

DENTAL TRIBUNE

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Dental professionals in France deliver care through telecommunication

By Ivetta Ramonaite, Dental Tribune International

LEIPZIG, Germany: Since 14 March, France has been under COVID-19 Level 3 restrictions, including the halting of all non-essential services. To flatten the SARS-CoV-2 infection curve and ensure the safety of dental professionals, staff and patients, dental surgeries in France remain closed, and dental surgeons are only available to answer any possible questions that patients may have by phone or email, other than emergency treatment.

In an interview with Dental Tribune France, Dr Yassine Harichane, a graduate of the dental faculty of Paris Descartes University, said that like many other dentists, he too is only

providing emergency dental care, mainly on the phone. Commenting on the situation, he noted that the impact of COVID-19 for dental companies and the profession as a whole will be profound once operations resume and that the consequences will be twofold. Owing to business interruptions, many companies will face financial difficulties and trouble obtaining materials. Additionally, there will be a change in the relationship between dentists and patients as a result of limited physical contact and the constant fear of being infected.

French Dental Association's response

The coronavirus pandemic has created substantial challenges for den-

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tal professionals, and many healthcare workers are being overloaded with information. It has become difficult to differentiate real news and facts from speculation in order to decide how best to implement cross-contamination measures in treating dental patients. To help answer some of the questions dentists may have, the French Dental Association has created a question and answer section on its website as well as Facebook and YouTube pages that deals with health, clinical, financial and social issues.

In a broadcast on 24 March, Dr Serge Fournier, president of the Ordre national des chirurgiens-dentistes (national order of dental surgeons), stat-

ed that some dental professionals have chosen to continue their dental activities, ignoring the government's decision to close all dental clinics. Fournier stated that he strongly opposes such behaviour, since it puts the community and the dentists at risk. Consequently, the organisation has decided to sanction practices that continue to operate their businesses normally. The COVID-19 questions and answers on the French Dental Association website can be found at <https://www.adf.asso.fr/fr/covid-19/questions-expresso-avec-ladf>.

Busier than ever?

Speaking to Dental Tribune International (DTI), Dr Laurence Bury, a dentist and scientific editor at Dental

Tribune France, said that, despite the pandemic, she is staying busy. "I go to my office every morning, even on Saturdays and Sundays, where I listen and reply to all the messages and emails and send prescriptions. I'm also in contact with three nursing homes around my office and am fixing their broken dentures and looking at the photographs sent by the nurses to understand the gravity of their symptoms."

"Four times a week, I see some patients from the neighbourhood for pulpitis and then I wear two surgical masks to protect myself and put a dental dam over the tooth being treated. Patients come in, wash their hands and rinse their mouths, and

then I start working," she continued.

Bury also told DTI that she had found a sensible solution for covering her body while working. She uses a travel raincoat, which is reusable and can be disinfected.

When dental activity resumes, hopefully on 11 May, when the lockdown restrictions are to be lifted, Bury said that she will manage one patient at a time and allow 15-minute breaks between patients to be able to sterilise the office.

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Editorial note: This article was originally published online on 27 April 2020 at www.dental-tribune.com.

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Success CD for perfect temporary crowns and bridges

By Promedica

Success CD is Promedica's composite-based, self-curing paste-paste system for quick and easy chairside production of temporary crowns, bridges, inlays and onlays.

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vinces with its excellent flexural and overall strength as well as its capacity to withstand high functional loads.

The product's minimal polymerisation shrinkage results in precisely fitting temporary restorations. Success CD's high colour stability and brilliant, enamel-like gloss ensure long-term aesthetic results. Moreover, its natural fluorescence and the choice of available shades promote perfect aesthetic results. [DT](#)

For more information, please contact

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Incredible inside. Incredible outside. Ready for the future with the new Lara sterilizer

By W&H

Be prepared for today and for tomorrow – with the new Lara sterilizer from W&H, users not only have state-of-the-art today, but additional high-tech for the future. Equipped with fast cycle times and a safe documentation system, Lara simplifies and speeds up the sterilization process. Lara offers so much more: with W&H's new invented activation code system, users can easily upgrade additional features. This allows Lara to be easily adapted to individual and future requirements of the practice.

Incredibly fast, incredibly easy to use

From inside a full power package, from the outside a real eye-catcher: The new Lara convinces with its smooth surfaces and its colour touchscreen, which allows fast and intuitive navigation through the menu structure. The clear aim of the operating concept is to save time in order to have more time available for the treatment of patients. Even the standard version of Lara is equipped with one of the fastest cycle-times of its class. To meet the demand for complete traceability, a high capacity USB drive automatically records the cycle reports throughout Lara's entire service life. Users benefit from control and safety during instrument reprocessing. Optionally available: a label and cycle report printer, which offer printed documentation without additional computer or software. An automatic water filling valve provides additional efficiency: it allows connection to a demineralization system. This means manual filling and draining are no longer required.

Enhanced functionality by easy upgrade

Depending on future requirements of the practice or regulatory needs,

the new Lara sterilizer can be easily customised and upgraded by the activation code system. This allows users to activate even more speed and

an extended documentation. The activation codes and functions at a glance:

Activation Code "Performance": even faster cycle times by upgrading to Eco Dry+, which automatically adapts the drying time to the mass of load. Saving time and energy.

Activation Code "Fast Cycle": a type S fast cycle whenever needed, the fast cycle allows sterilization of unwrapped instruments in just 20 minutes.

Activation Code "Traceability": this functionality enables the customisation of the sterilizer to trace back to the person who initiated the sterilization cycle.

Activation "All-in-one": this code activates all functions mentioned above at once.

Whatever happens in the future – with Lara, you are well-prepared! In addition to the standard Lara functionalities with the high level of W&H quality, the new activation code system offers the opportunity to prepare today for tomorrow's requirements. This gives dental practices more flexibility and, above all, the certainty that they are optimally equipped for all upcoming tasks. [DT](#)



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The type B sterilizer Lara: perfect ergonomics and functionality for incredible usability.

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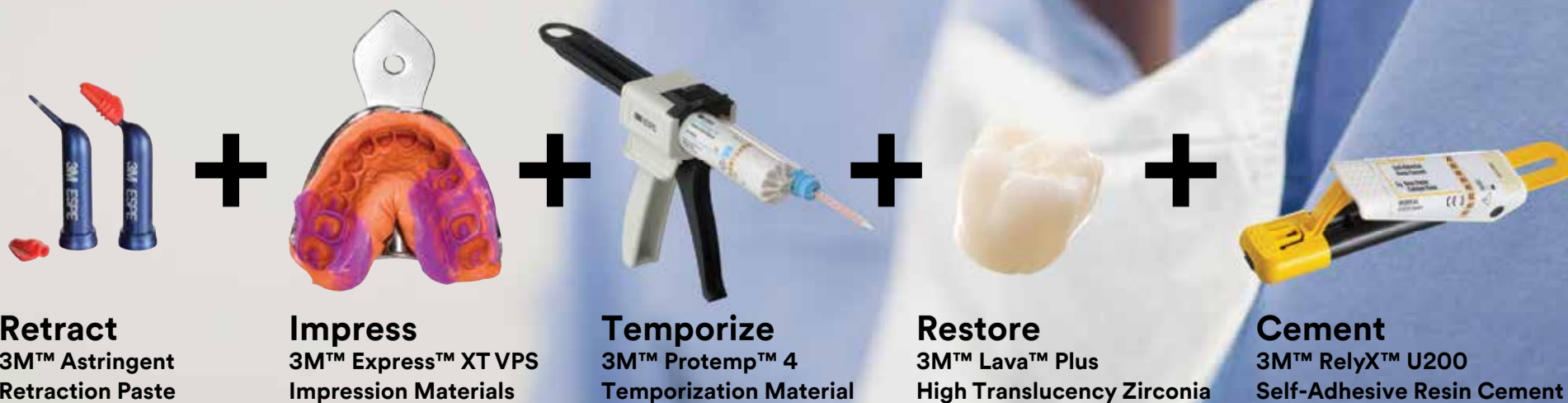
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Digital endo assistance fully automated CanalPro™ Jeni Endo Motor navigates through treatment



By COLTENE

Autonomous driving, operations using a robot arm, computer-aided design (or CAD for short) - there is hardly an area in which humans can now not be assisted by an electronic co-pilot. The more complex the application, the more useful the support via algorithms. Endodontic treatment is no exception and also requires the utmost precision and reliability. Endo specialists therefore increasingly rely on the fully automatic navigation of the latest endo motors.

Electronically controlled preparation

The internationally recognised, leading dental specialist, COLTENE, has achieved a breakthrough with

a virtually-self-propelled endo motor: the fully automatic CanalPro™ Jeni, named after its developer Prof. Dr. Eugenio Pedullà, finds its way through the root canal autonomously and thus accompanies mechanical and chemical preparation step by step. Via touch screen, the Jeni connects directly to the selected NiTi file system such as the HyFlex CM or EDM or the files of MicroMega from the COLTENE group of companies.

What is new is that the user can work forwards continuously from coronal to apical applying only slight pressure and the motor decides independently on the progress of movement. For this purpose, the Jeni assistance system uses complex algorithms and controls the variable file movements at millisecond intervals by

constantly regulating rotational movement, speed, torque and file stress. The endo motor adapts to the individual root canal anatomy and guides the preparation step by step. Integrated length measurement is available at the same time. The outstanding comfort and level of safety that Jeni delivers during preparation, is unmatched.

Jeni recognises the risk of a potential fatigue fracture of the file and informs the dentist with an acoustic signal that a file change is necessary. The CanalPro™ Jeni is also very familiar with the common endodontic irrigation protocol: the device records mechanical reprocessing progress and notifies the chairside dentist or assistant, acoustically, when and how often irrigation should be per-

formed between file changes. This is incredibly important when the long-term success of treatment depends largely on thorough irrigation of the prepared root canals.

Synchronised endo instruments

With the CanalPro™ Jeni Motor, the COLTENE group of companies has added another useful tool to its range of ideally matched endodontic instruments and dental materials. COLTENE has always worked closely with international scientists, practice owners, key opinion leaders and dental teams to design and realise concrete solutions for everyday treatment routines.

On www.coltene.com or one of the innovation leader's social media

channels, interested dentists can find out about the latest trends and ideas from the dental world. In addition, COLTENE also offers a wide range of training courses and practical workshops to ensure the optimal use of technical aids and digital assistants. This way, even endo beginners will be able to achieve competent and efficient preparation after only a short time. [DT](#)

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Inject and shape for easier, faster and stronger restorations

By SHOFU

The need for easier, simpler and faster workflow is more critical in dentistry, now more than ever before. Conventional composite restorations are time-consuming and require laborious build-up techniques to minimize polymerization shrinkage, linked to staining, micro-leakage and secondary caries.

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maintains gloss and resists surface staining.

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Celtra Press: The most stable high-strength glass ceramic, regardless of testing method

By Dentsply Sirona

Zirconia-reinforced lithium silicate (ZLS) has been available from Dentsply Sirona under the name of Celtra Press. With its three-point bending strength of more than 500 MPa, it has once again significantly raised the benchmark for high-strength glass ceramics. Experiments conducted by the University of Giessen, Germany have now shown that Celtra Press is clearly ahead of its competitors also in terms of biaxial strength.

Internal measurements in a study of three-point bending strength have shown an average result of 567 MPa for Celtra Press.¹ In comparison, the millable Celtra Duo ZLS (also from Dentsply Sirona) comes in at 210 MPa after finishing and polishing and at 370 MPa after optional glaze firing.¹ This extends the range of indications of the pressable variant of ZLS for the dental technician, which provides a tangible benefit: Celtra Press can be used not just for single-tooth restorations but also for three-

unit bridges with up to the second premolar as distalmost abutment.

In addition to its superior three-point flexural strength, Celtra Press also exhibits the highest biaxial flexural strength among the high-strength glass ceramics, as researchers at the University of Giessen determined in recent laboratory experiments.² The measured values were 678 MPa (Celtra Press), 413 MPa (Celtra Duo after finishing and polishing), and 560 MPa (Celtra Duo after glaze firing) (Fig. 1, Table 2).

Understanding strength measurements

Product literature and technical publications sometimes highlight a material's three-point bending strength and sometimes its biaxial flexural strength. According to the relevant ISO 6872:2015 standard, both testing methods are acceptable, but the results can be properly assessed only by determining what values were obtained using which testing methods. An important thing to note is that the strength values obtained by the bi-

axial test method are usually higher than those obtained by three-point bending test. The reason for that is that less effort is generally required to break the standard bar resting on two supports than the standard disk with three supports (Figs. 2 and 3).³ This is only partially compensated for by recalculation based on geometry data. In addition, the quality of the edge preparation in the biaxial samples is less important compared to the three-point supports.

The exceptionally high strength of Celtra Press is ensured by the addition of 10% of zirconia, which is completely dissolved in the glass matrix, and by a power firing step that is already integrated into the stain-and-glaze firing for monolithic restorations. But there is still another advantage of Celtra that will be immediately convincing to dentists: The material's excellent surface properties permit intraoral polishing including, where required, finer occlusal adjustments—no separate glaze firing is required.

	3-point-flexural strength	biaxial flexural strength
Celtra Duo only polished	210 MPa*	413 MPa**
Celtra Duo with firing	370 MPa*	560 MPa**
Celtra Press with powerfiring	567 MPa*	678 MPa**

*In-house measurements Dentsply Sirona
**Flexural strength testing by Justus-Liebig University Giessen, Germany

Table 1: Both the three-point bending test and the biaxial testing method result in Celtra Press being top-of-the-class among its competitors.

References

1. In-house measurements by Dentsply Sirona.
2. Measurements carried out by the Department of Dentistry, Clinic for Dental Prosthetics, Justus Liebig University, Giessen, Germany.

3. Yongxiang Xu, Jianmin Han, Hong Lin, Linan An. Comparative study of flexural strength test methods on CAD/CAM Y-TZP. Regen Biomater. 2015 Dec; 2(4): 239–244 [DOI](#)

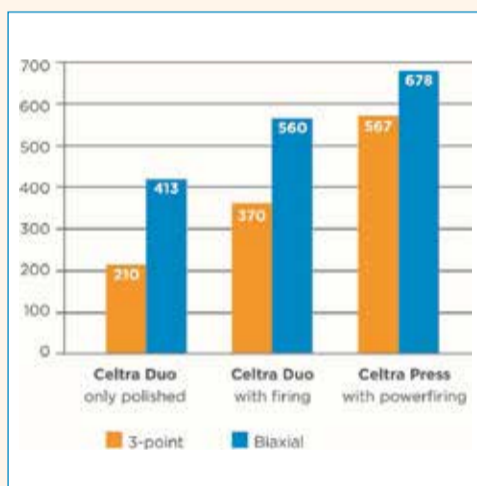


Fig. 1: A new benchmark for the strength of high-strength glass ceramics: three-point and biaxial flexural strengths compared.

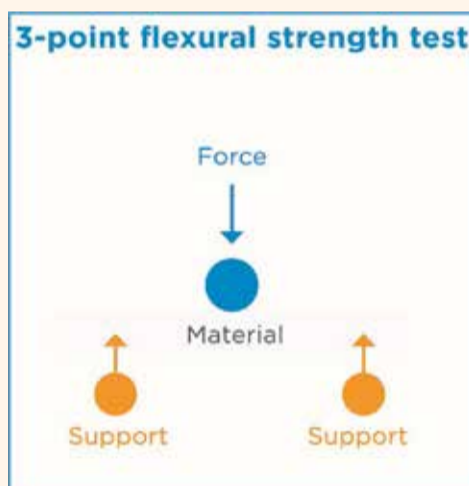


Fig. 2: In the three-point bending test, a bar resting on two supports is loaded from above with a punch until it breaks.

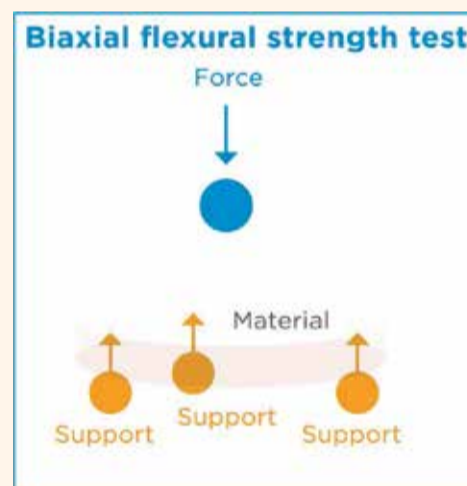


Fig. 3: The biaxial testing method loads a disk on three supports. The results of this test are generally higher than those of the three-point bending test.

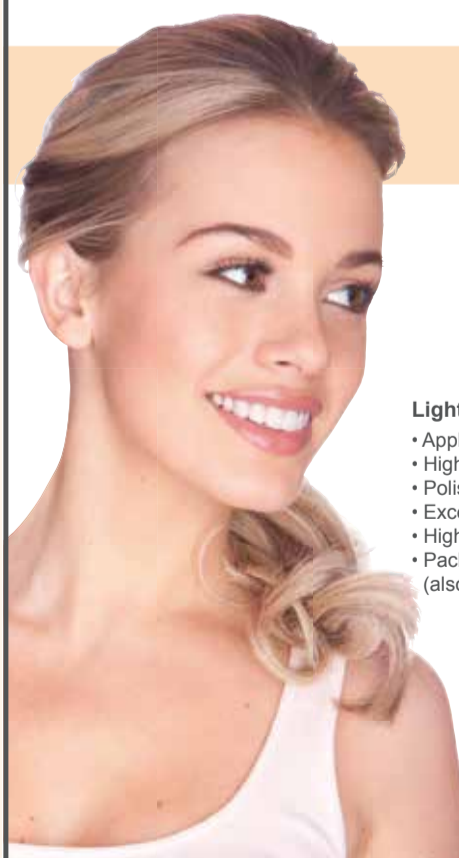


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The importance of using Semi-Adjustable Articulators

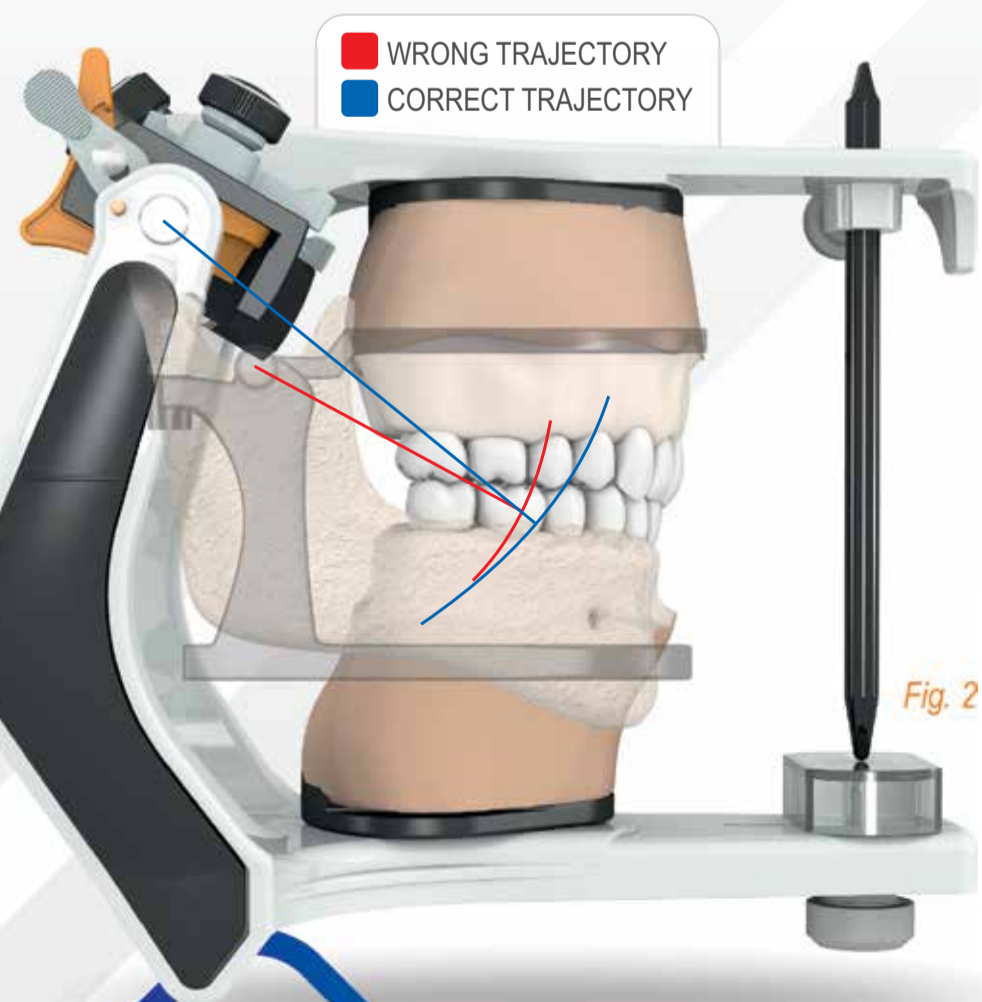
One of the most important reasons for assembling the study models in a semi adjustable articulator is that the simulated condylar rotational axis between the arches will be closer to the patient's mandibular rotation axis, thus allowing a more reliable functional analysis in reference positions of static and dynamic occlusion. This axis of rotation is defined in the mandible by the medial poles of the condyles, which in the articulator is represented by the condylar sphere (fig.1).



When the plaster models are assembled in a non-adjustable articulator, known as “**simple hing articulator**”, the only position for analysis is the static, in which the models are fixed and the axis of rotation is in a different location of the patient and in a shorter radius. It results in a wrong trajectory of the mandibular movements, allowing the appearance of possible occlusal interferences of greater magnitude in the posterior region (fig. 2).

Thus, the assembly of study or work models in an articulator is essential to **achieve a correct diagnosis, planning with predictability, a safe and effective treatment with longevity.**

However, other advantages are enumerated: it maximizes clinical procedures, minimizes unnecessary adjustments and repetitions, as a result, we have time-consuming saving and cost reduction.



Minimizing the risk of sharps injuries with Hu-Friedy IMS System

By Hu-Friedy

Dental practices count on their instruments day in and day out. But the same instruments that help dental professionals treat their patients effectively can represent safety hazards when not handled properly. Sharps injuries—punctures and cuts inflicted by instruments—are among the most frequent and most costly accidents that can occur in a dental practice.

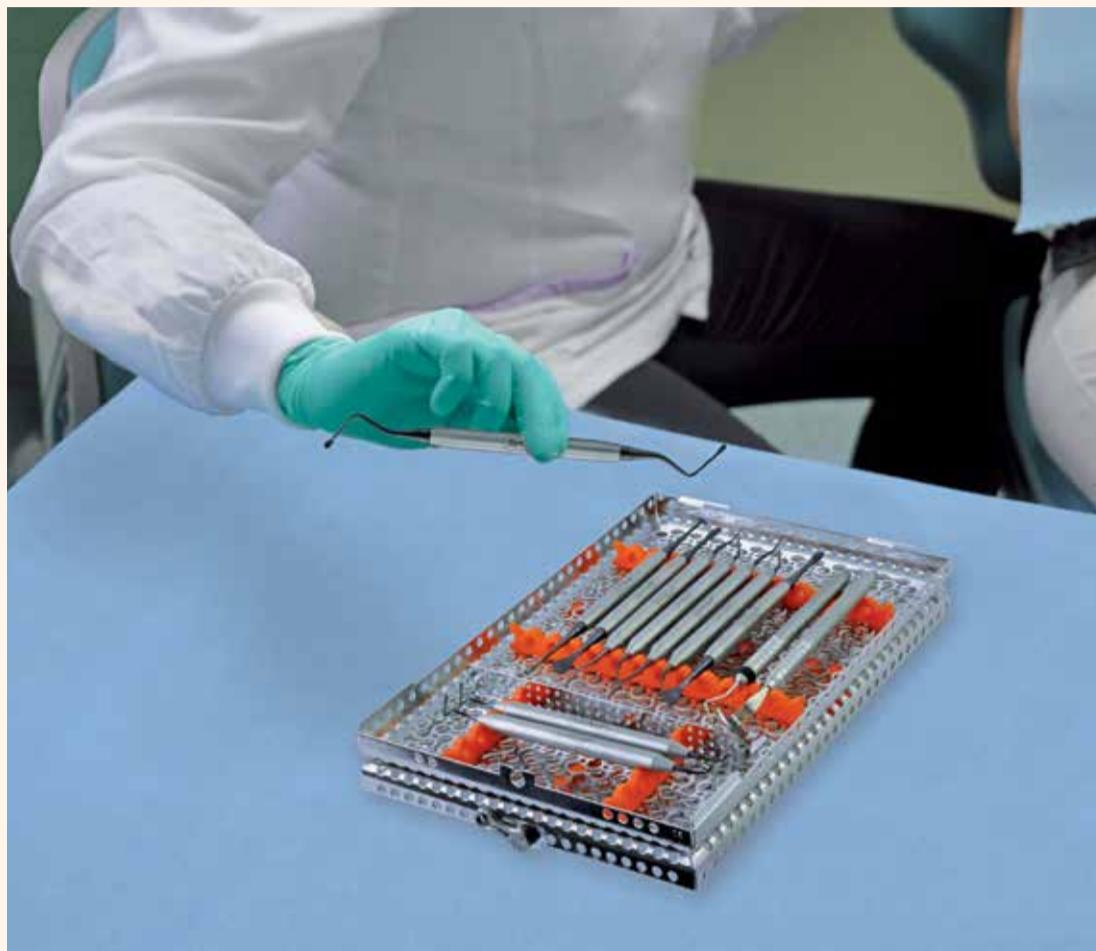
Sharps injuries aren't merely painful. Dental instruments are routinely in contact with blood and other bodily fluids, and therefore, may carry dangerous infectious diseases such as hepatitis B and C, and HIV. The U.S. Centres for Disease Control and Prevention (CDC) estimates that the cost of treating each sharps injury in a healthcare setting can range from \$500 to \$3,000*. The CDC also notes that there are "harder to quantify costs," including fear and anxiety, lost work time, and litigation.

Dental instruments are always on the move. As instruments cycle through a dental office, they undergo cleaning and sterilization, wrapping, organisation and storage, preparation for procedures, and use with patient treatment. Almost every step along the way presents the potential for a sharps injury.

Accidental cuts and punctures happen most often when instruments are kept and transported loose, rather than organized and stored in secure cassettes. The table attached shows how loose instruments can cause sharps injuries throughout the typical dental office workflow.

How Cassettes Provide a Safer Experience

Cassettes keep dental staff safe by reducing the need to handle con-



Cassettes

taminated instruments directly. Once cassettes have been configured according to procedure, instruments remain secure throughout the re-processing cycle. The only time staff members make direct contact with any instrument is while treating patients.

Cassettes eliminate many of the dangers of working with loose instruments:

- Instruments do not slide out or fall

off locked cassettes during transportation. Instruments stay safe even if the cassette is dropped.

- Cassettes can be placed directly into thermodisinfectors and ultrasonic cleaners, rinsed, dried, wrapped, and then sterilized without removing instruments. No need for pouches – which can be punctured – or hand scrubbing.

- Cassettes can be used to keep all the instruments required for specific procedures together. Clinicians do not have to sort through loose instruments on a tray.

Cassettes also prevent the spread of infection by helping ensure the proper placement of instruments in automatic cleaners and autoclaves. (If instruments cannot be processed right away, enzymatic spray can keep the bioburden on the instruments moist.)

Efficiency Gains With Cassettes

A dental professional's time is best spent treating and caring for patients. All too often, too much time is consumed searching for the right instruments to use for patient procedures, cleaning and sterilizing individual instruments, and moving slowly to avoid accidents.

Cassettes can help dental practices get their time back. Practices that use Hu-Friedy's cassette-based Instrument Management System (IMS) report saving 5 to 10 minutes per procedure**. Over the course of a day, that can translate into well over an hour.

Another efficiency-boosting benefit of cassettes is that they prolong the life of instruments. Instruments can be bent, broken, or lost during the re-processing cycle, but cassettes keep them sheltered and secure in a protective layer.

by implementing the Hu-Friedy Instrument Management System. That's \$57,310 over six months. A practice that performs 30 procedures a day may see an additional \$171,930 over six months. The extra revenue comes from having more time to spend with current patients or take on new patients.**

Hu-Friedy Instrument Management System even makes staff training easier. Every instrument has a spot within the cassette. Colour coding makes it simple to find the right procedural set-up.

If you're interested in making your dental practice safer and more efficient, contact a Hu-Friedy representative to learn more about getting started with the Instrument Management System.

* According to "SHARPS INJURY PREVENTION WORKBOOK" page 6. CDC (<http://bit.ly/sharpsinjuryprevention>)

** When compared to single instrument decontamination - based on market survey results. Data on file.

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AD

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CHAIRSIDE

When treating patients, clinicians must place instruments down and pick them up with care to avoid injuries. An assortment of instruments loose on a tray can also lead patients to question the cleanliness and organization of a dental practice.

TRANSPORTING INSTRUMENTS TO AND FROM CHAIRSIDE

In the hectic atmosphere of a busy dental practice, people can collide, trip, or run into objects in their haste. Loose instruments can slide off trays and inflict wounds. International and National Guidelines recommend that contaminated instruments must be transported in closed, puncture-resistant containers.

RECEIVING/CLEANING

Researchers at the New York University College of Dentistry conducted a 10-year survey and discovered that 31 percent of all exposures to blood in a dental office***, happened during instrument cleanup – more than any other scenario. One reason for this is that dental professionals continue to scrub instruments by hand, risking sharps injuries, and exposure to aerosols and pathogens.

Thermodisinfectors and Ultrasonic cleaning technology negates the need for hand scrubbing, but instruments should be divided securely into cassettes. Dental office personnel can get poked while placing loose instruments into and taking them out of the baskets of cleaning equipment. Loose instruments should not be bundled together with rubber bands, as it will prevent them from being properly cleaned.

Another safety concern is that many practices do not use the correct personal protective equipment (PPE). The CDC and European Guidelines recommend the use of puncture- and chemical-resistant utility gloves when cleaning instruments.

INSTRUMENT PREP AND PACKAGING

Dental hygienists and assistants can get poked or cut while sorting and organizing instruments by procedure type or placing them in pouches before sterilization. While preparing for patients, staff must locate pouches and assemble instruments onto trays for treatment – all the while risking sharps injuries.

STERILIZATION

Loose instruments can puncture sterilization pouches and injure anyone who handles them.

*** Journal of Dental Education - Volume 65, No. 5, 4/2001
Occupational Exposures to Blood in a Dental Teaching Environment: Results of a Ten-Year Surveillance Study

Table 1

WHAT'S **NEW** FROM HU-FRIEDY

HIGH DEFINITION BLACK LINE MIRRORS

Proven to Reduce Glare up to 80%*

Designed for enhanced performance, Hu-Friedy's HD Black Line Mirror is engineered to optimize clinical outcomes by delivering superior visibility throughout any dental procedure.

The Diamond Like Carbon (DLC) coating of the handle and mirror frame reduces glare up to 80%!

The durable black matte finish in combination with the superior brilliance and color of Hu-Friedy's proprietary HD Mirror glass facilitates quicker and more accurate visibility of the mouth.



Watch the video

Frame the OrCode with your smartphone and watch directly on Facebook. Video courtesy of **Dr. Stavros Pelekanos**.

SUPERIOR BRILLIANCE & COLOR

HD Mirror provides superior brilliance and color for quicker and more accurate visibility of the mouth. †

- **113% reflection factor** for exceptional image clarity. †
- **38.5% brighter** than rhodium coated mirror glass. †
- **50% brighter** than other front surface mirror glass. †

* When comparing the Hu-Friedy DLC coated mirror head and handle to the Hu-Friedy non-coated stainless steel mirror head and handle.

† Data on file and available upon request.

AKRO-FLEX™

Create Beautiful Restorations

Akro-Flex™ is an extremely flexible composite instrument which allows clinicians to effortlessly manipulate composite materials during aesthetic restorations.

The inclusion of a ductile material allows Akro-Flex to perform as a solid brush.



Watch the video

Frame the OrCode with your smartphone and watch directly on Youtube. Video courtesy of **Werestore.it**

UNPARALLELED FLEXIBILITY

By incorporating Nickel Titanium, a material known for its super elasticity, Akro-Flex acts as a solid brush. The resilient working ends are excellent when creating fine anatomical detail with delicate, artistic strokes.

ERGONOMIC HANDLE

The smooth, lightweight handle offers increased control due to the large diameter. It creates an ergonomically friendly option that provides maximum comfort and helps reduce hand fatigue. Reducing hand fatigue can increase the longevity of a clinician's career.

HYPER-THIN PROFILE

Ultra thin working ends reach narrow interproximal spaces with ease. The flexible, versatile working ends allow for better visibility as compared to traditional composite instruments.

Patent pending.

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How the best perform



Tooth whitening that works for you— Opalescence tooth whitening

By Ultradent

As the global leader in tooth whitening, the Opalescence™ whitening family has become beloved and trusted by patients and clinicians alike. With multiple Townie Choice, Reality's Choice, Dental Product Shopper awards, and more, we've got the laurels to prove it.

As proud—and grateful—as we are of these accolades, they aren't why Opalescence tooth whitening is a success. Ultimately, each and every one of our tooth whitening products is a success because it works for you and your patients! So, let's take a look at the product itself and see what makes Opalescence tooth whitening so great.

Tooth whitening at home and the dental office

Whether your patients want to whiten their teeth at home, at your dental



office, or as they go about their day, Opalescence whitening products give your patients options to get the white smile they want. With in-office whitener, prefilled whitening trays, custom-made whitening trays, and

more, Opalescence tooth whitening allows you more versatility and convenience in your whitening treatments.



For example, Opalescence™ Boost™ in-office whitening is perfect for those patients who need a brighter smile fast, with most patients seeing noticeable results after a little more than an hour. Opalescence™ PF custom whitening trays allow your patients to comfortably whiten at home and even overnight. Opalescence Go™ whitening's innovative UltraFit™ tray is perfect for your patients who want to whiten practically anywhere. It is ready to use right out of the package and easily adapts to any smile!

Opalescence tooth whitening also offers specialty products that are able to treat unique cases. Whether you're lightening tetracycline stains, whitening a non-vital tooth after a root canal, or treating a patient with braces, there's an Opalescence whitening product for everyone.

Tooth whitening that is safe and actually work

Many patients think that tooth whitening is bad for their enamel, will damage their teeth, or will be uncomfortable—or even painful! The reality is that tooth whitening is very safe. With Opalescence tooth whitening you are able to determine the right whitening treatment for your patients by tailoring their whitening based on strength and wear time. Our products are also designed with patients' comfort in mind to ensure that they have the best whitening experience possible.

One key factor that sets Opalescence whitening apart is its patented sticky viscous gel. Other tooth whiteners can be hard to apply, making them ineffective and discouraging to use. But Opalescence PF whitening gel is the perfect consistency, allowing it to stay inside the custom-made tray and in contact with the teeth rather than seeping out past the gumline.

Not only will it stay in place, Opalescence whitening gel is designed with a perfectly balanced and buffered pH to closely match the pH of the mouth. And unlike other whitening products, Opalescence whitening gels are water-based to keep teeth hydrated during the whitening process. Its high-water content not only helps reduce sensitivity, but it also reduces the likelihood of shade relapse in the future because your pa-

tient's teeth will stay hydrated from start to finish.

Tooth Whitening for Sensitive Teeth For your patients searching for tooth whitening but are concerned about tooth sensitivity, we are here to help. Tooth sensitivity varies from person to person depending on what factors are contributing to their discomfort. Some may have sensitivity to hot or cold temperatures or sensitivity after a filling or a crown, but no matter the cause sensitivity is a pain!

There are many ways to help manage your patient's sensitivity prior to, during, and following Opalescence whitening treatment. Ultradent's Enamelast™ fluoride varnish, UltraEZ™ desensitizing gel, and Opalescence™ Sensitivity Relief Toothpaste can each be used at different stages of the whitening process to treat various contributing factors.

The versatility, effectiveness, and convenience of Opalescence tooth whitening makes it easy to use, whether you're a whitening patient or a dental professional. In the end, that is what makes Opalescence so great—that it works for you and your patients. [DU](#)



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AD

Opalescence



Tooth Whitening

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Fast, easy,
effective.



Highly esthetic results with CEREC® Primemill

By Dentsply Sirona

CEREC Primemill, Dentsply Sirona's new milling machine, has taken chairside dental restorations to the next level. Thanks to its state-of-the-art technology, a wide range of restorations can now be manufactured faster, using a large variety of materials with results that are very precise and particularly easy to achieve. Josef Kunkela, DMD, PhD, an innovative and renowned dentist and founder of the Kunkela Academy in the Czech Republic, has offered chairside restorations in his practice for the past 13 years. As a clinical tester for Dentsply Sirona, he had the opportunity to comprehensively evaluate the new milling machine. The following is a description of his first experiences with CEREC Primemill based on a patient case.

I have two essential requirements for digital restorative dentistry: I want to satisfy my patients to the best of my ability for example by producing accurately fitting and

very aesthetic restorations. I also want to retain complete control over the workflow. This is exactly what CEREC has offered me for 13 years. It's not just about switching from conventional to digital impression taking, it's about the entire process. With the right workflow, I can work very efficiently. This is where CEREC Primemill takes us to a new level. It is a machine that is simple to operate, works with a really fascinating speed and yields high-quality results.

As a beta tester of CEREC Primemill, I had the opportunity to follow the development process. When this milling machine was set up in my practice, I immediately noticed the new touch interface. In my opinion, it is a great feature to get information about milling cycles and the right instrument recommendation for every procedure.

The second striking point is that the machine works very quietly and above all quickly. CEREC Primemill only takes approximately five min-

utes using Super Fast mode to fabricate a zirconia crown. In my practice, the assistant takes over the first scan with the new CEREC Primescan. After I have examined the patient and made the therapy decision (which restoration, which shade), the assistant can prepare the CEREC Primemill. Meanwhile, I prepare the teeth to be restored and take the digital impression with CEREC Primescan. The fabrication process then starts directly after the design of the restoration, which is carried out by a dental technician in my affiliated practice laboratory. I can fully concentrate on my work with the patient and on his dental situation. This is efficient and very important for me.

Of course, a perfect workflow also requires the right quality. How useful is it to be finished with everything in the shortest possible time if the restoration does not fit exactly or is visually unattractive? This is where CEREC Primemill once again offers impressive results. The surface of the materials is extremely smooth and



Fig. 1: Initial situation: The patient wants to have an aesthetic solution for her diastema.

the margins are very clearly defined. From a clinical point of view, the following aspects convince me above all else about CEREC: The entire scanning process, including bite registration and preparation control, is very simple. In addition, there are the advantages of the initial scan: catalogue of beautiful natural smile, recycle patient smile, family cross copy smile, gingiva mask over de-

sign proposal model, index for direct restorations. If you are going to fabricate a direct restoration of broken incisal edge or corner and if you would like to use layering technique, you benefit from having scanned the initial situation before and from having made a silicone index according to the 3D-printed model of patient's natural dentition. And there is greater patient convenience because of the reduction of appointments for treatment and temporary restorations. From an organisational and economic point of view, the efficient workflow, the reduced number of appointments and the ability to delegate many work steps are particularly noteworthy. My experience shows that CEREC begins to pay off at the reception desk when a well-trained assistant plans the appointments and can explain the advantages of this treatment method to the patient.



Fig. 2: This is the natural structure of the teeth we wanted to adapt in the final restorations.



Fig. 3: As there are different methods of copying natural teeth shapes, we decided to categorize them into these three categories of Biocopy.



Fig. 4: Face scan for setting up the occlusal plane and the patient's midline.

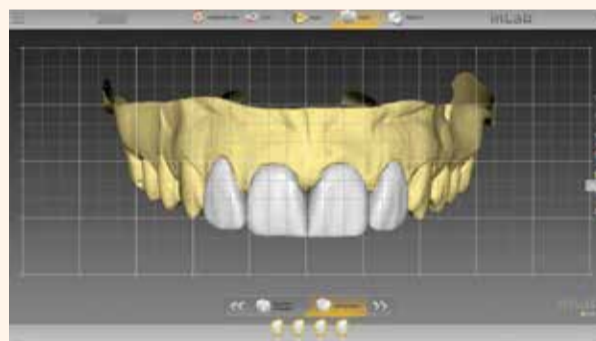


Fig. 5: Mock-up design of the veneers in the inLab SW 19.



Fig. 6: Try-in of the milled mock-up veneers.

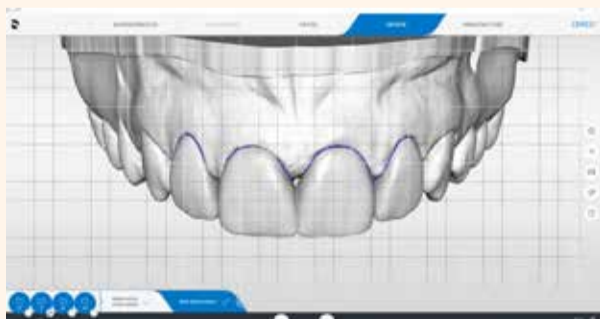


Fig. 7: Export of the data into the CEREC SW 5.1.1 and final design of the veneers.



Fig. 8: Milling preview.



Fig. 9: Milled veneer in detail.



Fig. 10: Inserting the veneers using rubber dam for perfectly dry luting surface.



Fig. 11: Close-up of the veneer surface which shows the good adaption of the natural surface of the teeth.



Fig. 12: Final situation – the new smile.

◀Page 16

The most important thing is that CEREC Primescan and CEREC Primemill work together to create a great setup for everyday restorative dentistry. The CEREC system is exceptionally versatile and allows us to freely scan, design and switch from laboratory to chairside software according to our requirements and the daily needs for different material choices and workflows. The following case illustrates this.

Case study

A 23-year-old female patient came to my practice and asked for an aesthetic solution to her diastema and tremata. The challenge was to preserve the natural surface structure as much as possible. In this case we used the so-called Biocopy Stretch Technique. It is a fairly simple technique that uses the scanned anatomy to create a larger version of the original while maintaining anatomical accuracy. It is essential that the scanned anatomy is used for the restorations that are to be fabricated. At the same

time, it is possible to build a custom tooth library in this way. This can be used for future restorations. This initial scan also offers the possibility to use the gingival mask as a reference for the emergence profile when designing anterior restorations.

With regard to the patient's youth, we opted for non-prep veneers for both the central and lateral anterior teeth. We used the initial scan to make a mock-up of the planned veneers in order to get a better idea of the final treatment result. We sent this scan via the Case Connect Centre to our own laboratory where it was processed in the inLab software 19. To further modify the initial proposal, we used the aforementioned Biocopy Stretch Technique. Subsequently, the virtual articulator was used to ensure function in all jaw movements (protrusive and laterotrusive). The mock-up was then milled from PMMA in an MC X5 (Dentsply Sirona). I prefer this method to others because its distinct edge

sharpness helps to avoid undercuts and transitions in the final restorations, especially laterally. The PMMA veneers were then temporarily fixed with a small amount of a flowable composite.

A few days later, the patient returned to the practice. Depending on the degree of satisfaction, the veneers are either re-shaped or used directly as a template for the final restoration. In this case everything fit perfectly. We then imported the data seamlessly from the inLab software into the CEREC software in dxd-format. In the CEREC software, we simply changed the material setting to composite block and then fabricated the veneers in the new CEREC Primemill. In doing so, we were able to achieve a high level of precision. We used the fine mode because it is ideally suited for the production of ultra-thin veneers.

In order to maintain the high transparency of her natural teeth, the

milled veneers were slightly cut back at the incisal edge and constructed with the same restoration material as the blocks used for milling. We then polished the surface in a two-stage system and bonded it adhesively under a rubber dam with composite. The result shows very natural anatomy of the anterior teeth.

To sum it up: The CEREC system is exceptionally versatile in allowing us to freely scan, design and switch from lab side to chairside software and then mill or grind a restoration in the extraordinarily precise and accurate CEREC Primemill. Capturing the patient's initial situation, position, shape and surface structure for potential future reference, which can also serve as donor anatomies for other patients, will serve more and more purposes not just in dental prosthetics but also for the manufacturing of 3D models and silicone keys, which are then used for layering restorative materials, digital implantology or dentures. [DT](#)



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All-ceramic rehabilitation with CAD/CAM restorations made of a zirconia-reinforced lithium silicate (Celtra Duo)

By Dr Tim Hausdörfer and Joachim Riechel MDT, Germany

Abstract

Patient:

55-year-old patient with an insufficiently restored dentition and a reduced vertical Dimension of occlusion.

Challenge:

The patient wanted an improvement in her anterior tooth aesthetics and a comprehensive oral rehabilitation.

Treatment:

A periodontal and conservative pretreatment was performed. The functional pretreatment included raising the bite using a centric splint. The posterior teeth were restored supplied with veneered crowns and bridges with zirconia frameworks. The aesthetic restoration of the maxillary anterior teeth was performed with crowns and veneers made of zirconia-reinforced lithium silicate ceramics (Celtra® Duo).

Introduction

Zirconia-reinforced lithium silicate ceramics (ZLS) have good mechanical and optical properties. Their mechanical strength makes them well-suited for partial and full posterior crowns and also—thanks to their good shade match and excellent polishability—for aesthetic anterior restorations (such as veneers). The present article illustrates the versatile application of CAD/CAM-made ZLS restorations (Celtra Duo; Dentsply Sirona Restorative, Konstanz, Ger-

many) based on the complex case of a patient with extensive restorative treatment needs.

Case report

A 55-year-old woman presented at the Department of Preventive Dentistry, Periodontology and Cariology of the University of Göttingen. The clinical and radiological examination revealed an adult dentition that had been insufficiently treated with fillings and dental restorations and exhibited a loss of vertical di-

mension of occlusion (Figs. 1 and 2). Insufficient restorations (secondary caries) were found on teeth 24, 25, 26, 27, 37, 38, 35, 47, and 48. The existing bridge (17–15, 14) was insufficient due to extensive ceramic fractures. Part of the hard tissue of the upper maxillary incisors with their—sometimes extensive—composite restorations had been lost to attrition and vestibular erosion. The endodontic

▶Page 18



Fig. 1: Clinical baseline situation



Fig. 2: Radiograph of initial situation



Fig. 3: Baseline situation for designing the aesthetic anterior restorations following bite raising in the posterior region



Fig. 4: Mock-up



Fig. 5: Preparation of the partial crowns and the veneers, occlusal view



Fig. 6: Preparation, vestibular view



Fig. 7: Impression taken with Aquasil

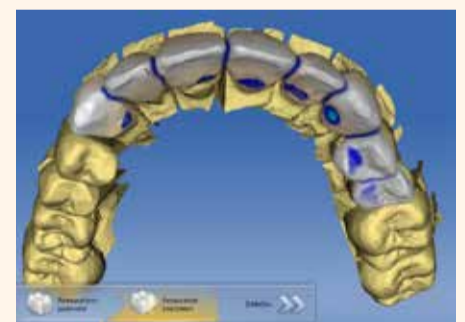


Fig. 8: Digital model

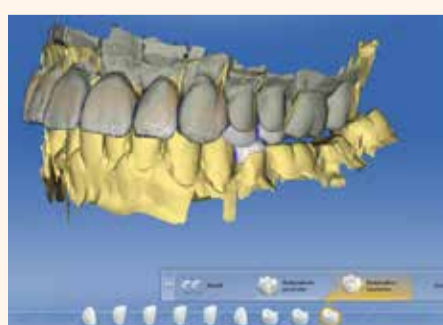


Fig. 9: Digital design of the restoration



Fig. 10: Milled restorations fit on the model



Fig. 11: Single crown milled from a ceramic block



Fig. 12: Final customized restorations after staining and glaze firing



Fig 13
Figs. 13 and 14: Final restorative result after adhesive cementing



Fig 14



Fig. 15: Preoperative smile and lip profile



Fig. 16: Postoperative smile and lip profile

treatment of tooth 34 was adequate, while tooth 46 required a primary endodontic treatment due to a irreversible pulpitis. All other teeth were vital and free of symptoms. The periodontal findings showed moderate gingivitis (periodontal screening index < 3 in all sextants). Teeth 13, 23, 24, and 43 additionally exhibited vestibular gingival recessions.

In addition to an oral rehabilitation, the patient also wanted to improve her anterior tooth aesthetics.

She first received extensive oral hygiene instructions and professional tooth cleaning. The insufficient restorations on teeth 24, 25, 26, 27, 35, 37, and 47 were replaced by call restorations (Luxacore; DMG, Hamburg, Germany) that were adhesively cemented (OptiBond FL; Kerrhawe SA, Bioggio, Switzerland). Teeth 38, 48 and the class V cavities of teeth 24 and 33 were definitely restored by direct composite fillings (Venus;

Heraeus Kulzer, Hanau, Germany). The gingival recessions on teeth 13 and 23 were not surgically covered because a sufficient amount of attached gingiva was present and no further progression was observed. In addition, the patient had a low smile line, meaning that this posed no aesthetic problems.

A formal treatment plan and cost estimate was provided and checked by a dental expert of the patient's health insurer. The following measures were approved: Crown restorations for teeth 11, 21, 22, 24, 25, 26, 27, 35, 37, and 47 plus a remake of bridge 17-14.

The functional pretreatment was performed with the aid of a centric splint in the maxilla which simulated a bite raised by 2mm. The patient did not show any symptoms of myoarthropathy or craniomandibular dysfunction after establishing her new vertical dimension of occlusion.

In a first prosthetic treatment step, the posterior teeth were supplied with crowns (teeth 14, 26, 27, 37, and 47) and a bridge (teeth 17-15) in veneered zirconia. Teeth 32-42 were bleached and their incisal edges clinically lengthened by means of direct composite restorations (Essentia and G-Premio Bond; GC, Bad Homburg, Germany) in order to obtain a uniform aesthetic result. Within the framework of the Celtra Campus Challenge, the patient could be offered a cost-effective and aesthetic treatment offer upper jaw: Teeth 21 and 22 were restored with crowns and teeth 11, 12, 13, and 23 with veneers. In addition, teeth 24 and 25 received partial crowns. For the planning of the ceramic restorations, a wax-up was created and developed into a composite mock-up (Figs. 3 and 4) (Luxatemp; DMG). The tooth shade (A2) was selected based on the Vita Classic shade guide (Vita, Bad Säckingen, Germany).

The preparations (Fig. 5) followed the preparation guidelines for all-ceramic restorations¹ and the appropriate minimum wall thickness requirements for lithium silicate ceramic restorations. The preparation for the partial crowns 24 and 25 had rounded interior line angles and a 90° shoulder at the preparation margin. To prepare for the veneers (13, 12, 11, 23), approximately 0.5-0.7mm of hard tissue was removed on the labial aspect and a 0.5mm chamfer provided (Fig. 6). The intact proximal surfaces remained untouched. Otherwise, the teeth were prepared for circular full veneers ("360-degree veneers"). The crowns of teeth 21 and 22 were prepared with a 1-mm circular shoulder. Reduction of the incisal edges could be dispensed with as a consequence of raising the bite by 2mm.

A conventional impression was taken of the prepared teeth and the casts were scanned. Prior to taking the impression, retraction cords (UltraPak; Ultradent, South Jordan, Utah, USA) were placed for gingival retraction around the prepared teeth. Retained proximal contacts were separated with thin matrix strips. The impression was taken using an addition-type silicone at one time and in two phases (Aquasil; Dentsply Sirona Restorative) (Fig. 7). The conventional impressions and casts facilitated the digital design process by providing a laboratory-made wax-up and subsequent adjustment of the restorations. This meant that hardly any intraoral adjustments were required. A transparent vacuum-formed splint (Erkodent, Pfalzgrafenweiler, Germany) was first made with the aid of the wax-up, allowing provisional resin restorations to be produced (Luxatemp; DMG). These were subsequently connected to the prepared teeth with Prime & Bond XP (Dentsply Sirona Restorative) and a flowable composite (Baseliner; Heraeus Kulzer).

The restorations themselves were produced using the CEREC CAD/CAM (Dentsply Sirona, Bensheim, Germany). To this end, the saw-cut models were scanned with a Blue-Cam (Dentsply Sirona) (Fig. 8). The teeth of the wax-ups were copied digitally and used for the design of the restorations (CEREC software v. 4.4 using the Biogeneric Copy option; Dentsply Sirona) (Fig. 9).

The restorations were milled from blocks of a zirconia-reinforced lithium silicate (Celtra Duo; Dentsply Sirona Restorative) of A2 HT shade, finished with water-cooled diamond cutters and adapted on the model (Figs. 10 and 11).

Having ensured that the restorations were clean and free of grease and residue, they were customized with stains and glaze and subsequently fired. A more intensive shade effect (Fig. 12) was achieved by repeating cycles of applying and firing the material. The first stain/glaze firing took place at 820°C and the second one at a lower 770°C.

The restorations were tried in with the aid of a glycerine-based gel (Try-In; Ivoclar Vivadent, Schaan, Liechtenstein). Care was taken to ensure a good marginal fit, correct proximal contacts, a harmonious contour of the incisal edges and an appropriate shade. Minor corrections were carried out with a diamond cutter under irrigation, followed by polishing.

After the try-in, the teeth were isolated with rubber dam and cleaned. The ceramic restorations were etched on the adhesive surface using hydrofluoric acid (Ultradent Porcelain

Etch; Ultradent, South Jordan, Utah, USA) for 30 seconds and conditioned with a silane solution (Calibra, Dentsply Sirona Restorative) for 60 seconds. The teeth were conditioned with 36% phosphoric acid (DeTrey Conditioner 36; Dentsply Sirona Restorative) for 30 seconds on the enamel and 15 seconds on the dentin and subsequently with Prime & Bond® XP + Self-Cure Activator (Dentsply Sirona Restorative).

Calibra dual-curing resin cement (Dentsply Sirona Restorative) was used for adhesively cementing the full and partial crowns. The veneers were used with a light-curing cement (Calibra Esthetic Resin Cement, Dentsply Sirona Restorative). After thorough removal of any excess resin and light curing, the occlusion was checked and the restorations were polished (Figs. 13 and 14).

The zirconia-reinforced lithium silicate ceramics are characterized by good polishability and shade adaptation to neighbouring structures (Figs. 15 and 16).

Summary

ZLS ceramics already have a high strength after milling² and can be cemented adhesively immediately after polishing. In the present case, however, we decided to work with the laboratory to provide the restorations, since many restorations have to be made at the same time and since the aesthetic result and the mechanical strength of the ceramic could be further improved by additional stain and glaze firing. The digital design of several restorations was considerably facilitated by the laboratory-made wax-up. By adapting the restorations on the model, the patient's chair time could be reduced. Adhesive cementing with Calibra was a very pleasant process, since any composite residue was easy to remove and the optical properties of the ZLS ceramic were not adversely affected. Very good aesthetic results can be achieved with ZLS even for monolithic ceramic restorations.

ZLS ceramics have improved mechanical properties compared to lithium disilicate ceramics³. However, only a few case reports on clinical use have become available so far^{2,4}. Clinical trials are still pending. D

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Fundamental principles in designing reprocessing areas

By Christian Stempf, Austria

It is recognized all too often that very little consideration is given to sterilization or reprocessing areas in either existing or newly designed dental practices. And yet reprocessing instruments between patients is crucial to meet today's hygiene rules in dental offices. Dental practitioners also have a moral and legal 'duty of care' calling for effective, well-defined and implemented infection control measures to prevent the transmission of infectious diseases to patients and staff.

Beyond the purely regulatory and safety aspects, many dentists have made the sterilization area a key asset for their activity. Located in a prime and visible location lets patients understand up front that their health and safety is important. The staff don't hesitate to share this passion for hygiene with patients, happy to answer any questions they may have. Flattered by this attention, it makes the patient feel confident and secure. To create new reprocessing areas or enhance existing ones is not an "insurmountable" challenge. It simply requires some basic principles this article will outline.

Having sufficient space dedicated to the reprocessing area is essential. In most of the cases it is undersized. The room must be functional, well lit and in proportion to the size of the dental practice and volume of instruments to be reprocessed. There must be space for cleaning and sterilization devices with their respective accessories as well as enough bench space for intermediate stages i.e. before/after cleaning; before/after packaging and after sterilization.

The first fundamental principal is to have two areas in the room; a dirty zone and a clean zone. Rationally, instruments must travel in one direction from the dirty zone towards the clean zone. As a consequence of this one-way flow, processed (clean) instruments must not enter the dirty zone; hence one preferred design for a reprocessing area would be rectangular - a corridor with two doors (IN & OUT) (Fig 1). Both zones require ventilation and the airflow should be designed to prevent air from the dirty zone being forced into the clean zone. Where the areas are beside one another, this can be achieved by pressurizing the clean area through air conditioning outlets and/or having exhaust fans in the dirty area.

At the entrance, there should be a hand washing basin equipped with an eye washing station, vital in case of accidental splashing of disinfectant or any harmful fluid. Liquid soap and hydro-alcoholic gel dispensers should have an automated dispensation (or elbow operated) which avoids contaminating them with soiled hands. It is recommended to pat dry hands with paper tissues.

Form follows function

The configuration of each part of the room follows the reprocessing steps i.e. pre-disinfection, rinsing, cleaning, rinsing, drying, packaging and sterilization. This room must not be used for any other purpose. Floors and working surfaces must be smooth, avoiding sharp corners and edges and be easy to clean and disinfect.

Waste

Waste should be disposed of into bags or containers through openings in the bench. Sharps and cutting items must be safely disposed of in specific plastic containers to protect staff, be collected and processed by specialized companies in treating contaminated waste. It is imperative to follow your local national guidelines as they may vary from country to country.

Pre-disinfection – Soaking

In order to prevent blood, saliva and debris from drying, all used and non-used instruments must be soaked as soon as possible after the procedure, using one or more disinfecting containers depending on the number, type and size of the instruments i.e. a small one for burs and files, bigger one(s) for bulk of items, kits or cassettes, etc. Note the manufacturer's guidelines NOT to immerse or soak certain instruments such as transmission instruments in solutions! The manufacturer's guideline on the concentration and contact time of the chemicals must be strictly observed. The temperature of the solution should not exceed 40-45°C, thus preventing coagulation of blood proteins which increases the challenge of cleaning.

Another benefit of this crucial first step is the reduction of the microbial population, decreasing the risk of infection during handling and cleaning. A basin will permit rinsing of the instruments with tap water aiming to remove any residual chemicals particularly in hollow and hinged items. Chemical residues could lead to irreversible staining and damage to instruments should a thorough rinsing step be missed.

Cleaning

The cleaning step is of utmost importance. Mechanical cleaning by means of an ultrasonic cleaner offers a good level of performance.

Note: Manual cleaning is discouraged, as it is the least efficient method of cleaning particularly for complex or hollow instruments and rough surfaces. The degree of cleanliness relies on the operator's experience and appreciation and also raises the risk to staff of skin penetrating injuries.

In order to remove chemicals and bioburden, all instruments must be thoroughly rinsed with tap water in a second basin. Ideally this would be followed by a second rinse with demineralized water to eliminate residues and salts present in tap water that could lead to whitish stains on sterilized instruments.

Washers or washer-disinfectors are a preferred mechanical cleaning method thanks to the higher performance of the cleaning cycle validated by the manufacturer in compliance with stringent applicable standards (i.e. ISO-EN15833-1/-5). The cycle process includes pre-washing, rinsing, washing and drying without manual intervention which allows free space on the bench, sparing the soaking container/s and one basin. It is wise to keep the second basin.

Buffer bench space after cleaning

Next to the washing station, space is reserved to check the dryness, cleanliness and integrity of all instruments. Compressed air will assist drying hinged instruments (scissors, forceps, etc.) which may also require periodic lubrication. Transmission instruments will be maintained at the same place. Internal and external cleaning as well as lubrication should be mechanically assisted by means of an automated process validated by the manufacturer. It is virtually impossible to manually complete internal cleaning.

Packaging – Sterilization

An area should be considered for a pouch sealing device as well as an area for the temporary storage of packages prior to process in the bench top sterilizer. To ensure safe and efficient sterilization it is crucial to check the load and cycle-type for compatibility. Selecting a cycle which is not designed and validated for the type of load (instruments) will lead to non-sterile products.

Additional space beside the sterilizer is intended for cooling and labelling of packages which have been released by the operator for storage and use (Fig 3). Special attention must be paid to ensure that pouches are hermetically sealed and are completely dry. Damp instruments/packages are not acceptable as sterile.

For extended storage time, pouched items should be stored outside the reprocessing area and surgery (operatory) in clean and dry drawers or cabinets. In doing so, single pouched items could safely be stored for up to 3 months.

Conclusion

All readers should reflect on these two definitions:

Reprocessing: "All activities required to ensure that a used medical device is safe for reuse" (ADA Guidelines for Infection Control - 2012).

Sterilization: "validated process used to render a product free from viable microorganisms".

"...the presence of a viable microorganism on any individual item can be expressed in terms of probability. This probability may be reduced to a very low number; it can never be reduced to zero." (ISO/TS 11139:2006).

In other words; the better each step is accomplished, the closer to "zero". Always bear in mind that each step of the reprocessing cycle is important. None shall be rushed or skipped which would compromise sterility and the safety of patients and staff. [DU](#)

About the author



Christian Stempf

has worked extensively within the European dental industry. He has been involved in infection prevention for nearly 30 years, with focus on reprocessing reusable medical devices, in particular sterilization and organization of sterilization areas.

He has gathered valuable practical knowledge and experience through his daily activities and contacts with healthcare professionals and experts in the field of infection prevention throughout the world.

He is a member of the European (CENTC102) normalization committee participating to two working groups i.e. bench top sterilizers (EN13060) and washer disinfectors (EN15883).

Christian shares this experience offering lectures in all objectivity on the topic of sterilization and infection prevention for healthcare professionals as well as comprehensive courses for dental assistants worldwide.

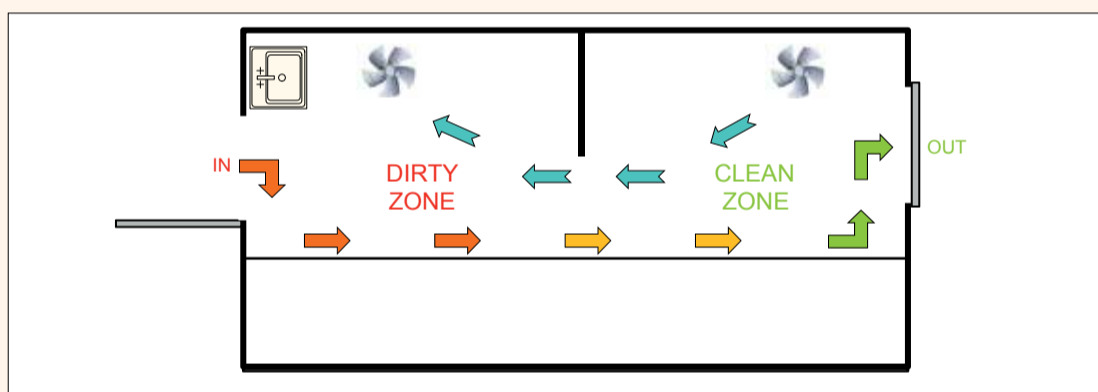


Fig 1. Instruments must travel in one direction in the reprocessing area from the dirty zone towards the clean zone. Conversely, airflow should be designed to prevent air from the dirty zone being forced into the clean zone.¹

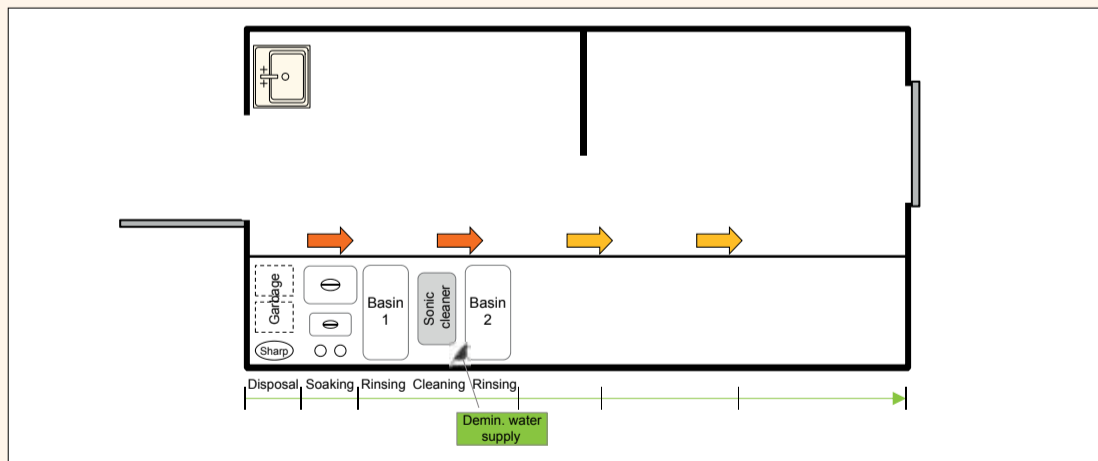


Fig 2. Dirty instruments are cleaned and rinsed on entry to the reprocessing area.

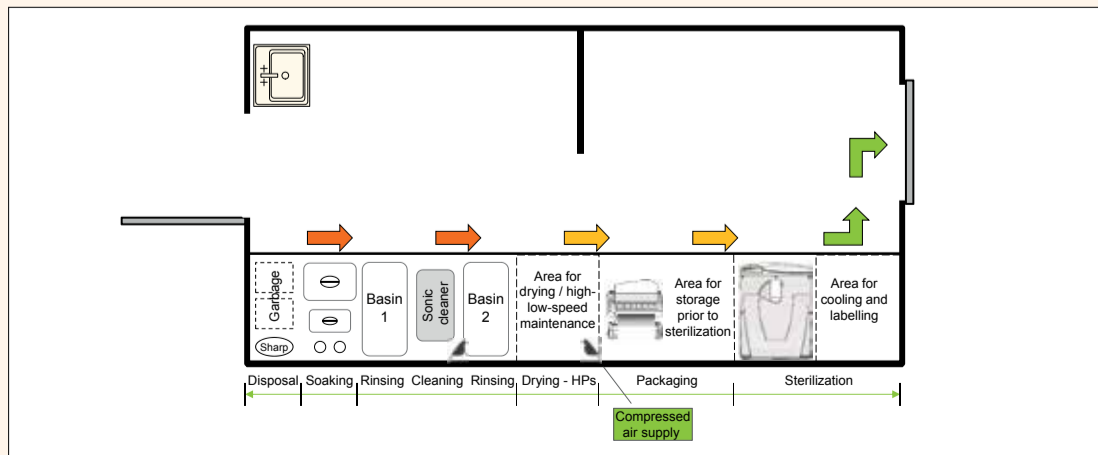


Fig 3. Clean and dry instruments are then packaged and sterilised

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Fig. 1: Initial situation, smiling.



Fig. 2: Initial situation, frontal view with lips retracted.



Fig. 3: V-Posil impression.

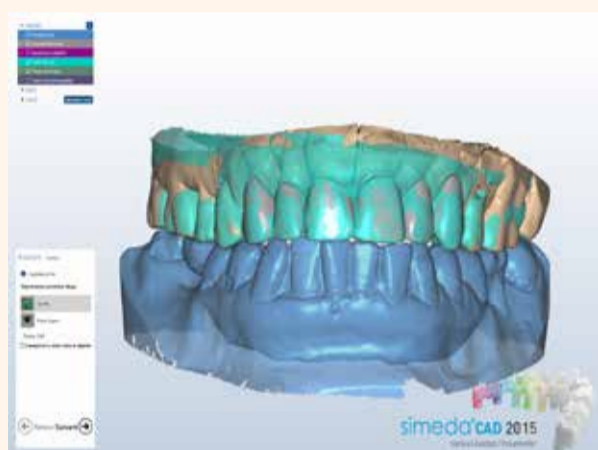


Fig. 4: Screenshot of the design software.



Fig. 5: Structur CAD disc.

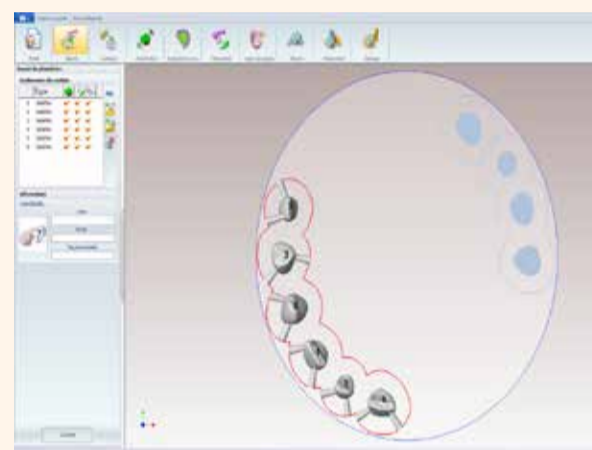


Fig. 6: Screenshot of the nesting software.

By Dr Yassine Harichane, France

Introduction

Nature has always captivated us with its beauty. Whether it is a landscape, a sunset or the intricate details of a leaf, one marvels at natural aesthetics. The goal of an artist is to copy nature in every medium: painting, sculpture, music, photography. It is easy to see parallels in dentistry. The teeth and soft tissue display details on the macroscopic and microscopic scale that make up all their beauty. Even the smile has characteristics that define what is beautiful and what is not. Like an artist, the dentist and the dental technician use all

their combined talents to create life-like restorations. The secret to imitating nature is in the details of daily practice and hard work.

Fortunately for dental practices and laboratories, technology has advanced considerably, making the ability to imitate nature much more achievable while paving the way for new practical methodologies. Performing a single restoration on a central maxillary incisor is a challenge, both technically and artistically. Whether it is a filling, a crown or an implant, all the skills of the artistic dentist must come into play because

the patient naturally expects a result symmetrical to the contralateral tooth. Using the latest technology, it is as simple as the copy and paste function one is so accustomed to using on a computer. The dentist has gone from being an artist to a computer scientist with the same optics: copying nature in all its perfection.

On the basis of a clinical case without the utilisation of an intra-oral scan, I will demonstrate a workflow with CAD/CAM technology. This will show that the ability to copy nature has now become accessible to all practitioners.

Preparation

In this clinical case (Figs. 1 & 2), the patient wanted the aesthetic aspects of her smile to be improved without losing unique features she had come to consider as part of her look and personality. The maxillary anterior teeth showed caries and defective restorations, but their overall shape was satisfactory and they had a certain charm despite their defects. Although her premolars did not have an optimal aesthetic appearance, the patient's budget limited treatment to the incisors and canines.

The first step was to take an impression of the preoperative oral condition. Although the dimensions and appearance did not conform to all the rules of dental aesthetics, they would be preserved because they had characteristics specific to the patient and they respected the occlusal dynamics. The impression of the teeth can be taken with an intra-oral scanner. However, the number of dentists who own intra-oral scanners is relatively low. The current materials allow for a satisfactory physicochemical impression and remain accessible to all dentists. A polyvinyl-siloxane impression was performed in one step and two viscosities (V-Posil Putty Fast and V-Posil X-Light Fast, VOCO) to record the initial clinical situation (Fig. 3).

Temporisation

The second step was to prepare the provisional crowns by copying and pasting the patient's teeth. After preparing the teeth, the impression is sent to the laboratory, which will scan and design the provisional crowns. Most CAD/CAM software possesses this copy and paste function (Fig. 4), so the scan and design processes take less than 1 hour. The six provisional crowns were then milled over the course of 1 hour and 30 minutes from a resin disc suitable for producing long-term provisional restorations (Structur CAD, VOCO; Figs. 5 & 6). Finishing the provisional crowns—checking the contact points, controlling the occlusion and polishing—required 30 minutes, allowing delivery of the crowns two days after taking the impression. The result obtained was strikingly natural (Fig. 7) thanks to the material's aesthetic properties: natural shade, easy polishing and improvable with characterization. Concerning the form, the provisional crowns had an asymmetry that is found only in



Fig. 7: Structur CAD provisional crown.



Fig. 8: Try-in of provisional crowns.



Fig. 9: Smile with provisional crowns.



Fig. 10: Porcelain crowns luted with Futurabond DC and Bifix QM (VOCO).



Fig. 11: Final result.

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nature, being both spontaneous and pleasant. They were temporarily cemented in the mouth to validate the prosthetic project (Figs. 8 & 9). The material's biocompatibility clinically allows for a three-year maximum period in which the crowns can be worn, making it a material perfectly suited for complex cases, or those requiring periodontal rehabilitation. The material's composition provides not only excellent resistance to abrasion, but also the possibility of repair with a compatible composite. In this clinical case, the provisional crowns were kept in the mouth for one week—the time needed to prepare the definitive restorations. No defects were observed.

Finalisation

During the last stage, after the functional and aesthetic validation of the provisional crowns, definitive porcelain crowns (IPS e.max, Ivoclar Vivadent) were milled also by copying the preoperative situation from the original scan. The provisional crowns were then removed, and the underlying teeth were cleaned. After fitting and validation within the mouth, the definitive crowns were luted (Futurabond DC and Bifix QM, VOCO; Fig. 10). The final result was a harmonious smile that did not distort the features the patient considered to be an important part of her facial personality (Fig. 11).

Discussion

Therapeutic success is measured by dental and periodontal health, as well as by patient satisfaction and feedback from the healthcare team. The skills of a caregiver are not limited to making the right diagnosis or defining the ideal treatment plan; technical skills are essential and mimicking nature is a daily challenge.

Dentistry has come a long way with the introduction and implementation of digital technologies, becoming faster and more precise as a result. These tools are becoming increasingly popular, and many practitioners are quickly equipping their offices and operatories. Contrary to

what one might think, the acquisition of an intra-oral scanner for the office is not an absolute obligation for one to take advantage of the digital dentistry revolution. Digital dentistry, above all, is a concept and we have just seen that it allows for an unsuspected and perhaps surprising function: copy and paste.

The advantages of copying and pasting are numerous and benefit everyone involved: dentist, dental technician and patient. For the dentist, the main advantage of copying and pasting is obtaining an intuitive result. On the one hand, the current materials (composite and porcelain), allow for a natural rendering. On the other hand, digital technology makes it

possible to copy nature with all of her details. The use of computer-generated provisional restorations makes it possible to validate complex or demanding projects. In the end, restorations are both functional and aesthetic. They integrate perfectly with the occlusion because no major changes have been made. In addition, they integrate with the overall harmony of the face.

For the dental technician, the copy and paste function is part of his or her skill set. On the one hand, the laboratory scanner can capture every detail of the dental arch. On the other hand, milling machines can deliver strictly identical crowns over and over again as needed. The milling of a provisional disc or block will therefore validate the therapeutic project before moving to more expensive materials such as zirconia or lithium disilicate. In the same way, if returned to the laboratory, the cost will be lower by using a millable temporary resin. After provisional crowns are validated, the dental technician only needs to press a button to start producing the definitive crowns in the desired material.

For patients, digital dentistry is an education on just how far dentistry has evolved: technological advancements in clinical procedures are replacing many of those treatments of their bad childhood memories. It is now possible for the patient to reclaim the smile of his or her twenties. Better still, it is possible to copy the child's juvenile smile and place it in the deteriorated dental arch of the father. The smile will become a legacy that will be passed down through families.

Conclusion

Technology is making significant progress in dentistry, it is up to us to appropriate it. The emergence of new tools, such as intra-oral scanners, and unique new materials, like millable temporary resins, makes it possible to develop new therapeutic concepts and procedures. Copying and pasting is now a part of the dentist's, and dental technician's, therapeutic armamentarium. A copycat is an artist who tries to capture nature in all its glory through painting. Now, a copyCAD is an artist who can capture nature in all its perfection through CAD/CAM technology.

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Dr Yassine Harichane graduated from the Paris Descartes University and conducted several research there. He is an author of numerous publications and a member of the Cosmetic Dentistry Study Group (CDSG) at the Paris Descartes University in Paris, France.

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Meeting patients' needs and transforming smiles with direct veneers

By Dr Mohammad Zuhair Al Khairo, UAE

Introduction

"I can't afford e.max veneers, do you have something more affordable?" is a question often encountered in clinical practice today!

Being a restorative dentist with more than 15 years of experience in private practice, I have been asked this question innumerable times. With the recent advances in direct resin technology, I am able to confidently say "YES" and provide an alternative of composite resin-bonded veneers with an emphasis on preserving tooth structure. The next question the patient asks with much anticipation is "what is the difference?". Since I started using a nano-hybrid, bioactive composite resin with a porcelain like shade, the one-word answer to this question is "COST!!".

Compared to a decade or two ago, today we encounter more internet-informed patients who visit the clinic with a preconceived notion, which you are expected to fulfill. Therefore, the dynamics of treatment planning has changed towards providing a suitable solution while managing patient expectation.

The advancement in composite resin technology with natural shade replication has created an avenue for clinicians to offer highly standardized, predictable restorations in terms of aesthetics, strength, polishability and durability. Shofu composites are unique as they are bioactive and provide an additional acid neutralization and anti-plaque effect to minimize caries risk while enhancing longevity of the restorations.

Being a firm believer in prevention and minimally invasive treatment, we follow a stringent prevention

protocol that I call "3X Protocol". Part of this protocol emphasizes "X for Prevention from eXtension" which has been modified from GV black principle "Extension for Prevention". Another "X" for eXpenditure, evaluates the cost benefit and to provide cost-based treatment options to the patient. The final "X" would be managing patient eXpectation as this is a crucial element of cosmetic dentistry. The "3X Protocol" has enabled us to provide a more conservative patient-centred treatment with the desired aesthetic outcome while preserving natural tooth structure.

The patient case presented below is an anterior diastema with old discoloured composite restorations. In clinical situations with multiple diastema, It is important to first evaluate treatment options from a restorative point of view before considering orthodontic treatment. In order to achieve long-term stability and predictable outcomes over time,

the restorative plan should consider different aspects such as:

1. Arch /space discrepancy in relation to occlusion.
2. Restorative material of choice
3. Biological cost and patient's financial limitations.

Patient case

A young female patient visited the clinic requesting for an enhanced smile as she was unhappy with the appearance of her front teeth after completing orthodontic treatment. Upon careful examination it was observed that composite resin restorations were used for diastema closure before orthodontic treatment (Fig 1, 2). The filled teeth had chipped at the incisal edge and had a grey discoloration. After careful evaluation the following treatment options were suggested to the patient:

1. e.max veneers with minimum tooth preparation,
2. Direct resin-bonded veneers with no tooth preparation.

After the treatment planning discussion, the patient requested to proceed with direct resin-bonded composite veneers to enhance her smile. After the old composite fillings were removed (Fig 3, 4), smile design, was done to restore the golden proportion by modifying the shape and size of the teeth. Based on the smile design a mock-up was created to help obtain patient approval on the expected outcome and fabricate the silicone index.

Materials used

- Prepare: Shade Selection & case documentation - EyeSpecial C II (Shofu)
- Restore: Beautifil II LS shade A2O, A1, Beautifil Flow Plus FO3 shade INC and Beautifil II Enamel HVT Composite (Shofu)
- Finish: Yellow banded Fine diamond bur, Super-Snap Black disk, for contouring and Super Snap Purple disk for finishing (Shofu)
- Polish: OneGloss polisher, Super-Snap X-Treme Green and Pink disks
- Super polish: Super Buff impregnated buff disk for enamel like lustre (Shofu)

Restorative approach:

Smile design

Digital Smile Design DSD, was used to reestablish proper proportion of the teeth and redesign the smile according to lower lip line, (Fig 5).

Tip: Smile design is a great aid to establish correct golden proportion and help convince the patient on the treatment plan

Wax-up

Indirect wax up was performed according to the smile design, (Fig 6).

Tip: Since it is a prepless case the lab should be informed not to prepare the cast during wax-up.

Direct mock-up

Silicon mold was used to create a direct mock-up trial to ensure proportion compatibility, occlusion and obtain patient approval.

Tip: checking the occlusion at this stage helps identify the points of interference that might affect the final restoration design and minimize adjustments.

Silicon index

Silicone index with putty impression material was used to create the palatal shell of the restoration for each tooth separately (Fig 8).

Tip: make the index with incisal wrap to help duplicating the thickness of the incisal edge (Fig 9).

Shade selection

Accurate shade selection was carried out using the direct technique where small buttons of each composite material was placed directly on the tooth surface. Beautifil II LS shade A2O was identified for Hue specification, Beautifil II Enamel HVT was identified to restore the value since the case involved bleaching ten days prior to the restorative procedure. Beautifil II LS shade A1 and B1 were compared under Shade Isolate Mode using EyeSpecial C II to determine the ideal Chroma and shade A1 was identified as the most suitable shade (Fig 10, 11). Beautifil Flow PLUS FO3 INC. shade was selected to create the palatal shell.



Fig 1: Pre-operative macro view of patient smile



Fig 2: Pre-operative retracted view



Fig 3: Smile after removal of old restorations



Fig 4: Retracted view after removal of old restorations



Fig 5: Digital Smile Design



Fig 6: Indirect wax-up



Fig 7: Direct mock-up to assess occlusion and obtain patient approval



Fig 8: Silicone Index fabricated with putty impression material



Fig 9: index with incisal wrap to help duplicating the thickness of the incisal edge



Fig 10: Direct placement technique for shade selection



Fig 11: Final recipe of shades for the restoration



Fig 12: Shade confirmation using the Isolate Shade Mode of EyeSpecial CII camera



Fig 13: Shofu EyeSpecial camera



Fig 14: Natural aesthetics achieved with direct veneers



Fig 15: Patient smile post treatment

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Tip: Shade Isolate Mode removes the influence of the background gingival colour and helps obtain a more accurate shade selection (Fig 12, 13).

Composite layering

Teeth were polished using non-fluoridated paste, etched and bonded. Restoration of each tooth was completed separately in a progressive manner according to a customized colour scheme, (Fig 14)

- Palatal shell was created using the silicone index with a very thin layer of Beautifil Flow Plus FO3 shade INC composite

- Proximal walls were created using Beautifil II LS shade A1 with a layer of Beautifil II Enamel shade HVT on top
- Beautifil II LS shade A20 was used incisally as a very thin line to help recreate the Halo effect and placed cervically as the first dentin layer, Beautifil II LS shade A1 was used to build-up the body dentine layer leaving to restore dentine colour leaving 0.5mm for the final enamel layer with Beautifil II Enamel shade HVT (Fig 14).

Tip:

- A flowable composite Beautifil Flow Plus FO3 should be used to create a thin palatal shell and ensure adaptation to tooth structure.

- A kidney shape matrix band was adapted to create the proximal walls and the contact with the adjacent teeth. Lateral incisors were restored before the central incisors to help reduce finishing time and material wastage.

- Use a brush such as Uni Brush (Shofu) to adapt the composite and refrain from using a resin liquid as it affects the composite colour

• Final layer of enamel should be 0.5mm all around to ensure uniform finish with proper shade characteristics

Contouring and finishing protocol

- Yellow banded Super Fine Diamond burs in high speed and Super-Snap Black disks in low speed were used to contour and create a uniform surface.

- Super-Snap Purple disks were used to create the mesial and distal reflective line angles.

- One Gloss polisher was used in the cervical area and to achieve the natural surface texture.

- Super-Snap X-Treme Green and Pink disks were used to polish the restoration.

- Super Buff impregnated super polisher was used for final polishing to achieve enamel-like luster.

Results and conclusion

The planned cosmetic restorative treatment with non-prep composite resin veneers was successfully completed and the patient was extremely happy with her enhanced "natural" smile (Fig 14, 15). The emphasis on shade selection and adoption of the 3X protocol which takes into consideration "prevention from eXtension" by avoiding over-preparation, "prevention from undue eXpenditure" by eliminating cost while maintaining quality and "managing patient eXpectations". As a clinician, our final aim with cosmetic treat-

ment is to recreate a natural smile that meets or exceeds the patient's expectations while ensuring longevity of the restorations. This concept can be easily achieved today with the help of innovative, bioactive composites capable of recreating natural life-like aesthetics with a predictable outcome. [DTI](#)

About the author

Dr. Mohammad Zuhair Al Khairo

Dr. M. Zuhair AK, earned his bachelor degree in dental surgery from Mosul University, Iraq in the year 1999 with the degree of honour. Two years later he specialized and trained in Conservative Dentistry where he was mentored by the renowned Prof. Abdul-Haq Abdul Majeed Suliman. At the department of Conservative Dentistry, Mosul University, Iraq. He had his own practice in Iraq early in year

2001 where he gained a very big reputation for his delicate, professional and honest way of dealing with his patients. In the year 2005 he moved to Dubai UAE to extend his experience across a different parts of the globe. His settling in Dubai for more than 8 years now gave him the chance to give his imprint by practicing international quality healthcare standards which has been internally developed and continuously improved over the years through rigorous clinical compliance parameters. In year 2013 he gained the German Board of Oral Implantology from Muenster University/DGZI with the first degree of honour among 29 students. Since then he has been awarded the membership of the German Association of Dental Implantology DGZI. Today, Dr. M. Zuhair's philosophy of dental care is more and more towards developing a high standard dental practice that offers a good quality dental service through combining the experience of a highly trained team and state of the art dental equipment.

Mectron launches own continuing education platform

By Dental Tribune International

The dental community is facing extraordinary times, and it has responded by adapting and implementing new strategies. This is also true for continuing education (CE) in dentistry. Embracing the opportunities of e-learning, Italy-based dental company mectron has recently

launched a webinar platform, which will provide dental professionals access to clinically relevant presentations 24/7 free of charge.

The new industry-wide dental CE platform delivers free CE accredited content through the convenience of the Internet. After quick and easy registration, dental professionals

will be able to attend live webinars and watch recorded webinars on-demand, and these will cover a wide range of topics relevant to the oral healthcare professional community, including implant treatment and prophylaxis. Twelve webinars in English, French, German, Italian and Portuguese are already planned and will become available soon on

the platform. More webinars will be scheduled in the second half of this year.

Andre Reinhold, mectron's international marketing manager, told Dental Tribune International that the company had been planning to start a Web-based education platform for some time already. However, the

recent COVID-19 outbreak and the related restrictions on travel and events, which have rendered maintaining customer relations almost impossible, prompted mectron to go online now.

"E-learning has become an effective tool for us to stay in contact with our customers and reach out to new customers, especially in regions in which mectron does not yet have a local branch," Reinhold said. "Although this online platform cannot replace physical presentations in the long run, it definitely facilitates access to and helps raise interest in our products. Through the webinars, dental professionals are provided with a comprehensive overview of the advantages of our products in daily practice," he explained.

The feedback has been overwhelmingly positive. "Within the first week of the launch, over 1,300 members registered. The registrations for the single webinars have also exceeded our expectations," Reinhold stated.

Since 1979, mectron has been one of the major players in the international dental industry, producing surgical, ultrasonic, air polishing and LED polymerisation devices, which are available in over 80 countries worldwide. With the introduction of the first ultrasonic titanium handpieces, the first LED polymerisation lamps for composite materials and, in 2001, the first ultrasonic surgical unit for piezoelectric bone surgery, mectron has developed some of the most important innovations in the dental field. [DTI](#)

More information about upcoming webinars can be found on the platform website at <https://education.mectron.com/>.

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Produkt-Dentures SA, Vevey, Switzerland

Testing a novel endodontic sealer

By Drs Paolo Generali and Francesca Cerutti, Italy

The aim of endodontic treatment is to eliminate microorganisms and their byproducts from the root canal system, together with avoiding its recontamination^{1,3}. The outcome of endodontic treatment is strictly linked to several steps: root canal debridement, disinfection protocols, hermetic obturation of the canal space⁴.

Root canal obturation in a 3-dimensional space with a stable, nontoxic material and the creation of a tight seal is fundamental for the success of the treatment, since the root filling seals the communications between the periodontium and the endodontium and, along with shaping and disinfection, allows a further bacteriological defense^{5,6}.

Sealers should be used to fill the morphologic root canal system irregularities, to avoid gap formation between the dentinal walls and core materials; moreover, sealers should facilitate the placement of the filling core with a lubricant action, penetrate into dentinal tubules to prevent microleakage and entomb

any remaining bacteria^{7,8}. Many different sealers are available on the market, but all of them ideally aim to have the following features: tissue tolerance, no shrinkage with setting, slow setting time, adhesiveness, radiopacity, bacteriostatic properties, absence of staining, solubility in solvents, insolubility to oral and tissue fluids, easy handling⁹.

The different endodontic sealers are categorized basing on their main components: zinc oxide eugenol (ZOE), calcium hydroxide, glass ionomer, resin-based, polydimethylsiloxane (silicon)-based and bioceramic-based sealers. Resin-based sealers became popular because of their adhesive properties and have been reported to be used with single gutta-percha cone technique for canal obturation¹⁰; even bioceramic sealers can be used with this last technique¹¹.

The most commonly used sealers in root canal treatment are ZOE-based sealers, modified for endodontic purposes based on Grossman or Rickert's formula. The powder of these sealers contains zinc oxide (ZnO), which combines with a liquid, generally eugenol. ZnO is an envi-

ronment-friendly material, which has been used widely in medical applications, with antibacterial properties and favorable characteristics in terms of biocompatibility. Unlike resin-based sealers, which are subject to shrinkage, setting reaction of ZOE-based sealers is a chelation reaction occurring between eugenol and the zinc ion of the zinc oxide; this reaction might also occur with the zinc oxide phase of gutta-percha along with the calcium ions of dentin. This might explain the decreased setting shrinkage associated with the ZOE-based sealers¹⁰.

Michaud et al.¹² have shown that volumetric expansion of gutta-percha (almost 135.35%) occurred in contact with eugenol during a 30-day period, and a pilot study done earlier showed a remarkable increase in the gutta-percha dimensions when placed in eugenol that continued even after 4.5 years.

Theoretically, sealer penetration into dentinal tubules could improve sealing of a root filling by increasing the surface contact area between the root filling materials and dentinal walls. Furthermore, retention of root filling



Fig. 1

material might be improved by mechanical locking. However, contrary to common belief, a positive correlation between sealer penetration into dentinal tubules and sealability has never been established¹³.

Penetration refers to the amount of sealer entering the dentinal tubules and adaptation qualitatively describes the way in which the sealer conforms to the dentine wall. Penetration and adaptation depend on many factors, including the patency and density of the dentinal tubules¹⁴.

A study by Russell et al¹⁵ investigated the penetration and adaptation of common types of root canal sealers (AH Plus, Kerr Pulp Canal Sealer, MTA Fillapex and EndoREZ) in cross-sections of tooth roots exhibiting the butterfly effect and to determine if this differs between coronal and middle root sections. Penetration and adaptation quality varied between obturation material groups but this did not reach significance, reporting AH Plus as the most performing material between the tested cements and Pulp Canal Sealer and EndoREZ as the less performing. The superior adaptation and penetration of a sealer may be attributed to its pseudoplastic behaviour inside root canals; this has been described as a decrease in viscosity and an increase in flow parallel to an increase in shear rate during filling procedures.

When using gutta-percha with sealer as core material for filling the canal space; the amount of sealer should be kept at the lowest, whereas the amount of gutta-percha placed into the canal must be maximized¹⁶.

To reach the ideal consistency of the sealer, it is important to calibrate the powder/liquid or paste/paste ratio of the mixed cement, because even small alterations to this ratio may cause a change in thickness and flow of the material, affecting its penetration and adaptation to the dentine.

ZOE cements have some drawbacks, such as the capability to stain the tooth and to have a setting time depending on the heat/humidity of the environments.

In order to improve ZOE powder-liquid sealers, many attempts have been done, adding various substances or substituting Eugenol in the



Fig. 2a



Fig. 2b

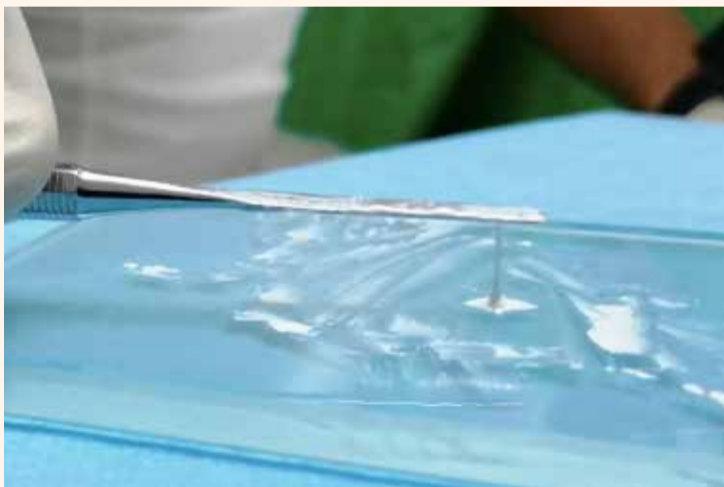


Fig. 3



Fig. 4



Fig. 5

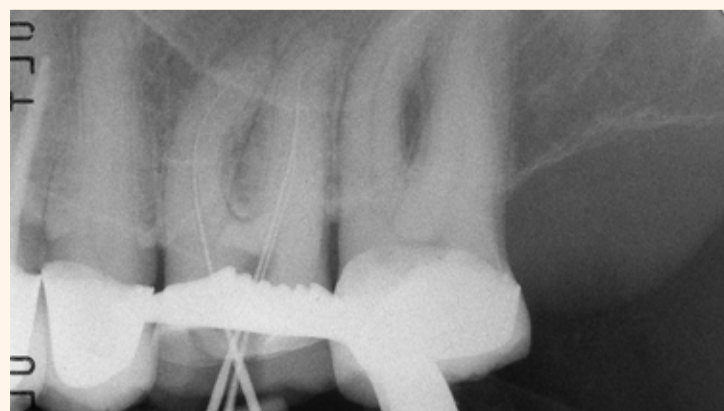


Fig. 6

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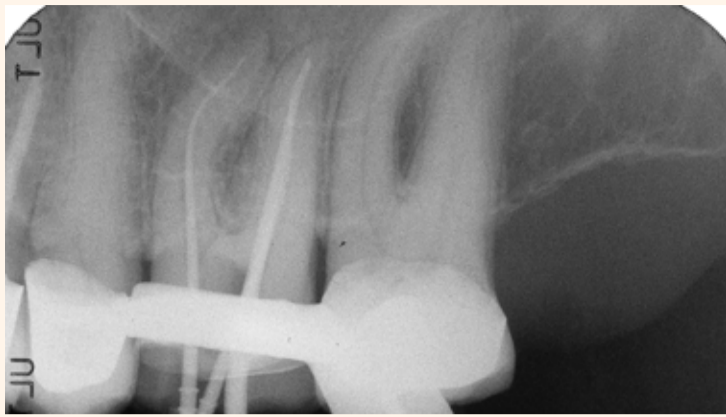


Fig. 7

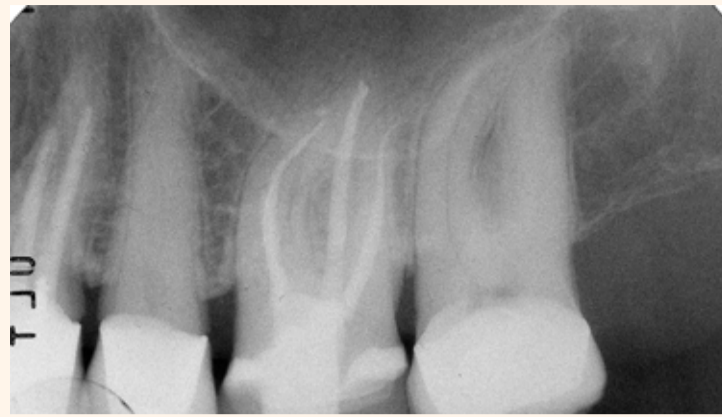


Fig. 8

liquid component. This has given rise to a number of Zinc Oxide Non-Eugenol-based sealers (ZONE).

In 2019, a new sealer containing Tea Tree essential Oil (EssenSeal, Produits Dentaires SA, Vevey, Switzerland) has been launched on the market. (Fig.1)

Tea Tree Oil is the essential oil obtained from the Australian native *Melaleuca alternifolia* or tea tree, indigenous to northern New South Wales and southern Queensland⁷.

Tea tree oil (TTO) is a complex mixture of essential oils, comprising approximately 100 components, most of which are monoterpenes, sesquiterpenes, and their related alcohols⁸. TTO has been shown to possess a number of therapeutic properties, including anti-inflammatory activities⁸, antimicrobial activity against a wide spectrum of microorganisms, for example *Staphylococcus aureus*⁹, a range of oral bacteria²⁰, certain viruses, including herpes simplex and influenza viruses²⁰, many fungi including some azole-resistant yeasts²¹. TTO has also demonstrated a potential biofilm inhibiting activity²². In an animal study, TTO succeeded to promote healing of the extracted sockets and prevented alveolitis²³.

According with Siqueira²⁴, the microbial flora present in failed canals has unique characteristics, with extremely resistant bacterial strain and even yeasts, and these pathogens survive in an inhospitable environment, often organizing in biofilms. Incorporating plant extracts or purified compounds derived from plants has become an emerging area of great interest in the medical and scientific community. Antibiotic resistance has directed researchers toward alternative therapies, including traditional plant-based medicines. Many such plants are those traditionally used by indigenous communities to treat infectious diseases²⁵. This is the case of TTO, that has been used therapeutically for long time, being one of the plants used in traditional medicine by the Bundjalung aborigines of northern New South Wales²⁶.

TTO is a natural compound with reported antimicrobial and immunomodulatory activities, used in traditional medicine. Its use in an endodontic sealer for endodontic retreatment could be an example of the new trend towards the use of natural products derived from plants in association with conventional means, to overcome the problems due to microbiological resistance.

EssenSeal is a powder-liquid cement highly flowable with low paste thickness, that should be mixed according with manufacturer's instruction, 1 drop of liquid with 1 of the provided spoon of powder.

The clinical impressions while using this sealer are positive: mixing and manipulation of the cement are easily done (Fig. 2-3) and the final product has a smooth consistency that allows an easy placement of the

gutta-percha cone into the root canal. In addition, this sealer diffuses a pleasant scent during manipulation and its white colour should prevent discolouration issues.

A procedure performed on a freshly extracted tooth showed good penetration of root canal anatomy and sufficient radio-opacity (Fig.4).

A clinical case shows the good penetration of the sealer into the root canals and the absence of voids (Fig. 5-8). The white colour, the pleasant scent and the good handling make this product suitable for everyday endodontic treatments, in addition the interesting properties of TTO against resistant micro-organisms and biofilms suggest particularly its use in retreatment procedures.^{DT}

Editorial note:
A full list of references can be obtained from the publisher.



The Danube Private University: Studying where others go on holiday – in the Wachau UNESCO World Heritage Cultural Landscape

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Despite the general trend towards specialization, the majority of patients want holistic treatment from their family dentist. It therefore goes without saying that the practice of today should also offer implantology and oral surgery. Anyone who has dealt with implantology and oral surgery, wants to expand their intellectual and manual spectrum. One should not immediately push oneself to one's limits, but rather subject oneself to a well-founded scientific learning process.

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AD

Researchers develop model to automatically localise mandibular canals



By Dental Tribune International

ESPOO, Finland: To place an implant, dental professionals first have to localise the mandibular canal, which is typically done using CBCT imaging techniques. Since this often requires considerable time and energy, Finnish researchers have recently developed a method for automatically localising mandibular canals with the help of artificial intelligence in order to facilitate the placement of dental implants.

The study was a collaboration between researchers at the Finnish Center for Artificial Intelligence, Tampere University Hospital in Finland, Finnish manufacturer Planmeca and the Alan Turing Institute in the UK. In the study, the researchers developed a novel deep learning method that helps automatically determine the exact location of mandibular canals. The model is based on training and using deep neural networks, employing a dataset consisting of CBCT scans.

After training the model on the coarsely annotated volumes, the researchers were able to accurately localise the mandibular canals of the voxel-level annotated set, the mean curve distance and average symmetric surface distance being 0.56mm and 0.45mm, respectively. The results show that the model successfully outperformed the statistical shape models typically used in research.

According to the researchers, the new model can achieve near-human accuracy in cases in which the patient does not have any pre-existing conditions and does not require special treatment. "In more complex cases, one may need to adjust the estimate, so we are not yet talking about a fully stand-alone system," said lead author Joel Jaskari, a doctoral candidate at Aalto University in Finland, in a press release.

The researchers noted that the aim of the study was to optimise the workflows of radiologists. "The aim of this research work is not, however, to replace radiologists but to make their job faster and more efficient so that they will have time to focus on the most complex cases," explained Prof. Kimmo Kaski, senior adviser in computational science at Aalto University.

Planmeca, which specialises in developing 3D and 2D digital imaging devices, dental units, and CAD/CAM solutions and software, is currently integrating the model into its dedicated software. The model will be used with Planmeca 3D tomography equipment.

The study, titled "Deep learning method for mandibular canal segmentation in dental cone beam computed tomography volumes", was published online on 3 April 2020 in *Scientific Reports*. [DT](#)

AD



The Importance of Proper Light Curing

There are several clinical challenges dentists encounter if they choose an inadequate curing light or apply inappropriate light curing techniques including weak adhesion and compromised physical and chemical properties of the restorative material. In fact, studies revealed that more than 37% of composite restorations are insufficiently cured! This will likely have a negative impact on the longevity of the restoration.

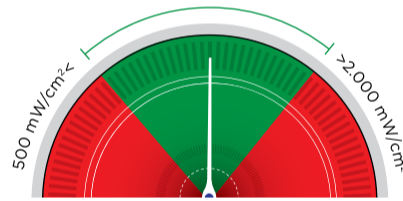
The following guidelines are based on the Consensus Statements on Light Curing² (Northern Light Meetings, Halifax) and are intended to help you achieve more predictable and reliable outcomes.

Shining A Light On Curing

Not all lights are created equal

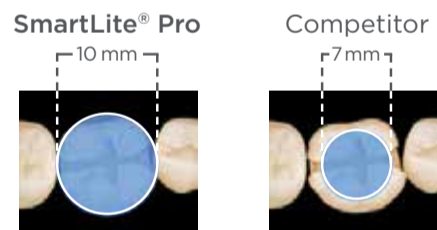
Be aware of the key performance indicators: Make sure your light delivers a minimum of 500 mW/cm² in standard mode. Be cautious when using high output lights (above 2.000 mW/cm²) that advocate very short exposure times (e.g. 1-5 seconds).

- SmartLite® Pro: ~1.250 mW/cm² over the whole curing area



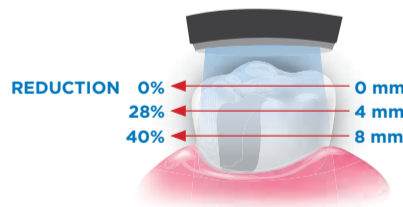
Maximize Coverage. Choose a light with a uniform output that covers as much of the restoration as possible. If the light tip is smaller than the restoration, use overlapping exposures.

- SmartLite® Pro: Large active curing area of 10 mm diameter



Cure Over Distance. Select a light that offers the least reduction in irradiance as distance from the tip increases.

- SmartLite® Pro: Collimated beam for reliable curing over larger distances



How To Properly Light Cure

Before getting started, be sure to:

- Use eye protection
- Watch position of curing light

Inspect And Clean. First make sure the light is free of defects and debris. Apply barrier sleeve to protect lens and handpiece from gross contamination.

Place Light. Position light as close as possible (without touching) and with tip parallel to the surface of the restoration.



Double Check. Light cure restoration for recommended time. Follow the resin manufacturer's curing table.



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 2. Price R., Light Curing Guidelines for Practitioners: A Consensus Statement from the 2014 Symposium on Light Curing in Dentistry, Dalhousie University, Halifax, Canada, J Can Dent Assoc 2014;80:e61.
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