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EQUIPMENT Does wearing loupes make your curing light more hazardous to your eyes?

SPECIALTY PRODUCTS An evaluation of the pulsystem™

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The products you choose for your practice give you special abilities, and by choosing the right ones you can bring capabilities such as super strength, super speed and other amazing powers to your practice and patients.

**BEST PRACTICES**

**THE POWER ISSUE:**

**How Dental Products Can Empower a Practice...**

**RESTORATIVES**

**Dental zirconia and keys for clinical success**

This in-depth look at this popular indirect restorative material delves into how zirconia is produced and explains the different types of the ceramic and how they are best used.

**NEW PRODUCTS**

**[ KURARAY NORITAKE DENTAL ]**

**PANAVIA™ SA Cement Universal**

This new cement is designed for use with almost any restoration type and almost any restorative material.

**[ DENTIMAX ]**

**DentiMax 20**

The latest update to this practice management platform adds new features to make the business side of dentistry less challenging.

**[ CARESTREAM DENTAL ]**

**CS 3700**

The latest generation of this intraoral scanner features product design from Studio F.A. Porsche and adds shade matching and improved scanning speeds.
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iProphy Mobile Hygiene Handpiece

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CS 3700
Featuring a handpiece designed in collaboration with Studio F. A. Porsche, the CS 3700 intraoral scanner from Carestream Dental offers a range of enhanced features said to make capturing a digital impression simple and efficient. The scanner is capable of capturing impressions for restorative, orthodontic, implant-borne prosthetic and sleep device treatments, and the system reportedly features customer-centric workflows; smart-shade matching; high-speed scanning and processing; and touchscreen capabilities. The shade matching technology is powered by a patented bidirectional reflectance distribution function (BRDF) that captures shade values from multiple views for enhanced shade detail and accuracy. The new scanner also provides a 20 percent increase in scan speeds when compared to previous Carestream Dental intraoral scanners, and can reportedly capture a full arch in as little as 30 seconds.

Why this scanner is worth noting:
With the CS 3700, Carestream Dental paid close attention to enhancing the details that make the scanner easy to use. The balanced, ergonomic handpiece is further enhanced with an optional wrist strap to prevent damage from accidental drops. On the function side of the equation, the scanner’s new CS ScanFlow software adds more power and control. Few other scanners offer a similar range of standout features.

Carestream Dental
800-944-6365
carestreamdental.com
CIRCLE RS #2

PANAVIA™ SA Cement Universal
With its proprietary LCSi monomer silane coupling agent, PANAVIA SA Cement Universal from Kuraray Noritake Dental, is designed to provide strong chemical adhesion to almost any dental material including porcelain, lithium disilicate, composite resin, and glass ceramics. The cement does not require a separate primer and contains high concentrations of MDP which has been shown to provide increased bond strengths with zirconia, dentin, and enamel. The cement is reportedly well suited for use with crowns, bridges, inlays, onlays and implant abutments, and the single-step protocol makes the material easy to use. It is available in both autotem and handmix formulations, can be applied without the need for a dispenser, offers easy cleanup, and can be stored at room temperature.

Why this cement stands out:
A single cement that can be used in almost any restorative situation is a huge advantage. If that single cement also allows for a simple, single-step placement protocol, it’s an even bigger breakthrough. PANAVIA SA Cement Universal is just that: a single cement to use with just about any case that comes through the operatory. This is a cement that can simplify clinical procedures as well as inventory management in just about any dental practice.

Kuraray Noritake Dental
800-879-1676
kuraraydental.com
CIRCLE RS #3

DentiMax 20
Designed to help practices easily manage finances and improve collections, DentiMax 20 practice management software can coordinate benefits between primary and secondary insurance plans, note age and frequency limits, set alternate fees, and manage non-covered items and downgraded codes. The platform also includes features to make managing multiple locations easier. A new Collections Module allows for patients to pay bills sent via text, and collection efforts on past due charges can easily be prioritized. Training is also simplified and reinforced with an On-Demand Training Guide, making tutorial videos available at any time.

Why this software is notable:
There are numerous options when it comes to practice management software, and all of the applications include features for managing both the business and clinical sides of the practice. DentiMax remains a robust platform with great clinical capabilities and flexibilities, but the latest update takes the business side further than ever before. Enhancements to collections make the process less complex for both the practice and the patients should mean more money coming back to a practice, while other improvements make it easier to navigate the often complex dental insurance and payer landscape.

DentiMax
800-704-8494
dentimax.com
CIRCLE RS #4
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The Joy of Providing Relief looks at the benefits of natural pain management products, and Exploring an innovative model for specialty dental care delivery looks at a unique pediatric care facility. Check out these articles and more at: dentalproductsreport.com

NEXT MONTH: 6 mistakes dentists make placing implants looks at common challenges for implant cases and how to overcome them.

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THERE’S BIG BENEFITS TO ALIGNING POWER AND FOCUS

WE LIVE IN A WORLD SMOOTHERED WITH INFORMATION AND DISTRACTIONS. Signs, labels, pictures, posters, and video screens are ubiquitous. They ceaselessly throw information in our paths almost everywhere we go. Staying focused on a single task seems more difficult than ever.

These days most of us keep a smartphone nearby to provide instant access to almost any information we’re seeking, along with plenty of other information other people hope we’ll pay attention to along the way. It can be a challenge to complete a task without some notification demanding our attention.

With all of this noise, I’m constantly amazed at the way you stay focused solely on a singular task while treating patients. Avoiding distractions is a growing challenge, and it’s a critical skill for a successful dental career.

Focus requires effort and practice. It’s definitely one of many “powers” that can help you be successful. These special abilities and the dental products that can bestow them on a dental professional are the subject of “How dental products can empower a practice” this month’s cover story. We look at products that provide strength, speed, stretching and other fantastic abilities.

New Products – The heart of this publication was and will continue to be a showcase for the latest dental innovations with a goal of explaining not only what they are but how they work and how they can be put to work for practices and patients.

Restoratives – Restorative dentistry is a key part of most general dentistry practices, and providing the best care requires knowledge and understanding of the newest and most effective restorative products, materials, services, and techniques.

Technology – The industry is changing, and our focus on technology aims to explain what is ready for use today, what is in development now, and how these technologies can successfully be employed to benefit practices and patients.

Equipment – Here we showcase critical products such as sterilization systems, utility systems, seating and handpieces among others. These are the products a practice absolutely must have to be open for business.

Best Practices – Here we look at how products and services fit into the business and operations sides of a dental practice. Success with a new dental product is as much about how and why a product is used as it is about what that product does and how it works.

Going forward, you’ll notice us calling out these areas of focus in the magazine’s table of contents and within the articles themselves. Some pieces will cover topics branching between or touching on more than one focus, but everything we publish will address at least one.

We chose these topics because we believe they give us a set of lenses through which we can share stories from multiple points of view about any type of product or service used in dentistry.

What do you think? Did we get this right, or did we miss something? Get in touch and let us know if we are on target or if our focus could use further refinement.

[ Noah Levine ]

Dental Products Report Editorial Director
Join us for two days of quality education in all phases of general dentistry!

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### Hand Instruments

**Atlas Forceps**

Designed to provide the power and control necessary for the most challenging extractions, Atlas Forceps from Hu-Friedy feature an internal spring to keep the instrument in the open position. This is said to reduce hand movement and strain during procedures for enhanced clinician comfort and control. The forceps are fabricated from surgical grade stainless steel and are available in 14 designs in both standard and apical styles for an atraumatic extraction.

Hu-Friedy  
800-HU-FRIEDY | hu-friedy.com  
CIRCLE RS #11

### Composite

**Aura Easyflow**

A light-cured flowable composite based on SDI’s Aura composites, Aura Easyflow is highly radiopaque and can be used as a liner or for esthetic restorations. The material is said to adapt to cavity preparations and completely seal the tooth-restorative interface. Its nanohybrid fillers provide durability, and its chameleon effect allows just four shades to be used to match eight VITA A1-B4 shades.

SDI  
800-228-5166 | sdi.com.au  
CIRCLE RS #12

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**NEW PRODUCTS**

- **[Hand Instruments]**
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    - Hu-Friedy  
      - 800-HU-FRIEDY | hu-friedy.com  
      - CIRCLE RS #11

- **[Composite]**
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    - SDI  
      - 800-228-5166 | sdi.com.au  
      - CIRCLE RS #12

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**PRODUCT WATCH**
[GLASS IONOMER]

SMART Advantage™
SMART Advantage Glass Ionomer from Elevate Oral Care® is available in A1-A2 shades. This self-cure, high viscosity, opaque, fast-setting restorative is designed to bond to and mask SDF-treated surfaces. Complete with a yellow PAA Tooth Conditioner to easily differentiate from the blue SDF, SMART Advantage is said to be ideal for masking discoloration. SMART Advantage comes in three capsule delivery kits of A1 only, A2 only or mixed A1/A2 shades with yellow PAA tooth Conditioner.

Elevate Oral Care
877-866-9113 | elevateoralcare.com
CIRCLE RS #13

[PREMIE]

Zirconia Prime
A multi-surface primer said to be suited to zirconia, metal and alumina, Zirconia Prime from DenMat is designed to enhance the bond between indirect restorative materials and a wide range of resin cements. Zirconia Prime contains MDP which has been shown to increase bond strengths to zirconia restorations by 119 percent and to metal restorations by 21 percent.

DenMat
800-433-6628 | denmat.com
CIRCLE RS #15

[3D PRINTING RESINS]

SprintRay 3D Printing Materials
SprintRay recently expanded its line of 3D printing resins with four new FDA-compliant materials and new model materials. The new resins are said to be economical options that can provide access to new 3D printing workflows. The new biocompatible materials are SprintRay Splint for splints and occlusal guards, SprintRay Surgical Guide 2 for guided implant surgery, SprintRay Try-In for bite and occlusion checks with 3D printed dentures, and SprintRay IDB for indirect bonding trays. The new model resins are Die & Model Tan and Die & Model Gray.

SprintRay
800-914-8004 | sprintray.com
CIRCLE RS #16

[OBURATION SYSTEM]

elements™ IC Obturation System
A cordless system, the elements IC Obturation System from Kerr Endodontics is based on the award-winning elements free system and offers enhanced battery life, improved ergonomics and a new OLED interface. The Downpack heat source precisely heats pluggers to 200°C in 0.5 seconds, and the gutta-percha backfilling device is said to work without ratcheting. It is designed to treat 16 canals on a single charge of the Backfill.

Kerr Endodontics
800-KERR-123 | kerrdental.com
CIRCLE RS #14

If your practice is using Silver Diamine Fluoride to treat caries, it makes sense to work with a material designed to mask any SDF-related staining.
**GLASS HYBRID RESTORATIVE**

**EQUIA Forte® HT**

Built on the same platform as EQUIA Forte, GC America is launching EQUIA Forte HT, a bulk fill glass hybrid restorative said to be ideal for restoring high-risk caries, as well as pediatric and elderly patients. The material combines EQUIA Forte HT fill with EQUIA Forte Coat in a new, flip-top bottle to reportedly provide enhanced translucency and durability, optimized marginal seal and fluoride release at the tooth-restorative interface.

**GC America**
800-323-3386 | gcamerica.com
CIRCLE RS #19

**CBCT**

**Viso™ G5**

The Planmeca Viso G5 CBCT system offers an unlimited field of view that can be adjusted between 3x3 cm to 20x17 with a maximum single scan volume of 20x10 cm. Four cameras assist with patient positioning, and included software and technology features are said to provide high-quality imaging, advanced diagnostic tools and reduced radiation exposure for patients.

**Planmeca**
630-529-2300 | planmecausa.com
CIRCLE RS #20

**NEW PRODUCTS**

**IMPLANT STABILITY TESTER**

**Beacon**

After receiving FDA clearance, the Osstell Beacon implant stability testing device is now available in the United States. The Beacon is based on the same technology powering the Osstell ISQ, which has been shown in studies to help improve implant treatment outcomes. The Beacon can be used to determine when an implant is stable enough to support a restoration. The instrument displays the stability reading both numerically and with a color indication for ease of use.

**Osstell**
633-677-8355 | osstell.com
CIRCLE RS #17

**PRACTICE MANAGEMENT SOFTWARE**

**CS SoftDent v18**

Designed to help dental practices manage the clinical and business sides of the operation, the updated CS Softdent v18 practice management software from Carestream Dental features a number of efficiency enhancements. New features include a “Reviewed by Dr.” checkbox to sync up clinical note reviews while maintaining system security. Other enhancements include a Print Routing Slip shortcut, a Team Talk Notes window, bulk insurance payment interface enhancements, and more.

**Carestream Dental**
800-944-6365 | carestreamdental.com
CIRCLE RS #18

Having a way to measure an implant’s stability provides confidence for clinicians and patients alike.
PRODUCT WATCH

[ WHITENING SYSTEM ]

**ARC Blue Light Teeth Whitening Kit**
Combining ARC whitening treatments with a special blue light system, the ARC Blue Light Teeth Whitening Kit is said to produce noticeable results with three consecutive days of 30-minute use. The commercially available kit includes thin, flexible ARC whitening strips which feature a hydrogen peroxide infused gel. The Blue Light reportedly helps weaken yellow stains beneath the enamel surface.

**ARC**
866-989-3951 | ARCSmile.com
CIRCLE RS #23

[ PROPHY ANGLE ]

**Ultrapro™ Tx Sweep™**
Designed to reduce splatter during prophy appointments, the Ultrapro Tx Sweep disposable prophy angle features a brush guard near the head to sweep away saliva and prophy paste. This innovation can reportedly reduce splatter by as much as 95 percent. The excess prophy paste is swept toward the mouth, making it more efficient for hygienists. The new Sweep prophy angles also include the main design features of the company’s Ultrapro Tx Skin prophy angles, including optimal flare and quiet gear design.

**Ultradent**
800-552-5512 | ultradent.com
CIRCLE RS #21

[ AIR POLISHER ]

**PROPHYflex™ 4 Portable Air Cleaning Device**
Designed to aid with removing stains, plaque and the cleaning of enamel surfaces, the KaVo PROPHYflex 4 offers three adjustable pressure settings for supragingival cleaning. It features a narrow cannula and low mist formation which is said to reduce mess and enhance visibility. An optional Perio Kit is designed to provide optimal pressure for subgingival use for periodontal treatment or cleaning crowns, bridges and implants. The handpiece is said to be ergonomic and comfortable to use.

**KaVo Kerr**
800-ASK-KAVO | kavokerr.com
CIRCLE RS #22

[ SALIVA EJECTOR ]

**Super Saliva Ejector**
Designed to ejet saliva while deflecting aerosol bacterial spray, the Super Saliva Ejector is said to reduce contamination while making spray instruments more efficient. The ejectors are reportedly ideal for use when using a hand-piece or ultrasonic scaler. They are made from soft, FDA grade material and are designed to be gentle to soft tissues.

**Dental Splatter Shields**
725-244-0588 | supersalivaejector.com
CIRCLE RS #24
**Engage™ Plus**

An addition to the Engage bone level implant system, the new Engage Plus implant from OCO Biomedical features a 1 mm machine-finished collar to bring the implant-abutment junction above the crest of bone. Its aufer tip and mini-cortico threads in a unique pattern reportedly lock into bone for rapid fixation. The implants are available in 4.0 mm, 5.0 mm and 6.0 mm sizes with the two larger sizes designed for platform switching. The universal hex connection matches other OCO implant systems.

**Primosplint**

A methyl methacrylate and peroxide-free composite, originally developed and used for function therapy bite splints, Primosplint reportedly shows no shrinkage in the material itself and is very easily adapted to the model prior to light curing due to its Play-Doh like consistency and special rod shape. It is designed to make bite splint production highly efficient. After curing, it is said to fit perfectly, and it can be used for making implant surgical guides, CT scanning and X-ray, transfer and insertion guides and other custom devices.

**STELLAR™ Attachment Resin**

STELLAR Attachment Resin is a dual-cure PMMA Acrylic resin specifically formulated for the pick-up of overdenture attachments. It features a working time of 3 minutes, and a total self-cure time of 4 minutes, which is said to allow it to be used to pick-up as many as 6 attachments at once. It can be placed without a bonding agent and reportedly features the right viscosity for easy seating with no polymerization heat or shrinkage.
**NEW PRODUCTS**

**[ IMPRESSION MATERIAL ]**

**V-Posil Putty Fast**

A new extension of the V-Posil VPS impression material product line from VOCO, V-Posil Putty Fast is now available in a 380 ml cartridge. The material is said to be suited for use as a tray material for a range of impression techniques and clinical situations. It features an intraoral setting time of 2:30 minutes, and a Shore A hardness of 63 with 99.5 percent elastic recovery from deformation.

VOCO America Inc.
888-658-2584 | vocoamerica.com
CIRCLE RS #29

**[ CBCT ]**

**I-Max 3D**

Recent enhancements, including improved face scanning and a new airway analysis capability add more versatility to the updated I-Max 3D imaging system from Owandy Radiology Inc. The enhanced face scanning is said to assist with cosmetic cases and patient communications. An expanded 12x10 cm field of view allows for sleep apnea diagnosis with colored airway visualization for enhanced diagnostics and patient communication.

Owandy Radiology Inc.
203-745-0575 | owandy.com
CIRCLE RS #31

**[ STERILIZERS ]**

**M9 and M11 Steam Sterilizers**

With new upgrades designed to improve efficiency, the M9 and M11 Steam Sterilizers from Midmark feature stainless steel construction and ASME certification. The sterilizers feature new cycle times to comply with FDA recommendations and align with chemical and biological indicators. They also feature improved drying, and the optional printer has also been updated for enhanced efficiency.

Midmark
844-856-1235 | midmark.com
CIRCLE RS #30

**[ ETCHING GEL ]**

**Icon-Etch Refill**

In response to demand from customers, DMG America recently added Icon-Etch Refill etching gel to its Icon Smooth Surface product line. The new refill kits contain three 0.45 ml syringes of Icon Etch etching gel and 15 smooth surface tips for application. The etching gel was originally included as a part of the Icon treatment for interproximal caries and white spot lesions.

DMG America
800-662-6383 | dmg-america.com
CIRCLE RS #32
IT WAS NOT SO LONG AGO that the ability to wave a wand over a patient’s teeth to build a virtual model of their dentition was the stuff of science fiction novels. In truth, dental digital impression technology dates back several decades, and today the technology is establishing itself as a new standard for efficient, accurate dentistry.

At their most basic level, intraoral scanners are designed to capture detailed information on the sizes and shapes of intraoral structures. A wide range of technologies employing a mix of cameras, lasers, software and more are used in dental digital impression systems, but regardless of the specific imaging technology, all of them feature a scanning wand that is passed along the patient’s teeth to send data a computer can interpret and translate into a digital, 3D dental model. These models are often more accurate than physical impressions, and because the files are digital, they do not change or break down over time.

The first intraoral scanners were the starting point for chairside CAD/CAM dentistry systems, but today’s scanners are capable of doing much more than just same-day crowns and bridges. Today, digital impressions can be used for just about every type of case from restorative dentistry, to implant dentistry, to orthodontics, and more. The scans make for wonderful diagnostic aides and can be amazing patient education and communication tools.

Practices that have already embraced this technology are finding that intraoral scanning adds efficiency and can open the practice to a wide range of new clinical opportunities. Some practices now scan every patient at every appointment to keep a detailed, digital record of any changes to the dentition over time. Even practices who don’t use the technology with every appointment often find patients impressed by the standout technology.

If your practice hasn’t considered adding an intraoral scanner, this roundup is a great place to begin the search.
INTRAORAL SCANNERS

PRODUCT WATCH

Planmeca Emerald™ S
- Enhanced over previous Emerald scanners, the Emerald S is 2.5 times faster scanning at 65 frames per second
- A larger field-of-view offers a comprehensive view of the patient’s oral environment
- Shade Assist technology simplifies the color-matching process through improved color uniformity to remove guesswork in matching restorations
- Lower power consumption, upgraded image sensors and redesigned laser drivers result in a more efficient scanner
- Other features include autoclavable, anti-fog scanning tips, plug-and-play capability and two-button hands-free operation

Planmeca
800-718-4598 | planmecausa.com
CIRCLE RS #33

Primescan
- Uses high-resolution sensors and shortwave light to capture 1 million data points per second for precise digital impression capture
- Able to scan to depths of up to 20 mm to capture deep preps and even subgingival preparations
- Captures scans quickly and more easily than previous scanner generations
- Well suited to capture digital impressions that can be used for a wide range of clinical applications
- Increased field-of-view captures more data with less movement of the scanning wand
- Validated and open data transfer options allow scans to be sent to almost any lab for restoration design and production

Dentsply Sirona
844-848-0137 | dentsplysirona.com
CIRCLE RS #36

CS 3700
- Smart-shade matching technology detects the enamel color of the scan area to identify the ideal match and then compiles a shade report with multilayer shade information for the selected area of interest
- The CS 3700 also features a 20 percent scanning speed increase over previous Carestream Dental intraoral scanner models without sacrificing accuracy
- Turbo speed scans have been tested and proven to scan in-vitro single arches in 30 seconds when the recommended PC configuration is used
- The scanner’s handpiece was designed in collaboration with the renowned Studio F. A. Porsche, the originator of the brand Porsche Design, and features optimized curves and sleek style for ergonomics and user comfort

Carestream Dental
800-944-6365 | carestreamdental.com
CIRCLE RS #35

Planmeca Emerald™ S
- Designed to make intraoral scanning simple, the Aadva IOS features a small and light handpiece said to be capable of reaching even the most difficult areas
- Start & stop mode can be activated with a simple gesture
- The handpiece is positioned on a rotating cradle with a heating function to reduce lens fogging
- The flexible arm and rotating screen allow the scanner configuration to be customized for any clinician’s preference
- The 19-inch touchscreen provides real-time visualization of scans, and interrupted scans can be restarted from any previously scanned area

GC America, Inc.
800-323-7063 | gcamerica.com
CIRCLE RS #34

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Carestream Dental
800-944-6365 | carestreamdental.com
CIRCLE RS #35
GOING BEYOND THE SCANS

Dental intraoral scanners are designed to capture a digital version of a patient’s teeth, replacing the need for a physical impression and in some cases for a dental model. While these systems are getting better and better at efficiently creating these digital dentition maps, some systems are now designed to do a whole lot more than replace impression material with a computer processor.

Here are other dental products some of the cutting-edge intraoral scanners are capable of replacing:

- **Intraoral camera**: Many of these systems include cameras and some of them can capture still or video images along with digital impressions.
- **Shade matching systems**: Matching shades is critical to restorative dental cases, and some intraoral scanners can automatically recommend a shade to match surrounding dentition, improving shade accuracy and simplifying lab communication.
- **Dental lab communications platforms**: A software-based feature of many scanners, these systems create an easy, secure and HIPAA compliant way to send cases to a lab and to monitor progress.
- **Caries detection systems**: The cutting edge of intraoral scanning technology is the ability to use the scans as a caries detection system while capturing a digital impression.
- **Patient education graphics and videos**: Showing a patient images related to a recommended procedure can be useful when presenting a treatment recommendation, but this can be even more effective when the graphics on screen are actually from the patient to whom you are presenting.

TRIOS 4

- Quickly captures full-color digital impressions with some of the highest accuracy in the industry
- Designed to capture dynamic occlusion with the TRIOS Patient Specific Movement module
- Integrated Artificial Intelligence automatically removes excess soft tissue from the scans
- Open architecture system compatible with a wide range of clinical indications and CAD software applications
- Included Patient Excitement Apps for improved case presentation
- Caries diagnostic aid and monitoring tools (pending FDA approval)

3Shape
908-867-0144 | 3shape.com
CIRCLE RS #37

iTero Element Foundation

- Designed for restorative dental workflows and can be upgraded to add orthodontic workflows
- Offers flexibility with streamlined workflows for sending cases to labs and an optional chairside production workflow
- TimeLapse technology compares patient scans over multiple appointments for enhanced patient communications
- Includes technical service support, virtual classroom training, webinars and e-learning modules

Align Technology
408-470-1000 | aligntech.com
CIRCLE RS #38

i500

- Designed to provide value, efficiency and productivity to dental practices of all types
- An open system that supports a wide range of CAD/CAM workflows via the export of STL files
- Features an intelligent scan-detecting algorithm and two high-speed cameras for highly efficient scanning
- Lightweight and comfortable to use, the i500 features a small scanning tip for easier intraoral access
- High resolution, full-color digital impressions make identifying margin lines and different tissue types simple
- Capable of powderless scanning in most instances

Medit
medit.com
CIRCLE RS #39
INTRAORAL SCANNERS

PRODUCT WATCH

Virtuo Vivo™
- Compact powder-free scanner said to capture highly accurate digital impressions
- Removable, autoclavable scanning tips for faster turnaround between patients
- Available in either cart or laptop-based configurations, and older Dental Wings scanners can be retrofit for the newest scanner handpiece
- With full-color scans, streamlined workflows, and open STL file export, the system is designed for efficiency and connectivity
- Integrated voice and gesture control allows the cart-based scanner to be operated without touching the cart or screen
- Intuitive scanner interface and audio and visual scanning feedback enhance the ease of use

Aoralscan Intraoral Scanner
- Designed to provide a premium scanning experience at an economical price point
- Obtains high-quality digital impressions quickly and easily
- Suitable for capturing digital impressions for use with restorative, orthodontic and implant cases
- An open architecture system with open source software
- Available at a flat price without ongoing annual license fees

Midmark Mobile True Definition™ Scanner
- Employs technology similar to the motion capture effects of Hollywood to make incredibly accurate digital impressions
- The first mobile intraoral scanner that operates solely on a tablet and features the smallest wand on the market
- The uniquely small wand makes scanning easier for clinicians and is said to create a more comfortable point-of-care experience for patients
- Upon purchase of the True Definition Scanner and affordable data plan, dentists gain access to unlimited scans, crown and bridge restorations, connections to their lab of choice and third-party providers, and more

POWDERLESS FUTURE

The earliest generation of intraoral scanners all required the patient’s teeth to be prepared with a powder coating prior to scanning. This powder was designed to create a uniform surface for the scanner to record, thus eliminating light reflections off of intraoral moisture or the tooth surface itself.

However, the newest scanners are all capable of scanning without powder. These scanners use a mix of advanced imaging capabilities and improved software to eliminate the need for the use of contrast powder. This makes the scanning process faster and more convenient for patients and more efficient for clinicians.

Still, some systems do continue to require the use of a contrast powder in order to capture accurate digital impressions. When considering digital impression systems, it is important to understand if the system you are looking at is powder-free or requires a contrast medium.

That detail needs to be factored into your return on investment calculations so you understand the ongoing costs and staff time related to intraoral scanning contrast powder.

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Dental Wings
888-856-6997 | dentalwings.com
CIRCLE RS #41

Aurident
800-422-7373 | aurident.com
CIRCLE RS #40

Midmark
844-856-1235 | midmark.com/truedef
CIRCLE RS #42

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**Product Watch: Intraoral Scanners**

**VIZ Intraoral Scanner**
- A scanner designed to provide clinicians or lab technicians digital impression capabilities with speed, comfort and effectiveness
- An open system compatible with almost any dental lab
- An economical scanning option with just the most needed features
- Small and lightweight for a comfortable clinician experience
- Comprehensive product training is included
- 3D imaging is captured at 10 frames per second with a half arch scan capture taking less than 2 minutes

ADIN Digital  
info@adin-digital.com | adin-digital.com

**Condor Intraoral Scanner**
- Featuring one of the smallest scanning handpieces, the Condor is a software-based intraoral scanner
- Precise enough to scan objects as small and thin as a human hair
- Scan times as fast as 1 minute per arch and 30 seconds per quadrant
- Exports open STL files for easy connectivity to other CAD/CAM systems
- The handpiece is approximately the size of a toothbrush and connects to a laptop to complete the intraoral scanning system

Condor  
info@condorscan.com | condorscan.com

**CHOOSING THE BEST CONFIGURATION**

The earliest digital impression scanners were built as a part of a bulky cart that could be wheeled from room to room, but today there are several choices when it comes to the system configuration. Some scanners are available in just one set-up option, while others have a range of custom configurations from which to choose. Here’s a breakdown of the scanner set-up options:

**System Configurations:**
- **Cart:** Modern digital impression carts tend to be small, sleek and easy to maneuver with a large touchscreen monitor for visualizing and manipulating scans
- **Laptop/Mobile:** A mobile system with just a scanning wand connected to a laptop or tablet computer for optimized portability
- **Dental Unit Integration:** A digital impression scanner completely integrated into the dental unit and connected to the operatory TV or computer monitor

**Handpiece Configurations:**
- **Wired:** The scanner connects to a cart, laptop, tablet or dental unit via a cord and a plug that can be USB, another standard connection type or a custom connection
- **Wireless:** The scanner is battery powered and uses a wireless protocol to connect to a cart or computer
- **Wand Grip:** The most common style of intraoral scanner handpiece, these wands are designed to be held like an intraoral camera or similar handpiece
- **Pistol Grip:** A pistol-style handpiece is attached beneath the scanning wand for a different scanning style

**MIA3d**
- An open system using standard STL files, the MIA3d is designed for both restorative and orthodontic workflows
- The scanner is said to be fast and accurate
- An inexpensive scanner option, it does not include any click fees, scan fees, cloud fees or other ongoing fees
- A portable system, the scanning handpiece is connected to a laptop for easy transportation between operatories
- A plug and play system, the scanner can be controlled with a foot pedal

MIA3d  
info@mia3d.com | mia3d.com

**Densys 3D**
- Densys 3D is a digital impression scanner designed for both restorative and orthodontic workflows
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Densys 3D  
info@densys3d.com | densys3d.com

CIRCLE RS #44

CIRCLE RS #43

CIRCLE RS #45
GC QUALITY
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Introducing GC FujiCEM® Evolve in New Syringe Delivery System

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- Ideal for cementation of zirconia, PFM and lithium disilicate restorations
- Rechargable fluoride release and moisture tolerance

Try new GC FujiCEM® Evolve and join the evolution.
Seeing the light on optimized shade matching

How the Shade Wand helps eliminate ambient light variables to help match shades and minimize remakes. [compiled by Noah Levine]

Information provided by Dental Creations.

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**THE PROBLEM**

Environmental factors make matching a patient’s tooth shade a challenge

Depending on the light in the room, the clinician’s vision and even the viewing angle the clinician is using, tooth shades can appear different, making it difficult to make a precise match.

---

**THE SOLUTION**

Shade Wand

- The 5,500 kelvin LED light generates neutral, ambient light at three power settings
- Provides the optimal amount of light at the patient’s mouth for easier and more precise shade matching
- Eliminates color distraction and outside color sources from interfering with shade selection
- Powered by rechargeable batteries that provide up to 4 hours of full-power light time on a single charge
- No warm-up time required before it’s ready to use

---

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Making sure patients have access to sterile materials post-op

How SteriPocket packets make it easier for post-surgical patients to keep sterile sponges with them at all times. [compiled by Noah Levine]

Information provided by Richmond Dental and Medical.

THE PROBLEM

Patients often require sterile gauze after surgical procedures

When patients leave your practice, you want to be sure they are prepared to follow all of your post-op instructions, but keeping materials sterile outside of a medical environment can be a challenge.

THE SOLUTION

SteriPocket

- Contains two, pre-sterilized packets of cotton-filled or Rayon/Poly nonwoven sponges
- Ideal for sending home with patients after extractions
- Eliminates the need for team members to sterilize gauze for patients
- Rayon/Poly sponges are available in two sizes
- Ensures patients are confident that the sponges remain sterile
- Makes it easier for patients to follow post-op instructions

Richmond Dental and Medical
855-841-0743 | RichmondDentalAndMedical.net
CIRCLE RS #50
Why Are Thousands of Doctors Trusting OMNICHROMA?

“OMNICHROMA is GROUNDBREAKING—a win-win for all offices. No need to stock 30 composite shades that expire and take up space. So economical and it works great!”
- Dr. Peter Auster

“OMNICHROMA has all the features you need from handling, strength, polishability, and, most importantly, it matches all the tooth shades. This is my go-to composite from the simplest to the complex... The result speaks for itself.”
- Dr. Allan Mohr

Innovated to color-match like you’ve never seen before, Tokuyama’s unique dental composite matches every shade from A1 to D4 with just one shade of composite. By streamlining the restorative process, OMNICHROMA simplifies day-to-day dentistry and saves you time and money.

*Limit one sample kit per doctor. While supplies last. Offer valid until 12/31/19. Please allow 4-6 weeks for delivery of complimentary goods. Offer valid in US and Canada only. For evaluation purposes only. Participating doctors or dentists are obligated to properly report and reflect any bonus product, rewards, rebates, discounts or other benefit they receive on their submissions to Medicare, Medicaid, state or federally-funded healthcare program and/or private insurance.

Interested? Circle Product Card No. 51
DENTAL PRODUCTS REPORT.COM | October 2019

PRODUCT WATCH

INTRAORAL SCANNERS

SOLVE MY PROBLEM

CLOSER LOOK

BENCHMARK

EQUIPMENT

Cut costs and reduce staff and patient risks from medical waste

How the Medical Waste Machine turns medical waste into ordinary waste that is easier to dispose. [compiled by Noah Levine]

Information provided by Medical Innovations, Inc.

THE PROBLEM

Medical waste removal is expensive but necessary

Medical waste, including sharps and potentially infectious materials, must be managed carefully and can involve risk to team members who must handle the waste.

THE SOLUTION

The Medical Waste Machine

- Converts regulated medical waste into ordinary waste that can be thrown out with the regular trash by sterilizing the waste and melting it into a single piece of plastic
- Reduces waste costs by up to 80 percent by eliminating the need to contract with a medical waste removal service
- Improves infection control by sterilizing hazardous waste, reducing the amount of time potentially infectious materials are present in the practice
- Reduces potential liability from the storage of hazardous waste on site at the practice
- Waste is reduced in size by approximately 75 percent, which means less total waste is disposed, reducing the environmental impact of the practice
- Reduces waste to a sterile, unrecognizable, amorphous block

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Interested? Circle Product Card No. 53
Great bond strength and easier cleanup equals next level luting

How GC FujiCEM® Evolve makes it easier to take advantage of the benefits of a resin modified glass ionomer cement. [compiled by Noah Levine]

Information provided by GC America.

Finding a cementation option with the desired bond strength to zirconia restorations remains a challenge. RMGI Cements are well suited for zirconia restorations, but bond strengths can significantly weaken over time, putting restoration longevity at risk.

GC FujiCEM® Evolve

- Provides strong and durable bond to zirconia to reliably keep restorations where they are placed.
- The 3-second tack-cure capability makes cleanup simple.
- Syringe delivery is ergonomic and dispenses with ease.
- Also indicated for use with PFMs and lithium disilicate restorations.
- High radiopacity for easy visualization on X-rays.
- High moisture tolerance for easier placement, requiring no isolation.
- Provides rechargeable fluoride release.
- Does not require a primer.
- Reduces post-operative sensitivity.
HEALTHY HABITS
START WITH FIREFLY FUN

#1 IN KIDS MANUAL BRUSHES #1 KIDS GROWTH BRAND!

1 MINUTE LIGHT-UP TIMER PLUS NO MESS SUCTION CUP!

REACH® TOTAL CARE
Floss Clean:
Reach Floss Clean helps remove plaque deep between teeth and along the gum line. The angled neck gets to hard-to-reach places while the floss bristles help in between teeth for a dual-action clean. This brush also has a tongue cleaner for a whole mouth clean.

REACH®, please contact your local dealer
Interested? Circle Product Card No. 55
SECRET TO A SUCCESSFUL ENDODONTIC PROCEDURE

How Traverse™ streamlines the process of glide path creation. [compiled by Patti Phelps]

Information provided by KaVo Kerr.

THE PROBLEM

Glide path negotiation is difficult and time consuming

There are often challenges when establishing the glide path using stainless steel hand files, typically when going from the #10 to the #15 or #20, which can represent an increase in tip diameter of 50 percent.

THE SOLUTION

Traverse™

- A nickel titanium rotary file said to make forming the glide path easier, reducing time and manual labor and improving efficiency
- Reported to be the only file system offering tip sizes of 0.13 and 0.18 with an 0.06 taper, decreasing the stress on later shaping files
- Features Maximum Flute Diameter, which means taper stops increasing when file diameter reaches 1 mm
- A triangular cross section allows for greater cutting efficiency
- Reportedly incurs less debris apical extrusion than files used under reciprocation motion
- Files are pre-sterilized, doing away with the need to autoclave the file before using
- Traverse files feature a non-cutting tip to minimize transportation

KaVo Kerr
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Keeping the exam area clean and visible

DryShield provides simplified isolation while adding comfort for dental patients.  [By Scott E. Rupp]

DryShield Single-Use Mouthpiece

Designed by a dentist for dentists, the DryShield mouthpiece is engineered in two options—autoclavable and now single-use—to meet dentists’ needs for maximum affordability or convenience. The new mouthpieces are available in pedo, small, medium and large sizes to fit all patients. They come in a box of 20, with each mouthpiece individually packaged.

Patients report a more comfortable experience no matter the procedure and typically face shorter appointments. In Dr. Halabo’s practice, patients’ reactions to the device have been welcoming.

“We’ve been using isolation appliances for number of years, so patients are used to it, and we always explain the benefits of the instrument to them,” Dr. Halabo says. “All of our patients have gotten really accustomed to the DryShield because it’s less invasive than traditional isolation such as rubber dams, clamps, and cotton rolls,” he says. “DryShield is really simple to use, in and out. It helps keep patients’ mouths open and they stay comfortable during the procedure.”

In his experience, DryShield is proving to be better for adhesive dentistry, for isolation, and keeping moisture away from the work environment. For adhesive-based dental procedures, he explains, a dry, isolated environment means the restorations can last much longer than those placed in environments where isolation is not used or is not nearly as effective. Treatment overall, is more effective because of DryShield, Dr. Halabo says. Because of this, he uses DryShield on almost every patient.

“Treatment is more efficient, and treatment time is quicker,” he says. “DryShield allows more efficient work and time savings during work. I definitely recommend using DryShield because it’s an excellent patient isolation method.”

Dr. Sam J. Halabo, who has practiced dentistry for more than 22 years in Chula Vista, Calif., has used DryShield since the product first became available more than five years ago. When the single-use DryShield became available, he was excited to try it. Dr. Halabo’s practice is progressive technologically, so advancements in patient technology appeal to him.

“The DryShield is super easy to use and provides excellent benefits,” Dr. Halabo says. “It provides for the ability for a patient’s mouth to stay open with their tongue out of the way during a procedure, and retracts the cheek while allowing nothing down the patient’s throat—everything stays clean and clear.”

It provides for a clear, saliva-free environment for adhesion—especially important during implant procedures, he adds. Most importantly, the device also provides intraoral isolation. DryShield also allows for the ability to easily perform two-quadrant dentistry, reducing patient chair time.

Dentists report reduced chair times by as much as 40 percent per procedure when using DryShield, meaning the practice frees up time, allowing for additional procedures or patients per day. While it provides all of the same benefits to patients as the reusable DryShield device, the single use version requires no cleaning or autoclaving, which frees up even more time for staff who can focus on other tasks.

The multi-functional system appears simple, but along with isolation, the DryShield provides suction to remove liquids and debris, an integrated bite block to enhance patient comfort, patient protection in the form of a tongue and oral pathway shield, a cheek retractor which helps enhance visibility, and airway protection for patient safety. With all of this in one device, the DryShield remains simple to set up and easy to place and remove from the patient’s mouth.

All DryShield mouthpieces are made from soft and flexible material that contours to the patient’s mouth. The hands-free, continuous suction feature means patients are comfortable and assistants can multi-task. The DryShield system also is portable for ease of use between operatories and offices.

Dr. Sam J. Halabo

CLINICIAN | TEAM MEMBER | PATIENT

Dental materials can be environmentally sensitive, so maintaining an optimal oral environment is important. A dry, debris-free working field can make treatment more efficient and restorative materials more effective, but obtaining that ideal working environment can present a challenge.

DryShield effectively performs the tasks of a high-suction evacuator, bite block, tongue shield and oral pathway protector in one easy-to-use device. The mouthpiece lets dental practices easily eliminate dependency on saliva ejectors, bite blocks, cotton rolls and gauze. At the same time, DryShield provides a breakthrough in isolation, bringing new levels of ease and comfort to doctors and patients alike.

Dr. Sam J. Halabo, who has practiced dentistry for more than 22 years in Chula Vista, Calif., has
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Efficiently getting calcium to the pulp

The benefits TheraCal PT™, a resin-modified calcium silicate material, has brought to one dentist’s practice. [By Renée Knight]

After using TheraCal LC calcium silicate pulp liner for a few years and having great success, Dr. Ted Croll wanted to know if it could work as a primary tooth pulpotomy filling material as well. A BISCO scientist told him that while it wasn’t indicated for that procedure, the company was developing a related material for exactly that purpose. That turned out to be TheraCal PT.

Dr. Croll eagerly anticipated the release of the “PT version” and has been using the biocompatible, dual-cured, resin-modified calcium silicate pulp filler for his pediatric patients for about six months. He’s had excellent results with the few dozen cases he’s completed, and that’s a trend he expects to continue.

“TheraCal PT delivers calcium, which is very kind to the pulp,” Dr. Croll says. “BISCO has made delivery of the material extremely convenient. The hardened filler doesn’t break down because the resin component of the material stays solid and continues to deliver calcium. It’s unlike any other material I’ve ever used.”

It saves time

TheraCal PT makes pulpotomies much easier and quicker to complete than the zinc oxide/eugenol mixture, or the mineral trioxide aggregate (MTA) materials dentists have been using for years, Dr. Croll says. The fact that it’s light-cured gives clinicians an immediate light-hardening of the material in addition to a chemical setting reaction. If the tooth is to receive full coronal coverage, such as with a preformed stainless steel or zirconia crown, there’s no need to place another material on top of the liner, which is a time saver.

“A chief problem with this procedure has always been the timing of treatment,” Dr. Croll says. “Once this material is placed in the pulp chamber after hemostasis is achieved, hardening of the material is immediate as the light beam is applied. The opacity of the material might make practitioners question whether there’s hardening of the material deep within the chamber, but the chemical cure obviates that concern. In the same way a dual-cured resin-based composite makes for sure through-and-through material setting, TheraCal PT rapidly and conveniently ensures optimal pulp chamber fill.”

All told, using TheraCal PT routinely cuts procedure time by five to 10 minutes, Dr. Croll says, sometimes more.

Fast, convenient delivery

The packaging also gives TheraCal PT an advantage over other pulpotomy filling options on the market, Dr. Croll says. The double-barreled delivery system and injection/mixing mechanism eliminates the need to squeeze the material out onto a pad, mix it together and then put it back in a syringe tip, which saves clinicians even more time.

And because the procedure doesn’t take as long as it once did, Dr. Croll’s young patients are out of the chair faster—and that’s a benefit for the practice as well as the patients.

“Those little mouths get tired of opening and kids get wiggly,” Dr. Croll says. “TheraCal PT just makes the pulpotomy procedure easier, faster, and better for the patient, the dental assistant and the dentist.”

A trusted company

Even though TheraCal PT hasn’t been on the market that long, Dr. Croll knows BISCO has done the research necessary to ensure it will hold up over time. In fact, he says using this material to protect the dental pulpal complex could become the standard of care for primary molars.

“The results over the first six months have been excellent, but of course clinicians want to know how their pulpotomies will perform to last seven or eight years, the usual exfoliation time. Primary second molars may need to last longer than that. BISCO scientists are attuned to that clinical challenge and their research is geared to ensure long-term success of TheraCal PT pulpotomies. The TheraCal PT formula is based on the same chemistry as TheraCal LC, which has proven to be a most durable and reliable lining material. I believe there is enough clinical experience and science behind the new material to use it with confidence.”

TheraCal PT™

TheraCal PT is a biocompatible, dual-cured, resin-modified calcium silicate designed for pulpotomy treatment. It’s said to maintain tooth vitality by performing as a barrier and protectant of the dental pulpal complex. TheraCal PT is radiopaque, allowing for easy identification and differentiation from recurrent decay and other restorative materials. Its physical properties reportedly resist breakdown and degradation, leading to a durable seal.

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SPECIALTY PRODUCTS

An evaluation of thepulsystem™

Contemporary Product Solutions takes a look at this dental appliance tool. [by Shannon Pace Brinker, CDA]

ABOUT THE REVIEW

With the combination of the world’s leaders in their field, Contemporary Product Solutions’ dexterous, knowledgeable and experienced leadership team maintains a sharp eye for emerging products in the field of general and restorative dentistry by providing a “Total Office” perspective of clinical information and application, incorporating photographs and videos to assist chairside procedures for better patient results. CPS (cpsmagazine.com) will continue to evaluate one product at a time with professionalism, integrity and a commitment to excellence.

Contemporary Product Solutions recently conducted a review of thepulsystem™ from PUL Technologies among 14 product evaluators currently in dental practice. All evaluators indicated they would buy it and recommend thepulsystem to others.

Packaging

Measuring at three inches long, thepulsystem fits easily into retainer or aligner cases. This two-in-one removal and seating tool is all a practice needs for their aligner patient care kit, and includes one thepultool and one thechewtool™. Discounted bulk pulsystems begins in quantities of 20. This cost-effective solution is designed to last a patient’s entire treatment time, reduce plastic waste and save practices money spent on patient care tools.

Almost all evaluators (i.e., 99 percent) found the packaging to be excellent, great or very good. The compact and easy-to-store size was appreciated by three evaluators, while another’s commented that thepultool is “cost effective.” Its size and being individually wrapped allows it to fit into any aligner case offered in each practice.

Comparability to other brands

thepultool features a finger ring on one end that is ergonomic and intuitive to hold, while the hook on the other end is used to gently pull upper and lower arch aligners away from the teeth starting at the posterior. The hook can be placed on either the lingual or buccal side of the molars depending on patient comfort. thechewtool slides up and down the shaft of thepultool to comfortably seat aligners of various sized mouths. Starting from one side, the patient will hold the finger ring side of thepultool and bite down on thechewtool along their arch until they reach the other side to firmly and evenly seat their aligners into place. A common complaint of traditional seating tools is patients felt like they could (or did)choke on cotton-roll-sized seaters, and that they would lose their rigidity and become smelly after several uses, thechewtool maintained its durability and users found it to be comforting and “cool” to use, even when in public.

Although 50 percent of the evaluators said they currently don’t use a removal tool, 48 percent of those who do use one said that thepultool was better than what they’d currently been using. Evaluators noted several advantages of thepultool, including its sturdiness, bigger and better-shaped hook for removal, and longer handle. In particular, one evaluator noted that thepultool is ideal for individuals with decreased hand strength or the elderly, for whom removing aligners and/or other appliances (e.g., partials, night guards) would otherwise be difficult.

Ease of use

To safely remove aligners with thepultool, patients are encouraged to fully...
Latch the hook between the aligner and teeth and gently pull down (upper aligner) or pull up (lower aligner) and towards the front of the mouth. The ability to slide the chew tool portion of the pul tool system allowed patients to custom fit their tools to fit their mouths. Having an all-in-one tool for both seating and removing their aligners proved to be convenient and part of patient’s daily aligner regimen.

According to 75 percent of the evaluators, patient instructions for how to use the pul system were clear and rated good, great or excellent. Patients told the evaluators that they liked or loved the tool, and that they were happy to be able to remove their aligners more easily, safely and with self-confidence while performing removal in front of someone else.

**Conclusion**

By eliminating the need for patients to put their hands in their mouths, the pul system promotes better aligner tracking, sanitation and helps patients avoid frustration or embarrassment when removing their aligners. Every evaluator gave ideas of other ways this tool was helpful such as seating dentures, partials, retainer removals and night guards.

Overall, Contemporary Product Solutions’ evaluators found the pul system gave patients an easy way to seat and remove their aligners and/or appliances, especially those with brittle nails, men and the elderly. Based on their experience, more than 98 percent of the evaluators rated the pul system as a perfect 5-diamond product.

“the pul system boosts the chances of your patient’s teeth moving in the right direction AND easily removes their aligners”

“the pul system helps patients confidently wear and remove their aligners with or without attachments”

**DR. FISCHER & ZITTERICH DENTISTRY, ROCKWALL, TEXAS**

**HOLT ORTHODONTICS, FOLSOM, CALIFORNIA**

**Figs. 1-3** The chew tool is designed to make it easier to properly insert and seat clear aligners by allowing patients a comfortable way to gently bite down and push the aligner into place (Fig. 1). The pul tool is designed to easily fit into a standard aligner case, making it easy to keep it where you need it whenever you need it (Fig. 2). The pul tool is used to more easily remove aligners. It can be used with both upper and lower aligners (Fig. 3a & 3b).
**HOW TO TREAT A VASCULAR LESION USING A ND:YAG LASER**

Using the PerioLase MVP-7 Free-Running Digitally Pulsed Nd:YAG Laser makes it simple and easy to remove these benign growths without leaving a scar.

[By Allen Honigman, DDS, MS, Dip. Perio]

**VASCULAR LESIONSPOSE A COMPLEX CHALLENGE**

A challenge due to possible risk of excessive blood loss during surgical intervention and frequent recurrence of the lesion. Historically, hemangiomas were considered abnormalities to observe, but that were inherently benign and therefore without an immediate need for excision.

Particularly due to the nature of traditional surgical incision, which leaves a scar and has the potential for excessive bleeding, most clinicians were inclined to “watch and wait” until the hemangioma became a bigger problem that needed pressing attention.

However, patients are often frustrated or embarrassed by the unsightly nature of vascular lesions, particularly when they occur in or around the mouth and lips (venous lake hemangiomas). Cryosurgery, electrosurgery and sclerotherapy all emerged as alternative treatments that could address vascular lesions, but with varying results.

Typical adverse effects include scars, pigmentation changes, and tissue texture changes. Additional disadvantages of sclerotherapy include potential toxicity, allergic reaction and skin necrosis.

With the advancement of laser techniques in the past several decades, clinicians have felt more comfortable surgically treating vascular lesions in a minimally invasive nature. Specifically, the free running digitally pulsed Nd:YAG laser has been shown to be an effective tool to treat vascular lesions because it is moderately absorbed by hemoglobin but penetrates more deeply into the affected tissue.

For deeper vascular lesions, lasers with deeper tissue penetration are necessary. A study from 2006 showed 94 percent of venous lake cases clearing up completely after a single treatment using the Nd:YAG.

While other lasers have been used to treat vascular lesions, scarring was more likely when compared to the Nd:YAG. Continuous-wave diode laser energy is only effective superficially and unsuitable for hemangiomas >3 cm. Carbon dioxide lasers have a surface effect on vascular lesions, leading to recurrence of the lesions and more frequent tissue changes, affecting both pigmentation and texture.

**Case report**

A female patient in her late 40s presented at the office with a large vascular lesion on the lateral border of her tongue (Fig. 1). The lesion had been present for more than 20 years, and the patient had never been offered a treatment option. The clinical situation was discussed with the patient, and treatment with the PerioLase MVP-7 was agreed upon. The patient was educated about the procedure.

**PerioLase MVP-7**

- Powerful and versatile enough for a wide range of laser dental procedures
- A 6-watt, free-running variable pulsed Nd:YAG laser with 7 pulse durations
- The only laser approved for the LANAP protocol for treating periodontitis and the LAPIP protocol for treating peri-implantitis
- Touchscreen controls with 20 preset procedures
- Light and balanced TrueFlex handpiece
- The laser is mounted on wheels and compact enough to be easily moved between operatories

**Step 01**

The patient was prepped with local anesthetic (4% Septocaine + 1/100k epi) with care taken to avoid blanching the lesion. Topical anesthetic such as tricaine blue can be used if the lesion is small.

**Step 02**

The PerioLase MVP-7 free-running pulsed Nd:YAG laser was set for a longer pulse duration of 550 usec and power of 3.8 W/20 Hz.

**Step 03**

Treatment was performed in noncontact mode, with the laser about 1 to 2 mm away from the lesion, to allow the energy to be absorbed specifically by the stagnant blood of the lesion.

**Step 04**

Energy is delivered to the vascular lesion by gently moving the laser fiber tip back and forth over the benign growth until it was completely white. Care was taken to keep the laser tip 1 to 2 mm away from the tissue and to remain within the borders of the lesion so as not to damage unaffected tissue.

**Step 05**

After less than 1 minute, the procedure was completed (Fig. 2). Treatment duration, laser settings, and energy delivered were appropriately proportional to the size of the lesion. As the body clears out the debris and reabsorbs the tissue, the patient was advised that she would develop a sore in approximately two weeks (Fig. 3) with complete healing following two weeks after that.

**Step 06**

The patient presented four weeks post-op for a follow-up appointment. Upon examination, there was no indication of the hemangioma ever existing (Fig. 4).

**Conclusion**

The free-running digitally pulsed Nd:YAG laser offers a minimally invasive treatment method for venous lake hemangiomas and vascular lesions, with quick procedural and healing times as well as predictable positive outcomes.

With patients eager to remove these lesions for cosmetic reasons and clinicians wanting a modality that minimizes the amount of pain, clinical complications, and scarring involved, the Nd:YAG laser appears to be a superior choice for both patient and clinician satisfaction.

References available online at dentalproductsreport.com
1. The patient presents for treatment with a vascular lesion on her tongue.

2. Immediately after the laser procedure, the vascular lesion appears white.

3. Two weeks after treatment, the patient exhibits a small sore on her tongue in place of the lesion.

4. One month after the procedure, there is no evidence the vascular lesion was ever present on the patient’s tongue.

To view a video of this technique, visit dentalproductsreport.com

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DOES WEARING LOUPES MAKE YOUR CURING LIGHT MORE HAZARDOUS TO YOUR EYES?

A study of the risks of eye damage clinicians face when using curing lights while wearing dental loupes.

[by Denise A. Mills, DDS, MHA; Nicole M. Putnam, PhD, MS; and John C. Mitchell, PhD]

More than 146 million resin-based sealants and restorations are placed annually in the U.S. Increased use of resin-based restorative materials also means the increased use of the light-curing unit (LCU) for photopolymerization.

Most LCUs emit in the 400 to 500 nm wavelength ranges depending on the light source emission spectrum, which is vital for a reaction to occur in the light-cure resin restorative materials. The spectral requirements of the resin-based composite (RBC) materials and the spectral emission of the LCU should correspond to ensure optimum polymerization of restorative dental materials.

One photoinitiator frequently used in resin-based restorative materials is camphorquinone (CQ), which is activated by high-intensity blue light. LED LCUs correspond with the wavelength necessary to activate the CQ with an ideal narrow blue spectral emission for photoinitiation. Some resin and bonding systems use other photoinitiators in translucent and lighter shade restorative materials.

LED LCUs are often the curing unit of choice because of the unit’s high curing efficiency, long life, low energy consumption, and device convenience and ease of use. The LED LCU narrow spectral emission is better centered on the peak of maximum absorption of the photoinitiators. Although the LCU operates at a blue light spectrum to most effectively cause photoinitiation of RBC materials, it is of an intensity and wavelength that may cause ocular damage.

Blue light hazard
Retinal blue light sensitivity has been identified in the literature for decades. Dental operator’s eyes are at risk from acute and cumulative effects of blue light. Increased use of optical aids such as magnifying loupes, increases the image size which may increase the risk of retinal hazard.

Study set up
A VALO blue-light emitting LCU from Ultradent was selected for the experiment. Absolute irradiance from 422 to 525 nm was measured using an Ocean Optics Flame Spectrometer and Ocean View’s Software. A cosine corrector optical diffuser with a 3.9 mm diameter was used to collect signal from 180° field of view. An external National Institute of Standards and Technology (NIST) standard light source was used to calibrate the spectrometer at the beginning of the experiment. The LCU and the spectrometer were rigidly mounted on an optical bench (Fig. 1).

Two different types of telescope lenses were used: Keplerian (Expanded Field) and Galilean. Lenses were obtained from Designs for Vision, Inc and for each type of telescope, three different magnifications were used (Table 1).

In order to measure the effects of viewing the LCU through magnification loupes, the loupes were positioned 45.7 cm away from the teeth and the LCU. The spectrometer was placed 13 mm behind the loupe to simulate the working distance behind the mounted loupes and the eye in a clinical situation. A sub-analysis with the spectrometer directly in contact with the loupe at a variety of distances up to 2.5 mm revealed this placement was critical, in particular for the expanded field design.
The study was designed to mimic a blue light exposure with a LCU similar to a clinical experience. For the first configuration, measurements were taken five times for each of the lenses with the LCU directed toward natural teeth to evaluate reflected blue light (Fig. 2). Additional measurements were taken for a second configuration with the curing light positioned behind the lingual surfaces of natural maxillary incisors to simulate accidental direct exposure that may occur in that scenario (Fig. 3).

**Study outcomes**

We found that the amount of integrated irradiance measured by the spectrometer through the loupes varied considerably with configuration and type of loupes. There was no clear trend that a larger or smaller magnification resulted in more light transmission with the most light being transmitted by the 4.5x Keplerian lens and the least light by the 4.5x Galilean lens. More light was observed at the corneal plane for all lenses except for 4.5x Galilean (Table 2).

To further understand the trends with telescope type and magnification, we applied two normalization factors. The first was to account for the area of the objective lens because larger collecting optics will result in more light entering the system. The second factor accounted for the relative solid angle subtended by the lens as they each had a different field of view. A lens area factor and a solid angle factor, which are intended to normalize the lenses to an average objective diameter and average field of view, were calculated. When these two correction factors were applied to the raw data, clear trends were observed for each telescope type (Fig. 4).

The distance to the telescope matters and results in drastically different results for the Keplerian telescopes compared with the Galilean telescopes. To study this, the absolute irradiance was measured when the spectrometer was in contact with the loupes and at distances of 13 mm and 25 mm behind the loupes. The data indicated there was a significant difference between telescopes, with the Keplerian telescopes increasing in irradiance at a distance of 13 mm compared with contact and one inch and the Galilean telescopes abruptly decreasing at a distance of 13 mm and remaining relatively stable in the transition from 13 mm to 25 mm.

The difference is at least partially explained by a significant difference in optical design between the two telescopes, which results in an external exit pupil for the Keplerian design around 13 mm behind the ocular lens, resulting in additional light being measured by the spectrometer. This significant difference means the two telescope designs should be considered separately (Fig. 5).

What this means

Magnification lenses are a vital part of a dental armamentarium. The literature posits the benefits of increased visual acuity, increased productivity, as well as the improved quality of dental care and reduced fatigue and injury.27-31 It is reported that prism loupes have improved magnification, longer working distance, a larger field of view as well as a wider depth of focus.13 Exposure to the risk of blue-light from an LED source can occur in two ways: either from looking at an irradiated scene or directly viewing the light source. During dental procedures, the operator may be directly exposed to a blue light source such as when working on the anterior teeth and a portion of the light-curing tip is not covered by the teeth and the eyes are directly exposed. More commonly, blue light exposure occurs during photopolymerization either as a reflected or transmitted source (Fig. 2).

A study of more than 748 dentists reported that almost one-third of dentists used what would be considered as inadequate eye protection against blue light exposure during dental procedures.7,8,33,36 Almost 20 percent of study participants used a LCU mounted shield, while approximately 8 percent looked away from the light.

Eye aversion to bright light is a natural response that may limit the exposure time to less than 0.25 seconds.24,35,36 Unfortunately, blue light from an LCU may not induce the same protective response and thereby increase blue light exposure time due to a delayed pupil constriction response. Furthermore, the operator is trained to watch to make sure they align

**Table 1 The specifications of the telescope lenses used in this research.**

<table>
<thead>
<tr>
<th>Lens (magnification/type)</th>
<th>Objective Diameter (mm)</th>
<th>Field of View (deg)</th>
<th>Focal Length (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5x Keplerian (Expanded Field)</td>
<td>14</td>
<td>14.0</td>
<td>45.7</td>
</tr>
<tr>
<td>4.5x Keplerian (Expanded Field)</td>
<td>21</td>
<td>9.0</td>
<td>45.7</td>
</tr>
<tr>
<td>6.0x Keplerian (Expanded Field)</td>
<td>21</td>
<td>6.5</td>
<td>45.7</td>
</tr>
<tr>
<td>2.5x Galilean</td>
<td>23x15</td>
<td>12.0</td>
<td>45.7</td>
</tr>
<tr>
<td>3.5x Galilean</td>
<td>20</td>
<td>8.0</td>
<td>45.7</td>
</tr>
<tr>
<td>4.5x Galilean</td>
<td>20</td>
<td>6.0</td>
<td>45.7</td>
</tr>
</tbody>
</table>
Clinical Design has a real exit pupil, which can account for this increase in absolute irradiance. The first increase and then decrease with increasing distance behind the loupes. The Keplerian Galilean designs quickly decreasing in absolute irradiance whereas the Keplerian designs of the telescope and the spectrometer for the two magnifications in common between the

<table>
<thead>
<tr>
<th>Lens (magnification/type)</th>
<th>Configuration 1 (microW/cm²)</th>
<th>Configuration 2 (microW/cm²)</th>
<th>Average (microW/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5x Keplerian (Expanded Field)</td>
<td>49.82</td>
<td>192.88</td>
<td>121.35</td>
</tr>
<tr>
<td>4.5x Keplerian (Expanded Field)</td>
<td>123.62</td>
<td>548.87</td>
<td>336.24</td>
</tr>
<tr>
<td>6.0x Keplerian (Expanded Field)</td>
<td>13.56</td>
<td>73.98</td>
<td>43.77</td>
</tr>
<tr>
<td>2.5x Galilean</td>
<td>44.78</td>
<td>210.68</td>
<td>127.73</td>
</tr>
<tr>
<td>3.5x Galilean</td>
<td>37.39</td>
<td>425.11</td>
<td>231.25</td>
</tr>
<tr>
<td>4.5x Galilean</td>
<td>2.65</td>
<td>16.26</td>
<td>9.45</td>
</tr>
<tr>
<td>No Lens</td>
<td>12.17</td>
<td>61.77</td>
<td>36.97</td>
</tr>
</tbody>
</table>

Figure 4 Average Normalized Irradiance vs. Magnification. The integrated irradiance was normalized to account for the size of the telescope objective (entrance pupil) and the field of view.

Figure 5 Absolute irradiance measurements with increasing separation between the back of the telescope and the spectrometer for the two magnifications in common between the Keplerian and Galilean designs. There is a clear difference between designs here, with the Galilean designs quickly decreasing in absolute irradiance whereas the Keplerian designs first increase and then decrease with increasing distance behind the loupes. The Keplerian design has a real exit pupil, which can account for this increase in absolute irradiance.

The curing light to the tooth being treated to assure ultimate cure of the restorative material. Clinicians who avert their eyes run the risk of not correctly aligning the curing light to the restoration, possibly leading to inadequate photopolymerization of the restorative material.

Light wavelengths of under 400 nm are absorbed by the lens of the eye and do not reach the retina. Blue spectrum radiation can reach the retina and in the young eye ocular transmittance can be close to 90 percent at 450 nm. Blue light damage may be resultant to a phototoxic process causing injury to the pigmented epithelium and choroid of the retina. The extent of retinal injury is dependent on the efficiency of the antioxidant system. Dental professionals who have undergone cataract removal would be more susceptible to damage from blue-light exposure.

Several studies identified the cumulative character of light damage to the eyes. Interestingly, a study found that three and four exposures of five minutes duration followed by a one-hour dark interval led to significantly more damage. Such light dose fractionation can elicit a more harmful effect than the same dose of light without interruption. This may be of particular concern for dental personnel because of the repetitive use of the LCU throughout the day.

Based on the results of this study, the use of expanded field Keplerian dental loupes 13 mm from the magnification of dentists in the clinical setting reported 57.5 percent of their working day was spent placing light cured restorations.

One-fourth of dentists use the shield mounted to the curing light for eye protection. However, these shields may not be beneficial as the only form of protection as they are too small to protect against light spreading in all directions. Blue-light filtering spectacles cause a reduction in the transmission of light below 500 nm to less than 1 percent. Another option for safety is a paddle designed filter to protect the eyes of clinicians.

Conclusion

Blue-light hazard is the potential for retinal injury due to high-energy short wavelength light and is greatest at 440 nm. Most LCUs emit in the 350–450 nm wavelength range and the absolute irradiance received by the eye may be greater with expanded field telescopes. Lack of eye movement and focus while using magnification may increase the potentially damaging effects of greater radiant exposure to the retina.

Whether or not they are wearing loupes at the time, dental professionals should protect their eyes when using LCUs. Protective spectacles or paddles designed to filter out the harmful wavelengths should be used.

Acknowledgements

Special thanks to Midwestern University – Arizona for supporting our research and Designs for Vision, Inc. for providing telescopic lenses used in the study. Also thanks to Allen Tang who was a student of Midwestern University at the time of the study for his assistance.

*For references please view the online version at dentalproductsreport.com
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HOW TO ENSURE RADIATION EXPOSURE IS LIMITED FOR PEDIATRIC PATIENTS

Strategies and approaches to protect your youngest patients who are the most vulnerable to radiation exposure. [by Juan F. Yepes, DDS, MD, MPH, MS, DrPH]

Recomendately, there is an increase concern in the public and health professionals about exposure to radiation (medical and dental) in children. In 2007, the International Commission on Radiation Protection changed the calculation of the effective dose from ionizing radiation, and this change revived interest in the concept of As Low As Reasonably Achievable (ALARA). The individual risk from dental imaging is small when compared to the benefits it can provide through helping with accurate diagnosis. Still, unnecessary radiation exposure during dental procedures should be avoided. This is critical in children. Children are more sensitive to radiation. They have more rapidly dividing cells that can be exposed to low-level of radiation. The main goal of this article is to understand the importance of radiation safety in the practice of dentistry with children and important measures to attain this goal.

Children are more sensitive to radiation

In comparison with adults, children are inherently at greater risk of cancer induction from radiation exposure. Sensitivity to radiation is higher early in life. The greater sensitivity in children is probably related with a rapid cell division in developing tissues. The radiation exposure from a single dental diagnostic procedure is usually small. Because of the increased lifetime risk per unit dose for children, the potentially higher doses, and the increasing frequency of pediatric radiology procedures—including dental procedures—can lead to a small, but non-negligible, increase in risk of cancer. While these procedures are clearly beneficial, the magnitude of exposure of children can often be reduced without significant loss of information.

The Alliance of Radiation Safety in Pediatric Imaging is a coalition of different and numerous health care organizations dedicated to providing safe, high-quality pediatric imaging.1 The main mission of the Alliance is to create and increase awareness in the imaging community of the need to adjust radiation dose when imaging children.

The Image Gently Campaign®
The American Academy of Oral and Maxillofacial Radiology, the American Association of Oral Maxillofacial Pathology, The American Academy of Pediatric Dentistry, The American Dental Association, the American Association of Oral and Maxillofacial Surgeons, The American Association of Endodontists and The American Association of Orthodontists are part of the alliance. The Image Gently Campaign in dentistry focuses on improving safety and effectiveness in pediatric imaging of the maxillofacial complex by informing dental professionals and parents about radiation safety best practices. The campaign outlines 7 steps during pediatric dental procedures:

- Select x-rays for individual needs, not merely as a routine
- Use the fastest image receptor possible
- Collimate the beam to areas of interest
- Minimize retakes
- Always use thyroid collars
- Child-size exposure time
- Use cone-beam CT only when necessary

Justification for radiation exposure

Justification refers to the pertinence of each radiograph performed. There are no limits in the exposure when there is a clear justification. The clinician has the responsibility to assure each exposure is justified. If the image is indicated, there are no limits or restrictions on patient exposure.2 In the pediatric patient, as well as with adults, radiology is part of the diagnostic process, but it is not the only piece of the diagnostic diagram. The decision is made on the findings from the patient history, clinical examination, and review of any previous radiographs. Critical is also the particular circumstances of each patient. For example, a bitewing radiograph is probably not justified in a child with posterior open contacts. The critical point is the dentist must take the individual characteristics of the patient into account when making radiography decisions. The anticipated individual benefits must be that the radiographic examination is likely to add new information to the patient’s treatment. The American Academy of Pediatric Dentistry endorsed the selection criteria guidelines published by the American Dental Association.3

Using the optimal X-ray receptors

The adoption of digital intraoral imaging receptors—solid-state sensors and reusable phosphor plates—has been slow but steady in the United States. These faster receptors have been adopted primarily to reduce patient dose, improve overall image quality by eliminating chemical processing and to increase office productivity, which are all positive goals. It is recommended that all dental practices should adopt digital intraoral X-ray imaging.

Solid-state sensors and reusable phosphorous plates will reduce patient X-ray dose the most, compared with conventional films.4 Reusable phosphor plates (PSP) are similar in size to the conventional films. In young patients, PSPs can be easier to position in the oral cavity and more comfortable for the patient. Furthermore, PSPs are associated with fewer retakes in the young patient, which translates to less radiation exposure.

In 2006, it was estimated by an NIDCR committee... there were approximately 750,000,000 dental X-rays performed annually. It is estimated the number would be well over 1 billion dental X-rays annually now."

Unfortunately, because the images from solid-state detectors can be seen immediately, it is recognized that many operators often take multiple images in order to select “the best” when working with solid state sensors. This practice defeats the intent of reducing dose to the patient.

All dentists in all dental practices must re-educate and instruct their dental assistants in proper positioning techniques and safe radiographic imaging practices to eliminate retakes and reduce patient X-ray dose. In 2006, it was estimated by an NIDCR com-
mittee looking for large data sets for research in osteoporosis, there were approximately 750,000,000 dental X-rays performed annually. It is estimated the number would be well over 1 billion dental X-rays annually now. It has also been reported that 7 percent to 13 percent of all dental X-rays are retakes. That means that there are more than 100 million unnecessary dental X-rays taken every year in the US. This is a conservative estimate that only documents the known retakes.

The benefits of rectangular collimation
Several ways to limit the size of the X-ray beam are available. The National Council on Radiation Protection and Measurements (NCRP) Report 145 (2003) provides radiation protection guidance for the use of X-rays in dental practice. The NCRP was chartered by the U.S. Congress in 1964 to perform several tasks related with the use of radiation, including to periodically assess new technologies and radiation safety practices in order to make recommendations.

By following the report, dentists and patients can obtain maximum benefit and minimum radiation exposure. Rectangular collimation has been widely available for several decades. Several U.S. dental schools recommend the use of rectangular collimation. However, there is not a significant acceptance in the dental office.

Using the appropriate collimation to the precise size of the image receptor eliminates scatter radiation. When scatter radiation hits the receptor, the result will be a reduction in image quality. Most companies produce large, round cones with large X-ray beam patterns so the operator will be sure to expose the film or receptor.

Round collimation adds scattered radiation, decreases the image quality, and increases the patient radiation dose. The NCRP Report 145 suggests rectangular collimation of the beam be used routinely for periapical radiography. Each dimension of the beam, measured in the plane of the image receptor, should not exceed the dimension of the image receptor by more than 2 percent of the source-to-image receptor distance.

There are several advantages of rectangular collimation over round collimation in terms of reduction of the radiation dose to the patient and increased contrast and clarity of the image. The general reduction of the effective dose using rectangular collimation is close to 35 percent.

The other advantage of rectangular collimation is the reduction of scatter radiation and the increase of the image contrast. Scattered radiation adds unwanted and non-diagnostic photons to the image and that decreases the contrast. Peterson and collaborators compared the image quality between bitewings taken with rectangular collimation and round collimation in terms of caries detection. Results showed the films taken with rectangular collimation ranked higher for film resolution, overall appearance and accuracy of caries diagnosis.

There are reports that suggest the use of rectangular collimation may result in more retakes. Thornley et al looked at the retake level using rectangular collimation in a group of general practitioners. They found the use of rectangular collimation increased the number of retakes by 7 percent with a significant reduction in the radiation dose to patients.

Parrott and Ng studied if the use of rectangular collimation was associated with cone cut errors that could adversely affect the diagnostic capability of the film. They found that the use of rectangular collimation increased the incidence of cone cuts. However, the errors considered “rejects” was very small. They also concluded that use of film holders helps in reducing the incidence of errors. Parks also looked at the errors produced by the use of rectangular collimation and found more errors are associated with the use of rectangular collimation. However, the majority of errors were not significant enough to generate a retake.

Converting to rectangular collimation
Several methods are available to convert an existing round collimation into rectangular collimation. Probably the easiest is by inserting a rectangular collimator at the end of the round cone (Figures 1-4). The other two methods include the use of rectangular cone or the use of a position-indicating device.
with the round cone and which collimates the beam at the skin surface. Collimating the X-ray beam does not affect the settings for conventional or digital films. It is important to reaffirm the critical role of film-holding and beam-alignment device to decrease the frequency of errors including cone-cuts and retakes. Several dental companies offer different options to convert existing round collimation into rectangular collimation.

Conclusion
Radiographs are critical components of the diagnostic process. However, the use of X-rays carries a small risk of radiation exposure. Children are more radiosensitive than adults. Decreasing radiation exposure to children and producing consistently high-quality radiographic images are critical goals of any dental office.

Several organizations, including the American Dental Association and the American Academy of Oral and Maxillofacial Radiology, recommend the use of rectangular collimation for periapical and bitewing radiographs in order to reduce further radiation exposure and dose to children. The use of PSP in children is advised, similar size to conventional films and easy positioning in the mouth are factors that decrease the number of retakes.

Even with clear advantages in terms of dose reduction and better image quality, rectangular collimation has not been widely used in practice. Critical issues related with an easy transition to rectangular collimation include the use of positioning devices, use of rectangular collimators that can be inserted at the end of round tubes and the review of the paralleling technique.

Dentists are responsible for protecting children from excessive radiation by regularly updating the equipment, reexamining practices and techniques, and following recommendations for standards of care. Further studies must look at the specific reasons of the underutilization of rectangular collimation and creating strategies to increase use.

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Dental zirconia (ZrO₂) is the oxide version of zirconium (Zr). Zirconium esthetics are essential. Thin restoration walls and natural situations where high mechanical stability, translucency suitable for clinical situations—today’s new zirconia materials—demonstrate acceptable esthetics and that can be milled to full contour and ties—today’s new zirconia materials (4Y-TZP) have become available to meet dentists’ different functional and esthetic demands. Differentiated by a number of factors—including composition, mechanical and optical properties—today’s new zirconia materials offer dentists and laboratories solutions that can be milled to full contour and demonstrate acceptable esthetics and translucency suitable for clinical situations where high mechanical stability, thin restoration walls and natural esthetics are essential. What is dental zirconia? Dental zirconia (ZrO₂) is the oxide version of zirconium (Zr). Zirconium occurs in nature only as a mineral—mostly as zircon (ZrSiO₄)—and is a soft, ductile, shiny-silver metal, optically similar to aluminum foil.¹,² To produce dental zirconia, zircon is purified via complex production and purification processes and converted into synthetic zirconium precursors, which are finally transformed into ZrO₂ through thermal and mechanical processes. These are the only synthetic powder components used to make dental zirconia.¹,³ Zirconia is polymorphic ceramic; depending on temperature and pressure, the same elements of the material exist in three different crystal structures (i.e., monoclinic (m); tetragonal (t); and cubic (c)) (Fig. 1). Pure monoclinic zirconia, the most stable phase, is present at room temperature. At about 1,170°C, the monoclinic phase transforms into the tetragonal phase, with an approximately 4 to 5 percent volume shrinkage. At about 2,370°C, the tetragonal phase then converts into the cubic phase. These transformations occur within a temperature range (rather than at a specific temperature) and involve movement of atoms within the crystal structure. The tetragonal and cubic phases of zirconia can be made stable at room temperature by incorporating additional components (dopants), such as yttrium oxide (Y₂O₃), calcium oxide (CaO) or magnesium oxide (MgO) into the ZrO₂ crystal structure to form partially or fully stabilized zirconia.¹,³ Without the addition of these components, tetragonal converts back into a monoclinic below 950°C and, hence, cannot be used clinically. Low amounts of these dopants lead to partially stabilized zirconia, with mainly metastable tetragonal and cubic phases.¹,³ For example, how much dopant in molar concentration is used in a zirconia is abbreviated by Y₂O₃ for 3 mol percent Y₂O₃; 4Y-TZP as 4 mol percent Y₂O₃; or 5Y-TZP as 5 mol percent Y₂O₃. When approximately 4.5 to 6 weight percent (3 mol percent or 3Y-TZP) yttria is added to a structure, a 100 percent tetragonal phase (traditional dental zirconia) can be produced at room temperature. When approximately 9 to 10 weight percent (5 mol percent or 5Y-TZP) yttria is added, a structure of 50 percent tetragonal/50 percent cubic phase (known as cubic or HT zirconia) can be produced at room temperature. When these powders are mixed, an approximately 6.5 to 8 weight percent yttria containing zirconia can be produced (4 mol percent or 4Y-TZP) giving a microstructure of 75 percent tetragonal and 25 percent cubic (Table 1). Table 1 – Dental Zirconia Classification The composition of zirconia material defines its mechanical and physical properties and hence clinical indications. The biaxial flexural strength of zirconia materials ranges from 650 MPa (3Y-TZP) to 1,200 MPa (3Y-TZP). The higher the value, the stronger the material. In addition, the presence of polymorphic phases in zirconia materials provides a phenomenon known as phase transformation toughening. It causes the tetragonal crystals to change to monoclinic when a crack is introduced. The monoclinic phase has a greater volume. This stops the crack from traveling through the material, basically pinching the crack shut and, hence, further increases resistance to fracture (Fig. 2). No phase transformation toughening can be observed in 3Y-TZP materials. Lastly, the translucency of 3Y-TZP is comparatively lower than 4Y-TZP and 5Y-TZP which is the most translucent, resulting in a decision-making tree for clinical indications and cementation procedures. Ensuring success with different zirconias As discussed earlier, the obvious disadvantage of new higher translucency and more esthetic ZrO₂ materials is a reduction in the mechanical properties (e.g., lower fracture toughness, lower strength). There is a growing interest in using zirconia for fabricating monolithic, full-contour restorations—particularly different generations that demonstrate new levels of optical and mechanical properties to meet dentists’ demands. The composition, mechanical properties, optical characteristics and processing of these new zirconias are different from previous generations of the high-strength material.⁴,⁵ Currently, newer generation cubic - 5Y-TZP (e.g., Cubex2) or hybrid - 4Y-TZP (e.g., CubeX2) or hybrid -
**Table 1: Dental Zirconia Classification**

<table>
<thead>
<tr>
<th>3Y-TZP Zirconia 4.5 – 6.0 wt percent Y₂O₃</th>
<th>4Y-TZP Zirconia 6.0 – 8.0 wt percent Y₂O₃</th>
<th>5Y-TZP Zirconia 9.0 – 10.0 wt percent Y₂O₃</th>
</tr>
</thead>
<tbody>
<tr>
<td>~100 percent Tetragonal phase*</td>
<td>~75 percent Tetragonal phase*</td>
<td>~50 percent Tetragonal phase*</td>
</tr>
<tr>
<td>0 percent Cubic phase*</td>
<td>~25 percent Cubic phase*</td>
<td>~50 percent Cubic phase*</td>
</tr>
<tr>
<td>HIGHEST Mechanical Properties (~1,200 MPa)</td>
<td>HIGH Mechanical Properties (~850 MPa)</td>
<td>LOWEST Mechanical Properties (~650 MPa)</td>
</tr>
<tr>
<td>LOWEST Translucency</td>
<td>HIGHER Translucency</td>
<td>HIGHEST Translucency</td>
</tr>
</tbody>
</table>

* Tetragonal phase helps with fracture toughness and strength while the Cubic phase helps with translucency.

4Y-TZP (e.g., IPS e.max ZirCAD MT) zirconia materials are limited to single-unit restorations, or to three-unit bridges. These zirconias exhibit improved translucency for esthetic full-contour (i.e., monolithic) restorations, but they demonstrate lower mechanical properties and a reduction in strength and fracture toughness compared to some other restorative materials. This may limit their use to certain indications, wall thicknesses and connector dimensions.

The 3Y-TZP zirconia materials (e.g., IPS e.max ZirCAD LT) are indicated for single-unit restorations to multi-unit bridge frameworks with a maximum of two pontics. These materials demonstrate high-strength, excellent mechanical properties and a low risk of temperature degradation; however, they exhibit a slightly lower level of translucency.

The newest generation of zirconia restorative material (IPS e.max ZirCAD PRIME) has been introduced with a unique gradient technology (Fig. 3). This technology allows gradation of 3Y-TZP and 5Y-TZP material in one puck, ensuring the strength of 3Y-TZP and esthetics of 5Y-TZP.

**Proper preparation**

Clinicians should follow tooth preparation guidelines specific to their selected zirconia restorative material. It is also critical for both clinicians and dental laboratory technicians to consider the differences in properties among zirconia materials when selecting the ideal zirconia for a specific clinical indication.

Preparation guidelines for 3Y-TZP zirconia materials range from 1.0 mm to 0.5 mm occlusal and axial reduction, whereas for 4Y-TZP and 5Y-TZP zirconia restorative materials, they range from 1.5 mm to 1.0 mm reduction (Fig. 4). Additionally, the connector dimensions for bridges vary from 12.0 mm² for 5Y-TZP and 4Y-TZP materials, compared to 7.0 to 9.0 mm² for 3Y-TZP zirconia materials.

**Optimal adhesive protocols**

Further, although there are various cementation options available for use with zirconia restorations (e.g., conventional, self-adhesive and adhesive cements), it is important to remember that the actual technique—and diligently following its protocol—also influences clinical restorative success. Clinicians often use conventional cements such as resin modified glass ionomers or glass ionomers when placing zirconia restorations, due to their ease of use. However, the limited bonding properties of conventional cements restrict their use in non-retentive tooth preparations.

The common myth is zirconia material cannot be chemically bonded. However, it is well cited in the literature that zirconia restorations can be adhesively cemented if proper steps are followed. To ensure successful cementation, the following critical protocol should be implemented with zirconia restorations. Avoiding any step in the cementation protocol will compromise the clinical outcome.

1. Zirconia restorations cannot be chemically etched. Traditional dental etching procedures are preferential and involve etching away the open glass phase structure in glass-ceramic restoration, such as IPS e.max lithium disilicate; this leaves the crystals, because zirconia has no secondary glass phase. Therefore, sandblasting the intaglio surface of a zirconia restoration using Al₂O₃ particles (50 μm) at 1 bar pressure—which is usually performed by the dental laboratory—roughens the zirconia surface to increase micro-retention for improved bonding.

2. After a try-in of the zirconia restoration in the patient’s mouth, it should be cleaned. Zirconia surfaces show a high affinity for phosphate groups, and saliva and other body fluids contain various forms of phosphate (e.g., phospholipids) that may react irreversibly with the restorative surface and compromise bonding.

This also contraindicates the use of phosphoric acid on zirconia restorations. To clean zirconia restorative surfaces after try-in and create an optimum surface for adhesive bonding compared to other cleaning protocols, a unique
3. The cementation of zirconia restoration can be performed using an adhesive cement (e.g., Variolink® Esthetic, Multilink® Automix) or a self-adhesive cement (e.g., SpeedCEM® Plus). The cementation protocol includes application of primer on the restoration, followed by the use of cement. Unlike glass-ceramic bonding, which uses silane bonding, zirconia bonding uses phosphate end groups to bond. The use of primers containing phosphate end groups, or cements containing MDP (10-methacryloyloxydecyl dihydrogen phosphate), is recommended for achieving the best bonds to the tooth structure (Fig. 6). The MDP-containing ceramic primers (e.g. Monobond Plus) should be applied on the restoration followed by extrusion of adhesive resin cement in the restoration. Because few self-adhesive resin cements (e.g., SpeedCEM® Plus) contain MDP, the application of restorative primer as a separate step can be eliminated.

4. Finally, cement is extruded in the restoration; the doctor should seat it per path of insertion, followed by polymerization of the cement per the manufacturer’s recommendation.

5. Lastly, the translucency of the zirconia restorations depends on the material’s composition and thickness, and hence light attenuation through the restoration varies. Therefore, it is critical to consider these factors while selecting the cement options. For opaque restoration, use of self-cure and dual-cure cements are recommended, and it is extremely important to let the cement set on a self-cure mode before checking occlusion or making occlusal adjustments.

REFERENCES
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THE POWER ISSUE:
HOW DENTAL PRODUCTS CAN EMPOWER A PRACTICE

How different dental products give clinicians and practices the superpowers they need to provide optimal care and promote business success.

[By Robert Elsenpeter]
An important element of power is balancing the notions of better, faster and safer, all while being both a responsible clinician and business owner.

“Maybe that even means how I utilize my team,” Dr. Jason Goodchild, DMD, director of clinical affairs for Premier Dental observes.

“So, for me, I think an overarching theme of ‘power’ is how to marry all of these things to achieve that—which results in better patient care and better business outcomes.”

Powers—and the benefits reaped by both clinicians and patients—are achieved through any number of properties, and they can be personified by some specific superheroes.

When Dr. Bruce Banner was accidentally exposed to an extreme amount of gamma radiation, the result was the creation of his alter ego, The Hulk. The Hulk’s superpower is his incredible strength. Strength in the dental office comes in many forms, from restorative materials’ potency to the power achieved by equipment.

MATERIALS
An age-old concern for dentists (and patients, alike) is a restorative material’s strength. For instance, dental zirconia dates back to the 1980s, but only in the last decade or so has it become a leading fixture in restorative materials.

“Technology has been evolving over the past few years, and as it is evolving, dentistry is rapidly adapting to it. This is co-evolution,” Dr. Srid Janyavula DMD, MS, dentist and manager, global clinical affairs, Dentsply Sirona says. “We are another step closer to the intersection of biology and technology. Today, we have stronger multi-purpose materials that didn’t exist a decade ago, and these advancements came in stages that we couldn’t have predicted in the past. This new age of stronger materials are shaping what we do and how we do dentistry—a modernized reset to our clinical decision-making, except for being better. They empower the clinician’s and the patient’s choices to better address the clinical needs with well-informed decisions and manage the expectations better than we were able to do before. This is just a glimpse of the digital future and we are at the cusp of experiencing the greatest burst of innovation and simplification in the human history.”

Stronger materials mean more treatment options.
“A stronger material simplifies everything from tooth reduction to bonding protocols and inventory,” Dr. Janavyula says. “They fundamentally can break free from the long held binary view of restorability/non-restorability by saving more tooth. This led to a new era of bulk filling materials, stronger translucent zirconia, chairside fabricated prostheses and functional clear aligners, etc. And, ultimately, through enhancing the patient’s experience, reducing the chairside time and making procedures affordable it is a win-win, both for the dentists and for the patients, at the same time.”

That notion of strength need not apply to just fracture resistance or some high number on the chart. Strength should also mean resilience, flexibility and clinical adaptability. “I think, perhaps, another idea is finding materials that don’t degrade in the mouth; to preserve strength, in other words,” Dr. Goodchild says. “Take bonding agents as an example. What if you didn’t need the bond strength to start so high, and you find a way to make bond integrity last longer? A potential strategy could be to stabilize bond strength and prevent degradation, so these adhesive agents are better able to hold up within the mouth. Everybody who ever practiced knows that everything you place in the mouth will fail. Maybe the idea of using stronger materials is the belt and then engineering them for improved compatibility is the suspenders for improved longevity. An interesting next step may be to consider the impact of bioactivity and biocompatibility of dental materials in clinical outcomes and longevity.”

**STRENGTH ENOUGH?**

Every year, materials seem to get stronger and stronger. But at some point, are the materials strong enough? In other words, is having the strongest material simply a manufacturer’s bragging rights?

“When we talk about the strength of a dental material or the strength of the bond between dental materials and the tooth, we always look for the tallest bar on the chart,” Dr. Nathaniel Lawson, DMD, director of the division of biomaterials at the University of Alabama at Birmingham School of Dentistry says. “But at some point we can ask ourselves, ‘What number is high enough and when does increasing strength further produce no additional benefit?’

“There are a couple ways to look at that question,” he continues. “First, you can compare strength values to materials that have historically performed well. For instance, it takes a similar force to fracture the porcelain off of a 1.5 mm PFM crown as it does to fracture a 1 mm thick zirconia crown. Since we consider PFM crowns to be a reliable treatment with a long track record of success, we could expect similar results from a zirconia crown at 1 mm thickness. Another option is to compare strength values to those found in nature. So, if you want to know what force should a crown achieve prior to fracture, you can suppose that an average chewing force on a molar can range between 20-80 N (approximately 5-20 lbs.) and maximum clenching forces can reach as high as 400 N (approximately 100 lbs.). High strength ceramic crowns, such as lithium disilicate or zirconia, can resist fracture up to loads around 3,000-5,000 N (750-1,250 lbs.).”

“It’s something that in research we’ve referred to as ‘tall bar syndrome,’” Dr. Goodchild adds. “Which is, if I’ve got the three different materials and I show you data about their strengths, your preference always goes to the one that has the tallest bar. And is that really the right way of evaluating the material—just based on one physical property, but maybe the totality of what that material can do.”

At some point, even more important than materials’ strength is how doctors elect to use them. “Sometimes innovation is about coming out with new products, but today it’s about popular ways to use the same product in different clinical situations,” Dr. Janavyula says. “We have, unambiguously, more than one ideal material for every clinical application, but the question is, how are we truly deploying their strength in challenging clinical situations and, even better, by understanding how we are using them in preserving the tooth structure and reduce the unused inventory? Trying to use complete product systems, like class II procedural solutions, single unit crown solutions and CEREC solutions, in which the products are thoughtfully designed and meticulously analyzed to work together, can amplify the benefits than using individual products and fragmented solutions. They can be seamlessly used in the right workflows, crucial for less disruption and clinical success. There is necessarily no need to make even stronger materials—it’s just how you understand the science, apply them in a gamut of clinical situations and how these procedural solutions provide long term value is most important now.”

**EQUIPMENT**

Equipment, such as handpieces, must deliver the kind of power that dentists need. In some capacities, however, the power of given equipment delivers on several fronts. For instance, Dr. Christina Do, DDS, a general dentist at Smiles4OC in Costa Mesa, California, says she has achieved different forms of power, thanks to her Waterlase laser from BIOLASE.

First, it performs its primary purpose as a piece of clinical equipment. “I use the laser on virtually every patient who needs dental procedures,” she says. “It can be gum tissue needing trimming or a cavity that needs to be removed, conservatively; the laser is my go-to instrument. Any patient who needs some form of dental procedure, I’ll find a way to use it on them. Through years of using it, I know patients have less postoperative discomfort and better healing by using that laser.”

Not only has it been an effective dental instrument, but it has also served as a means of developing her practice. “It gives me the power to promote my career and to do dentistry in a different, more modern day, technological way,” Dr. Do says. “It allows me to market myself as a dentist with a better way of treating my patients. I market myself as a dentist who could do fillings without anesthetics for patients who have higher anxiety or patients who have sensitivity. In that regard, it has been—and continues to be—a powerful practice builder for me.”

**THE SUM OF ITS PARTS**

“Power isn’t simply a measure of one metric. All of the equipment’s features and functions must work together to deliver muscle, effectiveness and control.”

“When it comes to rotary cutting instruments, especially dental high-speed handpieces, the cutting efficiency translates to ‘power,’” Alfred Hayrapetian, product manager, NSK America Corp. says. “Either with air or electric handpieces, that power is always the combination of the rotational speed and the torque. With more power you can cut faster, with less pressure and fatigue in your hands. For a dentist, it’s not important how fast the bur rotates, but it does matter how fast the bur cuts the hard ceramic or zirconia. For example, with air-driven highspeeds, normally the bur rotates faster than electric highspeeds, but their cutting power is much less. Because electric handpieces, in general, have higher and more consistent torque than air-driven, which means they are more powerful handpieces.”

Hand-in-hand with that notion of strength, handpieces must also be controllable.
“Higher cutting power is always appreciated by a dentist, especially for cutting some of the new all-ceramic or zirconia crowns,” Hayrapetian says. “Therefore, there is no such thing as too much torque or a too-powerful handpiece. However, that power should come with a smart control system, resulting in safety and accuracy of cutting to reduce trauma to the healthy tissue. Controlling the speed is needed for quality and to bring speed to cutting for all sorts of different procedures. With the NLZ electric system and Z-series handpieces, you can control the speed very precisely, and also make sure the safety functions are in control. We always need equipment which cut the modern hard materials easier, better, faster.”

Design and ergonomics must not be overlooked when considering a piece of equipment’s power.

“Apart from control factor, what matters most is the dimension of handpieces,” Hayrapetian says. “Head and neck size of the handpiece should be small enough to create better access and visibility during operation and allow dentists to get into hard to reach areas easily for fast and accurate cutting. The handpiece and motor should be as lightweight as possible to avoid causing fatigue in user’s arm and shoulder. Dentists appreciate a lightweight and perfectly balanced handpiece and motor combination.”

speed’s power is manifested by faster, more efficient tools and processes. Speed can encompass such elements as how fast a material polymerizes, the rotational speed of a handpiece or how soon CAD/CAM can deliver a completed restoration.

BALANCE

On the surface, speed seems like a good thing. That is, the faster something is accomplished, the happier the clinician and the patient. However, drill a little deeper, and speed comes with some caveats.

“It is good, as long as it equals quality,” Dr. John Flucke, DDS, technology editor for Dental Products Report says. “A friend of mine once said to me: ‘Speed, quality, price – you can pick any two’. With healthcare, speed and quality are the two important pieces. You may have to pay a little bit more, as the doctor, to get into something that provides speed and quality, so that price may not necessarily be there.”

But, for many aspects of the dental practice, speed does improve processes.

“Looking at CAD/CAM and digital impression systems, those have become so amazing,” Dr. Flucke says. “You can send a good clinical case with a chairside impression scanner, really, in less time than it takes to take a traditional impression, and with all the accuracy and all the benefits that entails. In my office, we can scan for a single-unit in four minutes—easily—and the impression material that I use sets up in five minutes. Then you’ve got the other assorted and sundry things that go with that, that take even longer.

“I would also count electric handpieces,” he continues. “They let you work faster with more efficiency, so the amount of time you actually are performing dentistry on a patient is less and they are more precise. But you also have that initial cost outlay of electric.”

But, are those three characteristics – speed, quality and price – coming closer together?

“I think speed and quality are converging a lot and the price is starting to get better,” Dr. Flucke notes. “It’s one thing to pay $5,000 or $10,000 for an electric handpiece system, but it’s another thing when you’re paying between $20,000 and $50,000 for a digital impression system. Those digital impression systems are coming down in price while the quality is going up. We are way past a tipping point on digital impression systems. It’s not, ‘Oh someday if I win the lottery, I could have one of those in my practice.’ It’s to the point now that it’s just, ‘When do you want to get one?’ There are multiple systems on the market that work really, really well, and the price point has dropped to about as low as it’s going to get.”

BENEFITS

Everybody wants dentistry to be faster, better and safer – patients want to spend less time in the chair; doctors want to get more patients on their daily schedules to reduce the waiting time for new patients. Overall, when speed is properly utilized, it can be a huge boon to the practice and the patients.

“It’s actually a combination of everything,” Dr. Janyavula says. “At a fundamental level, speed improves the patient experience and their comfort level with their provider. Treatment acceptance improves as you cut down the appointments that are needed for the patient to come back. As you simplify, you do a lot of productive work in a single appointment with quadrant dentistry, immediate implants and so on. Patients’ expectations are largely shaped by our everyday lives in which we have things delivered to our door at the click of a button, but a dental crown turnaround time stayed stagnant at two weeks. Patients should be provided the freedom to choose a one-visit crown or a lab-fabricated crown, rather than just keeping them waiting for two weeks for a small upcharge to stay relevant.

“Speed in dentistry could mean managing better workflows and...
doing the order of treatments differently,” he continues. “Technology, with continuous learning, is certainly a driver for the speed. There’s no doubt about it.”

Technology, in and of itself, won’t improve the practice’s speed. It requires the doctor’s multi-disciplinary skills and expertise in customizing treatment plans.

“Most importantly, how you’re leveraging the use of this technology to your everyday practice and trying to improve the workflows. That’s important,” Dr. Janyavula says. “You can increase the production by offering specialty procedures safely than ever before with comprehensive planning aided by CBCT and CAD/CAM technology.

“You continuously build confidence and changing the order for procedures; that’s how you do it,” he adds. “Most of this can be accomplished chairside, which just involves taking a different approach than what we’re doing today. Rather than just doing endo first, doing a buildup and a crown after in the traditional workflow, just a change in the order of the same treatment by removing the decay, building up, tooth preparation, scan and mill the crown with CEREC Technology, and perform endo last as the crown is being milled in some clinical situations. You’re cutting it from three or four separate appointments to less than 90 minutes, just by doing it all over the chairside and reimaging the treatment order.”

CONTROL
It may be possible to do things faster, but it’s necessary to ensure that those things are being done with quality in mind.

“A lot of times when we speak about increasing the speed at which a procedure is performed, the term speed has a greedy or sloppy connotation,” Dr. Lawson says. “But in some ways, procedures that are simplified to increase speed may be able to improve clinical outcomes. For example, most chemists who develop bonding agents would probably rather produce a two-bottle bonding agent so they can separate things that don’t belong together, like hydrophobic and hydrophilic molecules. And many of the materials with a long clinical track record have at least two bottles. But two-bottle systems require more time to apply and each step requires specific application instructions.

“Under ideal conditions of treatment, under rubber dam and an operator who is familiar with the nuances of the instructions for use, a two-bottle system would likely produce a better clinical outcome,” he adds. “Recent surveys have shown that only 37 percent of dentists use rubber dams for restorative procedures, and those dentists only use them for 31 percent of their restorations. So, if the dentist is using a one-bottle adhesive, that reduces the amount of time for which it is critical to maintain isolation. Additionally, a one-bottle system also reduces the chance that a dentist confuses an application technique.”

Faster is not necessarily better, especially when a powerful piece of equipment that requires precision handling is concerned.

“The idea is how well can that power be controlled?” Dr. Goodchild says. “When it comes to dentistry, the handpiece is like your paintbrush. Using that handpiece to create these very small cavity preps with a specific geometry and prevention of iatrogenic damage to other teeth or tissue. There must be a balance between that added power, added potential speed or torque with the idea of, ‘Can I still use this as my paintbrush and create all these wonderful shapes with incredible precision at dimensions of one millimeter or less?’ Again, it’s this balance. I think that maybe Spider-Man said it right: ‘With great power comes great responsibility.’

“There’s a marriage of things,” he continues. “There has to be some balance, and when you think about handpieces—especially, air-driven handpieces that can spin it a 250,000 to 400,000 rpm. When it touches the tooth, that decreases the speed. We combated that loss of speed and the decreased torque of air-driven handpieces by developing electric handpieces that spin at a lower rate, but have much increased torque, and maybe even a little less on the noise side.”

Superman is perhaps the best-known superhero, possessing any number of superpowers—but for this discussion, let’s focus on his vision. He is able to see objects from miles away, observe incredible detail on nearby objects and see through and inside objects and people with X-ray vision.

In the dental practice, that power is achieved through loupes, scopes and advanced radiography systems.

AMALGAMATION
Imaging is a vital component of delivering good dentistry, and integrating that with the practice management system provides access to those images in any number of places.

Mike Fillmore, senior marketing manager for Henry Schein One’s Dentrix, illustrates how Dentrix Smart Image facilitates imaging integration.

Fillmore says, “What isn’t widely adopted in the industry yet is that these two softwares (practice management systems and digital imaging systems) should be operating as one, almost like a single system. There should be a communication that happens there. For instance, you wouldn’t hire staff members if they spoke different languages, or didn’t speak at all. It would hurt
MANAGING THE POWER DYNAMIC OF THE WORKPLACE

Like Batman... Iron Man gets his superpowers from his intelligence. But Tony Stark has something with which Bruce Wayne struggles: People skills. That trait is especially useful when managing a team of unique personalities and responsibilities such as The Avengers—or the practice’s staff. Finding the right balance of responsibilities within the practice is a good way to get the best out of that staff.

ROLES
The size of the practice can affect the power dynamic. Single-location practices will have a different power structure than a practice with two or three locations. That dynamic changes when the practice is a DSO.

“The biggest thing for me when I think about power dynamics in the office is really the type of practice,” says Dr. Jason Goodchild, DMD. “Let’s talk about a small mom and pop shop: It’s usually a single dentist, single hygienist, small practice, three or four chairs. You probably still have that kind of a dynamic, which is the dentist being the de facto leader, potentially having an office manager that handles the operations of the dental practice, but the dentist becomes sort of a leader. Maybe it’s single dentist owner, but that is changing, dramatically.

“We are seeing a huge uptick in group practice models and then into a DSO structure,” he continues. “And the hallmark of a DSO structure is decentralized operations, which is that you have part of the business that supports the practice. And that supporting organization could be staffing, marketing, operations, procurement—there are lots of different things. So as practices grow, you’re not a mom and pop shop anymore. For instance, maybe you’ve got five practices. Now, a single dentist can’t really run that. They may have a director or an office manager, where somebody can oversee all of the practices.”

Ultimately, Dr. Goodchild emphasizes that patient care should be the ultimate goal.

“At the end of the day, I think if we focus on the patient’s care and experience as a driver towards a healthy business, then forces align for business success and growth,” he says. “That’s where it has to be. I don’t care if you’ve got 700 offices or just one office. If you don’t provide excellent care and customer experience, dental businesses don’t survive.”

Gender roles can play another factor in that power dynamic, but times seem to be changing.

“In an historical sense, it used to be there were a lot of male dentists and there were a lot of female hygienists and a lot of female assistants;” Dr. Goodchild observes. “And so you have this paternal figure, this is a male figure, as the leader, but that is really not what it is now. And that’s a good thing. I think that lots of different people are in all these different roles, so it’s not that way anymore. There are male hygienists, so the gender thing is going away, and I think that’s great.”

THE RIGHT PEOPLE FOR THE RIGHT JOB
Having the right people in the right roles is key to the practice’s optimal power structure. There are, of course, core jobs for which staff is hired. However, those roles can be dynamic and evolve, based on the staff’s competencies and the practice’s needs.

“I am a big fan of people that know what they’re doing and can do it right,” Dr. John Flucke, DDS, says. “And then just let them get out, let them do that job, get out of their way and let them do what it is they do. For example, we have one dental assistant in my office that we kind of dedicate to the overflow of the office. And those are things like sending in crowns and bridges, doing denture adjustments, taking impressions, things like that. That position is sort of what I call a Super Assistant, because that employee operates with more autonomy, because they’ve got a higher level of education and in a higher degree of clinical skills, and so that helps my office run a lot smoother when somebody can come to me and say, ‘The patient is here to have crown number 30 cemented. I’d tried it on. It fits well. I’ve adjusted the contacts a little bit, everything looks perfect. I just need you to come in and bless it so that we can get this thing submitted.’”

“Most offices do have one or two people that are really mechanically inclined, and there’s no reason that the doctor has to fix everything, or that it’s a simple fix, that somebody needs to call a third-party that costs you more. There are a lot of folks out there that can do those kinds of things. We fluctuate between 10 and 12 employees in my office, and almost everybody has one or two little niches that they are responsible for that they enjoy. It gives them a lot more job satisfaction than just showing up and doing the same thing every day.”
your productivity. That’s kind of what Smart Image, in a nutshell, is. It’s the strategy or the purpose behind what we made—that vision of making sure that digital imaging and practice management systems are built around the patient record.”

Imaging and patient records should not only coexist together, but they should complement each other, Fillmore observes.

“Patient records live inside of your practice management system, like Dentrix, but some very important pieces of that patient record are wrapped up in digital imaging systems,” Fillmore says. “So, it’s powerful to put them together the way that dentists need them put together, having everything you need in one place to co-diagnose with a patient or to make sure that you’ve got all the diagnostic information you need at your fingertips, inside the patient chart. It doesn’t take a couple of different clicks—that people have right now—to do that. And there’s custom bridges, exclusive bridges, that operate with different practice management vendors and different imaging vendors, that the dentist has to deal with. They don’t have control over it.

“What it means today, is if I have Dentrix,” he continues, “I usually am going to choose a Dentrix-friendly imaging system, because they have a custom bridge that works really well. If I’ve got Eaglesoft and Patterson, I’m probably going to go with a Patterson-friendly imaging system, because they have a great integration relationship. What that does is put more of my information in one place and streamlines more of that workflow, so I have to click less to see what I want.”

**LOUPES**

Superman may be able to use his extraordinary vision to see things close-up, but mere mortals may need a little bit of help. Loupes are nothing new, but they’ve become more common and help clinicians see the things that they need to see.

“When I was in dental school, very few people had loupes,” Dr. Goodchild says. “Now, everybody has loupes. Everybody has magnification. In some schools, it’s required as a part of a freshman package or an equipment package that you purchase. Everybody also has additional illumination, which means they’ll have an LED Headlight. So, you not only have a magnified view, but you have to have targeted light. It’s really commonplace, now. It’s more unusual to see people without loupes practicing than with them. It seems like it’s everybody on the team, too. I’ve seen most hygiene, now, wearing loupes.”

While being able to see what one is working on is, of course, important, there is another factor involved: The clinician’s health.

“Eye health is incredibly important,” Dr. Goodchild says. “It’s not just the eye strain. We try to crane our neck so we’ll see things better. And what about the bright lights? The LED illumination, the blue lights to polymerize composites. Again, there’s this power balance, which is, we have incredible magnification, and what comes with incredible magnification is incredible light, very bright light. And that can also be sort of detrimental to your eyes. We’ve come so far, we can see things so much better, but we also have to recognize with that comes a renewed focus—no pun intended—a renewed importance on eye health.”

Like any technology, loupes continue to improve and evolve, providing dentists with the features they need.

“The thing that I really like now is that there are variable magnification systems on the market that allow you to work at lower magnification for things like hygiene visits, initial exams where you can still see things really well,” Dr. Flucke says. “But you can see more of the mouth at once, because as you go up in magnification, your field of view narrows. So at a low magnification, maybe you can look at half the mouth at once, whereas at a high magnification, maybe you look at a tooth-and-a-half in your field of view.”

Dr. Flucke has a couple of wish list entries that he would like to see in the future loupe developments.

“Vibration reduction like we see now in the cameras that people are using in professional photography for sporting events and such,” he says. “When you zoom in on something, everything shakes a little bit when you’re holding it in your hands. Nikon and Canon have come out with what they call ‘vibration reduction’, which means that even if your hand is shaking, the image stays still, which is pretty incredible. It would be tremendous to be able to go up at a really high magnification for dentistry and not have any kind of wobble because your head moves just a little tiny bit.”

“T’d also love to see some type of a heads-up display in the glasses that would give me, maybe, the view of an intraoral camera, which is 30 to 32x,” he continues. “I could have, maybe, like bifocals where I could see a very high magnified view by looking up and then a normal magnified view by looking down, or something like that. I’d also have voice-activation. Right now, if I’m doing an exam at three-and-a-half, I want to look at something five-and-a-half, I’ve got to stop and actually push on my glasses to lock them in at a higher magnification. It’d be really nice if there were some voice-activated thing where I could just say 5.5 and the glasses would just change. And I don’t think that would, honestly, be that hard to do. Maybe it would be expensive, but I don’t think it’d be difficult.”

**RADIOGRAPHY**

In order to see what’s not readily visible, dentists rely on radiography. It’s no secret that dental radiography has evolved since it was brought to dentistry in 1895 by Dr. Otto Walkhoff, a dentist from Braunschweig, Germany. In the 124 years since, impressive gains have been made. From their humble beginnings as fuzzy X-ray images to their current state as color, 3D images on a computer screen, dentists can see things better than ever.

“When I started was probably D-Speed film that you squinted at if you wanted to see things on it,” Dr. Flucke says. “And now, we’re at a point with sensors that take remarkably high-def images that you can then throw up on a 4.5-inch monitor if you want to and look at. It’s the ability to change all the parameters. You can increase the contrast ratio, decrease the contrast ratio, colorize, all of those things. It’s a completely different diagnostic world in radiography that probably will continue to improve just as cameras continue to improve.”

Dental radiography has changed radically in the century since it was
first introduced. But some of the most impressive evolution has occurred in just the past couple of decades.

“When I was at Creighton, and I was chairman of the diagnostic sciences department, one of the parts of my department was radiology,” Dr. Goodchild says. “We were in the dark ages 20 years ago. All we really had was film, generally periapical and panoramic radiographs. Now, we’ve got cone beam computed tomography (CBCT), capable of providing all different types of views. Knowledge is power. The better we can see the problem, we can better diagnose things. The price point, recently, has made it so it’s so more accessible now. A proper diagnosis and what that equals, is of course, efficiencies for everybody. Better imaging can help us zero in on the diagnosis, and what that best treatment is going to be, very, very quickly.”

“And then with the digital age, this imaging can be shared with other providers or specialists almost instantaneously, making second opinions or consults easy and fast. What that future may hold in terms of better visualization, I’m not sure, but I’ll bet that it continues on the same pathway where we’re able to see better and better quality images in 3D inside of a patient’s jaw or tooth.”

address his leadership super-powers in the sidebar: Managing the Power Dynamic of the Workplace on Page 59.

Intelligence encompasses many different areas of the dental practice from the clinicians (the type of continuing education that they receive) to practice management software (how well it helps run the practice) to all the data the practice collects (what it can tell the practice about itself and its patients).

**DATA**

The paperless office may not be the norm just yet, but there’s no doubt that computers play an integral part in managing the practice. Practice management software coordinates any number of tasks at the dental office, and the intelligence gained from those systems is an important power. Twenty-first century business is awash in data, and the dental practice is no different. While large practices already know this, smaller practices should take advantage of the opportunities.

“Everybody’s swimming in data,” Fillmore says. “Big Data has been a thing for at least 15 years in the high-tech industries, and it’s coming to solo practices, DSOs and multi-sites. Corporate dentistry, for example, already knows this. They’re swimming in data and they need insights or they need someone who’s able to parse that data in a useful way to give them actionable intelligence. There’s no reason that we can’t offer the same thing to solo practices or to your small and medium business owners.

“Intelligence means data intelligent insights from the data you have,” he adds. “That data often centers around your patient file, which means practice management systems are a good place to start looking for those insights. Your PMS vendor should be giving them to you. Take Dentrix’s Practice Advisor report as an example. It doesn’t just tell you how many patients you have or what your income is, it tells you how close to your goals you are and what you can do to improve your KPIs.

“It’s always been the same,” he continues. “It’s garbage in; garbage out. And right now, I feel like there’s a lot of garbage data swimming around in a lot of practices. You take things like this, which streamlines workflows across disciplines, across clinical, financial and patient information barriers. First of all, that helps clean your data and it helps allow your people to focus on more important things, rather than mundane and repetitive tasks.”

Practice management software is a key tool in coordinating that data intelligence.

“Practice-wide reporting and workflow automation are key,” Fillmore says. “Yes, it’s important to have insurance management software, clinical solutions, software to help you manage all those aspects of a dental office, but they should all be talking together to make your practice more intelligent and to give you more intelligent insights into your patients’ behaviors, your patients’ treatments; how they accept them and at what percentage; what your active patient base looks like; what your production mix looks like. These are all things that are really important for a practice owner to understand.”

**CONTINUING EDUCATION**

In order to maintain their state licensure, clinicians are required to earn a certain level of continuing education (CE) every year. That was, historically, accomplished by showing up and taking an in-person class. In this day and age, however, CE can be delivered not only through those traditional classrooms, but there are distance-learning, Internet-based resources available.

“I like to use the word upskill,” Dr. Goodchild says. “Upskill the provider. You’re the dentist or the hygienist, and you learn what’s new in dentistry, new philosophies, new equipment, new therapies, whatever. CE is more acces-
“Knowledge is power. The better we can see the problem, we can better diagnose things. A proper diagnosis and what that equals, is of course, efficiencies for everybody.”

- DR. JASON GOODCHILD, DMD

sible, easier to get than ever before. When I graduated dental school, I’m not sure that we even had online CE programs. Now, there are a variety of free programs. They can take CE anywhere in the world, anytime, from their living room, while they’re sitting in their pajamas, and get all kinds of CE—and very high quality CE. Lots of web platforms offer low-cost CE—some platforms even provide free CE.”

The more high-tech dental equipment becomes, the more clinicians need to be upskilled on its use. Happily, the resources are available to help with that learning.

“Learning technology has never been this easy,” Dr. Janyavula says. “Technology usually starts at the low end of the spectrum before it becomes mainstream. First, it used to be a thing for the hobbyists and the hacks, tinkering their way through a period of non-integrated systems. Sometimes innovation is about timing, especially if you look at the adoption in the past two, three years—it’s rapid. In a short amount of time, a new market is invented for devices like CEREC, clear aligners that people clearly didn’t think they want or need.

“We modernized dentistry with this sudden exponential J curve demand,” he continues. “Every year, things are being smaller, powerful and less expensive. I think that’s where dentistry is going, and there will be people who will be early adopters and there will be people who want to do the catch-up and there will be people that who want to be Luddites—they try to battle the technology. But, of course, as dentists, we should work and use and learn things that make our patients’ lives better, not what makes our life better. Now the time is right and the atmosphere is super charged. It is important that we are a part of the new destined changed course as science is an endless frontier.”

RESOURCES

Attaining necessary CE used to cost hundreds of dollars every year, and was just the price look being a dental professional. In 2019, however, there are plenty of free resources to which clinicians can avail themselves.

Social media is another, outside-of-the-box way in which CE can be delivered.

“Intelligence is omnipresent and demonstrates that no one is immune to it,” Dr. Janyavula adds. “There used to be one platform where people would consume knowledge. That has been completely replaced. Social media is providing a greater insight where you develop ideas in a conversation, along with the traditional means of going to a classroom to pick up knowledge and intelligence.

“CE has evolved from just being a monologue from one person to a very interactive, module-based learning system with the advancement of a more online education, providing a greater ability to cross-fertilize and cross-pollinate new ideas and concepts. We can benefit from the collective wisdom of many dentists around the world through social media, like Instagram and Facebook, by following really high-quality posts and cases that people are presenting from anywhere.”

INTEGRATION

It’s easy to become overwhelmed by so much data, but learning how to wield all of that power makes for better dentistry and a better practice.

“Today, we leer at the center of epic moments of quantitative digital health and personal well-being, forging connected communities. The more you are informed, the better decisions you make and the same applies to Dentistry,” Dr. Janyavula says. “Dental practice management software is still not as interactive and integrated as it possibly could be, but they will evolve with machine learning and cloud computing databases.

“As the analytic solutions get better, you’ll be better able to make decisions on how many patients you see and what kind of treatments you do. Transparency has become a default setting for our daily lives, and by revealing what used to be hidden, you’ll be better able to inform patients of the history of the treatments and provide continuous monitoring and risk assessment and cheer them on towards progress.”

“This data will be an express line towards operating excellence, where every member of office is aligned to commit to teamwork with a unified goal and philosophy. You’re able to better understand the productivity and track for accountability making your office efficient. And you can stretch for ‘amazing’ by capturing value from the data of your best patients and indulging patients for cosmetic dentistry and other new treatments, like facial fillers, etc., options increasing the scope, volume and, ultimately, the bottom line. The data can facilitate continuous performance management, improves the office culture, bringing everybody on the same page with common goals and shared commitment and ensuring they’re all working towards a unified mission.”

Tapping and integrating the practice’s data can be used across many facets of the practice.

“You could take digital images, digital radiographs, and optically scan a patient’s dentition—all of which can be incorporated into patient records,” Dr. Goodchild says. “This volume of information could then be used for a variety of clinical procedures: crown and bridge, implants, and clear aligner therapy are just a few examples. This data could be used to communicate with a consulting provider on a second opinion, or shared with a referring provider. It’s that knowledge, that ability to image our patients, being able to record clinical situations of our patients, that is so incredible right now. Looking forward, efficiencies from data collection and integration, I believe, will continue to grow, probably in ways that I can’t even imagine right now.”

At some point, clinicians may be taken out of the equation and systems will be able to help with the thinking.

“Artificial intelligence is where companies are full-blown into development,” Dr. Flucke says. “Artificial intelligence programs will be able to read X-rays and help with diagnosis.”

Dr. Flucke notes that in the 90s and early 2000s there were a number of standalone systems (including computers, cameras and so forth) and at some point, there was an integration phase. For instance, computers started becoming omnipresent in the
practice, spreading from the front office back to the operatories. That trend continued with such technologies as CAD/CAM, but not just any computer could access the data. He sees that continuing to evolve.

“I think that right now, with practice management, we’re starting to head back into another integration phase,” Dr. Flucke says. “Dentrix is a good example of being able to look at your digital impressions in Dentrix without opening the digital impression software in your acquisition unit. For a lot of offices, right now, if the lab calls about an image or a digital impression, the doctor has to go to the digital impressioning unit in the office, open the case and basically sit right at that machine, because that’s the only machine in the office that has access to that data. Well, the new version of Dentrix allows you to access that data directly and be able to look at the scans or your digital impression systems, right from your desk.”

While dentists aren’t reaching to retrieve an item from a cabinet across the room, stretching encompasses such issues as multitasking products, materials and equipment, as well as clinicians and staff being able to perform more than one task.

CROSS-TRAINING

In some offices, staff are willing to take on additional roles, which can be a huge benefit to the practice.

“A lot of dental offices have people that can do multiple jobs,” Dr. Goodchild says. “That was how I wanted to structure my practice, so that if people were out or people were busy, everybody could step in and help, because everybody had to wear multiple hats. And that is why those kinds of people become so valuable and so sought after.”

MULTITASKING

Multitasking can be a great way to give staff the opportunity to spread their wings. It is also a great way to improve workflows around the office, including the use of CAD/CAM equipment.

“One thing that’s very important about this is that when you have people working together, it makes the team more efficient, and it allows the team to work together. It allows the team to work in a more collaborative way, and it allows the team to work in a more productive way.”

By virtue of their concurrent roles as business owners and clinicians, dentists are already expected to be cross-trainers. To some extent, that can be extended to staff.

“Multitasking can be a great way to give staff the opportunity to spread their wings. It is also a great way to improve workflows around the office, including the use of CAD/CAM equipment.”

“Not all tasks are created equal,” Dr. Janyavula says. “Multitasking can demolish the office silos, makes the process open, allowing everyone to tune-in, progress and learn to work as a team. It is how..."
you invest in your staff, and one of the primary drivers to improving the productivity and efficiency in the practice.

“There are many ways you could really multitask, from better scheduling to better patient communication to better use of technology while the patient is in the chair,” he continues. “Advances in digital technology make the moment ripe, and it makes sense to do it now. And how do you do it? One is the cross-training that you possibly could leverage from some of the technology that we have today. You’re able to better prep and the assistant is able to design and mill the crown, doing all the chairside work more efficiently and effectively without any challenges.

“Today, with the help of a CEREC, you could do very much everything. Everybody could get a diagnostic baseline scan in less than a minute, let the scan integrate in to the practice management software and that can go into the patient’s permanent record. You could do your orthodontics, you could do your posterior crowns. You could do an implant custom abutment and the crowns. You could make a provisional or temporary crown. You could make up to a four-unit bridge. You could make surgical guides. They’ve really become a multipurpose and multifunctional tools. As for the practice, it’s like winning a triple prize: Satisfied patients plus reduced time waste plus lower costs.”

Multitasking can be a noble pursuit for some, but for others it can be overwhelming. To help alleviate that trepidation, properly engineered software can step in.

“You don’t want to stretch staff too far,” Fillmore says. “It frustrates them. There are seemingly contradictory things we hear from staff all the time. ‘I have too many things to learn; too many pieces of software; too many pieces of technology that I’ve got to be an expert on, and I can’t be. I just don’t have that kind of time.’

“The other thing we hear at the same time is, ‘The software is so complex, especially practice management systems’, he continues. “They’ve been around for 23 years and they do a lot and they don’t know it well enough in order to be able to utilize it the best they can. They’ll seem contradictory. But what we see is that people want to be passionate and people want to be specialized.

“So, what they can’t be is total practice experts,” Fillmore adds. “You have to be able to allow their roles to specialize in the practice and allow them to be deep and knowledgeable about those subjects. Get them business training. First off, if they’re going to be an office manager, for example, and they’re focused on that area, and then help them get specific about the areas of business you want them to manage. Then, if they’re going to use a limited amount of applications that are related to their jobs, if they need to learn Dentrix, make sure they’re learning the appropriate pieces that apply to them.

“Sure, they may need to cross-train some to cover other responsibilities of other staff, but that should be the exception, not the rule,” he concludes. “They can have some high-level training on the whole thing, but allow them to specialize. Once you allow your people to become deep specialists within certain areas of your business and of your practice, then allow your software to automate these repeatable and mundane tasks. We’ve found that nothing frustrates staff more quickly than having to do work that can be automated.”

**PAIN AND ANXIETY MANAGEMENT**

The concept of “stretching” can also be applied to doing something in an unconventional way. Rethinking pain management can be one of those ways.

According to the National Institute of Dental and Craniofacial Research, in 2016, 42,249 deaths were attributed to opioid overdose. Since 2016, the National Institute on Drug Abuse says that opioid overdoses increased 30 percent from July 2016 through September 2017 in 52 areas in 45 states.

Further, National Institute of Dental and Craniofacial Research writes, “Dentists prescribe approximately 6.4 to 8 percent of opioid analgesics dispensed by outpatient US retail pharmacies annually and are the highest percentage prescriber group for patients between 10 and 19 years of age.”

Some dentists are turning to hemp extracts as a replacement for, or adjunct to, conventional pain medication. Carolina Hemp Company markets its Kingdom Harvest hemp extract to dentists. The product can be used before a procedure to put patients at ease, and then following the procedure to reduce pain and promote healing.

“We have a pipette system that is distributed with our products to the dental offices,” Waylon Ford, Carolina Hemp Company CBO, marketing strategist and hemp advocate explains.

“Carolina Hemp Company provided a digital pipette system that allows us to give a 0.5 mL serving when their patient comes in,” Beth Clifton, office manager at Dr. Larry G. Hubbard, DDS of Statesboro, Georgia, says. “It lowers blood pressure, preemptively attacks any inflammation that will happen during the procedure and also lowers the anxiety and stress of being at the dental office. It allows the use of less anesthesia and may keep practices from having to put patients under as often.”

Each person’s unique biochemistry means that the extracts can be more or less effective, but Ford says patient response has been overwhelmingly positive.

“The patients are administered a 0.5 mL dose and then relax in the waiting room,” he notes. “Within an average of 15 minutes, they start feeling our Kingdom Harvest whole-spectrum hemp extract and that’s when they’re called back into the office.”

“We have yet to have anyone say that they did not have the most relaxing and best experience in the dental office as they started taking the Kingdom Harvest before their
procedure” Dr. Larry Hubbard, DDS, says.

After the procedure is completed, patients can buy a bottle to bring home to help with pain management.

“On the way out, as another preemptive measure, dentists can sell them a bottle of Kingdom Harvest,” Ford says. “That, coinciding with their standard hygiene care and oral health care, can help defeat gingivitis, gum disease, and bone decay.”

Hemp extracts differ from marijuana in that they provide relaxation properties, but without the psychotropic effects. “The THC is very little; it’s over 10 times less than the legal limit,” Ford says. “It only has enough to get the other phytonutrients working. This is what makes Kingdom Harvest whole-spectrum hemp extract different from other full or broad spectrum products.

Hemp was originally a component of dental anesthetics, but in the 1930s, opposition to hemp led to its removal from everyday life—including those dental anesthetics. Carolina Hemp Company brings that usage back to its roots.

“Hemp was originally a large part of the dental and medical industry,” Ford observes. “And then when it became outlawed, it was taken away. So, we’re actually reintroducing it into the dental industry. At one point, a hemp extract was in probably about 80 percent of the medications used in the medical industry.”

Whether it’s the restorative materials strength; CAD/CAM’s speed; advanced radiography’s vision; or staff cross-training to stretch their abilities, power manifests itself in diverse number of ways within the practice. But no matter what the ability, Uncle Ben said it best, “With great power comes great responsibility.”

For more coverage of the powers dentists can bring to their practices and patients, see Technology Editor Dr. John Flucke’s Technology Evangelist column, “Expanding Knowledge Brings Dentists New Powers” on page 64.
I’m not sure who came up with the expression Knowledge is Power but whoever thought of it was a genius. Those three simple words are true in many different ways. By bringing knowledge into the equation, we become much more powerful in ways we never considered.

Research and development in a myriad of subjects is rapidly increasing the “bottom line” of our knowledge base. Now that we have computers and machine learning, the curve continues to accelerate.

According to Industry Tap Into News, Buckminster Fuller created the Knowledge Doubling Curve. He noticed that until 1900, human knowledge doubled approximately every century. By the end of World War II, knowledge was doubling every 25 years. Today things are not as simple, as different types of knowledge have different rates of growth. For example, nanotechnology knowledge is doubling every two years and clinical knowledge every 18 months. But on average, human knowledge is doubling every 13 months. According to IBM, the build out of the “internet of things” will lead to the doubling of knowledge every 12 hours. Now, this may seem daunting at first, but if you think about it, having access to all of that knowledge can open doors and let us do things we would never have dreamed of.

In the beginning

It used to be that the general practice was sort of a “clearing house” of sorts for procedures. The GP performed basic restorative procedures and simple procedures such as basic extractions and easy one-canal endodontics. Anything more complicated ended up in the hands of one of the local specialists.

Back then, fluoride was not yet in all the places and substances it is now. Restorative needs of the patients was the “bread and butter” of most general practices. Doctors were so busy restoring large carious lesions they didn’t have the time to learn and implement other procedures into their practices. If the patient’s teeth were misaligned, a referral to the local orthodontist. Impacted third molars? A referral to a local oral surgeon.

As time passed, fluoride began to work its magic and the scope of the general practice began to change. Restorative procedures changed from amalgam and “bombed out teeth” to slot preps and conservative compos-
One of the best examples of this is the data we are aggregating via our intraoral scanners. It used to take several minutes and a certain degree of skill to scan for a single crown. Now full mouth scans can be accomplished in well under 5 minutes. This will allow us to take scans at every 6 month recare. Why? Because the scanner companies created apps to show how patients’ dentition changes over time. Can you imagine how great a patient education tool that is? I certainly can.

Now let’s look at merging this digital data. Because it is all digital, we can now combine CBCT and digital impression 3D scans! Imagine being able to virtually visualize your treatment inside of a 3D scan before you begin! You can now superimpose your digital impression scans inside your CBCT scans for a constantly updated 3D patient.

We are already seeing virtual treatment planning for implants which allows a 3D graphical representation of the implant to be placed inside the CBCT volume and then moved via “drag and drop” to the ideal spot for proper support and longevity. Once the implant is “placed virtually,” the file can be sent to a lab where a self-limiting surgical guide is fabricated. The guide is then snapped into the patient’s mouth and the implant is placed with minimal trauma and without a flap. When completed, the implant is in the exact location in which it was placed virtually.

Now let’s take this one step further and simply send the file to the office 3D printer where, in a few hours, the surgical guide is fabricated. We are now able to go from new patient visit to guided implant placement inside of 24 hours.

Or imagine a patient indicating a desire to have straight teeth. You will be able to scan, fabricate the virtual orthodontic treatment plan, and print the first aligners. Patients will be able to go from new patient to undergoing clear aligner therapy in less than one business day. Wow!

**Diagnosis**

Digital data also can be a tremendous aid to the diagnostic process. The fact that diagnostic information is all 1s and 0s means that it can be shared and viewed by anyone we designate anywhere they happen to be. Virtual consults can be simple and easy.

Then there is the matter of using Artificial Intelligence. There are several groups working on the prospect of AI evaluating radiographs and offering objective second opinions.

In hygiene today, we setup and take radiographs constantly. In the very near future, diagnostic indicators of potential carious lesions will show up in these images automatically. The doctor will “agree” or “disagree” and the system will take that information and learn from it to improve accuracy.

I’ve been experimenting with one of these systems for more than a year and cannot imagine working without it.

**Wrapping up**

This issue of Dental Products Report is all about “power” and while that term can encompass a lot of different things, power isn’t always about stronger or more resilient or force. Sometimes power can be about knowledge and seeing things from every conceivable angle.

As our skillset progresses further into the digital realm, our profession will work more with virtual diagnosis and treatment planning. We are still going to need incredible hand-eye skills, but we are also going to work with more digital tools. These tools will allow us to create some incredible results for our patients. Dentistry has already done a really great job of setting up digital business and progress notes, but now we are heading into the territory of true digital treatment planning and digital treatment. The future is bright!

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How payers automate information management to streamline claims

Why these solutions that automate claims management and adjudication can be of big benefit to your practice.

[by Robert Patrick, NEA President of Dental Sales & Services and Vyne Operations]

INSURANCE PLANS AND PAYERS MANAGE tremendous amounts of data. This data often exists in various forms: printed letters, emails, faxes, phone recordings—you get the picture.

According to CAQH, hundreds of millions of phone calls are handled by health plans across the U.S. each year, so it’s no surprise to hear dental office managers relaying frustrations with payers. These complaints vary, but usually have something to do with payers having “no record” of receiving a submitted document—especially if the claim hasn’t been submitted electronically and there’s no tracking.

CAQH research states “access to IT systems and software capable of consistently executing and updating fully electronic transactions is critical,” and payers are increasingly turning to technology. Until recently, data collation had been a manual process involving receiving documents via mail or fax, scanning them into an electronic form and importing them to the appropriate record. With data coming from multiple sources, there’s a constant need for process improvement.

Solutions that automate claims management and adjudication are a welcome sight. Payers now have access to solutions that can collate and manage millions of member calls and untold amounts of information from disparate systems, faxes and documents into a single record.

This collation of member information translates into the ability to better manage information, creating quality and efficiency controls. Payers can turn data caches into information repositories, making individual patient data accessible, dissectible and searchable. According to the needs of the organization, member information can be easily accessed and used by teams to enhance client service efforts and provide any required reporting.

**How it works**

Collation and communication management technologies capture, centralize and allow for searching and querying data by fields, such as “patient” and “document type,” or a custom field to index, report and capture business intelligence.

**Voice:** Audio content, such as phone calls, voicemails and any face-to-face interaction through PCs, mobile devices and even desktop-based microphones can be captured with ease. With voice capture, any two-party communication is recordable, and pre-authorization conversations between payers and providers can be rendered. Other types of communication capture can include conversations regarding patient acknowledgement of financial responsibility, faxes to/from referring providers and supporting documentation for claims.

**Fax:** Fax data capture can be integrated with existing solutions, eliminating the need to print, scan and manually review documents. Images can be captured, indexed, stored or routed through collation technology.

Through the integration of the capture technology with health information system platforms, payers can communicate with providers to easily send and receive content, images and audio links between systems, including direct file transfer (DFT) and content links through either a feed or HL7. Audio files can be linked directly to a member’s record, indexed and stored for playback, download, routing and quality scoring.

**Measurable impacts**

As data comes from multiple sources, payers constantly seek solutions that efficiently automate claims management and adjudication. Collection solutions aim to create a chronological, auditable trail that can be dissected granularly, with information including the provider generating a claim, the member covered by the plan, the employer offering the plan and other relevant indexing criteria.

These solutions lead to improved claim tracking and adjudication; reduction in lost time; and possible revenue improvements. A reduction in paper documentation and the ability to convert data from thousands of calls into actionable information has a powerful impact.

Data collation enables opportunities for growth and can be used as a driver for conversations with patients. Smart data management can help payers improve operations while enhancing customer service. Finally, collating patient-related data means organizations can improve relationships with members and care providers.

Automatic data capture gives organizations the ability to capture and analyze massive amounts of information, a process that was impossible with manual and often paper-based data collation procedures.

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Avoid digital landmines with routine network scans

Protecting your network and your practice and patient data requires regular assessments to identify unsecured ports, and other potential security risks. [by Dr. Lorne Lavine]

Let’s face it, many dental offices prefer to live by the old adage, “If it ain’t broke, don’t fix it.” Most of us are lucky if we get to even a majority of the items on our To Do list. We’ve evolved into a society of digital fire-fighters who run from one emergency to the next while also trying to get more work done with fewer resources.

When it comes to setting up and managing an IT network, even the most diligent with competent internal and external technical resources (and, unless you’re a large group practice or DSO, it’s all external) struggle to keep up. Most of our IT time is spent responding to client issues, patching systems, monitoring the backups…you know, the daily tasks required to keep a modern dental practice running and have all their data available.

In a lot of situations, there’s a lot that can be “broken” that sits under the hood. The reality is we rarely look there because nobody is complaining about their system. Yet around 90 percent of the networks we analyze for our HIPAA Risk Assessments have a potentially serious problem sitting undetected, just waiting to create a data disaster.

Many software systems require you to open ports from the firewall/router to the Internet, which is definitely not safe or best practices. Former employees and others, such as previous IT companies with remote access credentials, may still have access to your network without your knowledge. When you replace a laptop or workstation, what are you doing with the older system? If it’s lying around, it most likely can easily connect to the network if it were ever stolen.

Many PMS programs recommend giving all employees administrator level access to the data, basically giving everyone in your office unfettered access to private data. And the list goes on.

Preventive monitoring
What’s sad is that in most cases, these network “landmines” waiting to explode can easily be discovered and “disarmed.” You don’t need to be a rocket scientist, it doesn’t require major expenditures, and it doesn’t require a lot of time. In essence, you just need to find the right software tool and a qualified technician who can run the scan, analyze the results, and develop a treatment plan on how to resolve the issues.

In my opinion, the cost-benefit of running periodic network scans is a no-brainer. No matter how busy your practice, you really can’t afford NOT to take a few hours a couple of times per year to scan and analyze your network for those hidden configuration settings and security holes that are easy to fix and could prevent some major headaches.

Even if your network is small by most standards (server and 5-10 workstations, for example), you should consider at the least an annual scan. And if your network is larger, then consider doing it more frequently, say, every 3–4 months. This is the minimum I would recommend as it’s a worthwhile insurance policy to protect your IT assets and your practice. And, oh, did I mention that HIPAA requires you to do this?

If you haven’t done a formal risk assessment or can’t remember the last time you did, reach out to your IT provider, or feel free to contact me if you’d like to discuss how I can help.

ABOUT THE AUTHOR
Dr. Lorne Lavine, founder and president of The Digital Dentist, has more than 30 years invested in the dental and dental technology fields. A graduate of USC, he earned his DMD from Boston University and completed his residency at the Eastman Dental Center in Rochester, N.Y. He received his specialty training at the University of Washington and went into private practice in Vermont until moving to California in 2002 to establish TDD, a company that focuses on the specialized technological and HIPAA needs of the dental community. He can be reached at drlavine@thedigitaldentist.com or 866-204-3398.
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Technology

Bringing Early Stage Carious Lesions to Light

Using nanotechnology, GreenMark Biomedical is developing a non-invasive approach to diagnosing and treating active, incipient carious lesions.

[by Lou Shuman, DDS with Steven Bloembergen, Ph.D. and Wendy Bloembergen, MD, MS]

The idea of nanodentistry may still seem a little like pure science fiction or a distant vision. In fact, products based on “small scale” targeted technology for diagnosing, treating and preventing caries may well be in your practice in the near future.

Last month I had the opportunity to sit down with Steven and Wendy Bloembergen of GreenMark Biomedical Inc., two pioneers working to make the vision of early detection and noninvasive treatment of caries a near term reality.

GreenMark is a healthcare startup specializing in targeted biopolymer particle technology. Steven, GreenMark’s Founder and CEO, has more than 30 years in the field of biomaterials, while Wendy, a noted nephrologist, serves as GreenMark’s Vice President of Clinical Affairs.

**LS: What’s the background behind GreenMark’s core technology?**

**SB:** Since my original Ph.D. research project, I have had a passion for developing sustainable cost-effective alternatives to petroleum-based plastics and other non-biodegradable materials that are used for disposable products and packaging. The core technology, which is based on starch nanoparticles, became the driver behind my first startup company, EcoSynthetix, now a global corporation.

At EcoSynthetix, we were able to replace oil-based chemicals such as styrene butadiene and harmful formaldehyde-based binders used to produce everyday products like magazines, books, cereal boxes, and wooden composite panels. GreenMark was created in 2016 to pursue targeted and noninvasive dental and medical applications with this same technology.

**LS: How did you decide to adapt the technology for dental applications?**

**WB:** In early 2000, I helped Steven with the writing of a grant which was funded by NIH to investigate applications of the starch particle technology in healthcare, specifically for drug delivery to fight cancer. This research on a targeted delivery system was set aside for almost a decade. However, it was eventually resurrected as the subject of Ph.D. research by Nathan Jones at the University of Michigan.

The research caught the attention of Brian Clarkson, Professor of Cariology at the U of M dental school. Brian recognized that in the early stages of tooth decay you develop porosities in the enamel which these sub-micron particles could penetrate. Nathan, now GreenMark’s VP of Technology, found a way of targeting these particles to attach to the subsurface of active carious lesions which is truly a breakthrough.

**LS: What’s the potential significance of this breakthrough in the detection and treatment of caries?**

**SB:** We know visual and tactile exams using the explorer miss lesions or can cause cavitation. X-rays cannot catch lesions until they’re well advanced—but that time is too late for anything but drill and fill. But if you can detect caries in the incipient stage, you have the opportunity to treat noninvasively.

Perhaps even more exciting is the potential of this technology to distinguish between actively progressing and inactive lesions. The small particles only penetrate lesions with surface porosity, which are believed to be those lesions that are active or likely to progress. At present there are no diagnostic techniques or devices capable of differentiating between active and inactive lesions on the market. Dental professionals tell us it’s a guess.

Lastly, we believe the technology will allow dentists to monitor the effect of noninvasive treatments. So, we think this is truly a disruptive technology that has the potential of changing the way things are done in the field of caries management.

**LS: How can the same nanoparticle technology be used in noninvasive treatment?**

**WB:** Calcium and phosphate, the key minerals that are depleted from teeth during the process of decay, can be bonded very effectively inside the small sub-micron starch particles. Since the targeted starch particles adhere to the surface of carious lesions, we have the potential to deliver the building blocks of enamel directly to the site of active disease. The minerals are released when the starch degrades, triggering recrystallization of the tooth subsurface by the diagnostic test as part of a routine prophyl exam. We have developed a mouth rinse where the targeted starch particles are dispersed at a low concentration in water. The patient rinses first with the diagnostic solution and then with plain water. All that remains after the water rinse are the particles that have penetrated the tiny porosities in the enamel and attached themselves temporarily to the active subsurface lesions. The particles contain molecules that fluoresce or light up under exposure from a standard blue curing light. Within seconds, the dentist receives a direct visual diagnosis because the illuminated areas indicate areas of porosity.

The starch particles are completely biocompatible and resorbable, making them ideal for use in the oral cavity. They break down in the presence of amylase which is a naturally occurring enzyme in human saliva. So, by the time the patient leaves the office the particles are completely degraded and there is no residual.

**LS: How would a diagnostic application work?**

**SB:** The practice would administer the diagnostic test as part of a routine prophyl exam. We have developed a mouth rinse where the targeted starch particles are dispersed at a low concentration in water. The patient rinses first with the diagnostic solution and then with plain water. All that remains after the water rinse are the particles that have penetrated the tiny porosities in the enamel and attached themselves temporarily to the active subsurface lesions. The particles contain molecules that fluoresce or light up under exposure from a standard blue curing light. Within seconds, the dentist receives a direct visual diagnosis because the illuminated areas indicate areas of porosity.

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drawing on large amounts of naturally occurring calcium and phosphate from the saliva in a process known as “crystal nucleation.”

While this application is still in preliminary research, our team has been very excited by the initial test results. In the lab we’ve created artificial lesions on human enamel that look exactly like the white spots that we see in natural lesions. We’ve then treated this enamel with mineral laden particles and over the course of weeks we see a complete return to what looks like natural enamel. Next steps would be to replicate these results in vivo with natural lesions and ultimately in vivo in patients’ mouths.

The implications of these results are very promising. Unlike fluoride treatments that arrest lesions by sealing surface micro channels in the tooth enamel, we see the potential for targeted bio-delivery of minerals which restores the enamel from within, into the depth of the lesion.

LS: How soon could we see products utilizing these technologies available to dental professionals?

WB: The diagnostic application, which we’re calling LumiCare™, is scheduled to be submitted for FDA regulatory review this year. We plan for initial availability in 2020. The noninvasive treatment is still in the research phase, but we’re moving rapidly on that application as well. If readers would like to track our progress, we invite them to visit http://greenmark.bio/news-events/.

ABOUT LOU SHUMAN, DDS
Dr. Lou Shuman is the CEO of Cellerant Consulting Group, dentistry’s leading corporate incubator and accelerator, a venture-in-residence at Harvard’s i-Lab; the chairman of the technology advisory board at WEO Media; a long-time contributor to Dental Products Report; and the founder and creator of the Cellerant Best of Class Technology Awards.

ABOUT STEVEN BLOEMBERGEN, PH.D.
Dr. Steven Bloembergen founded GreenMark Biomedical in Michigan in 2016, with a vision to deliver health based benefits to society through biobased targeting technologies. He has 30 years of leadership experience in the development and commercialization of biomaterials. In 2012, Dr. Bloembergen received the Ernst and Young “2012 Entrepreneur of the Year Award”. He received his Ph.D. in Polymer Science and Engineering from the University of Waterloo, Ontario, and is the inventor of over 25 patent families related to biomaterials.

ABOUT WENDY BLOEMBERGEN, MD, MS
Dr. Wendy Bloembergen is an Internist and Nephrologist who is pursuing her entrepreneurial interests after spending a number of years raising her family. She received her MD from the University of Western Ontario, London, Ontario, and her Internal Medicine and Nephrology fellowships at McMaster University, Hamilton, Ontario and University of Western Ontario. She subsequently completed a Research Fellowship at the University of Michigan Medical School and an MS in Clinical Research Design and Statistical Analysis at the University of Michigan School of Public Health. She is the author of more than 20 peer reviewed articles and several book chapters, and has consulted for a venture capital firm as a medical analyst.

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Best Practices

One exercise dentists should never do

Here’s why you should replace superman with the bird dog.

[by Dr. Bethany Valachi, PT,DPT, MS, CEAS]

Dear Bethany: I read an article in a dental journal, “The One Exercise that All Dentists Need to Do” that states the superman exercise is the best exercise for dentists. However, I have been going to a physical therapist for my back pain and he says the superman exercise is unsafe.

Dear Doctor: You have a wise physical therapist! This exercise has been shown to place unsafe compressive loads to a hyperextended spine and should be avoided.

The theory of the superman exercise (Fig. 1) is that it targets one of the primary spinal stabilizers, the lumbar multifidus, by lifting both arms and both legs simultaneously. Dysfunction and atrophy of the multifidus muscles has been closely related to chronic low back pain.1,2,3

There are many strengthening exercises that target the lumbar multifidus muscles—the most popular are the bird dog, bridging and superman exercises. However, according to the world’s foremost expert on spinal biomechanics and low back pain, Dr. Stuart McGill, the superman exercise “results in over 6,000 N of compression to a hyperextended spine, transfers load to the facets and crushes the interspinous ligament—It should not be done in any form.”4

Further, the superman exercise is a dynamic exercise that takes the lumbar spine through a range of motion under high compression. Back machines at the gym that replicate this movement have been shown to cause disc herniation.4 The superman exercise was one of Joseph Pilates’ original exercises. The Australian Physiotherapy and Pilates Institute (APPI) evaluated the original Pilates exercises, based on the latest research, and recognized many of the early Pilates exercises are ballistic and unsafe and have modified or removed many. The original superman exercise was one of the exercises that was modified.

The resultant APPI program, the ‘Modified Pilates Rehabilitation Program’ is now taught in 22 countries. (In Australia and the United Kingdom, most Pilates instructors are APPI certified and must adhere to the ‘Modified Pilates Rehab Program’—the original superman exercise is NOT allowed!) Unfortunately, in the United States, there is little regulation of Pilates certification and many unsafe exercises are still commonly used.

The author of the article you are referring to provided no references for the efficacy of, or appropriateness for the superman exercise. As medical professionals, we must thoroughly vet our sources.

There are three variations of the superman exercise that are much safer and approved by the APPI. These modified exercises include:

1) lifting arms only off the floor
2) lifting legs only off the floor
3) lifting opposite arm and opposite leg simultaneously off the floor

However, the safest way to strengthen the multifidus muscles is with the bird dog exercise. (Fig. 2) When performed with abdominal bracing and neutral spine, this is a very safe and effective way to strengthen the multifidus (and other back extensor muscles) and prevent low back pain.4,5

Watch a video of the bird dog exercise here: https://posturedontics.com/the-birddog-exercise/

For a free white paper “14 Exercises Dental Professionals Should Avoid,” please e-mail info@posturedontics.com.

References and author bio available online at dentalproductsreport.com.
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3 common infection control questions answered

Straightening out some of the most misunderstood aspects of optimal dental infection control. [by John A. Molinari, Ph.D.]

Efficient reprocessing of contaminated instruments after patient treatment can be complex. It involves a series of procedures which utilize specialized equipment, adequate space, and healthcare personnel who both understand and can effectively perform required tasks.

One of the positive aspects of presenting infection prevention seminars is that I see how dental practices progress in this area. Think about it. It wasn’t that many years ago when a number of dental personnel were scrubbing soiled instruments by hand using detergent and running water. As ultrasonic units and instrument washers have become standard in dental facilities, a high level of cleaning prior to sterilization can be reached. Similar progress has been made with new generations of heat sterilizers, especially autoclaves.

However, even though these developments helped improve infection control practices, basic principles of cleaning, sterilization, and monitoring still should be followed. Unfortunately, they can sometimes be inadvertently overlooked. The following discussion addresses questions related to these procedures.

Why is it important for cassettes to be dry prior to sterilization?

Infection control recommendations and sterilizer manufacturers’ instructions for use (MIFUs) state instruments should be dry before packaging and sterilization. To understand why this is important, look at pouches that are removed after an autoclave sterilization cycle. Some may be dry, but others can be very wet. This creates a potential problem whereby the pouch paper can be punctured from within by processed instruments. Wet pouches can also cause “wicking,” whereby the wet paper can act as a funnel for external air and bacteria to enter the sterile pack.

Venting and drying components of sterilizers are designed to remove the same amount of water vapor from the chamber that enters during a prescribed cycle. When pouches containing very wet items are placed in an autoclave, the unit will still remove the amount of water vapor it was calibrated for, but it may not be able to eliminate the excess moisture from packaged instruments. In the absence of placing instruments and cassettes in a separate drying unit, the instruments and cassettes can be air dried (Fig. 1).

Alternatively, if using cassettes, one can also use a clean, dry towel or cloth to dry before wrapping/pouching for sterilization. Hand drying loose instruments isn’t recommended due to the risk of sharps injury. In any event, wearing puncture-resistant utility gloves is essential during instrument cleaning, preparation and packaging in order to minimize the risk of a sharps accident.

Because instruments in a cassette are already in a tight container, is it necessary to wrap before placing in the sterilizer?

Yes, they must be either wrapped in either a sterilization wrap (i.e. “blue wrap”) or placed in pouches sized for cassettes (Fig. 2).

Even though cassettes can keep all the instruments together from the chairside procedure through cleaning, rinsing, drying, and sterilization, the presence of their hole patterns requires that they be packaged to maintain sterility after removal from the sterilizer. Remember, while the instruments are sterile at the end of the cycle, as soon as the door is opened and unwrapped cassettes are removed and exposed to air, their contents are clean, but they are no longer sterile.

Is routine use of Type V integrators in monitoring sterilization a good idea, and can they take the place of biological monitoring?

Routine monitoring of sterilization cycles using chemical indicators and integrators has become more efficient over the years. Type V chemical integrator strips became available a few years ago and are a valuable addition to monitoring heat sterilizers (Fig. 3).

In contrast to other chemical indicators which can—at best—monitor 2 sterilization variables, Type V integrator strips contain a steam sensitive material that reacts with all 3 criteria for proper steam sterilization (i.e. temperature, pressure, time). During the sterilization cycle, the material moves across the wicking strip and only registers ACCEPT when the three sterilization conditions are met. Using a test strip in the center of each sterilizer load can serve as an important and early monitoring tool in between required spore testing intervals.

As useful as these test strips can be, they are not replacements for the gold standard of sterilization—biological monitoring using heat-resistant bacterial spores.

Type V integrators are considered analogous to spore testing, but not a replacement. Dental practices still must follow the biological monitoring requirements recommended by the CDC and required by individual states.
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Dentistry is typically a relatively small business with few employees. From a small business standpoint this makes perfect sense. Dental offices must operate “lean and mean” to help ensure maximum efficiency and low overhead. The downside is if just one team member is gone, it causes panic and chaos. There is a void everyone must scramble to fill even though they lack the proper knowledge and skillset. How can this be avoided? Cross-training. Cross-training is simply teaching your employees the skills and responsibilities of another position. Here are three great reasons to start cross-training your team today:

01 A cross-trained team member can fill in on any given day
Rather than experiencing stress and breakdown, the practice can simply shift the responsibilities of a missing team member onto other team members throughout the day. This allows the practice to maintain a functional schedule, handle responsibilities and still provide five-star customer service.

02 Cross-training helps keep the practice flow moving forward each day
Cross-trained team members can automatically step into different functions as necessary. If the practice falls behind or has a problem in a specific area, the cross-trained team member can move into that area and bring the practice back into its normal flow for the day.

03 Cross-training will show the practice when there is a need to hire
If cross-trained team members are continuously being pulled into their second area of responsibility, then the practice is probably understaffed. For example, if the front desk person is frequently taking on the role of dental assistant, eventually they will fall behind in their duties at the front desk.

Patients don’t notice any break in customer service and the doctor can continue to function, moving from patient to patient. For example, a front desk person who also has dental assisting skills can jump in periodically to help the practice if the clinical area is overwhelmed.

We recommend team members be trained in no more than two areas. You do not want to create more stress by asking too much of your staff. It would be very difficult for a dental assistant to also be an expert on greeting patients, insurance coding and inventory management.

Summary
Small staffs are always at risk of breakdown when team members leave or get sick. Cross-training eliminates the panic that comes when a staff member is missing and allows dental offices to keep running without missing a beat.
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