



Digital Radiography: Addressing the Challenges

Gordon’s Clinical Observations: Digital CMOS (*complementary metal oxide semiconductor*) x-ray sensors have wonderful advantages but also some glaring limitations. Their thickness, rigidity, high cost, frequent repair, and difficulty of accurate interpretation of caries need immediate attention by manufacturers. Some of the challenges are being overcome by changes in technologies, and most manufacturers know that additional modifications are needed for this everyday technology. *CR scientists and clinicians have analyzed CMOS sensors, and they provide current information and suggestions for you in this issue.*



Figure 1: Large sensors (top) can be difficult to position. Options include phosphor plates and smaller sensors.

Digital sensors have revolutionized radiography—from bitewings to endodontics. Advantages include instant radiographs, patient education, reduction of x-ray dose, and elimination of wet chemistry. Clinical challenges include the size and rigidity of the sensors, and inconsistent image quality and detail. **The following report shows ways to address some of the common challenges with intraoral digital radiography, and reviews the features of eight current sensors.**

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Making Sense of Sensitivity

Gordon’s Clinical Observations: Many products are available for potentially treating this commonly occurring malady. **BUT**—numerous potential reasons for the sensitivity make treatment decisions difficult. Unfortunately, the longevity of the desensitization is often discouraging. Because of these well-known challenges, diagnosis and treatment should include a careful analysis of the specific individual tooth or collective tooth sensitivity and directing treatment toward reduction or elimination of the cause of the sensitivity. *CR scientists and clinicians have identified the most popular and effective products and treatments, and the best alternatives for your consideration.*



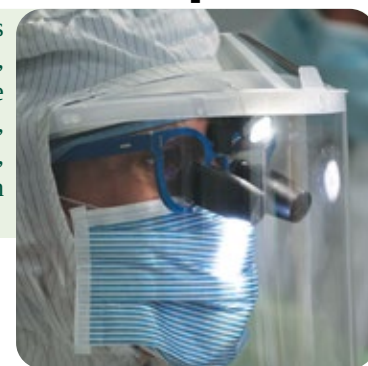
Cervical abfraction and abrasion

Diagnosis and treatment of external tooth sensitivity: Dentinal hypersensitivity (*DHS*) is defined as pain in varying degrees of sharpness experienced from external stimuli to exposed dentin. Etiologically, enamel and cementum are lost due to abrasion, abfraction, attrition, or erosion. Not all exposed dentin becomes sensitive. Do not discount individual susceptibility. Many patients do not report their tooth sensitivity early, and DHS diagnosis may not be as straightforward as one thinks. Dentists need to be aware of possible alternatives. **This report discusses the identification of predisposing factors, external dentinal stimuli, differential diagnosis of DHS symptoms, treatment options, commonly used therapeutics, duration of pain relief, insurance codes, and treatment suggestions.**

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Which Face Shields Accommodate Loupes and Headlamps?

Gordon’s Clinical Observations: COVID-19 has motivated many dental professionals to use face shields in addition to face masks and other PPE. But many clinicians wonder the true effectiveness of face shields, which obviously protect against splatter, but do not fully protect against aerosols. Additionally, there are many types of face shields ranging from a simple piece of plastic in front of the face to highly engineered, industrial models that cover the entire head and face. What is the best design that does not impede vision, access, or production of quality dentistry? Are they mandatory, elective, just another adjunct to infection control? *CR tells you conclusions in this issue.*



Loupes Face Shield by Ultra Light Optics

Face shields provide additional protection from spray and splatter common during many dental procedures. However, many clinicians feel they cannot wear face shields because they are “incompatible with loupes.” A recent CR survey of over 900 clinicians showed that over 70% of clinicians wearing loupes (85%) felt that face shield fit over loupes was “less than excellent.”

This report examines common challenges and selection criteria for dental face shields and identifies models compatible with loupes and headlamps.

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Products Rated Highly by Evaluators in CR Clinical Trials

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

LOTUS Disposable Prophylaxis Angle (Soft)

Reasonably priced specialty prophylaxis angle designed with splatter shield

Periacryl 90 HV: Surgical oral tissue adhesive (*thickened cyanoacrylate*) for securing periodontal dressings

FIT SA: Successful giomer filler technology is now available in a well-received flowable restorative

SoftDry (Parotid PAD): Moisture control pad with soft edges absorbs well while protecting cheek

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Digital Radiography: Addressing the Challenges *(Continued from page 1)*

Common Clinical Challenges and Methods to Minimize Them

1. Bulky, Rigid Sensors

Common complaints include patient pain, difficulty positioning sensor for correct alignment, and dislodging sensor as patient closes.

- Use **phosphor plates** for indications not needing immediate images (e.g., ScanX). Plates have size, thickness, and flexibility similar to film packets. (See Clinicians Report November 2015 for information on phosphor plate systems.)
- Use **smaller sensors** when necessary (e.g., size 1, size 0) for improved intraoral access. (See Figure 1 on page 1.)
- Use **sensors with rounded corners or thin body** (e.g., Clio, DEXIS, Dream Sensor, KaVo IXS). (See Figure 2.)
- **Avoid barrier sleeves with sharp seams and edges.** Cover with finger cot, foam guard, or finger of glove. (See Figure 3.)
- **Manufacturers are encouraged to develop soft, comfortable sensors** (e.g., Wave Sensor).



Figure 2: Rounded corners can improve sensor positioning and patient tolerance.

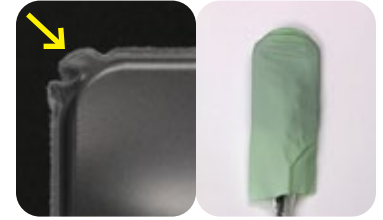


Figure 3: Barrier sheaths can have sharp and jagged edges. Cover with a glove finger, finger cot, or foam guards for patient comfort.

2. Positioning and Alignment

Proper positioning is essential, regardless of technology used. Clinicians indicated that the most common alignment challenges were periapicals of maxillary canines, maxillary molars, and mandibular centrolaterals—as well as molar and premolar bitewings! Unfortunately, the ease of acquiring digital images can inadvertently lead to sloppy technique.

- **Demand good radiographs. Learn anatomy and evaluate landmarks as sensor and tube head are being positioned.** Don't blindly trust the positioner. (See Figure 4.)
- **Bar and ring positioners (RINN style)** have proven most effective for holding and aligning rigid sensors. Bite tabs and improvised holders are frequently needed for some alignments.
- **Position sensor toward middle of oral cavity**, where the vault of the palate will not impinge on the sensor, using the paralleling technique. Periapicals often require the bisecting angle technique as the sensor must be tilted to capture the root tips.

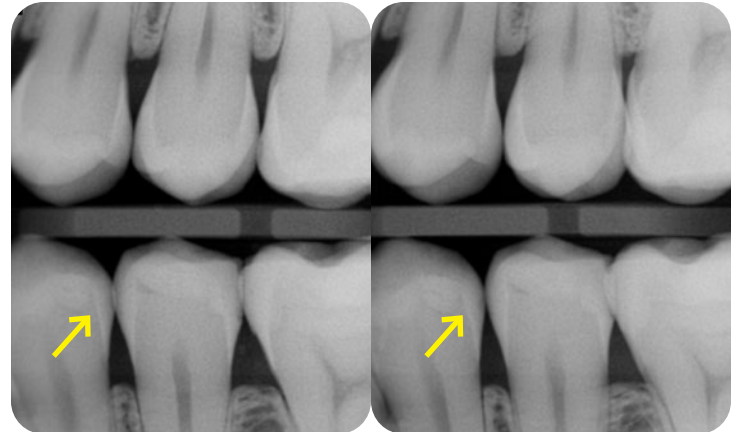


Figure 4: Opening all contacts often requires multiple bitewing orientations. Interproximal caries on teeth 20–21 are hidden by overlap in radiograph on left, but obvious in radiograph on right.

3. Resolution and Detail

Digital sensors do not equal conventional film in resolution or sensitivity to structural density. However, their instant images, diagnostic capability, patient education value, and reduced radiation are well established. Image enhancement capabilities improve diagnostic value.

- **View original image** in addition to enhanced image. Enhancement tools are a significant advantage of digital radiography, but should be used with care. Images often become **sharp but grainy, creating a false perception of detail** and possible artifacts. (See Figure 5.) **Re-train your brain to perceive details in the subtle shades of gray in unenhanced images.**
- **Make additional radiographs** at different angles if first image is questionable.
- **Avoid under- and over-exposure.** Image processing algorithms often optimize contrast and appearance even if poor exposure failed to capture details. Find correct exposure for your system and post it on equipment. (See Figure 6.)

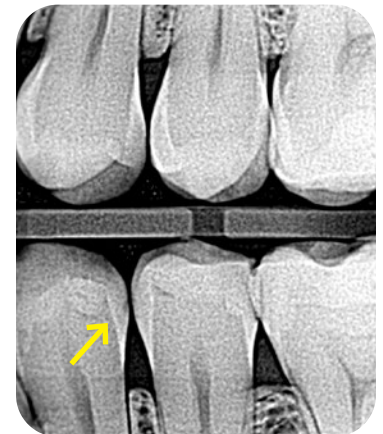


Figure 5: Image enhancement of interproximal region shown in Figure 4 makes caries more apparent, but edge effects and grainy appearance hide other details. Use enhancement with care.

4. Cost and Repairs

X-ray imaging technology is complex and expensive. Sensors are subjected to stress events every day, including bites, drops, cord pulls, and disinfection chemicals. (See Clinicians Report May 2016 for information on care and repair of sensors.)

- Use **sensors with improved longevity**—durable outer housing, sealed for immersion disinfection, reinforced cord, replaceable cord, etc.
- **Consider low-cost sensors** available from some manufacturers.
- **Purchase a repair plan.** Many manufacturers offer maintenance and replacement options that cost less over time than replacing a sensor.
- Use **phosphor plates** when immediate image not required. Individual plates are available in a variety of sizes and easily replaced if damaged.

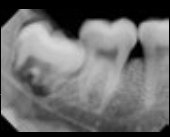



Figure 6: Underexposed radiograph where software adjusted the contrast to make it appear acceptable. However, notice the streaking effects and lack of detail.

Digital Radiography: Addressing the Challenges (Continued from page 2)

Features of Eight Digital Radiography Sensors

The following chart shows seven CMOS sensors and one phosphor plate sensor, listed alphabetically, that were evaluated in controlled clinical and scientific tests. An example sensor is shown (*size 2 or similar*) with key features related to ease of use.

Brand Company	Photos	Sensor Sizes Available (Approx. Price)*	Dimensions	Active Image Area	Infection Control Options	Cord	Example Radiograph (Jaw Phantom)	Key Features
Clio SOTA Imaging		Size 2: \$5,995 Size 1: \$4,995	Size 2 shown 43 × 31 mm 5.3 mm thick	900 mm ² ~68% of sensor	Sheath Wipe Submerge	USB 6.4 feet		<ul style="list-style-type: none"> • Round edges • Rounded corners • Thin • Two sizes
Dexis Titanium KaVo Imaging		PerfectSize: \$10,995	40 × 30 mm 8.8 mm thick	790 mm ² ~67% of sensor	Sheath Wipe	USB 8.5 feet		<ul style="list-style-type: none"> • Round edges • Clipped corners • Intermediate size • Touch-free control
Dream Sensor DentiMax		Size 2: \$6,999 Size 1: \$5,999	Size 2 shown 43 × 31 mm 5.3 mm thick	900 mm ² ~68% of sensor	Sheath Wipe Submerge	USB 6.3 feet		<ul style="list-style-type: none"> • Round edges • Rounded corners • Thin • Two sizes
KaVo IXS KaVo Imaging		Size 2: \$9,995 Size 1: \$8,995	Size 2 shown 43 × 30 mm 8.2 mm thick	860 mm ² ~66% of sensor	Sheath Wipe	USB 8.5 feet		<ul style="list-style-type: none"> • Round edges • Rounded corners • Two sizes
RVG 6200 Carestream		Size 2: \$6,000 Size 1: \$6,000	Size 2 shown 44 × 32 mm 7.3 mm thick	930 mm ² ~66% of sensor	Sheath Wipe Submerge	USB 9.3 feet		<ul style="list-style-type: none"> • Round edges • Two sizes
Schick 33 Dentsply Sirona		Size 2: \$7,995 Size 1: \$7,695 Size 0: \$5,695	Size 2 shown 43 × 31 mm 7.0 mm thick	910 mm ² ~68% of sensor	Sheath Wipe	USB module 5.8 feet User-replaceable		<ul style="list-style-type: none"> • Round edges • Three sizes • Replaceable cord
Wave Sensor Vatech		Size 2: \$7,999 Size 1.5: \$7,999	Size 1.5 shown 41 × 30 mm 7.6 mm thick	740 mm ² ~60% of sensor	Sheath Wipe Submerge	USB 9.5 feet		<ul style="list-style-type: none"> • Comfortable soft silicone • Round edges • Clipped corners • Slightly pliable • Two sizes
Phosphor Plate ScanX Air Techniques		Size 4: \$180 Size 3: \$73 Size 2: \$58 Size 1: \$60 Size 0: \$60	Size 2 shown 41 × 31 mm 0.4 mm thick	1220 mm ² ~95% of sensor	Sheath Wipe Submerge	None		<ul style="list-style-type: none"> • Thin • Round corners • Pliable • Large imaging area • Five sizes

** Approximate prices are shown. Actual prices can vary tremendously with promotional discounts.*

Summary of Evaluation:

- All systems tested made clinically acceptable radiographs. Images could be adjusted and enhanced to clinicians' preferences.
- Imaging software varied greatly among brands, but once learned, all were simple and fast to operate.
- CMOS sensors made nearly instantaneous images and had easier infection control (*one barrier sheath per patient*), but were bulky and rigid. Phosphor plates had similar handling as film, but required scanning and wrapping and unwrapping individual plates.
- If looking to acquire sensors or change brand, consider features that improve ease of use such as rounded corners, smaller size, thinner, replaceable cable, etc. If staying with current brand, suggestions on previous page can help optimize use.
- A survey of 760 clinicians indicated that popular models were DEXIS (38%), Schick (27%), RVG (15%), GXS now KaVo IXS (6%), Dream Sensor (2%), plus 17 additional brands reported in use.

CR CONCLUSIONS: Digital radiography has revolutionized dentistry, but **manufacturers need to improve sensors immediately!**

- Bulky, rigid sensors are uncomfortable and hamper proper placement and alignment in some situations.
- Image quality and detail are often inferior or inconsistent.
- Cost is high, and sensors frequently suffer damage.

Challenges can be minimized with knowledge of oral anatomy, proper clinical technique, attention to detail, and selection of appropriately sized sensors and positioning equipment. All systems tested produced clinically useful images. Individual convenience features varied among sensor brands and designs.

Making Sense of Sensitivity (Continued from page 1)

CR Survey Results on DHS (Dentinal Hypersensitivity)

- N=799; 94.5% General Dentists
- **DHS identification included in routine patient exam: 67%**
- **Percentage occlusal/incisal DHS patients:**
73% reported 0–10%; 23% reported 11–25%
- **Percentage cervical DHS patients:**
52% reported 11–25%; 32% reported 26–50%
- **DHS locations treated most:**
91.6% cervical; 0.2% occlusal/incisal; 7.8% both
- **Age range of DHS patients: 41.3%** 31–40 years; **37.6%** 41–50
- **Gender: 68.3%** female; **2.1%** male; **29.5%** both
- **Order of tooth damage type most frequently treated:**
1. Abfraction, 2. Abrasion, 3. Attrition, 4. Erosion
- **Bulimia home care: 49%** dispensed (e.g., 5000 ppm fluoride gel), **17.7%** dentifrices and rinses
- **Bulimia office care: 20.4%** used fluoride varnish or restorative treatments

Why Sensitivity?

There are multiple theories regarding the mechanism of dentin hypersensitivity. The widely accepted Hydrodynamic Theory was proposed by M. Braennstroem (1964).

- Theory is based on the presence and movement of fluid that surrounds odontoblasts inside the dentinal tubules. When fluid is stimulated, it activates the nerve endings at the pulp end of the tubules.
- Stimuli such as tactile, cooling, drying, evaporation, and application of hypertonic solutions (e.g., 5% dextrose) tend to move the dentinal fluid away from the pulp–dentin complex producing pain.
- Hypersensitive dentin shows the presence of widely open dentinal tubules. Recommended treatments strive to block the dentinal tubules.

Etiology of Dental Sensitivity

Gingival recession predisposes the loss of enamel and cementum exposing underlying dentin (e.g., age, periodontal and/or restorative treatments, hygiene neglect). Dentin becomes subject to one or more of the following attacks:

- **Attrition:** Bruxism, malocclusion caused grinding, occupational influences
- **Abrasion:** Aggressive toothbrushing, cervical areas
- **Abfraction:** “Biocorrosive abfractions” cause occlusal wear from facial–lingual tooth movement (John O. Grippo, DDS)
- **Erosion:** Dietetic acids, plaque, GERD, morning sickness, bulimia, and some occupations

Differential Diagnosis

- **DHS test:** Tactile (*pos*), cold (*pos*), hypertonic liquids. Pain is short lived. Patient identifies pain as short but sharp.
- **Interdental osteitis:** Gentle interproximal air elicits pain, papilla damaged. Patient thinks tooth is painful, it’s bone.
- **Reversible pulpitis:** Cold (*pos*), percussion (*neg*), heat (*neg*), sweets sensitive (possible patient experience).
- **Irreversible pulpitis:** Cold (possible, may linger depending on severity), percussion (*pos*), heat (*pos*). Severe and persistent pain.
- **Cracked tooth syndrome:** Cold (*pos*), percussion (*localized pos*), biting pressure (*pos*). Enamel staining may detect crack.
- **Localized hyper-occlusion:** Lateral percussion (*pos*), occlusal interferences (identified with articulating ribbon).

DHS Treatment Options and Therapeutics

- ▶ **HOME CARE DHS—Cervical (abfraction, abrasive, erosion; most prevalent in canines and premolars)**
• **Survey—Home care dentifrices: 69.4%** 5000 ppm (any brand); **36.6%** Sensitive Pro-Relief (Colgate); **30%** Clinpro 5000 (3M)

- ▶ **HOME CARE—Erosive: Occlusal/Incisal (GERD, morning sickness, and bulimia)**

- **GERD and morning sickness:** After any acid reflux, rinse with water. Swish with bicarbonate of soda rinse (various brands), wait 30 minutes, then brush with fluoride toothpaste.
- **Bulimia:** Most common in teenage females. Erosion evident on palatal surfaces of maxillary anterior teeth. Recommend: immediate water rinse after purging, then swish with sodium bicarbonate rinse (various brands). Important: Wait 1 hour, use soft toothbrush with 5000 ppm fluoride toothpaste (various brands). Practitioner may prescribe 5 minute daily use of neutral 1.1% fluoride gel (e.g., Prevident 5000 gel, (Colgate)) in custom trays. If xerostomia exists, tray with gel can be used for 2 minutes before bedtime.
- **CAUTION:** Bulimia nervosa—Need patient willingness and cooperation. Coordinate with medical professional.

- ▶ **OFFICE CARE: THERAPEUTICS**

- **Survey: 60%** Gluma Desensitizer (Kulzer), **55%** Microprime G (Zest Dental), **16%** G5 (Clinicians Choice)
- **Survey: Desensitizing products—35.6%** Shield Force Plus (Tokuyama), **29.8%** TEETHMATE Desensitizer (Kuraray Noritake)
- **Survey: Fluoride varnish products—33%** Prevident Varnish (Colgate), **25.3%** Nupro White (Dentsply Sirona), **20.6%** Vanish XR (3M)
- **Survey: 13%** use silver diamine fluoride (e.g., Advantage Arrest (Elevate Oral Care); Riva Star (SDI))
- **Survey: Mouthwashes/rinses—52%** Listerine Sensitivity (J&J); **36.2%** Crest Pro-Health Sensi-Care (Proctor & Gamble); **36.2%** SENSODYNE (GSK)

- ▶ **LONGEVITY Reported:** Highly variable. **Survey: 14.3%** indefinitely; **48%** few months; **15.8%** few weeks

DHS EXAMINATION QUESTIONS

1. Do you have any sensitive or otherwise painful teeth? Where? If yes, pursue the following questions.
2. How long has this tooth been hurting or sensitive? (e.g., when did it begin?)
3. What triggers the pain? (dietary, tactile, cold, heat, sweets, biting, chewing, other)
4. How severe is the pain? (1–10)
5. How long does the pain last?
6. Have you been able to relieve the pain on your own? How?
7. What do you think caused the particular tooth to become hypersensitive?
8. Is the pain enough to negatively influence your life?

Diagnostic Techniques Definitions

- **Tactile:** Explorer point touching and moving over dentin areas
- **Air/Evaporation:** Blow air gently
- **Cold:** Cotton swab with ethyl chloride or ice stick
- **Heat:** Warm and apply gutta percha stick
- **Percussion:** Tap gently with mirror handle
- **Biting Sensitivity:** Use Tooth Slooth (patient bites firmly and lets go quickly on each cusp.) Patient may identify pain as mild, moderate, or severe in any case.



Extreme bulimia in a 25-year old female

Making Sense of Sensitivity *(Continued from page 4)*

Suggested Treatment Protocol

► AT HOME—Based on practitioner's experience

- **Try desensitizing toothpastes first.** Place undiluted toothpaste on sensitive area and massage with finger or cotton swab for 1 minute daily or as needed. Re-evaluate DHS in a few weeks. If sensitivity has not diminished, in-office care and home care combination as needed.
- **Successful products:** SENSODYNE TRUE White (KNO_3 NaF) (GSK), SENSODYNE Pro-namel Repair (0.4% SnF) (GSK), and Sensitive Pro-Relief (8% Arginine, $CaCO_3$, NaF) (Colgate)

► IN-OFFICE TREATMENTS

1. **TEETHMATE Desensitizer (Kuraray Noritake):** Mix and apply paste gently with prophy cup two to three times. May apply and cure one layer of bonding agent over treated area to increase longevity. **Do not etch.**
2. **Shield Force Plus (Tokuyama):** Follow 30-second detailed light-cure procedure.
3. **Gluma Desensitizer Gel (Kulzer), Microprime G (Zest Dental):** Two 1-minute applications. Longevity is minimal. **CAUTION:** Avoid tissue contact. Isolate tissue.
4. **Traditional Self Etching (SE) bonding agents** may be used over cleaned dentin surface.
5. **Fluoride Varnish 5000 ppm (e.g., Varnish America (Plak Smacker) or other varnishes above):** Longevity is limited.
6. **Prevention possible:** Occlusal adjustments as needed, restorative treatments, mouth guards, orthodontics, etc.

Insurance Treatment Codes

A good business practice is to prior authorize treatment plans.

D0140 Limited oral evaluation, problem focused

D5986 Tray use for desensitizing gel

D9110 Palliative (emergency) treatment of dental pain - minor procedure (22%)

D9910 Application of desensitizing medicament (topical fluoride) (32%)

D9911 Application of desensitizing resin for cervical and/or root surface, per tooth (36%)

Fees ranged from <\$25 to >\$150:
32% <\$25; 34% \$26–\$50

CR CONCLUSIONS:

- Dentinal hypersensitivity (DHS) is a common dental problem. It can be debilitating for some.
- Inclusion of DHS identification in the routine dental exam is noticed and appreciated by our patients.
- Dental pain must be considered carefully in order to make the proper diagnosis.
- Dentin hypersensitivity, estimated to be about 40% of U.S. adults, occurs considerably more often in the cervical area.
- Dietary and tooth brushing behavior should be discussed. Pain relieving treatment is not black and white. This can be discouraging to dental practitioners and patients.
- There are a multitude of medicaments. Most companies make claims about pain relief and longevity based on the hydrodynamic studies, but not all teeth react the same. Patients need to be aware of this fact.
- Diagnosis and treatment plans take time. Dentists are not paid an adequate fee for their expertise and time.
- Make sure your fee pays for the time and effort expended.

Which Face Shields Accommodate Loupes and Headlamps? *(Continued from page 1)*

Key Features of Effective Face Shields

There has been an influx of new face shield designs from a variety of sources. Because there are no universal standards for face shields, they vary widely in design, size, and ability to meet the unique challenges of dentistry. Consider the following features when selecting an effective dental face shield:

► Protects Clinician's Face

- **Face shields block splatter and droplets, but are less effective against aerosols.** Numerous studies have validated the effectiveness of face shields against larger particles. However, due to the lack of a peripheral seal, they are less effective against prolonged exposure to small particles and aerosols. **Face shields are NOT a replacement for face masks!**
- **Face shields are not specifically required in most locations** and are generally categorized as one form of “eye protection” (*consult local regulations*). However, in addition to the eyes, face shields protect the face, loupes, face mask, etc., and are preferred by many clinicians.
- **Solution:** Face shields *do not* replace surgical masks and respirators. Select shields that meet your desired level of protection. Frames and shields may be wiped with, or soaked in, glutaraldehyde or alcohol (*may affect some optical coatings*). A final rinse with water may help avoid streaking, which can cause optical distortion. Blot dry with Kimwipe or air dry. Aggressive wiping may scratch/cloud optics.

► Accommodates Loupes and Headlamps

- **High magnification loupes** with long telescopes impact shield fit and effectiveness.
- **Headlamps often protrude** a significant distance and *may* generate peripheral glare which can impact vision. Face shield manufacturers typically attempt to accommodate headlamps via: 1) extension, 2) perforation, or 3) exterior mounting.

Over 60% of clinicians surveyed may continue to wear face shields post COVID.

“I really like not feeling splatter on my face while doing dental procedures.”

“I will continue to wear a face shield as I have never liked getting [sprayed] while my assistant rinses a procedure.”



Solutions on following page

Glare and poor fit are common challenges with face shields.

Which Face Shields Accommodate Loupes and Headlamps? *(Continued from page 5)*

Key Features of Effective Face Shields *(Continued)*

► Accommodates Loupes and Headlamps *(Continued)*

• Solutions:

1. **Extension:** Various foam and plastic extensions create clearance to accommodate headlamps internally. *May generate glare* with some headlamps.

2. **Perforation:** Flaps or holes in plastic face shield allow headlamp to extend beyond plastic shield which eliminates glare, but *creates infection control challenges*.

3. **Exterior Mounting:** Mounting headlamp directly to face shield eliminates glare and facilitates adjustment. *May alter headlamp spot size and angulation, and complicates cleaning/disinfection.*



► Allows Access and Adjustment

• **Loupes and headlamps often require adjustment** and access (*orange composite filters, headlamp controls, adjustable magnification, etc.*).

• **Many clinicians wear face shields only during procedures generating splatter**, and remove shields when refining margins, to clear fogging, or when communicating with patients.

• **Solution:** Flip-up face shields provide superior access for adjustment, air circulation, and improved communication.



Many headlamps and loupes require occasional access.

► Enables Optimum Dentistry and Quality of Care

• **Visibility:** Fogging of loupes remains a challenge when wearing a face shield and face mask or respirator. Some clinicians noted glare and optical distortion, especially at higher magnification. *Ensure protective films are removed from shield prior to use.*

• **Mobility:** Face shield length among brands tested varied from 7"–12". Larger shields protect operators, but may inhibit range of motion and mobility depending on clinician's stature.

• **Solution:** Face shield design and materials ideally protect, yet vent heat and allow some air circulation. Face shields should be optically clear and free from defects and may have anti-fog coatings. Select an appropriately sized shield; many thin shields can be trimmed to size.

Best Face Shield for Loupes and Headlamps

CR Evaluators and scientists compared 20 different face shield models for adequacy in dentistry. These were selected based on unique design, claims, and availability. Face shields were evaluated on the following criteria: visibility, comfort, protection, infection control, durability, ease of use, cost, and compatibility with loupes and headlamp. The dental face shield with the best combination of features was the Loupes Face Shield by Ultra Light Optics.

Loupes Face Shield by Ultra Light Optics

Starter pack of 10 Shields and 1 Visor: \$26.95 *(additional purchase options available)*

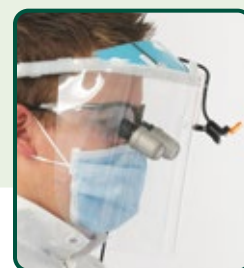
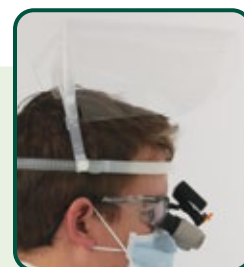
Replacement shields: 99¢–\$4.00 Each *(regular, small, extra wide, extra thick, lower extended coverage)*

Advantages:

- **Adjustable plastic headband** is lightweight, durable, and easily cleaned and disinfected.
- **Shields are easily cleaned** and reused or replaced.
- **Accommodates loupes and headlamps** (*mounted internally or externally*).
 - Visor extenders (*optional*) provide up to 4" of internal clearance.
- **Vented visor/top shield** provides additional protection and air circulation.
- **Face shield flips up when not in use.**
- Various colors, shield sizes, designs, and accessories available.

Limitations:

- External headlamp mounting complicates cleaning and may require optional mounting adapters.
- Separating protective films on both sides of shield challenged some operators; use of sticky tape greatly facilitates removal.



► Additional Excellent Options

• **Many quality face shields are available from a variety of sources. Because designs vary so widely, deciding the best face shield often comes down to personal preference.** Additional excellent options include: LumaShield by LumaDent, iVisor Loupe by Pac-Dent, FS-1 Face Shield by Spring Health, and others.

CR CONCLUSIONS:

- Face shields block splatter to face, but are less effective against aerosols **and DO NOT replace face masks/respirators.**
- Face shields should be regularly cleaned and disinfected or disposed of. Reusable models with replaceable shields were preferred.
- Flip-up face shield designs were preferred by many clinicians and allow access and improved communication.
- Many excellent face shields are available that accommodate dental loupes and headlamps. The Loupes Face Shield by Ultra Light Optics had the best combination of features.

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

- Address some of the common challenges with intraoral digital radiography
- Discuss in detail dental hypersensitivity
- Select an appropriate face shield for use in dental practice
- Evaluate new products and their potential clinical usefulness

Self-Instruction Test, November 2020, 1 CE Check the box next to the most correct answer.

1. The following techniques can minimize positioning challenges with CMOS digital radiography sensors, **except**:

- A. Use a large, rigid sensor even if patient can't close.
- B. Use a smaller sensor, if necessary, for proper alignment.
- C. Use a sensor with rounded corners.
- D. Use a phosphor plate with size and thickness similar to film.

2. Digital radiography image quality and consistency can be improved by all of the following, **except**:

- A. Align sensor and tube head using anatomical landmarks.
- B. Identify exposure settings that produce optimum detail with your system.
- C. Reduce x-ray dose for patient safety even if radiograph is underexposed, since software will adjust contrast to make it appear acceptable.
- D. Avoid over-enhancing image, which destroys details.

3. What is the widely accepted theory regarding dentin hypersensitivity (DHS) proposed by M. Braennstroem in 1964?

- A. The Hydrodynamic Theory
- B. The Thermodynamic Theory
- C. The Hypersensitization Theory
- D. None of the above

4. What is a common treatment for dentin hypersensitivity (DHS) experienced as a result of morning sickness, GERD, or bulimia?

- A. Brush with fluoride toothpaste immediately after purging.
- B. Do nothing immediately after purging. Saliva present in the oral cavity has a buffering effect on stomach acid.
- C. Rinse with water immediately after purging followed by a swish with sodium bicarbonate.
- D. None of the above

5. Which of the following are potential challenges when wearing face shields in dentistry?

- A. Accommodating loupes and headlamps
- B. Allowing adjustment of headlamps, filters, etc.
- C. Not impairing mobility or visibility
- D. All of the above

6. Which of the following statements regarding face shields is **true**?

- A. Face shield designs are all very similar due to universal standards.
- B. Face shields are more protective against splatter than against aerosols.
- C. Face shield use is mandated by the CDC.
- D. Face shields can replace use of masks or respirators.

7. LOTUS Disposable Prophylaxis Angles use a "wiper-like" feature to reduce accumulation of oral fluids on the outside of the cup, which reduces splatter and aerosols compared to standard prophylaxis angles.

- A. True
- B. False

8. Periacryl 90 HV is:

- A. A new type of suture and needle with no toxic or foreign body reaction.
- B. Clear and hard to visualize on tissue.
- C. A thickened surgical-grade super glue with dispensing that allows easy application.
- D. All of the above

9. FIT SA is a flowable restorative material with:

- A. Fewer steps due to self-adhesive formulation.
- B. Two viscosities for clinician preferences.
- C. Filler supports strength and light transmission for color match.
- D. All of the above

10. SoftDry (Parotid Pad) are less adhesive and more comfortable than other competing brands.

- A. True
- B. False

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Products Rated Highly by Evaluators in CR Clinical Trials *(Continued from page 1)*

Reasonably Priced Specialty Prophy Angle Designed with Splatter Shield

LOTUS Disposable Prophy Angle (Soft)

Pac-Dent/AJK Engineering



\$69/Package of 100 angles
(69¢/prophy angle)

Clever features on dental equipment and devices are being introduced to help with the aerosols and splatter that are common in dental procedures. This disposable prophy angle is designed with a splatter shield (*wiper-like feature*) that wipes accumulated saliva from the outside of the cup during rotation, which reduces splatter.

Advantages:

- Reduces splatter compared to traditional prophy cups
- Cup tested was soft and flexible
- Successful new design

Limitation:

- Shield can reduce visualization.

CR CONCLUSIONS: Splatter shields on prophy angles are desirable for reducing aerosols and splatter. 75% of 21 CR Evaluators rated LOTUS Disposable Prophy Angles excellent or good and worthy of trial by colleagues.

Surgical Oral Tissue Adhesive (*Thickened Cyanoacrylate*) for Securing Periodontal Dressings

Periacryl 90 HV

Salvin Dental Specialties



\$109/5-ml Bottle
(\$21.78/ml)

Cyanoacrylate was developed as a non-suture surgical closure alternative. It has since become popular as the highly effective all-purpose Super Glue which is available OTC, but not with surgical-grade purity. Periacryl 90 HV (*high viscosity*) oral tissue adhesive is a surgical-grade colored formulation of thickened cyanoacrylate that temporarily assists in securing periodontal dressings to moist living tissue without toxic or foreign body reaction.

Advantages:

- Can simplify securing periodontal dressings temporarily
- Dispensing allows easy application
- Color allows visualization

Limitations:

- Viscosity allows fast flow, requires a while to set, and not easy when significant bleeding.
- Learning curve

CR CONCLUSIONS: 100% of 16 CR Evaluators stated they would incorporate Periacryl 90 HV into their practice. 100% rated it excellent or good and worthy of trial by colleagues.

Successful Giomer Filler Technology is Now Available in a Well-Received Flowable Restorative

FIT SA

Shofu Dental Corporation



\$39/2.2-gram Syringe
(\$32.25/ml)

Self-adhesive, light cured, flowable restorative in two viscosities: F03 (*low flow*) and F10 (*high flow*). Unique nano-hybrid filler with patented bioactive Giomer Technology has been well received internationally and has high survival rates in clinical studies. Giomer filler provides strength, and its structure combines light transmission with diffusion properties to blend well with surrounding dentition for easy color match.

Advantages:

- High flow and low flow viscosities allow for clinician preferences
- Flow characteristics allow this material to stay in place while filling irregularities
- Fewer steps required because of self-adhesive formulation

Limitation:

- Long-term clinical performance is being established.

CR CONCLUSIONS: 88% of 16 CR Evaluators stated they would incorporate FIT SA into their practice. 100% rated it excellent or good and worthy of trial by colleagues.

Moisture Control Pad with Soft Edges Absorbs Well while Protecting Cheek

SoftDry (Parotid PAD)

Pac-Dent Inc.



\$18/Pack of 50
(35¢/Pad)

Parotid absorption pad has soft edging and a soft silicone backside to reduce sticking to oral mucosa. It is absorbent while maintaining flexibility during use. Different sizes are color coded for easy identification. SoftDry are less adhesive than other similar pads and are more comfortable for some patients.

Advantages:

- Provides moisture absorption
- Soft corner and pliability provide patient comfort
- Different sizes are identifiable by color

Limitation:

- Pads get thicker with use and are less absorbent than some more adhesive competitors.

CR CONCLUSIONS: 76% of 21 CR Evaluators stated they would incorporate SoftDry (*Parotid Pad*) into their practice. 86% rated them excellent or good and worthy of trial by colleagues.