

CAD/CAM

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1 2012

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clinical perspective

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E4D Dentist

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Never look back



Gary Severance, DDS

Nearly 30 years ago, three technologies were introduced to dentistry in one year that forever changed the capabilities of communication, diagnosis and treatment: the first digital intraoral camera (Fuji/Fujicam®), the first intraoral digital X-ray system (Trophy®) and the first chairside digital restorative system (Siemens®/CEREC®) all made their North American appearance in 1987.

While two of the three technologies can now be found in nearly 70 percent of dental practices and are used daily to provide better dentistry, digital restorative dentistry has lagged behind with less than 10 percent of practices taking advantage of providing patients with a digital scan, digital design and in-office fabrication of the final restoration.

While chairside CAD/CAM technology has continued to progress over the nearly 30 years since its introduction, it wasn't until a laser-based system (E4D Dentist™) was introduced in 2008 that clinicians could actually "see" what they were capturing. The introduction of the E4D Dentist System provided dental professionals with the ability to fabricate a one-appointment, indirect ceramic restoration digitally without first covering the hard and soft surfaces to be scanned with powder. In addition, D4D Technologies introduced centralized education and remote support (Support on Sight or S.O.S.) to further facilitate integration of this technology into the modern dental practice.

Yet, what has kept chairside CAD/CAM from revolutionizing the capabilities of dentistry much like Lenscrafters® transformed the expectations and experiences of patients needing eyewear? The concept of "one-hour" eyeglasses was introduced in 1983 and now is an instantly recognizable and accepted concept that brings the technology and convenience to the patient with no compromise in quality. The same is true with today's chairside CAD/CAM systems — convenience with no compromise.

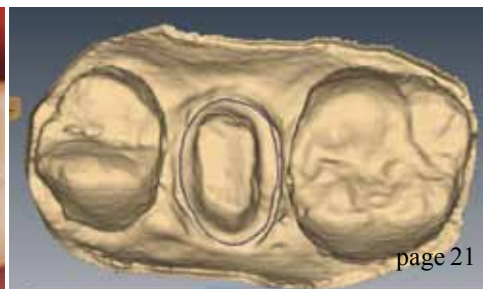
When asked why chairside CAD/CAM isn't the current standard of care in dentistry, the first answer from those in the profession is "the cost." Unfortunately, this answer is a common fallacy because in most cases, chairside CAD/CAM costs "less than what you're doing now" for the average private practitioner.

As you read through this issue of CAD/CAM magazine, you will meet clinicians and assistants who at first hesitated but then took the step into digital restorative care and have never looked back. You'll read of new technologies to promote the services to your patients and, most of all, understand the true cost of "not" incorporating chairside restorative care into your practice.

I encourage you to look forward and explore all that digital restorative care offers you, your team and your patients.

Sincerely,

Gary Severance, DDS
Chief Marketing Officer
D4D Technologies



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_Gary Severance, DDS

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Cover image provided by D4D Technologies



Practice Operating Statement Worksheet		
Use this sheet to determine your actual gross income, expenses, and net income percentage. Include all expenses and income.		
Monthly Practice Income		Percent Of
Professional Fees:		Total
Doctor Fees	\$ 61,339.00	Practice
Associate Fees	\$ -	Income
Hygiene Fees	\$ 22,884.00	
Adjustments:		
Patient Refunds	\$ 1,487.32	
Other		
Total Practice Income	\$ 82,735.68	
Monthly Practice Operating Expenses		

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DISCOVER THE DIFFERENCE

CREATE

DESIGN

- Autogenesis™ customizes the proposal to match the proximal central grooves, cusp heights, and marginal ridges
- Multiple design tools available like Rubber Tooth™ which makes the proposal as pliable as rubber
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CAPTURE

SCAN

- High speed laser captures digital scans without powder
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E4D chairside CAD/CAM restorations: Case presentations and lessons learned

Author_Wally Renne, DMD

_c.e. credit part 1

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Despite the increasing popularity of the current CAD/CAM laboratory systems and continuing technical advances, some clinicians have remained reluctant to incorporate the very same CAD/CAM techniques into their clinical chairside practices. Two often-repeated misconceptions relate to the perceived lack of strength and lack of esthetics of the ceramics available for use with these systems.

A wide variety of materials are available to use with the E4D Dentist System™ (D4D Technologies), and each has a separate set of esthetic and mechanical properties that must be considered. This article will review current materials and show clinical examples of restorations made using the E4D Dentist System.

One distinct advantage of chairside CAD/CAM is

having the ability to make restorations in a single visit from a solid pre-manufactured block that is essentially flawless in construction. A pre-manufactured block is made in ideal conditions, and as a result, has an ideal density with none of the residual porosity found in many layered or pressed porcelains.

Porosities may act as a weak point and lead to the buildup of internal tensile stress in the ceramic and eventually cause a catastrophic failure. Monolithic restorations have several distinct advantages over layered restorations when it comes to mechanical properties. Layered restorations are often veneered with weak feldspathic glasses that can chip or break, especially if not supported properly by the framework.

Furthermore, one does not need to worry about delamination and micro-chipping of the veneering porcelain, which has been reported to be as high as 25 percent for porcelain-fused-to-zirconium restorations.¹

IPS Empress® (Ivoclar Vivdent) is a feldspathic glass with approximately 45 percent leucite crystals for dispersion strengthening. The 5 µm leucite crystals improve strength and fracture toughness by acting as "roadblocks" to prevent crack propagation. IPS Empress is an esthetic material and is available in polychromatic blended shades that give the restoration a layered appearance. Empress Multiblock has a flexural strength around 160 MPa and requires isolation and attention to detail when bonding to ensure long-term success.

IPS Empress has been on the market for approximately 24 years, and as a result, good clinical research on the longevity of these restorations exists

Fig. 1 Patient presents with crown missing from tooth #9. (Photos/ Provided by Dr. Wally Renne)



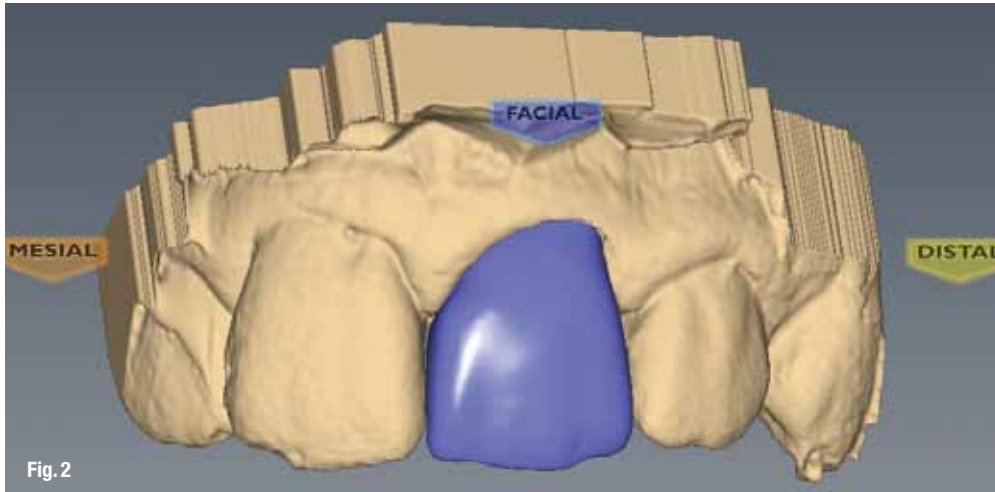


Fig. 2



Fig. 3

Fig. 2_ E4D Dentist System is used to take a digital impression, then the restoration is designed using E4D DentaLogic Software.

Fig. 3_ An IPS Empress DAC Multi A1 restoration is milled and custom characterized using IPS Empress Universal Stains.

in the literature. A literature review conducted by Brochu and El-Mowafy evaluated and summarized six clinical studies that met their inclusion criteria. They concluded the survival rates for IPS Empress inlays and onlays ranged from 96 percent at 4.5 years to 91 percent at seven years. IPS Empress crowns had a survival rate ranging from 92 percent to 99 percent at three to 3.5 years.

For both crowns and onlays, most failures were due to bulk fracture.² In general, IPS Empress has higher failure rates in the posterior than the anterior and higher fracture rates on molars compared with premolars.³⁻⁶ Therefore, IPS Empress is an excellent material choice in the anterior for esthetically demanding patients. However, alternative materials exist for posterior use.

Case presentation

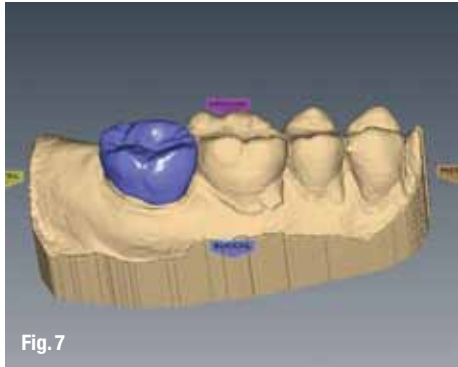
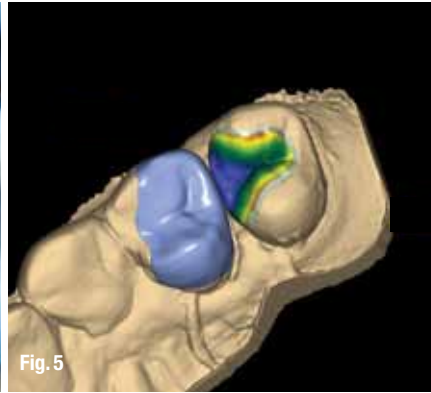
A new patient called the office and said his crown "exploded." He presented to the clinic with the crown missing on #9 (Fig. 1). The E4D Dentist System was used to make a digital impression of the preparation and the bite registration. Using the intuitive design features in the E4D software, a restoration was designed (Fig. 2). An IPS Empress CAD Multi A1 restoration was milled and characterized using IPS Empress Universal Stains. For delivery, the crown

was prepared by etching with 4.9 percent hydrofluoric acid for 60 seconds and silanated for 60 seconds with Monobond-Plus (Ivoclar Vivadent). The tooth was pumiced; Optibond XTR (Kerr) was applied and cured for 20 seconds; and Nexus 3 resin cement (Kerr) was used to bond the crown (Fig. 3).

The use of IPS Empress has been selective partly because of the popularity of IPS e.max[®] CAD (lithium disilicate). IPS e.max CAD comes in a lithium metasilicate state (blue color) that is not fully crystallized but can be easily machined. The milled restoration is then placed in the oven for 19 to 26 minutes to crystallize the glass. During crystallization, the lithium metasilicate crystals are replaced with lithium disilicate crystals, increasing flexural strength from around 160 MPa to 360 MPa.

IPS e.max was introduced to the market in 2006. Gehrt and colleagues followed 104 IPS e.max crowns in 44 patients and found the corresponding survival rate for all restorations was 97.4 percent after five years and 94.8 percent after eight years of clinical service with location not significantly impacting survival rate.⁷ These results were for IPS e.max press restorations that were cut back and veneered. It can be hypothesized that monolithic chairside milled IPS e.max may perform better.

In a 10-year study, Kern et al. found three-unit fixed partial dentures (FPDs) made from monolithic



Figs. 4–6 In this case, a patient who was not happy with the esthetics of an amalgam restoration presented with recurrent caries on the mesial of tooth #13. The E4D Dentist System was used to make a digital model, and restorations were milled out of IPS e.max CAD HT A2 blocks.

Figs. 7–9 With the strength of IPS e.max, predictable restoration of second molars using the E4D Dentist System is possible.

lithium disilicate ceramic showed five- and 10-year survival and success rates that were similar to those of conventional metal-ceramic FPDs.⁸

They concluded that for the monolithic lithium disilicate FPDs, the calculated survival rate was 100 percent after five years and dropped to 90.8 percent (when considering only catastrophic ceramic fractures) and 87.9 percent (when considering catastrophic ceramic fractures and biological failures) after 10 years.⁸ It is interesting to note that all catastrophic failures occurred in molars.⁸ Single-unit monolithic IPS e.max can be expected to perform better than FPDs in this study.

Interestingly for both clinical studies mentioned, the restorations that were conventionally cemented performed just as well as those that were bonded.^{7,8} Therefore, assuming proper retention and resistance form has been achieved, it is acceptable to conventionally cement monolithic IPS e.max restorations.

Because of the incredible flexural strength of IPS e.max, some clinicians were concerned that IPS e.max may be aggressive on the opposing dentition. In a clinical study, Silva et. al. found IPS e.max to be more gentle on the opposing enamel than feldspathic ceramics with a wear rate on enamel similar to natural definition.⁹ Chairside CAD/CAM allows the clinician to predictably provide more conservative restorations, such as IPS e.max inlays and

onlays, that have a longevity similar to full coverage crowns.¹⁰ The advantage to onlays over crowns is the conservation of healthy tooth structure and subsequent prolonging of the tooth's life cycle.

Chairside milled onlays are an ideal restoration compared with direct resins. Despite their popularity, large posterior resin-based composite (RBC) restorations last only six to seven years.^{11,12} RBC restorations have poor clinical longevity, higher recurrent caries and greater need for replacement compared with the alternative, high-copper amalgam.^{13–17}

Amalgam and cast gold are not a popular option for many patients because of esthetic concerns, and an E4D onlay restoration is the ideal treatment for many patients who refuse these alternative treatments. Milled inlays and onlays have been shown to be very successful.

One study found a success rate of 90.4 percent after 10 years with older feldspathic ceramics as well as older milling and design technology.¹⁸

In this case, the patient was not happy with the esthetics of the amalgam restorations, and she had recurrent caries on the mesial of #13. The E4D Dentist System was used to make a digital model, and the design software proposed well-contoured, anatomical restorations that were milled out of e.max CAD HT A2 blocks. For delivery, the restorations were prepared by etching with 4.9 percent hydrofluoric



Fig. 10



Fig. 11



Fig. 12



Fig. 13

acid for 20 seconds and silanating for 60 seconds with Monobond-Plus (Ivoclar Vivadent). The tooth was pumiced clean; Optibond XTR (Kerr) was applied and cured for 20 seconds; and Nexus 3 resin cement (Kerr) was used (Figs. 4–6).

Despite the benefits of onlays, single-unit crowns are still the preferred restoration for the general dentist, and the E4D Dentist System fabricates excellent restorations with a short learning curve. With the strength of IPS e.max, predictable restoration of second molars using the E4D Dentist System is possible (Figs. 7–9).

Once the learning curve of single-unit restorations is mastered, it will not be long before the benefits of the E4D Dentist System become apparent for more complicated cases. A 37-year-old male presented for a consult for dentures. He had been to several dentists and an immediate denture was the treatment plan he had selected. He presented with severe acid erosion and abrasion from a combination of gastroesophageal reflux disease (GERD) and bruxism (Figs. 10, 11).

Occlusal examination revealed a lack of anterior guidance and posterior support. The lateral pterygoids were sensitive to palpation, and upon visual examination it was noted that he had hypertrophic masseters. Lip commissures were folded and he appeared to have a collapsed vertical dimension of occlusion (VDO). He did not close in a repeatable

position and had a severe anterior deviation from centric relation.

When evaluating the location of the gingival margins it was determined that compensatory eruption had taken place. However, based on the closest speaking space during the production of sibilant sounds, the patient had excess freeway space.

It was determined that the patient lost vertical dimension of occlusion, and therefore compensatory eruption did not keep up with the rate of erosion. Two centric-relation (CR) records were made using bimanual manipulation, a custom triad jig and a rigid bite material. The case was mounted on a semi-adjustable articulator in centric relation and the mounting was verified with the second CR record.

It was decided (based on freeway space, esthetics and phonetics) that to recapture the lost VDO the patient needed to be opened 2.5 mm in the anterior; this correlated to around 1 mm in the posterior. A diagnostic wax-up was made. The teeth were prepared and temporized based on the diagnostic wax-up (Figs. 12, 13). The patient was kept in temporaries for six weeks to verify tolerance of the new vertical dimension, phonetics (particularly "F" and "S" sounds) and CR.

In the provisionals, anterior guidance was established with no balancing interferences during lateral excursive movements. CR was stable and at the end of the six-week trial period the patient was pain-free

Figs. 10, 11 In this case, a 37-year-old male presented with severe acid erosion and abrasion from gastroesophageal reflux disease and bruxism.

Figs. 12, 13 After a diagnostic wax-up was made, the teeth were prepared and temporized.

Fig. 14_ The E4D Dentist System clone feature copies the occlusion and anatomy of the temporaries exactly.

Fig. 15_ The E4D Dentist System software, DentaLogic, enables the clinician to superimpose the temporary "clone" model over the restoration design to determine accuracy.

Fig. 16_ Restorations are milled out of B1 e.max CAD LT, prepared and seated.

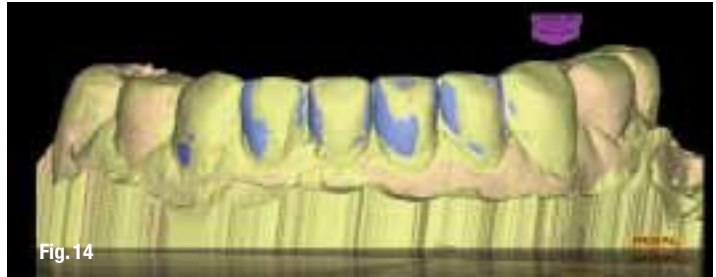


Fig. 14

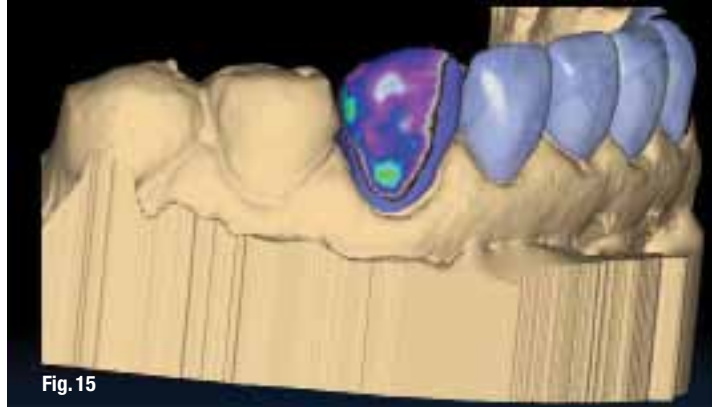


Fig. 15



Fig. 16

upon palpation of his lateral pterygoid muscles, and the provisionals did not show signs of malocclusion, such as fracture or accelerated wear. His central incisors were hitting just inside the wet-dry line of the lower lip during "F" sounds. During "S" sounds, the closest speaking space, the patient's maxillary and mandibular anterior teeth did not touch.

Once verified, a vinyl polysiloxane (VPS) impression of the temporaries was made along with a bite registration. At this point, centric relation was equal to maximum intercuspal position (MIP). The E4D Dentist System system's clone feature copied the occlusion of the provisionals exactly (Fig. 14).

The software, DentaLogic, allows the clinician to superimpose the provisional "clone" model over the restoration design to determine accuracy (Fig. 15). One of the most powerful features of the software is the ability to turn the clone model clear and analyze how accurately the software has copied the anatomy and occlusion. The accuracy of this is within microns and an intuitive color map displays the discrepancy that exists between the temporaries and the final crown design (Fig. 15).

The restorations were milled and prepared by etching with 4.9 percent hydrofluoric acid for 20 seconds and silanating for 60 seconds. The tooth was then pumiced, curing solution applied and cured for 20 seconds. The restoration was then ready for cementation.

The occlusion was identical to the provisional and thus no adjustments were needed on the day of delivery. With the option now to use IPS e.max HT, this case had a better esthetic result because the LT block appears slightly monochromatic and opaque.

Summary

Dental patients typically want tooth-colored indirect restorations; and with the newer ceramics that are available for chairside milling, the same high-quality ceramic restorations that labs are producing can be fabricated in a single appointment.

With a chairside CAD/CAM system, large, technique-sensitive and inferior direct resins require less treatment planning because milled IPS e.max onlays can take their place. Chairside CAD/

CAM dentistry is not the only way to provide patients with high-quality restorations, but it certainly is the most exciting from both a clinician's and patient's viewpoint.

Multiple-visit, single-unit restorations; single-unit temporaries; difficult resins; expensive monthly fabrication fees; and bonding restorations after weeks of contamination with temporary cement and saliva is routine for most dentists who have not invested in CAD/CAM technology. The old adage "what you don't know you don't miss" holds true.

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‘restorations that were conventionally cemented performed just as well as those that were bonded’

about the author



Wally Renne, DMD, is a 2003 graduate of the College of Charleston and a 2008 graduate of the Medical University of South Carolina (MUSC) College of Dental Medicine. He is active in undergraduate dental education and holds a full time faculty position in the department of oral rehabilitation at MUSC. He is the course director for CAD/CAM technologies and ceramics and runs the E4D CAD/CAM clinic at MUSC. Renne maintains an active general dentistry practice utilizing both the CEREC AC and E4D Dentist System. His special interests in patient treatment include advances in CAD/CAM dentistry, adhesive dentistry and conservative dentistry. He is active in dental research and currently has a patent pending for a new dental adhesive that is permanently antimicrobial and has revolutionary bond durability components that prevent enzyme degradation of the hybrid layer. This bonding agent may prevent recurrent caries and bond breakdown in the long term.

CAD/CAM

Using in-office CAD/CAM technology and lithium disilicate to fabricate efficient and predictable restorations

Author John C. Schwartz, DDS

c.e. credit part 2

This article qualifies for C.E. credit. To take the C.E. quiz, log on to www.dtstudyclub.com. The quiz will be available on Aug. 3.

In today's fast-paced world, instant gratification is expected to be synonymous with worthwhile results. This also applies to dental treatments. While there have been many recent technological innovations specifically for chairside restorations, dentists have faced complications when mastering complex and time-consuming protocols.

The E4D Dentist System™ (D4D Technologies) eliminates those obstacles by providing outstanding clinical results in a single visit using intuitive, efficient and state-of-the-art technologies.

The E4D Dentist System's three-dimensional software simplifies designing and milling multiple restorations. This provides dentists with more control over the esthetic process. The E4D in-office CAD/CAM system is equipped with a high-speed intraoral laser scanner for capturing digital impressions, which provides restorations with better-quality fit and function because it incorporates intraoral digital impressions, traditional impressions and models.

The E4D Dentist System streamlines work for dentists, who gain the enhanced confidence of pro-

ducing reliable restorations for every patient case. Meanwhile, patients receive both enhanced and more efficient care with faster treatment times.

Contributing to efficiency and accuracy is the E4D design software, which facilitates required modifications to finalize restorative designs in record time.

Restorative designs are then sent to the E4D precision milling unit, which incorporates dual spindles and diamond burs to efficiently form CAD materials into restorations that exhibit exceptional fit, maximized strength and lifelike esthetics. In fact, restorations fabricated using CAD/CAM processing have demonstrated less chipping or fracturing, which enhances the predictability of the restoration.¹

Among the materials that can be processed chairside with the E4D Dentist System is lithium disilicate (IPS e.max® CAD, Ivoclar Vivadent), which is available for processing CAD/CAM restorations indicated for placement in the anterior and posterior.

The material is also indicated for an assortment of dental procedures, including partial and full coverage inlays and onlays, thin veneers (0.3 mm) and implant

Fig. 1 A preoperative, buccal view of the patient's smile revealing unsightly crown margins and gold restorations. (Photos/Provided by Dr. John C. Schwartz)

Fig. 2 Preoperative occlusal view of the patient's unsatisfactory restorations.



Fig. 1



Fig. 2

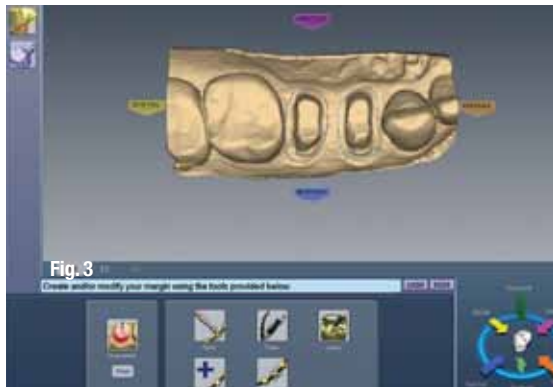


Fig. 3

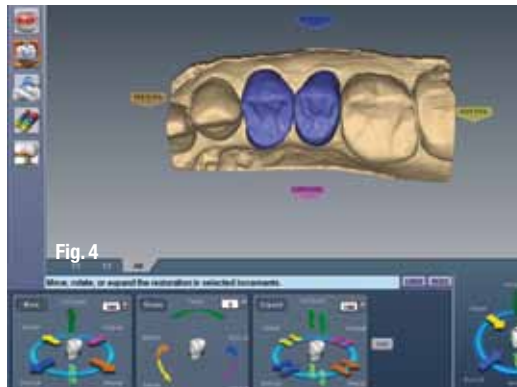


Fig. 4

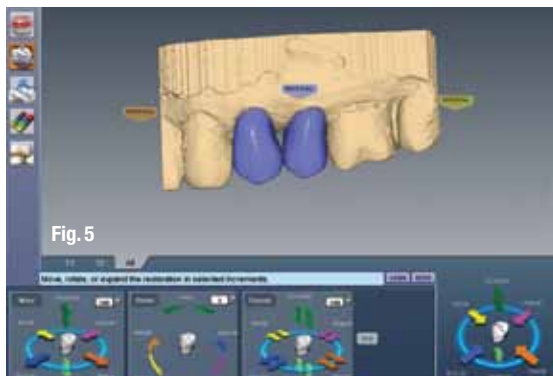


Fig. 5

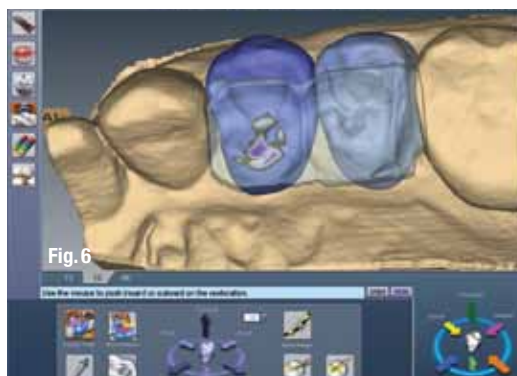


Fig. 6

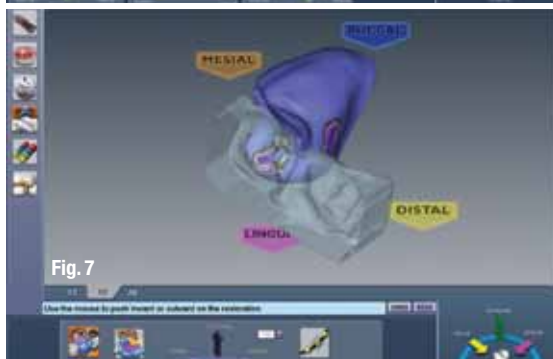


Fig. 7

Fig. 3_Scan of the patient's prepared teeth with margins identified.

Fig. 4_View of the CAD proposals created utilizing Autogenesis.

Fig. 5_Buccal view of the CAD proposals.

Fig. 6_Optimization of CAD proposal to account for occlusion and contact pressure.

Fig. 7_Optimization of CAD proposal with model and occlusion in place.

superstructures. Lithium-disilicate glass ceramic trumps traditional ceramic materials because of its durability and high flexural strength values.

Case presentation

A 55-year-old woman presented requesting removal of the maxillary left bicuspid and molar crowns. Their unsightly margins and the gold restorations were visible in her smile (Figs. 1, 2), and the patient had grown weary of their unsettling and lackluster appearance. Her goal was to whiten her dull-looking teeth in order to reflect the brighter color of her natural anterior dentition.

In-office CAD/CAM restorations (IPS e.max CAD) were discussed with and agreed to by the patient. The optical qualities of IPS e.max CAD, which include a fairly low refractive index, optimal light transmission and lifelike translucency, would provide natural-appearing and highly esthetic restorations.^{2,3}

Preparation and digital impression taking

The existing crown restorations were removed and the teeth were prepared for IPS e.max CAD crowns. Preparations included a 2 mm occlusal reduction and a 1–1.2 mm shouldered margin. A scan was performed of the patient's arch and prepared teeth, and the margins were identified (Fig. 3).

Digital restoration creation

The autogenesis feature in the E4D DentaLogic intuitive software was used in conjunction with E4D CAD proposals (Fig. 4), which incorporated images of the buccal and occlusal aspects (Figs. 5, 6) and contact intensity (Fig. 7).

The restorations were designed and then sent to the E4D milling unit, where lithium-disilicate high-translucent (HT) blocks (IPS e.max) were milled. After completion, the monophasic crowns were first tried in the patient's mouth to appraise fit, contour and anatomical harmony, then crystallized.

Fig. 8_The internal aspects of the crowns are cleaned, etched and silanated.



Fig. 8

Fig. 9_Ceramic Etching Gel is applied for 20 seconds, rinsed with water and dried. In preparation for silanating using Monobond Plus primer.



Fig. 9

Fig. 10_The Monobond Plus Primer was applied with a microbrush for 60 seconds.



Fig. 10

Fig. 11_The preparations are cleaned and three drops each of Multilink A&B solution are mixed in a well.



Fig. 11

Customization

The restorations were removed from the furnace, then cleaned and dried. To fulfill the patient's desired goal of having a more natural colored smile, the restorations were appropriately stained and glazed. The ideal shade stain was placed on the tip of a hygienic brush and applied to the restorations.

Once staining was complete, the crowns were fully crystallized and fired. The case was ready for seating using universal cement (Multilink, Ivoclar Vivadent).

Cementation

Lithium-disilicate glass ceramic restorations (IPS e.max CAD) can be traditionally cemented or bonded adhesively. As a result, any restrictions that may be presented due to placement or location within the mouth are eliminated.^{4,5}

The internal aspects of the crowns were cleaned with Ivoclean and etched with Ceramic Etching Gel. The Ceramic Etching Gel was applied for 20 seconds, rinsed with water and dried in preparation for silanating using the Monobond Plus Primer (Fig. 9).

The Monobond Plus Primer was applied with a microbrush for 60 seconds to the internal surfaces of the restorations to ensure a sound bond between

the restorations and cement, as well as increase bond strength (Fig. 10). Excess primer was air dried.

The solution was then applied to the prepared teeth and allowed to sit for 40 seconds. The Multilink A&B solution (Fig. 11) was air blown gently to remove excess. Note that the patient's surrounding gingival tissues may turn white temporarily (Fig. 12).

Next, the internal aspects of the IPS e.max CAD crowns were loaded with Multilink Automix (Ivoclar Vivadent) (Fig. 13) and seated on both the maxillary left bicuspid and molar with slight pressure applied. The "wave" technique was then used to cure the excess cement to a gel like state, which enabled easy removal (Fig. 14).

Excess cement was removed from interproximal and cervical areas using a microbrush, after which complete polymerization was achieved by curing from the buccal, lingual and distal aspects.

Conclusion

The combination of lithium-disilicate blocks (IPS e.max CAD) and the E4D Dentist System is a state-of-the-art material and technology solution that enhances the predictability, esthetics and ease-of-use of in-office CAD/CAM procedures. Restorations completed with this complementary



Fig. 12



Fig. 14



Fig. 13



Fig. 15



Fig. 16

Fig. 12_Excess Multilink A&B solution is air blown gently to remove excess.

Fig. 13_Multilink Automix cement is loaded into the crowns.

Fig. 14_The crowns are seated and the Wave technique used to facilitate easy cleanup of excess cement.

Fig. 15_Postoperative, buccal view of the patient's restored smile, complete with more natural looking IPS e.max CAD lithium-disilicate crowns.

Fig. 16_Postoperative occlusal view of the final chairside fabricated E4D restorations.

combination demonstrate excellent fit, function and esthetics (Figs. 15, 16). As a result, dentists can provide progressive, one-day treatments to patients, eliminating more invasive and time-consuming procedures that can require multiple appointments.

By incorporating the essential components of smile design and accurate scanning, the E4D Dentist System helps to ensure the accuracy and predictability of resulting restorations.

When milled from highly esthetic lithium-disilicate blocks (IPS e.max CAD), the restorations enable dentists to provide exceptional treatments tailored to the patient's authentic esthetic characteristics.

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CAD/CAM technology: Setting the standard and achieving success

Author_Matthew Krieger, DDS

_c.e. credit part 3

This article qualifies for C.E. credit. To take the C.E. quiz, log on to www.dtstudyclub.com. The quiz will be available on Aug. 3.

_As a full-time general dentist, CAD/CAM technology is a subject that has been of significant interest to me. I incorporated CAD/CAM into my practice more than 10 years ago and have been a proponent of the technology and its efficiency ever since.

I began with CEREC® 3, and then graduated to CEREC 3D. After successfully incorporating 3-D technology into my practice, I was excited to see some new faces emerge in the CAD/CAM marketplace. E4D, Itero and Lava COS were all options to consider for digital capture, but only the E4D Dentist System™ and CEREC offered both scan and mill capability in the office.

When the time was right for me to upgrade to the newest technology, the E4D Dentist System by D4D Technologies was just a better fit – literally and figuratively. The software, support, training and results were more in line with my practice goals and vision, and I felt more confident in the longevity of the hardware. While both systems can produce high-quality restorations, I felt that I would be better supported in

achieving restorative success with the E4D Dentist System. I made my decision to switch late in 2010 and have never looked back. Since then, research and development in CAD/CAM restorative materials have exploded. We have a wide variety of material options to choose from to meet all of our restorative and esthetic demands.

My peers routinely ask me about how to use technology most effectively to cope with rising costs and lower margins. I often answer by suggesting that they incorporate chairside CAD/CAM into their practices. I am confident that chairside CAD/CAM is the future of restorative dentistry, not only from a clinical perspective, but also in terms of profitability and marketing.

_Simple economics

Over the last five years, my practice has doubled in revenue. In 2010 it grew 18 percent while other practices were struggling to break even. It consistently

Fig. 1_ Tooth #2 before.

Fig. 2_ Tooth #12 after (same-day IPS e.max).



Fig. 1



Fig. 2



‘It is much easier for patients to accept treatment if they can fit it into their budget, as well as into their schedule.’

produces more than \$1 million on a four-day work week, with an average collection rate of 98 percent. It maintains an overhead of about 55 percent and normally attracts more than 30 new patients per month. I am able to do all of this while participating with more than 15 preferred provider organizations (PPO), as well as several reduced-fee plans and two union plans. I attribute the success of the practice to five key factors (Table 1).

Although every factor plays a critical role in the growth and success of a practice, technology has the most significant impact on my practice's ability to generate high-quality restorative dentistry in a more efficient and less stressful way. My practice utilizes networked office management software with computers in every operatory, office and support area.

In addition to digital radiography, we regularly use intraoral cameras, diode and erbium lasers and, most importantly, chairside CAD/CAM technology. Our ability to provide high-quality dentistry with ease and efficiency relies on the integration and utilization of all of these different technologies, with CAD/CAM being at the center of our restorative treatment appointments.

The decision to purchase and implement new technology can be challenging. In a PPO practice, where fees can be as much as 30 percent lower than in a fee-for-service office, the decision can be even

more intimidating. With a lower potential profit margin, added capital expenditures can have more of an impact on your bottom line. I considered several factors when choosing to add CAD/CAM to my technology armamentarium. Quality, fit and durability of the restorations were the primary focus of my clinical decision. The profitability, practical application and return on my investment were the primary focus of my business decision.

Control and esthetics

Esthetics was a significant concern as well. Would I be able to achieve optimal esthetics with the available materials with same-day CAD/CAM dentistry?

Would the materials available offer enough variety to handle complicated esthetic challenges?

After I completed some additional clinical training in CAD/CAM esthetics, including staining and glazing IPS Empress® and IPS e.max® ceramic (Ivoclar Vivadent), and now the simplified polishing of LAVA Ultimate™ (3M ESPE), I was surprised by how easy it was to achieve great esthetics. I now find myself tackling the more challenging cosmetic cases on my own because I have more control when characterization is done chairside.

The E4D Dentist System also offers the option to have your restorations designed and/or milled offsite

Fig. 3_ Teeth #8 and #9 pre-treatment.

Fig. 4_ Immediate post-treatment (same-day IPS e.max).

Table 1_Five key factors to practice success.

Five key factors to practice success	
Technical skill	Proficiency in clinical, diagnostic and communication skills for the practitioner and team
Team	Highly skilled, motivated, well-trained and easily adaptable individuals
Systems	Clear and effective protocol for clinical, administrative and financial practice management
Marketing	Effective marketing and advertising to generate awareness and new patients
Technology	Cutting-edge technology to increase efficiency and productivity

Table 1



Fig. 5



Fig. 6

Fig. 5_Teeth #13 and #14 pre-treatment.

Fig. 6_ Post-treatment (CAD/CAM IPS e.max Crowns).

Table 2_ The economics of single-visit vs. multiple-visit indirect restorative dentistry.

using the E4D SKY network. For an additional fee, you can actually send your scans to D4D Technologies to expert designers to have your designs or milling completed if you choose. This is a great service for dentists who are new to the technology, are just getting into more advanced restorative/cosmetic cases or want to maximize utilization while still keeping a full schedule.

In addition, the E4D Dentist System (DentaLogic Version 4.5) can import and export open file formats (.stl), providing additional options for utilizing a variety of digital services from laboratories and services through the E4D Sky network.

Not only can it match the esthetics, strength and durability of traditional indirect restorative methods, but CAD/CAM technology can also provide a significant and immediate financial advantage over traditional impression-based dentistry.

It allows a dentist to produce and deliver restorations in one visit.

It reduces overhead by eliminating external fabrication fees and it reduces material costs associated with impressions and provisionalization as well reducing chairtime.

_Scheduling same-day dentistry

Every patient visit costs a practice time and money. Each time a patient is seated we use perishable goods, expend valuable chairtime, utilize staff time and must track and manage scheduling. The average crown delivery visit requires 30 minutes of chairtime and costs a practice more than \$50 in overhead expense.

It is critical to maximize the efficiency with which you provide dentistry in order to remain profitable, and one visit is more efficient than two. The economics of single-visit vs. multiple-visit indirect restorative dentistry is obvious and impactful.

In addition to an increase in total profit and hourly productivity, the dentist has 30–45 minutes of addi-

The economics of single-visit vs. multiple-visit indirect restorative dentistry

Crowns #13, #14	Traditional Restorative Treatment	CAD/CAM Treatment
Visits (time)	150 minutes	135 minutes
Lab cost	\$250	\$0
Materials cost	\$100	\$80
Staff cost	\$40	\$50
Average PPO fee	\$1,722 (\$861 each)	\$1,722 (\$861 each)
Production per hour (fee/time)	\$688.80	\$765
Total profit (fee minus cost)	\$1,372	\$1,592
Down time	15 min	45 min*

* During this procedure, Krieger delivered three IPS Empress CAD/CAM crowns and produced an additional \$565 in direct restorative dentistry in his second chair. The total office production for the two-hour time span was \$2,157.

Table 2

tional down time to produce more dentistry, provide hygiene exams and perform administrative duties.

Beyond the financial return on investment are the intangible and immeasurable benefits that same-day dentistry provides. If a patient does not need a temporary, he or she is certainly less likely to call you over the weekend to have the temporary re-cemented.

If a second visit is not necessary to insert a restoration, then the potential of cancelling, changing or not showing for the appointment is eliminated. This reduces stress and opens up valuable time in your schedule to produce more dentistry profitably.

Marketing same-day dentistry

Whenever I am speaking with dentists or team members about practice management and increasing production, marketing strategies invariably become a topic of discussion. I usually suggest that the best marketing techniques focus on addressing the concerns that our patients have regarding dentistry.

Fear, money, time and discomfort are common barriers to dental treatment. CAD/CAM addresses the issue of time quite well, but for most patients every dental visit represents time away from work, family members or other important tasks. By providing same-day restorative treatment you are saving your patients precious time.

People don't like going to the dentist. It's not personal. It's just not pleasant. Have you ever had a colonoscopy? Not a great memory. Now imagine the thought of a colonoscopy that took not one, but two visits and required you to "wear a temp between each visit that may fall out."

It is much easier for patients to accept treatment if they can fit it into their budget, as well as into their schedule.

Show patients that you value their time and that you have made a significant time/money investment in your practice in order to facilitate the ease and efficiency with which you can provide treatment, and I will show you a great marketing strategy.

Not only is time a major deterrent to treatment acceptance, but so is fear. When patients are told that they need a crown, these are the thoughts and images that come to mind: An awful tasting impression materials or temps that fall out during an important meeting. Ugly gray lines near the gum lines around old crowns. Think about how powerful a marketing tool it is to be able to tell them that in your practice:

- they don't need any impressions (no goo!),
- they don't have to wear a temp,
- there is no metal under the crown so they won't have gray lines,
- and the entire procedure can be done in one visit, during which they will have 30–45 minutes to catch



up on work, return e-mails or just relax and watch TV (I have TVs in all of my operatories).

When that patient leaves with a brand new crown and goes back to work or out with friends, he (or she) is going to talk about what a wonderful and convenient experience he just had in your office. "No, I don't have to go back. My dentist can do crowns in one day." That's how to market your practice, and that's the most significant return on your investment that CAD/CAM has to offer.

By offering CAD/CAM, you are able to address two common and significant barriers to treatment acceptance. Same-day dentistry is a powerful marketing tool, as well as an effective way to increase the frequency with which your patients choose to move ahead with restorative dentistry.

Although the decision to implement new technology into your practice can be stressful and challenging, reduced productivity due to outdated technology should be of greater concern.

Make an investment in your office, your team and your practice, and the results that you see will far outweigh the financial concerns that are preventing you from making a huge leap forward and a difference in your dentistry.

(Photo/Provided by Dr. Matthew Krieger)

_about the author

CAD/CAM



Matthew Krieger, DDS, is a 1998 graduate of New Jersey Dental School. He completed a GPR at Mt. Sinai Hospital in New York City. He started his practice in 2003 and built it into a full-time practice in just one year. He has consistently grossed more than \$1 million since 2006. In addition to running a full-time private practice, Krieger is the founder and CEO of Symposia C.E., and he serves as a practice efficiency consultant with High Performance Dental Consulting. Krieger maintains more than 500 hours of C.E. credits and continues to expand his knowledge in dental practice management.

Marginal/internal crown fit evaluation of CAD/CAM versus press-laboratory all-ceramic crown

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Objectives: To evaluate in vitro marginal and internal fit of all-ceramic between conventional press laboratory-made all-ceramic crowns and CAD/CAM systems.

Methods: Tooth #14 was prepared per standard specification to receive an all-ceramic crown restoration on typodont. The preparation had well-defined, 1 mm circumferential shoulder gingival margin, 2 mm occlusal reduction, rounded internal angles, and less than 20° total occlusal convergence. Forty-five tooth #14 were duplicated and poured in dental stone type V. Each tooth was randomly divided into three groups (n=15) and placed in full-dentate typodont.

All-ceramic CAD/CAM crowns (Group 1) were fabricated with the E4D Dentist System™ (D4D Technologies) according to manufacturer's instructions. For press laboratory-made crowns, impressions were taken on the posterior left region area with two-step impression techniques using a custom triple tray with light and putty consistency VPS. Impressions were sent to two dental laboratories (Group 2 and 3) for fabricating the monolithic press lithium-disilicate crown. All crowns were cemented using Multilink® Automix (Ivoclar Vivadent) under constant

pressure of 100 N. Samples were embedded in acrylic and sectioned buccolingually. Sections were evaluated under digital microscope and measured on three locations per buccal and lingual side of section: marginal edge, mid-axial wall, and cusp tip. Statistical analysis was accomplished with Kruskal-Wallis one-way ANOVA. Significance was predetermined at $p < .05$.

Results: No Significant difference was found at the buccal and lingual margins in all groups. However, there was significant difference for cement thickness in midaxial, cusp and occlusal within the group.

Conclusions: Based on the statistical results there was no statistical difference in marginal fit of all-ceramic crowns made by CAD/CAM system or laboratory press ceramic.

Keywords: CAD/CAM, ceramics, crown, dental materials and Teeth

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(μm±SD)	Buccal			Occlusal	Lingual		
	Margin	Mid-axial	Cusp		Cusp	Mid-axial	Margin
Group 1	(44.88±32.06)	(120.45±45.95)	(95.47±59.99)	(161.05±29.11)	(95±34.53)	(154.6±57.94)	(39.07±32.44)
Group 2	(33.46±38.77)	(183.95±43.16)	(178.15±56.33)	(215.71±35.8)	(167.99±45.12)	(178.89±77.2)	(36.09±38.47)
Group 3	(45.22±41.87)	(150.51±57.96)	(249.42±54.67)	(221.89±111.03)	(238.97±81.14)	(117.51±50.13)	(62.02±49.96)

Complex restorative challenges with the E4D chairside CAD/CAM system

Author_Robert B. Mongrain, DMD

_In my practice, I like to take advantage of new technology to enhance patient outcomes. Using chairside CAD/CAM allows us to utilize new adhesive and ceramic technologies and provide high-strength esthetic restorations in a single visit while preserving natural tooth structure. I have used chairside CAD/CAM since 1998 in various forms, and the E4D Dentist System™ (D4D Technologies) clinically since 2007.

The E4D Dentist System is designed for same-day delivery of full and partial restorations. Clinically versatile, it can also accommodate cases where there may be a need to separate the procedure into two visits. The E4D Dentist System can be used to scan, design and mill all-ceramic restorations.

Virtual models are used to create the appropriate crowns, veneers, inlays, onlays and laboratory-fabricated ceramic bridges, while incorporating the opposing dentition, a wax-up or scans of a provisional or preoperative condition.

With E4D, clinicians can scan both hard and soft tissue, pre- or post-preparation, and record bite registrations. The E4D is the only digital CAD/CAM system with the ability to scan in the mouth, directly on the impression or on a model without using contrast agents or opaueing mediums.

_Case overview

A 32-year-old woman presented with a fractured upper left premolar (tooth #13). Her medical history included high blood pressure, diabetes controlled with oral medications and fibromyalgia. Significant caries was present, and a bitewing radiograph showed carious pulpal exposure.

A variety of restorative options were discussed with the patient, including extraction and implant placement, extraction and insertion of a three-unit bridge or preservation of the tooth with endodontic therapy and crown placement.

The patient elected to maintain the natural tooth, choosing endodontic therapy and an all-ceramic crown for esthetic reasons. The tooth was prepared, the caries removed, endodontic therapy was performed and a temporary filling was placed.

Approximately three weeks after endodontic therapy, the patient returned for a post and core procedure and crown preparation. Upon evaluating the remaining tooth structure after removing the temporary filling, it was determined that a post and core was necessary.

A Premier® Cure-Thru® IntegraPost® was chosen

Fig. 1_Tooth #13 prepared using Two Striper 770.8C for axial reduction and margin finishing.

Fig. 2_Margin evaluation after rinsing off Traxodent (Premier Dental Products) hemostatic retraction paste.



Fig. 1



Fig. 2



Fig. 3

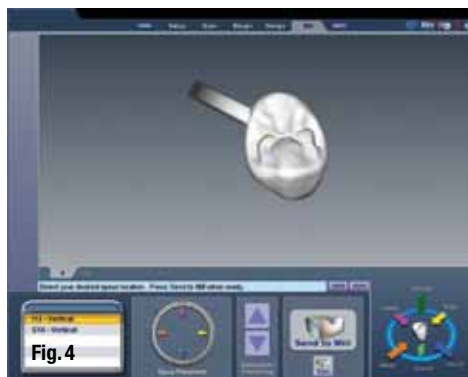


Fig. 4



Fig. 5

Fig. 3_ The margin is easily identified utilizing E4D DentaLogic software (D4D Technologies).

Fig. 4_ E4D DentaLogic software shows final restoration sprue location. Ready to send and mill with Two Striper E4D milling diamonds.

Fig. 5_ IPS e.max CAD (Ivoclar Vivadent) tooth #13 post-op.

because of its esthetic, light-transmitting zirconia glass fiber properties as well as its strength. After the post space was prepared, it was treated with the Premier Integra adhesive system including IntegraBond™, IntegraCem™ resin cement to cement the post and CompCore™ AF Stack for the core build-up.

Preparation

The Two Striper® TS2004.5 coarse football was used for the initial occlusal reduction of the preparation. This spiral football diamond has a maximum width of 2.3 mm, which serves as a depth-guide and allows one to remove enough tooth structure to ensure adequate occlusal clearance.

The Two Striper 770.8 coarse round-end taper was used to create the desired axial reduction and margin finish lines. Diamond bur selection should be based on the block material preparation guidelines, recommended reduction parameters and margin type.

Two Striper brand diamonds supplied by Premier Dental have always been my choice for fast and accurate crown and bridge. Manufactured with natural diamonds and utilizing a technologically advanced bonding process, it is no coincidence that the E4D milling system exclusively uses Two Striper milling diamonds to produce smooth and accurate ceramic restorations.

The patient in this case opted for two shorter appointments. Therefore, an impression was taken of the prepared core build-up to create a physical model that would later be scanned for an E4D single-unit crown.

Critical steps when creating a detailed impression

I can't over emphasize the importance of creating a good prep and obtaining good tissue management in order to make a superior digital or conventional impression. Obtaining a good impression requires adequate tissue retraction and hemostasis. To effectively capture the preparation margins without

distortion, the preparation must be free of blood, saliva and other fluids.

An alternative to retraction cord soaked in hemostatic agent, which requires packing and can put pressure on as well as tear gingival tissue, is Traxodent® Hemodent® Paste Retraction System by Premier® Dental, which is extruded into the sulcus via a bendable syringe tip.

The syringe tip is placed at an angle to the gingival sulcus without penetrating the sulcus. This facilitates the placement of the material slightly into the sulcus, which is important for adequate hemostasis.

Next, a size-3 anatomically formed retraction cap is carefully placed over the preparation with the scalloping on the working or preparation end, facing interproximally. The patient then gently bites down on the cap. After two minutes, the retraction cap is removed.

The hemostatic retraction paste is thoroughly rinsed using an air-water syringe and a suction tip, leaving an open, retracted sulcus.

Before the impression is made, the preparation margins are evaluated to ensure there is access for the impression material to all the margin areas. In this case, a posterior T-LOC™ Triple Tray® (Premier Dental) was selected for making the impression. This type of tray is wide enough to ensure that it does not impinge on the alveolar process.

Its thin, flexible mesh allows adequate closing into occlusion without distortion, and it has retentive features built into the tray rim to stabilize and retain the impression material without the need for adhesive.

A heavy-body impression material (Imprint 3 Penta Heavy Body, 3M ESPE) was chosen because it offers adequate working time in addition to a short setting time, which minimizes the time the material needs to be in the mouth, adding to patient comfort. The light-body material (Imprint 3 Quick Step Light Body Impression Material, 3M ESPE) was extruded around the prepared tooth and margin areas, while the heavy-body material was loaded into the tray.

The heavy-body material was "overloaded" on both sides of the tray. The tray was then placed in the

mouth and the patient was instructed to close into her maximum interocclusal position for 2.5 minutes. Upon removal, the impression was evaluated to verify all of the margins could be identified.

A temporary crown was fabricated using a bis-acryl, light-cured, temporary composite material placed inside a putty impression matrix of the unprepared tooth. After trimming the margins, adjusting the occlusion and polishing, the temporary was seated and cemented with non-eugenol temporary cement.

Fabricating the final restoration with CAD/CAM

The final restoration for this case was fabricated using IPS e.max® lithium disilicate (HT block shade A2, Ivoclar Vivadent). The preparation side of the dual-arch impression was directly scanned. The restoration was designed utilizing the bite information from the neighboring teeth and the occlusion, ensuring a highly accurate restoration.

After milling, the ceramic CAD glass block, or "blue block," was tried on the model and adjustments were made. IPS e.max stain and glaze were applied and the restoration was crystallized to its final hardness. The chameleon effect and higher strength of the IPS e.max all-ceramic material provides excellent esthetics and resistance to functional forces.

Final restoration delivery

When the patient returned for the final delivery of the restoration, the temporary was removed and the preparation was pumiced to remove any temporary cement residue for optimal bonding.

After try-in of the milled restoration to check for shade, fit, contacts and proper occlusion, any necessary adjustments were made with fine diamonds at medium speed before it was polished. A rubber dam was applied to ensure a dry field. If there is any seepage in the marginal tissue, Traxodent can be applied for two minutes.

Before final seating, the IPS e.max CAD restoration was etched with 5 percent hydrofluoric acid (IPS Ceramic etching gel, Ivoclar Vivadent) for 20 seconds, rinsed and dried thoroughly.

The preparation side of the restoration was then silanated to promote adhesion of the composite to the restoration (Monobond Plus, Ivoclar Vivadent). After being left to react for 60 seconds, the silanating agent was air-dried.

The restoration was seated using a universal, self-etching luting composite (MultiLink transparent, Ivoclar Vivadent). This dual-curing material is designed to be used with a wide variety of indirect restoration materials; it sets quickly and has demon-

strated high-strength bonding values and long-term stability. After the enamel-dentin A/B primer was mixed in a 1:1 ratio in a mixing well, it was applied to the tooth surface with a microbrush and scrubbed vigorously for 15 seconds. The tooth surface was then gently air-dried.

With the Multilink Automix syringe with tip in place, the material was expressed directly into the crown. After the crown was fully seated, the A/B primer was light cured for only two seconds at each line angle to achieve a gel state. Excess cement was immediately removed with an explorer. Contacts were flossed to remove excess cement interproximally. Light curing was completed by curing for 20 seconds each from buccal, lingual and occlusal angles.

The Premier diamond Compo-Strip® was used in the proximal regions to ensure that all cement was removed; final, proper occlusion was confirmed; and the patient was dismissed with postoperative instructions.

Conclusion

The same critical steps required for conventional crown and bridge restorations must be followed in order to achieve a highly functional and esthetic restoration using the E4D CAD/CAM system. Effective tissue management and proper tooth preparation must be accomplished in order to obtain a predictable, functional, long-lasting restoration.

Traxodent Hemodent Paste Retraction System provides effective hemostasis and retraction so that preparation margins can be easily read.

Proper understanding of the Two Stripper diamond geometry can help dentists to efficiently prepare teeth based on the restorative material preparation guidelines.

If these steps are followed, the E4D scanner can effectively detect preparation margins, thereby helping to ensure that your designs are an accurate foundation upon which to build a quality, accurate, durable restoration.

about the author

CAD/CAM



Robert B. Mongrain, DMD, is a 1979 graduate of the University of Florida College of Dentistry. He currently has a private practice in Tulsa, Okla. He is an adjunct faculty at the University of Oklahoma College of Dentistry. He is a member of the AGD, ADA and board member of the Academy of CAD/CAM Dentistry. Mongrain is active as a consultant and speaker on dental materials, digital radiography, digital imaging, CAD/CAM and technology integration. He is a past member of the 3M Council for Innovative Dentistry and past instructor for Dentistry by Design. You may contact him at rbmbike@aol.com.

How E4D and IPS e.max revolutionized a family practice

Author_Carilee Kitchener, RDA

Imagine a technology so advanced it could single-handedly change the way we view dentistry: a state-of-the-art, in-office piece of equipment with the ability to dramatically increase production, enhance patient relations, and increase the overall success of your practice. That's E4D Dentist System™ (D4D Technologies) CAD/CAM technology.

In an effort to keep up with the latest advancements, our practice has been familiarizing itself with CAD/CAM technology since 2005. As with every technology, there was a learning curve, but I immersed myself in the technology — attending every class, watching online training videos, joining study clubs — and by January 2008, I was designing and creating four-plus restorations in a single day.

The E4D Dentist System allowed me the opportunity to expand my knowledge of CAD/CAM and is my prime choice for anterior cases. The intuitive Dental-Logic design software is phenomenal and easy to use, and the IPS e.max® CAD blocks (Ivoclar Vivadent, Amherst, N.Y.) together have totally changed CAD/CAM dentistry.

Many of the previous materials used with CAD/CAM required a minimum thickness of 2 mm to re-

duce the likelihood of ceramic fracture.¹ Many clinical situations do not allow for such aggressive reduction,^{2,3} and furthermore, we were not comfortable removing that amount of natural tooth structure.

The introduction of IPS e.max allows for conservative preparation with a restorative material that is more than three times stronger than traditional porcelains. Veneers with a minimum thickness of 0.4 mm and a strength of 360 MPa can be fabricated from the inherently opalescent material, producing esthetic and strong yet minimally invasive anterior restorations.^{4,5}

The purpose of investing in CAD/CAM was to serve our patients faster and more efficiently with the ability to produce a superior quality restoration in one visit. When we decided to invest in the E4D Dentist System, I viewed it as an opportunity to strengthen our practice foundation and restructure our goals.

Every member of the team was involved in determining the most effective way to utilize the new technology efficiently and productively. All aspects of the practice were considered, including scheduling and recall appointments, room set-up, insurance coding, billing, etc.

Fig. 1 Image of Lakebrink Dental team. (Photos/Provided by Carilee Kitchener)

Fig. 2 Peg laterals previously built up with composite material and repaired diastema. The patient was unhappy with the esthetics.



Fig. 1



Fig. 2

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* The IPS e.max Scientific Report Vol. 01 (2001-2011) is now available at: www.ivoclarvivadent.us/emax/science

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[†] M. Kern et al. "Ten-year results of three-unit bridges made of monolithic lithium disilicate ceramic"; Journal of the American Dental Association; March 2012; 143(3):234-240.
^{††} Mean observation period 4 years IPS e.max Press, 2.5 years IPS e.max CAD.
See The IPS e.max Scientific Report Vol. 1 (2001-2011).

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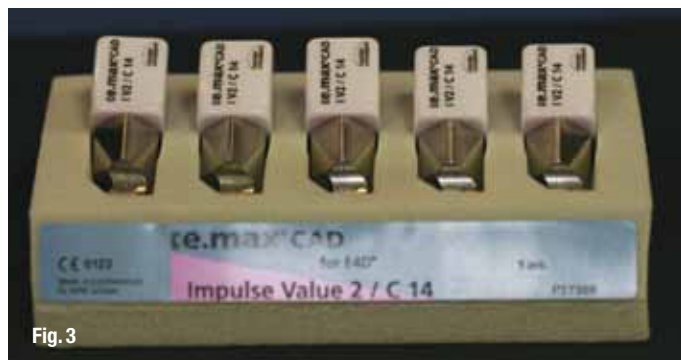


Fig. 3



Fig. 4

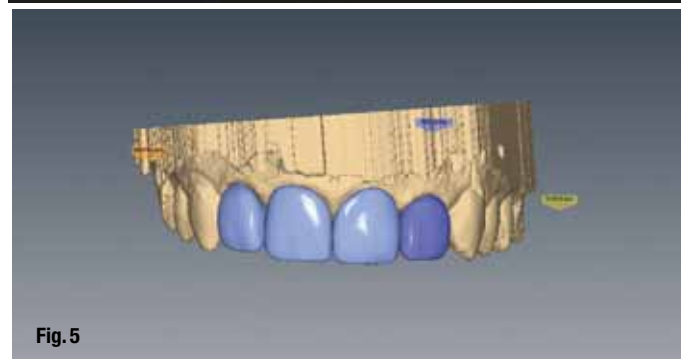


Fig. 5



Fig. 6

Fig. 3._IPS e.max CAD Impulse Value blocks.

Fig. 4._Image of impression for traditional waxup.

Fig. 5._Image of digital waxup.

Fig. 6._Postoperative closeup of anterior restorations.

It is imperative to practice success that everyone on the team be united regarding practice goals and directives, especially during a restructuring. It is a necessity today to utilize all team members to their maximum potential to increase efficiency and productivity and, in turn, practice revenue. Also, when team members feel vital to the practice they feel fulfilled, experience an increase in job satisfaction and are more motivated, resulting in higher employee retention rates and enhanced customer service.

What is unique about our practice is that it is family run. The oldest of five children, I began working for my father, Thomas Lakebrink, DDS, in 1999 straight out of high school (Fig. 1). What I lacked in dental education I made up for in drive. I immersed myself in continuing education courses, from marketing to business to dental anatomy. I've attended courses taught by the most renowned leaders in the profession and learned that there is no limit to success.

My two sisters also work with us. Michele has held the treatment coordinator/patient care position since 2005, and Lauren handles the marketing, new patient and events departments. In a family business, everyone is emotionally invested. More than half of the team that works at Lakebrink Dental has been employed for more than seven years. We've developed deep, trusting relationships with our patients as if they were extended members of our family.

Because we concentrated on selecting employees who share our values, morals, work ethic and caring attitude, patient care has become second nature. Not only are our employees happy to be here

— we actually attract employees — but the family atmosphere is also inviting and comforting to our patients. They far prefer entering a warm and caring environment, where treatment is performed with a genuine concern for their well being than a purely clinical environment with indifferent or disgruntled practitioners.

The E4D Dentist System was a perfect addition to our family. Incorporating E4D into our practice provided us the opportunity to establish ourselves and become highly regarded and irreplaceable oral clinicians in the lives of our patients. Having cutting-edge technology at our fingertips distinguishes our practice from others and is empowering and fulfilling because of the advanced services it enables us to offer patients. With E4D technology and IPS e.max materials, the opportunities for growth and success are endless.

What stands out with the E4D Dentist System is that you are never alone. The D4D Technologies team is like extended family! The E4D Support on Site (S.O.S.), online remote support, provides instant access to hardware and software technicians and dental professionals to guide you every step of the way, making the E4D experience unlike any other. From set-up to milling, the S.O.S. teams work to facilitate a smooth transition, resulting in many effective and successful restorations.

Because the dentist's goal is to treat each patient comprehensively while producing quality dentistry in a timely manner, a major advantage of E4D is the ability to train dental assistants to complete as much

‘Without a doubt, incorporating E4D into our practice has proven to be the most motivating, challenging and gratifying professional experience to date.’

of the process as possible, allowing dentists to do what they do best, produce dentistry. With E4D technology, dental assistants have the opportunity to expand their roles to include intraoral scanning, create scan impressions and models, design the restoration, and once the design has been approved, mill it using innovative materials such as IPS e.max.

The increased job satisfaction among dental assistants is phenomenal, and where local regulations permit, to create a restoration from beginning to end, view the results and witness patient satisfaction due to their efforts is highly motivating and gratifying.

Because E4D frees up the dentist to perform other forms of dentistry, not only does it enhance the role of the assistant, but it also increases productivity. It's a win-win situation. Without a doubt, incorporating E4D into our practice has proven to be the most motivating, challenging and gratifying professional experience to date.

A case in point

A 30-year-old female patient returned for a recall appointment and was unhappy with the shade and shape of her existing tooth structure. Several years prior, composite material was utilized on her anteriors to close a diastema between her anterior central incisors and to resize teeth #7 and #10, which presented as peg laterals (Fig. 2).

Because the patient presented with acceptable tooth alignment, it was agreed upon to utilize E4D CAD/CAM technology to complete the restorations in one visit. Her laterals would be replaced with crowns and her centrals with veneer preparations. Ideal for anterior indications, the IPS e.max CAD Impulse block was the material of choice based on its value system (Fig. 3).

The IPS e.max CAD Impulse blocks are designed with different brightness values from 1, which is the lowest value, to 3 which is the highest, and blocks out darker stumps while retaining a bright, natural look.

This makes it easy to incorporate restorations intraorally that blend magnificently with the surrounding natural tooth structure. The preparation shade was determined and an impression taken and sent to the laboratory for a traditional wax-up (Fig. 4).

Before the preparation appointment, the wax-up was scanned in and converted into a digital copy (Fig.

5). Once the teeth were prepared, the gingival aspects of teeth #7–#10 were lasered for tissue uniformity.

Intraoral scans were taken to match the clone model, and the IPS e.max Impulse block milled and the resulting restorations tried-in. Any necessary adjustments were made before anatomy was added, utilizing a laboratory handpiece, and stains and glazes were applied for individual characterization.

The restoration was fired, cleaned and tried-in using try-in paste. A cement shade was chosen and the restoration seated (Fig. 6).

Acknowledgements

The author would like to thank Jimmy Fincher, CDT, for his dedication and skill as an experienced E4D laboratory technician and mentor.

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CAD/CAM



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There is nothing to fear but fear itself: Don't wait to invest in E4D

Author_Ch Charles Fischer, DDS

Fig. 1 Pretreatment view of the patient with a natural smile. (Photos/ Provided by Dr. Charles Fischer)

Fig. 2 Close-up pretreatment view of the patient's maxillary anterior teeth.

Fig. 3 View of the completed preparations and shade taking for the E4D chairside CAD/CAM restorations.

Fig. 4 Because the patient would receive four anterior maxillary restorations, he was provided with a provisional to allow sufficient time for designing, milling, staining and glazing.

Dentistry continues to evolve with technological advancements. While it's always been my mission and that of my practice to remain current with advances in dentistry, the idea of investing in new technology can be frightening and overwhelming.

Fortunately, the ultimate goal of providing patients with the most effective treatments available encourages dentists to overcome these fears. This was the case when I evaluated the E4D Dental System™ (D4D Technologies) chairside CAD/CAM technology.

Having experienced the clinical results of earlier generations of chairside CAD/CAM systems and concluding that the anatomy was not a good fit for my practice at the time, I was cautious about investing in more recent offerings. My dedication to dental excellence, however, encouraged me to continue looking for ways to better serve my patients, and E4D was the answer.

The fact that respected dental manufacturers, including 3M ESPE, Ivoclar Vivadent and Henry Schein were directly involved with the E4D Dentist System, increased my confidence in the pioneering company behind it and encouraged me to take a closer look. My interest was further piqued with the exceptional anatomy achieved by the system, which was more suited to my needs than earlier generations of chairside systems.

Couple that with the outstanding library of anatomical forms developed by Lee Culp, CDT, and the system's ability to scan an impression rather than being limited to internal scanning of the mouth, and I was sold. For cases where dental professionals are unable to scan in the mouth, the ability to scan an impression is incredibly beneficial.

However, my initial concerns were: Would I see a return on my investment? Would it lower my lab



Fig. 1



Fig. 2



Fig. 3



Fig. 4

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Figs. 5, 6 Natural smile, close-up and retracted postoperative views of the completed E4D restorations that enhanced the esthetics of the patient's smile.

costs and overhead? Would I alienate the ceramist with whom I've been working for years? When I finally invested in the E4D Dentist System, it quickly became apparent that my initial concerns were of no concern at all.

The return on your time and investment begins with the educational factor. Before installing the system, D4D requires a training session. It's a first-class educational experience that allowed me and my staff to get up-and-running right away.

We performed our first crown procedure the day after the system was installed in our office. We started with full-crown single units and were soon performing onlays and two adjacent units in one visit.

With D4D, you are never alone with your system because the online support is awesome. If you have trouble with a design, support staff talk you through it or take over for you with D4D's real-time, interactive Support On Site (S.O.S.).

After the first month, we essentially were running independently. Knowing that D4D representatives are always there if, and when, you need them gives you assurance and confidence. And it doesn't end there. D4D offers numerous advanced courses as well, of which we've taken several, to help rev-up use of the system and our return on investment.

The impact of E4D technology on our practice has far exceeded my expectations. Investing in E4D resulted in faster patient turnaround, lower laboratory costs and lower overhead. The fact that E4D technology allows us to perform a complete crown procedure in one visit "wows" patients, who greatly appreciate the technology because it saves them time and makes their lives easier.

They also notice the pride and excitement it brings to the practice, and they're confident that their dental family cares enough about their health and well being to invest in this advanced technology. Because people always hope for a painless and easy dental

'The impact of E4D technology on our practice has far exceeded my expectations. Investing in E4D resulted in faster patient turnaround, lower laboratory costs and lower overhead.'

procedure, they tell their family and friends, so our practice continues to grow. For practices performing restorative dentistry, E4D is the way to go.

Conclusion

After experiencing E4D technology, I've come to view it as a necessity for future growth. As there are more and more skilled ceramists retiring than there are replacing them in the workforce, E4D chairside technology will be extremely beneficial in the future for enabling dentists to design and mill their own restorations when needed.

On the other hand, more laboratories are investing in digital technology as well. Those of us who work closely with a ceramist can continue to do so, and for me, that is also a major plus.

I've never been so satisfied with an investment or so glad that I didn't allow my fears to hold me back from embracing E4D technology. E4D brings speed and efficiency to your practice. Whether veneers, quadrant dentistry or implant restorations, E4D makes it easy to design, fabricate and deliver predictable and long-lasting restorations.

Contact

CAD/CAM



Charles Fischer, DDS, has been engaged in private practice in Greenwood Village, Co., for 33 years. His practice is focused on adult restorative dentistry and occlusion. He is a graduate of the University of Colorado Health Sciences Center and has dedicated his pursuits to continuing his professional dental education. He has been active in organizing and teaching seminars in occlusion and restorative dentistry. You may contact Fischer at atfischerdds@aol.com.



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With E4D chairside CAD/CAM, ‘old dogs’ can learn new tricks

Author _ Paul Thompson, DDS

Fig. 1 _ Preoperative view of tooth #30 before in-office treatment with the E4D Dentist System. (Photos/Provided by Dr. Paul Thompson)

Fig. 2 _ Postoperative view of tooth #30 after in-office treatment with the E4D Dentist System.

Fig. 3 _ Preoperative view of teeth #18 through #21 before quadrant treatment with the E4D Dentist System.

Fig. 4 _ Postoperative view of teeth #18 through #21 following quadrant treatment with the E4D Dentist System.

_In pursuing dental perfection for our patients, investing in the most innovative and proven technology is of the utmost importance. Unfortunately, when it comes to making that investment and adopting a new treatment method, fear can be a factor holding back many professionals.

My biggest fear regarding investment into chairside CAD/CAM was the cost of entry. However, the E4D Dentist System™ (D4D Technologies) chairside CAD/CAM system is technology with a very fair price tag considering the innovation, education and support provided, and the numerous ways it benefits our practice.

My commitment to maintaining a competitive edge by keeping up with the latest dental technology strengthened my resolve to invest in chairside CAD/CAM technology. I chose the E4D Dentist System rather than earlier generations of the technology when I learned that Lee Culp, CDT, was involved in the design and that Henry Schein was there to provide distribution support.

I've known and respected Culp for 16 years. When I spoke to him regarding the E4D Dentist System, he shared his insight in terms of what the product was capable of. Since then, one thing I've learned from using the system myself is that the advantages you read about E4D are not hype but fact, and I find that refreshing.

The education and support provided with E4D is exemplary. The initial training in Dallas was efficient, precise and comprehensive. A myriad of advanced courses are offered, including smile design.

D4D Technologies is unprecedented in terms of supporting their system by providing onsite setup; training and integration support; a remote design service; remote support from clinical, laboratory, software and hardware experts; and a local support team.

Another concern I had when investing in CAD/CAM technology was whether I would be able to provide the same high-quality, long-lasting restorations using IPS e.max® (Ivoclar Vivadent), which I'd





Fig. 5



Fig. 6

Fig. 5 _Preoperative view of anterior teeth #7–#10.

Fig. 6 _Postoperative view of the E4D veneers on teeth #7–#10.

been getting from my lab before purchasing the E4D system. Not only have I been fabricating predictable and long-lasting posterior restorations (Figs. 1, 2), beginning at first with single posterior onlays, inlays and crowns using IPS e.max (Ivoclar Vivadent) and some using composite, but we've added quadrant dentistry (Figs. 3, 4). We're also moving into anterior restorations (Figs. 5, 6).

For those of us who are set in our ways and were adults before computers and other advanced technologies were introduced, E4D may present a slight learning curve, depending on how technologically savvy the individual is. However, if I can create long-lasting, predictable and esthetic restorations with the E4D system, anyone can.

At the age of 61, I was accustomed to doing things a certain way. Since investing in the E4D Dentist System, I've taken the advanced classes offered by D4D, and I've recently completed the advanced smile course in order to take full advantage of the system's capabilities.

I would share a few pearls of wisdom with those professionals considering adding E4D technology to their practices. First, learn to prepare the teeth for the CAD/CAM environment, because it may be a different process than you've been accustomed to.

Second, focus on tissue management because when taking any type of impressions, very clear and defined margins are important. Finally, find a

dedicated, trusted assistant to train along with you. In my office, while I focus on preparing the patient's teeth, I rely on the backup and support of my assistant Danielle Ford, who is trained to perform the design and milling.

This workflow decreases patient chair time, increases patient turnaround and, in turn, increases our return on investment. It is a win-win situation for everyone.

_Conclusion

Not only does investing in the E4D Dentist System improve your practice economically, it also improves it perceptually for you, your patients and your staff.

My staff and I are proud to provide our patients with same-day crowns and the myriad benefits that accompany the E4D technology, and our patients are proud that their dental office offers such advanced capabilities. They're impressed with the quick, easy and virtually painless procedures we perform, and your best public relations is a pleased customer!

All in all, I have been very pleased with the E4D Dentist System and D4D Technologies in general. Both the system and the company have performed remarkably.

I'm glad that I invested in E4D in spite of my initial fears. I wouldn't change a thing, and the E4D technology has shifted my practice into the 21st century._

_about the author



Paul Thompson, DDS, is a graduate of Loyola University Dental School, receiving his DDS degree in 1979. Thompson has practiced in Manchester, N.H. for more than 28 years. Thompson continues to be at the forefront of his profession by incorporating lasers, intraoral cameras, digital radiography, computer-guided implant placement and restoration and video imaging into his practice. He was trained by the top esthetic dentists in the United States, and has taken numerous advanced clinical courses that focus on attractive and natural dental restorations. Thompson has been a clinical instructor at the Las Vegas Institute for Advanced Dental Studies, the Pacific Aesthetic Continuum and an adjunct professor of dentistry at the University of Pacific Dental School in San Francisco. His memberships include the American Dental Association, American Academy of Cosmetic Dentistry, New Hampshire Dental Society, Manchester Dental Society and Crown Council Alliance for Optimal Dental Care. You may contact Thompson at (603) 669-6131 or drpaul@newhampshiresmiledentistry.com.

CAD/CAM

Effective social media and marketing strategies in five easy steps

Author_Matthew Petchel

2012 is the year that social media finally takes hold in dental. If you do not believe this, then I apologize for this interruption and you can go back to your music on eight-track tapes. It's been widely proven that social media is a very effective tool when used properly to promote a person, product, company or brand.

Yet, before you go crazy and start posting, pinning and tweeting, take a few minutes and think about the big picture and how it works within your existing/traditional marketing plan.

Social media alone will not save your practice. If you are a sub-standard dentist with an out-of-date practice and snarky staff members, social media is not going to change any of that.

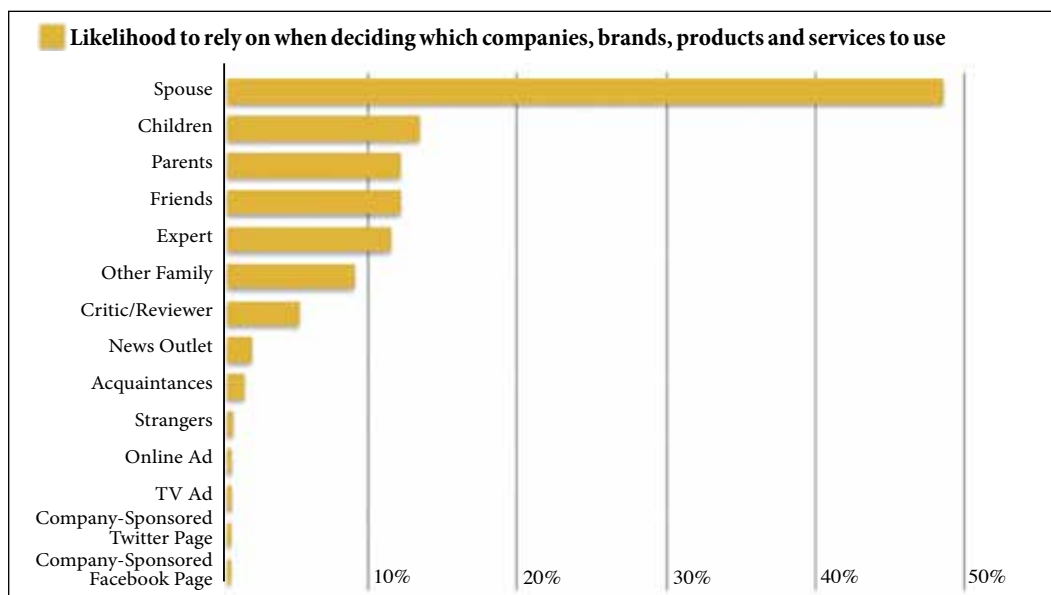
It's important to have it in your tool belt, but you don't want to drive nails with it and it won't measure

a piece of wood. A good tool belt has all the basics that serve specific purposes and work to create something bigger.

Social media is just one tool in your belt. Before we jump into marketing and social media, here are some basic facts on consumer buying habits from a recent Gallup Poll (Table 1)¹ that demonstrate the power of social media:

- 14 percent of consumers trust advertisements
- 78 percent trust peer recommendations
- Spouses influence consumers' decisions more than anything else
- Strangers influence consumers' decisions more than advertising
- 25 percent of search results for top brands are links to user-generated content

Table 1 Key influences on customer decisions. Customers are far more likely to rely on personal recommendations from a spouse or from close friends and family in making decisions rather than company-sponsored online ads, Facebook pages or Twitter feeds, (Source/Gallup)





Hi. My name is John.
I'm a dentist and
I dislike facebook.

THE FIRST STEP TO RECOVERY IS ADMITTING YOU HAVE A PROBLEM. And the problem is integrating social media into your dental practice.

Let's get real. You did not become a dentist to learn social media. And you don't want to be messing around on Facebook and Twitter in-between patients or in your free time - **you're just not wired that way.** You are highly trained to diagnose your patients oral health and give them the smile they desire.

Let's face it, this is something your TEAM should be doing - NOT YOU. As a dentist, you don't answer the phone. You don't schedule patients. And you don't do social media. And no matter what the so-called experts and publications say, you cannot learn social media on a free webinar or do it in 5 minutes a day.

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‘Happy paying customers refer their friends, families and even strangers.’

All this means is that different people are influenced in different ways, and it's clear that referrals from family, friends and strangers are as important as ever. Make sure you are covering your bases and communicating with your targeted group the correct way.

Step 1: Get your brand right

The very first step is to make sure that what you are broadcasting to the world represents you and your practice in the way you want to be seen. If you already know who you are and what kind of practice you are, then skip ahead. However, if you're like many dentists, you're not sure what your brand is — maybe you don't even know what a brand is and how it's relevant to you, a dentist. While the word brand can mean different things to different people, most would agree that a brand is not a tangible thing. It is not a car. It is not a logo. It is not a bottle of beer. It is not a dentist office.

A brand is a consumer's overall feeling and impression of you and your practice that affects whether or not he or she will use your product or service.

For example, Nike's brand is not the shoe or even the logo on the shoes — it's the feeling you get when you put the shoes on that makes you think you could hang with Michael Jordan in a game of one on one. That feeling is what allows Nike to charge a premium for its product when you could probably do just fine in a pair of PF Flyers.

OK, so now that we “sorta, kinda” know what a brand is, the next step is defining your brand. What do you want people to feel when they hear your name or walk into your office?

- Are you a high-tech dentist with CAD/CAM, cone-beam and lasers? Then, you are a high-tech dentist and your patients should know that.
- Do you donate to worthy causes and volunteer in the community? Then, you are a warm-fuzzy dentist and your patients should know that.
- Do you see a ton of kids and they all think you are cool (for a dentist)? Then, you are family-friendly practice.
- Do you speak at tradeshows, corporations and traveling sideshows? Then you are an expert and your patients should know that.
- Do you use social media to promote your practice and connect with your patients? Then, you're a social media dentist.

Keep in mind, this is just a quick list of examples. There are certainly other “brands” you could be and you are probably a little bit of each of these. However, more than likely, one of these categories resonates with you. Pick the brand that feels good to you and wear it proudly.

Step 2: Re-evaluate your traditional marketing

It's easy these days to jump full-bore into social media and forget about all of the traditional marketing methods that have worked in the past and are still relevant. Here are a few basics that you should still be doing.

Optimize your website

It's 2012. Your website should be simple, full of pictures (and video) and easily updateable. If your website requires a Java programmer from another planet to update a picture or some text, your site is not easy to update. Make 2012 the year you simplify your website.

Invest in a quality website design, but remember that it doesn't have to cost a small fortune. The vast majority of your new patients will check out your website before they agree to have you poke around their mouth.

Besides a personal referral, your website is the single biggest factor on whether they will become a new patient, so spend a few \$1,000 and hire a professional. Hire a professional and you won't regret it or need to re-build it in six months. If you already have a workable site, then make sure it is easy to use and can do the following things:

- Patients can make an appointment on your site
- Contact information should be easy to locate
- One-click driving directions (with a big map)
- Pictures of your office and staff
- Testimonials from existing patients (videos)
- Before and after images of existing patients
- Finally, consider referring to Google Analytics to see how patients currently use your website

Search Engine Optimization

Search Engine Optimization (SEO) simply means that your website is easy to find. SEO makes sure that when a potential patient types in certain keywords into a search engine (such as “cosmetic dentist Fresno

CA"), your website will come up higher in the list than your competitors. Other questions to consider:

- Are new patients able to find you online without scrolling past all of the competition first?
- Do the search engines even know you exist?
- If you are not doing SEO, get going quickly.

E-mail and text

Countless studies have shown that it's easier to keep an existing patient than it is to find a new one. And because your patients do not want you to stop by for Sunday dinner or call them at home, you should ask them how they want to be contacted.

E-mail is now one of the most trusted brand communication channels because (nearly) everyone uses e-mail. In addition, there are still plenty of people that are either not using social media at all or just use it casually. By now, you should have exported or mail-merged a list out of your practice management software. Contact this list monthly with timely reminders or holiday promotions and bonus points, or consider one-to-one e-mails as they are even more effective.

Radio and TV ads, direct mail

Depending on your market and your brand message, these tried-and-true methods might still be right for you. I personally know several dentists who successfully run TV and radio ads to bring in new patients.

Step 3: Optimize social media

You're probably thinking, man, did I have to read a lot of words just to get the part about social media. Congratulations, you made it! Here are the basic stats on social media:

- 901 million Facebook users worldwide
- 800 million users on YouTube every month
- 1 trillion video playbacks on YouTube
- 225 million Twitter accounts
- 100 million Twitter users worldwide (44 percent are only reading and not posting)

Set goals

What would you consider to be a successful marketing result before you begin? Revenue, number of new patients, phone calls per day, etc.?

Identify your target audience

As with any type of marketing campaign, you need to know whom you are talking to before you start talking. Who makes your practice what it is? Go where they are. If your practice is younger and you see a lot of kids, then your strategy will be different than an adult practice in a rural area.

Setup your social-media platform

YouTube, Facebook, Twitter, LinkedIn, etc., ... the venues you should choose are based on your personality and your target audience behavior. These venues will be your home base for outbound social media campaigns and provide a place for your happy patients to share their experiences.

It's now relatively easy to tie all of your social personas together so that when you post a video on YouTube, it automatically sends a Facebook post and Twitter feed. Tools such as HootSuite and TweetDeck make this process extremely easy to accomplish.

Optimize your blog (SEO)

Does your practice maintain a daily blog where you and your staff can share news and information about what's going in the office? Blogs and video are the main drivers of new search engine traffic to your website. If you have already optimized your website, a blog will bring you new patients or good prospects when they see how involved your practice is with its patients.

Manage your reputation

Profiles on review sites are incredibly important. These are places where patients go specifically to rate your services. Google Places, Yelp, Manta, Angie's List and others are but a few of the many that are out there. Make sure your information on these sites is correct and then make sure to have them monitored for any reviews that appear.

It is important that you ask your patients for good reviews, but it is also important to respond to any negative reviews that might show up. Believe it or not, a great response to a negative review can actually drive patients into your office.

Start posting and feed the social engine

Once you're optimized and your social media platform is set-up, you are ready to create a content calendar and work it into your monthly, weekly and sometimes daily routine.

You don't need to post every minute of every day — leave that to the Kardashians — but you should post a few times a week to keep things fresh. This should be a team effort, so you will not be doing this yourself. Surprisingly, this will be the hardest thing to implement into your practice as it requires time, skill and consistency.

Facebook: Pictures are worth 1,000 fans

Facebook deserves special mention and it is literally a book of faces. Happy, smiling patients, staff, family and friends are what prospective fans want to see.

So dust off that Flip video camera and photograph or video something ... anything. The more ways you

SOCIAL MEDIA AND MARKETING STRATEGIES



(Image/Provided by Matthew Petchel)

_contact

CAD/CAM



Matthew Petchel is founder of Brand Target Advertising and Get Social Dental. Get Social Dental is the dental industry's single source for training, education and monthly, managed services for dental practices. Petchel speaks to dentists and dental offices about how to grow their practice and build their brand. You may reach him at matthew@getsocialdental.com.

can figure out how to make photo posts to your Facebook business page the better you'll entertain and engage you audience.

When your patients see and then share with their friends, the exponential reach that is possible will directly bring you new, ready-to-take-action patients.

_Step 4: Engage and integrate

Consumer engagement is a big buzz term these days. The days of engaging with your patients once every six months chairside is long gone and about as effective as a Yellow Pages ad. Your patients want more from you. You just have to figure out what they want and how often they want it.

Maybe it's a promotion or a news story about your practice or a new hire. Give them something or they will eventually connect with a dentist who they feel wants them more than you do.

No marketing strategy is a silver bullet. Integrate social media into traditional marketing with promotions, contests and giveaways. Most importantly, try something new and have fun engaging with your patients.

If the experience is fun for your patients, you will get the result you most desire: happy paying customers who will refer their friends, families and even strangers!

_Step 5: Track and repeat

If your front desk is not asking new patients what brought them in the door, you have no idea what is working and what isn't.

John Wanamaker said it best when he said, "I know that half of my advertising dollars are wasted, I just don't know which half." The thing is that he said that more than 100 years ago (just before indoor plumbing and social media). You can do better, and it's really not very difficult.

Tracking success is vital in the new marketing age. I encourage you to figure out what is working and keep doing it until it doesn't work anymore.

This will be the easiest change you can make immediately. Google Analytics is a free, industry-leading resource. Sign up, add it to your sites and learn each time to do better next time.

So, dust off your tool belt and add a little social media to your arsenal.

At this point, the question isn't really if you're going to participate in social media, it's how well do you want to do it.

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Signs of the times

Author_Jason J. Krause, MBA

If you are reading this, you've either invested or have considered investing in one of the greatest technologies in the dental profession — chairside CAD/CAM dentistry. Any hesitation is probably based on one or more issues, including the return on investment (ROI), the quality of the final result and the question of how your patients will learn about or react to it — and will they see the benefits?

Suffice it to say, unless you tell your patients (and the patients of other practices) which unique services or attributes your office provides, no one else will.

While the CAD/CAM companies each provide some methods and materials through patient marketing kits to communicate to your community your newly added services, it is important that you consider all options to maximize awareness and realize your ROI sooner rather than later. So how do you inform your patients about what this means to them?

One result of implementing chairside CAD/CAM dentistry is one of the greatest customer service benefits you can offer your patients: dentistry on their schedule and under your control. In fact, this technology can elevate the quality of your dentistry, and you shouldn't hesitate to tell others about it.

Moreover, the easiest and fastest way to get your current and future patient base to know about your new investment is setting up a Facebook or a Pin-

terest account and taking advantage of these free marketing tools.

Here is a remarkable statistic published online by *USA Today's* Technology Live website in October 2010. As of that date, there were 6.8 billion people in the world, 1.96 billion Internet users and 517 million Facebook users.

As Byron Acohido, author of the piece noted: "Put another way: about seven percent of the world's humans are on Facebook." Just over a year later, Facebook notes on its statistics page that there are now 800 million active users of the social media network.

How many of those Facebook users need dentistry and how many are accessing dental providers via smartphones? Consider this: Facebook's statistics page says there are 350 million users who actively interact with Facebook via their smartphones. Therefore, it's a safe bet you want your new technology, reputation and your entire practice online and mobile.

Digital sign in reception room

If you couple your practice's social media with patient smartphones and then add patient-engaging digital signage to your reception area, you create an important marketing and education opportunity.

Promote chairside CAD/CAM in your practice by using social networking to get your patients to be walking and talking billboards for you.

(Images/Provided by Dr. Jason J. Krause)



A digital sign in your reception area with a real-time Facebook feed gives patients the opportunity to communicate with your practice.

With Dental Clinic's eAssistant you now have a chance to market your practice via a digital sign/message board within the reception/waiting room in your office. Digital Clinic has created a technology that will allow dentists to put an interactive and informative "digital sign" within their reception area, but at the same time allow the interaction with any social media network the practice is utilizing.

This breakthrough technology allows real-time Facebook feeds to be displayed within the reception room, giving patients the opportunity to communicate with the practice.

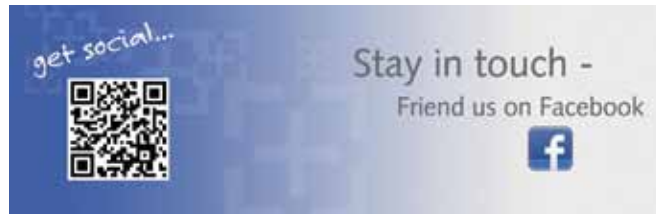
This is the first of its kind and if you want to market your same-day restorative services and other digital technologies to the masses, there is no better way than increasing your "likes" on Facebook and spreading the word via the "social media express".

Leveraging social media in this way will give patients a virtual bulletin board on which to post reviews and pictures, as well as give them a way to learn about procedures and new technology such as the E4D Dentist System™ (D4D Technologies). The best outcome for a practice maximizing social media is to get patients to refer family and friends, while minimizing your investment.

Get your patients to be walking and talking billboards for you. The already amazing news for dentists looking to take advantage of the social media trend is that many patients are already quite familiar and confident with Facebook. In fact, people are on Facebook one out of every seven minutes on the Internet, and Facebook has now passed Google as the most widely used marketing method for local suppliers.

It's not just Facebook

It's also important to note that Facebook isn't the only social media platform that can be leveraged for digital signage content. Twitter and the new Pinterest easily fit into the same mold as a convenient way to let patients publicly interact with one another on a digital sign via their smartphones. A dentist has only a small window of time with his or her patients and that



time usually is only two times every year. Therefore, trying to engage your patients while they're waiting for you is only logical.

A digital sign gives you an opportunity to talk about your practice on a personal level and creates a more intimate environment. The overall goal is to relax a patient as he or she waits, with entertainment and education ultimately cutting the perceived wait time but also providing information on the unique aspects of your practice.

As a small business owner, you should consider what digital signage content to present to your patients, while remembering to add engaging, attention-grabbing elements to your digital signage. This may be no further than Digital Clinic's eAssistant.

With the integration of video clips demonstrating that same day-dentistry is available (via D4D) and live Facebook feeds, your patients will be amazed at how tech savvy your practice is, and these patients will spread the word for you!_

about the author

CAD/CAM



Jason J. Krause, MBA, is an accomplished social media speaker and is nationally recognized as a social media consultant. In his current role as vice president of Digital Clinic he is building a new company based upon digital patient engagement technology and social media integration. His passion and expertise is in dental outreach, and he has served in more than 30 events in more than 10 states. These events propelled him to cofound with Bill Busch, DMD, MAGD, the dental nonprofit TeamSmile (www.teamsmile.org). Krause and Busch have been working together in creating a new outreach program that makes volunteering easy and fun. This program has been in eight major cities and has worked with the NFL, MLB, PGA, NBA and NHL. You may contact Krause at jason.krause@digitalclinic.com. Please visit www.digitalclinic.com for more information as well.

Tools for making prudent decisions

Author_Robert Willis, DDS

_For most dentists, the main objective of attaining a dental degree is so they can apply their trade and help patients enjoy the benefits of good dental health. We tend to enjoy dentistry, getting to work with a wide variety of people, setting our own schedules, being our own boss and, from time to time, creating much out of not so much.

It's always a good feeling to sit down with a patient who has a dental problem and be able to solve that issue because of our skill set and knowledge base, and have the patient thank us on the spot for helping him.

When we applied to dental school, we knew it was not going to be cheap to attend (plus passing on four years of income in some other field), but felt that it would be a good investment in the long haul.

When we become the owner (Chief Financial Officer) of our dental practice, often times we are asked to make decisions about spending money, so knowing how best to evaluate the difference between cost or investment is critical.

Dental practice owners really need to have an effective method of keeping track of what is going on in their practices and have the tools they need at their fingertips so they can take advantage of opportunities as they present themselves. As the old saying goes, "It is better to be prepared and not have an opportunity, than to have an opportunity and not be prepared."

For more than 20 years, I have worked with dentists around the country, coaching to help them achieve their practice goals, preparing them to be ready for opportunities, then helping evaluate those opportunities to make intelligent and informed decisions.

Unfortunately, most of us dentists don't have simple, easy to implement systems that can expedite the business management processes, so most dentists are at risk when it comes to making well-informed decisions and running highly effective practices.

In this article we are going to focus on one aspect of business management, and that is operating overhead, how best to categorize it and how to get real "apples to apples" comparisons. We are going to look at what happens when you go from all lab work "sent out" to the real effects of having an in-office CAD/CAM machine and how to structure a monthly practice operating overhead worksheet so you will know what's going on in your practice at a moment's notice.

If I spoke with you today to discuss your practice operations and you could not give me up-to-the minute information as shown in Figures 1 and 2, you have work to do. If you don't believe me, think for a second about how long it takes well-run corporate practices to take their pulse.

I can tell you that corporations running multiple practices are getting real time production, collection, accounts receivable, overhead numbers, etc., so they know at any given point in time where they are.

_Calculating costs

We're moving into an era where we have an increasing number of dentists who have in-office CAD/CAM computerized milling machines and, therefore, are not utilizing traditional dental labs as before. If you have one of those machines, my suggestion is that anything you pay, including the monthly payment for the machine, what you pay for the supplies, etc., goes under a sub-category in lab fees.

If you were providing laboratory restorations and you weren't using that machine, you would be paying a lab fee. This now allows you to more easily and accurately (1) compare apples to apples, (2) determine what your real expenses are and (3) evaluate and compare costs per unit for each type of laboratory service.

As we move forward in dentistry, this will be a very important factor. In the past, most have put CAD/CAM monthly payments under equipment and

Practice Operating Statement Worksheet

Use this sheet to determine your actual gross income, expenses, and net income percentage. Include all expenses and income.

Monthly Practice Income		Percent Of
Professional Fees:		Total
Doctor Fees	\$ 57,312.00	Practice
Associate Fees	\$ -	Income
Hygiene Fees	\$ 23,749.00	
Adjustments:		
Patient Refunds	\$ 1,643.29	
Other		
Total Practice Income	\$ 79,417.71	
Monthly Practice Operating Expenses		
Staff Salary/Taxes	\$ 18,742.00	23.60%
Staff Other	\$ 1,578.00	1.99%
Total Staff Comp		25.59%
Equipment	\$ 1,396.00	1.76%
Facility	\$ 3,742.34	4.71%
Lab Costs	\$ 9,428.21	11.87%
Dental Supplies	\$ 5,459.94	6.87%
Office Expense	\$ 1,436.58	1.81%
Misc. Expenses	\$ 9,247.19	11.64%
Total Operating Costs	\$ 51,030.26	64.26%
Practice Operating Profit	\$ 28,387.45	35.74%

Fig. 1

Practice Operating Statement Worksheet

Use this sheet to determine your actual gross income, expenses, and net income percentage. Include all expenses and income.

Monthly Practice Income		Percent Of
Professional Fees:		Total
Doctor Fees	\$ 61,339.00	Practice
Associate Fees	\$ -	Income
Hygiene Fees	\$ 22,884.00	
Adjustments:		
Patient Refunds	\$ 1,487.32	
Other		
Total Practice Income	\$ 82,735.68	
Monthly Practice Operating Expenses		
Staff Salary/Taxes	\$ 19,668.00	23.77%
Staff Other	\$ 1,578.00	1.91%
Total Staff Comp		25.68%
Equipment	\$ 1,396.00	1.69%
Facility	\$ 3,911.56	4.73%
Lab Costs	\$ 5,079.43	6.14%
Dental Supplies	\$ 4,998.67	6.04%
Office Expense	\$ 1,663.32	2.01%
Misc. Expenses	\$ 8,947.26	10.81%
Total Operating Costs	\$ 47,242.24	57.10%
Practice Operating Profit	\$ 35,493.44	42.90%

Fig. 2

CAD/CAM supplies under dental supplies when in actuality they are neither, because the truth of it is: That particular piece of equipment has a specific use and it's really a laboratory-use function.

For the purpose of really knowing your costs and determining profitability (and pricing) on your comprehensive profit and loss statement, you will probably want to subdivide the laboratory expense category into:

- Fixed prosthetics
- Removable prosthetics
- Implant prosthetics
- CAD/CAM prosthetics
- Appliances
- Ortho

You could further break down CAD/CAM prosthetics into:

- Lease payment
- Supplies
- Repairs and maintenance

Doing it this way will allow you to see each part of the equation and how you are doing at a glance. Your accountant can handle the expenses from a tax standpoint in a manner the two of you decide, but if you plan to be a successful dental practice owner, you need up-to-the minute data on a real cash in

and cash out basis. Having an operating budget and tracking operating expenses will provide you what you need, when you need it.

Cost example

I am reminded of a client I worked with to put together a long-term plan on positioning her practice to lessen the effects of dental insurance; to make sure she had the best team on board; to raise the level of service and services in the practice; and to be well positioned for the changes happening in dentistry.

One of the practice operating expenses was laboratory expenses, which at the time were running about \$9,400 a month for outside lab services, mostly fixed prosthetics and crown and bridge work.

The dentist was discussing the "cost" of a CAD/CAM system, which was more than \$100,000 at the time, and this big number had her concerned. We discussed cost versus return on investment (ROI), and once the comparison was calculated, the decision was made to move ahead. The month following the introduction of the practice's CAD/CAM machine was a revelation.

Outside lab dropped to just under \$1,500, a \$7,900 decrease. CAD/CAM related costs were about \$3,600, giving a net gain of \$4,300. The dentist was elated, but soon found that was only part of the story.

The marketing value from having the equipment was useful in attracting some additional patients.

Fig 1 Before this practice's investment in a CAD/CAM system, it is spending about \$9,400 per month on lab expenses (under the "Lab Costs" line item). (Images/Provided by Dr. Robert Willis)

Fig. 2 A month after introduction of the practice's CAD/CAM system (payments categorized under "Lab Costs" to enable clear before-and-after comparison), not only are lab expenses and thus overall operating costs lower, but total practice income is higher because of new patients the CAD/CAM services helped to attract and expanded treatment they enabled. Not shown: A year later, net gains are even higher compared with the previous 12 months.

‘CAD/CAM is a no brainer if you provide restorative and crown and bridge services’

The dentist did more onlays and an occasional inlay, and she did more quadrant treatment on patients due to convenience for the patient.

Fast forward 12 months, and net gain for the practice compared with the previous 12 months (when only outside lab services were being used) was more than \$63,000. I'm not sure where else in your practice you can do the same procedure and increase the revenue to that extent.

The most significant impact CAD/CAM has had has been financially. The expense of a CAD/CAM machine, in most practices, can replace 75 percent or more of a practice's lab costs. This should be a significant increase in net profit without having to increase production. It's a real no-brainer if you provide restorative and crown and bridge services in your practice.

In addition, when you invest in chairside CAD/CAM, patients will see that your office is not only high-tech and up to date on the latest procedures, but also seeks to save them time and money. This leads to more referrals and the ability to do restorations in one visit and more quadrant dentistry.

The laboratory expense is but one of eight major categories that all dentists should have laid out in their operating statements.

What to look for in your operating overhead statement

Reviewing an operating statement is important in evaluating what is going on financially in a practice and seeing if there are areas that are getting off track and need to be redirected.

If you really want to know where the operating expenses fall, you need to properly categorize the expenses so you can determine at a glance the direction of the practice. You need to be able to see this at a moment's notice, not in a report that you get 30 days or more after the end of the quarter. No real business would operate without up-to-the-minute facts, so why would you?

- *Staff salaries/taxes (20–23 percent for general practices, including hygiene comp.):* This includes the staff compensation plus any taxes you pay on behalf of the staff.

- *Team, other (up to 3 percent):* Generally includes team benefits such as insurance, pension contribution, staff C.E. costs, gifts for staff, etc.

- *Lab fees (9–15 percent):* This includes all outside lab costs, any CAD/CAM materials/supplies and the cost of the CAD/CAM machine.

- *Dental supplies (6–7 percent for total supplies):* This would include normal disposable dental supplies used daily, restorative supplies, impression materials and patient products.

- *Facility expense (3–5 percent):* This includes rent or mortgage payment, utilities, facility maintenance and property taxes.

- *Equipment (3–5 percent):* This includes equipment leases or purchases, repair and maintenance for equipment, and annual taxes assessed and paid on the equipment you have.

- *Office supplies (1–2 percent):* This includes administrative items and supplies, postage and printing, computer services and any other administrative costs.

- *Miscellaneous expenses (7–10 percent):* This includes marketing costs, bank charges, books/subscriptions, consulting fees, dues, licenses, interest expense, legal and accounting expenses, travel/entertainment, telephone costs and other expenses.

You will have some expenses that are one-time expenses, such as paying a year's insurance in advance, which will throw your percentages off, but will even out over time.

The important thing is to understand why it is. If you are not sure, those items will bear further investigation. Note that this will be only a few items each year, so the time spent investigating these will be minimal.

about the author

CAD/CAM



Robert Willis, DDS, working with www.dentalcoach.com has been helping CAD/CAM users for more than 20 years and has extensive experience in strategic planning for dentists, streamlining practice operations, private coaching, in-office consulting and training, practice growth strategies and

transitions, and comprehensive practice assessments. For more information, call him at (800) 866-0655 or e-mail drwillis@dentalcoach.com.



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The ‘next big thing’

Author_Bruce Lipsig, Director of Imaging for Henry Schein Dental

I recently read a magazine article where the president of one of the leading technology companies in the world was asked what he thought would be the “next big thing” in technology. His answer was along the lines of how amazing cone-beam technology is all by itself. However, I would add that when you integrate that with CAD/CAM, you have the foundation of what could very well be the next big wave in dentistry — computer-guided treatment.

When you dig a bit deeper, what you’ll find is two-fold. These two technologies — cone-beam and CAD/CAM — are some of the most impressive advances in dental technology. Yet, when combined, the sum of these technologies can do even more than either one could do by itself.

Some things are better together. Not only can incredible technologies such as these be integrated with each other, they can be taken even further than integration as far as how they can serve the practitioner.

This brings to mind one of the newest industry buzz words today. That word is “automation”.

Early on in technology, the buzz word was “integration,” meaning the ability for two systems to talk back and forth (or just one way), thus allowing those systems to work more closely together, and this was better for the clinician. A good example of this would be the integration between practice management (PM) software and imaging software.

In the past, we had to enter patient ID information into our imaging application as well as our practice management application (double data entry). This was helped along dramatically by linking together the PM and imaging software through some sort of communication bridge that would allow us to enter patient data once in the PM software and then have it automatically appear (or be automatically created) in the imaging software.

This integration became the standard method of interface for many of the technologies you see today as we try to keep all of the digital data found in the dental office linked properly to the patient record.

While integration was a major step toward usability of digital data in the dental office, the real magic would come with the next step in revolutionizing the dental industry, and that would be “automation.” What used to take three software applications could be done with one. What used to take 12 clicks of the

mouse could be done with four. It is truly automation, to which the dental industry is looking to help take us to the next level of usability for these incredible new technologies.

While one can discuss the integration of cone-beam and CAD/CAM, what is really happening is the automation of treatment planning and the treatment itself. Implant therapy is an excellent example here. What used to take the collaboration of clinicians can now be centralized into one practitioner, who can “quarterback” the procedure given the proper treatment planning application.

Cone-beam technology is capable of capturing incredibly clear anatomical data of the oral cavity, focusing on an area below the gum line where an intra-oral wand from a CAD/CAM system cannot view. At the same time, the intra-oral wand is becoming more widely used than ever before to acquire a digital map of the oral cavity.

Today, if we are treatment planning implant therapy for a patient, we can now combine data from a cone-beam scan (incredible detail below the gum line) with the intra-oral scan from a handheld intra-oral scanner (the highest resolution image for everything above the gum line). While this may be seen by some as integration, one company has taken this technology a step further with automation of these two technologies.

D4D technologies has created an implant planning software application (E4D Compass) that has the ability to take the digital data from both of these technologies and combine it automatically in a single software application. The data created from these two high-tech machines (cone-beam and an intra-oral scanner) can now be paired together automatically in the E4D Compass software, thus enabling the clinician to have more data than ever before from which to diagnose and treatment plan.

While this technology is relatively new, many industry analysts are already touting it as “the next big thing” as we strive for better ways of treatment planning for new techniques and the highest possible standard of care for our patients.

Technology like this uses some of the newest tools in dentistry and then automates their use to a level whereby basic treatment planning for implant therapy can now be done chairside with the patient. This has also brought about a new theory in the implant

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‘restorative driven implant therapy means that we approach the implant therapy by taking into consideration the positioning of the restoration in conjunction with the placement of the implant’

world. That theory is “restorative-driven implant therapy,” which simply means that we approach the implant therapy from the restorative point of view by taking into consideration the positioning of the restoration in conjunction with the placement of the implant, rather than just focusing on the placement of the implant and then leaving the clinician to place the restoration.

Consultative and communicative, this technology has the ability to allow the clinician more control of the implant therapy even if he or she is not placing the implant.

Restorative driven implant therapy has been received well in the dental community and will be adopted more as tools such as cone-beam and CAD/CAM become not only integrated together, but auto-

mated to perform functions that previously needed the collaboration of many specialists.

The automation of these technologies is what will continue to add value to not only each individual technology as they perform separately, but also to the pairing of these two technologies as we strive for the highest standard of care for our patients.

_about the author

CAD/CAM

Bruce Lipsig is the director of imaging for Henry Schein Dental and is also one of the innovators who brought 2-D and 3-D imaging to dentistry.



E4D makes the difference for Dr. Jansen.

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DENTAL

Benefits and realities of incorporating E4D chairside CAD/CAM

Author_ Matthew Felts, DDS

Technology can make professional life easier, and procedures associated with it faster and better, but the idea of mastering technology brings fear into the hearts of many. That's why when considering investing in a major piece of technology, the principal questions are:

- Is it a piece of equipment that can and will be incorporated into the office?
- Will this major investment sit and collect dust?
- What are the true benefits and the real consequences?

Those were my biggest fears and concerns when investing in the E4D Dentist System™ (D4D Technologies), but I can say with not the least bit of reservation that my fears were vanquished. In my practice, the E4D is utilized every day for crowns, onlays and composite restorations.

When I first considered investing in CAD/CAM technology, I checked with my colleagues regarding earlier generations of chairside systems but didn't get the rave reviews I hoped for. I decided upon E4D when I realized Henry Schein, the company from which I purchase most of my equipment, backed it. They're a company I trust and respect, which was a first-class recommendation for me.

What I hoped to accomplish with the E4D was fabricating same-day crowns for most single-unit cases. My expectations were achieved, and from the very start the E4D Dentist System was utilized in every possible case. Investing in the E4D Dentist System proved not to be a financial hardship, but rather a financial windfall.

The ability to produce same-day crowns makes it easy to pay for the E4D system by keeping most of our crown work in-house and reducing our monthly lab bill, which is now allocated toward our investment

(Images/Provided by D4D
Technologies)





in the E4D CAD/CAM technology. The fact that it also allows us to treat more patients on a daily basis contributes to our return on investment. Of course, as with anything, there is a learning curve. However, we started by performing single cases and after a short time, we've progressed to multiple-unit cases.

To make the most of your investment, training and education are of primary importance. I could not imagine investing in the E4D Dentist System and not taking full advantage of as much training and education as humanly possible to maximize its potential. The continuing education and myriad of advanced classes are exceptional.

A vital factor to the success and integration of the E4D Dentist System is educating and training at least one or two of your assistants. By performing all the scanning and digital wax-ups, trained assistants speed up the process by allowing dentists to be more productive in other ways.

With E4D, you're not alone after the initial investment. D4D Technologies is with you every step of the way, which is a welcome convenience and a relief when investing in an advanced piece of technological equipment. The E4D support staff has been indispensable, and in the beginning, we utilized them fully.

They helped to get us up and running quickly and this allowed us to overcome our initial operational insecurities. They were especially instrumental during the period between the initial setup and our participation in the advanced courses.

D4D Technologies provides exceptional support via live, remote Support On Site (S.O.S.) with visual diagnostics, clinical, educational and technical support. They are available whenever you need them. They can talk you through a whole case, if necessary, or even take over a case via remote support and walk you through it.

For those considering E4D CAD/CAM technology, my words of wisdom are to make the most of it. Don't be afraid to use it, and to use it every chance you can from the very start. With experience, the E4D Dentist System becomes faster and easier to use. At first it, may take time, but that will quickly change, especially if your assistants are trained as well.

With regard to procedure, I suggest using the composite blocks for large crown build-ups after endodontic therapy. For example, prepare the tooth, take the impression and have your assistant design and mill the crown.

By the time the endodontic procedure is completed, you have a beautiful composite restoration to seal. That's why it is necessary to train your assistants. It decreases the length of the procedure and chairtime for the patient, which they appreciate, and it increases patient volume, which we appreciate.

The E4D Dentist System has been working great for us. If it has proven beneficial to my small, rural practice, imagine how advantageous it can be in a more urban environment.

My original fear that it would collect dust was unfounded. The E4D Dentist System delivers. _

_about the author

CAD/CAM



Matthew Felts, DDS, is a graduate of University of Missouri-Kansas City dental school. He runs a full-time practice along with his father that specializes in family dentistry in southern New Mexico. When he's not in the office, Felts is an avid outdoorsman.

New CAD/CAM block from 3M ESPE

New block part of an optimized system of CAD/CAM material, adhesive and cement

Author_Brent Fredrickson, DDS

Dentists with in-office CAD/CAM systems understand the importance of maximizing productivity with their machines to gain an optimum return on their investment. To do this, dentists must pay close attention not only to the CAD/CAM system itself, but also to the materials used with the system. CAD/CAM blocks that are difficult to work with or are time-consuming can eat into productivity.

3M ESPE has recently introduced a highly esthetic, extremely strong CAD/CAM block that can help dentists fully maximize their time. 3M® ESPE® Lava® Ultimate CAD/CAM Restorative is made from a unique new material that blends approximately 80 percent nanoceramic particles with a highly cured resin matrix. This material enables a simple, efficient, no-firing process for making CAD/CAM restorations. It can also be polished to an enamel-like luster in just a few minutes.

Unlike traditional glass ceramics, the material is not brittle, giving it high fracture resistance and long-term durability. Finally, it allows users to easily make adjustments, build up or reseal restorations. This material offers a two-fold advantage for saving

time with faster milling and no need for a firing step. The elimination of the firing step alone can save approximately half an hour from the typical in-office CAD/CAM procedure.

Experience with this material has proven the advantage of its less brittle quality resulting in precise milling. The restorations mill out predictably and smoothly, providing an outstanding marginal fit. A scanning electron microscope analysis of Lava Ultimate Restorative versus glass ceramics demonstrates that it exhibits less chipping at the margins.¹

Furthermore, it offers similar or higher compressive strength and higher flexural strength² than leading chairside materials.³ Another important property of Lava Ultimate Restorative is the low wear of opposing enamel. Wear experiments at the University of Minnesota have shown that this material is significantly less wearing on opposing enamel compared with glass ceramic materials.⁴

This nanoceramic material alone is an excellent step toward increasing productivity, but 3M ESPE has also recently introduced two additional components that make the process even simpler: 3M

(Photos/Provided by Dr. Brent Fredrickson)



Fig. 1



Fig. 2



Fig. 3



Fig. 5



Fig. 6

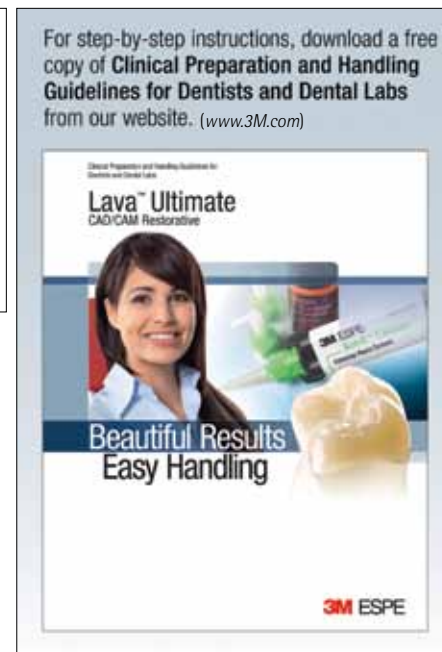


Fig. 7

ESPE Scotchbond™ Universal Adhesive and 3M ESPE RelyX™ Ultimate Adhesive Resin Cement. Since its introduction last year, users of Scotchbond Universal Adhesive have discovered the convenience of having a single-bottle adhesive that can be used on all surfaces in total-etch, self-etch or selective-etch mode.

This gives dentists a flexible tool that lets them stock just one adhesive, no matter what their preferred technique. The results show consistent high bond strengths, as well as almost no postoperative sensitivity.

In addition, the adhesive functions as a metal primer as well as a silane agent for glass ceramics, meaning that the dentist needs no additional products for these purposes. The adhesive's primary use is with light-cured materials, but it can also be used with dual-cured cements, as long as the activator is mixed with the adhesive. Once again, the dentist saves time and energy using this simplified adhesive system.

When Scotchbond Universal adhesive is used with RelyX Ultimate Adhesive Resin Cement, dual-cured bonding becomes even easier. This is because 3M ESPE placed a unique dual-cure activator within the resin cement itself, allowing the dentist to perform indirect restorations with a one-bottle adhesive system. The combination of Scotchbond Universal with RelyX Ultimate makes for a simple and effective CAD/CAM bonding procedure.

This trio of products is designed to help maximize productivity in the dental office, while also providing excellent esthetics, durable restorations and predictable results with low postoperative sensitivity.

With a CAD/CAM material that mills quickly and needs no firing, a versatile adhesive that can be used for nearly any application, and a cement designed specifically to complement the adhesive, dentists have a very useful set of tools for working efficiently.

Scotchbond Universal Adhesive is compatible with various preferred bonding techniques. The RelyX Ultimate Cement, with its dual-cure activator, is designed to work specifically with the Scotchbond adhesive. Together, these products produce a simple, highly effective bonding procedure.

Finally, the properties of Lava Ultimate restorative

make it an appealing option not only for productivity, but also for performance and esthetics. In a posterior case such as the one shown here (Figs. 1–4), where strength is very important, the material's demonstrated durability should give dentists added confidence. The fact that it is gentle on opposing dentition also makes it a good choice for long-term success. These properties alone would make Lava Ultimate Restorative appealing, but when its timesaving benefits are considered as well, the material becomes an even more attractive option.

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_contact CAD/CAM



Brent Fredrickson, DDS, practices in a group private practice in St. Paul, Minn. He is a 1995 graduate of the University of Iowa College of Dentistry. He is an active member of the MOA, ADA and AACD, and his practice focuses on comprehensive and cosmetic dentistry.

New adaptive learning technology for dental teaching institutions

E4D Compare™ is an innovative adaptive learning technology tool for dental teaching institutions that provides students with self-evaluation tools for precise measurement and feedback about the student's sample preparations and restorations and how he or she compares to the institution's standards.

As students progress, they develop digital portfolios that demonstrate their accomplishments in tooth preparation, restoration design and occlusal articulation. From the faculty perspective, E4D Compare provides evidence-based assessment tools that also document student progression.

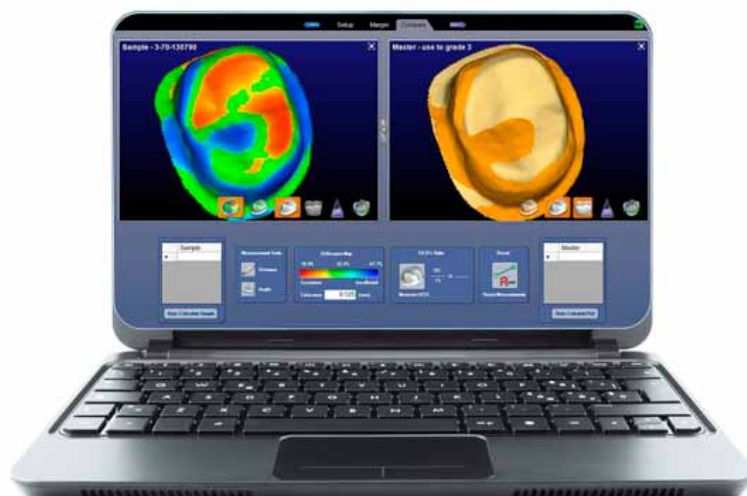
"The development of E4D Compare and its utilization in teaching institutions provide both students and faculty with an innovative method of self-paced learning and a more consistent and objective evaluation of all parameters. This is another example of our commitment at D4D to making dentistry better at every level" said Gary Severance, DDS, of D4D Technologies.

(Photo/Provided by D4D Technologies)

"There is a crisis in dental education; many students believe that grading is subjective and inconsistent," said Wally Renne, DDS, course director for CAD/CAM technologies and ceramics at the Medical University of South Carolina, College of Dental Medicine.

"The E4D Compare software program enables students to learn by challenging themselves against the 'master' templates. E4D Compare has proven to be revolutionary in my classes. The students that have used this program have seen fast results and have been engaged from the beginning. The E4D Compare software provides new possibilities for enhancing the learning experience within the dental curriculum," Renne said.

E4D Compare is available through Henry Schein Dental, and is compatible with the E4D Dentist System and E4D Labworks™ systems, as well as PCs meeting certain processing and graphics requirements. For more information, please visit to www.E4D.com/compare.



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The faculty of dental, education, and communications professionals provides an array of basic and advanced training courses, self-paced tutorials, and video, print and online training materials specifically designed to further the capabilities of the experienced CAD/CAM user. Courses offered include the following:

E4D Elements Class

The E4D Dentist Elements course introduces the primary features and functions of the E4D Dentist system's Design Center and Milling Center and the DentaLogic software that powers the system.

Clinical Elements Of Success

This one day hands on course enables associates and auxiliaries who did not attend the E4D Dentist Elements two day course to learn the clinical techniques and skills necessary for optimal E4D implementation in the practice.

E4D CAD CAMP

E4D CAD CAMP provides hands-on guided practice capturing digital impressions – intraorally, from impressions, and from models. Participants will learn the latest techniques for simplifying the design process as well as optimizing milling procedures.

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This two day intermediate hands-on course will provide participants with comprehensive techniques on advanced scanning, design and practical principles needed to take the E4D system to the next level in clinical efficiency and functional esthetic success.

Mastering Digital Dentistry: Posteriors

This two day advanced hands-on course will offer participants insight into the replication of posterior esthetics while focusing on proper function and occlusal harmony.

Mastering Digital Dentistry: Smile Design

This exciting two day hands-on course offers participants a unique insight into the replication of natural anterior esthetics while focusing on proper function and occlusal harmony

Focus on Veneers

This two day intermediate hands-on course introduces concepts, design principles, and workflow for the production of multiple anterior restorations, including advanced characterization and stain and glaze techniques.

CADapult Your E4D Practice

This one day workshop is taught at locations around the US and is a great refresher providing demonstrations, lecture and participation to take participants to the next level in patient care and convenience with the E4D system.

For more information go to www.E4D.com or scan the QR code to tour the facility.

(Photo/Provided by D4D
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We can run an extra long article in multiple parts, but this is usually discussing a subject matter where each part can stand alone because it contains so much information. In addition, we do run multi-part series on various topics.

In short, we do not want to limit you in terms of article length, so please use the word count above as a general guideline and if you have specific questions, please do not hesitate to contact us.

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