



Clinical Guidelines for Selecting Loupes

Gordon's Clinical Observations: Although once thought to be an elective item, loupes are now used by nearly all dentists and are gaining popularity among hygienists. However, you may need new loupes because of the numerous improvements that have been made since their introduction many years ago. What is the most popular magnification level? Should a headlamp be used routinely? What is loupe declination angle, and is it important? *In this issue, CR clinicians and scientists answer these questions for you.*

A recent CR survey of over 1600 clinicians showed that over 90% of dentists surveyed use loupes. However, because not all loupes are ergonomic, simply wearing loupes doesn't ensure a healthy posture or eliminate leaning/hunching over the oral cavity (*some models may exacerbate poor posture*). While ergonomics/posture is just one of many factors to consider when choosing loupes, nearly 90% of loupe wearers rated loupe ergonomics as either *very or extremely important*. **The following report will guide you as you decide to stay with current loupes, or consider a new pair.**

Continued on page 2

Is Overhead LED Lighting Ready for Dental Operatories?

Gordon's Clinical Observations: Undoubtedly you have noticed the shift to LED lighting (*light emitting diodes*) in all areas of life. The introduction of white LEDs was not without challenges such as low intensity, early burnout, and high cost. Significant improvements have been made, and today we are surrounded by well-functioning LEDs every day and night. Are there advantages to LED lighting in dentistry? Is the light adequate for color matching? Do light fixtures have to be replaced? *The CR team has evaluated the concept and numerous commercial brands to assist you in making the decision for yourself.*

LEDs are now poised to replace fluorescent interior lighting, just as fluorescent replaced incandescent lighting years ago. The main advantages are improved energy efficiency and potentially longer life, resulting in significant energy and cost savings. Commercially available LEDs that directly replace fluorescent tubes are new on the market, but little is known about their performance, particularly in critical applications such as dentistry. **The following report provides answers to key questions regarding current LED operatory lighting.**

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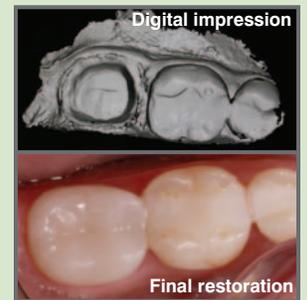


Externally, LED tubes look very similar to fluorescent tubes, but inside is an array of low-voltage, solid-state LEDs that produce light.

Are Scanning and Milling for You?

Gordon's Clinical Observations: Vinyl polysiloxane and polyether impressions have served the professions with excellence for over 40 years. Today, digital scanning is gaining rapid acceptance in practices as the scanners become more affordable and user-friendly. In-office milling of restorations, while slowly growing over the last 30 years, has also become easier and more accurate and is well accepted by those clinicians regularly using this concept. *CR helps you this month with an evaluation of popular examples of current instruments, and will assist you in making decisions about using this concept in your practice.*

CAD/CAM dentistry is progressing, but slowly, and not without difficulties. It is widely utilized in dental labs (*example: milled zirconia restorations*) but only a small percentage of clinicians are scanning and milling in-office. Currently, the most popular in-office milled material is IPS e.max CAD, which is performing very well, but requires final firing after milling. Efforts to develop a fast-milling material that needs no firing has resulted in many brands, but the retraction of Lava Ultimate as a full-coverage crown material has some clinicians wary of the new materials. Since CR's last reviews of CAD/CAM systems (*see Clinicians Report August 2015 and March 2014*), there have been advancements in scanning, milling, and CAD/CAM materials. **This report evaluates updated intraoral scanners, and provides valuable feedback from clinician users.**



Patients appreciate the option of same-day dentistry made possible by CAD/CAM technology and new restorative materials.

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Products Rated Highly by Evaluators in CR Clinical Trials

The following products were rated excellent or good by CR Evaluator use and science evaluations.

Admira Fusion: Light-cured nanohybrid ORMOCER (*all ceramic based*) universal restorative material

Bluephase Meter II: Radiometer designed for fast determination of intensity of all resin curing lights

Marly Skin Guard: Protective skin foam/cream protects hands from frequent washing and prolonged glove use

CASI-3C and CASI-3L: Sculpting instrument for resin-based composite produces natural tooth anatomy and convexity

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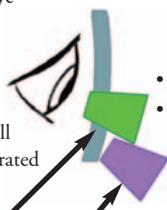


Clinical Guidelines for Selecting Loupes (Continued from page 1)

Loupe Optics

Fixed: Through-the-Lens (TTL)

- Used by 76% (CR survey data)
- Optics mounted closer to eye
 - Larger field of view
 - Well balanced
- Customized to individual
 - Lower maintenance
 - Retains alignment well
 - Prescriptions incorporated into optics



Through-the-Lens Flip-up

Flip-up

- Used by 20% (CR survey data)
- Optics farther from eye
 - Greater declination angles achievable
- Lower cost
- Ready-to-wear
 - Adjustments made by clinician (may require frequent realignment)
 - Prescription (lens only) changed by local optician
- Optics “flip up” when not in use



Galilean (2x–3.5x)

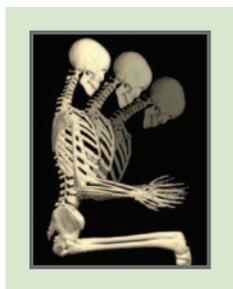
- Lighter weight (shorter optics)
- Larger width of field
- Lower cost
- Loupe novices adapt to optics easier
- Longer depth of field (broader range in focus)

Prismatic (3.5x–8x)

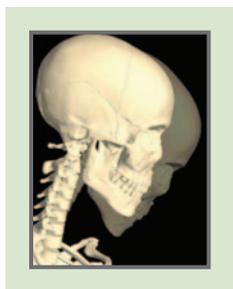
- Stronger magnification (up to ~8x)
 - Requires precise alignment and heavy-duty frames
- Sharper resolution
- Expanded field optics available

Loupe Ergonomics

There is a growing trend toward more ergonomic loupes with longer working distances, higher magnification, and greater declination angles (the angle at which the loupe optics are inclined downward) which facilitate a neutral working position and better neck and back posture. The most common working distance was 18 inches (16.4% CR survey data), and many experts recommend declination angles >35° and head tilt angles <25° (a delicate balance between neck strain and eye strain must be maintained). Loupes can immediately improve posture, if proper measurements are selected. Most larger companies will send a representative to your office to obtain ideal measurements.



Longer working distances promote a more upright working position. (This distance is determined by the clinician, and then set by the loupe manufacturer.)



Greater declination angles reduce head tilt, improve neck posture and reduce muscle/ligament strain.



Some modern frames (pictured: Ergo Max by SurgiTel) offer improved declination angles (notice the slant of both lenses and frame, allowing the optics to decline more).

Skeletal images created using KineMan Pro

Lighting

Longer, more ergonomic working distances often require increased magnification to compensate for the added distance. This increased magnification requires additional light, and many consider headlamps essential for use of operating loupes (78.1% of loupe wearers wear a headlamp). (See Clinicians Report April 2012 for excellent, lightweight LED headlamps.) New lightweight, cordless LED headlamps are now available.

Clinical Tips

- **Have current eye exam** before ordering loupes as prescriptions are incorporated into custom loupes.
- **Novice loupe users:** Start with low magnification (~2.5x) or expanded field loupes for a larger field of view. Wear loupes for short periods each day as your eyes gradually adjust.
- **Try multiple brands before you buy.** Each clinician is different; try loupes out at dental meetings or try on a colleague’s pair to see how they feel. But if buying fixed TTL loupes, have a representative measure the proper interpupillary distance, working distance, declination angle, etc.
- **Premium vs. Inexpensive:** Quality optics are expensive. While some inexpensive models work well, many have inferior optics and ergonomics, or may have unreliable customer support.
- **Frames** must be stable enough to support significant weight (optics, headlamp, etc.) without misaligning oculars.

Popular Brands of Loupes (from CR Survey)

Brand	% Use (CR Survey)	User Comments and Features
Orasoptic	40.1%	Most popular brand, excellent resolution
Designs for Vision	31.9%	Excellent comfort, customer support, and easy to clean
SurgiTel	12.1%	Excellent declination angle, lightweight

- **Comfort:** Carefully adjust frames, nose pads, etc., and use adjustable head strap to prevent slipping and for comfort/support.
- **Cleaning:** Loupes should be disinfected and cleaned regularly with warm, soapy water (see manufacturer guidelines). (See Clinicians Report February 2015 for example protocol.)
- **Exercise your eyes to avoid strain/fatigue.** Occasionally look up, or take loupes off and focus on a distant object away from the lens.
- **Consider multiple loupes** for different procedures and as a backup. 2.5x is most common and used for routine procedures. 4.5x can be used for more delicate procedures: margin refinement, locating calcified canals, root tip retrieval, etc. The EyeZoom loupes (Orasoptic) offers 3x, 4x, and 5x adjustments on the same loupe.
- **Evaluate your working posture:** How is your posture? Ask a co-worker, or have them observe or video you as you treat patients.

CR Conclusions:

Clinicians are trending toward ergonomic loupes with longer working distances, higher magnification and greater declination angles. Longer working distances facilitate better posture and a neutral working position; however, **images will appear smaller unless magnification is also increased.** Reduce neck and back strain with greater declination angles. When selecting operating loupes additionally consider; cost; weight (including headlamp); depth and width of field; and post-purchase customer support. Operating loupes improve treatment with better visualization and can be customized to fit the practitioner’s needs.

Is Overhead LED Lighting Ready for Dental Operatories? *(Continued from page 1)*

Key Questions and Answers

1. Is the color correct?

Yes and no. Most LEDs tested exhibited a color temperature between “Warm White” and “Cool White” in the range of 3000–4000 kelvin (K); only two approached 5000K. The ideal light for color perception has a color temperature of 5500K and a Color Rendering Index (CRI) rating of 90–100. For most accurate color perception, choose an LED with a color temperature of 5000–6000K.

2. Is the intensity adequate?

Yes. LED tubes can be as bright as fluorescent tubes. Operatories appear lighter and more inviting.

3. Are they cost effective?

Yes. LEDs tested were, on average, 61% more energy efficient than fluorescents, resulting in long-term energy savings. Initial cost per tube was \$10–\$30.

4. How long will they last?

Unknown. The lifetime ratings provided by manufacturers are generally based on residential rather than commercial use patterns. LEDs don’t wear out in the traditional sense, but if not engineered correctly, they can overheat and deteriorate over time. Longevity testing is underway.

5. Must existing light fixtures be replaced?

No, but some require re-wiring. Most current LED tubes are designed to directly replace fluorescent tubes and use the same ballast. Some require removing the ballast and re-wiring—a simple procedure for an electrician that can be done without removing the ceiling fixture. As LED lighting becomes more common, fluorescent ballasts will eventually be eliminated.

Comparison of Commercial Brands

CR evaluated eight commercially available LED tubes. Color parameters were measured using Illuminance Spectrophotometer ILT350 by International Light Technologies. Intensity (*lux*) was measured at a clinical distance below a single 3-tube fixture in a controlled environment for comparison purposes.

Brand	Company (Source)	Cost Each	Color Temperature	Color Rendering Index *	Intensity (lux)	Energy use per Tube (watts)	Energy Efficiency	Wiring Changes	Overall Light Quality
CONTROL: Fluorescent “Sunshine”	GE	\$4.74	5300K	71	780 lx	28 W	28 lx/W	N/A	Good–Fair
1. TOGGLED Natural Light	TOGGLED (Home Depot)	\$29.97	4810K	87	870 lx	16 W	54 lx/W	Remove ballast, re-wire	Good
2. Philips LED Daylight	Philips (Home Depot)	\$9.97	4910K	85	780 lx	18 W	43 lx/W	None: use existing ballast	Good
3. FEIT Electric 4ft LED	Feit (Home Depot)	\$21.97	3840K	87	750 lx	16 W	47 lx/W	None: use existing ballast	Fair
4. TOGGLED Cool White	TOGGLED (Home Depot)	\$19.97	3850K	85	610 lx	15 W	41 lx/W	Remove ballast, re-wire	Fair
5. SubstiTUBE Cool White	Sylvania (Home Depot)	\$14.98	3730K	86	590 lx	13 W	45 lx/W	None: use existing ballast	Fair
6. Bright White	Utilitech Pro (Lowe’s)	\$9.98	3790K	85	970 lx	21 W	46 lx/W	None: use existing ballast	Fair
7. SubstiTUBE IS Cool White	Sylvania (Lowe’s)	\$22.48	3710K	85	760 lx	18 W	42 lx/W	None: use existing ballast	Fair
8. Philips Cool White	Philips (Home Depot)	\$9.97	3790K	84	710 lx	17 W	42 lx/W	None: use existing ballast	Fair

* CRI (0–100) is a measure of how accurately different colors appear under a light source. Higher values mean greater accuracy.

Summary of table:

- LEDs with closest match to ideal lighting were: TOGGLED Natural Light (4810K, 87 CRI) and Philips LED Daylight (4910K, 85 CRI).
- All LEDs had adequate intensity.
- All LEDs were significantly more energy efficient than fluorescent tubes.
- Most are designed to directly replace fluorescent tubes and use existing ballasts.

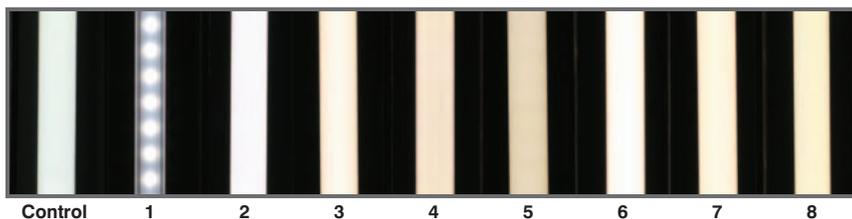


Photo shows lights in same order as table and allows for a direct comparison of their appearance. Whiter appearance of brands 1 and 2 resulted in more accurate color perception. Other brands had more yellow and red in their output. The human brain can partially compensate for lighting conditions and all of these may appear acceptable if viewed on their own.

CR Conclusions:

LED overhead lighting for dentistry looks promising. Choose lights with high color temperature (>5000K) for best color perception. Best brands identified in this study were TOGGLED Natural Light and Philips LED Daylight. All LEDs tested had significantly better energy efficiency than fluorescents. Most current commercial brands directly replace fluorescent tubes and use the existing ballasts in the fixtures. Longevity in the clinical environment is still unproven. Offices that have switched to LEDs are pleased with the results.

Are Scanning and Milling for You? (Continued from page 1)

Digital Impression Scanners

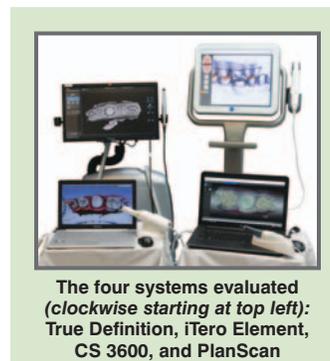
Intraoral scanners replace conventional impression materials. The digital impression and prescription are sent electronically to the clinician's selected lab, saving time and effort. Or, if using an in-office mill, the restoration is designed, fabricated, and placed in a single visit. The following table shows key features of four scanners evaluated since CR's previous study (see *Clinicians Report March 2014*).

Brand Company	Approximate Cost*	Data Plan Costs*	Type of System	Significant Upgrades	Handpiece Photo	Handpiece Dimensions	Requires Powder	Live 3D Model	Intraoral Access	Rapid Acquisition	Margin Detail Capture	Ease of Use
CS 3600 <i>Carestream Dental</i>	\$36,000	none	Scanner (open use files)	Faster scanning, color, thinner tip		315 g 22 cm	No	Yes color	Excellent-Good	Excellent	Excellent	Excellent-Good
iTero Element <i>Align Technology</i>	\$30,000	\$360/month	Scanner (open use files)	Faster scanning, color		500 g 30 cm	No	Yes color	Good	Excellent-Good	Excellent-Good	Excellent-Good
PlanScan with Color tip <i>Planmeca</i>	\$25,000 (\$120,000 Planmeca FIT with mill)	none	Scanner or CAD/CAM (open use files)	Color, full arch mode		450 g 27 cm	No	Yes color	Good	Excellent-Good	Excellent-Good	Excellent-Good
True Definition 3M	\$16,000	\$200/month	Scanner (open use files)	Closer focus, faster scanning		135 g 24 cm	Yes	Yes monochrome	Excellent	Good	Good	Good

* Cost can vary significantly with distributor discounts and hardware, software, and data plan options.

Summary of controlled laboratory evaluation:

- **All scanners** tested had live 3D models with feedback for accurate data collection and captured adequate detail for excellent impressions. (*Accuracy of full-arch scans were not evaluated in this study.*)
- **Greatest improvement** was rapid scanning with fewer pauses due to system becoming "lost." Fastest systems were CS 3600 and iTero Element.
- **Handpieces** with best ergonomics and intraoral access were True Definition and CS 3600. Large handpieces are heavy and can be challenging on patients with limited opening.
- **In-office milling** expands scanner usefulness and treatment options. PlanScan had the best in-office milling integration.
- **Cost varies** with brand and system capabilities. Scanners with lowest initial cost were True Definition and PlanScan.



Clinical Feedback (survey responses from 352 scanner users)

- **Scanner brands:** 59% Cerec (*Omniscam, Bluecam*); 15% PlanScan (*including E4D*); 8% iTero; 7% True Definition; 7% Trios; 2% CS 3500/3600
- **Satisfaction with digital impressions:** 93% satisfied or very satisfied; 69% would purchase same system again
- **Clinical situations where used:** 98% single-unit crowns; 69% onlays; 50% inlays; 43% multi-unit fixed prosthodontics; 42% veneers; 16% orthodontic trays; 8–3% removable appliances (*various types*); 1% surgical guides
- **In-office milling:** 73% regularly use in-office design and milling; 27% scan only
- **In-office milling materials:** 66% IPS e.max CAD; 13% VITA Enamic; 12% Cerec Blocs; 11% Celtra DUO; 9% Lava Ultimate; 8% Empress CAD; 6% CeraSmart; plus 9 additional materials

Advantages

- **Same-day-dentistry** option for patients needing indirect restorations.
- **Accuracy and quality** of clinical treatment and restorations often improve due to large on-screen view and attention to details.
- **Discounted lab fee** and faster turn-around time for digital impression sent electronically.

Limitations

- **High costs** associated with equipment, data plans, training, and upgrades.
- **Complexity and time** required to learn equipment, perform scans, and adjust workflow and patient scheduling, particularly when accomplishing in-office milling.
- **Continued excellent service of VPS** impression materials, particularly in situations where scanning is less successful.
- **Risk of over-treatment**—doing a crown instead of more conservative options.
- **Unproven long-term clinical performance** of new quick-milling materials.

Materials

Some current CAD/CAM material options available for in-office milling systems:

Ceramics

IPS e.max CAD (*post-mill fired*)
CEREC Blocs
CELTRA Duo
IPS Empress CAD
VITABLOCKS
Obsidian (*post-mill fired*)
VITA Suprinity (*post-mill fired*)

Hybrids/Composites (*quick milling*)

VITA Enamic
Lava Ultimate
CeraSmart
Paradigm MZ100

Zirconia (*post-mill fired*)

InCoris TZI
BruxZIR Now (*pre-fired, slow milling*)
Zirlux FC2

and other temporary materials, metals, acrylics, etc.

CR Conclusions:

Digital impression scanning and in-office milling provide alternative treatment options not possible with conventional techniques. Newest scanner models and upgrades are faster and easier to use. Greatest advantage of in-office milling is elimination of second appointment. Use of digital impressions will increase, while in-office milling will continue to grow slowly. Major limitations continue to be cost and complexity of integrating new technology and digital workflow into clinical practice. Majority of users and patients are satisfied with performance.

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At the completion of this test, participants should be able to:

- Evaluate their current dental loupes and make an educated choice when it is time to upgrade or replace
- Determine if switching to LED lighting is an option for their office
- Discuss the benefits of scanning and the state of the industry

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CE Self-Instruction Test—August 2016 *Check the box next to the most correct answer.*

- Which of the following is **false** regarding operating loupe optics?
 - A. Galilean lenses are shorter and lighter than prismatic.
 - B. Prismatic lenses are available in stronger magnifications than Galilean.
 - C. Galilean lenses are less expensive than prismatic.
 - D. Prismatic lenses offer larger field of view than Galilean.
- Loupe ergonomics can be improved by which of the following methods?
 - A. Increasing the working distance.
 - B. Increasing the declination angle.
 - C. Decreasing the weight of loupes (*and loupe mounted equipment*).
 - D. All of the above
- Which statement regarding current LED overhead lighting is **false**?
 - A. LEDs have adequate intensity, comparable to fluorescent tubes.
 - B. LEDs have proven longevity in the clinical environment.
 - C. LEDs are more energy efficient than fluorescent tubes.
 - D. LEDs are available to directly replace existing fluorescent tubes without re-wiring fixtures.
- Which statement regarding current LED brands is **false**?
 - A. All LED brands tested had higher Color Rendering Index than control fluorescent.
 - B. TOGGLED brand LEDs require removing existing ballast and re-wiring fixture.
 - C. Philips LED Daylight had Good overall rating and low cost.
 - D. All LED brands use more energy (*watts*) than fluorescent.
- Which statement regarding intraoral scanners is **false**?
 - A. True Definition had the lightest weight handpiece and best intraoral access.
 - B. iTero Element had rapid acquisition with a live onscreen 3D model.
 - C. CS 3600 had slow acquisition and difficulty relocating its position.
 - D. PlanScan Color had 3D model in full color.
- Clinical users of scanners reported all of the following, **except**:
 - A. Overall high satisfaction ratings.
 - B. Major uses were single-unit crowns and onlays.
 - C. Majority also regularly accomplished in-office milling.
 - D. Least-used material was IPS e.max CAD, which required post-mill firing.
- Admira Fusion is a unique direct composite restorative because of:
 - A. All-ceramic-based monomer (*ORMOCER*) and fillers.
 - B. Contains no classic monomers, such as bisphenol A, BisGMA, TEGDMA, UDMA, or HEMA.
 - C. Has CR confirmed low shrinkage stress.
 - D. All of the above
- Bluephase Meter II:
 - A. Is designed exclusively for the Bluephase resin curing light.
 - B. Is a precise dental radiometer for the quick and easy verification of the light intensity of all types of curing lights.
 - C. Has most consistent readings with optical lens based curing lights.
 - D. Measures light intensity in two easy steps.
- Marly Skin Guard:
 - A. Protects hands from skin irritation experienced from frequent washing and prolonged glove use.
 - B. Forms a protective film over skin.
 - C. Creates a greasy layer on hands for easy glove placement.
 - D. Should be re-applied each time gloves are replaced.
- CASI-3C is a hand instrument designed for:
 - A. Easy opening of blocked or tight contacts.
 - B. Safe scaling of implants.
 - C. Placing resin-based composite in minimal class II preparations.
 - D. Sculpting resin-based composite with convexity and anatomical curvatures of natural tooth structure.

Print Participant Information. For additional participants, photocopy this page and list requested information.

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Products Rated Highly by Evaluators in CR Clinical Trials (Continued)

Light-Cured Nanohybrid ORMOCER (all ceramic based) Universal Restorative Material

Admira Fusion VOCO



\$55.20/ml

\$87/Refill kit (one 3-gram syringe or 15.2-gram compules)

Admira Fusion is a nanohybrid (filler content 84% w/w) restorative. It contains no classic monomers, such as bisphenol A, BisGMA, TEGDMA, UDMA, or HEMA. Its ceramic resin matrix and glass fillers are both silicon oxide based making it an all-ceramic-based direct restorative. The ORMOCER (ORGanically MODified CERamics) which has been used in place of conventional monomers combined with nanohybrid filler produce very low polymerization shrinkage, low shrinkage stress, and high biocompatibility. This formulation has low shrinkage stress confirmed by CR (see *Clinicians Report March 2016*). It also has excellent color match (18 shades) and natural translucency.

Advantages:

- Shades matched natural tooth well
- High initial polish achieved easily
- Good handling characteristics

Limitation:

- Material is stiff and was somewhat challenging to extrude for some Evaluators

CR Conclusions: 74% of 27 CR Evaluators stated they would incorporate Admira Fusion into their practice. 85% rated it excellent or good and worthy of trial by colleagues.

Radiometer Designed for Fast Determination of Intensity of All Resin Curing Lights

Bluephase Meter II Ivoclar Vivadent



\$372/Radiometer

Many resin curing lights are not delivering the intensity of light output expected by clinicians. Reasons for such underperformance are discussed in *Clinicians Reports* May 2012 and 2013. Bluephase Meter II is a precise dental radiometer for the quick and easy verification of the light intensity of all types of curing lights within wavelength of 380–550 nanometers. Readings are obtained in three simple steps: Measure the diameter of the light probe using the template on the back, enter the value, and illuminate the sensor with the help of the centering gauge.

Advantages:

- Easy and fast to use for daily confirmation of light output
- Accurate reproducible readings
- Good size
- Reading is easy to understand

Limitation:

- Designed to accomplish most consistent readings from curing lights with glass fiber light guides

CR Conclusions: 62% of 26 CR Evaluators stated they would incorporate Bluephase Meter II into their practice. 100% rated them excellent or good and worthy of trial by colleagues.

Protective Skin Foam/Cream Protects Hands from Frequent Washing and Prolonged Glove Use

Marly Skin Guard Hedy Canada

(U.S. distribution by Patterson)



\$35/100ml dispenser
(150 applications)

Many clinicians experience skin irritation on hands. Marly Skin Guard protects the skin against a range of problems from wearing gloves to the drying effects of frequent cleansing and sanitizing. It penetrates skin instead of forming a barrier over skin to create a non-greasy, non-visible surface. Remains on skin up to four hours even with soap and disinfectant use.

Advantages:

- Protects hands from drying, keeps hands soft
- Does not inhibit glove placement
- Non-greasy and very mild aroma
- Long lasting (up to 4 hours)

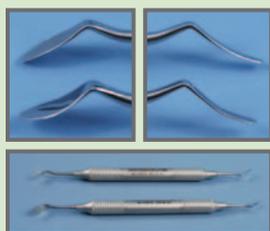
Limitation:

- Non-metered dispensing can lead to dispensing more than desired

CR Conclusions: 70% of 20 CR Evaluators stated they would incorporate Marly Skin Guard into their practice. 70% rated it excellent or good and worthy of trial by colleagues.

Sculpting Instruments for Resin-Based Composite Produces Natural Tooth Anatomy and Convexity

CASI-3C and CASI-3L Aesthecon



\$69/Instrument or \$134/Set

This double-end hand instrument is designed for sculpting direct resin-based composite restorations. It produces the convexity and anatomical curvature of natural tooth structure. Instrument set tested by CR is constructed of stainless steel (3C and 3L). A higher priced titanium-coated instrument is also available.

Advantages:

- Effective angulation and contour for achieving anatomical shapes
- Ergonomic handle diameter
- Lightweight and easy to use
- Some flex/spring

Limitation:

- Premium priced hand instrument

CR Conclusions: 70% of 27 CR Evaluators stated they would incorporate CASI-3C and CASI-3L into their practice. 83% rated it excellent or good and worthy of trial by colleagues.

Products evaluated by CR Foundation® (CR®) and reported in *Gordon J. Christensen CLINICIANS REPORT®* have been selected on the basis of merit from hundreds of products under evaluation. CR® conducts research at three levels: (1) Multiple-user field evaluations, (2) Controlled long-term clinical research, and (3) Basic science laboratory research. Over 400 clinical field evaluators are located throughout the world and 40 full-time employees work at the institute. A product must meet at least one of the following standards to be reported in this publication: (1) Innovative and new on the market; (2) Less expensive, but meets the use standards; (3) Unrecognized, valuable classic; or (4) Superior to others in its broad classification. Your results may differ from CR Evaluators or other researchers on any product because of differences in preferences, techniques, batches of products, and environments. CR Foundation® is a tax-exempt, non-profit education and research organization which uses a unique volunteer structure to produce objective, factual data. All proceeds are used to support the work of CR Foundation®. ©2016 This report or portions thereof may not be duplicated without permission of CR Foundation®. Annual English language subscription \$199 worldwide, plus GST Canada subscriptions. Single issue \$18 each. See www.CliniciansReport.org for non-English subscriptions.