mW/cm² power for fast quality cure from fillings to veneers. It is constructed from solid metal with an advanced and intuitive backlit LCD. Not only it cures in ultrafast 5 seconds, but also it is the only multifunctional and versatile light that can perform caries/fractures/canal/early cancer detection and chair-side whitening for added profit streams.



Buffies Disposable Rag Wheels



Buffies Dental

Buffiesdental.com
419-542-7748

Description

Buffies Disposable Rag Wheels fit standard dental lathes and are designed for single use to avoid cross contamination. Buffies are fabricated from multi-layer, non-woven polypropylene fabric to closely resemble the feel and performance of muslin wheels. They are anti-microbial and can be used in place of traditional polishing wheels; no separate mandrel is required. Buffies come in two sizes: large, blue 4.5" diameter and small, green size 3" diameter. Buffies Disposable Rag Wheels were evaluated by 27 consultants in 506 uses. This disposable polishing wheel received an 87% clinical rating.

Suggested Retail Cost	
Buffies Disposable Rag Wheels (Large) 20-count package	\$23.00
Product Name Single Dose Value Pack 20-count package	\$19.00

Product Features

Eighty-nine percent of consultants were concerned about cross-contamination with rag wheels and felt that **Buffies Disposable Rag Wheels** offered a solution to this problem. They fit onto conical mandrels well and can be used at high and low speeds. Since the hydrophobic material does not hold water or pumice, continual rewetting of the object being polished is necessary. The flexibility of Buffies is greater at low speeds; more stiffness is achieved at higher speeds. The small size has less flexibility and can be used with more pressure for more effective polishing. Quality of the final polish is similar to that achieved with muslin wheels.



Consultants' Comments

"I think there is a need for disposable wheels."

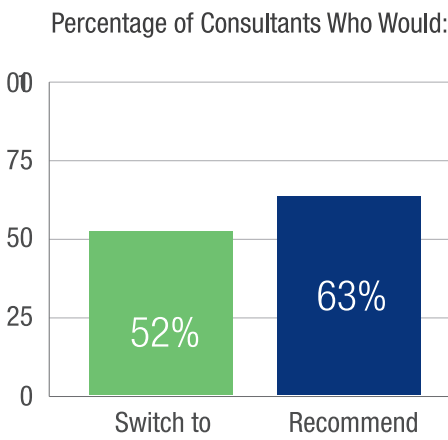
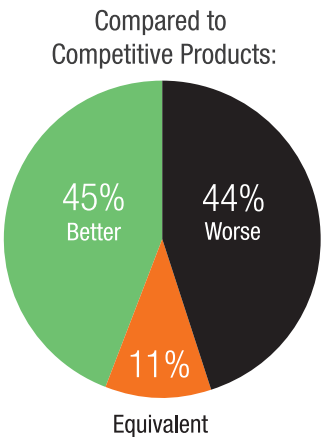
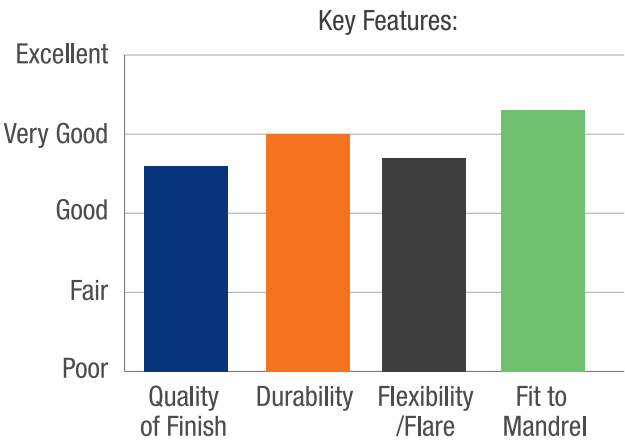
"Produces a nice polish."

"Material is similar to disposable gowns and masks."

"Wheels do not hold pumice."

"Add more stitching to the sides of the wheel to make the layers less prone to separation."

"A version impregnated with polishing compound would be great."



Filtek™ Supreme Ultra Universal Restorative

3M ESPE Dental

(800) 634-2249

www.3mdental.com

Description

3M ESPE Filtek™ Supreme Ultra Universal Restorative

is a composite indicated for anterior and posterior restorations. The composite is filled 63% by volume with a combination of 4-20 nm particles and loosely-bound clusters of these particles, 0.6-10 micron in size. The composite is radiopaque.

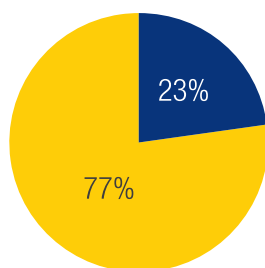
Cure times, using a high intensity LED curing light, are 10 seconds for the body, enamel and translucent shades and 20 seconds for the dentin shades. Filtek Supreme Ultra Universal Restorative is available in 4 g syringes and 0.2 g single-dose capsules.



Clinical Evaluation Protocol

598 restorations were placed over a 6-year period. Restorations were evaluated for esthetics, resistance to fracture/chipping, resistance to marginal discoloration, and wear resistance on a 1-5 rating scale: 1=poor, 2=fair, 3=good, 5= excellent. The distribution of restorations is shown in Figure 1. The years in service of restorations is shown in Figure 2.

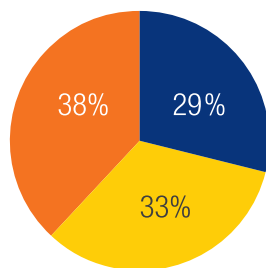
Fig. 1: Distribution of Filtek Supreme Ultra Universal Restorative restorations



■ Anterior restorations
■ Posterior restorations

302 restorations were recalled. 23% represented anterior restorations and 77% were posterior restorations.

Fig. 2: Years in service of Filtek Supreme Ultra Universal Restorative restorations



■ 2 years or less
■ 2-4 years
■ 4-6 years

Of the 302 recalled restorations, 88 were in service two years, 101 for 2 to 4 years, and 113 for 4 to 6 years.

Clinical Observations

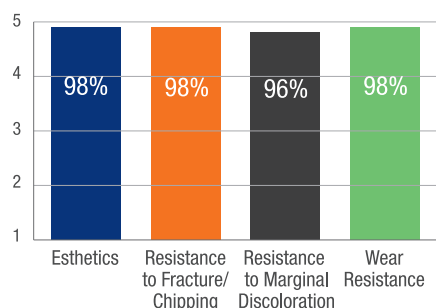
Esthetics

Filtek Supreme Ultra Universal Restorative shades blended extremely well with the surrounding tooth structure. The availability of numerous shades helped in achieving superior esthetics in the vast majority of recalled restorations. Eighty-nine percent of the restorations received a 5 or excellent rating, 9% a 4 or very good rating and 2% received a 3 or good rating (Figure 3). None of the restorations were replaced due to lack of esthetics. Often the recalled restorations exhibited a very smooth and shiny surface texture with margins that were difficult to discern from tooth structure.

6-year Clinical Performance

++ ++ ++ ++ ++

Fig. 3: Results of Filtek Supreme Ultra Universal Restorative at 6 years



Resistance to Fracture/Chipping

Ninety-five percent of the recalled restorations exhibited no chipping or fracture (Figure 3). Of the fifteen restorations (5%) that chipped or fractured only 5 (1.3%) required replacement; the rest were smoothed, recontoured or repaired with flowable composite.

Resistance to Marginal Discoloration

Ninety-one percent of restorations had no visible staining at the margins and received a rating of 5 (Figure 3). Eight percent had minimal staining at the margins not requiring replacement with a rating of 3 or 4. Only 1% of the restorations needed to be replaced due to marginal discoloration, probably as a result of the bonding agent. The bonding agents used were: 5th-, 6th- and 7th-generation bonding agents.

Wear Resistance

Ninety-seven percent of the recalled restorations exhibited no wear while 2% exhibited minimal to moderate wear with a rating of 4 or 3 (Figure 3). Only 1% of the restorations required replacement due to excessive wear. These restorations had wear at the incisal edges of upper or lower anterior teeth as result of bruxism.

Discussion

Among the 302 recalled restorations, there were 24 restorations (8%) replaced as a result of recurrent decay. Another 1% were repaired due to open contacts or after root canal treatment or fracture of the tooth. These failures were not attributed to the composite.

Summary

Overall Filtek Supreme Ultra Universal Restorative performed exceptionally well in the categories of esthetics, resistance to fracture/chipping, resistance to marginal discoloration, and wear resistance. Two other areas of interest that THE DENTAL ADVISOR tracked were the number of restorations replaced and those that debonded. Thirteen restorations debonded, 10 were facial and 3 were incisal. This is often due to the bonding agent and technique. Forty-three restorations (14%) were replaced. The most common reason for replacement was decay (8%), fracture/chipping (3%), marginal discoloration (2%) and wear (1%). Another 1% were repaired due to open contacts or after root canal treatment or fracture of the tooth. These were not material related. Filtek Supreme Ultra Universal Restorative received a clinical performance rating of 98% at six years.

G-aenial Universal Flo

GC America, Inc

(800) 323-7063, (708) 597-0900

www.gcamerica.com

Description

G-aenial Universal Flo is a universal light-cured composite with a flowable viscosity. Unlike other flowable composites that have limited indications, **G-aenial Universal Flo** is indicated as a direct restorative for Class I, II, III, IV, and V cavities. It may also be used as a pit and fissure sealant, for sealing hypersensitive areas, for the repair of direct esthetic restorations, as a temporary crown and bridge material, for blocking out undercuts, and as a liner or base. **G-aenial Universal Flo** is filled 69% (by weight) with 200 nm strontium glass particles and does not contain bis-GMA. This composite has a “low-flow” viscosity and is syringe-delivered through a unique twist-on dispensing tip. Shades include A1, A2, A3, A3.5, A4, B1, B2, B3, C3, AO2, AO3, BW, CV, JE, and AE. **G-aenial Universal Flo** is available in 3.4 g syringes with 10 dispensing tips. Consultants evaluated shades A1, A2, A3, B1, and CV.

Clinical Evaluation Protocol

- 133 **G-aenial Universal Flo** restorations were placed over a seven-month period.
- 60 restorations in 27 patients were available for evaluation of clinical performance at three to four and one-half years after placement.
- Class I-IV restorations were placed in the anterior and posterior regions and recalled (Figures 1 and 2). Restorations were evaluated on a 1-5 rating scale: ww1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

Clinical Observations

Resistance to Fracture/Chipping

After four years in service, **G-aenial Universal Flo** demonstrated excellent resistance to fracture and chipping (Figure 3). Three anterior restorations fractured and were replaced. Four additional restorations chipped and required repair or smoothing. The remaining 53 restorations were in excellent condition.

Esthetics

The esthetics of 88% of the **G-aenial Universal Flo** restorations recalled at four years maintained the optimal esthetics reported at placement in both the anterior and posterior regions (Figure 3). The esthetics of the remaining 12% was compromised by fracture/chipping.

Resistance to Marginal Discoloration

All of the **G-aenial Universal Flo** restorations were placed using self-etching bonding agents, of which 82% were **G-aenial Bond**. Of the 57 restorations remaining after four years, all demonstrated excellent resistance to marginal discoloration (Figure 3).

Wear Resistance

Nearly all restorations demonstrated excellent resistance to wear in both the anterior and posterior regions (Figure 3).

Lack of Sensitivity

Little to no sensitivity (Figure 3) was reported by patients in the teeth restored with G-aenial Flow Universal.

4-year Clinical Performance

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Consultants' Comments

“Excellent esthetics and strength after four years.”

“No staining around margins after four years in areas where discoloration is typically seen.”

*“No debonds in any of the teeth restored with **G-aenial Universal Flo**.”*

FIGURE 1

Distribution of **G-aenial Universal Flo** Restorations in Anterior and Posterior Teeth

■ Molars
■ Premolars
■ Anterior Teeth

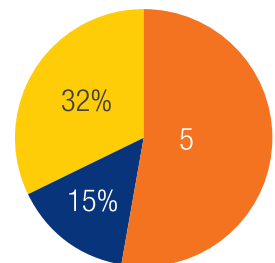


FIGURE 2

Distribution of **G-aenial Universal Flo** Restorations Recalled at Four Years

■ Class I
■ Class II
■ Class III
■ Class IV

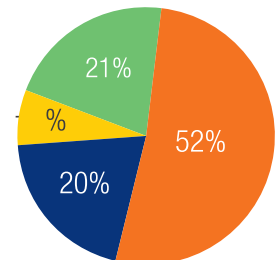
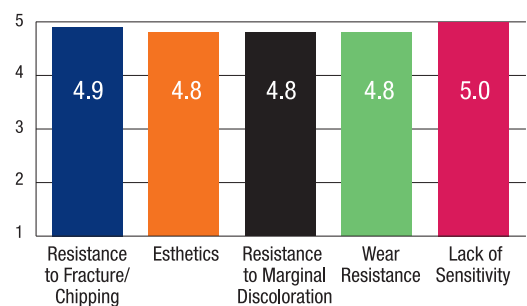


FIGURE 3 Results of **G-aenial Universal Flo** Recall at 4 Years



Summary

Sixty **G-aenial Universal Flo** restorations in 27 patients were recalled after four years. Three restorations fractured, and four 4 had chipped. Retention was 100%. No marginal discoloration in the intact restorations was reported. After four years in service, the esthetics and resistance to wear remained excellent. **G-aenial Universal Flo** received a clinical performance rating of 97% at four years.

G-aenial Bond

GC America, Inc

(800) 323-7063, (708) 597-0900

www.gcamerica.com

Description

G-aenial Bond is a 7th-generation bonding agent designed for the selective etching technique (self-etch for dentin, etch and rinse for uncut enamel). This one-component, self-etching, light-cured adhesive does not require refrigeration. It is indicated for the bonding of light-cured composites and compomers to tooth structure. It can also be used to bond dual-cured luting and core build up composites to tooth structure as long as these materials are light cured. **G-aenial Bond**, is available in a 5 mL bottle or 0.1 mL Unit Dose packs.

Clinical Evaluation Protocol

- **G-aenial Bond** was used to place a total of 208 restorations.
- At four years, 154 of these restorations were available for recall. Ninety-seven restorations were three- to four-years old (Figures 1 and 2).
- A variety of universal composites were used, of which 50% were **G-aenial Universal Flo**.

Clinical Observations

Lack of Marginal Discoloration

Ninety-one percent of the restorations showed no signs of marginal staining (Figure 3). Nine percent of the restorations showed slight to moderate marginal staining, including three restorations that required replacement or repair due to chipping.

Lack of Postoperative Sensitivity

No patients reported any long-term sensitivity in the teeth where **G-aenial Bond** was the bonding agent used (Figure 3).

Retention

No restorations placed using **G-aenial Bond** as the bonding system debonded during the four years in service.

Summary

Two hundred and eight composite restorations were placed over the past four years, using **G-aenial Bond** as the bonding system. Ninety-seven restorations that were three- to four-years old were 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 four-year period. **G-aenial Bond** received a 98% clinical performance rating at four years.

4-year Clinical Performance

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Consultants' Comments

*"The long-term success of **G-aenial Bond** builds my confidence about using GC America's bonding and restorative systems."*

*"The bond strength of **G-aenial Bond** is clearly proving to be excellent as I have seen almost no marginal discoloration in the restorations during the past four years."*

*"The retention and lack of sensitivity are imperative to my patients. Using **G-aenial Bond** gives me confidence I can provide this."*

FIGURE 1.

Distribution of Composite Restorations Bonded with **G-aenial Bond** in Anterior and Posterior Teeth Recalled at Four Years.



FIGURE 2.

Distribution of Composite Restorations Bonded with **G-aenial Bond** Recalled at Four Years.

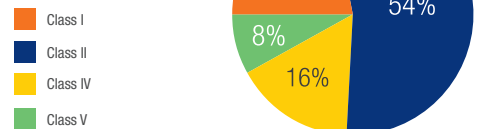
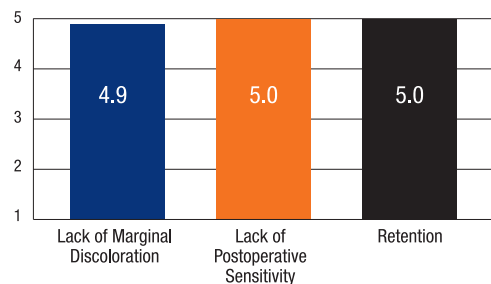


FIGURE 3. Results of **G-aenial Bond** Recall at 4 Years



Dentimax Dream Sensor

DentiMax, LLC
www.dentimax.com

Description

DentiMax Dream Sensor is a thin, wired CMOS intraoral x-ray sensor. The sensor has rounded corners and beveled edges and is available in Size 1 and Size 2. The Kevlar-reinforced cable has a direct USB connection with no in-line box. **DentiMax Dream Sensor** is waterproof and contains a “shock absorber” plate that lays over the sensor for protection from accidental bite pressure. Each sensor includes a two-year replacement warranty. Image resolution is greater than 20 line pairs/mm. **DentiMax Dream Sensor** can be used with DentiMax Imaging Software or any other program that supports TWAIN capture. DentiMax Imaging Software is an open system that supports all digital dental hardware (except Dexis) and bridges with all major practice management systems. **DentiMax Dream Sensor** was evaluated with DentiMax Imaging Software by 10 consultants over a three-month period. This digital x-ray sensor received a 96% clinical rating.

Product Features

The DentiMax Dream Sensor is the thinnest CMOS sensor on the market and rated excellent for patient comfort. Dental hygienists found it easier to place for bitewing images, as the thin design readily slips between the teeth and tongue. The resulting images are clear with very good contrast and sharpness for diagnosis. The “plug and play” simplicity of the USB connection offers efficiency with a minimal number of clicks and set-up required. The design features for durability of the **DentiMax Dream Sensor** are reassuring to clinicians who use these devices



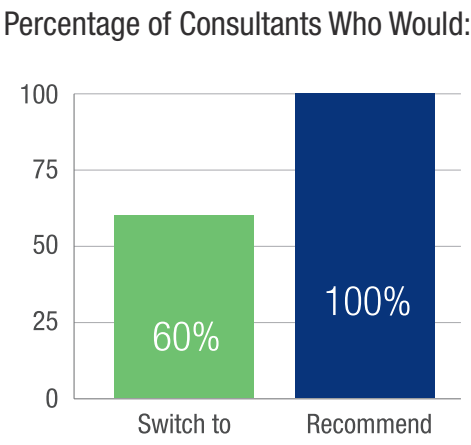
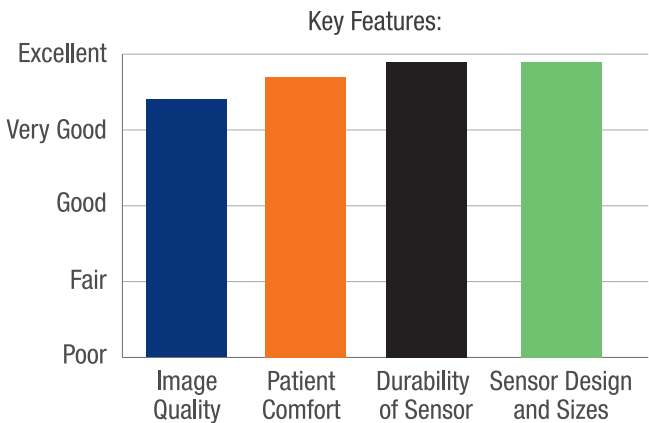
Consultants' Comments

- "Patients commented on the comfort. It's just a little slimmer but it makes a big difference."
- "Very clear images - diagnostic quality was excellent."
- "Its thin, 5.5 mm profile offers a high level of patient comfort."
- "Customer support is very responsive."
- "Images are more crisp than those from many other sensors."
- "The Size 1 sensor is a little smaller than #1 film. This makes it ideal for pediatric patients."
- "Great value."

numerous times every day and are responsible for protecting them from damage. Having two sizes of the **DentiMax Dream Sensor** in the office satisfies adult and pediatric needs.

Clinical Tip

- There are many variations of passages.



reliaFIL LC

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Advanced Healthcare Ltd.

ahl.uk.com

Description

reliaFIL LC is a universal, light-cured, nano-hybrid composite filling material offering fluoride release and recharge. **reliaFIL LC** is indicated for use on posterior and anterior teeth in classes I, II, III, IV, and V cavities; wedge-shaped defects and root caries; direct laminate veneers; core build-ups; and repair of fractured laminate veneer and porcelain. **reliaFIL LC** has a flexural strength of 120 MPa and a radiopacity twice that of natural dentin. **reliaFIL LC** comes in 0.25 g capsules in 20 count boxes or 4 g syringes in 12 shades: A1, A2, A3, A3.5, A4, A2O, A3O, B1, B2, C2, BW, and INC (incisal). Curing time is 30 seconds with a halogen lamp or 10 seconds with a powerful LED light. **reliaFIL LC** was evaluated by 28 consultants in 770 uses. This universal composite received an 88% clinical rating.



Consultants' Comments

"Its continual fluoride release make it an ideal choice for patients at high risk of caries."

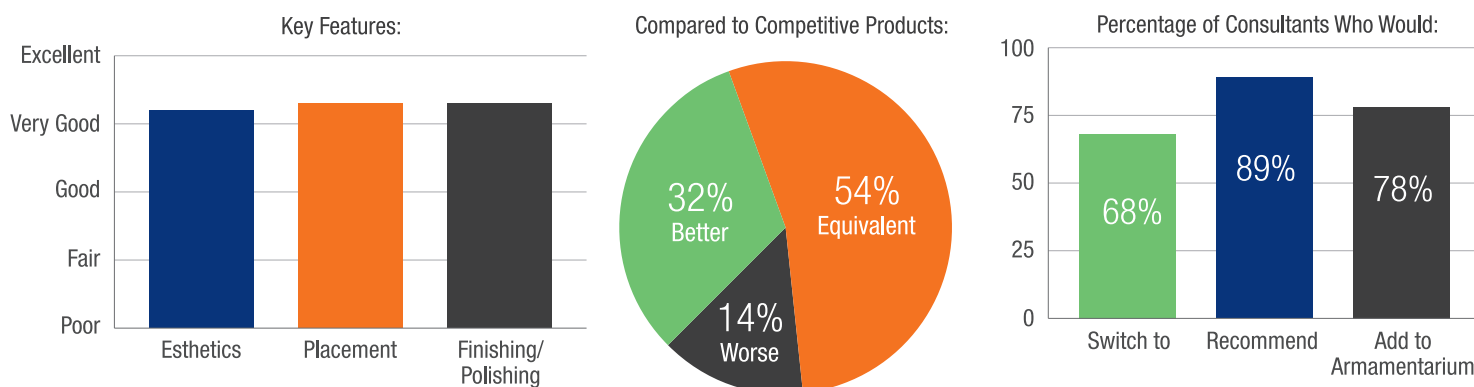
"Very radiopaque."

"It blends very well with the tooth, making the margins imperceptible."

Product Features

reliaFIL LC is a smooth composite that dispenses easily and is sculptable with minimal sticking to instruments. The potential for fluoride release and recharge is appealing for use in patients with high

caries risk. Radiographically, **reliaFIL LC** is readily apparent. Restorations finished to a smooth surface and polished to a high gloss. The opaque shades are useful for masking dark dentin or filling deep cavities, and the standard shades blend well with the surrounding enamel.



THE DENTAL ADVISOR Upcoming Programs

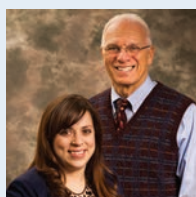
To register, contact: Heidi Graber, (734) 665-2020 ext. 101
hgrab@dentaldvisor.com

What's Bugging Your Practice? A Hands-On Infection Control Workshop

When: Friday, Oct 9, 2015
9:00 AM - 12 PM

Where: THE DENTAL ADVISOR
3110 West Liberty
Ann Arbor, MI 48103
3 CE Credits - \$75.00

AGD Approved National Sponsor



Dr. John Molinari
and Peri Nelson, BS

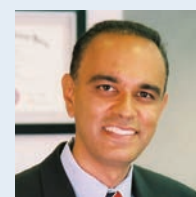
Infection Control Department,
THE DENTAL ADVISOR

Pathways To Success: Endodontic Hands-On

When: Friday, Nov. 13, 2015
8:00 AM - 4:30 PM

Where: THE DENTAL ADVISOR
3110 West Liberty
Ann Arbor, MI 48103
8 CE Credits - \$495.00

AGD Approved National Sponsor



Diwakar Kinra, DDS, MS

Adjunct Professor of Graduate
Endodontics and Graduate
Periodontics at the University of
Detroit-Mercy, School of Dentistry

Evolve 300

Cranberry USA

www.cranberryusa.com

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Description

Evolve 300 is an ultra-lightweight, powder-free nitrile exam glove that combines high tensile strength with exceptional tactile sensitivity. Evolve 300 are designed with a silk-like softness that provides a bare hand feel that contours to the clinician's hands. Textured fingertips provide both agility and dexterity, enhancing excellent grip, even in wet conditions. Evolve 300 gloves are royal blue in color and come 300 to a box in five sizes, extra-small to extra-large. **Evolve 300** was evaluated by 43 consultants in 3430 uses. This nitrile glove received a 92% clinical rating.



Suggested Retail Cost

Box of 300: \$19.99

Product Features

Evolve 300 is a very soft, flexible glove that provides a comfortable fit, even for extended periods of time. This nitrile material has some stretch and flexibility to conform to the hand. The texture on the fingertips aids in grip and is less slippery than some other nitriles, and the thinness contributes to comfort and tactile sense. Minimal tearing was noted; occasionally a glove would tear at the cuff during donning. Users of other nitrile gloves found **Evolve 300** caused less feeling of hand constriction and strain. Hands also feel soft upon removal.

Consultants' Comments

"It's one of the best feeling nitrile gloves."

"Gloves do not stick together and are easy to remove from the box."

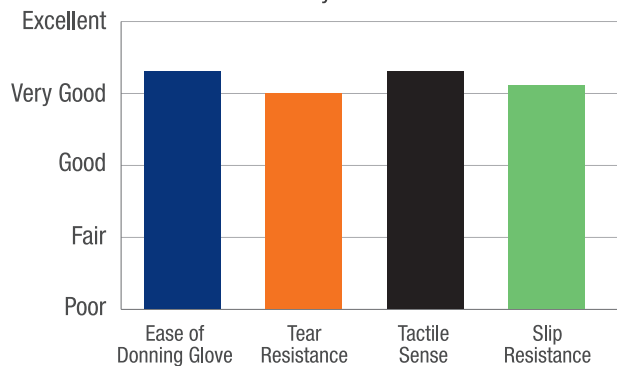
"Go on easily."

"Extremely soft and comfortable."

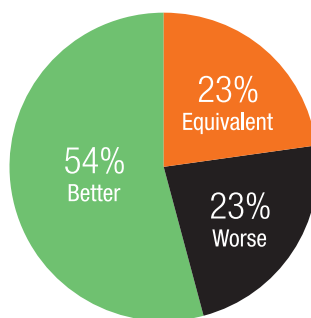
"Cheerful color."

"Sizes run slightly large."

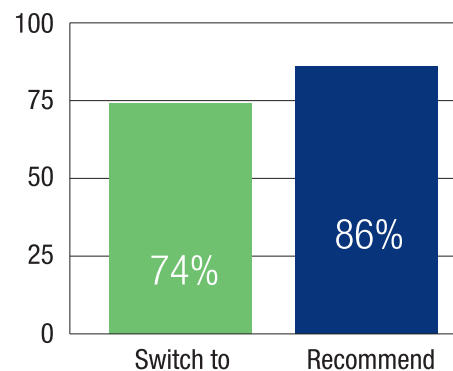
Key Features:



Compared to Competitive Products:



Percentage of Consultants Who Would:



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