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digital

international magazine of digital dentistry

interview
"Digital technologies are fundamentally changing the dynamics of our industry"

case report
Restorative simplicity for a challenging case

industry
Extension of Ceramill CAD/CAM workflow

dti] Dental Tribune International

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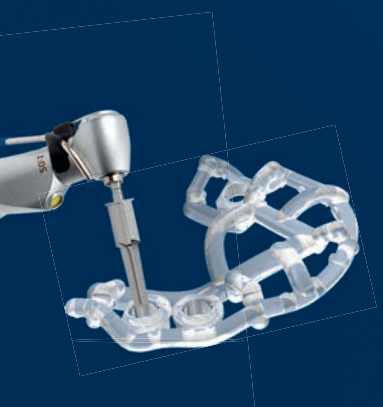

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Dr Scott D. Ganz

Editor-in-Chief

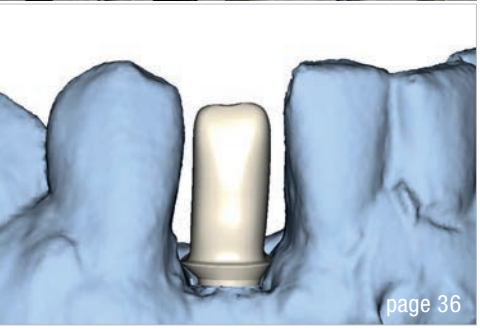
Signs of recovery

As we approach the last month of 2021, we can reflect on how our lives have changed during the global pandemic. Regardless of where you live in the world, SARS-CoV-2 has had a profound impact on daily life, including various levels of personal restrictions: wearing masks, social distancing, vaccine mandates, decline in travel and in-person meetings, and a large population of people working remotely. While it appears that the world is slowly making progress against this devasting virus and its variants, we are not yet there. In our world of dentistry, many events have been postponed or cancelled, and some have gone remote or are a hybrid mix of both in-person and remote sessions. The largest international dental event in the world, the International Dental Show held every two years in Cologne in Germany, was pushed back from its usual time in March until September, and both the vendor participation and overall attendance were significantly lower. The good news is that the event did happen; within the new restrictions of travel and vaccine status, new products were showcased, educational courses were held, and vendors and clinical colleagues were finally able to meet face to face.

The 107th annual meeting of the American Academy of Periodontology, held in Miami in the US, was a success, as was the 103rd annual meeting of the American Association of Oral and Maxillofacial Surgeons recently held in Nashville in Tennessee in the US. This past weekend, the American Academy of Implant Dentistry held its 70th annual conference in Chicago in the US and celebrated a record 63 diplomates awarded at the event. These meetings were successful despite being hindered by a lack of international attendance due to imposed travel restrictions. Clearly, there is a pent-up need for in-person meetings, continuing education, large and small symposiums, live-surgery training, hands-on workshops, etc. These are all signs that our industry is slowly recovering, albeit to a new normality.

Perhaps one of the most encouraging signs was the amazing success of the Digital Dentistry Society Global Congress, which was held in beautiful Lake Como in Italy earlier in November. Over 750 clinicians descended on the Villa Erba international congress and exhibition centre in Cernobbio to learn from international experts speaking on all aspects of digital dentistry at an incredible venue made possible by the generous support from industry sponsors. All participants were required to show their green pass, proof of vaccination or negative recent PCR test to enter the facility with their masks. Despite these limitations, the participants—from around the globe—were happy to be there to take part in this event. The signs are there, we are moving in a positive direction and hopefully the past is behind us. Please enjoy our new issue of digital **magazine** as we look forward to a very successful 2022 season and return to normality with renewed energy and spirit.

Dr Scott D. Ganz
Editor-in-Chief



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Time management—there simply do not seem to be enough hours in your day.

The COVID-19 practice manager 2021: Four steps to confidence—Part 4

Chris Barrow, UK

In the first part of this series, we looked at the characteristics of great leadership and how this applies in the role of practice manager. In the second part, we looked at management and the checklist of systems required to run a modern-day dental business. In the third part, we talked about teamwork: what makes an ideal team player and an ideal team, and how does the practice manager keep the right people?

In the concluding part of this series, I will be looking at extreme self-care, making sure that the best possible version of you can turn up for work (and arrive home again!). I set the scene by running through what has inevitably become a series of present-day challenges:

- time management—there simply do not seem to be enough hours in your day;
- task management—when you get to the end of the day, you rarely get to the end of the list;
- energy management—you are living in what seems to be a perpetual state of exhaustion;
- attention management—everyone wants a piece of you and a variety of digital channels are used to try and grab your attention.

Sound familiar? I want to share some insights about each of these challenges that have helped me (and those I care for) to navigate the pandemic.

Time management

It has been suggested that time management is a myth, that we all have 24 hours in the day and the choice as to what we do with them. That sounds very harsh when you have a family to raise and bills to pay. I am lucky to be at an age when my five children have left the nest, and believe me, I recognise my good fortune (if you see what I mean), but I also remember long years of

struggling to make ends meet, come a boom or bust economy.

To anyone caring for others at home as well as at work during the pandemic, I can only offer my admiration. I do, however, want to make a point about boundaries, about learning to say NO to situations, things and people that are unhealthy for you.

People are not designed to work a 50- to 70-hour week or to take on the stresses of everyone else as well as their own—that kind of high-energy level of operation can only be sustained for short periods before you burn out. My business coach, Rachel Turner, likens this to a revolution counter on a car engine, asking two questions:

1. How long do you operate with your revolution counter in the red zone?
2. How do you get your revs back down again?

The answer to the second question can reveal much. Do you use:

– alcohol
– caffeine
– sugar
– low-quality TV
– shopping

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Task management—when you get to the end of the day, you rarely get to the end of the list.

Or

– yoga
– meditation
– high-quality reading
– running/cycling/swimming/walking
– music?

Task management

Philosopher and guru Wayne Dyer famously observed that “nobody in a cancer ward ever wished they had spent more time at the office”. You get the point. That list of yours is endless—there will be no end to it, and it will outlive you. So, you must learn to do the best you

Energy management—you are living in what seems to be a perpetual state of exhaustion.


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reasonably can and accept that what is left over will either get done by somebody else or never get done. You cannot work eight days a week or 27 hours a day.

Task management is another myth—there is only priority management. One of the first modern-day books on time management, *The Time Trap* by Alec MacKenzie, suggested the following:

– Make a list every day.
– A, B, C the list.
– Do the As first.

Simple enough but profound and timeless.

I am a list person—my life is a list—and I keep that list nowadays on the cloud and synced to every device I own. Do not try managing your list; simply manage your priorities (and often other people's—that can be the hard part)—back again to strong boundaries and saying NO.

Energy management

I use a simple mnemonic with my clients, SNEF:

– Sleep. Read Matthew Walker's book *Why We Sleep*. I did in 2019, and it changed my approach to the subject. Without adequate and appropriate sleep, we cannot function at high revs for any sustainable period.
– Nutrition. I do not do diets and am a happy carnivore, but I do ensure that my nutrition is healthy and balanced. COVID-19 introduced me and my wife to meal kit company HelloFresh, and we remain committed clients.
– Exercise. Aerobic exercise has been a backbone of my life since the mid-1990s. Nowadays, I am a retired marathon runner after countless injuries, but I have taken up cycling and taken to it, both indoors and outdoors. Having two hunt, point and retrieve dogs helps as well.
– Fun. Despite everything the world throws at us, I have always regarded a healthy sense of humour as being a prerequisite of happiness (and the best version of that is the ability to laugh at oneself—which I do most days). Fun can be quality entertainment, great company or a mini-adventure.

Attention management

This is a modern-day phenomenon that seems to have crept up on us in the Internet age. There is a lot of online talk at the moment of the difference between synchronous and asynchronous communication.

Synchronous communication happens when messages can only be exchanged in real time. It requires that the transmitter and receiver are present in the same time and/or space. Examples of synchronous communication are phone calls or video meetings via platforms like Zoom and Microsoft Teams. Another example of synchronous communication is that tap on the door (or the shoulder), followed by "I know you said not to be interrupted, but...". In this case, the transmitter is someone who wants your help (or to dump his or her load) and the receiver is you.

Attention management—everyone wants a piece of you and a variety of digital channels are used to try and grab your attention.

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Focus on you; become incredibly selfish, so that you can best serve those who need you.

Asynchronous communication happens when information can be exchanged independent of time. It does not require the recipient's immediate attention, allowing him or her to respond to the message at his or her convenience. Examples of asynchronous communication are e-mails, online forums, collaborative documents and communication via platforms like WhatsApp, Slack and Asana. Another example of asynchronous communication is you taking yourself off to get some privacy—whether that is working from a local coffee shop or at home—frankly, just hiding from the synchronous stuff so that you can get your own work done or find the time and space to think.

Here is what COVID-19 did to us regarding attention demands:

1. increased the amount of synchronous communication we are expected to be available for, so that we risk burn-out
2. added pressure to treat asynchronous communication as if it were synchronous: the ping of an incoming message that we delude ourselves into thinking requires our immediate attention when it does not
3. decreased the amount of asynchronous communication that we allow for ourselves so that we do not suffer burn-out.

I am going to give away one of my big secrets of success: I ruthlessly minimise my availability for synchronous communication. This is going to sound terribly pompous (and I am sorry), but NO, I have not got a minute (unless it really, really is a genuine emergency—and there are very few of them), and so if you want my attention you either have to book a slot with my business manager, Phillippa (my synchronous communication guardian), or send me an asynchronous message, and I will answer it when I am able to.

In summary, my advice is to:

1. create boundaries around your time;
2. prioritise your tasks;
3. conserve your energy; and
4. protect your attention.

My advice to anyone who is in a management position is simple and stark (and I am paraphrasing the late, great Thomas Leonard, father of modern coaching): become incredibly selfish, so that you can best serve those who need you.

about

Chris Barrow has been active as a consultant, trainer and coach to the UK dental profession for over 24 years. His main professional focus now is through his Extreme Business company, providing coaching and mentorship to independent dentistry around the world via face-to-face meetings, a workshop programme and an online learning platform.

Teledentistry: A bridge between present and future

By Dr Carlo Fornaini, France and Italy

The COVID-19 pandemic has dramatically and totally changed all medical clinical practices. The aims of limiting physician–patient contact and reducing hospitalisation have become major concerns, pushing researchers to find novel ways to perform medical care.[1]

The new field called "telemedicine" has achieved great importance, and today it can be used in several medical specialties:

- Store-and-forward telemedicine, common in the medical fields of dermatology, radiology and pathology, makes it unnecessary for the medical practitioner to meet in person with a patient because patient information such as medical images or biosignals can be sent to the specialist as needed after it has been acquired from the patient.[2]
- Remote monitoring, also known as self-monitoring or self-testing and extensively used in the management of chronic diseases such as cardiovascular disease, diabetes mellitus and asthma, uses a range of technological devices to monitor the health and clinical symptoms of a patient remotely.[3]
- Real-time interactive services can provide immediate advice to patients who require medical attention, utilising for this purpose several media, including the phone and the Internet, followed by an assessment similar to one conducted during face-to-face appointments.[4]

The term "teledentistry", first used in 1997 when Cook defined it as "... the practice of using videoconferencing technologies to diagnose and provide advice about treatment over a distance,"[5] is a new area of dentistry that integrates electronic health records, telecommunications technology, digital imaging and the Internet, in order to improve access to care for patients in remote settings. It allows specialists located many miles away to make a diagnosis and recommend treatment options and/or referral for patients who, otherwise, would find it difficult to see them.[6]

In the field of oral and maxillofacial surgery, it has been reported that diagnostic evaluation of impacted teeth using teledentistry is as efficient as real-time patient assessment. Similarly, it has been shown that screening for dental caries in children using teledentistry is comparable with traditional techniques such as tactile and visual dental examinations. In the field of endodontics, teledentistry has been successfully used to identify root canal orifices and periapical lesions of anterior teeth.[7]


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Beyond the pandemic, there are several situations where it is convenient to have a consultation via teledentistry, such as in the case of geriatric, special needs and oncological patients who sometimes have difficulties coming to the clinic.[8,9]

Whereas several dental clinical treatments can today be remotely performed, for others, it is possible to hypothesise that, in the future, there will be the opportunity of full "at-distance" management.

The field of oral medicine is becoming increasingly interesting. By using smartphones or intra-oral cameras, which are very inexpensive today, it is possible, by sending images to the specialist, for him or her to make a tentative diagnosis and to decide, for example, whether a biopsy is necessary. Some studies have demonstrated that screening for potentially malignant oral disorders using photo messaging can serve as an effective adjunct and a potential cost-effective tool in a low-resource setting.[10]

Moreover, by utilising smartphone-based mobile digital PCR devices which allow, in a simple way, smartphones and tablets to be transformed into chemical laboratories, the research of particular salivary biomarkers in the saliva will be also possible.[11]

A recent study at Newcastle Dental Hospital's Paediatric Dentistry New Patient Service recently demonstrated that teledentistry can be used for numerous applications in paediatric dentistry, including initial triage, remote assessment, reinforcement of oral disease prevention, implementation of initial management and building of rapport to maximise safety and minimise inconvenience for both parent and child.[12] Another study showed that including a teledentistry consultation in the standard care provided to patients in an eating disorder day hospital could be beneficial, notably for screening for particular pathologies and preventing dental erosion.[13]

In conservative dentistry, remineralisation treatment which offers the advantage of being non-invasive, is increasingly being used as a minimal intervention treatment in managing incipient enamel caries, and a solution of 38% silver diamine fluoride (SDF) has been reported as an effective treatment for caries arrest.[14] Therefore, it is possible to think that the treatment of small carious lesions may be performed at home with SDF application supervised by a remote follow-up.

Tele-orthodontics, a term first used and described by Squires, may be a cost-effective way to provide care by reducing expenses, such as transportation for a consultation with a specialist, and additionally, it may help general practitioners to screen and/or appropriately refer potential patients for future orthodontic therapy.[15] With tele-orthodontics it is possible to check tooth movement and treatment progression using at-home digital photographic technology with a smartphone device and, when associated with aligner therapy, it allows the patient to progress through aligner trays independently, which may, in turn, reduce the number of in-office visits and help orthodontists monitor treatment progress even when the patients are at home.[16]

Teledentistry represents the future of oral health: patients, doctors and companies will have to make a great effort to be ready for this important opportunity, which will completely change current ways of performing oral treatment.

Editorial note: A list of references is available from the publisher.

about

Dr Carlo Fornaini is a researcher at the Microbiologie Orale, Immunothérapie et Santé (oral microbiology, immunotherapy and health) laboratory at the dental faculty of the Université Côte d'Azur in Nice in France and at the Group of Applied ElectroMagnetics of the Department of Engineering and Architecture at the University of Parma in Italy.

"Digital technologies are fundamentally changing the dynamics of our industry"

An interview with master dental technician Stephan Kreimer

By Iveta Ramonaite, Dental Tribune International

Stephan Kreimer is a master dental technician who runs a dental laboratory in Warendorf in Germany. Since he developed an interest in technology early on, Kreimer was always eager to integrate dental technologies into his workflow. Now, more than a decade later, innovative technologies such as CAD/CAM, CNC milling and 3D printing are shaping his work and offer increased efficiency. In this interview with Dental Tribune International, Kreimer shares his journey from a conventional to a digital laboratory and weighs up the advantages of investing in an in-house 3D printer.

Mr Kreimer, when did you first start working in the dental field, and what led you to a career in dentistry?
Technology has always been an interest of mine. Since 2009, I have been able to combine this interest in technology with dentistry through my education in dental technology. At the time, my parents were operating a conventional dental laboratory in Germany that made little use of digital technologies such as CAD/CAM.

After completing my master's in dental technology, I took over as managing director of our family laboratory.

1

Fig. 1: Master dental technician Stephan Kreimer believes that digital technologies such as 3D printing will help establish new standards of care in dentistry and create new business models. **Fig. 2:** Stephan Kreimer bought his first 3D printer back in 2016 and has significantly scaled up digital production in his dental laboratory ever since.

I was betting strongly on innovative technologies such as CNC milling and 3D printing and closed collaborations with leading manufacturers, including 3Shape and Formlabs. Smartly combining the passion for aesthetics and craftsmanship, which is inherent to our industry, with the enormous potential of digital technologies is definitely the way forward.

Your dental laboratory has eagerly adopted digital technologies into its workflow. Could you tell us more about it and discuss some of the digital solutions you are using?

It has been a journey. We started as a conventional dental laboratory and have been operating with traditional workflows for over 30 years. In 2009, we adopted our first CAD software but outsourced all of our digital production to service providers. Things changed quickly when we invested in our first 3D printer, a Formlabs Form 2, in 2016. At the time, the system was not optimised for dentistry, but it was clear that it had great potential. Within the less than five years since then, most of our customer base has adopted intra-oral scanners and we scaled our digital production capabilities significantly. Today, we use an imes-icore milling machine and multiple 3D printers that run almost 24/7 and work with both 3Shape and exocad. Around 70% of our customers send us digital impressions.

How did you integrate digital technologies, including 3D printing and CAD/CAM, into your laboratory?

It was definitely through trial and error. Especially in the early days, which was just a few years back, 3D printing was not well optimised for a dental workflow. Interfaces to materials, software and other workflow requirements have not been coordinated well between different manufacturers. This has led to the formation of a highly active international community of dental technicians who exchange through social media what they have learned. Personally, I've learned a lot from my peers around the world, and I'm equally giving back to the community

> "Combining the passion for aesthetics and craftsmanship, with the enormous potential of digital technologies is definitely the way forward."

3

Fig. 3: 3D-printed dental appliances. *(All images: © Stephan Kreimer)*

and the manufacturers. Dentistry is at the intersection of multiple disciplines, and we need to have good communication to make progress.

The rate of innovation in digital dentistry is extremely high. We now see manufacturers coordinating much better and creating more accessible ecosystems that are much easier to use. At the same time, most of the potential is still untapped and will become apparent as we undergo significant transformations within our industry.

> "We are undergoing a paradigm shift in dentistry because digital technologies are fundamentally changing the dynamics of our industry."

Having worked with digital technology for over a decade now, what benefits do you see of using dental technology, especially 3D printing, in a dental laboratory?

To me, dental technology is about combining the best of two worlds: analogue and digital. We still need and will continue to need traditional craftsmanship to meet the high requirements for individualised aesthetics in complex cases. At the same time, the holistic digital workflow works well in an increasing number of areas, enabling significant increases in efficiency while maintaining or improving overall quality. Digital fabrication in particular enhances production speed and reproducibility.

Dentistry is constantly evolving. What lies ahead for dentistry, and what dental technology is most likely to shape its future?

In my view, we are now at a point where most of the industry understands and embraces the vast potential of digital technologies. At the same time, we are just about to move from an early adopter stage to the early majority stage when it comes to the adoption of digital technologies. In Germany, for example, only 15% of dental practices are using intra-oral scanners, much less than in the US. However, the trend towards digital impressions is accelerating fast!

We are undergoing a paradigm shift in dentistry because digital technologies are fundamentally changing the dynamics of our industry. We will see entirely new business models, and together we will establish new standards of care. It is an exciting time, and for those who embrace this change, there will be many opportunities.

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Amann Girrbach goes "shareside"

By Jeremy Booth, Dental Tribune International

Going digital in dentistry is now more important than ever. CAD/CAM pioneer Amann Girrbach has a long history of developing workflow solutions for dental clinics and laboratories. "We're experts on both sides," said CEO Dr Wolfgang Reim, who spoke in this interview about the company's new modular Ceramill Direct Restoration Solution (DRS) and the communication and case management platform AG.Live.

Dr Wolfgang Reim has been the CEO of Amann Girrbach since 2020. *(All images: © Amann Girrbach)*

Dr Reim, what is new regarding Amann Girrbach's approach to the overall digital workflow?
The traditional approach to chairside workflows cuts off the competence of the laboratory from that of the dental technician. This is what we want to avoid. We have learned a great deal about the challenges at the interdisciplinary interface and have focused on the development of Ceramill DRS in order to offer added value to all stakeholders. With our new software platform AG.Live, in combination with the modular DRS, we have combined clinical and laboratory workflows, thus closing the gap between the dental practice and the laboratory. As a result of this process, professionals have more choices and instant modes of communication, and both sides can contribute their core competencies in order to provide patients with the best possible restorations. This is what we call "shareside"—Amann Girrbach's specific concept of chairside.

There are two core elements to the new and fully integrated workflow. Firstly, can you tell us more about the Ceramill DRS?
Ceramill DRS offers dentists and laboratories fully integrated and validated workflows with consistent highest-quality restorations and full flexibility. Depending on the type of collaboration desired, three team workflows are available in combination with the corresponding Ceramill DRS modules.

The Ceramill DRS Connection Kit integrates digital impressions taken by the dentist into the digital laboratory workflow. It consists of a high-performance intra-oral scanner, the Ceramill Map DRS, and scan software. It includes a connection to AG.Live, through which all case data is shared seamlessly and in real time with the laboratory of choice, and further communication directly linked to the case can be done online or offline. This eliminates the need for handwritten job sheets and phone calls and enables same day dentistry for certain restorations with a fast laboratory process.

Users can upgrade to the Ceramill Motion DRS production module, and restorations can be designed either on-site or with the support of the laboratory via AG.Live. In combination with the Ceramill Therm DRS speed

sintering furnace, a full chairside workflow for a crown in less than one hour is possible in validated consistency and at the highest quality level.

The second core element is AG.Live. How does this platform connect and enable dentists and technicians?
AG.Live offers an infrastructure and patient case management that provides consistency and efficiency and raises the flow of information to entirely new levels.

It networks laboratories and clinicians both online and offline for a particular case, displaying, for example, its process status. For the production process in the laboratory, machine and material availabilities are visible and overall task management of the dental fabrication process is made transparent.

Thus, AG.Live allows dental professionals to keep track of all activities digitally—from anywhere and at any time. Furthermore, participants can work and collaborate more efficiently through this network and better focus on their strengths and core competencies.

Ceramill Motion DRS.

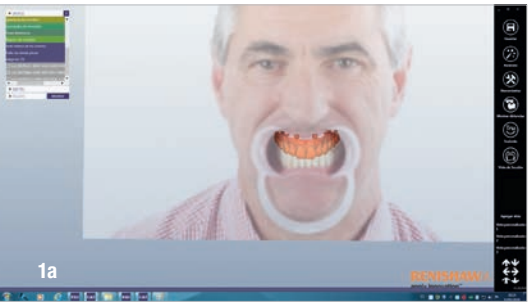
What are the real and tangible benefits of this fascinating solution for dentists and their patients?
There are three main benefits: firstly, the validated 100% consistency at the highest quality level, independent of the chosen workflow; secondly, the support of unique relationships between the dental practice and laboratory focusing on the best possible treatment of their patients; thirdly, the many options for the patient from this one scalable and validated system—from a single-visit crown to a full-mouth restoration.

Additionally, the flexibility and speed on offer may lead to a better experience for the patient and ultimately attract new patients and more orders for the laboratory.

With its Ceramill Direct Restoration Solution (DRS), Amann Girrbach has extended its integrated digital workflow to the dentist and thus closed the communication gap that existed between the dental practice and the laboratory.

Full-arch rehabilitation with lithium disilicate secondary crowns luted on to the primary framework

Joaquín García Arranz (Quini), Dr Ramón Asensio Acevedo & Oscar Jiménez Rodríguez, Spain



Figs. 1a & b: Digital mock-up. **Fig. 2:** Digital design of the gingiva.

Introduction

Dealing with implant restoration is challenging, and this process would be impossible if we could not communicate freely between the clinic and laboratory. At the start, we do not know what type of framework design we will have to make, nor what the pink and white proportions will be. The starting point is working as a team, maintaining constant communication through emerging technologies in photography or digital smile design. In a treatment protocol for complete edentulism with digital design information, we transfer the ratios of white and pink aesthetics to the scanner, turning it into an analogue test for a first analysis inside the mouth via CAM. When we know how far we need to go with the case, we select the type of material that will result in the best outcome, combining materials with appropriate techniques as required throughout the treatment. The patient's needs are always taken into account in pursuit of greater durability of our prostheses over time.

Case presentation

A patient with inadequate crown and bridgework attended the clinic because several abutment teeth had failed. Owing to the Class III occlusal pattern and the small number of remaining teeth with a good long-term prognosis, we decided on an implant-supported restoration in the maxilla and a combined tooth–implant restoration in the mandible.

Fig. 3: Mock-up in PMMA with pink and white aesthetics. **Figs. 4a & b:** Evaluating the integration of the mock-up in the patient's mouth.


5a


5b


5c


5d


6a

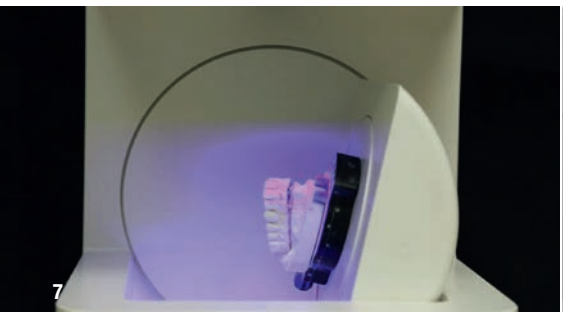

6b


6c

Figs. 5a–d: Choice of different definitive materials. **Figs. 6a–c:** Single-crown design on different framework materials for easy repair.

Today, these technologies are basic tools for approaching and establishing treatment. We combined digital smile design and the patient's photographs, and we entered them into the GC Aadva Lab Scan's exocad software. We merged the patient's facial contours with the Anteriores Templates Contour Library provided by Jan Hajtó (Figs. 1a–c). Once the teeth matching the facial features had been selected, we started to adjust the tooth shapes, keeping a close eye on length–width ratio, midline, and labial and pupillary plane. When the white aesthetics had been finished, we designed the pink aesthetics together with the implants, taking the anatomical design and the cleansable basal area into account (Fig. 2). After the aesthetic design, we sent this digital information to the CAM software to create a mock-up structure in PMMA. This can be done by either milling or printing (Fig. 3).

To check the precision, we systematically link our aesthetic mock-up to the implants. We do this by screwing three implant interfaces to the implants with the correct occlusion, providing a tripod of accuracy. With constant, good communication between dentist and laboratory, we did several aesthetic tests, working to a high degree of accuracy. In this phase, we need to work precisely and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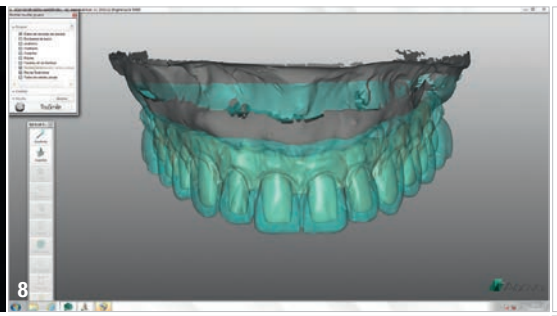
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11a

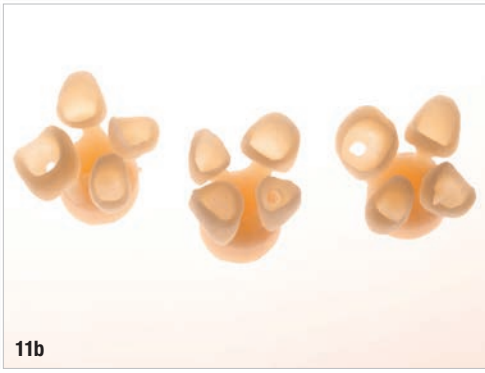
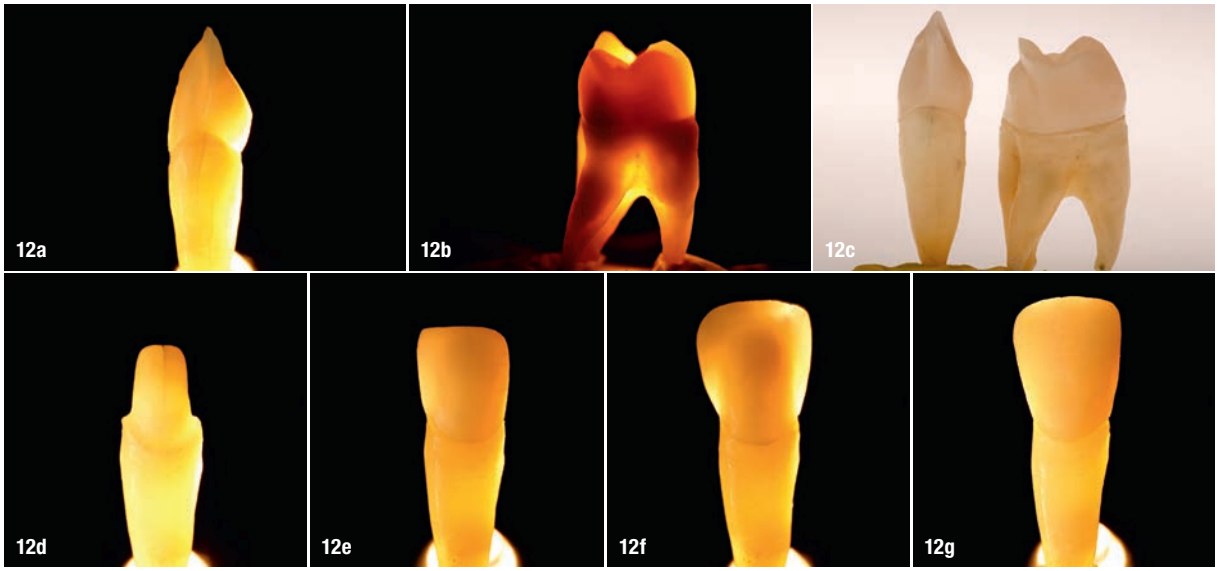

11b

Fig. 7: Scanning the aesthetic mock-up. **Fig. 8:** Framework design in GC's exocad software. **Fig. 9:** Porcelain-fused-to-metal framework: pink aesthetics with GC Initial MC. **Fig. 10:** Single-crown frameworks ready to be pressed. **Figs. 11a & b:** GC Initial LiSi Press ingot **(a)**. Secondary frameworks pressed in GC Initial LiSi Press **(b)**.

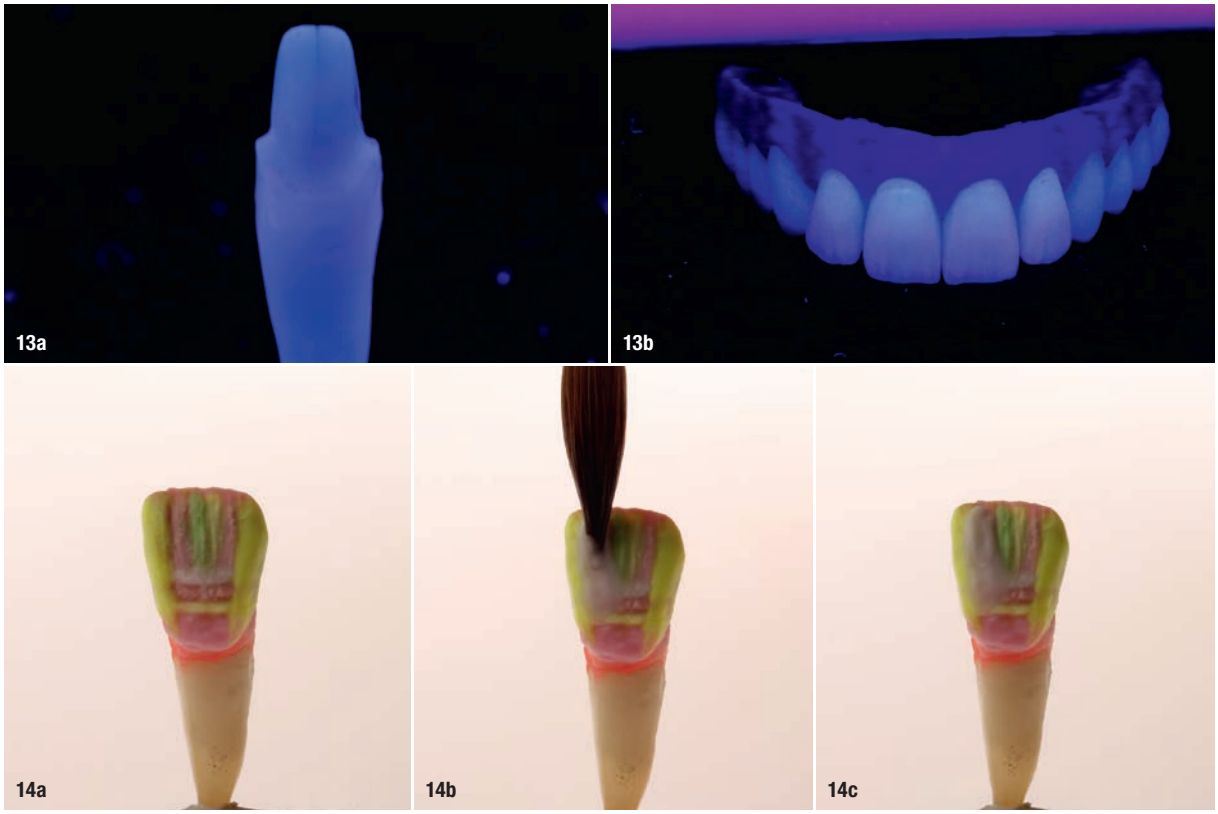


Figs. 12a–g: Light dynamics of natural teeth in direct and indirect light.

consistently before we can continue with the treatment. All necessary changes were made to clear any doubts until we achieved the desired integration of the mock-up into the patient's mouth and face (Figs. 4a & b).

During the treatment protocol for edentulous patients, we take the time to evaluate the aesthetic mock-up to verify what the best obtainable result would be and which material would be ideal for the definitive restoration: a conventional porcelain-fused-to-metal (PFM) restoration or a white material, such as zirconia, combined with metal interfaces (Figs. 5a–d). For this type of design, there are many elements that we have to take into account: the length from the implant to the incisal edge, implant–restoration ratio, widths of the design, occlusion, etc.

We take great care to ensure that every patient has a prosthesis customised to his or needs. The restoration



Figs. 13a & b: Light dynamics of natural teeth under fluorescent light. **Figs. 14a–c:** Layering with GC Initial LiSi.


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Fig. 15: Etching and pretreatment of the ceramic surfaces. **Fig. 16:** Cementation using G-CEM Veneer in Shade A2.

should be durable and, in case of an accident, easy to repair. Therefore, in some metal–ceramic and in zirconia restorations, we make single-crown designs on a primary framework (Figs. 6a–c). This enables us to repair or replace a broken element. In this case, where we had sufficient length, a change from a Class III to Class I occlusion with a considerable adaptation in the vestibular direction and long tooth structures in proportion to the gingiva, we opted for a PFM framework. We scanned the aesthetic mock-up with the GC Aadva Lab Scan and determined implant positions with its dedicated scan flags (Fig. 7).

Thanks to the tilt and swivel unit, 90° angulation and dual camera system, we were able to scan the basal side of the mock-up. With the exocad software, we could make a quick design of the restoration with a proportioned reduction (Fig. 8).

Once the frame structure had been designed, the STL file was sent to the milling unit to mill the metal framework. Although our protocol was carried out with rigid splinting of the impression copings, we still tested the framework's passive fit, both on the model and in the mouth.

For layering, we have two different techniques, both with their advantages and disadvantages:

– pink layering technique with white aesthetic cut-back technique; and
– pink layering technique with white aesthetic full-contour painting protocol (as is also shown in the alternative method section at the end of this article).

GC Initial LiSi Press MT was used for the secondary crown frameworks. The cut-back technique was used in the anterior area and full-contour frameworks were used in the posterior area. For this technique, we use duplicated secondary crowns in milled PMMA or wax to fit the emergence profile correctly while layering the pink aesthetics with GC Initial MC.

After layering the pink aesthetics, we applied a very fine layer of highly chromatic ceramic (GC Initial MC) on to the die's surface (Fig. 9). Once fired, this gives us the major advantage of being able to create a chemical bond between this feldspar-based ceramic and the future lithium disilicate secondary single crowns (GC Initial LiSi Press) that can now still be readjusted before pressing them (Fig. 10). We use this technique mostly for anterior restorations, leaving the lingual side monolithic with the correct occlusion and without any protrusive risk of chipping the ceramic. GC Initial LiSi Press looks very much like natural teeth, enabling excellent integration (Figs. 11a & b).

The best way to understand how the light dynamics of a material work is to conduct different tests with a natural tooth and play around, not only in direct light but also in indirect light (Figs. 12a–g) and even under black light or fluorescent light (Figs. 13a & b). By matching these optical properties, we can achieve good aesthetic results. GC Initial


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Fig. 17: Perfect integration of the pink and white parts after mechanical polishing. **Fig. 18:** Definitive restoration. **Fig. 19:** Intra-oral view after treatment.

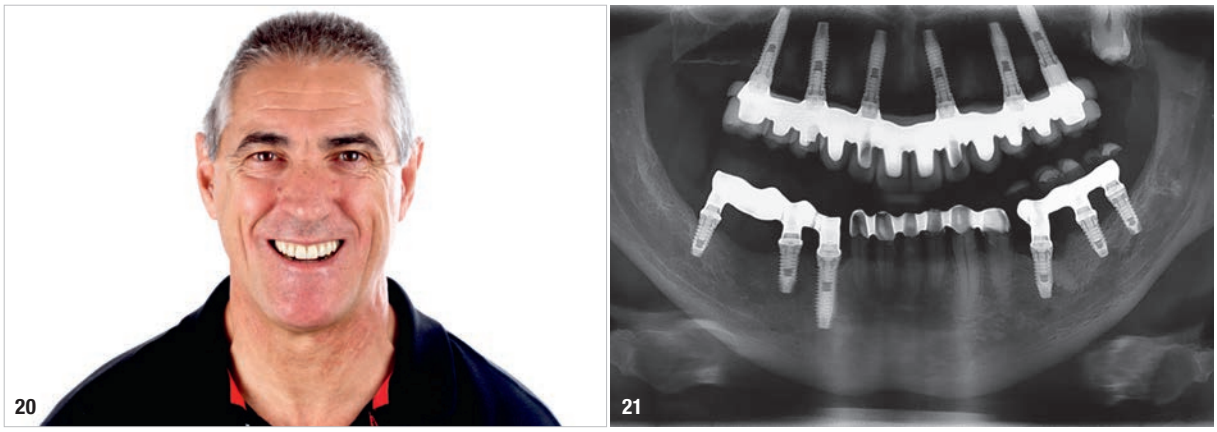

Fig. 20: Frontal view after treatment. **Fig. 21:** Radiograph after treatment.

LiSi Press is available in degrees of translucency, from the most opaque to the most translucent (MO, LT, MT and HT).

The anterior area is the most aesthetically demanding area and was veneered using the polychromatic layering technique using GC Initial LiSi veneering ceramic. This ceramic is exactly matched to the lithium disilicate framework and ensures a perfect fusion (Figs. 14a–c). Once the macro- and microtexture surfaces have been finished, we mechanically polish the restoration for perfect integration with the pink aesthetics.

Cementation and bonding protocol

The bonding protocol to cement the LiSi Press restorations on to the surface of the ceramic-covered dies starts by applying hydrofluoric acid to both ceramic surfaces and leaving it on for 20 seconds. After rinsing and drying, GC CERAMIC PRIMER II or G-Multi PRIMER (GC) is applied (Fig. 15).

Shade A2 of G-CEM Veneer (GC) was selected, verified with G-CEM try-in paste (GC) to check the shade and used to cement the restorations (Fig. 16). The cement was tack-

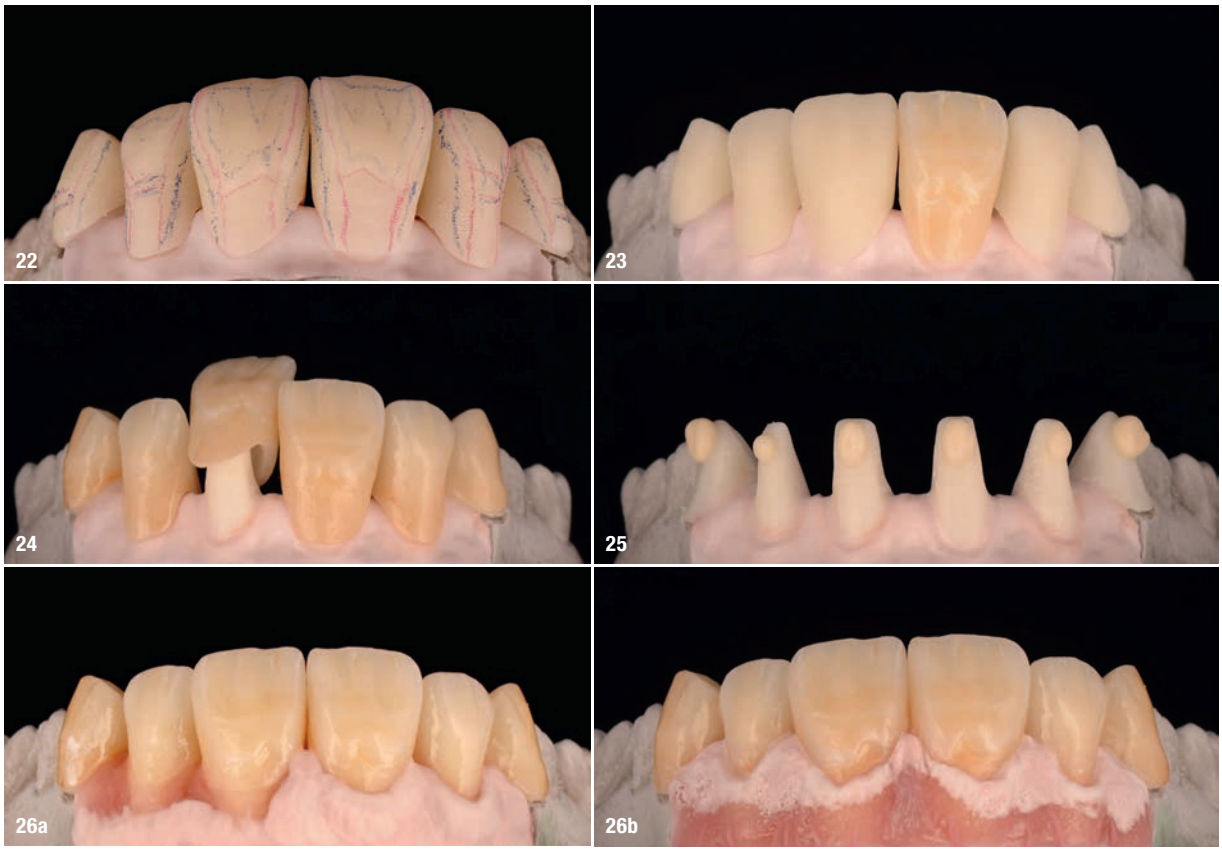

Fig. 22: Engineering of the micro- and microtexture of the surface. **Fig. 23:** Application of the GC Initial Spectrum Stains. **Fig. 24:** Fitting the GC Initial LiSi Press restoration on to the zirconia framework. **Fig. 25:** Highly fluid GC Initial LiSi ceramic is applied to the zirconia framework. **Figs. 26a & b:** Multi-chromatic layering of gingival structures.

Figs. 27a & b: Polished gingiva and teeth, view from two different angles.

polymerised for 1–3 seconds to remove excess material and then completely light-polymerised for 30 seconds. After completion, the restoration was finished and polished (Figs. 17 & 18).

The finished restoration placed in the mouth showed good integration (Figs. 19 & 20). The correct implant seating was verified with a CT scan (Fig. 21). The basal adaptation was perfect to enable optimal cleaning of the mucosa. Occlusal fit was checked with active posterior cusps and canine and protrusive guidance.

Alternative method

In this case, zirconia was used for the primary framework. Before sintering, the dies were infiltrated with colouring liquids and fluorescent effects. The secondary complete anatomical crowns were adjusted to the zirconia framework. After pressing in GC Initial LiSi Press MT, the surface structure (macro- and microtexture) was engineered (Fig. 22). Here, the aesthetic details were painted on to the full-contour zirconia restorations using the GC Initial Spectrum Stains and fixated in the ceramic furnace. A great advantage of this approach is the ability to continue firing until the desired colour has been achieved (Fig. 23).

Once the desired colour has been achieved, the surface is mechanically polished. The inside of the crowns and the zirconia die surfaces are gently sandblasted with aluminium oxide. We pay close attention to the correct fit between the GC Initial LiSi Press restorations and the zirconia framework (Fig. 24). The most delicate step in this technique is the placement of highly fluid GC Initial LiSi ceramic on to the dies' surface and manoeuvring of the crowns into their right position, taking the marginal fit and occlusion into consideration (Fig. 25).

A special firing for overall fusion of the secondary GC Initial LiSi Press crowns and the primary zirconia framework is conducted. Once both structures have been fired together, we layer the pink aesthetics with GC Initial Zr-FS. Multi-chromatic layering between different firing cycles is performed to reach the desired goal and achieve perfect gingival adaptation (Figs. 26a & b). The mucogingival surface is finished and mechanically polished together with the crowns (Figs. 27a & b), resulting in harmonious integration.

about

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The use of autologous tooth structure as adjunct grafting modality for full-arch dental implant rehabilitation

Drs Scott D. Ganz & Isaac Tawil, USA

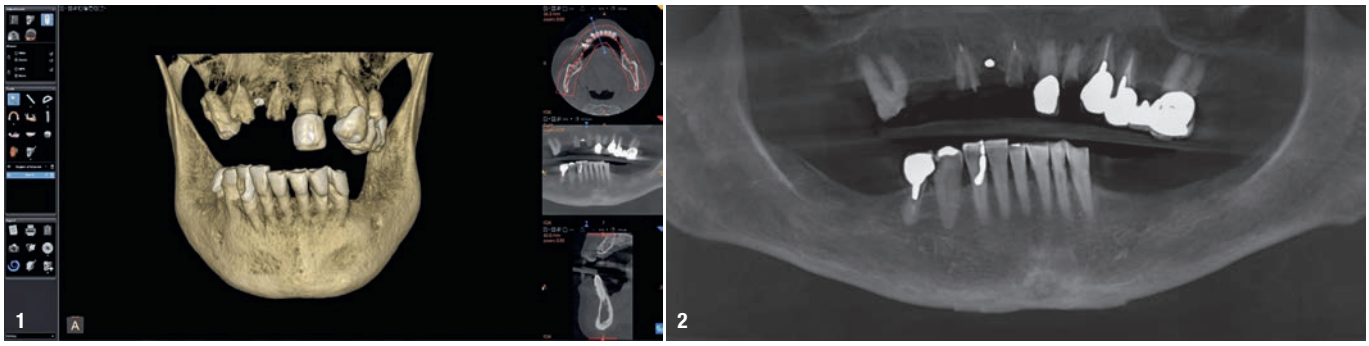
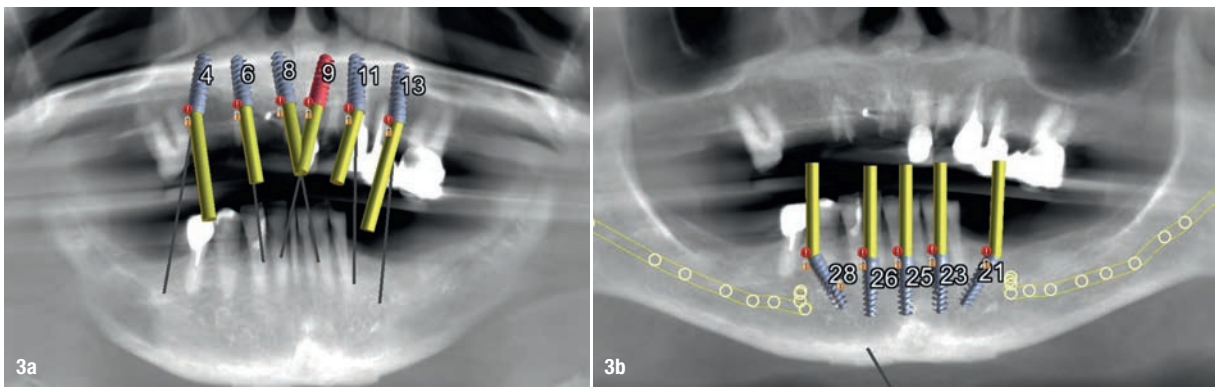


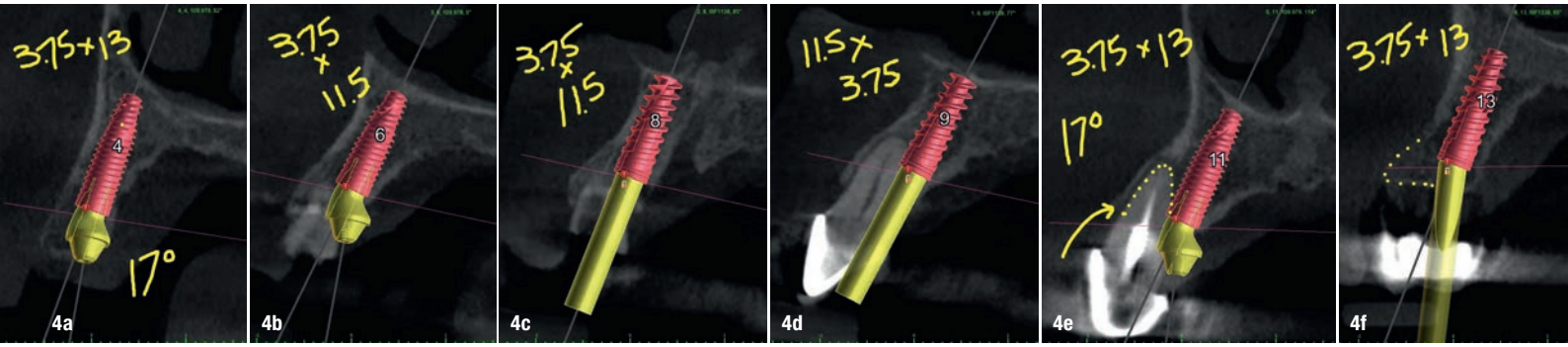
Fig. 1: CBCT imaging showing volumetric reconstruction, axial, panoramic and sagittal views. **Fig. 2:** Panoramic reconstructed view revealing fractured teeth, residual root tips and failing dentition.

Introduction

Full-arch dental implant rehabilitation is a viable treatment choice for patients who are edentulous or who have teeth that are compromised and in need of extraction. Regardless of a freehand or fully guided surgical protocol, treatment outcomes for full-arch implant-supported restorations have helped patients regain proper function, aesthetics and quality of life.[1–3] Additionally, the ability to place implants immediately after tooth extraction has become a viable treatment modality which can often reduce the time to delivery of functional restorations.[4] However, the residual alveolar ridge may require grafting to fill defects left by extraction sockets, or pre-existing concavities.[5,6] It is well understood that substantial bone resorption and loss of bone volume can occur when extraction sites are not grafted.[7,8] Avila-Ortiz et al. concluded that "alveolar ridge preservation is an effective therapy to attenuate the dimensional reduction of the alveolar ridge that normally takes place after tooth extraction".[9] The gold standard has always been autologous tissue harvested from the patient, but it is not always easy to harvest or readily accessible. Therefore, most clinicians currently utilise bone and membranes available through tissue banks. However, current innovations have fortunately provided a new, previously untapped source of this autologous tissue: the extracted



Figs. 3a & b: Six implants planned for maxillary arch fixed restoration **(a)**. Five simulated implants with two tilted to avoid the inferior alveolar nerves in the mandibular arch **(b)**.



Figs. 4a–f: Cross-sectional planning for maxillary implants and angled multi-unit abutments.

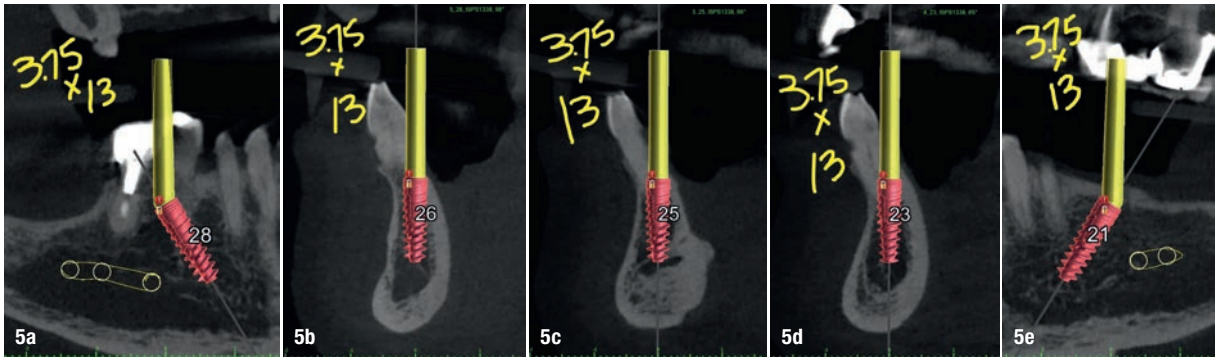
tooth, which is often readily available when full-arch implant rehabilitation is planned. This current article will demonstrate that it is possible to provide enough grafting material volume to fill all residual sockets and concavities from extracted teeth harvested during immediate implant placement for a dual-arch surgical procedure.

Case report

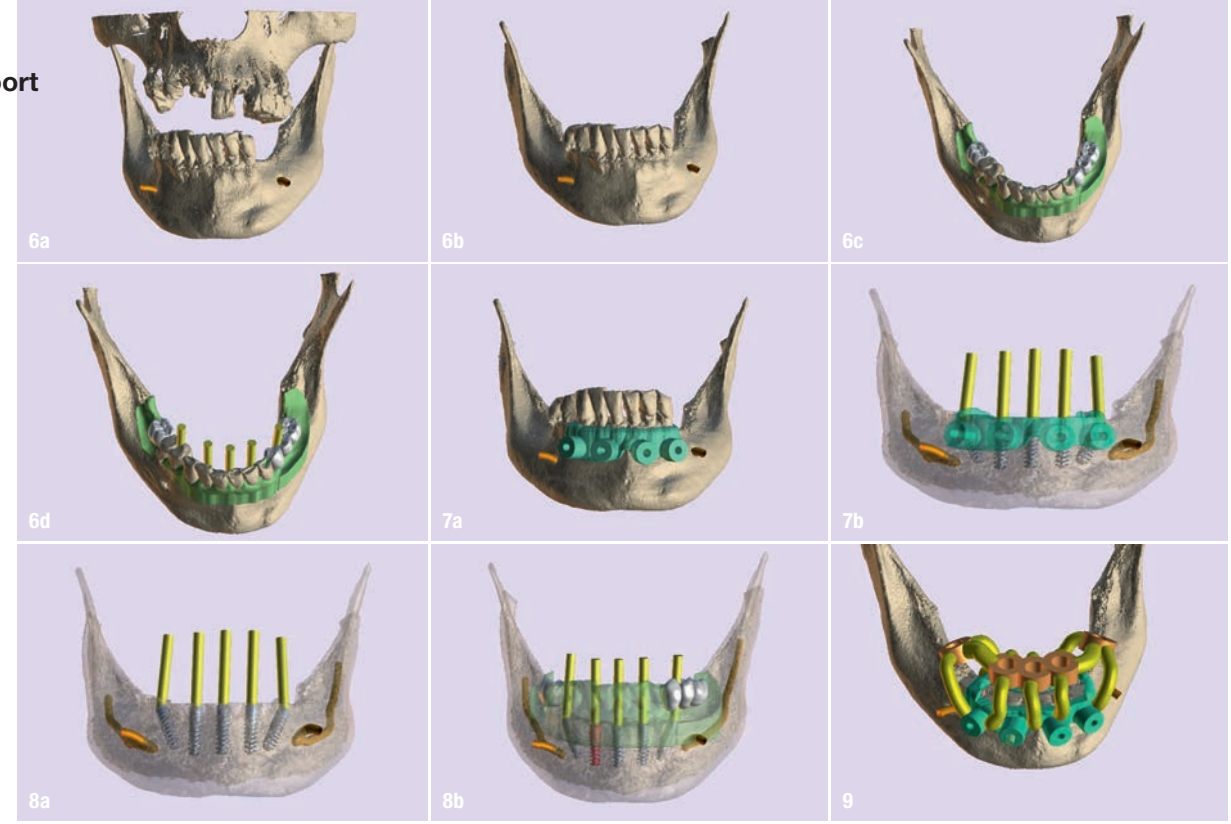
A 68-year-old female patient presented with failing dentition in the maxillary and mandibular arches due to years of neglect and patchwork dentistry. The patient was unhappy with the condition of her teeth and was embarrassed to go out in public. She had difficulty chewing owing to missing and fractured teeth in the maxillary arch, did not have any posterior mandibular teeth, and did not have a repeatable bite position. The patient had been to several dentists, who offered differing treatment plans, and was very confused regarding potential options to correct the deficiencies to improve her quality of life. Options that were presented included removable partial dentures, a maxillary complete denture and a mandibular removable partial denture, and implant-supported removable and fixed restorations for both arches. The patient wished to determine whether a fixed full-arch restoration could be considered for both the maxilla and mandible.

The patient's medical history revealed hyperthyroidism and hip replacement within the past five years. Clinical examination confirmed the diminished condition of the patient's dentition, and the need for a thorough 3D assessment of her existing anatomical presentation and that this could only be accomplished with a CBCT scan was explained to the patient. The CBCT scan allowed for the inspection of the anatomy in multiple views and with the digital tools afforded by the software (Carestream 3D Imaging, Carestream Dental; Fig. 1). The panoramic reconstruction served as a scout film to help visualise the condition of the patient's dentition (Fig. 2). The maxillary arch exhibited several fractured teeth, several that had undergone previous root canal therapy, a single crown and a four-unit posterior bridge on teeth #24, 25, 26 and 27. Using the embedded link, the original CBCT scan data was then exported from the Carestream 3D Imaging software directly to Blue Sky Plan software (Blue Sky Bio). Blue Sky Plan offers additional planning and design tools to aid in accurate diagnosis, treatment planning and surgical guide fabrication.

The preliminary plan consisted of placing implants in strategic positions to support implant-supported fixed restorations accurately delivered with the implementation of static, sequential surgical guides (Fig. 3). Each potential implant receptor site was designated by tooth number for the maxillary and mandibular arches. Manufacturer-specific simulated implants were then refined within the cross-sectional images, recording diameters and lengths in screenshots for the maxilla (Fig. 4) and the mandible (Fig. 5) utilised during the surgery as colour printouts.



Figs. 5a–e: Implant planning for the mandibular arch with straight and angled multi-unit abutments.



Figs. 6a–d: 3D volumetric reconstruction of the maxilla and mandible **(a)**. The isolated mandibular arch **(b)**. STL surface model merged with DICOM data with virtual posterior teeth **(c)**. Yellow abutment projections representing screw access channels **(d)**. **Figs. 7a & b:** Bone reduction guide design **(a)**. Reduced mandible, nerves and simulated implants with selective transparency **(b)**. **Figs. 8a & b:** Transparent reduced mandible, five implants and yellow abutment projections **(a)**. Transparent STL model and virtual teeth **(b)**. **Fig. 9:** Osteotomy drilling guide seated on the mandible.

When assessing the potential mandibular implant receptor sites, the buccal and lingual cortical plates appeared to be well defined. However, careful inspection revealed a deficient density within the intermedullary bone. Yellow abutment projections represented simulated abutment trajectories helpful in the determination of screw access channels within the transitional and definitive prostheses. It was also possible to place realistic simulated abutments based on the desired angulation and tissue cuff height chosen from the implant library within the software. The planning continued with the examination and manipulation of the 3D reconstructed volume of the mandible and maxilla (Fig. 6a). Using the isolate function within the Blue Sky Plan software, the mandibular arch was separated from the maxillary arch, which with the merging of the intra-oral scanning data helped with the restoratively driven planning and refinement of implant positioning (Figs. 6b & c). The implants were then planned with precise regard for the emergence of the screw access channels represented by the yellow abutment projections which extended above the occlusal plane (Fig. 6d). Once each of the implant receptor sites and the vertical positions had been validated, the amount of alveolar reduction (after tooth extraction) was determined. A bone reduction guide was then designed with four anchor pins for stable fixation to the mandible (Fig. 7a). The various components of the diagnostic progress can be better appreciated using selective transparency to visualise structures based on their density (Fig. 7b). Selective transparency was again utilised to visualise the final location of the three central straight implants and the two angled implants, clearly indicating the safe proximity to the bilateral inferior alveolar nerves (Fig. 8a). The translucent STL model of the mandibular teeth and virtual teeth helped relate the implant positions to the restorative plan (Fig. 8b). The sequential osteotomy drilling guide was designed based upon the parameters of the implant system and guided drilling kit utilised. The osteotomy drilling guide was to be secured to the mandible with the same fixation pins as used for the bone reduction guide (Fig. 9).

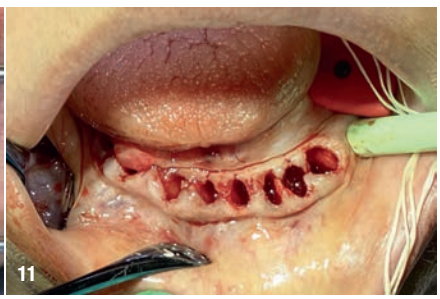


Fig. 10: Pre-op retracted view. **Fig. 11:** Mandibular extractions.

Clinical procedure

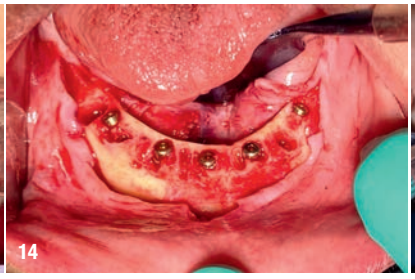
The patient presented with a collapsed bite due to missing, mobile and fractured teeth, which severely affected her ability to masticate food, resulting in embarrassment and a diminished quality of life (Fig. 10). After a thorough review of the diagnostic process, the treatment plan was presented and accepted by the patient for maxillary and mandibular implant-supported fixed restorations. At the request of the patient, one long procedure was scheduled to be completed under sedation administered by a dental

Figs. 12a–c: Smart Dentin Grinder and extracted teeth **(a)**. Teeth in the cutting chamber **(b)**. Large and small particle sizes sorted into two drawers **(c)**.

anaesthesiologist. Once the patient had been sedated, bilateral mandibular blocks were accomplished with 2% lidocaine with 1:100,000 adrenaline and 4% articaine. The remaining mandibular teeth were extracted using periotomes, elvatomes, and forceps (all TBS Dental), and all the sockets were thoroughly debrided and then irrigated with 0.12% chlorhexidine gluconate (Fig. 11). Many of the extracted teeth were free of decay, root canal therapy or fillings, and therefore it was elected to utilise the patient's own teeth to fabricate autologous grafting material for use in both maxillary and mandibular arches. The process of harvesting grafting material from tooth structure has been successfully reported in the literature and has become a great source of autologous tissue when teeth are to be extracted and grafting is required.

When teeth are to be extracted, often the extraction sites and implant receptor sites will require some type of grafting to manage the resultant anatomical defects and bony concavities. Currently, most bone grafting is dependent on tissue banks to supply us with bone in a bottle in various shapes, sizes and formulations. While these products are essential to have on hand, when teeth are to be extracted, perhaps an alternative concept would be to use the autologous material from enamel and dentine to serve as grafting material to fill defects and augment the surgical sites. As many of our patients present with a failing dentition due to alveolar bone loss, dentine grinding has gained popularity as an important ancillary method to gain significant volumes of grafting material, especially when patients are to undergo full-arch dental implants.[10–12] One such innovation is the Smart Dentin Grinder (KometaBio; Fig. 12a). Once the remaining mandibular teeth had been extracted and evaluated, a diamond bur in a high-speed handpiece was used to clean the tooth roots and areas of the enamel, removing all debris, soft-tissue tags, fillings and decay. The teeth were then dried and placed in the single-use sterile chamber attached to the Smart Dentin Grinder (Fig. 12b). The grinding process was timed for 3 seconds, followed by a 10-second sorting process, and was repeated until the teeth were sufficiently ground, and the particles were separated and sorted by size within the cannister and collection drawers. The particle size ranged from 250–1,200 µm as collected in two separate drawers (Fig. 12c). The volume of autologous particulate material was impressive at approximately 5–6 cm^3 of grafting material generated from the extracted teeth. According to the recommended cleansing protocols, the grafting material was transferred from the top and bottom drawers to a sterile dish. The entire volume of grafting material was then covered with the dentine cleanser solution and left covered for 5 minutes. The material was then dehydrated with a sterile gauze. This liquid cleansing process effectively rendered the dentine particulate bacteria-free without harming the collagen, bone morphogenetic proteins and growth factors imbedded in the dentine. A phosphate-buffered saline was then used to neutralise the pH levels, followed by dehydrating with a sterile gauze and a repeat of the rinsing process, and saved for later use as needed in both the maxillary and mandibular arches. The entire process can range from 8 to 10 minutes and is usually completed by a trained auxiliary.

A full-thickness mucoperiosteal flap was elevated from the approximate areas of tooth #46 to tooth #35 and carefully reflected to expose the alveolar ridge. A bone reduction guide was placed over the site and fixated with four anchor pins. The bone was then reduced to the planned vertical height with rongeurs and flattened with carbide burs in a straight handpiece (Alveoplasty Kit, Meisinger USA). Based upon the 3D planning, the 3D-printed osteotomy drilling guide was designed to fit over the reduced bone and fixated in the same holes as the bone reduction guide (Fig. 13). The fixation pins were of two different lengths and secured the resin guide to the mandible (Fixation Kit, ROE Dental Laboratory). The osteotomies were prepared with sequential guided drills for accuracy, and five implants (Helix Grand Morse, Neodent) were placed approximately 2 mm subcrestally (Fig. 14). Although the implants all exhibited moderate insertion torque, the intermedullary bone density within the mandibular implant receptor sites was poor, as previously



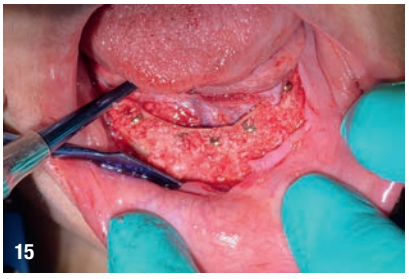


Fig. 13: Surgical guide fixated to the mandible. **Fig. 14:** Five implants placed as planned. **Fig. 15:** Dentine graft covering socket defects.

Fig. 16: Surgical guide fixated to the maxillary arch for guided drilling protocols. **Fig. 17:** Implant delivered through the guide. **Fig. 18:** Fully template-guided implants were placed.

noted during the diagnostic phase. Each implant was then objectively tested for stability using resonance frequency analysis, and implant stability quotient (ISQ) values were recorded (Osstell IDx, Osstell). The ISQ values confirmed the initial CBCT assessment of the mandibular bone, and a decision was made to bury the implants and leave them covered for approximately 2–3 months to provide sufficient opportunity and time for the implants to fully integrate within the mandibular bone prior to loading. Each subcrestally placed implant received a 2 mm cap screw to fill the coronal osteotomy site. All the residual tooth sockets and any defects or concave areas were then filled with the dentine grafting material (Fig. 15). Two 20 × 30 mm collagen membranes (MaxxMem, Community Tissue Services) were then draped over the grafted site and stabilised with deep horizontal mattress sutures. Closure was then achieved with continuous and interrupted sutures using #4/0 thread (VICRYL, Ethicon).

A similar procedure was completed for the maxillary arch. After local infiltration of anaesthetic agents, all remaining root tips and teeth were atraumatically extracted and all sockets thoroughly debrided. A full-thickness mucoperiosteal flap was elevated from approximately the area of tooth #16 to tooth #26 to expose the residual alveolar ridge. Once the bone had been reduced, an osteotomy drilling guide was fixated to the maxillary arch (Fig. 16). Osteotomies were then prepared, and six Helix Grand Morse implants were placed through the guide (Figs. 17 & 18). The stability of each implant was objectively measured, and the ISQ values were found to be below the threshold for immediate loading. Therefore, the maxillary implants were buried in a two-stage protocol. To preserve the width and height of the residual alveolar ridge, the extraction sites were all filled with the grafting material gleaned from the teeth extracted from the mandibular arch (Fig. 19a) and covered with large 20 × 30 mm collagen membranes (Fig. 19b). The immediate postoperative panoramic radiograph showed the placement of five implants for the mandibular arch and six for the maxillary arch (Fig. 20). The classic radiolucent appearance of fresh extraction sites was not evident, as each had been filled with the dentine grafting material. Small, round radiolucent holes could be visualised in the mandibular arch from the four fixation screws. The 2D panoramic reconstructed view is somewhat distorted and thus the true trajectory of each implant cannot be accurately appreciated. It was the original plan that the right and left most distal tilted implants would receive 30° angulated multi-unit abutments at the appropriate tissue cuff height once the implants had been uncovered and after osseointegration had been confirmed.

The patient was then brought out of sedation and allowed to recover until she was fully coherent and ambulatory. Immediate complete dentures were then delivered to the patient after soft-tissue relining had been accomplished to improve fit. Postoperative instructions were provided to the patient orally and in writing. The procedure was well tolerated, and the patient was subsequently followed for suture removal and healing progress.

Discussion

When full-arch implant restoration is contemplated for patients who are partially dentate, immediate extractions will be required. Many will require extractions of perfectly intact teeth and roots, which can provide an excellent source of autologous grafting material. These extraction sockets may leave significant voids in the bony architecture of the remaining alveolar ridge. As it is recommended that implants should be planned with 3D imaging acquired through CBCT scans, the diagnosis should also include an assessment of where the teeth will be extracted and what type of bony defects will be left after extraction. When implants are planned to be placed directly within fresh extraction sockets, often there is a gap on the buccal wall, which can be filled with grafting material to help preserve the bony housing. In other areas, the entire sockets can be filled to reduce potential for volumetric shrinkage of the ridge over time. The current case presentation illustrated the effectiveness of utilising an innovative device to grind extracted teeth to produce sufficient graft volumes required during the surgical phase of full-arch implant rehabilitation. Calvo-Guirado et al. found that, after processing with the Smart Dentin Grinder, “0.25 gr of human teeth produced 1.0 cc of biomaterial” and that the “chemical composition of the particulate was clearly similar to natural bone”.[13] The present case illustrated immediate extraction and immediate implant placement for a delayed loading protocol with

Figs. 19a & b: Implants and residual sockets **(a)**. Collagen membrane placed over the graft site **(b)**. **Fig. 20:** Post-op panoramic radiograph showing the implants and grafted sites.

autologous dentine grafting material, which can also be used for immediate loading protocols when appropriate.

Conclusion

Full-arch implant-supported restorations can be either fixed or removable overdentures. Regardless of the proposed treatment modality, when extractions are required, it is recommended that grafting be an integral and necessary part of the surgical procedure. The use of autologous tissue generated from the patient's own teeth has many advantages, including:

1. It represents a biocompatible material and is not recognised as a foreign body.
2. It has almost the same composition as bone, comprised of higher density hydroxyapatite and Type I collagen fibre.
3. Dentine and enamel are tougher than cortical bone and therefore provide an excellent scaffold and hence osteoconductivity.
4. Dentine contains good amounts of morphogenetic proteins and growth factors that aid in the regeneration process to form new bone relatively quicker than most grafts; hence, it is osteoinductive.
5. A single tooth, dependent on the type, can produce anywhere between 0.5 cm^3 and 2.5 cm^3, providing an ample amount of grafting material.
6. Autologous dentine does not require a secondary harvesting site and therefore eliminates morbidity, risk and pain associated with that secondary procedure.
7. Cost related to purchasing bone grafting material from tissue banks is reduced.

While dentine grafting can be especially useful with full-arch implant-supported restorations, additional uses can include conventional socket preservation, onlay grafting, sinus augmentation, creating sticky bone with platelet-rich fibrin and partial extraction (socket shield),[14] like any other available grafting material. Patients are also pleased that their own cells are being used to enhance the healing process. More research, especially long-term studies and follow-up, is recommended to quantify the benefits of this adjunct modality to provide autologous grafting material for patients in need.

Editorial note: A list of references is available from the publisher. This article originally appeared in Dentistry Today *in October 2021, and an edited version is provided here with permission from Dentistry Today.*

about

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Delayed immediate implant placement and direct soft-tissue management

Dr Haki Tekyatan, Germany

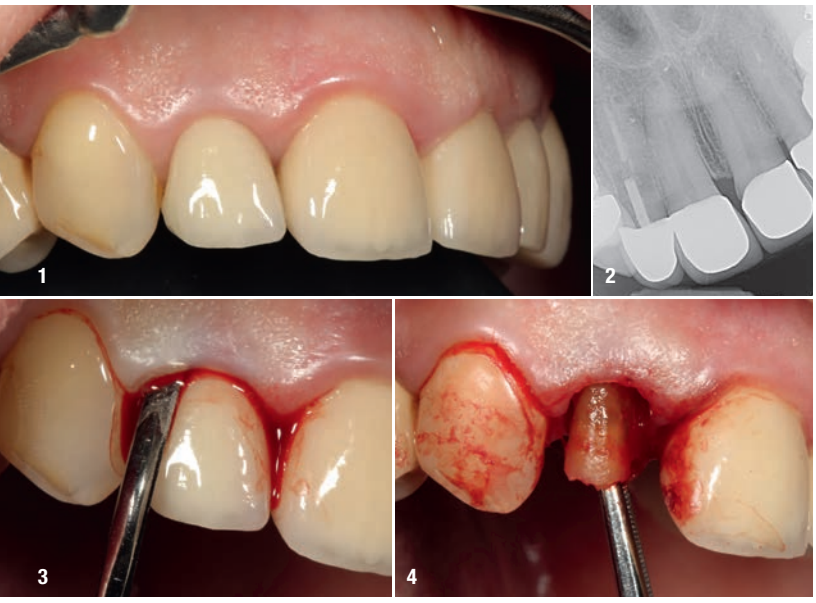


Fig. 1: Initial clinical situation of tooth #12. **Fig. 2:** Radiograph of tooth #12 showing failed endodontic treatment with the dislocated post restoration and deep complicated fracture. **Fig. 3:** Gentle detachment of marginal gingiva and periodontal ligament fibres using periotomes. **Fig. 4:** Atraumatic extraction of the tooth and the fractured fragment.

In the case of implant planning, the preservation of soft tissue and bone is essential for functional and aesthetic long-term success. There are now various different techniques and materials available. The timing of implant insertion and soft-tissue shaping play a crucial role, as do the measures taken in advance of the planned therapy. A targeted strategy can generate favourable conditions before implant placement. In this context, the use of bone grafting materials in combination with intravenously collected autologous platelet concentrates (I-PRF and A-PRF) has become increasingly important in recent years. With this "biologisation" of specially developed bone grafting materials for alveolar management, stable preservation of the extraction socket and the bone can be expected while promoting wound healing. The greatest loss of bone and, as a result, soft tissue occurs in the first 12 months after tooth extraction. In the literature, loss rates of up to 60% are reported.[3] In this regard, Tan et al. were able to show in a systematic review that six months after extraction there is a horizontal bone loss of 29–63% and a vertical bone loss of 11–22%. The transverse bone loss was found to be higher than the vertical bone loss.[12] This was also confirmed by Araujo and Lindhe in their animal studies. They found that the greatest changes to the alveolar process in the area of the buccal wall occurred within three to six months after tooth extraction.[2] In implant dentistry, these are limiting factors in daily practice. However, it is crucial to have sufficient hard and soft tissue both in quantity and in quality to achieve the goals of implant therapy.[5]

Preventive interventions can aid in counteracting bone loss and resorptive processes in order to preserve hard and soft tissue.[7] In this regard, alveolar stabilisation is a method performed during or after tooth extraction to minimise external resorption of the alveolar process, preserve bone, and promote and support bone formation within the extraction socket.[6] Various terms are used for this in the literature, such as alveolar ridge preservation (for three- or two-walled defects), socket preservation (for circularly intact alveoli), socket seal technique and alveolar preservation. The aim of these methods is to fill the fresh extraction socket with a bone grafting material and to achieve stabilisation of the alveolar walls.[9] In this regard, the use of bone substitute materials biologised with platelet-rich plasma (I-PRF and A-PRF) is described in the literature as a successful means to preserve bone and soft tissue and to support the healing process.[8, 11] In the following case report, socket preservation with CERASORB Foam (curasan) and I-PRF (IntraSpin, BioHorizons Camlog), obtained according to the Low Speed Centrifugation Concept (LSCC) of Prof. Shahram Ghanaati, was performed after extraction of tooth #12.[15] Similar cases were reported by Palm et al. and Al-Nawas et al. in the past.[13, 14] The implant was positioned and inserted six weeks later on the basis of external planning (DEDICAM, CAMLOG) and using a surgical guide with depth stop (CAMLOG Guide System). An intra-oral scan (Medit i500, Kulzer) was performed intra-operatively, and the first surgical phase concluded with submerged healing. During this period, a new type of healing abutment was fabricated entirely from PEEK material. After a healing pe-



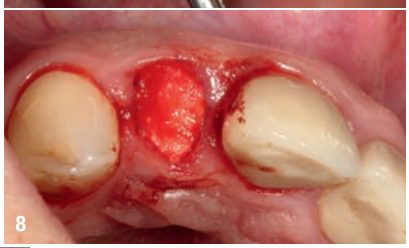




Fig. 5: Biologisation of the β-tricalcium phosphate collagen matrix CERASORB Foam with I-PRF. **Fig. 6:** Insertion of the biologised CERASORB Foam into the extraction socket. **Fig. 7:** Gentle adaptation of the easily mouldable CERASORB Foam to the alveolar walls with slight material compression. **Fig. 8:** Crestal covering and sealing of the augmentation material using a compressed A-PRF plug. **Fig. 9:** Stabilisation and fixation by means of cross-suturing. **Fig. 10:** Temporary restoration of the gap with an interim prosthesis. **Fig. 11:** Radiographic control of the augmentation site. Note the almost structurally identical distribution of the bone grafting material throughout the extraction socket.

riod of three months, this PEEK healing abutment was used directly after implant exposure in order to shape the peri-implant soft tissue optimally and atraumatically in a few treatment steps. Finally, the prosthetic restoration was realised with a ceramic-veneered CAD/CAM-fabricated crown.

Case report

A healthy 55-year-old female patient presented to the practice with an unsalvageable tooth #12. Clinically, the oral situation was unremarkable. The patient reported that the crown was loose and that it rotated slightly. She also reported pain on biting. The radiographic evaluation revealed that the tooth had been endodontically treated and restored with a metal post. Dislocation of the post and core with the crown and a deep fracture were detected, and the patient was informed accordingly (Figs. 1 & 2). A few days later, tooth #12 was extracted gently and atraumatically with the aim of preserving the alveolar walls as far as possible. Special periotomes and instruments (KLACK set, Geistlich Biomaterials) were used for this purpose (Figs. 3 & 4). Since an implant restoration was planned in this case, it was decided in advance, and together with the patient, that appropriate measures for bone preservation should be taken. The condition of the alveolus after extraction is an important criterion for deciding which treatment protocol should be used, that is, which bone grafting material with which resorptive properties should be used and when the implants should be placed. In the case described here, the alveolar bone could be preserved in all directions. The decision was made in favour of delayed immediate implant placement and the use of a bone regeneration material that is rapidly resorbed and quickly incorporated into the autogenous bone.

Socket preservation was performed with a β-tricalcium phosphate collagen matrix (CERASORB Foam), which was biologised in advance with I-PRF (platelet-rich fibrin concentrate; Fig. 5). In its hydrated, biologised state, the collagen matrix can be excellently shaped and adapted to the alveolar walls under as little compression as possible (Figs. 6 & 7). The augmentation site was covered crestally and sealed with a compressed A-PRF plug (Fig. 8). The site was then stabilised by means of cross-suturing (Fig. 9). Tight covering using the socket seal approach and a tissue punch was not necessary in this context. The gap was temporarily restored with an interim prosthesis, which was designed as a pontic in order to shape the soft tissue (Fig. 10). Lastly, a control radiograph was taken, and the optimal defect filling and almost structurally identical distribution of the matrix could be noted on the radiograph (Fig. 11). After the treatment, irritation-free, stable and, above all, pain-free healing was observed. As a result, planning for implant placement by means of CBCT (Orthophos XG 3D, Dentsply Sirona) could be carried out after only three weeks (Figs. 12 & 13). To achieve optimal 3D axial positioning of the implant in the vertical, mesiodistal and

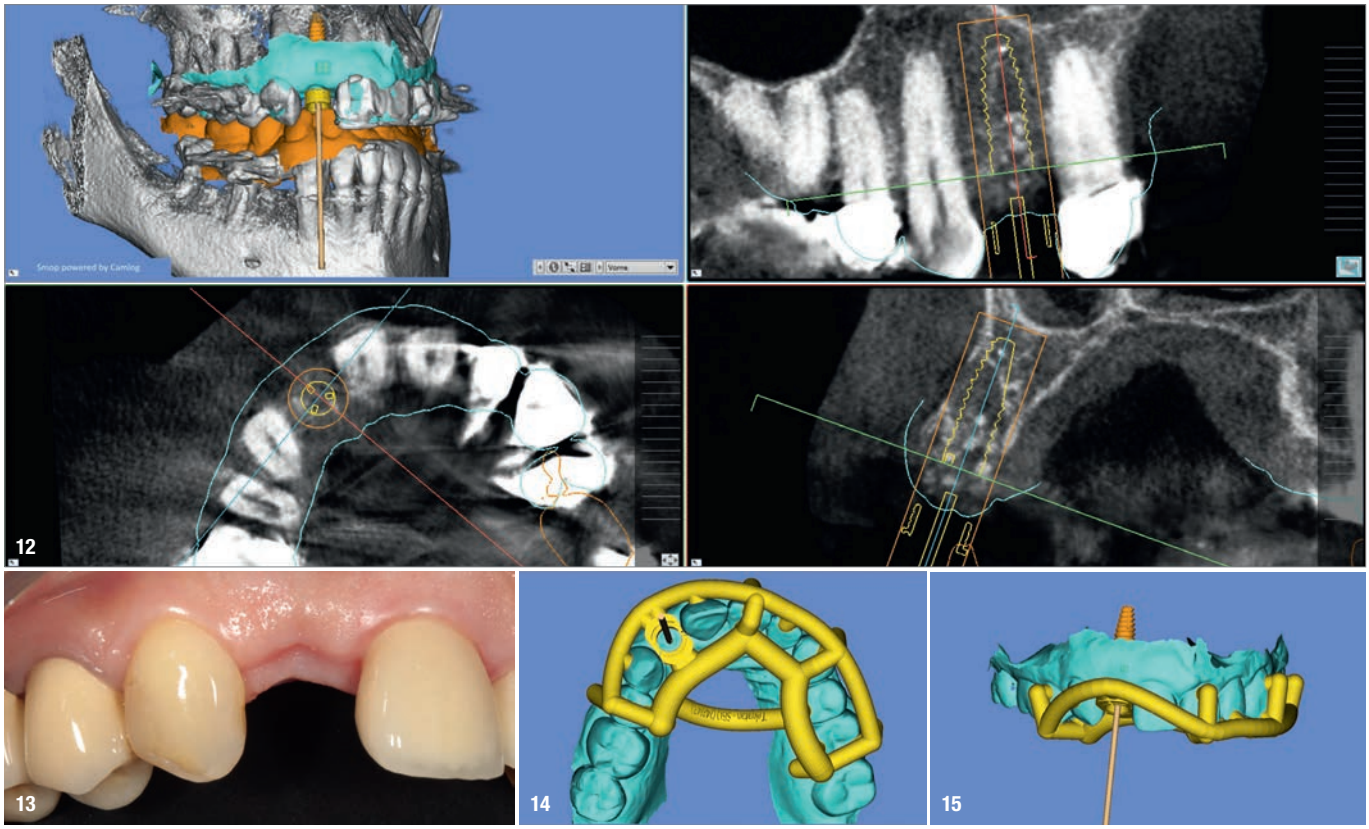
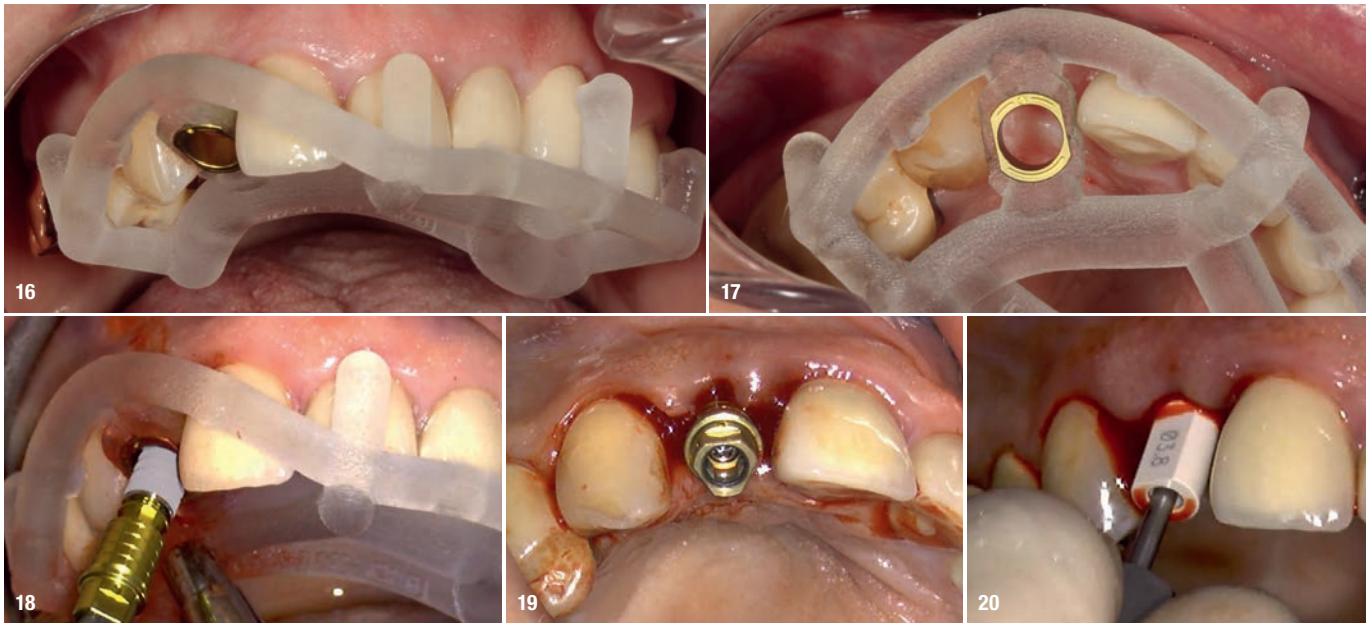


Fig. 12: Evaluation of 3D diagnostics showed sufficient stable bony conditions in all directions. **Fig. 13:** Clinical situation before implant placement. **Figs. 14 & 15:** Planning of the surgical guide (CAMLOG Guide), vertical and ventral views.

orovestibular directions, the CBCT/DICOM data sets were sent to an external planning centre (DEDICAM) via a secure channel and a surgical guide (CAMLOG Guide, SMOP, Swissmeda) was fabricated (Figs. 14 & 15). An implant (CAMLOG PROGRESSIVE-LINE, CAMLOG; diameter: 3.8 mm; length: 13.0 mm) was chosen which would ensure sufficient high primary stability owing to its progressive thread design.

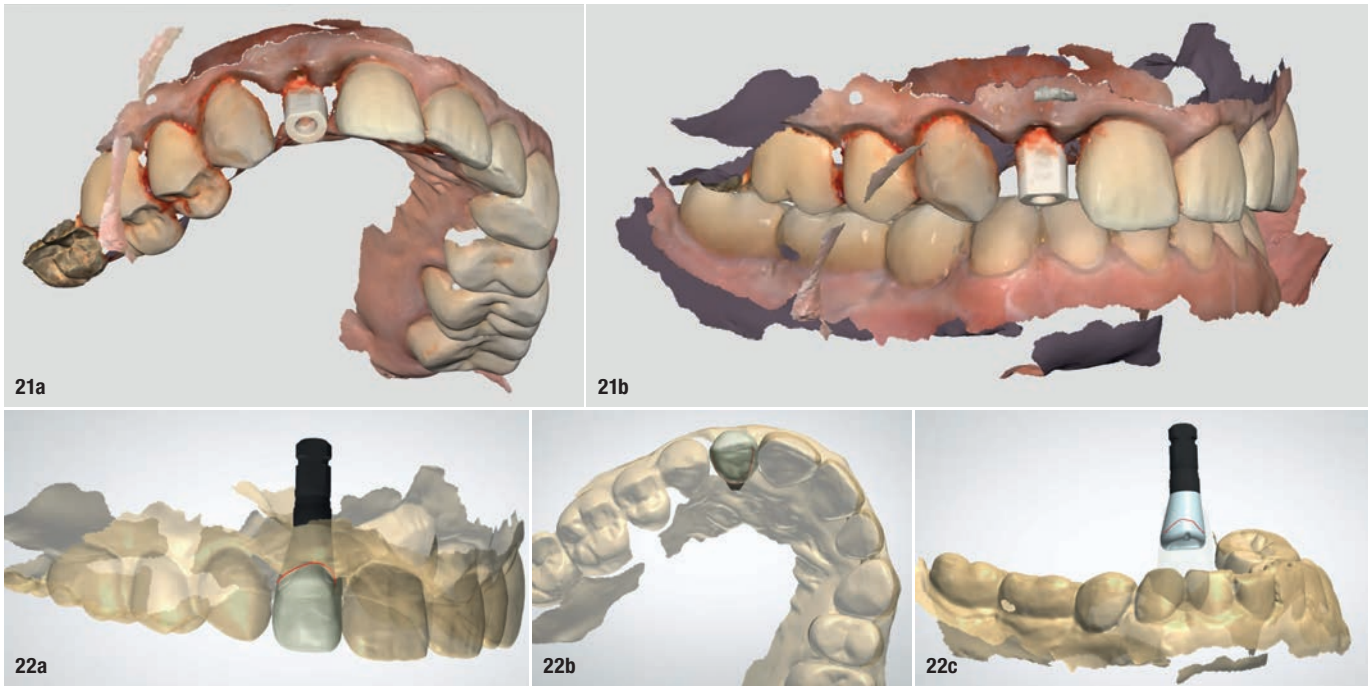
Six weeks after extraction and socket preservation, implant insertion in region #12 was performed under local anaesthesia. A crestal incision was made, and a flap was reflected in a minimally invasive manner. The surgical guide was put into position, and then the guide system and the 3.8 mm drill set (CAMLOG) were used to prepare the osteotomy in several steps to the planned length of 13 mm. Finally, guided implant placement was performed to a torque of 25 Ncm (Figs. 16–18). After final positioning of the implant (Fig. 19), the insertion post was removed and a PEEK scan body (CAMLOG) with the same diameter of the implant (3.8 mm) was inserted (Fig. 20). The implant and the jaws were then scanned intraoperatively (Medit i500 and Medit Link software, Medit) to verify the position of the inserted implant (Figs. 21a & b). After scanning, the scan body was removed, the healing abutment was installed, the surgical site was tightly sutured for submerged healing and a dental panoramic tomogram (Orthophos XG 3D) was taken (Figs. 22a–c). During the healing phase of the implant, the scans were further processed for further planning (Fig. 23). The objective was to shape the soft tissue and to fabricate the definitive restoration in as few steps and as effectively as possible. Experience has shown that it is important to minimise insertion and extraction torque in order to protect and stabilise the peri-implant hard and soft tissue. This is essential for achieving long-term implant success, which, in the present case, was realised on the basis of the treatment protocol followed.

After an irritation-free healing phase of three months, the hard- and soft-tissue conditions were considered stable, and therefore the implant was exposed under local anaesthesia. Since the soft-tissue situation was considered quantitatively sufficient, the incision was made crestally. In collaboration with the external planning service centre (DEDICAM), a novel healing abutment was fabricated from PEEK during the healing phase and subsequently inserted. This one-piece healing abutment does not require further processing, thereby minimising possible sources of error and potential contamination (Fig. 24). The soft tissue was modelled in the coronal direction by means of a suspension suture, and the wound margins were fixed to the adjacent teeth by means of vertically modified backsuture (Fig. 25). Finally, a con-



Figs. 16–18: Ventral and crestal views of the inserted surgical guide and guided implant placement in region #12. **Fig. 19:** Final position of the implant in region #12. **Fig. 20:** Insertion of the PEEK scan body.

trol radiograph was taken, and the interim prosthesis was adapted to the new situation (Fig. 26). With the customised healing abutment and the corresponding emergence profile, the soft tissue was entirely shaped within three weeks, and within the healing period. No further treatment steps, impressions or other measures were necessary. Not only is the treatment protocol shortened in this way, but the soft tissue is also protected from stress. The healing abutment is not radiopaque; thus, its position cannot be checked on radiographs at present. However, the correct position of the fixation screw is clearly visible. In this case, the focus was on the implant itself, the bone and tissue regeneration, and the control of the healing of the implant site after three months.



Figs. 21a & b: Determination of the final implant position by means of intra-oral 3D scanning. **Figs. 22a–c:** Different views: buccal view **(a)**, vertical view **(b)**, maxilla segmented on to the planned restoration **(c)**. The emergence profile of the healing abutment was matched to a virtual crown and designed accordingly (3Shape CAD software).

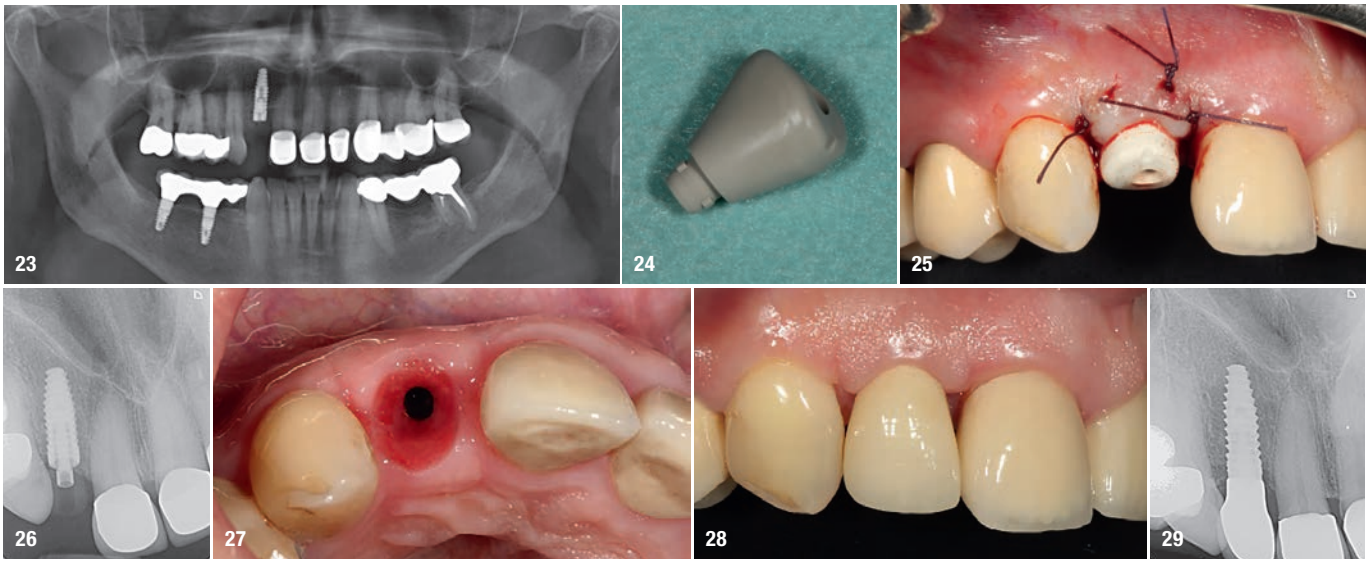


Fig. 23: Dental panoramic tomogram after implant placement in region #12 and post-op control at three months. **Fig. 24:** Healing abutment made of PEEK. **Fig. 25:** Inserted individual healing abutment and fixation of the peri-implant mucosa. **Fig. 26:** Periapical radiograph for radiographic control of the implant in region #12. **Fig. 27:** Vertical view shows the individually shaped mucosa immediately before the installation of the definitive superstructure. **Fig. 28:** Buccal view of the definitive crown in region #12. **Fig. 29:** Radiographic control of the implant in region #12 after installation of the definitive crown.

There was homogeneous and continuous bony healing of the implant site throughout (Fig. 26).

After a healing period of nearly three months, the definitive restoration of the implant in region #12 was carried out. A fully-veneered zirconia crown was fabricated in a CAD/CAM procedure. The customised zirconia abutment was bonded to the titanium base. The crown was then cemented onto the abutment. Following the final restoration, a final radiographic control was taken. Since the crown was placed immediately after customisation, further aesthetic remodelling of the approximal peri-implant mucosa is to be expected over time. Overall, a non-irritant, aesthetically pleasing and satisfactory result was achieved (Figs. 27–29).

Conclusion

Restoration in the anterior region is one of the greatest challenges in implant dentistry. The demands and expectations of patients regarding the aesthetic zone are very high.[4,7,10] In order to meet these expectations and to achieve an aesthetically predictable and prognostically reliable aesthetic long-term result, it is vital to ensure the preservation of the soft tissue. Extensive augmentation of the bone and soft tissue should be avoided if possible, and the tissue should not be put under stress after implant placement.[1] Preventive, predictable and minimally invasive measures aid in preserving bone and soft tissue. In the present case, implant surgery in the aesthetic zone was successfully carried out by means of a gentle extraction technique, alveolar management adapted to the situation using β-tricalcium phosphate collagen matrix (CERASORB Foam) biologised according to LSCC, delayed implant placement, as well as direct soft-tissue management after exposure using a prefabricated customised healing abutment. The case demonstrates how adequately sized and contoured hard and soft tissue for implant restoration in the aesthetically relevant zone can be achieved in preventive and efficient treatment steps that are kept as short as possible.

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about

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Restorative simplicity for a challenging case with limited space

Dr Fernando Rojas-Vizcaya & Jose de San Jose Gonzalez, Spain & Germany


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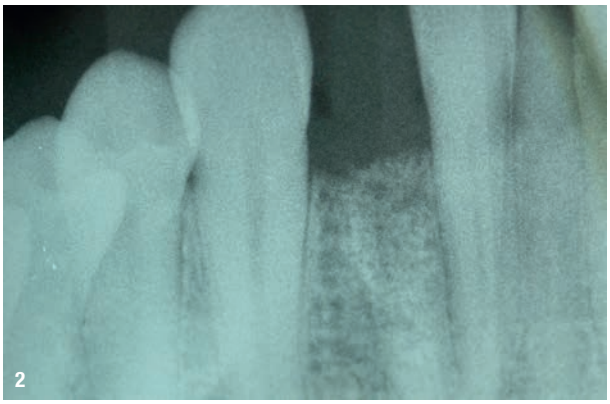
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Initial situation and treatment planning

A 40-year-old male patient with a missing mandibular right lateral incisor and grafted area requested restoration with a dental implant. The challenge with this type of restoration is the limited space available and the proximity of the adjacent teeth. The clinical evaluation revealed the limited space (Fig. 1), and the periapical radiograph taken before the treatment showed both the grafted area into the bone and the limited space (Fig. 2). The treatment plan involved conventional implant placement using an OsseoSpeed EV implant (Dentsply Sirona) and immediate provisionalisation using a Temporary Abutment EV (Dentsply Sirona), and for the definitive restoration, an Atlantis Crown Abutment (Dentsply Sirona) was planned to be used to restore the appearance and function of the missing tooth.

Implant placement

In the first step of implant placement, the biological aspects according to the 3A-2B rule were evaluated using a surgical guide (Fig. 3). The first drilling position was marked to obtain 2B and to create the osteotomy angulation using the Precision Drill EV (Dentsply Sirona). The angulation was confirmed and the implant depth of the osteotomy was prepared with the Twist Drill EV (Dentsply Sirona; Fig. 4). The depth of the osteotomy was verified using the Implant Depth Gauge


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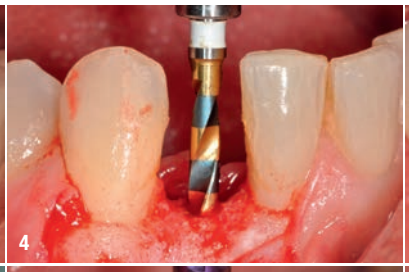
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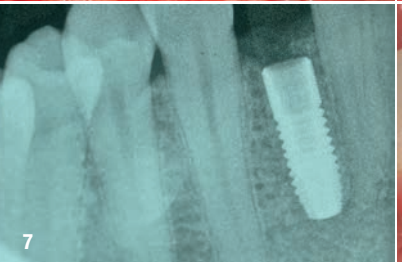
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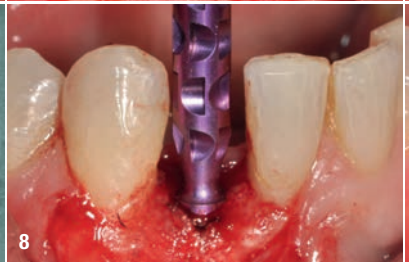
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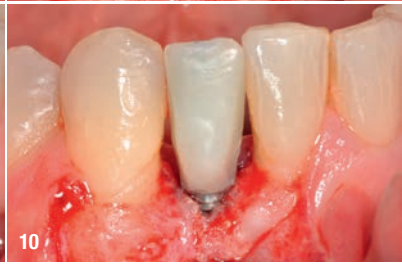
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EV (Dentsply Sirona; Fig. 5). Implant placement was then performed with an OsseoSpeed EV 3.6 implant of 11 mm in length (Fig. 6). The remaining interproximal bone was expected to provide support for the interproximal papillae. The periapical radiograph taken immediately after implant insertion confirmed that the implant had no contact with the adjacent roots (Fig. 7). Thereafter, an implant-level impression was taken using the Implant Pick-up Design EV (Dentsply Sirona), a self-guiding impression component that engages into the implant, in order to obtain the information regarding the implant's position (Fig. 8). The Temporary Abutment EV was modified in the shoulder area to avoid contact with the interproximal bone and to allow for a correct fit (Fig. 9). Using a dental dam, the immediate temporary restoration was fixed with acrylic resin (Fig. 10). After fixation, it was removed, finished, polished and repositioned with finger-light force.

Definitive prosthetic restoration

The patient was called in for an appointment one week after surgery. At that point, the fit of the temporary restoration was considered satisfactory (Fig. 11). Figure 12 shows the digital planning for the Atlantis Crown Abutment in zirconia with correct space for ceramic layers. The definitive restoration was produced in the dental laboratory with a view to creating harmony with the adjacent teeth (Fig. 13). Space for the interproximal papillae was created. The screw-retained abutment with lingual access can be seen in Figure 14. The provisional restoration was replaced with the definitive one (Fig. 15). The subgingival portion of the abutment provided soft-tissue support, and space for the interproximal papillae was created. The Atlantis Crown Abutment was torqued to 25 Ncm (Fig. 16). The lingual screw access hole was first covered with filling material (PTFE) and after that with a composite. Afterwards, another radiograph was taken of the implant with the definitive Atlantis Crown Abutment in place (Fig. 17). In Figure 18, the final outcome with the definitive restoration can be seen, showing the correct soft-tissue contour and the filling of the interproximal space. Also, the ceramic perfectly mimicked the colour of the adjacent teeth.

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“It was easy to turn off the pain”—Patient receives dental implant under self-hypnosis

By Franziska Beier, Dental Tribune International

Physically lying in a dentist’s office but mentally walking barefoot through a mountain river—that is how a patient successfully received a dental implant under self-hypnosis without any anaesthesia. The patient, who underwent such a procedure for the first time under these conditions, was very satisfied with the result and reported that he felt hardly any pain during the procedure.

It all started when the patient, Tomas Schröck, a hypnotherapist with his own practice in Leipzig, asked his dentist, Dr Nico Lindemann, co-owner of a dental practice Dr Lindemann, Kurtz-Hoffmann and colleagues in Leipzig, whether he would be willing to support him in a self-experiment: an implant surgery performed under self-hypnosis without any analgesics or anaesthesia.

"Even though I had been involved with hypnosis before, owing to the patient's desire for self-hypnosis, I would have to hand over the responsibility of pain elimination solely to him. On the one hand, I was optimistic that it would work. On the other hand, I wondered whether I could trust him enough so that the procedure could be performed properly as planned," Lindemann told Dental Tribune International.

When asked about his motivation for the self-experiment, Schröck said that he primarily wanted to raise awareness of hypnosis and demonstrate what can be achieved. Especially for patients afraid of dental treatments or with drug intolerances, self-hypnosis can be a very helpful enabler of treatment without fear or substantial pain. He was also curious and wanted to try out on himself what he had been teaching his patients for years.

"During self-hypnosis, one assumes both the role of hypnotist and the person being hypnotised and gives oneself corresponding stimuli. At first glance, this may seem contradictory. However, once one understands how hypnosis works, it becomes clearer," Schröck explained. It is assumed that everyone experiences trance states several times a day, often without realising it. Schröck gave the example of monotonous car journeys, during which the mind drifts off into everyday thoughts and the journey thus quickly passes. The same applies to hobbies, where time flies by. These moments, in which much occurs automatically via the subconscious, are everyday trances. This ability can be used for self-hypnosis. Individually selected memories or images are trained until

Fig. 1: Dr Nico Lindemann operating on Tomas Schröck, who was under self-hypnosis. **Fig. 2:** Tomas Schröck started practising his self-hypnosis technique several times a day six weeks before the operation. *(All images: © Tomas Schröck)*

Fig. 3: Before the operation, Tomas Schröck tested his pain sensation with the help of a vascular clamp.

they function largely automatically and only a few stimuli from the consciousness are necessary.

For his procedure, Schröck employed a memory of walking barefoot through an ice-cold mountain lake. "I chose this memory for two reasons. The feet are physically furthest away from the mouth and thus from the site of surgery, and I associate a strong feeling of euphoria with this memory. Euphoria and fear or negative pain tend to be mutually exclusive in my world," he explained.

He continued: "The art of self-hypnosis is to consciously self-regulate oneself on one level in order to have unconscious experiences on another level. That means you are not switched off or entirely passive in self-hypnosis. As soon as I became too aware of what was happening in my mouth, I directed my attention back to my

Fig. 4: A single implant was placed in the mandible.

Fig. 5: The team paid close attention to the patient's body signals during the operation.

resource place in the mountain stream." For the most part, Schröck only felt greatly diminished pain during the operation.

Keeping an eye on bleeding behaviour and hand signals

"The team was slightly nervous before the operation," Lindemann said. All eventualities during the procedure—for example, what would happen if the patient did experience severe pain—were considered by the dental team in advance, so the nervousness quickly dissipated once the operation had begun. When asked to what extent the team supported the patient during the procedure, Lindemann replied: "We created a very calm and relaxed environment. In addition, we agreed on signals that the patient should give us in case he felt pain or he needed a break to get back into a deep enough state of hypnosis."

During the placement of a single implant with minor osseous augmentation in an open procedure in the mandible with subsequent suture closure, the dental team had to pay particular attention to the bleeding behaviour, which differs from that under vaso-constriction.

A matter of trust

Although the hypnotherapist was convinced that his self-experiment would succeed, he harboured some doubts. In the run-up, he asked himself whether he would really manage to concentrate for the entire duration of the surgery. "I am very satisfied with the result. In retrospect, I was even a little surprised at how quickly it went, and how easy it was to turn off the pain," Schröck explained.

He failed only to control the bleeding to a level less than one would expect without anaesthesia. "There are enough studies and case vignettes in which similar things have been proved. Unfortunately, in the heat of the moment, I forgot to focus on that too." However, he plans to work on that aspect in the subsequent operation, during which the cover screw will be removed.

> "As soon as I became too aware of what was happening in my mouth, I directed my attention back to my resource place in the mountain stream."

According to Lindemann, the mutual trust between the patient and the team made it possible to fully concentrate on the operation. He concluded: "I am grateful for my great team and for the trust that our patient placed in me."

Study highlights how artificial intelligence can be used for detection of caries

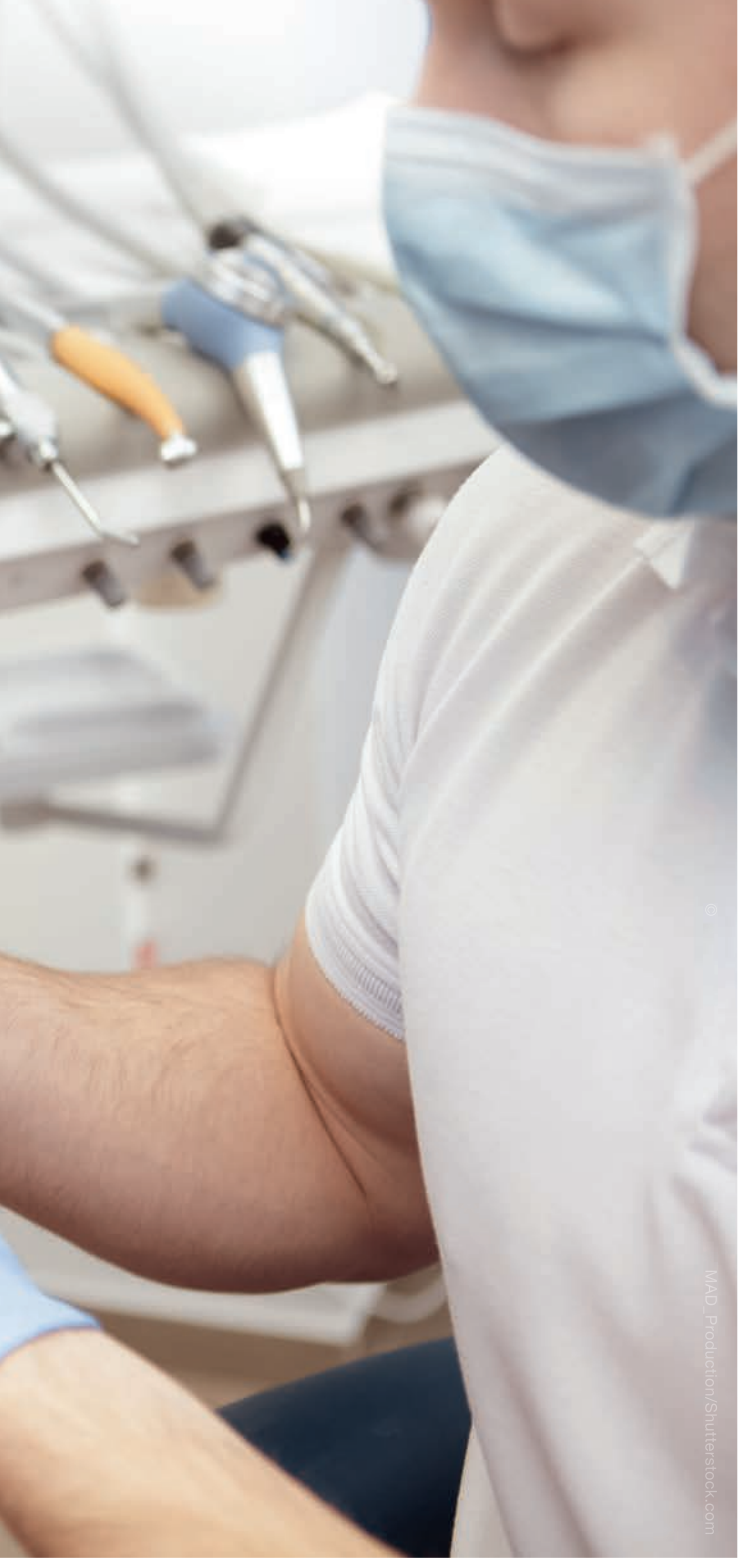
By Brendan Day,
Dental Tribune International

A study from researchers at Charité—Universitätsmedizin Berlin has sought to measure the impact that artificial intelligence has on the ability of dentists to detect caries.

Though artificial intelligence (AI) is being increasingly integrated into a variety of dental products and services, the body of literature evaluating its perceived benefits is scarce. To help rectify this, researchers from Charité—Universitätsmedizin Berlin have recently published the results of a randomised controlled trial they conducted. These results demonstrate that AI can increase the diagnostic accuracy of dentists.

Artificial intelligence technologies are steadily being adopted by dental practices aiming to digitise and streamline their workflows. From initial consultations, diagnosis and treatment planning through to surgical procedures and postoperative care, a range of dental tasks can now be augmented by the various AI solutions that have been developed in recent years.

The performance of these AI-powered tools in medical and dental settings, however, has rarely been tested in clinical trials. As a result, the real impact of AI on the decision-making and diagnostics processes of dental practitioners remains somewhat unknown. This lack of clarity can carry over into decisions regarding available courses of treatment and their advantages.



The research team thus commenced a trial using dentalXrai Pro, a software program that allows dental practitioners to analyse radiographs based on AI. The dentalXrai Pro project was co-founded at Charité by Prof. Falk Schwendicke, head of the Department of Oral Diagnostics, Digital Health and Health Services Research, and has since been spun off into a start-up simply titled dentalXrai.

The AI-utilising software was employed by the 22 participating dentists to support their detection of caries on 20 bitewing images randomly chosen from a pool of 140. Of the 20 images analysed by each dentist, ten were examined with the assistance of this AI tool, whereas the other ten were not.

According to the study authors, their hypothesis—that dentists using AI would be significantly more accurate than those not using AI—proved to be partially correct. In their discussion, they noted that "using AI significantly increased dentists' sensitivity, especially on enamel caries lesions, but did not greatly alter specificity; on more advanced lesions AI did not impact on accuracy at all". They stated that it was likely the AI was more helpful in situations where changes between images were miniscule, and that it played a lesser role when carious developments were significant and relatively easy to notice.

"Gathering evidence to better evaluate the benefits that AI can deliver dentists is at the core of what we do."—Prof. Falk Schwendicke

"Our results demonstrate that combining the AI model performance with human expertise can reach accuracies which are beyond those of the AI itself (...) or the human experts on their own," the authors wrote.

It was also noted, however, that using the AI software led to an increased likelihood of the dentists deciding to use invasive restorative therapy to treat the carious lesions. "In this sense, using an AI support to improve sensitivity may increase the risk of type I errors and overtreatment," the authors remarked, adding that it could be beneficial for the dental industry to provide evidence-backed treatment recommendations for lesions of various depths. In their view, this would ideally lead to "better, not necessarily more invasive care".

Prof. Schwendicke confirmed that further studies regarding the dentalXrai Pro software are already being planned.

"We are already planning on examining a different sample cohort using the updated version of this software that will be available early next year," he told DTI. "Gathering evidence to better evaluate the benefits that AI can deliver dentists is at the core of what we do," he explained.

Editorial note: The study, titled "Artificial intelligence for caries detection: Randomized trial", was published online on 14 October 2021 in the Journal of Dentistry, *ahead of inclusion in the December 2021 issue.*

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Apple's iOS 14 shakes up digital dental brands

Jeremy Booth, Dental Tribune International

In the past, key steps in maintaining one's privacy might have entailed drawing the curtains after dark, planting a hedge or shredding documents that contained personal information. Nowadays, in a world increasingly ruled by digital data, privacy begins with not opting in. Privacy changes in the 14th major release of Apple Inc.'s mobile operating system, iOS, have made it more difficult for companies to track users' virtual activities and caused headaches for marketing departments—including those at leading digital dental brands.

Apple's iOS 14 has significantly raised the bar for Internet-browsing privacy. The tech giant's new application tracking transparency (ATT) measures were launched with iOS update 14.5 and went live in April this year. Crucially, users are now required to actively opt in in order to share their device's identifier for advertisers (IDFA)—a random identifier that Apple assigns to its products—with the websites and apps that they use. Before the update, users were required to actively opt out. Apple has effectively closed the faucet that allowed user-related data to flow freely to those who sold adverts online.

The changes have hammered social media platforms such as Facebook (which commissioned academic research that found that they represented an "anti-competitive strategy disguised as a privacy-protecting measure") and resulted in challenges for the scores of companies that rely heavily on online advertising to inform consumers about their products, including digital dental brands. But are Internet users opting in?

This flow of data from IDFAs was sizable—picture Niagara Falls—and extremely lucrative for all parties, bar those to whom the data pertained. This fact was not lost on users, if current opt-in rates are anything to go by.

US-based mobile apps analytics company Flurry surveyed user privacy choices from two billion mobile devices and found that users opted out in 96% of cases and that just a quarter of users had agreed when presented with an ATT opt-in prompt. The worldwide opt-in rate was 25% and the US rate was 17%, according to Flurry, whose data related to the period between April and August this year. When the data was published, around half of users

had either not been exposed to the prompt or deactivated such prompts in their device settings, and Flurry estimated that the ultimate tally of opt ins would be around 21%—a number "too small to support robust user-level targeting and attribution".

Flurry wrote that it was time to move forward without IDFAs and proclaimed the time of death of the individual-level identifier as August 2021.

Digital-native dental brands forced to pivot on the back foot

Digital dental brands are proliferating, and many of them reach consumers in the same way that their treatment does: largely via virtual means. This is particularly the case for companies that offer partially or primarily remote treatments, such as clear aligner therapy, and the CEO of Align Technology, Joseph M. Hogan, confirmed that the privacy changes had been felt by the company.

He told analysts in late October that the company had registered some impact from iOS 14; however, he played down the significance of the privacy changes for the company's brand marketing. "The thing is, there's a lot of other media you can pivot to in order to find those patients," he said. Hogan confirmed that Align had needed to adjust its marketing strategy, but suggested that the changes may result in lasting impacts. "I wouldn't discount [the impact of the changes] in any way, in the sense of that change being material in some sense in the near future."

David Katzman, chairman and CEO of remote clear aligner treatment provider SmileDirectClub (SDC), was more candid. In early November, he reminded analysts that SDC had called out the privacy changes as representing a problem for digital-native brands.

"In the past three months, there have been no fewer than 20 companies noting this change as a substantial headwind in (the second and third quarters)," Katzman said. "Facebook and Snapchat's earnings last month reinforced just how material this change has been to their business. Similar to all of these companies, the privacy changes required us to pivot quickly to different lead strategies," he explained.

A large portion of SDC's marketing budget was previously spent on advertising on Facebook's platforms, and this had a high rate of conversion into sales. Now, the company is spending at least part of those funds elsewhere. "We've not only been shifting marketing spend away from these platforms to more TV, but we've also changed our lead strategy," Katzman explained. "We are now focused on higher funnel leads to more efficiently and effectively drive long-term growth."

Commenting on the "iOS effect", Katzman highlighted that changes in the conversion funnel (digital lead tools that result in sales) required a re-optimisation and re-targeting "because you really can't follow these people around the Internet".

Kyle Wailes, SDC's chief financial officer at the time, commented in a media release that, together with pandemic headwinds, the "Apple privacy changes earlier this year have presented significant challenges to digitally native brands such as SmileDirectClub".

> "Privacy changes in the 14th major release of Apple Inc.'s mobile operating system, iOS, have made it more difficult for companies to track users' virtual activities..."

A step forward for big tech and a challenge for marketers

The privacy changes that came with iOS 14 represent a positive step for the tech industry, according to Nishat Mehta, chief product officer at media analytics and marketing research company IRI.

Writing in *Forbes* in November, Mehta said that raising the bar for data collection had provided marketers with a new challenge. He wrote: "The new privacy rules, by design, reduce the amount of information marketers can collect from third-party sources and thereby create new hurdles for marketers who have relied on that data to reach target audiences with relevant, effective marketing messages." Providing advice to marketers, Mehta said that first-party customer databases have been undervalued and could be further exploited. He explained that companies could further invest in existing customer relationship management systems, e-mail subscription lists and followers on social media. Engaging with social media influencers and working together with retail and distribution partners are further strategies that he recommended to help marketers adapt to the new data landscape.

"Finally, an efficient marketing strategy—in today's post-iOS 14 landscape and beyond—includes constant, accurate measurement so marketers can validate which marketing investments are driving the strongest results," Mehta wrote.

With 3Shape Unite, dental professionals have the opportunity to harness the power of an app store and connect easily with world-leading companies and laboratories.

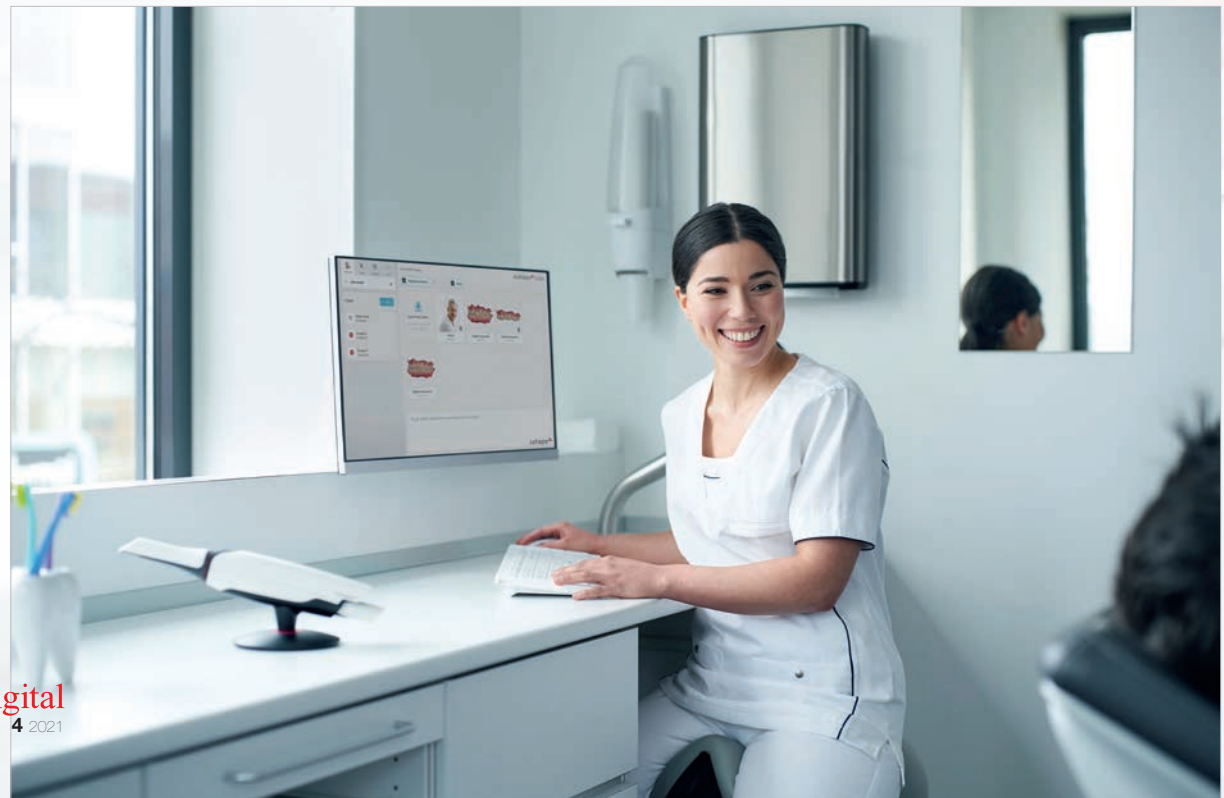
3Shape Unite—the platform connecting the digital dots in dental clinics

By Claudia Duschek, Dental Tribune International

In October, 3Shape launched 3Shape Unite. The new open platform brings world-leading dental companies, solutions and laboratories together and will allow dental professionals to manage all their cases seamlessly and efficiently.

During the launch event, Dr Rune Fisker, senior vice president for product strategy at 3Shape, introduced the new platform, describing it as the greatest effort and investment in the company's history. More than 100 people have been working on this project for the past three years. He explained that 3Shape had recognised that the main problem with digitised dentistry was that, although a wide range of tools were available, these remained rather isolated in use. 3Shape Unite aims to provide an unprecedented connection of digital tools, offering users freedom of choice, unrestricted access to their preferred products and the flexibility to easily switch between different brands' and manufacturers' solutions.

The main benefit of the new 3Shape Unite platform is its simplicity, providing an intuitive customer experience. *(All images: © 3Shape)*



"For dentists, 3Shape Unite simply and openly connects them to the right dental partners and makes digital dentistry easy, end to end," said Jakob Just-Bomholt, CEO of 3Shape.

On the new platform, 3Shape CEO Jakob Just-Bomholt said: "3Shape Unite is a tremendous launch for 3Shape! It brings to life our historic vision of giving dentists freedom and open options. It is digital dentistry united under one platform. From labs and treatment solution partners to managing patient care, 3Shape Unite creates workflows that just flow."

Leading the way for the future of the dental clinic

Aiming at making digital dentistry more straightforward and accessible, 3Shape opted for an app-based approach in the development of Unite—very similar to modern smartphones. Fully integrated with the award-winning TRIOS intra-oral scanner, the Unite platform and apps deliver an intuitive user interface, including a simplified laboratory order form with built-in chat and best-in-class workflow between the dental practice and over 1,000 laboratories; integrations with more than 50 clear aligner providers and patient management systems as the key cornerstone of Unite; and easy access to patient data and images.

"3Shape Unite is going to be the go-to dental platform, enabling treatment planning and execution in just a few clicks," Just-Bomholt added. In fact, Unite provides the interface for the entire treatment—from the initial scan to completion. With absolute integration between TRIOS and all partner apps, there is no need to switch platforms or to save or transfer files during the workflow. Included free of charge with every TRIOS, the Unite platform gives practitioners the freedom to effortlessly manage and expand their digital dentistry offering via an ever-growing built-in app library, Unite Store.

For dental laboratories, 3Shape Unite provides a platform and directory for them to become more visible to dental practices, market their services with a profile they create and take advantage of an optimised order workflow with practices.

In order to provide a truly open and united platform, 3Shape has joined forces with some of the leading companies in the dental industry: Henry Schein, Ivoclar Vivadent and the Straumann Group. The partnership enables 3Shape Unite users to directly access optimised, integrated digital solutions from these founding partners.

Guillaume Daniellot, CEO of the Straumann Group, said that the rationale behind the company's involvement in this project is to provide "frictionless access to Straumann solutions and services—be it our ClearCorrect clear aligner treatment, implant surgical planning or an overall Smile in a Box treatment, or any other prosthetic solution from the Straumann Group".

Diego Gabathuler, CEO of Ivoclar Vivadent, which has collaborated with 3Shape for ten years already, added that "the fit with Unite is perfect, as we can integrate our smart systems and workflows in a new platform where customers can access everything in one place".

Global launch in 2021

The platform will be available globally in mid-December 2021, Fisker announced.

Dental professionals can access the 3Shape Unite platform from their PCs and TRIOS MOVE via a software update that requires no additional hardware. In the long run, Unite will replace other 3Shape platforms, such as 3Shape Communicate and Dental Desktop.

More information about and an interactive demonstration of 3Shape Unite are available at www.3shape.com.

1

Fig. 1: MODJAW strongly believes that using 4D data from the Tech in Motion device brings more than just beautiful smiles. It brings, first and foremost, healthy and long-lasting ones. *(All images: © MODJAW)*

MODJAW: A next-generation digital dentistry solution

By MODJAW, France

2

4D dentistry is driven by the idea that both static and dynamic parameters should be considered in order to enable complete diagnostics and bespoke restorations. Having a 4D dentistry concept, French company MODJAW introduces a new way of entering patients' reality using true jaw motion and dynamic occlusion, in addition to 3D modelling.

MODJAW started to emerge on the digital dentistry scene in March 2019, when the company introduced a new digital dentistry solution for real-time jaw motion called MODJAW Tech in Motion.

How does it work?

Inspired by the animated movie industry, the device allows dentists and orthodontists to record the real-time jaw motion of their patients and to create their dynamic digital twin. MODJAW's unique platform can aggregate

all patient data, including 3D models, 4D movements, and CBCT and facial scans. It then creates a digital "clone" or exact virtual replica of the patient. This solution is the realisation of the company's strong belief that both static and dynamic data should be considered when treating a patient.

For diagnostics...

Using MODJAW and the recommended software, dental professionals can evaluate patients clearly and accurately during the diagnosis stage. Recording an animated dental arch in real time provides a broad and objective view of the patient's problem. Within a few minutes of recording, all static and dynamic parameters are obtained, and occlusal guides, unilateral occlusal contact, tooth wear, malocclusion or temporomandibular joint disturbances can be detected.

...and building treatment plans

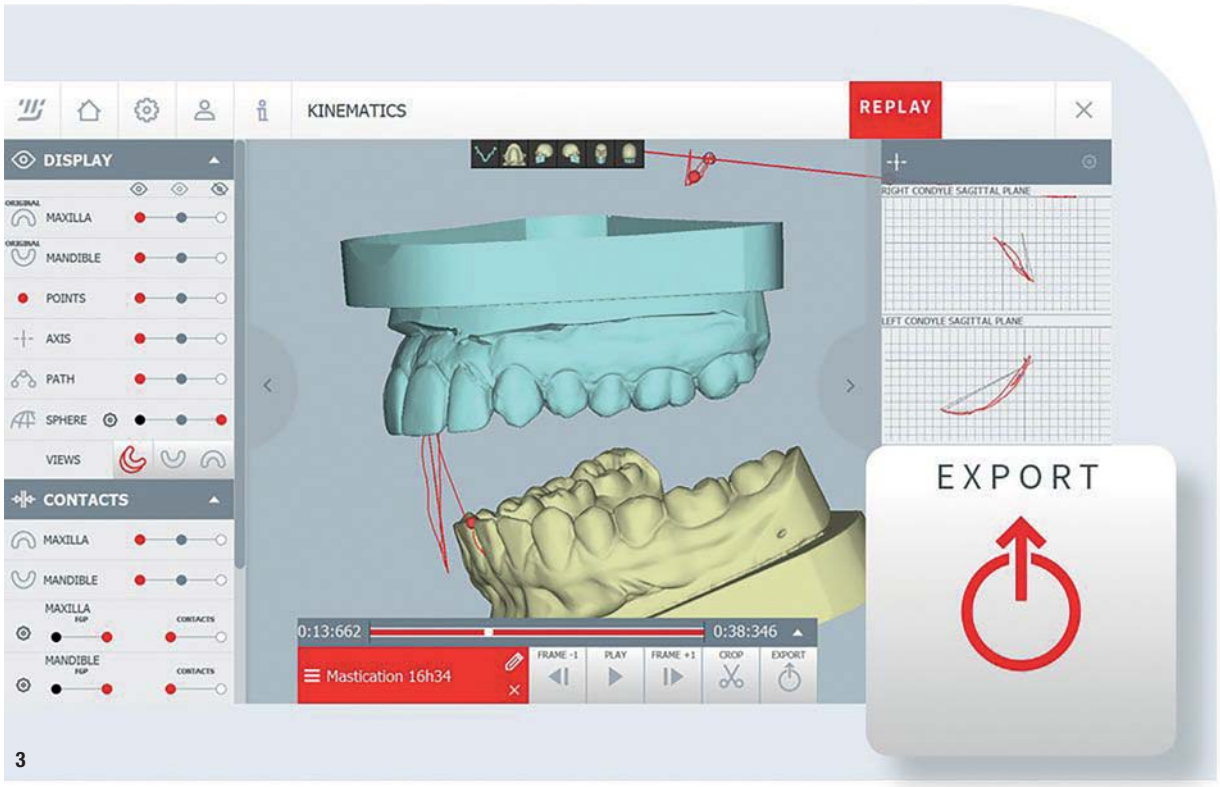
The data provided by MODJAW is used in the treatment phase to completely personalise the dental treatment. Considering the complex reality of every patient in motion is not a luxury, it is a must-have in order to be able to offer fully fitting treatments. It covers everything in simple to complex cases, including adhesive and removable prostheses, implants, and orthodontics.

One of its flagship features is that users can select a new vertical dimension from a record and apply previously recorded kinematics with just a few clicks. This is especially useful in eroded situations where space for the restoration is required.

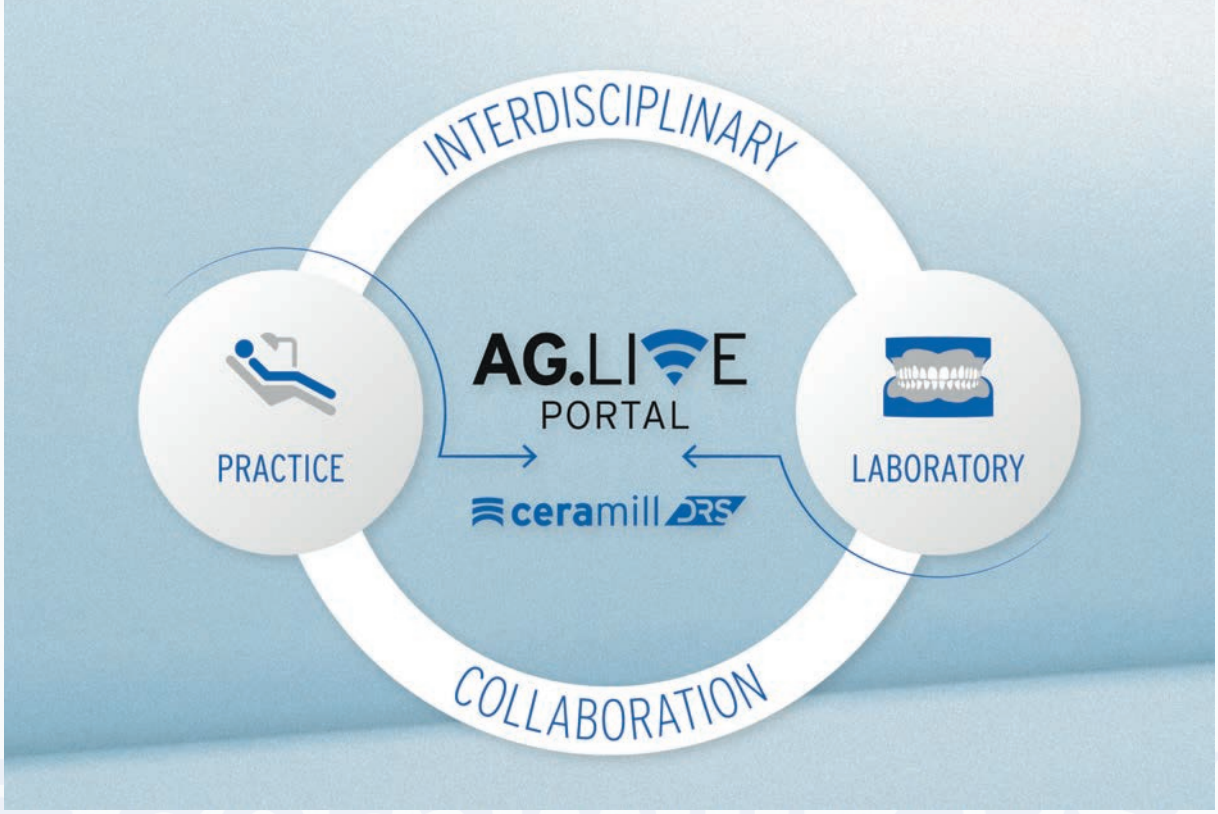
The solution is open and designed to make data accessible to all dental technicians. All static data is provided in STL file format, so it is compatible with all CAD software. For example, plans, arches in specific locations, hinge axes and constellations can all be transferred directly. The motion data from MODJAW in an XML file format is easily integrated with exocad software. The company is working on integration with other CAD/CAM software such as the products available from 3Shape.

Also, in light of the ongoing COVID-19 crisis, it is vital to reduce patient visits to the dental office to the absolute minimum. In other words, efficiency needs to be increased, and absolutely all patient data must be fetched at the first visit, including mandibular movements. Then any dentist beginning a treatment will be able to predict the outcome.

www.modjaw.com



Figs. 2 & 3: With the 4D dentistry concept, MODJAW introduces a new way of entering your patients' reality using true jaw motion and dynamic occlusion, in addition to 3D modelling.



Ceramill Direct Restoration Solution (DRS). The new digital workflow from Amann Girrbach has been designed to enable interdisciplinary future-oriented collaboration and streamlined production processes that enable same-day dentistry. *(All images: © Amann Girrbach)*

Extension of Ceramill CAD/CAM workflow—digital solutions lead the way into the dental practice

By Amann Girrbach, Austria

With its Ceramill Direct Restoration Solution (DRS), Amann Girrbach has extended its integrated digital workflow to the dentist and thus closed the communication gap that existed between the dental practice and the laboratory. The new digital workflow from Amann Girrbach has been designed to enable interdisciplinary future-oriented collaboration and streamlined production processes that enable same-day dentistry.

In this process, both partners contribute their core competencies in order to provide patients with definitive and functional prostheses in a more timely and less complicated way. The delivery of smaller units is possible on the same day, depending on the local distance between the two partners.

Depending on the type of collaboration that is desired, three team workflows are available in combination with the corresponding Ceramill DRS Kits. In each case, the central basis of these workflows is AG.Live, a new digital platform that provides the infrastructure and patient case management procedures to support a level of consistency and efficiency that was previously unattainable. As such, AG.Live takes communication and collaboration between the practice and the laboratory to an entirely new level.

Virtual platform AG.Live creates freedom, more efficient processes and greater customer proximity

With AG.Live, Amann Girrbach has started the largest digitisation offensive in the company's history. This web-based portal for collaboration between laboratories and dentists offers comprehensive digital services at all levels. For example, AG.Live is a central tool for digital case management, networking, infrastructure, material management and support services. It is also a knowledge database that will gradually replace the company's previous C3 customer portal.

On the one hand, the platform networks machines and materials in the laboratory, thereby simplifying processes and increasing quality and reproducibility. On the other

hand, the greatest advancement is that AG.Live connects the growing global network of dental professionals who are operating digitally. This bridges the interdisciplinary gap between dentists and dental technicians and facilitates future-oriented cooperation. Furthermore, within this network of optimised and new partnerships, participants can focus on their strengths and better position themselves on the market.

Extending the digital Ceramill CAD/CAM workflow to the dentist

The Ceramill DRS Connection Kit is the basic entry-level option, with which dentists and laboratories can already take full advantage of digitisation. It consists of a Ceramill Map DRS intra-oral scanner, the associated scan software and the connection to AG.Live. Any order data, including all the required information, can therefore be shared with the laboratory seamlessly and in real time via AG.Live. This eliminates the need for handwritten job sheets and conventional impressions. All that is necessary is the physical delivery of the restoration to the dental practice, and this is possible on the same day in cases of simple restorations. Such timely delivery can lead to a better dental experience for the patient and could ultimately attract new patients to the practice and generate more orders for the laboratory.

If the preferred material is zirconia, the High-Speed Zirconia Kit, consisting of Zolid DRS zirconia and a corresponding Ceramill Therm DRS sintering furnace, can optimally support the laboratory in fabricating straightforward zirconia restorations on the same day.

In an additional step—which can provide patients with their prostheses even faster—the system in the dental practice can be upgraded at any time with the Ceramill DRS Production Kit. This allows simple restorations to be fabricated in the practice and placed in the patient's mouth in a single session.

All Ceramill DRS Kits are currently available for pre-ordering within Germany, and the High-Speed Zirconia Kit is already available to laboratories. Early bird DRS users benefit from particularly close support from the DRS specialists at Amann Girrbach. For further information and to pre-order, visit www.ceramill-drs.com.

Free online presentation about the innovative Ceramill DRS

In this online presentation, Amann Girrbach explains why it places the dental laboratory at the centre of the prosthetic workflow and ensures the highest possible quality and patient satisfaction through close integration and digital exchange with the dentist. Even with the basic version, the Ceramill DRS Connection Kit and the link to the AG.Live digital platform, the practice and laboratory can connect in a unique manner and take full advantage of the benefits of digitisation. The presentation also explains interdisciplinary collaboration for restorations in a single session or on the same day, using the upgrades to the Ceramill DRS Production Kit and the DRS High-Speed Zirconia Kit.

The full presentation can be accessed, free of charge, in various languages from Amann Grirrbach website, https://academy.amanngirrbach.com/en/webinar/ceramilldrs-the-roi-of-digital-transformation/3606.

The Ceramill Direct Restoration Solution enables dental practitioners and technicians to work as an interdisciplinary and future-oriented team and makes same-day prosthesis fabrication possible.

Clinical advantages of KATANA Zirconia YML as related to an external organisation's test results

By Kuraray Noritake Dental, Japan

1

Introduction

Kuraray Noritake Dental is a manufacturer with a long history and wealth of experience in the field of producing dental materials, including bonding agents, cements and ceramics. The all-ceramic restorations market, including that for zirconia products, has been growing rapidly around the world since the beginning of the 2000s. In response to this trend, we have established an integrated production system that can be used to manufacture a wide range of dental zirconia products in-house, from powder to discs.

When we develop new zirconia products, we carefully analyse the characteristics of dental zirconia that are actually demanded by users in the clinical setting, and based on the results of our analysis, we craft new products with these clinically needed characteristics. In our first efforts, we focused on developing a dental zirconia that would have a natural tooth colour after sintering. We launched KATANA Zirconia, our first dental zirconia product to span all the VITA classical A1–D4 shades, in 2007, and in 2013, using our original manufacturing method, we launched KATANA Zirconia Multi Layered, a multilayered zirconia product that produces smooth colour gradations like those of natural teeth, avoiding sharp colour transitions between layers. Then, in 2015, we released KATANA Zirconia Ultra Translucent Multi Layered and Super Translucent Multi Layered (STML). We are one of the pioneering

manufacturers of dental zirconia, and as such, we are committed to continuing to deliver excellent highly aesthetic dental zirconia products to the dental market now and into the future.

Recent advancements in dental technology have made it possible to use zirconia as a prosthetic material across a wide variety of dental applications, from large implants, where great mechanical strength is required, to treatment in the anterior region, where aesthetics are of the utmost importance. The material characteristics needed, however, differ from one case to another. Many dental zirconia suppliers respond to these therapeutic requirements by offering various types of dental zirconia that feature different levels of mechanical and aesthetic properties. This requires dentists and dental technicians in clinical settings to select, from a wide range, the type of zirconia that will be the most appropriate for treating the specific case. This means that it is necessary for each clinic to keep in stock many types of dental zirconia materials with different characteristics in order to meet the requirements of the wide variety of possible case parameters.

Several dental material manufacturers have responded to these circumstances by offering dental zirconia disc products that have combinations of multiple layers with different levels of translucency and mechanical strength. They claim that these products make materials available that can be used to fabricate a wide range of restorations. These products, however, can have serious shortcomings. Some require laborious manufacturing work, tailored to the fabrication of the particular restoration. Others do not include the required high-strength zirconia layer that makes it possible to fabricate a bridge. These products, therefore, may provide no assurance of providing the mechanical strength recommended by the International Organization for Standardization for the manufacture of certain restorations.

A market need arose for dental zirconia products that could be used easily and safely for the fabrication of a wide range of restorations. In response to this need, at Kuraray Noritake Dental, we have developed and released KATANA Zirconia Yttria Multi Layered (YML), a new type of dental zirconia material that provides the blend of excellent performance variables of the KATANA Zirconia multilayered series (Fig. 1). With its well-balanced performance, YML is indicated for the fabrication of a wide range of restorations, from large ones requiring great mechanical strength to anterior crowns that require a high level of translucency. In this article, we will describe YML's features and the technology behind it. We will also present comparative data on YML and a similar competing product collected by Dr Masanao Inokoshi, an assistant professor in the Department of Gerodontology and Oral Rehabilitation at Tokyo Medical and Dental University's Graduate School of Medical and Dental Sciences in Japan.

Features of this product and the technology behind it

Short sintering time

YML can be baked satisfactorily in a short period, thanks to our innovative technology. In addition to the conventional sintering schedule of about 7 hours and even the 90-minute schedule, we have also made it possible to shorten the sintering time further, to a remarkable 54 minutes. (The material is removed from the furnace at 800 °C and can be used for up to three-unit bridges.)

> "The enamel layer is composed of the same zirconia material as KATANA Zirconia STML, which is highly acclaimed for its excellent translucency."

Excellent translucency and great mechanical strength

A YML disc consists of four layers: one enamel layer and three body layers. The enamel layer (35% of the total thickness: 750 MPa) is composed of the same zirconia material as KATANA Zirconia STML, which is highly acclaimed for its excellent translucency. The three body layers (1,000 MPa, 1,100 MPa and 1,100 MPa—three-point bending test according to ISO 6872:2015) that lie below the enamel layer are made from a new type of zirconia material. The first body layer is an intermediate layer that has the desirable translucence of STML. It includes, however, a well-balanced combination of translucency and mechanical strength suitable for the treatment of cases which demand these notable characteristics, such as those requiring bridges. The second and third body layers provide the high level of mechanical strength of KATANA Zirconia High Translucent Multi Layered, suitable for the fabrication of large restorations, along with an improved level of translucency. With its well-balanced combination of translucency and mechanical properties, provided by taking advantage of multiple zirconia materials, YML is a product that meets the demand for highly aesthetic products. It is suitable for the fabrication of the whole range of restorations, from single crowns to bridges.

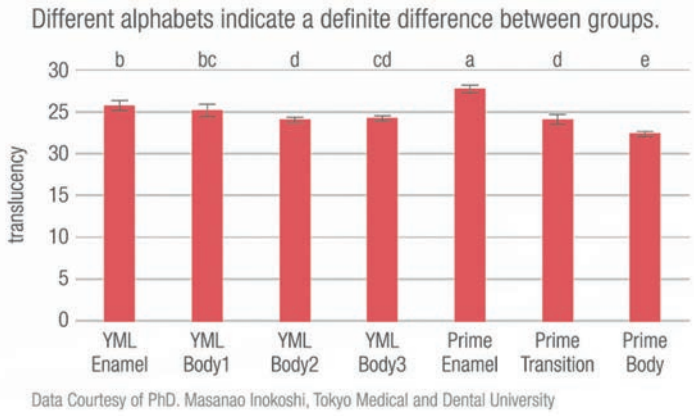
Multilayer gradation

Kuraray Noritake Dental released our first multilayered zirconia product in 2013. Subsequently, the company launched zirconia products very much appreciated for their smooth colour gradation, much like that of natural teeth. We use our own innovative pressing method to manufacture YML. It smooths the change of colours between layers, which provides the desirable feature of a very smooth and natural colour transition.

Reduced deformation after sintering

In general, dental zirconia shrinks during the sintering process by about 20% in 2D (50% in volume). If shrinkage cannot be controlled adequately, it becomes difficult to fabricate restorations that fit precisely on to complicated abutments or into margin lines. The shrinkage of zirconia materials varies subtly from one production lot to another, even when the same raw material is used. We appropriate raw material control, such as raw material crushing, using different sintering shrinkage rates for different production lots. In view of the fact that the sintering shrinkage of zirconia materials requires delicate control, it is not difficult to understand that shrinkage control is even more difficult when different zirconia materials are combined into one disc. If the shrinkage rates of the layers of a zirconia disc differ, the restoration will necessarily be deformed during shrinkage. Many users voiced particular concerns about dimensional stability when they were asked about using zirconia discs (which require high precision) for the fabrication of implants. Kuraray Noritake Dental has an integrated production system that is used to manufacture zirconia products in-house, from the design and manufacture of zirconia powder as a raw material to final products, thus making it possible for us to control the shrinkage rate of zirconia with great accuracy. For this reason, we are able to use zirconia materials with stably controlled shrinkage rates to manufacture YML, even though it consists of multilayers made up of different zirconia materials. This minimises deformation of restorations after shrinkage.

> “When we developed YML, Kuraray Noritake Dental kept in mind that the fabrication guide must be practical, as well as easy.”



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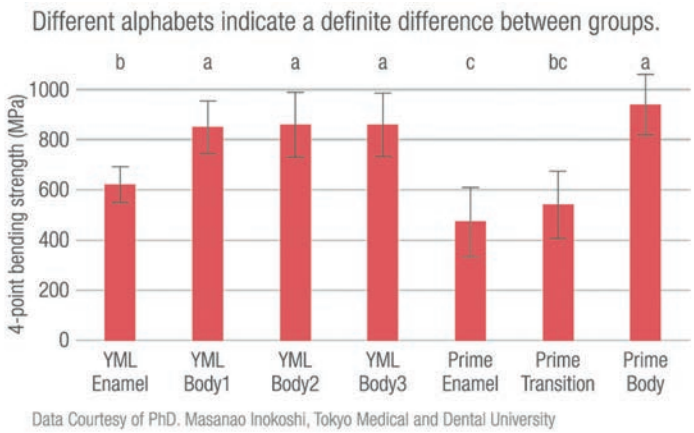

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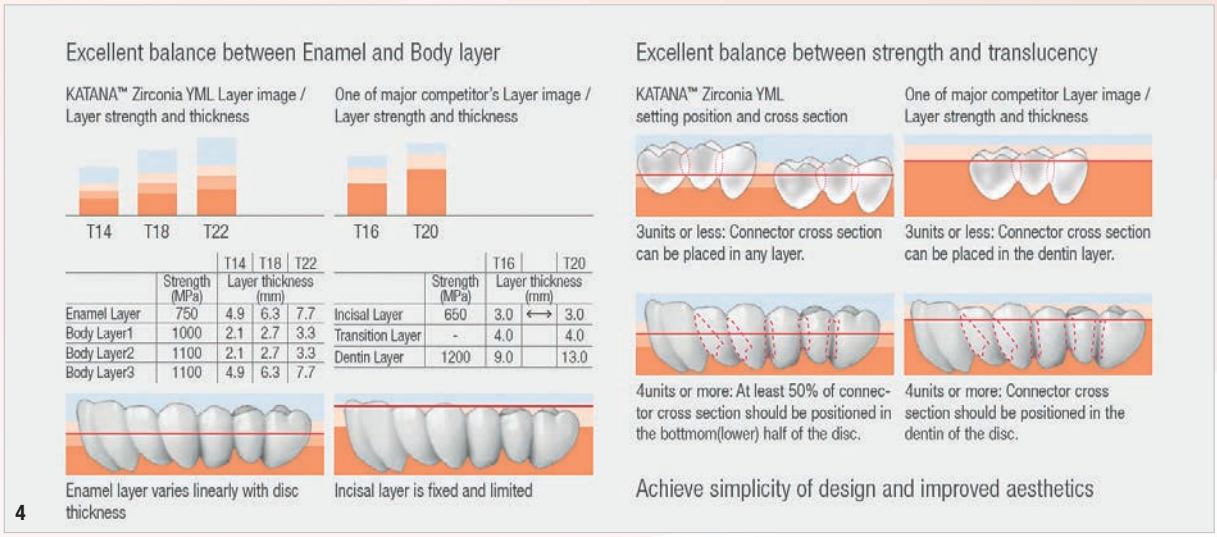
Results of a verification of the physical properties of YML and a review of its clinical advantages

To verify the physical properties of YML, the translucence, mechanical strength and crystalline structure of YML and IPS e.max ZirCAD Prime (Ivoclar Vivadent) were analysed and compared with one another at the Tokyo Medical and Dental University. This paper focuses especially on data on the translucency and mechanical strength, among the physical properties examined, of each product.

Data collected at Kuraray Noritake Dental on the relative translucency of YML and Prime

Total light transmittance (illuminant: D65; test specimens with a diameter of 30 mm and a thickness of 1 mm) of raw material in YML’s enamel layer (no colouring agent) was 49%, and the same was found for Prime’s enamel layer.



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Regarding the layers beneath the enamel, such as the transition and body layers, YML was found to be more translucent than Prime. It can be concluded that YML is sufficiently translucent even beneath the layers beneath the enamel layer. This makes it possible to fabricate prostheses with natural tooth colours when used in combination with an enamel layer that is suitably adjusted to provide the optimum colour.

The translucency of Prime was significantly higher than that of YML when a comparison was made at the enamel layer (Fig. 2). This is probably because Prime contains almost no pigment in the enamel layer, in order to bring out the brightness (whiteness) of the zirconia itself. By contrast, YML contains some pigment so that the product can deliver an optimal level of brightness in the clinical setting. It thus seems that the addition of pigments leads to a difference in translucency between YML and Prime.

The enamel layer of YML had a significantly greater bending strength than that of Prime (Fig. 3). However, when the bending strength of the body layers was compared, Prime's body layer was the strongest. The three YML body layers had bending strength values of more than 850 MPa (four-point bending test according to ISO 6872:2015), and there were no significant differences in bending strength between Prime's body layer and YML's three body layers.

The results revealed that, while YML has small differences in bending strength among the enamel layer and the three body layers, Prime has clearly different levels of bending strength between the body layer and the other two layers. YML's body layers (including the intermediate layer) have such a high level of mechanical strength that it is quite feasible to use it to fabricate highly reliable prostheses.

Layered design concept

The guide for fabricating large restorations using YML states the requirement that at least 50% of the connector cross section should be positioned in the lower part of the disc (Fig. 4). This means that generally you can meet the requirement of the guide by positioning the restoration at the centre of the disc's four layers. In fabricating restorations using zirconia discs available in the market, it may sometimes be complicated to position the restoration as specified in the guide or to position the piece as specified by the guide, making it difficult to fabricate a highly aesthetic restoration that makes use of the enamel layer's better translucency.

When we developed YML, Kuraray Noritake Dental kept in mind that the fabrication guide must be practical, as well as easy. That is why YML was designed with a sufficiently thick enamel layer that permits a high level of aesthetics for any type of restoration that might be fabricated.

Conclusion

KATANA Zirconia YML is our new zirconia disc product, and it features a well-balanced combination of mechanical strength and aesthetics. It has been developed using our innovative zirconia manufacturing technology, as well as by bringing together the essence of the development and production technology of multilayered zirconia discs. We hope that YML will be one of the options of choice for zirconia materials available to dentists and dental technicians who need to use multiple zirconia materials for various applications or who have concerns about the mechanical strength and aesthetic properties of the zirconia materials they are currently using.

www.kuraraynoritake.eu

DS World 2021 had something to offer for everyone interested in endodontics, implantology and sustainable dentistry.

DS World 2021: Latest innovations, product launches and partnership announcements

By Iveta Ramonaite, Dental Tribune International

From 23 to 25 September, dental professionals had the opportunity to immerse themselves in the world of dental technology and innovation, all thanks to this year's Dentsply Sirona (DS) World, which took place in Las Vegas. As expected, the event attracted thousands of participants, both in person and online, and featured major announcements, product releases, informative continuing education sessions and innovative technologies.

For the first time, visitors to DS World were able to join the hybrid event either on-site at Caesars Forum in Las Vegas or virtually via livestream and on demand. After each day full of educational opportunities, the attendees were also able to take some time out and enjoy musical and comedy performances.

The event reached 7,000 registered participants in total. The attendees were offered over 150 hours of clinical education, and the topics were presented by more than 100 expert speakers from all around the globe. On Friday, 24 September, participants were able to join the DS World press conference, which was streamed live from Las Vegas and included Don Casey, the CEO of Dentsply Sirona, Dr Terri Dolan, vice president and chief clinical officer at the company, as well as key dental experts Drs Dan Butterman, John West, and Shivi Gupta. During the conference, Gupta and Butterman gave presentations on the digital restorative workflow and the digital implant workflow, respectively, whereas West discussed new endodontic solutions and Dolan focused on sustainability.

Discussing this year's developments, Casey reminded the attendees that Dentsply Sirona is the first digitally native implant company, and that "the future is digital for Dentsply Sirona". He commented that the company has had many software enhancements throughout the year and is "on a new products' roll", in line with its mission to transform dentistry and empower dental professionals by offering innovative dental solutions.

Key highlights

During the event, the company announced the launch of DS PrimeTaper, an advanced implant system; ProTaper Ultimate

endodontic file, the latest addition to the ProTaper family; and a restage of the company's implant business, which will now include three signature workflows. Additionally, the company released its sustainability report and set environmental goals for the upcoming years. Sustainability was a major keyword at the event, and the company also announced a new hub dedicated to sustainability on its website.

"The world is facing major environmental, social and economic challenges, and all sectors need to step up and play their part," Casey said in a press release. "As a global leader in dentistry, Dentsply Sirona has a responsibility to go above and beyond to create a more sustainable future—empowering not only our employees, but our customers, partners and peers to take action with us," he continued.

Another major announcement was about a five-year partnership agreement with Smile Train, a non-profit organisation and charity that provides corrective surgery for children with cleft lips and palates. The partnership is planned to improve oral health globally and to help children and families affected by cleft lips and palates build a brighter future. A $5 million (€4.3 million) donation to the organisation was also announced.

"Our partnership with Smile Train will help children around the world gain access to cleft treatment and offer them the chance to live a happy and healthy life. By also focusing on global treatment standards and best practices, donating innovative technology, and supporting the training and development of local healthcare professionals, the partnership will have an empowering impact on communities and will provide access to the best possible cleft care, for years to come," Jorge Gomez, chief financial officer and head of Dentsply Sirona's sustainability program "Beyond", explained in a press release.

Needless to say, the event organisers complied with applicable state and local mandates as well as with the requirements of the venues, and the attendees were required to wear face masks indoors at all times.

World press conference speakers. From left: Don Casey, Dr Dan Butterman, Dr John West, Dr Shivi Gupta, Dr Terri Dolan and Marion Par-Weixlberger.

DS World 2021 exhibition hall. *(All images: © Dentsply Sirona)*

Registration for 2022 Midwinter Meeting is now open

By Dental Tribune International

Like myriad other events, the 156th Midwinter Meeting was a virtual one. However, the Chicago Dental Society (CDS) has recently announced that its 157th Midwinter Meeting will return to an in-person format and that registration for the February meeting is now open. The renowned dental meeting will be held at McCormick Place West in Chicago on 24–26 February.

"The Midwinter Meeting has a rich tradition of debuting the latest scientific information and cutting-edge products to dental professionals for more than 156 years," CDS President-elect Dr Thomas Schneider said in a press release. "After more than a year of virtual meetings, events and social gatherings, we're very excited to return to the traditional in-person format for the 2022 Midwinter Meeting, 'A Dental Tradition.' We deeply missed the camaraderie and reconnection with old friends and colleagues and can't wait to be back in person at McCormick Place," he continued.

The Midwinter Meeting is renowned for attracting the premier speakers in dentistry from across the country.


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The February 2022 event will offer attendees access to over 250 continuing education-accredited courses taught by renowned clinicians and leaders in dental education, and dentists and their teams will have the opportunity to benefit from the latest practice management solutions and evidence-based clinical knowledge. According to CDS, courses can be purchased a la carte, or for CDS members and their dental teams, as a lecture package for $270 (€233) per person.

> "The February 2022 event will offer attendees access to over 250 courses."

So far, more than 350 vendors have booked their places for next year, including many first-time exhibitors. The exhibition floor, which spans more than 270,000 square feet, will feature the latest products in dental innovation, and the attendees will be able to engage in special events that will provide fun networking experiences. These include the new Brews & Bargains happy hour and receptions for new dentists and dental students.

"CDS dentists are essential health care workers, and as such, we're on the frontlines battling infection daily, long before the COVID-19 pandemic and long after," Dr Schneider noted. "Much like our commitment to our patients, the health and safety of attendees, vendors and staff is our top priority," he added.

Owing to the ongoing COVID-19 pandemic, the 2022 Midwinter Meeting will feature enhanced health and safety measures. According to CDS, the organization is working closely with McCormick Place and will follow all federal, state and local health and safety requirements in effect in February.

Finally, CDS strongly encourages all attendees to be fully vaccinated before attending the Midwinter Meeting and noted that everyone attending the event will be required to wear a mask, regardless of vaccination status. Additionally, attendees will be required to sign a COVID-19 waiver.

More information about the 2022 Midwinter Meeting can be found online: www.cds.org/midwinter-meeting.

International events

AEEDC—International Dental Conference and Arab Dental Exhibition

1–3 February 2022
Dubai, UAE
https://aeedc.com

Dental Salon 2022

25–28 April 2022
Moscow, Russia
https://en.dental-expo.com/dental-salon-en

157th Chicago Dental Society Midwinter Meeting

24–26 February 2022
Chicago, USA
www.cds.org/midwinter-meeting

The British Dental Conference & Dentistry Show

13–14 May 2022
Birmingham, UK
https://birmingham.dentistryshow.co.uk

ICOI—Winter Implant Symposium

17–19 March 2022
Atlanta, USA
www.icoi.org/events

EAS—The 2nd Spring Meeting

May 2022
Oporto, Portugal
www.eas-aligners.com

BDIA—Dental Showcase 2022

25–26 March 2022
London, UK
www.dentalshowcase.com

17th IDEX Istanbul 2022

26–29 May 2022
Istanbul, Turkey
https://cnridex.com

The 5th International Dental Symposium

16–17 April 2022
Tokyo, Japan
https://www.gcdental.co.jp/100thsymposium

AAID—Annual Conference 2022

21–24 September 2022
Dallas, USA
www.aaid.com

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