Issue #2 | August 2023

DDS mag

The Magazine of the Digital Dentistry Society International

Summary Issue #2

The Society

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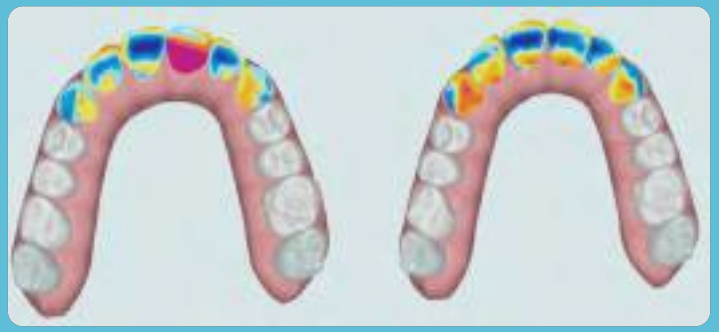
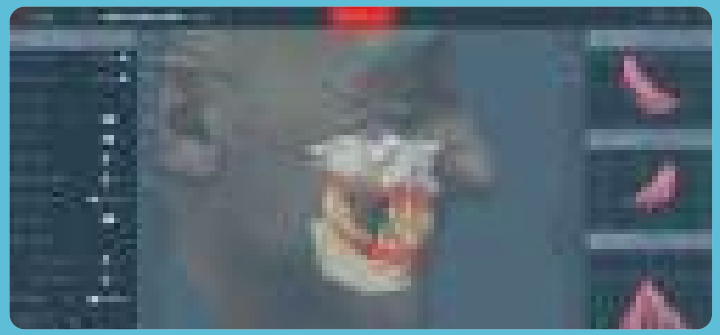
Case Reports



Summary Issue #2



Events & Embassies

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Summary Issue #2

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Promotion

Board of *Directors*

The Digital Revolution is changing the world: computers and digital devices are making what were previously manual tasks easier, faster, cheaper and more predictable. Even in dentistry, digital technologies are rapidly advancing: intraoral and face scanners, cone beam computed tomography (CBCT), motion tracking systems, artificial intelligence, virtual and augmented reality, software for computer-assisted-design/computer-assisted-manufacturing (CAD/CAM), milling units, 3D printers and robots are changing the way we treat our patients. The International Digital Dentistry Society (DDS) has been established in 2014 to help dentists all over the world to face these new challenges.

Jaafar **Mouhyi**

President of DDS

Casablanca

Miguel **Stanley**

Vice President

Lisbon

Francesco **Mangano**

President Elect 2024/2025

Como

The biggest and most active Scientific Society in the field of Digital Dentistry

Board *Members*

DDS aims to draw specific guidelines for the use of digital technologies in dentistry, and to validate the new workflows and products offered by the industry, offering professional recognition for its Members and Partner Companies.

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Board Member

Paris

Dr. Fabrizia **Luongo**

Board Member

Roma

Dr. Eitan **Mijiritsky**

Board Member

Tel-Aviv

Prof. Katalin **Nagy**

Board Member

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Dr. Mahmoud **Ezzat**

Board Member

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Dr. Christian **Monti**

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Prof. Reinhilde **Jacobs**

Board Member

Leuven

We are Digital Dentistry

Society Structure

Past Presidents

- Giuseppe **Luongo**
- Henriette **Lerner**
- Carlo **Mangano**

Scientific Committee

- Marta **Revilla-Leon**
- Maurice **Salama**
- Vygandas **Rutkunas**
- Thomas **Fortin**
- Fernando **Zarone**

Dental Technician Committee

- Lars **Hansson**
- Uli **Hauschild**
- Piotr **Nagadowski**
- Luigi **De Stefano**

DDS aims to educate dentists, technicians, developers & engineers on the use of digital technologies in dentistry

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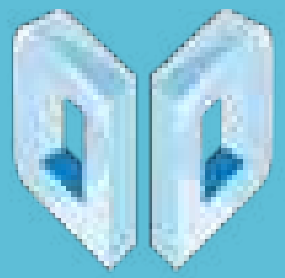


Editorial

Prof. Jaafar **Mouhyi**

- DDS, Free University of Brussels (ULB)
- University Diploma Bioengineering (VUB)
- Master in Periodontology
- PhD (Int. Res. Program ULB, Brussels/Goteborg University)
- Director, Casablanca Oral Rehabilitation Training & Education Center, Morocco
- Head of the Biomaterials Research Department, International University of Agadir (Universiapolis), Agadir, Morocco
- President of the Digital Dentistry Society (DDS) International
- Board Member of the Clean Implant Foundation
- International Board Member of South Europe North African Middle East. Implantology and Modern Dentistry Association (SENAME)
- Director of the Digital Education programs, Private University of Fes, Morocco
- Editorial Board Member and Reviewer, Journal of Dentistry, Clinical Implant Dentistry & Related Research, African Dental Journal

Great success for the DDS Mag first issue: join us at the *Global Congress* 2023 in Casablanca!

DEAR MEMBERS of the Digital Dentistry Society (DDS) International,

the first issue of this DDS magazine met a great success, not only from our loyal readers, but also from our partners, who found this unique format very useful to present innovations in clinical processes and procedures.

The authors also gave us an interesting feedback expressing a real pleasure to share their accomplishments on a distinguished online channel.

With this publication, we now have an elegant informational model that we hope to develop so that communication between our DDS partners and our members remains based on well-conducted and documented clinical short publications.

We are convinced that this magazine could catalyse interesting further fruitful collaborations between our DDS experts and industrial partners.

These collaborations would be beneficial at several levels: for more scientific projects to be published on the official journal of the DDS - THE JOURNAL OF DENTISTRY (Impact factor 4.4), for a better use of the DDS Certified Centres runned by DDS experts and finally to feed our quality forum project with the new tools to be tested and certified by the DDS.

I therefore invite you to consider this magazine as yours, share with us your vision of the best digital practice.

However, I would like to extend an invitation to be part of Digital Dentistry Society Global Symposium, which will be held from October 12th to 14th, 2023. This event offers an opportunity to be at the forefront of digital dental innovation. I am delighted to extend a warm greeting to you on behalf of the DDS Board in the vibrant white city of Casablanca, Morocco.

More than 70 international keynote speakers will present the latest findings in digital dental technologies to you. The participants were requested to conduct a comprehensive analysis, spanning a duration of two days, about the impact of artificial intelligence on the six primary domains within the field of dentistry, namely implantology, prosthodontics, aesthetic dentistry, orthodontics, endodontics, and maxillofacial surgery.

A third day, named “The Forum of Innovations,” will be dedicated to our industrial partners. Esteemed opinion leaders will join us to share their latest findings and future developments. In the expansive display space, over 60 firms will showcase a wide array of technologies essential for navigating the realm of dental digitalization.

Editorial

A *milestone* for digital dentistry culture: presenting the DDS Quality Forum

Dr. Giuseppe **Luongo**

MD, DDS

- Degree in Medicine and Surgery from University of Naples (1980)
- Post-graduate Specialization in Odontostomatology at University of Rome (1983) & in Maxillo-Facial Surgery at University of Naples (1988)
- Adjunct Professor at the School of Maxillo-Facial Surgery of the University Federico II of Naples from 1999
- Lecturer in many public and private Institute Meetings
- Fellow of the International College of Dentistry (ICD)
- Author of more than 50 articles on peer reviewed journals
- Author of the book "Il Successo in Implantologia" (Elsevier)
- Author of the book "Digital Implantology" (Quintessence)
- Founding Member of the Italian Academy of Osseintegration (IAO)
- Former President of the Italian Society of Osteointegration (SIO)
- Former President of the Digital Dentistry Society (DDS)

DEAR FRIENDS AND COLLEAGUES,
You may not know that the original idea to establish the Digital Dentistry Society (DDS) came from the necessity to create a non-biased source of scientific information in the field of digital dentistry. This aim is clearly defined in the mission of the society, reported in its statute.

Ten years after its foundation, the DDS is today indubitably recognised worldwide as the leading scientific society in its field. Following this, an interesting new project has been recently launched and is now in full swing: the Digital Dentistry Quality Forum.

The idea came from the evidence of a lack of clear scientific information on the correct use of digital technologies in dentistry, especially their benefits and limits. In particular, no criteria exist for the minimum parameters that digital devices and derived procedures must have to be safely used in daily dental practice.

The basic aim of the project is to come to a defined statement on the minimum quality characteristics of digital devices and procedures to be safely used in daily dental practice.
The four chosen topics are:

1. 3D radiology
2. Intraoral and face scanners
3. Guided surgery
4. Digital prosthetics.

Four groups of expert clinicians and researchers, each with its own coordinator, will take care of the process, which includes a careful analysis of the available literature and writing a first draft of the conclusion.

A subsequent closed meeting there will include a capillary comparison between the groups for drafting a single definitive document, which will be published in a high-impact journal as an official DDS position paper.

Representatives of all the DDS partner companies will be invited to be active parties in the process, together with ethicists and consumer representatives.

The results will be presented in 2024 in Florence, Italy, during the next Consensus Conference of the DDS.

We are sure that the scientific rigour with which this process was tackled and the resulting document, in addition to representing an important contribution to the realisation of our corporate mission, constitute the beginning of a cultural process for disseminating correct knowledge in the field of digital dentistry.

Editorial

An exciting decade and an even more exciting *future* for Digital Dentistry

Dr. Miguel **Stanley**

- Founder and clinical director of the White Clinic practicing dentistry everyday
- Co-founder of the Slow Dentistry Global Network
- Founder of the Missinglink.ai
- Co-Founder of Denturline
- Vice President of the Digital Dentistry Society
- Member of many nternational scientific and academic organization
- Adjunct professor at the prestigious Upenn, USA.
- Named one of the "32 Most Influential People in Dentistry" by Incisal Edge Magazine, 2022
- He is one of the first dentists to ever give a TEDx talk and the only to host a documentary on dentistry for National Geographic
- He has published several studies and articles over the years
- Over 300 lectures in over 50 countries
- Host of the podcast "Biting into Healthcare"

DEAR FRIENDS AND COLLEAGUES,
Yuvan Noah Hariri wrote in his book, *Homo Deus*, that "the train of civilisation" is leaving the station for the last time and those who do not understand technology will miss a seat on that train into the future.

It has been an exciting decade for dentistry, and for those that are paying attention to what is going on in the industry, things are accelerating into the future. It is no longer about simply having the tools with which to become a digital dentist. It is now about understanding how to seamlessly integrate the hardware, software and new materials in a way that could transform the way we think about our workflows and treatments moving forward.

The Digital Dentistry Society was founded on the premise that the transformation of analogue to digital dentistry required some guidance, education and support. It organises regular global congresses, of which the next will be from the 12th to 14th of October 2023 in the amazing city of Casablanca, Morocco. At these events, some of the greatest minds in the field of digital technology applied to dentistry and health care will gather to share their visions of the future.

I am privileged to be a part of this organisation, alongside my friends and colleagues on the board and all of our ambassadors around the world who are promoting and leading the way in the digital revolution. I have made my personal goal to keep the clinic that I founded in 1999 as advanced and up-to-date as possible. As such, I am blessed to work not just with an amazing team of dentists and co-workers but with some of the leading tech companies on Earth that endeavour each year to bring to market cutting-edge tools, materials and technologies that make life easier and more profitable for everybody, including the patient.

I remember clearly the first time I scanned a tooth prep back in 2008 using Cerec technology and how excited I was to be able to use computer-aided design and computer-aided manufacturing (CAD/CAM) to help me make a lithium disilicate crown. I thought that this would completely change everything, that I would never again have to take a silicone impression and that dental technicians' days were numbered. The truth of the matter is that the time taken to work on the CAD design was way too long, and despite the best of intentions of this technology to offer a chairside 'instant' solution, it was not in fact instant. I rapidly understood that the technology also required a deep understanding of how to integrate it into the modern dental workflow. Each clinic has its specific way of doing things, and without truly understanding this, a designated allocated time for each procedure. The transition from analogue to digital is thus not simply acquiring the technology but also reshaping the workflow to accommodate the extra time it takes to acquire the data. One of the biggest

things we have recently seen emerge is the concept of outsourcing the management of the acquired data to a third party. As a result, cloud-based services are growing, and as long as you can print or mill in your practice, this is something that can truly save time and mitigate costs.

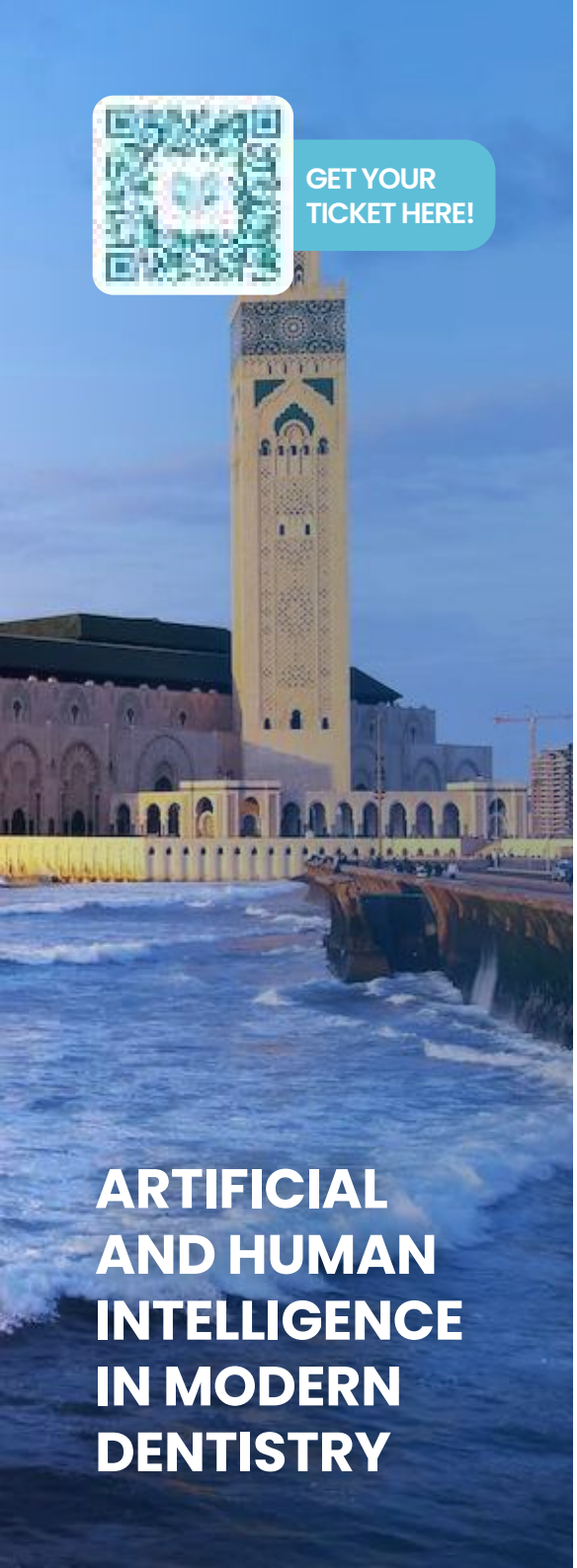
There is still no ideal formula. Each practice needs to understand what it can afford and what its patients can pay for. Training, education and awareness are fundamental and more important than ever to navigate the complexities of the modern digital dentistry landscape. I say this because I have been integrating technologies, materials and software for the longest time, and this requires a lot of effort and time in training, far beyond what is often expected or told to us by the manufacturers. Most companies will sell you a technology that makes incredible sense but unfortunately fail to understand the time it takes to integrate everything seamlessly into the practice. I would say, as a rule of thumb, that you will need an extra staff member for every new technology you acquire. Naturally, this is not possible in all settings, but in an ideal world, we will have some dentists doing the clinical work and others doing the digital work, and they will work together for each case.

Some companies understood this very early on, and a few have done this, such as Biotech Dental, led by Mr Philippe Vèran. Back in 2016, when I first heard about this company, and started using their technology. I understood there and then that vision of this company was to create an entire universe around different technologies that would make the life of the modern digital dentist easier. Everyone understands that having a company that can vertically integrate everything is the best way forward. I believe that Philippe Vèran's vision was futuristic and deserves mentioning when he acquired Nemotec, the treatment-planning software that is even used by Christian Coachman's world-famous DSD Smile design service. This came to help improve the lives of implant dental surgeons by allowing them to create very precise surgical guides and even design complex surgical procedures, far beyond aesthetic dentistry. It is truly an incredible tool. Moreover, with their aligner business, Smilers (recently acquired by Henry Schein and led by Dr Olivia Vèran, a great orthodontist in her own right), this software became the foundation for the treatment-planning centre that, to the best of my knowledge, was the first in the world to combine cone-beam computed tomography (CBCT) and iOS scanning for orthodontic treatment, which is now more common in other companies. They were true pioneers in offering this, which is one of the major reasons that I use this aligner system in what I consider to be ethical orthodontic treatment planning. Using advanced technology allows you to not just understand the position but also a position vis-a-vis the periodontal ligament and available bone in the biotype. This needs to be the gold standard in aligners globally! We must be very wary about using aligners simply for cosmetics without understanding the deep implications of moving tooth roots in a thin biotype, and without advanced technology, there is no way you can see this. This is why companies that try to bypass dentists and offer straight-to-consumer aligners need to be carefully looked into.

To make things even more interesting, Biotech Dental many years ago acquired a Swiss tech company that manufactures the incredible ATP 38 device, which provides high-powered photobiomodulation. I have been using this incredible device since 2016 and have 3 units for my clinic. We use it for everything, as almost all dental treatments can benefit from this powerful device. It transformed the way I think about dentistry and shaped the White Clinics future. Studies prove that using this technology can accelerate mitochondrial activity and speed up so many things in the life of the modern dentist, such as orthodontic movement, wound healing, facial aesthetics and cellular regeneration, all essential for the dental setting. The combination of photobiomodulation with aligner therapy is, in my understanding, the benchmark of the modern digital dentist. I am proud to say that we have been doing this for over five years. Much like advancements in the automotive industry, cell phones and so on, once you have tested the future, there is no turning back.

I think it is very important that we look to some of these leading companies that do not just sell us products but also develop the future and predict where that future is going to be by making huge investments in bringing extraordinary technology to the market. As the vice president of the Digital Dentistry Society, and also as a business leader and a simple dentist, I must thank all the incredible companies that work so hard to make life easier for us all.

Thank you all and see you in Casablanca.



GET YOUR TICKET HERE!

ARTIFICIAL AND HUMAN INTELLIGENCE IN MODERN DENTISTRY

The 3rd Digital Dentistry Society International **Global Congress** 2023: Program

Thursday 12th October 2023: INNOVATION FORUM

9:00-9:15	**Opening session** – President Jaafar Mouhyi, Nawal Bouyahyaoui, Francesco Mangano, Mohamed Sdira, Youssef Talic
9:15-9:25	Miguel Stanley – Avatars and Artificial intelligence in dentistry
9:25-9:35	Dirk Duddeck – Particle-free implants are key to clinical success. Can AI support the quality assessment process?
9:35-9:45	Markus Tröltzsch – Sense and nonsense of computer assistance and AI in augmentation and implant surgery
9:45-10:05	Ingo Baresel – Latest innovations in diagnostics using intraoral scanners
10:05-10:25	Paolo Avantaggiato – Next-Generation Dentistry: How AI and IoT are Transforming Oral Health
10:25-10:45	Ziad Salameh – Facially Driven Esthetic and Functional Rehabilitation: Decoding a Successful Workflow
10:45–11:15	**Coffee Break**
Moderators: Adriano Piattelli, Babakar Toure, Eitan Mijiritsky	
11:15-11:35	Carlo Mangano – Personalized therapies with custom-printed ceramic biomaterials and titanium implants: how AI can help us in Bone Surgery
11:35-11:55	Giacomo Fabbri – Interdisciplinary treatments in the digital era: quality, predictability and flexibility
11:55-12:10	Rebekka Hueber – Ceramic Implants and Digital Dentistry: Pioneering a New Era in Dental Implant Treatment
12:10-12:30	Fernando German – AI and other innovations in daily use
12:30-12:45	Sebastjan Varljen & Stefan Scholz – 4D dentistry on steroids
12:45-13:00	Matteo Valoriani – Augmented Reality in digital dentistry workflow
13:00–14:00	**Lunch Break**
Moderators: Christian Monti, Rachida Ameziane, Karim El Jaffali	
14:00-14:30	Christian Coachman – Building a Comprehensive Treatment System
14:30-14:50	Mahmood Ezzat - Restoring the past for full arch implant cases using digital technology
14:50-15:10	Michael Klein – Full arch implant supported restoration simplified: Nexus iOS, the 2-3 appointment full-arch solution
15:10-15:30	Markus Engelschalk – AI and patient management: how treatments will be planned in the future
15:30-15:45	Fabrizia Luongo – Digital magnification: an essential help in modern dentistry
15:45-16:00	Othman Mikou – Guided Surgery in Implant Dentistry: A Comprehensive Approach for Simple to Full-Arch Cases
16:00–16:30	**Coffee Break**
Moderators: Myroslav Goncharuk-Khomyn, Youssef Benkhaled, Yassir El Idrissi	
16:30-16:45	Alex Sanders – AI has become a reality in the field of dental diagnostics. What developments can we expect to see next?
16:45-17:00	Fernando Zarone – Falko-Medical Media Vision
17:00-17:20	Sameh Shaaban - Dicom + STL Twin Role
17:20-17:40	Yann Amauger - How AI Is Changing the World of Dental Technology
17:40-17:50	Abdessamad Agday - AI-Powered dynamic navigation for dental surgery
17:50-18:00	Maxine Feinberg - AI is your future. Will you be an early adopter?

Also on Thursday

Full program on the website

- Call for Posters **Oral Presentation**
- Official DDS Workshop for **Dental Assistants**
- **Dental Assistantss** Session
- Parallel Workshop for **Dentists** and **Dental Technicians**

Friday 13th October 2023

9:00-9:30	**Congress Opening Ceremony** – Jaafar Mouhyi, Henriette Lerner, Giuseppe Luongo, Carlo Mangano, Ihssane Benyahya, Mohamed Hjira
9:30-10.15	**Lectio Magistralis**: Rachid Yazami – Artificial Intelligence for Green Energy
IMPLANTOLOGY Moderators: Carlo Mangano, Zouhair Ismaili, Jerome Lipowicz	
10:15-10:45	Reinhilde Jacobs – The Dental Artist Behind AI
10:45-11:15	**Coffee Break**
11:15-12:00	Henriette Lerner & Fabrizia Luongo – Guided surgery: static or dynamic approach?
12:00-12:30	Maurice Salama – Fully Guided Implant Reconstruction of the Atrophic Maxilla utilizing non-alveolar anchorage sites
12:30-13:00	David Garber – Human Intelligence: 5 decades of single tooth replacement & failures in the Esthetic Zone
13:00-13:15	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
13:15-14:15	**Lunch Break**

Poster Oral Presentation

Researchers and **Clinicians** will have the opportunity to present their results in a 7 minutes short lecture in front of a panel of experts. The **Oral Presentation** session will be **Thursday 12th October from 9am to 1 pm**.

The **three best Oral Presentations** per category will be awarded **1500€, 1000€ and 500€** respectively, and all accepted Abstracts will be published on the **Journal of Dentistry** (Elsevier, Q1, indexed Pubmed, Impact Factor 4.4, Citescore 7.0)

ESTHETIC DENTISTRY
Moderators: Giuseppe Luongo, Katalin Nagy, Sanaa Rida

14:15-14:45	Fernando Zarone – The prosthodontist's POV: how digital has changed it
14:45-15:15	Mario Imbrugia – VertiCad: minimal preparation and full digital workflow in Esthetic Dentistry
15:15-15:45	Carlos Toro – Digitally Guided Veneers Preps: artificial intelligence Vs. human intelligence
15:45-16:00	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
16:00-16:30	**Coffee Break**

ORTHODONTICS
Moderators: Farid Bourzgui, Meshari Al Otaibi, Isabelle Savoye

16:30-17:00	Nuno Sousa Dias – Artificial Intelligence and Robotics: interesting tools for the orthodontist of the future
17:00-17:30	Simona Tecco & Laura Pittari – Temporomandibular dysfunction: the digital approach
17:30-18:00	Zakaria Bentahar & Zouhair Abidine – Science behind the most relevant indications of Digital Orthodontics in daily practice
18:00-18:15	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
20:00	**Gala Dinner**

Gala Dinner

The Gala Dinner is an iconic tradition of every DDS Congress: it is one of the most exclusive and relaxing moments of the event and this year will take place at the **Shore Club** (*10 Boulevard de l'Ocean Atlantic, Casablanca*), a beautiful venue right in front of the Ocean.
The **participation quote** is €120 and the gala requires seat reservation.

More info: info@digital-dentistry.org | congress.digital-dentistry.org

Saturday 14th October 2023

PROSTHETICS
Moderators: Chouaib Rifki, Phophi Kamposiora, Khalid Bouzekri

9:00-9:30	Rodrigo Salazar – 3D facial scanning: from static to dynamics. Our way to reach the meta-patient
9:30-10:00	Vygandas Rutkunas – Completing Digital Workflow for the Full-Arch cases
10:00-10:15	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
10:15-10:45	**Coffee Break**

Moderators: Amal Ouazzani, Samir Abou-Ayash, Anass Bennani

10:45-11:15	Piero Venezia – Aesthetics and function in complete denture prosthesis: digital perspectives
11.15-11:45	Murali Srinivasan – CAD/CAM complete dentures
11:45-12:15	Francesco Mangano – Augmented Reality and Artificial Intelligence in Dentistry
12:15-12:30	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
12:30- 13:30	**Lunch Break**

MAXILLO-FACIAL SURGERY
Moderators: Devorah Schwartz-Arad, Gilberto Sammartino, Pasquale Piombino

13:30-14:00	Ashraf Ayoub – Robotic, flapless and dynamic navigation guided implant surgery
14:00-14:30	Abdulmalik Alyahya – Digital orthognathic solutions: the impossible that became possible!
14:30-15:00	Gwenn Swennen – Current strategies in orthognathic surgery and the potential impact of AI
15:00-15:30	Ashwini Bhalerao – The impact of dynamic navigation on implant accuracy, post-surgical recovery and health economics
15:30-15:45	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
15:45- 16:15	**Coffee Break**

ENDODONTICS
Moderators: Yassir El Idrissi, My Ismail Afif

16:15-16:45	Roberto Fornara – From digital to artificial intelligence: what changes in endodontics
16:45-17:15	Paula Villa – Today's Endodontics : How far have we come?
17:15-17:30	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators
17:30	**Closing Ceremony**

Local Secretariat

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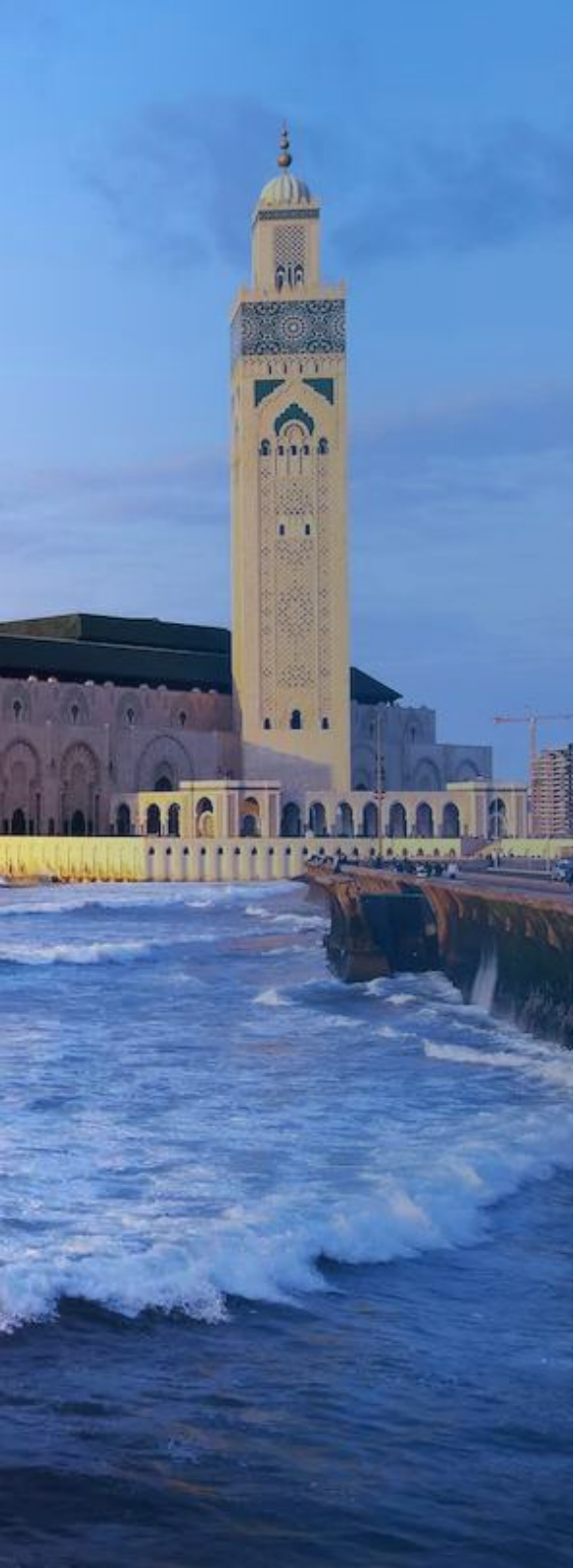

The 3rd Digital Dentistry Society International **Global Congress** 2023: Program

DDS Workshop for Dental Assistants

The Optical Impression: the correct use in the modern digital work flow

The modern digital work flow always involves, more than in the past, all the team in particular the Dental Assistants.
The workshop is mainly dedicated to these professional figures who will receive a complete information on the correct use of the intraoral scanner which represent today an essential device for a modern approach to diagnosis and treatment planning.

Thursday 12th October 2023

9:00–11:00	The intraoral scanner: Technical features and performance of the main IOS available on the market
	Accuracy and Precision
	Scanning strategies in fixed prosthesis
	Scan Bodies and Scanning strategies Implant rehabilitation
	Face scanner and the integration of the digital data: the Virtual Patient
	Digital communication with patients and within the operators
11:00–11:30	**Coffee Break**
11:30–13:00	**HANDS-ON** The Participants can personally experience the use of 3 different Intraoral Scanners learning the correct approach to the digital work flow in daily practice
13:00–14:30	**Lunch Break**
	DENTAL ASSISTANTS SESSION (Translation) Moderators : Nawal Rabii, Abdellah Squalli, Fatine Fares-Eddine
14:00–14:45	Miguel Stanley – Lectio Magistralis for Dental Assistants
14:45–15:15	Giorgio Castagno – The robotic management of sterilization in dentistry
15:15–15:45	Fouad Talic & Saba Ghazal – Artificial Intelligence and digital treatment plan from Hygienists and Assistant side
15:45–16:15	Heea Yang - How to grow stress resilience with somatic techniques
16:15–16:30	**Dynamic Discussion** – Q & A from the audience, orchestrated by the moderators

Speakers & Trainers Fabrizia Luongo, Erika Terranegra, Alessio Campanella

Workshop for Dentists and Dental Technicians

The workshops outlines the progress and potential applications of Artificial Intelligence in dental-aided diagnosis, treatment and disease prediction and discusses the data limitations.

Thursday 12th October 2023

9:00–10:00	Ouassim Salmi – Create your virtual patient with Modjaw
	Alessandro Cucchi – The guided surgery with Maestro protocol
	Roberto Mangano & Matteo Valoriani – AR/VR hands-on in Dentistry: the Virtual Patient in your daily practice
	Claudio Farnararo – Falko System: Tele-cooperation, live education and interaction during live procedure
10:30–11:30	Milos Ljubicic – 3D Printing and AI: Advanced digital solutions
	Rachid Bakal - 3D implant placement for a perfect emergence profile
	Michael Klein – Simplifying and streamlining the full arch implant restoration. From diagnosis to insertion of the final restoration in 4 patient visits: The Nexus iOS solution
	Alex Sanders – Exploring future opportunities of dental treatment planning driven by AI
	Frank-Michael Maier – From Virtual to Reality: How can digital technology help to design an aesthetic and functional denture, derive the ideal implant positions and tissue augmentation, and transfer all to the patient's mouth?
12:00–13:00	Paolo Avantaggiato – Mastering the Art of Digital Prosthodontics: From Concept to Creation
	Ingo Baresel – Working digital with iTero: from caries diagnosis to restorative
	Hugo Patrao - Predictable digital implant planning; CS 3D Imaging & SMOP hands on workshop
	Stephan Weihe - RAYFace, much more than just a face scanner – added values in prosthetics, orthodontics and implantology

Case Report

Implant restoration through a *full digital* additive chairside workflow: a simple case

THREE MONTHS AFTER the placement of an Anyridge® (Megagen, South Korea) single implant in position 36, the patient was ready for prosthetic rehabilitation.

The intraoral scan was performed with an iTero™ Element 5D Plus (Align Technologies, USA), an intraoral scanner with high trueness as demonstrated in a recent scientific study [1] and thus ideal for clinical application in not only orthodontics but also prosthetic dentistry (Fig. 1A–D).

In this case, an IPD® scanbody (IPD PRO CAM, Spain) was used.

The choice of a compatible scanbody was dictated by the quality of the implant libraries that IPD makes available to the dental technician in CAD. IPD PRO CAM offers a library with different solutions (or, rather, different enlargements of the same object), very useful in compensating for any errors or positional discrepancies due to the transition from mesh to library file [2], in the early stages of CAD modelling. The transfer of the correct position of the implant from the real to the virtual is thus granted, and modelling in CAD is possible without any error.

Dr. Francesco **Mangano**

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- Scientific Editor, DDS MAG;
- Scientific Editor, DentalTech, Infodent;
- Director of the Mangano Digital Academy (MDA);
- Author of 135 publications on international Pubmed indexed journals and high impact factor;
- He works as a freelance in Gravedona (Como), devoting himself exclusively to Digital Dentistry.

FIG. 1A-D *Intraoral scan with iTero™ Element 5D Plus (Align Technologies, USA). (A) Master model after removal of the healing abutment; (B) master and antagonist models in occlusion with the scanbody IPD PRO CAM in position; (C) detail of the high-definition scan of the scanbody; (D) the master model only with the scanbody.*

"The printing model with a double-fixation screw represents a valid solution [...] for the precise transfer of the implant position from the virtual to the real"

We opted for a crown cemented on a personalised abutment [3]: therefore, the dental technician modelled a monolithic crown to be cemented on an individual hybrid abutment (Fig. 2A–C). The model for 3D printing was also prepared in CAD (Fig. 3A–D). The printing model with a double-fixation screw represents a valid solution offered by IPD PRO CAM for the precise transfer of the implant position from the virtual to the real.

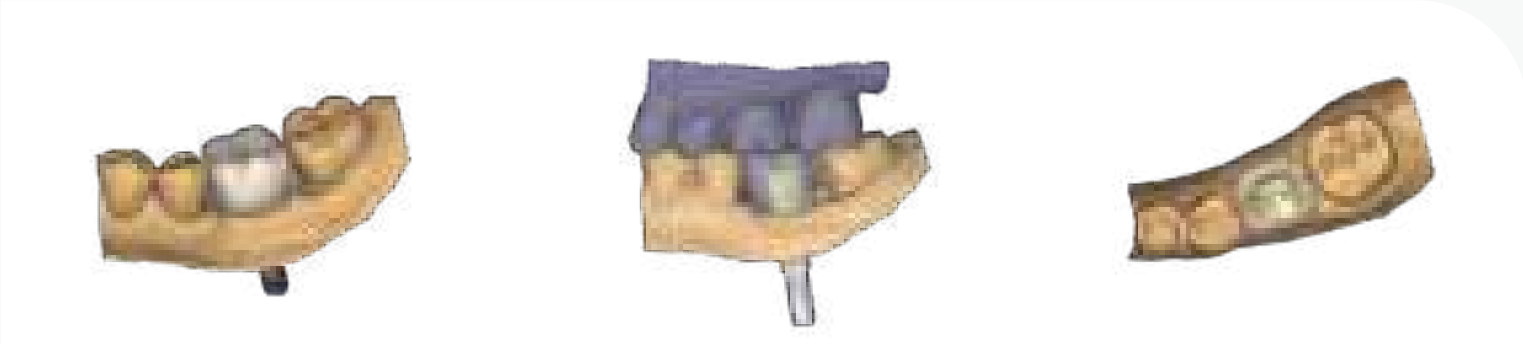

FIG. 2A-C *CAD modelling of the individual hybrid abutment and the final crown. (A) photorealistic rendering of the implant crown; (B) the monolithic crown in transparency with the individual abutment supporting it; (C) occlusal view.*

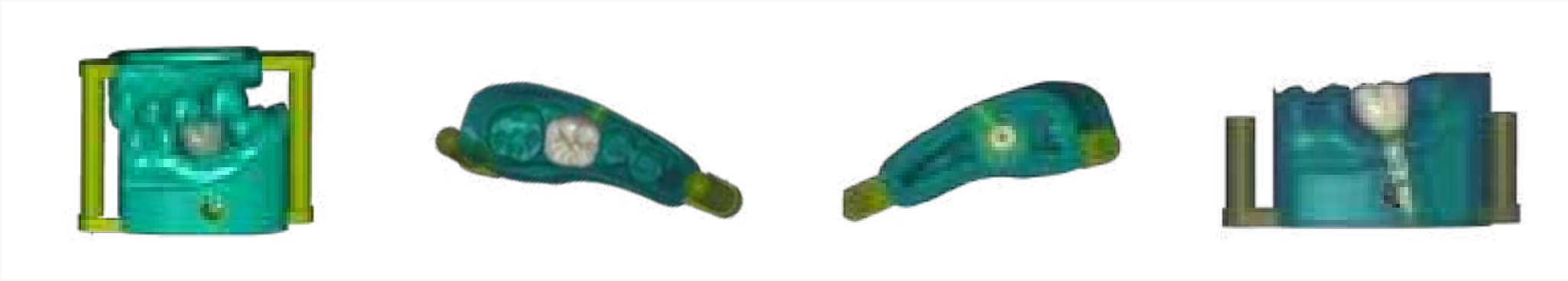

FIG. 3A-D *CAD modelling of the models. (A) the IPD PRO CAM models feature two holes for fixation screws, in order to replicate the virtual implant position in real; (B) top view of the model; (C) bottom view of the model with the first hole for the fixation of the implant analog in the correct position; (D) lateral view of the model with the second hole for the fixation of the implant analog in the correct position.*

FIG. 4A-E *The stereolithographic printer (DFAB®, DWS Systems, Italy) used in this case report. (A) The material used for manufacturing the crown and the abutment was an hybrid composite (Irix Max®, DWS Systems, Italy). This material is certified in Europe and US as definitive material; (B) the Irix Max® cartridge; (C) the material used here has three layers of colours thanks to the tilted stereolithography concept and the proprietary Photoshade® technology; (D) the cartridge and the printing plate in position; (E) the printer is ready for use.*

The monolithic crown was printed with additive technology using a modern 3D SLA printer, the DFAB® (DWS Systems, Italy), in the proprietary hybrid composite material Irix Max® (DWS Systems, Italy; Fig. 4A–E).

The DFAB printer, a small jewel of Italian technology, can print in 10–15 minutes up to five single crowns in a definitive material, in a colour gradient, thanks to the proprietary tilted stereolithography technology. Basically, the printer allows for obtaining restorations with three different colours because the operator can intuitively set the colour levels in the software (Fig. 5 A–D).

All the CAD/CAM is automated, which results in considerable time saving.

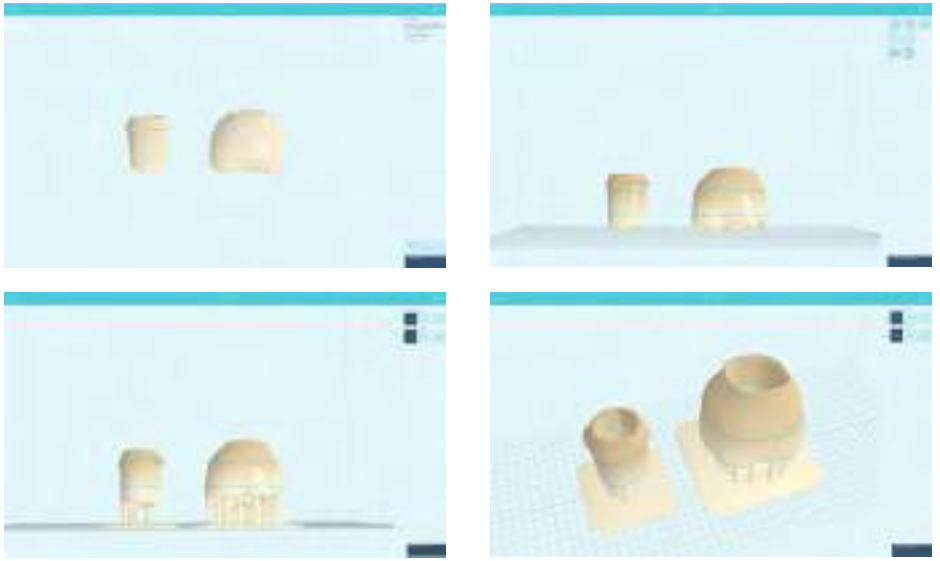

FIG. 5A-D *Details from the Nauta Photoshade® (DWS Systems, Italy) software. (A) the restorations are imported in the software; (B) the software automatically place them in the best position thanks to artificial intelligence; (C) the software automatically creates supports and bases for the printing process; (D) the operator can confirm the colour gradients and adapt the colour layers according to the specific clinical indications.*

Besides the monolithic crown, the dental technician also modelled a customised abutment in CAD, printed with the same additive technology in hybrid material, in a chairside procedure (Fig. 6A–E).

As an alternative, the abutment could be milled in zirconia after nesting in CAM with Millbox® (Cimsystem, Italy), using a powerful five-axis milling machine (DWX-52D®; DGSHAPE, Japan). In the case of zirconia abutments, sintering in the Tabeo® furnace (Mihm Vogt, Germany) is required; if the full chairside additive procedure is instead opted for, both the monolithic hybrid composite crown and the abutment need to be polymerised in the proprietary DCURE® oven (DWS Systems, Italy; Fig. 7A–C).

The accuracy of the printing is very high, as demonstrated by the quality of the occlusal features and marginal closure of the restorations obtained with DFAB® (Fig. 8A, B).

The customised abutment was subsequently adhesively cemented on an IPD® titanium bonding base (IPD PRO CAM, Spain). This individual hybrid abutment served as a support for the cementation of the final monolithic single crown, which could be further characterised.

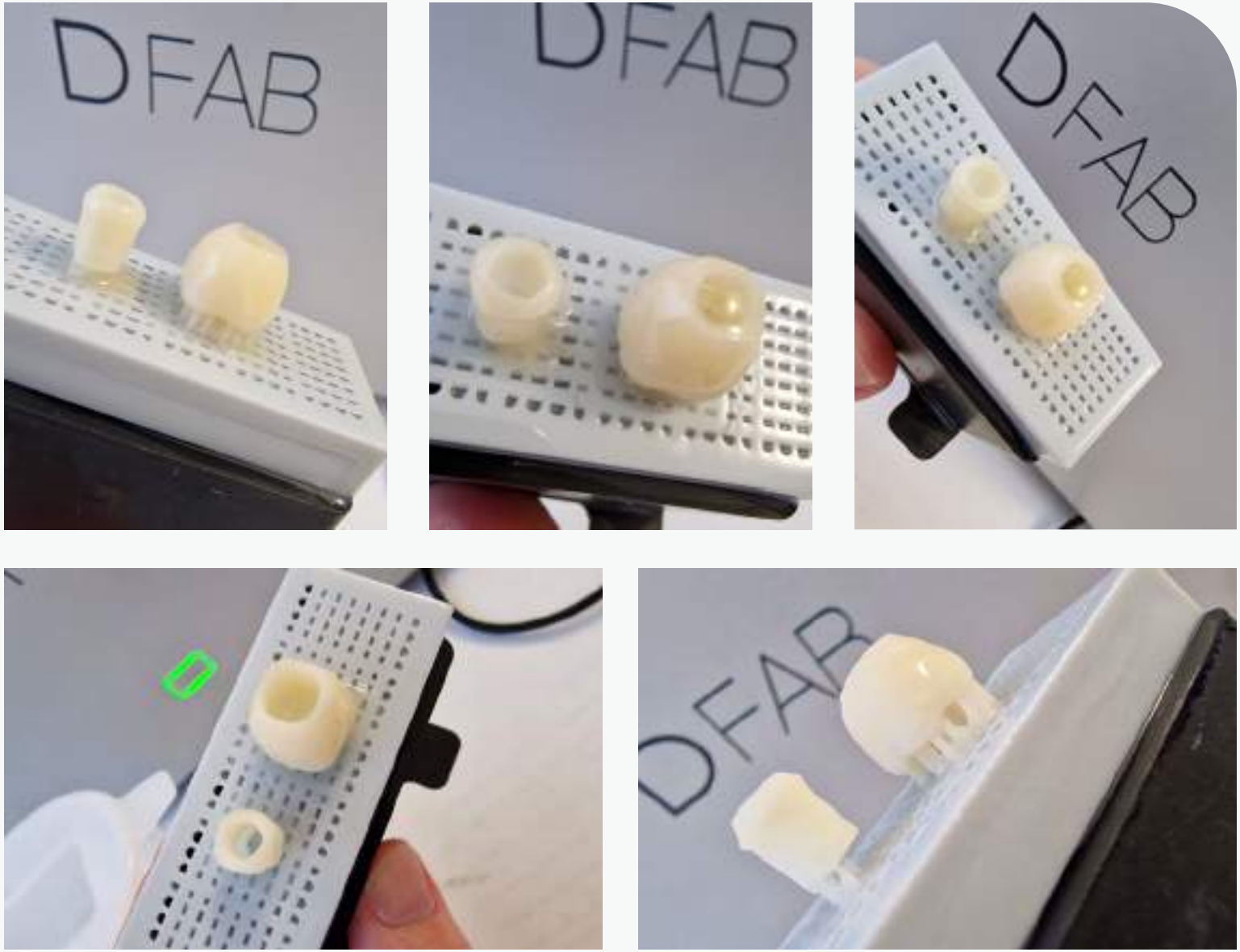

FIG. 6A-E *The monolithic crown and the hybrid abutment have been printed. (A) Prospective view; (B) lateral view; (C) immediately after removed from the printer, the samples must be washed in alchool for about 4-5 minutes in order to eliminate the exceeding material; (D) the samples have been cleaned in alchool; (E) the supports must be removed and the crown and the abutments are ready for polymerization.*

FIG. 7A-C *Polymerization in DCURE® (DWS Systems, Italy) oven. (A) View of the DCURE®; (B) the restorations are placed inside the DCURE® unit; (C) top view of the restorations after the curing process. The whole process takes only 5-8 minutes.*

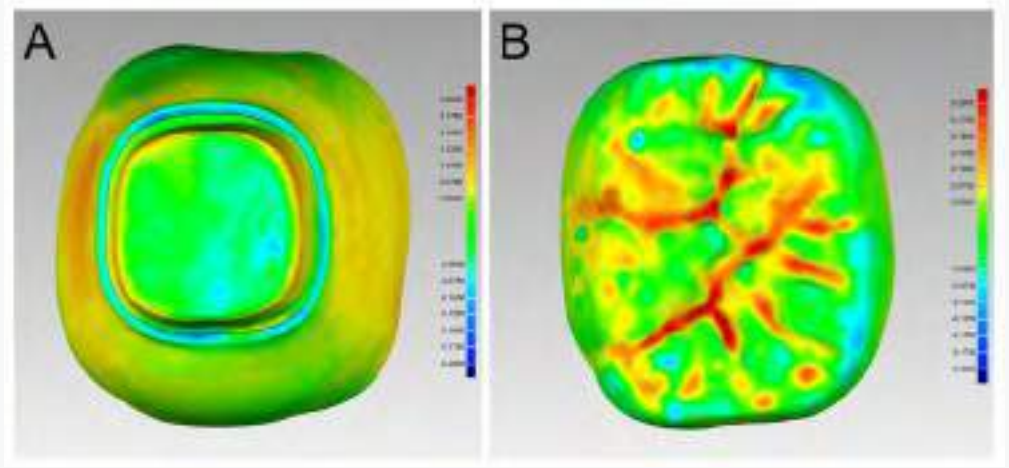

FIG. 8A, B *Quality control of the 3D printed restoration with iTero™ Elements 5D Plus (Align Technologies, USA) and Geomagics Studio® (Autodesk, USA). It is possible to scan the actual monolithic crown in high-definition, and compare the quality of this STL file with the original CAD modelling, using a reverse engineering software. (A) Note the high quality of the marginal closure; (B) the occlusal surface is also well represented.*

FIG. 9A-D *3D printed IPD PRO CAM model. This model grants the perfect transfer of the position of the analog, from the virtual to the real. (A) Lateral view with the final monolithic Irix Max® (DWS Systems, Italy) crown in position; (B) top view of the occlusal surface; (C) the individual hybrid abutment in position. The analog is screwed in position through two fixation screws (one is lateral, the other apical); (D) bottom view of the model with the fixation screw.*

The result was a certified crown for definitive use, aesthetically pleasing, with remarkable clinical precision [4] and ideal mechanical characteristics. Its function was guaranteed in the medium and long term [5].

The quality and accuracy of the restoration were verified on a model with a double-fixation screw (IPD PRO CAM, Spain) 3D printed on the XFAB 3500PD® desktop SLA printer (DWS Systems, Italy; Fig. 9A–D).

In a second session, the patient was recalled for delivery of the final restoration. Once the healing abutment was removed, the individual hybrid abutment was screwed into the correct position dictated by the index (hexagon). Subsequently, once the screw hole of the individual abutment was closed with Teflon, the final crown in the hybrid composite material was cemented onto the abutment with TempBond® temporary cement (Kerr, USA; Fig. 10A–E).




FIG. 10A-D *Delivery of the final restoration. (A) The patient before the removal of the healing abutment; (B) the tissues after the removal of the healing abutment; (C) the individual hybrid abutment screwed in position; (D) occlusal view of the Irix Max® crown; (E) lateral view of the Irix Max® crown.*

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it starts with iTero™

Case Report

Invisalign Smile Architect™ software allows a change in the *paradigm* of integrating orthodontic and prosthetic treatment plans. Here's how.

Prof. Piero **Venezia**

- Honors Degree in Dentistry at the University of Bari, Italy (1989)
- Specialized in prosthetics at the University of Siena, Italy, and in prosthodontics at the University of Bari, Italy (2003)
- He is a lecturer of postgraduate programs at the universities of Siena, Genoa, Naples, Bari, Foggia, Catania and Rome
- Contract Professor in Dental Prosthodontics at the School of Dentistry of the University of Catania.
- He is an active member of:
  - DDS (Digital Dental Society)
  - AIOP (Accademia Italiana di Odontoiatria Protesica)
  - IADDM (International Academy for Digital Dental Medicine)
  - DI&RA (Digital Implant & Restorative Academy)
  - Fellow of the ITI (International Team for Implantology)
- He has authored several scientific papers in prestigious journals.
- He focuses his clinical and scientific activities on prosthetics, removable prosthetics and implant prosthetics.

MODERN TREATMENT PLANS often involve multidisciplinary approaches. Digital workflows allow for easier communication between professionals (e.g., prosthetist, periodontist and orthodontist) and between clinicians and dental technicians.
Invisalign Smile Architect™ software combines orthodontics and restorative dentistry into one powerful tool. It allows professionals to foresee restorative goals with the end in mind, visualising them on each patient's face, and make changes to the orthodontic treatment plan to achieve an optimal clinical outcome.

This new tool represents the vehicle for one of the most desired results in modern dentistry – a predictable, minimally invasive approach to the patient's biological structures since dental elements can be positioned according to the prosthetic design. From this perspective, we increasingly speak about prosthetically guided orthodontics (PGO).

CLINICAL CASE

The patient, 39 years old, came to us with a request to improve his smile.
The initial aesthetic analysis revealed:
• disproportions between the dental elements
• presence of diastema
• incorrect inclinations of the dental axes
• excessive width of the labial corridors (Fig. 1A, B).

CLINICAL CONSIDERATIONS

Considering the needs of the patient and the initial clinical conditions, we decided to plan an integrated ortho-restorative therapy to improve the aesthetics of the smile. During the clinical observation, the patient showed a good occlusal relationship, irregular smile, non-coincidence of the midlines and evident buccal corridors. No articular symptoms or functional problems were present. At the time of the first visit, the patient reported no issues in chewing or occlusal function so he was in occlusal equilibrium and articular balance. These clinical conditions allowed us to plan an aesthetic treatment aimed at improving and harmonising the smile, respecting the occlusal relationships of the posterior sectors and the existing occlusal balance.

FIG. 1A, B *Patient's initial situation.*

The treatment included the restoration of the correct inclinations of the dental elements and space management in the first phase. A second phase proceeded to an implant-prosthetic rehabilitation for aesthetic rehabilitation of the anterior sector.

TREATMENT OBJECTIVES

1. Carry out the displacement of the anterior teeth only, without changing the posterior occlusal relationships.
2. Manage spaces for implant-prosthetic rehabilitation and the positioning of veneers.
3. Improve aesthetics with the replacement of the implant-supported crown in position 1.1 and nine adhesive veneers.
4. Solve the patient's aesthetic problem in the shortest time possible.

CONFIGURATION AND TREATMENT PLANNING

An intraoral scan was performed with the iTero™ scanner. Intraoral and extraoral images were collected via the Invisalign® Practice App. Through the Invisalign platform, the scanner allows the photos of the patient's face to be matched with the intraoral scan in a few minutes. The result of the tooth alignment in the patient's face can then be visualised using the Invisalign® Outcome Simulator Pro software.

Photographs and scans are uploaded to the Invisalign platform, together with the prescription for the required movements and the indications as to which teeth will be involved in the restorative phase.

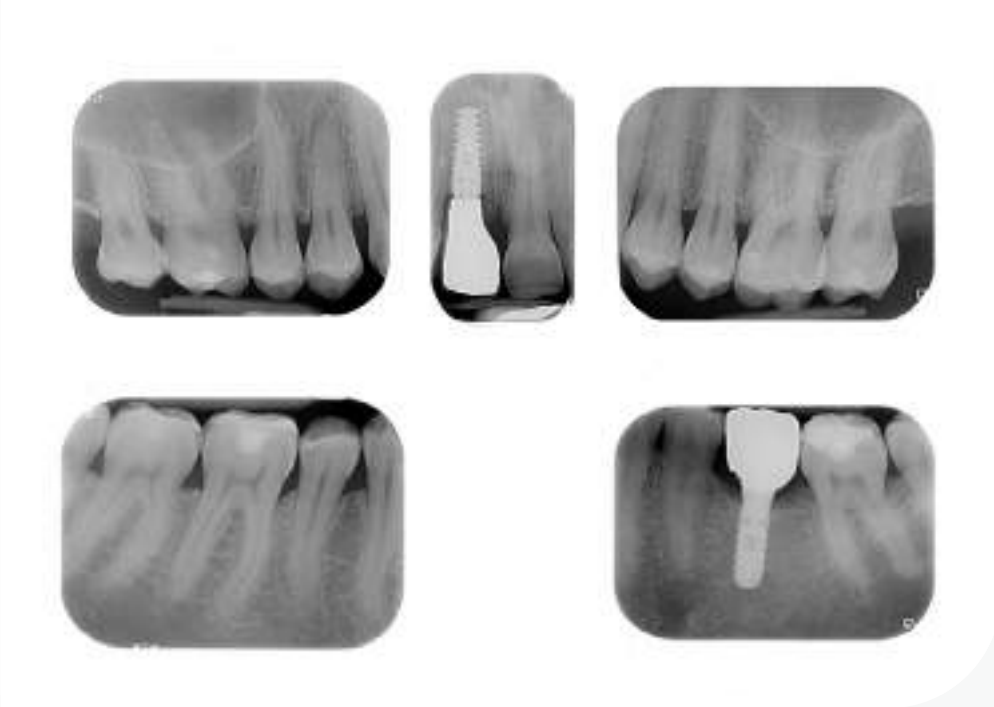

FIG. 2 *Patient's RX.*

FIG. 3 *Shape modification of planned prosthetic restorations in the aesthetic area through Smile Architect.*

FIG. 4 *Modification of volumes and adaptation of gingival levels.*

The clinician receives a proposed treatment plan that is fully customisable, both at the tooth alignment level and, using Smile Architect software, at the prosthetic level, where it is possible to work on the shape of the restorations (Fig. 3) and the volumes and gingival levels (Fig. 4).

The option also exists to modify the facial reference parameters (midline, incisal ridge course and interalar distance; Fig. 5).

An intraoral scan was performed with the iTero™ scanner, and both intraoral and extraoral images were captured.

FIG. 5 *Integration of Smile Architect and changes programmed with 3D controls in the ClinCheck plan.*

The achievable results of the integrated ortho-restorative therapy can also be assessed (Fig. 6).

The software allows for the evaluation of the tooth mass that should be removed with or without restorative therapy, visualising the minimally invasive approach gathered from an ideal tooth alignment (Fig. 7).

When the clinician has assessed the implementation of all required movements, they can request the production of the aligners. After the orthodontic therapy has been completed, they can proceed with restorative therapy, always using fully digital workflows (Figs. 8, 9).

FIG. 8 *Preparation of dental elements before the cementation of the crown in position 1.1 and the veneers.*

FIG. 6 *Simulation of the aesthetic smile result.*

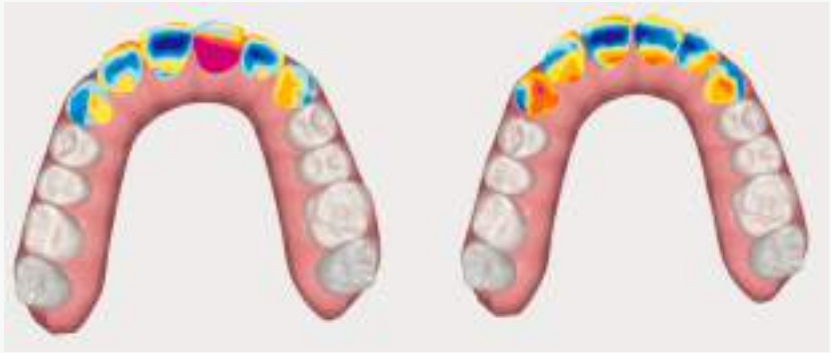

FIG. 7 *3D visualization of the amount of enamel to be removed during the prep of the elements in the upper frontal sector.*

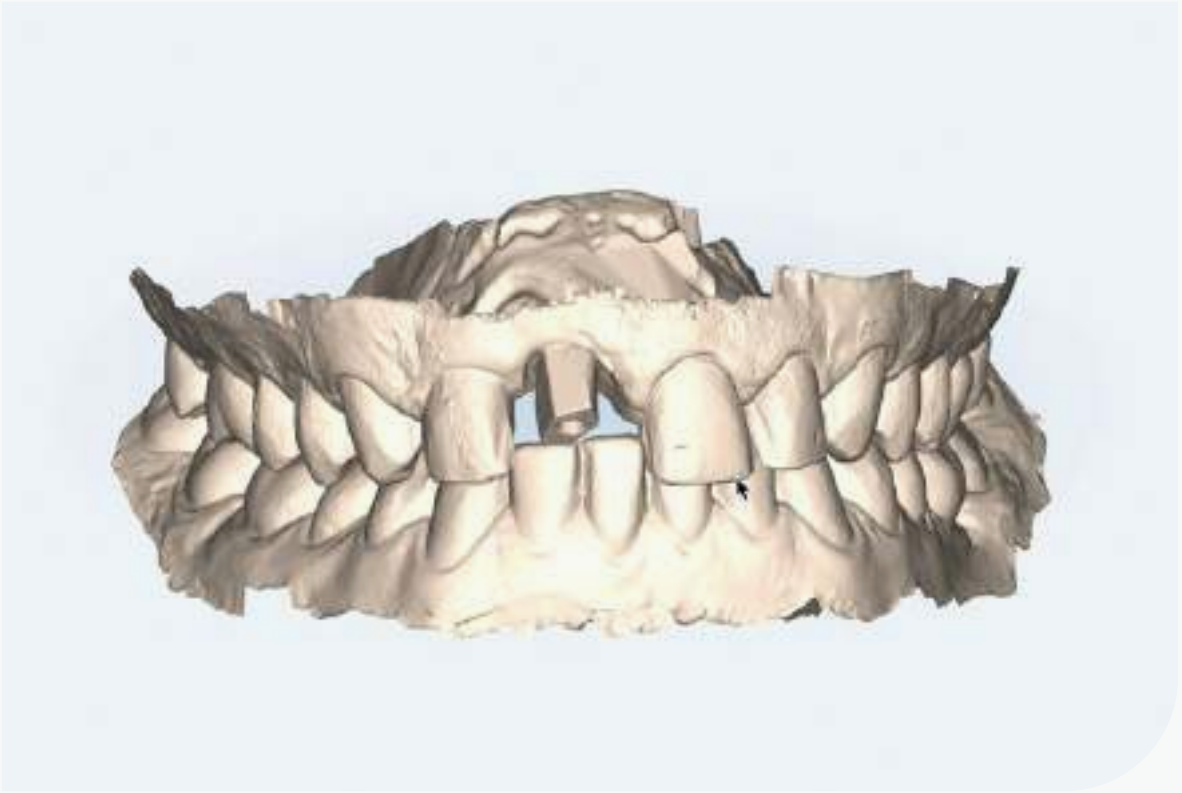

FIG. 9 *3D visualization of dental elements.*

"The combination of Smile Architect™ software with Invisalign Go has enabled a minimally invasive approach to the patient's biological structures"

STEPS IN THE RESTORATIVE PHASE

1. Delivery of retainers to stabilise and maintain the position achieved by the teeth during the alignment phase.
2. Preparation of anterior teeth and digital impression on natural teeth from 1.5 to 2.5 and on implant placement in position 1.1.
3. Cementation of the veneers and delivery of implant-supported screw-retained crown on 1.1
4. Delivery of a new retainer for the upper arch.

SUMMARY OF TREATMENT WITH ALIGNERS

- Number of aligners used: 13.
- Aligners: changed weekly.
- Treatment time: 13 weeks.
- Use of auxiliaries: none.
- Follow-up visits: the patient was seen one month after the placement of the attachments. The appointments were initially scheduled for every four weeks to monitor the progress of the treatment and check the patient's level of cooperation.

After two follow-up visits, given the patient's compliance, appointments were then scheduled for every six weeks.

- Urgencies during treatment: no follow-up visits were required for emergencies.

CLINICAL DISCUSSION

An aesthetic smile is often requested by patients seeking dental treatment today. Many clinical options are available, and these have been enhanced by a multidisciplinary approach involving several specialists. Moreover, in this field, digital workflows enable easier communication between professionals (prosthetist and orthodontist) and between clinicians and dental technicians during the planning and management of the treatment.

The recent introduction of Invisalign Go has enabled the general dentist to plan slight sectoral alignments for the preparation and management of aesthetic areas to be rehabilitated with restorative and prosthetic treatments. In particular, the introduction of the Invisalign Smile Architect™ software in Invisalign Go combines orthodontics and restorative dentistry into one powerful clinical tool, improving multidisciplinary treatment planning. The software allows the clinician to visualise the restorative objective by adapting it to the patient's face and make the necessary changes to the orthodontic treatment plan to integrate the two clinical approaches and achieve an optimal clinical outcome.

In the clinical case described, Invisalign Go allowed for easy and convenient management of the pre-prosthetic phase, which led to the alignment of the anterior sector and management of the spaces in the arch.

FIG. 10 *The arch.*

An improved alignment of the sector to be treated allows for a minimally invasive approach in the pre-prosthetic preparation, thanks to the 3D visualisation of the amount of enamel to be removed. The combination of Smile Architect™ software with Invisalign Go has thus enabled one of the most valued results in modern dentistry: a minimally invasive approach to the patient's biological structures because the dental elements can be positioned according to the prosthetic project.

From this perspective, we can talk more and more concretely about PGO. Within a multidisciplinary treatment plan, in this case, purely aesthetic, orthodontic programming must meet restorative and prosthetic needs. Invisalign Go allows, with very small movements and limited to the anterior sectors only, clinical results that are foundational to the restorative phase, with a fully conservative approach and considerable advantages for diagnostics, restorations and occlusal stability for the patient.

The synergy between digital workflows and Smile Architect software enabled an optimal end-to-end result in a highly predictable manner (Fig. 11).

FIG. 11 *The final result.*

Case Report

An *aesthetic* minimally invasive rehabilitation performed with a full digital workflow

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- Master of Advanced Studies in Microinvasive Aesthetic Dentistry at University of Geneva (2014–2016)
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- Coordinator of post-graduate program MAS of Microinvasive Aesthetic Dentistry of the same University
- Researcher and author of several articles on international scientific journals about dental materials for restorative dentistry
- Works in the private practice at the Geneva Smile Center as specialist in esthetic adhesives restorations for single tooth and full-mouth rehabilitations, with conventional approaches and digital devices

CASE DESCRIPTION

A 42-year-old male patient presented in our practice hoping to refresh the setting of his smile. He was conscious of the fact that he has worn dentition in the frontal sextant from upper canine to canine, right and left (teeth #13 to #23) and some posterior teeth.

This situation led to exposure of a significant area of dentin which created a high level of sensitivity in and also impacted the aesthetics of his smile in the anterior region (Fig. 1A, B). He also presented with a bit of crowding and some dental class III issues that resulted in a modification in the occlusal condition, tendency to occlusal class III and edge-to-edge condition (Fig. 2A-D).

The patient completed a partial rehabilitation at another clinic two to three years prior, but treatment of the lower molars, second lower right premolar and first upper left premolar remained incomplete. The patient's request was to maintain restorations already delivered if they were still in good condition.

FIG. 1A, B *Initial extraoral documentation.*

FIG. 2A-D *Initial intraoral documentation*

FIG. 3 *Digital impression of the occlusion.*

TREATMENT

The first step was to open the vertical dimension of the occlusion (VDO) by placing tabletop veneers on the teeth that had experienced abrasion and erosion — especially on teeth #14, #15, #16, #17, #25, #26, #27, #34, #35 and #44.

A digital impression (Fig. 3) was taken with the DEXIS™ IS 3800W intraoral scanner on the opened VDO in the centric relationship (CR) and stabilized with posterior jig of occlusion. Restorations were designed on the exocad software (Fig. 4) and a lithium disilicate was the elected material for their fabrication (Fig. 5A, B).

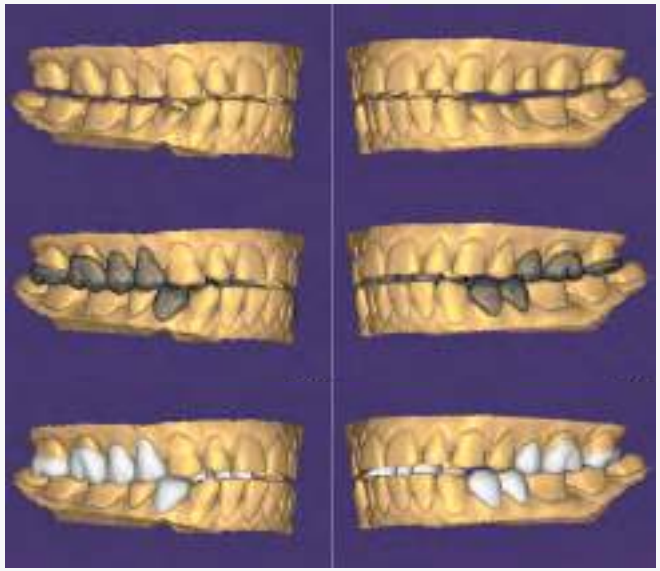

FIG. 4 *Exocad Project for posterior rehabilitation.*

FIG. 5A, B *VDO Augmentation.*

The restorations were bonded adhesively into the mouth of the patient. After the rise of the VDO the patient's anterior occlusion was ideal to restore anterior guidance.
Therefore, it was necessary to provide the patient with orthodontic treatment (Fig. 6).

FIG. 6 *Visualization of Pre- and Post-Orthodontic treatment.*

After the orthodontic treatment was completed, the direct composite was utilized to restore incisal edge of lower incisor (Fig. 7A-D).

FIG. 7A-D *Direct composite restoration of the lower sextant.*

Subsequently, the final esthetic wax-up of the anterior sextant was completed in order to ultimately validate the esthetic rehabilitation and to guide the minimally invasive preparations of the crowns (Fig. 8A-E).

Final preparations were guided by the mock-up (Fig. 9A, B) and, for the most part, they were limited to the interproximal area (Fig. 10).

FIG. 8A-E *Anterior Wax-up and Mock-up.*

FIG. 9A, B *Guided sulcus for preparation.*

FIG. 10 *Final preparation.*

After that, we took a final digital impression (Fig. 11) of the anterior crowns with the IS 3800W intraoral scanner after a simple displacement of the gingiva with the retraction cord.

For the digital design, a small reduction of the inferior half of the buccal surface of the monolithic restorations was created in order to stratify the porcelain and achieve the best possible aesthetic result (Fig. 12A, B).

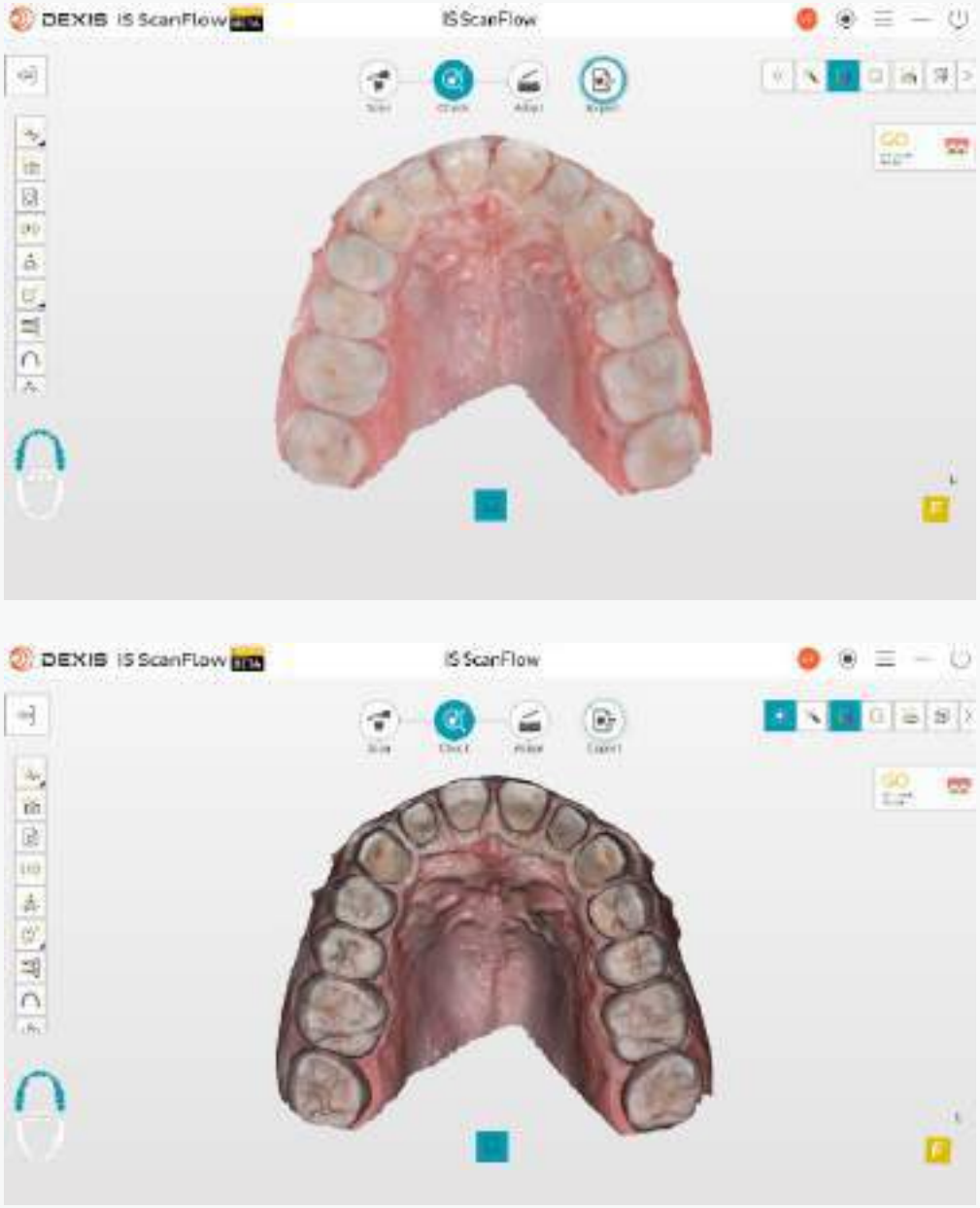

FIG. 11 *Digital Impression of the anterior crowns.*

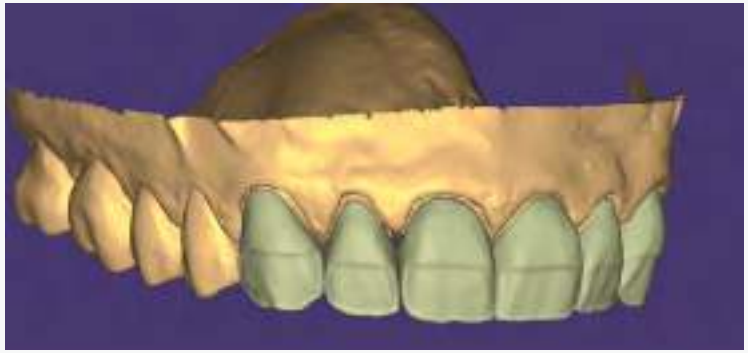

FIG. 12A, B *(A) Thickness control; (B) Final design (with space for anterior stratification).*

FIG. 13A, B *Final restoration.*

FIG. 14A, B *Adhesive procedures.*

Ultimately, the final restorations (Fig. 13A, B) were bonded adhesively into the mouth with the use of a rubber dam (Fig. 14A, B).

The final photos (Fig. 15A, B and Fig. 16A-E) were taken a couple of weeks after the cementation.

FIG. 15A, B *Final extraoral documentation.*

FIG. 16A-E *Final intraoral documentation.*

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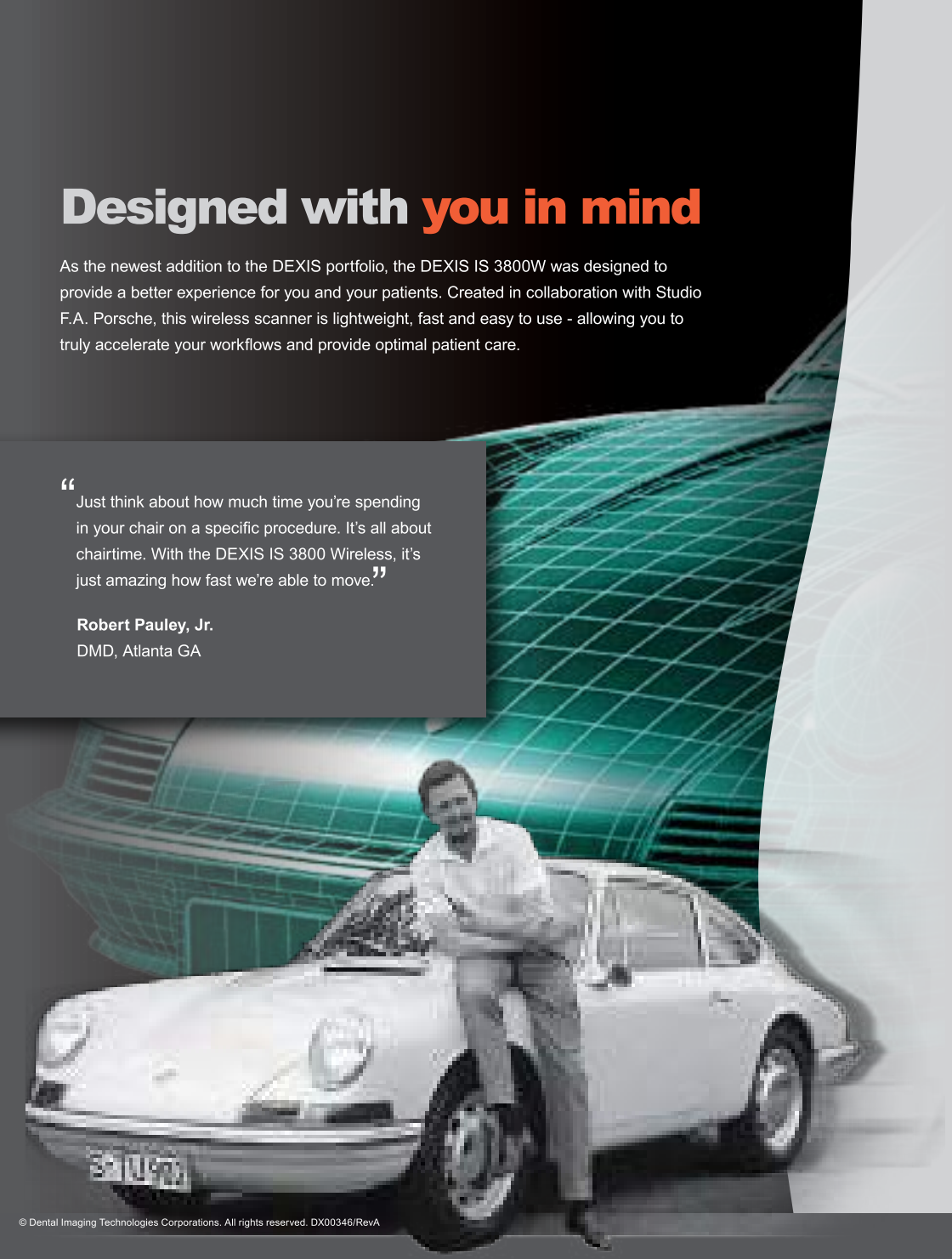
Robert Pauley, Jr.
DMD, Atlanta GA



DEXIS

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Case Report

Split-monolithic *zirconia* framework

Dr. Eitan **Mijiritsky**

DMD, PhD

- PhD Summa Cum Laude, on the topic of Immediate Loading in Oral Implantology
- Associate Professor in Prosthodontics and Coordinator of International Academic Affairs of the School of Dental Medicine at the Tel-aviv University School of Dental Medicine
- Prosthodontic Consultor and Research Coordinator – Dep. of Oral and Maxillofacial Surgery, Sourasky Tel-Aviv Medical Center
- Past President of the Israel Society of Prosthodontics
- President Elect and Council Member of the European Prosthodontic Association - EPA
- Board of Directors of the DDS and DDS Ambassador for Israel
- Member of the Editorial Boards of: Journal of Dentistry JD, International Journal of Prosthodontics IJP, Journal of Esthetics and Restorative Dentistry JERD, Journal of Clinical Medicine JCM
- 130+ scientific publications in peer reviewed international journals
- Heading the "Mijiritsky Dental Experts Center" in Tel-Aviv.

CASE DESCRIPTION

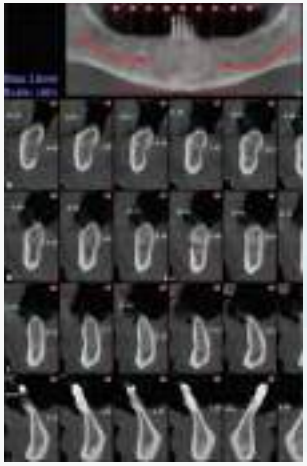
A 49-year-old patient, wearing a complete upper removable denture and an ill-fitting lower removable partial denture (RPD), came to our dental office with a specific request: "I want to replace my lower RPD with a fixed restoration."

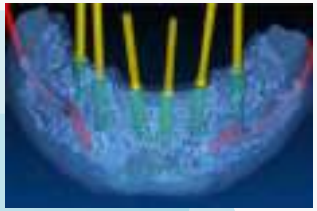
The patient had only four mandibular incisors left (42–32; Figs 1, 2) and needed six implants for an implant-supported full-arch restoration.

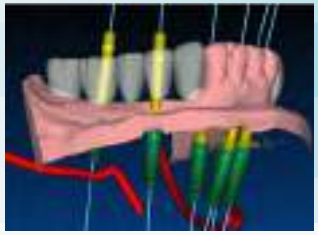
To adjust the occlusal plane, the patient needed a bone reduction procedure in the mandibular anterior zone.

A bone reduction surgical guide and an implant placement surgical guide were planned according to a virtual tooth setup and the implant position (Figs 3–8).

FIG. 1, 2 *Pre-operative situation.*







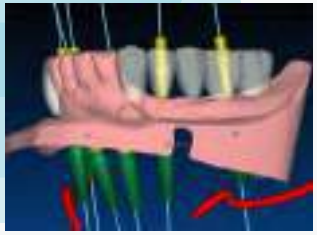


FIG. 3-8 *(3,4) Preliminary evaluation with cone beam computed tomography (CBCT); (5-8) Implant planning with a guided implant surgery software.*

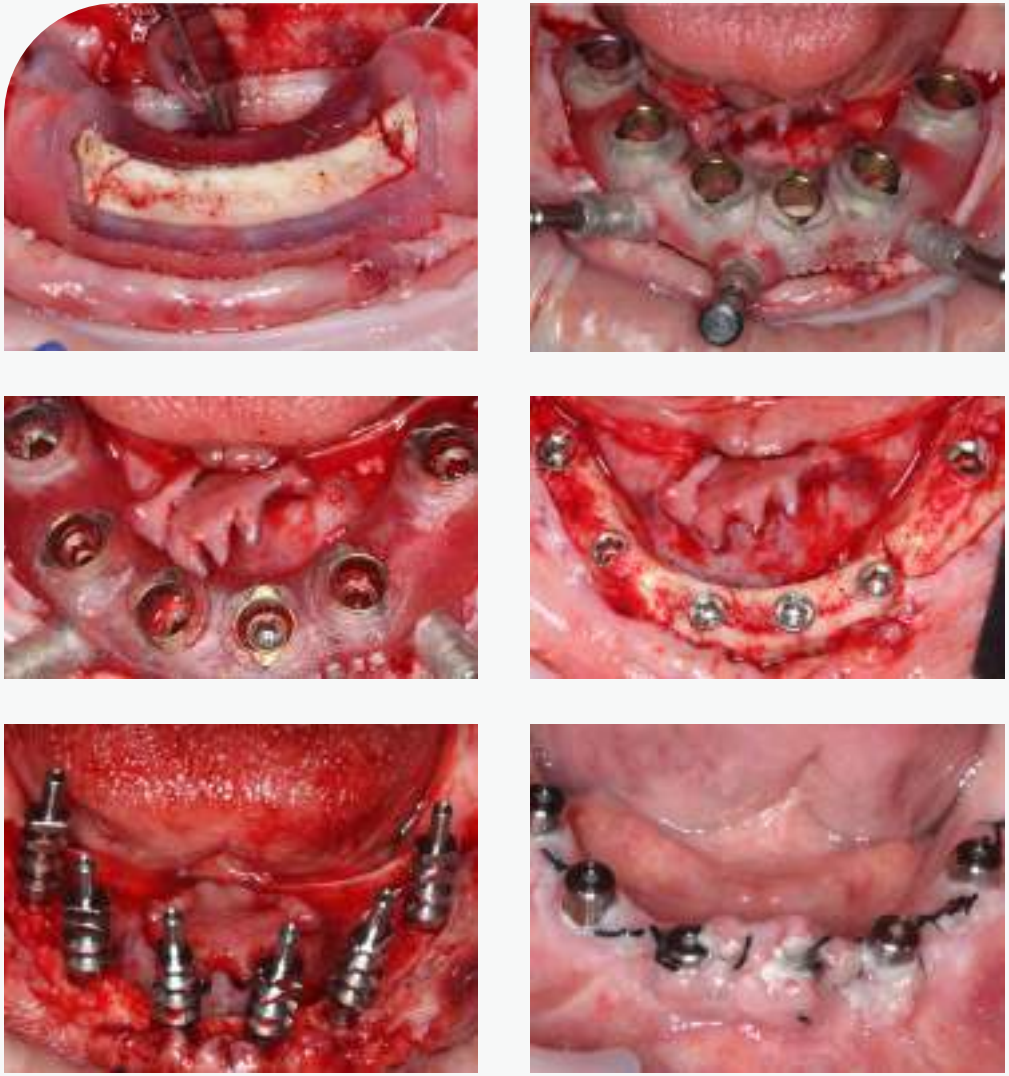


FIG. 9-14 *Guided implant surgery: bone reduction and implant planning.*

After the surgical session and the immediate loading of a provisional restoration (Figs 9–16), and a period of temporisation, a full-arch implant scan was captured with an intraoral scanner (IS 3800W®, DEXIS; Fig. 17).

FIG. 15, 16 *Immediate provisionalization.*

FIG. 17 *Intraoral scanning with IS3800® (DEXIS).*

The scan was used for designing a full-arch monolithic zirconia tubelock split-framework design with Exocad software (Figs 18–23).

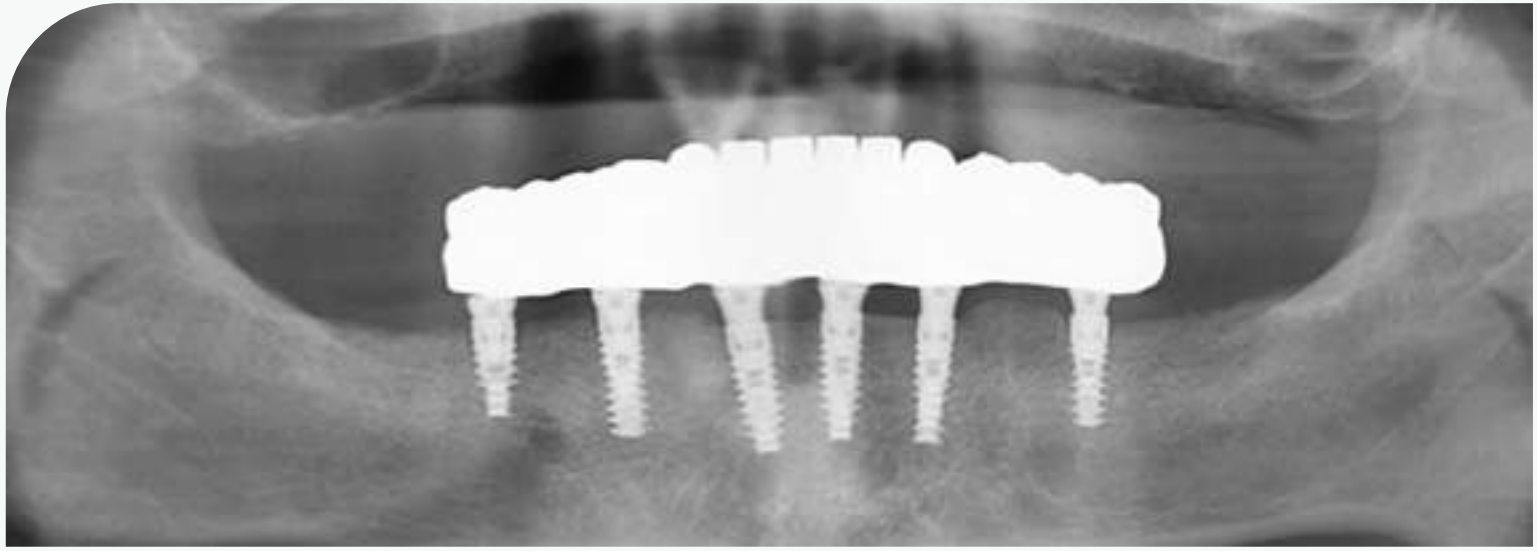


FIG. 18-23 *(18-20) Accuracy verification with milled aluminium bar and printed resin duplicate of the final restoration; (21-23) Delivery of the final restoration.*

By splitting the restoration into two parts, the potential detrimental effects of the mandibular flexure phenomena in the mandible on splinted full-arch restorations can be overcome (Figs 24–27).

In addition, a split-framework design can help achieve better accuracy when working with full-arch intraoral scanning.

FIG. 24-27 *Full-arch monolithic-zirconia tubelock split-framework designed with Exocad.*

Case Report

4D dentistry for *anticipated* prostheses

Dr. Maxime **Jaisson**

DDS

- Former AHU University of Reims Master in Biomechanics
- University Diploma in applied facial prosthesis
- Doctorate in Odontological Sciences
- Specialized in digital dentistry and especially functional occlusion & TMJ disorders and Implantology.

- Co-founder of MODJAW, holds a predominant role in research and development in the company and still works in a clinic half of the week
- His work in the field of biomechanics as well as the digital maxillofacial prosthesis allowed him to complete his second doctorate in science in 2012

ABSTRACT In the case of full-mouth rehabilitation, the practitioner faces many challenges and must master crucial steps such as evaluating the patient and their needs as well as offering an adapted treatment.

How can digital tools help the practitioner in these challenges, and how can they transfer all the digital data to the dental technician to work efficiently without losing information? This clinical case illustrates how digital tools, especially MODJAW™ Tech in Motion™, allow the practitioner to work efficiently in a digital workflow for the benefit of the patient.

INTRODUCTION Digital dentistry is accelerating with the use and improvement of computer-aided design and computer-aided manufacturing (CAD/CAM) in daily dental practice. In the case of full-mouth rehabilitation, many techniques and associated therapies are necessary, making it a real challenge for both the practitioner and the dental technician. These treatments require the establishment of a prosthetic project that will serve as a guide from the implant surgery to the final prosthesis.

The main objective of full-mouth rehabilitation is to restore the dentition by establishing new occlusal architecture and forms at a correct vertical dimension while maintaining the health and harmony of the entire stomatognathic system. From this perspective, the MODJAW™ Tech in Motion™ device completes the digital workflow by recording the functional envelope of the patient and helping in the predictability of a treatment plan, especially in the case of immediate loading. It helps to overcome three main challenges encountered in full rehabilitation. The first challenge is to validate a therapeutic mandibular position and transfer it to the laboratory. The second challenge is to respect the occlusal and aesthetic planes. The design of the occlusal anatomy respecting the patient's specific movements and envelope of function (functional area) can be seen as the third challenge.

An extraction-immediate implant placement situation will be used here to support the application of these new digital tools.
The consultation is driven by the wish to regain a harmonious and pleasant smile, as well as masticatory efficiency (Fig. 1A-C).

FIG. 1A-C *Patient situation.*

FIG. 2 *MODJAW™ Tech in Motion™: a Class 1 medical device.*

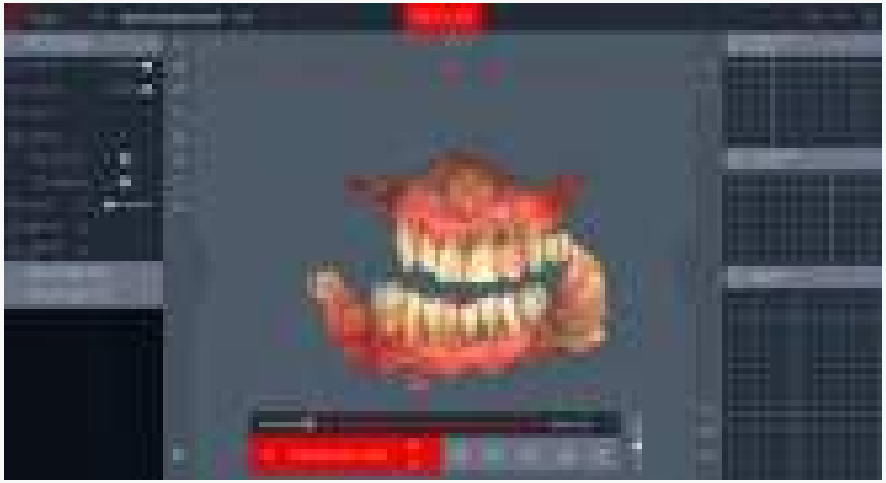


FIG. 4 *MODJAW™ Tech in Motion™: Software.*

THE MODJAW SYSTEM: MODJAW™ Tech in Motion™ is a class 1 medical device composed of a hardware and a software (Fig. 2).

The hardware:
This is based on the combination of 3D technology (3D models from intraoral scanners) and motion-capture techniques.

A set of minimally invasive sensors are placed on the patient's face without interfering with the function. A high-precision, high-frequency (120 Hz) infrared optical camera records the patient's movements and applies them to their intra-oral scans (Fig. 3).

For the first time, we can see what is happening in the patient's mouth.

FIG. 3 *MODJAW™ Tech in Motion™: Hardware.*

The software:
This is designed like an application to optimise the user experience (Fig. 4). The practitioner can manipulate the 3D models using the computer's touch screen. The acquisition interface, shown in the figure below, is divided into three main parts.
- On the left are all the features to interact with the 3D models of the patient. The features are divided into three modules: ACCESS, ADVANCED and AESTHETIC.
- On the right are the trajectories of three anatomical points (right condyle, left condyle and sub-nasal point) in the three planes of space.
- In the middle are the recorded movements and the possibility to replay and share them after the departure of the patient.

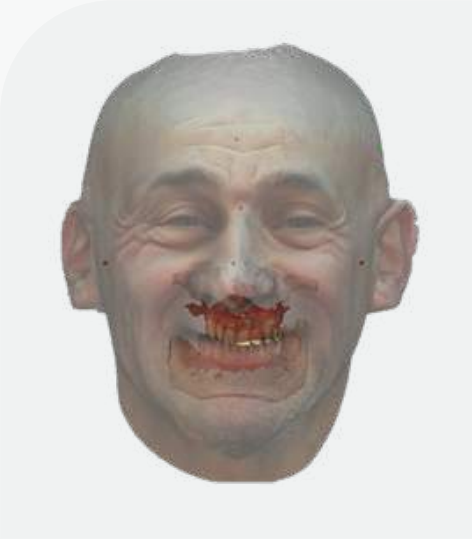


FIG. 5 *Face scan + intraoral scan.*

FIG. 6 *CBCT.*

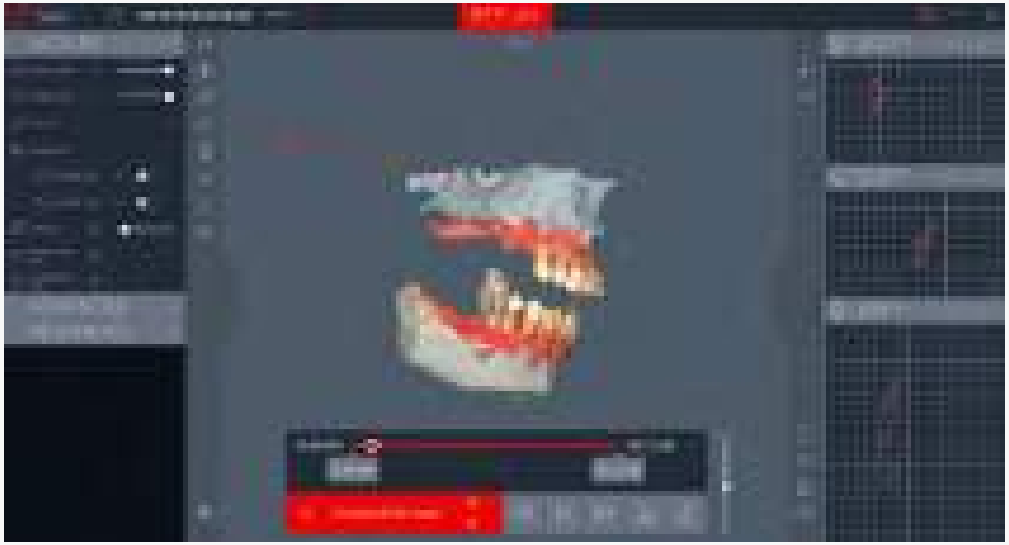


FIG. 7 *All the data imported in the MODJAW™ software.*

CASE PRESENTATION: THE DIGITAL DYNAMIC TWIN CREATION

Digital twins are digital prototypes or replicas of humans. The real-time jaw motion of the patient adds a layer of dynamic information essential to offer personalised treatment.

The collection of the data starts by taking the intra-oral scans to obtain the 3D models of the actual situation of the maxilla and mandible in a static occlusion (maximum intercuspation; MIP). In addition, 2D photographs and face scans capture extraoral and intraoral information for documentation and education and act as a reference for before and after treatment comparisons (Fig. 5).

A cone-beam computed tomography (CBCT) is performed to give 3D accessibility to craniofacial structures for the examination and treatment initiation (Fig. 6). The benefits of a CBCT in oral and maxillofacial surgery include a diagnosis of bone pathology and developmental anomalies. In implantology, a CBCT permits the area surrounding the future implant to be investigated, along with an evaluation of the height, width and quality of the alveolar bone and awareness of the surrounding anatomical structures.

All these data are collected and imported into the MODJAW™ software to record the mandibular kinematics of the patient and to get closer to creating a dynamic digital twin (Fig. 7).

FIG. 8 *Aesthetic evaluation.*

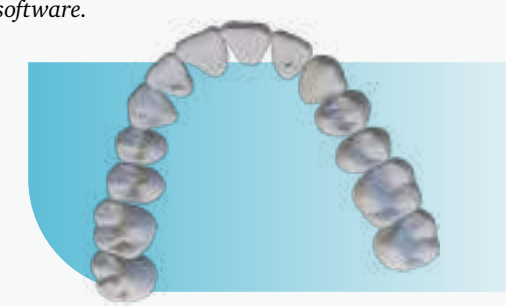


FIG. 9 *3D Model export.*

AESTHETIC EVALUATION

Numerous software programs (e.g. DSD, Smilecloud, SmileFy) are available on the market and provide an aesthetic preview of the prosthetic project to communicate with the patient and help with the process of accepting the proposed therapy. The aesthetic evaluation and planning in this case were made on the Smilecloud platform (Smilecloud, Romania). This offers adaptative libraries out of hundreds of possible designs. The choice is made according to parameters such as the smile line, the position of the lips, the smile and the bipupilar line (Fig. 8). Once the aesthetic evaluation is done and validated, the chosen library is exported as a 3D model to the laboratory (Figs 9).

FUNCTIONAL EVALUATION

The following records were registered with MODJAW™ Tech in Motion™:

- Open/close
- Protrusion
- Left and right laterotrusion
- Centric relation
- Speech
- Chewing

After the first step of recording is done, a dynamic evaluation is conducted using the MODJAW™ software.
This helps to identify two pieces of information: the mandibular position and the functional envelope of the patient can be preserved.

The mandibular position was evaluated by recording the centric relation (CR). The patient was guided in CR using the bi-manual guided Dawson technique to record a small amplitude of open/close movement so that the condyles remained in the pure rotation (Fig. 10). The trajectories of the inter-incisal point in the frontal and sagittal planes and the left and right condyles in the sagittal plane showed a reproducible CR coinciding with the MIP position.

FIG. 10 *The mandibular position.*

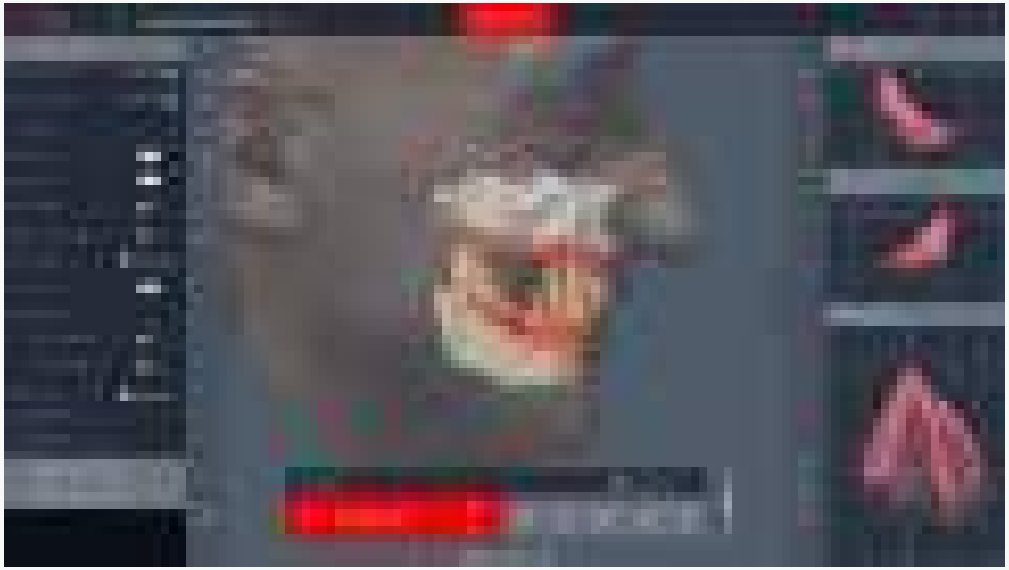


FIG. 11 *Evaluation of the mandibular position.*

The second evaluation was to check the functional envelope of the patient by looking at the border limit movements (open/close, protrusion and laterotrusion) and chewing pattern. The chewing showed a well guided by the teeth in place, along with a sharp and symmetric chewing pattern on the left and right condyle trajectories (Fig 11).

It was thus decided to keep the current mandibular position and functional envelope of the patient for the prosthetic design. To do that in a digital workflow, all the static and dynamic patient data were exported from MODJAW™ as standard files and imported into Exocad (Exocad GmbH, Germany).

TREATMENT PLANNING: PROSTHETIC AND IMPLANT PLANIFICATION

A motion dataset provides the dental technician with valuable patient information to help the design:

- A mandibular position in the three planes of space.
- An occlusal plane respecting the functional curves of Spee and Wilson.
- Border limit movements to adjust the anterior guidance according to the protrusion and laterotrusion recorded.

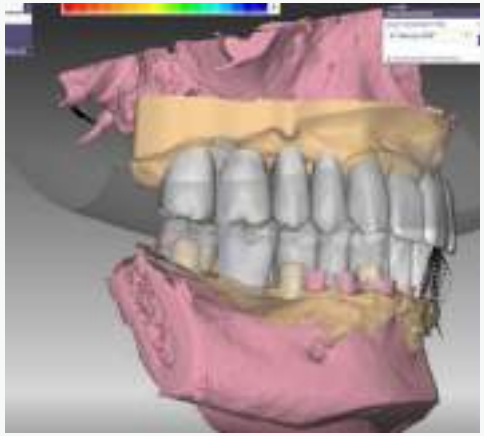


FIG. 12A, B *The prosthetic project: 4D wax-up.*

FIG. 13A, B *Superimposition of the 4D Waxup on the CBCT in EXOPLAN.*

- Masticatory movements to adjust the cusps of the posterior reconstruction.

With the collection of this information, a prosthetic design according to the chosen occlusal concept was achieved. The prosthetic project is called the 4D wax-up because of the use of dynamic movement in the design process (Fig. 12A, B).

Once this 4D wax-up has been created and validated, it becomes the reference that will guide each step of the implant planning. Thanks to the superimposition of the 4D wax-up on the CBCT in exoplan, the implants are ideally positioned in virtual space (Fig. 13A, B).

While the implant placement is planned, a virtual extraction of some teeth on the initial model allows for designing several guides. For each arch, two guides are created. The first is with mixed mucosal and dental support. The idea is to keep the necessary teeth to maintain the guide and place the first implants because dental and mucosal support offers more precision than mucosal support (possible mobility). A second guide is designed on a full extracted model to allow the surgeon total access to the last implant site.

By exporting the 4D wax-up and the position of the implants, the dental technician has the necessary information to create the temporary prosthesis, including aesthetic and functional recommendations to best guide the healing process. The surgeon receives the surgical protocol from the planning, the surgical guide and the finished patient's prosthesis ready to be screwed in.

SURGICAL PHASE & IMMEDIATE LOADING

After anaesthesia, the first teeth are removed. The first guide is used to place the first guided implants in the mandible and maxilla. The residual teeth are then removed, and the second guide is fixed on the implants already in place to continue the placement of the other implants.

For the maxilla, a bone reconstruction was not planned due to the patient. The possibility remained to manage it with osteotomy and crestal access, according to the Summers technique. Sleeves of the surgical guide were used to lead the osteomes on sites 16 and 26 (Figs 14, 15).

FIG. 14 *Surgical Guide.*

FIG. 15 *Surgical Guide.*

After all implants are placed, the variobase and temporary abutments are screwed. We anticipated the prosthesis, which was already milled on the day of surgery. On the maxilla, a support on the palate allowed us to stabilise the prosthesis and connect it in the right situation. We then injected composite to solidarise on the temporary abutments. For the mandible, the prosthesis was solidarised in occlusion. Everything was then unscrewed again and polished, and the occlusion was controlled. (Fig. 16A, B)

FIG. 16A, B *(A) Mandible support for temporary abutments; (B) Maxilla palate support, which helped to position and stabilize the prothesis.*

DISCUSSION

In this type of situation, multiple parameters need to be mastered: bone management, aesthetic evaluation, functional evaluation and psychology. With new digital tools, the dentist can evaluate their patient and collect all their data, static and dynamic. Additionally, they can delegate part of the work to the lab by fully virtualising the patient and sharing this with the dental technician.

This clinical case highlights how the practitioner can :
- obtain a comprehensive idea of the initial situation on both the aesthetic and the functional sides
- understand the compensation mechanism of occlusion and the impact on mandibular position and movements.

Once the initial evaluation is done, jaw-motion records allow the conservation of the functional initial situation in the prosthetic project. Motion data is very valuable in a situation of immediate loading because jaw motion is partially driven by proprioception, which programmes muscular contraction and is in the muscle memory.

After the surgery, mandibular movement will be only driven by muscular exteroception recorded in the initial situation. Thus, when the designed prosthetic including the initial functional movement is placed, the entire stomatognathic system will not encounter any obstacle. This integration will be smoother.

“With new digital tools, the dentist can evaluate their patient and collect all their data, static and dynamic. Additionally, they can delegate part of the work to the lab by fully virtualizing the patient”

CONCLUSION

The new tools in digital dentistry redefine traditional protocols: they keep improving the predictability and quality of treatments while simplifying the processes.

Managing the dynamic occlusion of implant restorations in a totally digital workflow is a reality with MODJAW™ Tech in Motion™. The practitioner can evaluate the mandibular position and the dynamic motion of the patient and integrate a new set of data in the prosthetic project to create an ideal static and dynamic occlusion.

FIG. 17, 18, 19 *Final result.*

“The new tools in digital dentistry redefine traditional protocols [..]. Managing the dynamic occlusion of implant restorations in a totally digital workflow is a reality with MODJAW™ Tech in Motion”

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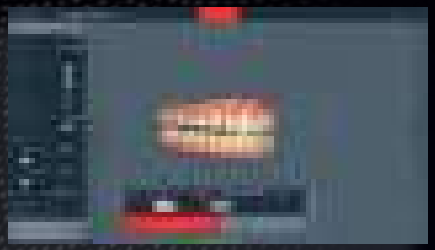

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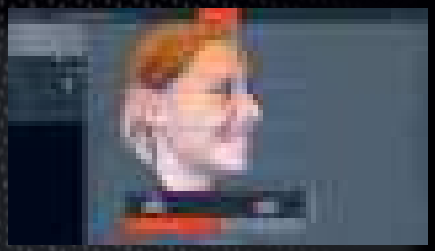

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Case Report

3D printing inlay, onlay, overlay with SprintRay: a *revolutionary* approach to Dental Restorations

Dr. Milos **Ljubicic**

DMD

- Resident at Clinic for Prosthodontics, University of Belgrade
- Specialised in aesthetic & digital dentistry and CAD/CAM systems
- Creator of the international course of standards and protocols in dental photography "The Bigger Picture"
- Nominated for the most promising young member of the European Society of Cosmetic Dentistry, ESCD St. Petersburg 2019
- Lecturer of the American Society of Cosmetic Dentistry, European Society of Cosmetic Dentistry
- 2019 Winner of the MPF Dental Photo Competition at IDS (Cologne) & of the ESCD dental photography contest (St. Petersburg)
- Published works in The International Journal of Esthetic Dentistry- IJED by Quintessence, Journal of Esthetic and Restorative Dentistry- JERD, Dental Technician Guild and others
- Key opinion leader for Medit, GC and Sprintray.

INTRODUCTION Dentistry has undergone a remarkable transformation with the advent of 3D printing technology. Gone are the days when patients had to endure multiple visits for restorative procedures. With cutting-edge 3D printing solutions, dental professionals can now offer patients a more efficient and convenient experience.

This article explores the use of 3D printing technology to create inlays, onlays and overlays in a single visit, revolutionising how we approach dental restorations.

THE PATIENT'S DILEMMA Imagine a patient walking into a dental office, seeking to replace old fillings and repair cavities (Fig. 1).

Traditionally, such restorations would require several appointments, numerous impressions and temporary restorations before the final one was ready. This process was not only time-consuming but also frustrating for the patient.

However, with innovative 3D printing capabilities, this patient's experience can be drastically improved.

FIG. 1 *Patient starting situation.*

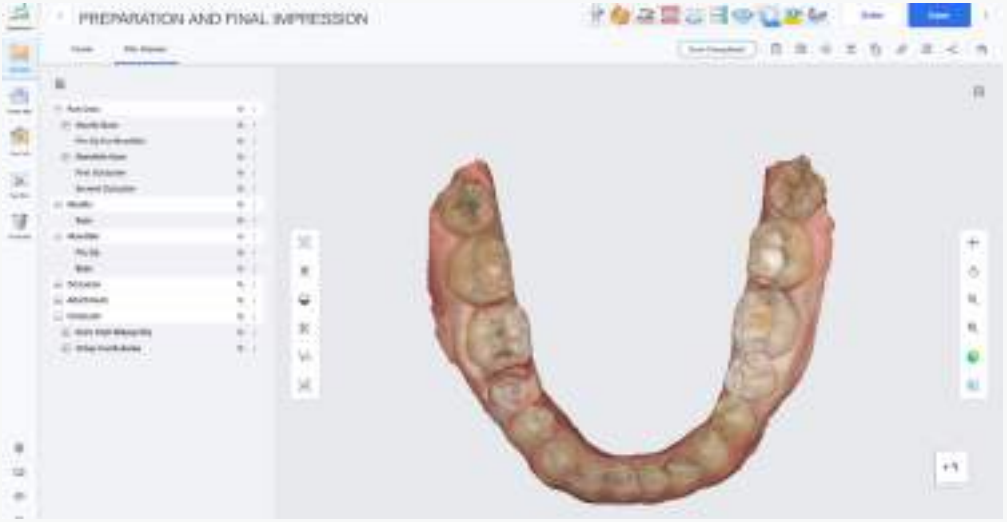

FIG. 2 *Digital Scanning (Medit i700 Wireless).*

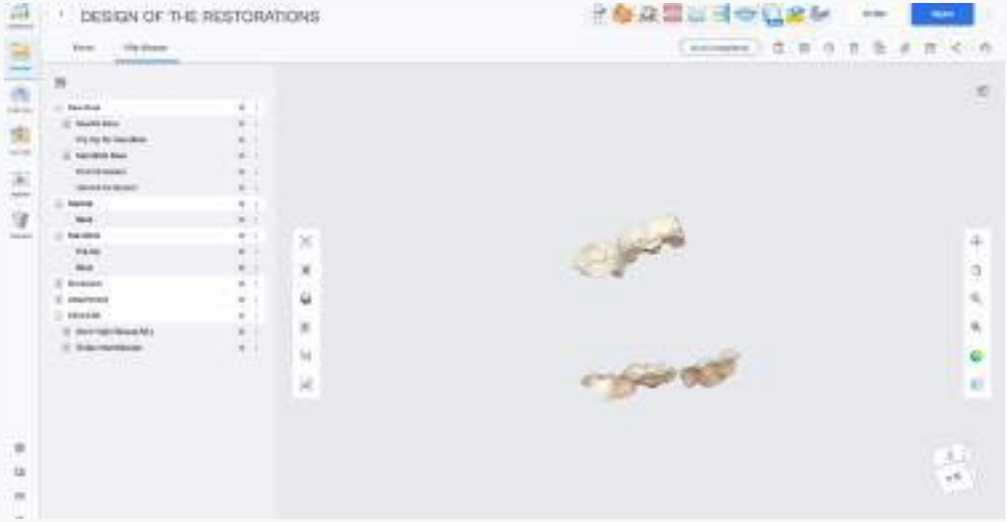

FIG. 3 *CAD Design through a computer-aided design software (Medit ClinicCad).*

THE SOLUTION

A good range of 3D printers are specifically designed for dental applications, including from SprintRay. These printers use advanced materials and high-resolution printing technology, enabling dental professionals to craft precise and durable dental restorations in a fraction of the time of traditional methods.

CREATING HYBRID RESTORATIONS IN ONE VISIT With the help of SprintRay's 3D printers and their unique crown kit, dental professionals can now create inlays, onlays and overlays using the latest hybrid resin materials (SprintRay Crown) in a single visit. The process is relatively straightforward and time-efficient, sparing patients the inconvenience of multiple appointments.

How it works:

1. Digital scanning: The patient's teeth are digitally scanned using an intraoral scanner (Medit i700 Wireless). This 3D scan creates a highly accurate virtual model of the patient's dentition, eliminating the need for messy traditional impressions (Fig. 2).

2. CAD design: The virtual model is imported into computer-aided design (Medit ClinicCAD) software, where the dental professional custom designs the inlay, onlay or overlay to precisely fit the patient's tooth (Figs 3, 4).

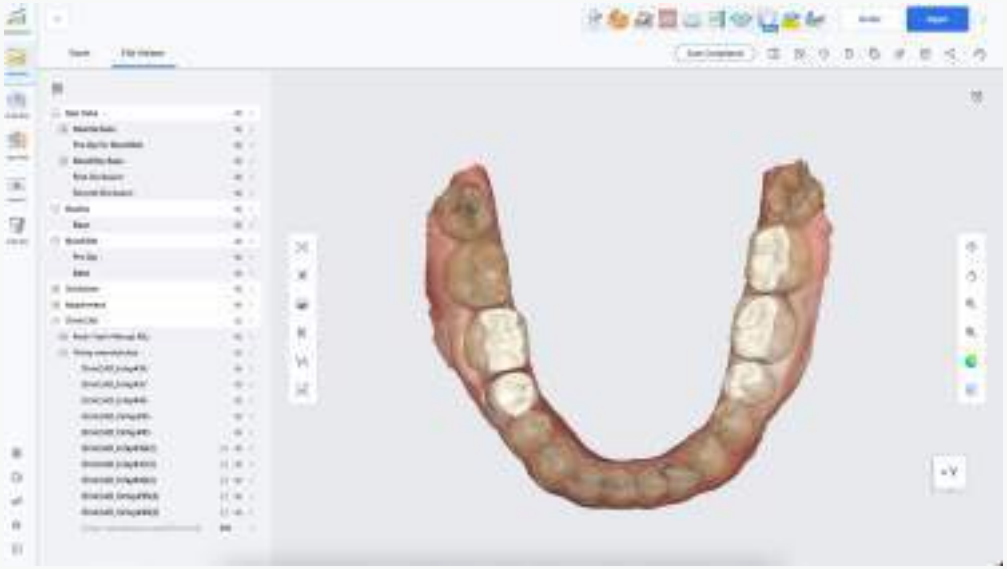

FIG. 4 *CAD Design: overlay of the restorations design over a 3D model of the patients dentition for a perfect fit.*

"With the help of SprintRay's 3D printers and their unique Crown Kit, dental professionals can now create inlays, onlays, and overlays using the latest hybrid resin materials"

FIG. 5 *Design file ready to be sent to the SprintRay Pro 95S 3D Printer. The SprintRay software hub for printing is RayWare.*

FIG. 6, 7 *The SprintRay Pro 95S 3D Printer.*

3. 3D printing: Once the design is complete, the digital file is sent to the SprintRay Pro 95S 3D printer (Fig. 5).
Using the chosen hybrid resin material (SprintRay Crown), the printer begins the additive manufacturing process, layer by layer, until the restoration is complete (Figs 6, 7).

4. After approximately 20 minutes of printing, thanks to the crown kit that speeds up the process, the dental professional carefully removes the restoration from the printer (Figs . 8, 9, next page)

FIG. 8 *Final results of the 3D printing phase: the restorations are ready for the next steps.*

The printed restorations are then placed in the SprintRay wash and dry unit, where they undergo thorough washing with isopropyl alcohol to remove any excess resin and ensure optimal cleanliness (Fig. 10).

5. The dental professional makes any necessary final adjustments and polishing to guarantee a perfect fit and natural appearance of the restoration (Figs 11, 12). Once the adjustments are complete, the restorations are transferred to the SprintRay ProCure2 unit for the final curing process.

FIG. 9 *The restorations.*

FIG. 10 *SprintRay wash and dry unit.*

FIG. 11, 12 *Final adjustments and polishing, for a perfect fit and natural appearance.*

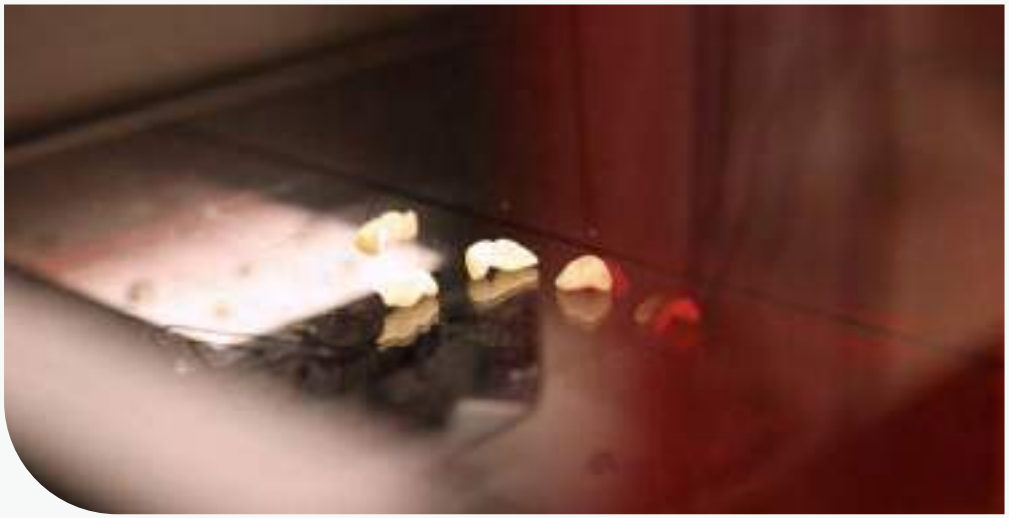

FIG. 13 *The SprintRay ProCure2 unit.*

6. The ProCure2 unit uses advanced light-curing technology to polymerise the resin fully, enhancing the strength and durability of the restoration. This step is crucial in ensuring that the restorations are ready for immediate use once they are taken out of the curing unit (Fig. 13).

7. With the printing, washing, curing and cementation processes completed in a single visit, the patient can walk out of the dental office with their new, fully functional and aesthetically pleasing restoration, thanks to the remarkable capabilities of SprintRay's 3D printing technology. The restorations are securely bonded in place using G-CEM ONE universal self-adhesive resin cement with dual-cure ability, designed to provide strong and durable bonding of indirect restorations. This ensures a long-lasting and reliable outcome for the patient's dental health and satisfaction (Fig. 14).

ADVANTAGES FOR PATIENTS AND DENTISTS

The integration of SprintRay's 3D printing technology in dental practices offers numerous benefits.

• Time-efficient: Patients can have their restorations completed in a single visit, saving them valuable time and reducing the number of appointments required.

• Enhanced precision: 3D printing ensures a high level of accuracy and a perfect fit for each patient's unique dental anatomy, leading to improved longevity and functionality of the restoration.

FIG. 14 *The final result: the restorations are placed in a single visit.*

• Improved aesthetics: The hybrid materials used in 3D printing closely mimic the appearance of natural teeth, providing patients with aesthetically pleasing and discreet restorations.

• Streamlined workflow: Dental professionals can optimise their workflow, reducing chair time and increasing patient throughput, ultimately benefiting both the practice and the patients.

CONCLUSION 3D printing technology has revolutionised the field of dentistry, offering patients a streamlined and efficient experience when it comes to restorative dental procedures. By using innovative solutions, such as SprintRay's crown workflow, dental professionals can now provide high-quality, precise and aesthetically pleasing inlays, onlays and overlays in a single visit, bringing a new era of convenience and excellence to dental restorations.

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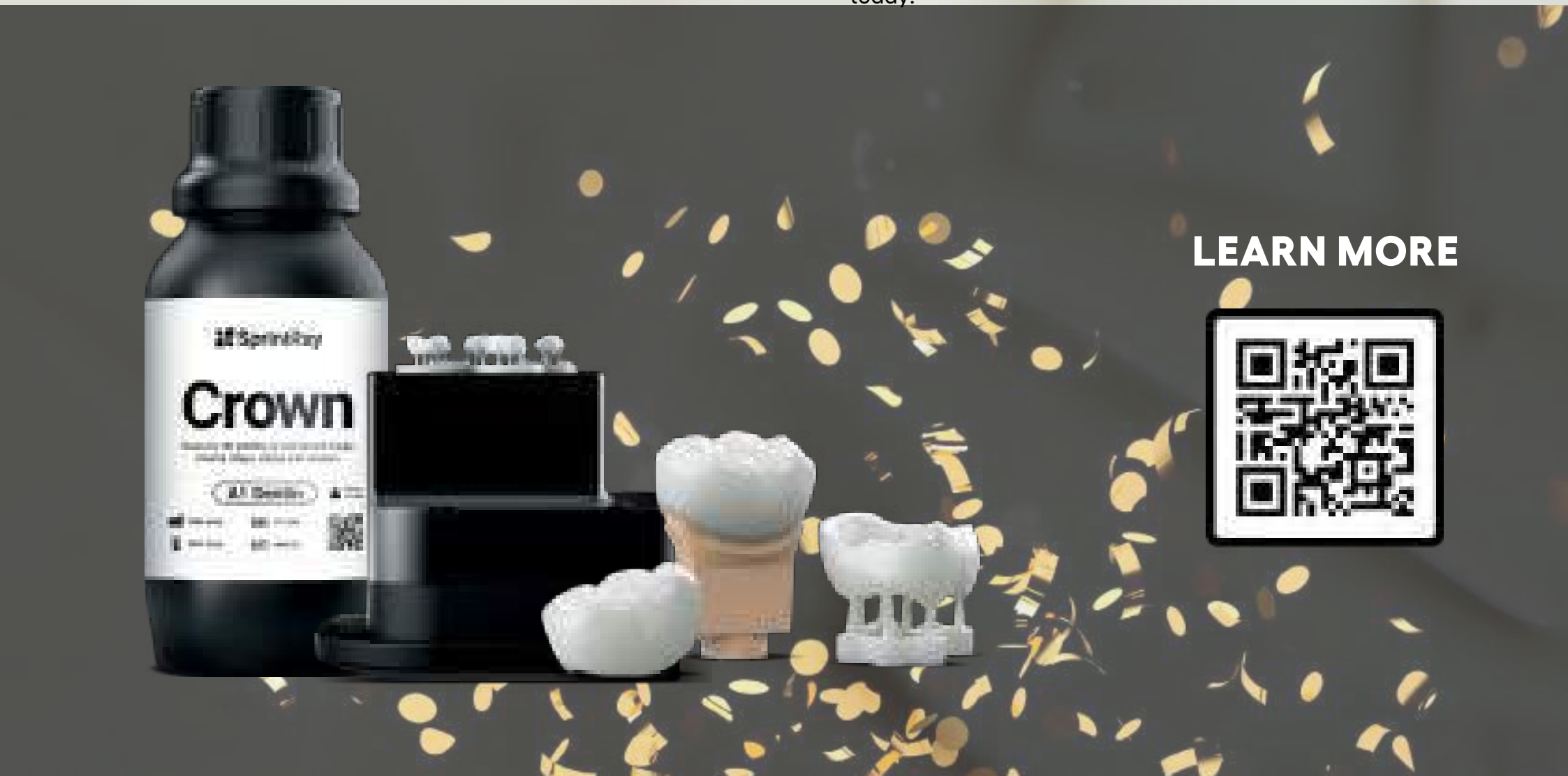

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Authors: **Ulrich Volz, Etyene Schnurr, Moritz Xaver Kneer**

Case Report

Zirconia implants: Digital workflow incorporating guided surgery and 3D-printed *prostheses*

Dr. Karl Ulrich **Volz**

DMD

- Dental Degree in Ulm, Germany
- Dr. Volz has placed over 29,000 ceramic implants since 2001.
- Founder and President, International Society of Metal-Free Implantology (ISMI)
- Developed the first market-ready ceramic implant
- Development of one of the first two-piece ceramic implants (2002-2012)
- Developer of SDS Swiss Dental Solutions' ceramic implant
- Founder of SWISS BIOHEALTH CLINIC
- Founder of the SWISS BIOHEALTH EDUCATION CENTRE with more than 4,000 participants/year (2017)
- Founder of: Scientific Academy for Blood Concentrates, Biological Dentistry, and Ceramic Implants" (SABBC)
- Certification in Biological Dentistry and Implantology

INTRODUCTION Immediate implantation using zirconia implants offers a treatment alternative for tooth replacement that is safe and biocompatible and meets the current aesthetic requirements [1,2]. Combined with a sleeveless, open-guided implantation system, implant positioning and prosthetic planning are usually accurate.

In the sleeveless system, the surgical handpiece is guided instead of using bone preparation drills. This allows for a controlled penetration depth to be determined based on the digital length of the implant. It reduces the risk of invasion by anatomical structures (such as the inferior alveolar nerve and maxillary sinus or the periodontal ligament and root of adjacent teeth when present) [3].

With open systems, the surgeon has adequate visibility of the operative field, and the surgery allows for insertion without raising a mucoperiosteal flap. Preserving keratinised mucosa during surgery is crucial for peri-implant health over time and for reducing postoperative pain. Irrigation in open systems is also favoured, without the risk of overheating the implant site. Thus, the cooling water spray spreads directly from the handpiece into the drill hole area.

Compared with guided surgery systems using metal sleeves, sleeveless and open systems made of resin offer some advantages. Implant surfaces and peri-implant tissues are no longer at risk of contamination by metal particles, biocorrosion or hypersensitivity to metals, all of which can compromise osseointegration and implant survival [4,5].

Minimally invasive backwards-planned surgeries align with the concept of metal-free dentistry as zirconia implants do.
Zirconia implants are considered inert (they do not release ions) during pH variations in the oral cavity and thus do not corrode. From a biological viewpoint, zirconia has demonstrated a low affinity for bacterial plaque [6], minimal inflammatory infiltration and good soft-tissue integration [7,8].

Swiss Dental Solutions (SDS) zirconia implants are tissue-level implants with integrated posts (suitable for the anterior, canine and premolar regions) or sub-sequentially cemented posts (suitable for the posterior regions). The system allows for the drilling and insertion of implants without compressing the cortical or crestal bone. They achieve stability and allow sufficient blood and cell perfusion for osseointegration without signs of scarring or fibrosis. Gaps between the flap margins or between the bone and implant can be filled with platelet-rich fibrin matrices (A-PRFs) [9].

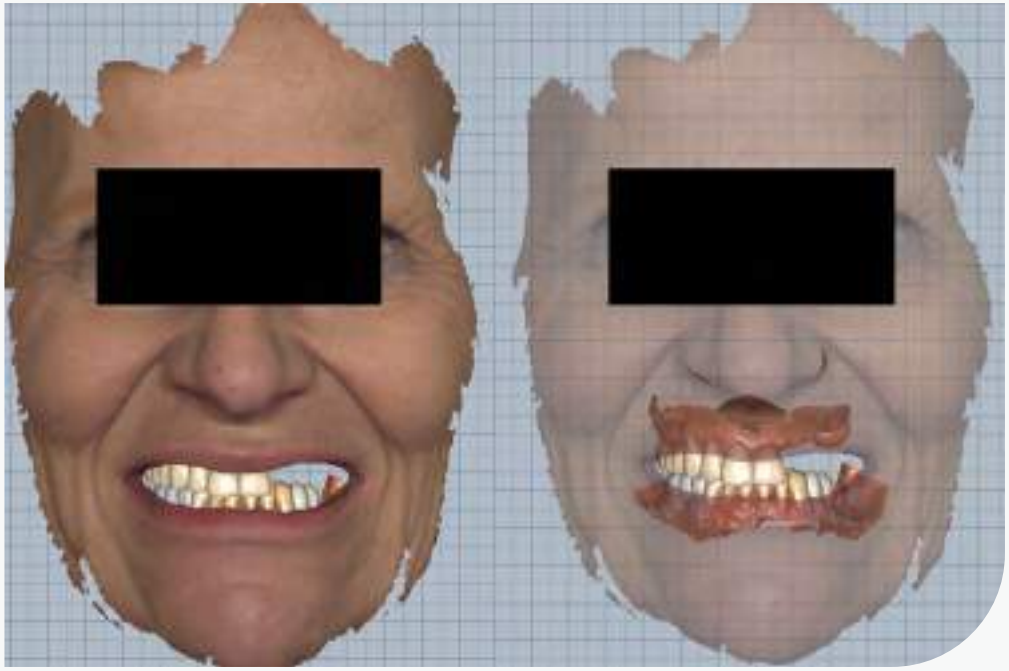

FIG. 1A-C *Initial situation: (A) Tooth loss and periapical lesions in teeth 16 and 46; (B) Clinical appearance and non-fitting prosthesis; (C) 3D Facial Scan (Face Hunter, Zirkonzahn GmbH) and profile of the remaining soft tissues.*

SDS zirconia implants have a favourable emergence profile, with a coronal shape that mimics the shape of a natural tooth and supports the soft tissue, preventing marginal flap collapse. Moreover, zirconia–epithelial–gingival attachment occurs during healing [7].

The use of zirconia implants and guided implantation systems reduces the number of dental visits and improves the predictability of treatment. Therefore, patients may return to their daily activities within a few days and have greater confidence in the success of their treatment, and their medical costs can be significantly reduced.

CLINICAL CASE

A 66-year-old woman presented to the Swiss Biohealth Clinic in Switzerland with numerous missing teeth and chewing difficulties. She had been wearing an unstable prosthesis for 12 years, which accumulated food debris. During anamnesis, she reported a hypersensitivity response to metal caused by a titanium implant in the second quadrant, explanted one year ago (Fig. 1 A, B, C).

She also reported headaches, a lack of smell and taste, sleeping difficulties, low back pain and shoulder tension.

After a cone-beam computed tomography (CBCT) examination (CBCT Orthophos, Sirona), we decided to extract teeth 16 and 46, which were associated with periapical lesions. Immediate implantation of the SDS zirconia implants was then performed. The missing tooth regions corresponding to teeth 14, 17, 22, 23, 24, 26, 27, 36, 37, 45 and 47 also received SDS zirconia implants. In addition, we recommended augmentation with artificial bone (TCP, Dentoss DEMEDI-DENT; 16, 46) and Allodyn (MEGAGEN CH) in the second quadrant after the external maxillary sinus lift was covered with a collagen membrane (Biocollagen, Bioteck). A-PRFs were used in all implant beds. All implants were tested for stability using the AnyCheck tool (Neo Biotech). Values greater than 65 on the Implant Stability Test (IST) scale were considered optimal (Table 1).

Digital information was acquired, including facial scans (Face Hunter, Zirkonzahn GmbH), intraoral scans (IOS Primescan, Dentsply Sirona) and digital recordings of jaw movement (Zebris Medical GmbH).

	Implant Position	SDS Implants Category*	Diameter/Length (mm)	Bone Augmentation**	AnyCheck/ IST Scale (First Stability)
Immediate Implantation	16	SDS2.2	4.6/14	Dentoss TCP (DEMEDI-DENT) 0.1- 0.5mm i-PRF, A-PRF	72
	46	SDS2.2	4.6/11	Dentoss TCP (DEMEDI-DENT) 0.1-0.5mm i-PRF, A-PRF	76
Late Implantation	14	SDS1.2	3.8/14	A-PRF	74
	17	SDS2.2	4.6/11	A-PRF	67
	22	SDS1.2	3.8/14	A-PRF	82
	23	SDS1.2	3.8/14	A-PRF	73
	24	SDS1.2	3.8/14	A-PRF	74
	26	SDS2.2	3.8/11	External Sinus Lift: Allodyn 2 ccm (MEGAGEN CH) i-PRF, A-PRF Collagen Membrane Biocollagen (Bioteck)	70
	27	SDS2.2	4.6/11	External Sinus Lift: Allodyn 2 ccm (MEGAGEN CH) i-PRF, A-PRF Collagen Membrane Biocollagen (Bioteck)	68
	36	SDS2.2	4.6/11	A-PRF	76
	37	SDS2.2	4.6/11	A-PRF	78
	45	SDS1.2	3.8/11	A-PRF	80
	47	SDS2.2	4.6/11	A-PRF	79

*SDS1.2 zirconia implant with integrated post; SDS2.2 zirconia implant with subsequent cemented post. **A-PRF, platelet-rich fibrin matrices; i-PRF, injectable platelet-rich fibrin.

TABLE 1 *Swiss Dental Solution (SDS) zirconia implants and surgical procedures.*

FIG. 2A-F *Creation of the virtual 3D smile design and implantation plan: (A-C) Virtually recorded jaw movements, virtual wax-up, IOSs, and facial scans combined by overlay; (D-F) These show the planning of the implants from the position of the definitive crowns.*

A digital 3D virtual design of the patient's smile was prepared based on the aesthetic parameters and proportions (exocad GmbH). By overlaying the digital data, an accurate 3D virtual smile design corresponding to the segmentation of the IOS and CBCT data (SMOP, Swissmeda AG) was obtained. Digital imaging and communication in dentistry (DICOM) and stereolithography (STL) segmentation were integrated into the planning software to visualise tooth extraction and alveolar analysis, providing better surgical procedures. Implantation planning was initiated. The data were then uploaded (2-Ingis DigitellV4), and the surgical guides were printed in the SDS prosthodontic laboratory.

Eight implants were planned for the upper arch, and five were planned for the lower arch for stable rehabilitation of the mandible in an aesthetically and functionally oriented position, guided by the 3D virtual smile design. The natural teeth and palate were planned as supports for the lower and upper guides.

FIG. 3A-D *Surgical guides and provisional: (A) First quadrant guide design; (B) The third quadrant guide design; (C) The 3D-printed model and the metal-free provisional; (D) Surgical guides printed in resin.*

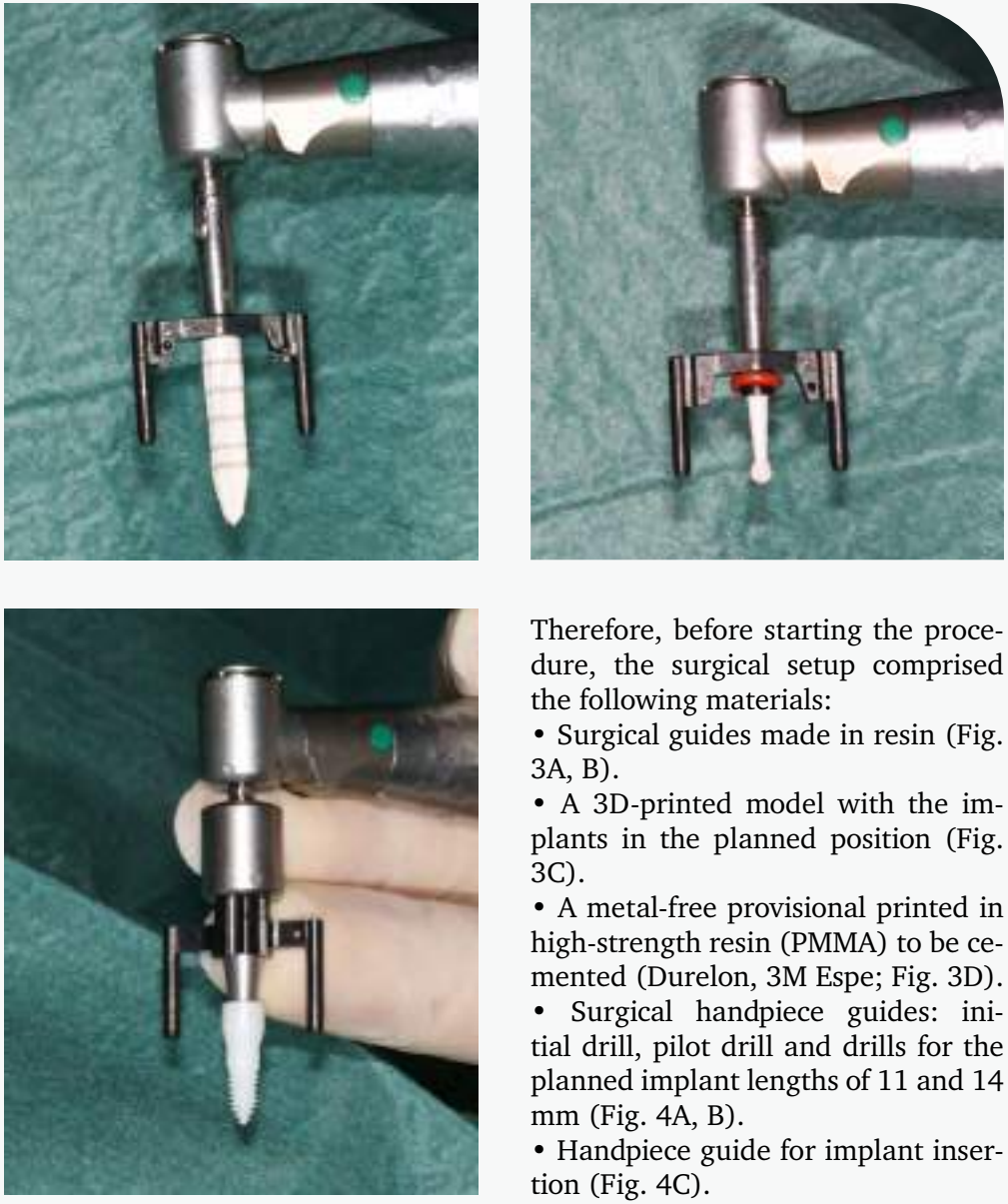

FIG. 4 *Surgical handpiece guides for drilling and implant insertion.*

Therefore, before starting the procedure, the surgical setup comprised the following materials:

- Surgical guides made in resin (Fig. 3A, B).
- A 3D-printed model with the implants in the planned position (Fig. 3C).
- A metal-free provisional printed in high-strength resin (PMMA) to be cemented (Durelon, 3M Espe; Fig. 3D).
- Surgical handpiece guides: initial drill, pilot drill and drills for the planned implant lengths of 11 and 14 mm (Fig. 4A, B).
- Handpiece guide for implant insertion (Fig. 4C).

“An advantage of SDS zirconia implants is that they can be prepared using diamond drills under irrigation”

The surgical procedures in the upper and lower jaws were performed in a guided manner using high-precision and stable 3D-printed guides (Fig. 5A). The guides allowed for visualisation and abundant irrigation of the implant site (Fig. 5B, C). Surgery and implant insertion were performed using the guides, which were removed only for the placement of bone graft materials (Fig. 6).

An advantage of SDS zirconia implants is that they can be prepared using diamond drills under irrigation (up to 30 degrees). In implants with integrated posts, small angulation differences can be corrected to ensure a passive fit of the provisional. Regarding the patient, despite the loss of the vertical dimensions and vestibularisation of the lower arch, the final position of the implants pre-

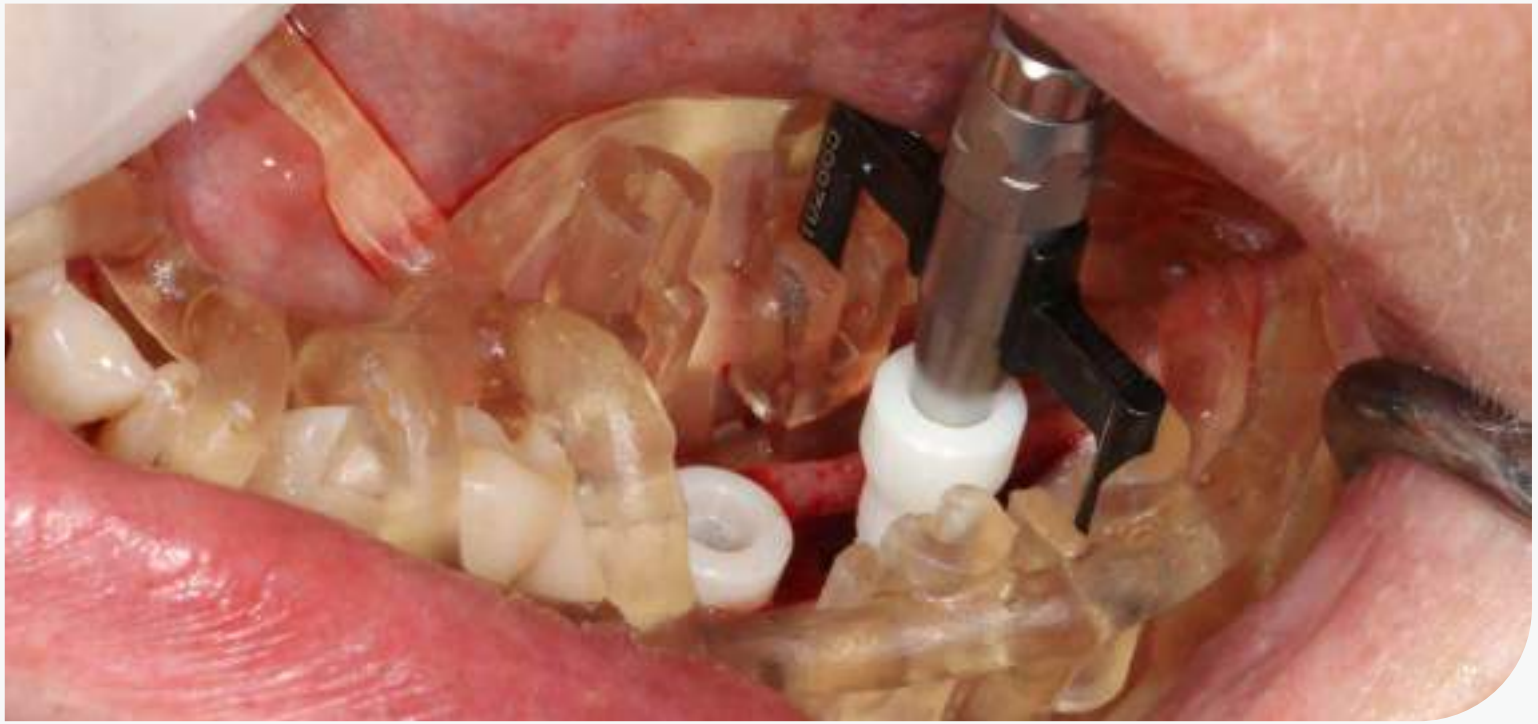

FIG. 5A-C *The guided surgical phase.*

cisely matched that of the 3D-printed model. However, the challenge of achieving a well-adapted passive-fit provisional was encountered.

As planned, implants that were loaded immediately achieved first stability with a torque of 35 Ncm and supported the cemented provisional prosthesis in both the upper (15–25) and lower arches (34, 35, 44, 45). The patient received the high-precision passive-fit provisional on the same day. Using this procedure involved a purely digital workflow, and the provisional was perfectly positioned; therefore, no post-insertion work was required. Still, because of the coronal shape of the SDS implants and their insertion at the tissue level, the soft-tissue support was predictable. An elegant provisional was obtained, which adapted perfectly to the gingival situation. Over time, we considered that this support would be a determinant for the proper healing of the tissues and maintenance of the keratinised gingiva, reducing the risk of gingival recession (Figs 7, 8).

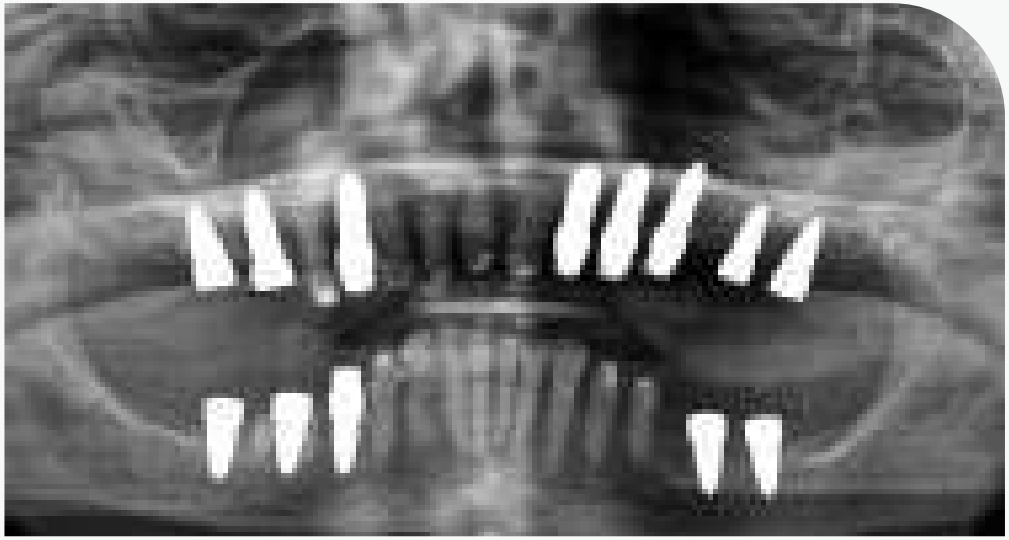

FIG. 6A-C *Implant insertion: (A) Preparation of the implant bed; (B) The implants were inserted with the guides in position; (C) Bone augmentation after external sinus lift performed in the second quadrant.*

FIG. 7A, B *Immediate loading of the SDS implants: (A) The orthopantomography showed the final position of the implant placement; (B) 24 h after surgery: the elegant and precise provisional adapted to the gingival situation and the coronal shape of the SDS implants at the tissue level.*

Further preparation of SDS zirconia implants with subsequent cemented posts (16, 17, 26, 27, 36, 37, 46, 47) will occur. Definitive restorations will be placed after healing and osseointegration (four months). Using this simplified process, no scanning bodies or distortions are involved. This increases the accuracy of the definitive restorations.

SDS implants combined with an open-guided surgery system allow for precisely centred implant placement. Digital workflows and this protocol were effective for immediate and delayed implantations. Extreme bone atrophy, which requires 3D reconstruction, did not hinder a fully digital workflow using SDS implants. Consequently, digitisation with SDS implants provided faster and more accurate procedures at a lower cost. A provisional in perfect alignment with the implant position was also provided to the patient on that same day. Soft-tissue health and osseointegration were promoted by limiting risk factors such as occlusal overload.

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FIG. 8A, B *Overview of the initial and final cases: (A) Initial situation and inadequate aesthetic and functional prosthesis; (B) Happy patient. Maintenance included professional cleaning every 3 months, minimum plasma level of vitamin D3 (40 ng/dl), and occlusion control once a year.*


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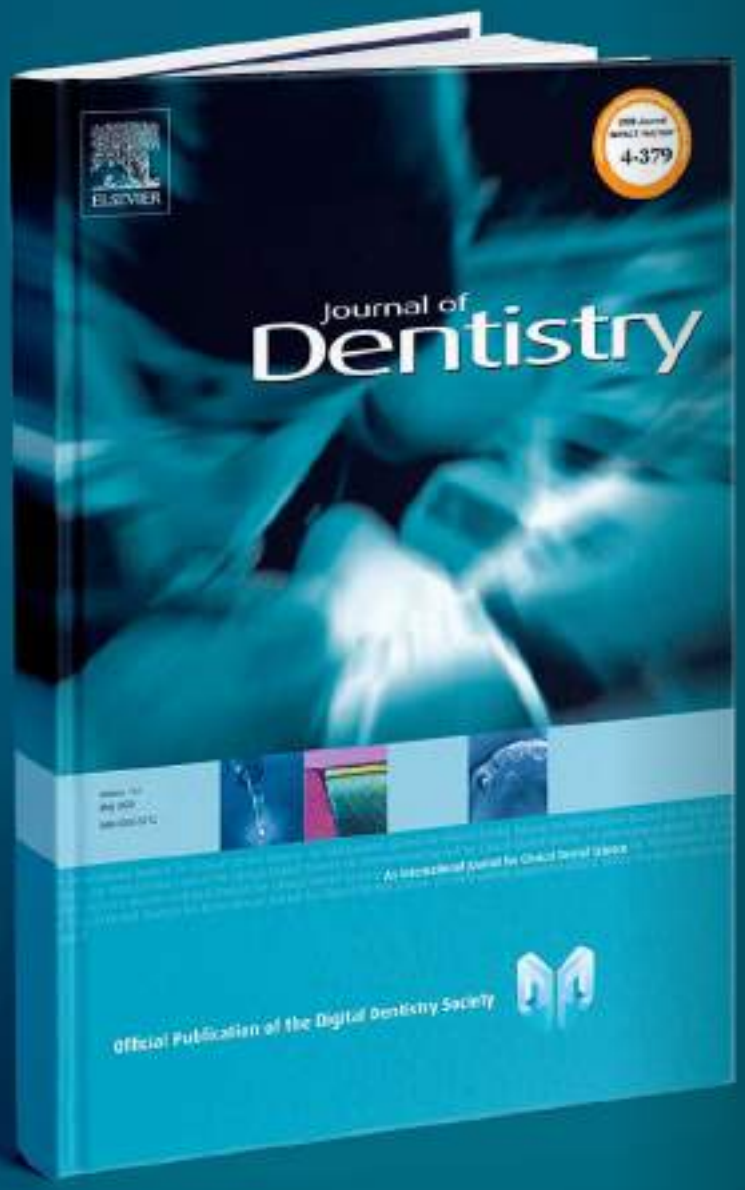

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Dr. Karl Ulrich **Volz**

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Interview with Dr. Ulrich Volz, the dentist and innovator who paved the way for the clinical use of *zirconia* implants

DDS MAG INTERVIEWS dentist and innovator Dr Ulrich Volz. He was among the first in the world, many years ago, to pave the way for the clinical use of zirconia implants. Today, Ulrich is the owner of Swiss Dental Solutions (SDS) and has placed close to 30,000 zirconia implants in the past 24 yearss.

Ulrich, how and when did the idea of using zirconia to manufacture dental implants come about? Can you tell us your story, your journey, the challenges you had to face?
Sensitised by my doctoral thesis on the dangers of amalgam, I was one of the first dentists to work with the Cerec system and one of the first to use zirconium oxide crowns and bridges. Towards the end of the last millennium, more and more of my patients asked for metal-free implants as an alternative to the common titanium implants. Luck was on my side since the owner of a large and well-known zirconium oxide medical device company was a patient with me and also wanted to benefit from a metal-free alternative. At the beginning of 2000, the ethics committee of the University of Tübingen approved a study of 300 implants so that by the time the first ones were approved in 2004, I was already able to place a few hundred.
Building up an implant company without external funds and without the influence of investors was only possible because, in addition to developing the SDS company, I placed up to 2,500 implants per year in my practices and clinics myself and thus, as my best customer, I had the necessary financial resources provided in-house.

What were and what are today the greatest difficulties that you had to face personally and as a group to be able to convince the world of research, universities and clinicians worldwide of the validity of this choice?
Initially, I noticed a great deal of interest in ceramic implants, since several hundred surgeons had been waiting for this product. As early adopters,

FIG. 1 *Zirconia implants.*

they were immediately and highly motivated to enter my system.
Despite strong scepticism and prejudice from the mainstream, usually due to a lack of knowledge, we have grown steadily between 15% and 50% per year since 2006.

"Around 90% of patients would now choose a metal-free white implant if given the opportunity"

Can you summarise in a few concepts the reasons why a dentist today should switch from using titanium implants to zirconia implants? What are the main advantages of the all-ceramic implant?
First of all, the main reason for surgeons to switch to ceramics today is that around 90% of patients would now choose a metal-free white implant if given the opportunity.
Furthermore, the peri-implantitis problem is an increasing reason for many dentists to switch to ceramics, since this material, which belongs to the group of bio-materials, has serious advantages here.
The change is becoming easier and easier because the data for ceramic implants are becoming more and more reliable, and all guidelines in Europe and the USA are very positive for this metal-free alternative, even including a full recommendation.
Last but not least, the ceramic implant from SDS can show significantly higher stability compared to titanium. With over 300,000 implants sold so far, it has shown an excellent success rate, above all with regard to long-term results and positive gingival behaviour.
In particular, the possibilities of immediate implantation with immediate temporisation have generated many fans for this fantastic biomaterial.

Today, Swiss Dental Solutions is the world leader in the production and marketing of zirconia implants. How many fixtures do you sell and in which countries? What are your main goals for the future as a dental company?
We will sell around 50,000 implants this year, with a focus on Europe and the USA.
In the coming years, we will provide further approvals in countries with an affinity for ceramics with our now 100-strong team to be able to grow not only in depth but also in breadth.
Superimposed on this business case of constant organic growth, we are preparing for a second business case. With at least partial replacement of titanium as an implant material, this will bring exponential growth of 100% or more per year and confront us with major challenges. We expect this exponential business case for 2025 and are preparing for it by expanding our production capacities to many hundreds of thousands of implants per year.

Furthermore, we operate a constant and intensive stock increase and think hard about how we will provide the necessary financial and human resources.

FIG. 2 *Swiss Dental Solutions: training room with screens and a platform for speakers.*

I had the opportunity to visit your headquarters in Kreuzlingen, and I must say that your centre is a real jewel of technology, but well-rooted in Swiss traditions and culture. Every detail is taken care of at its best and conveys serenity and professionalism. It is also evident that you pay particular attention to education: you have a very technologically equipped training centre. How important is education to be able to successfully face an important transition, such as from traditional implantology to ceramic materials? How long is the learning curve?

As early as 2004, I postulated that ceramic Implants are simpler but different, and this still applies today!

With ceramic as an implant material, there are a few things to consider to be as successful as with titanium implants. For example, we have developed a biological drilling protocol that prepares differently depending on the bone classes and thus prevents the bone from being overheated when screwed in because ceramics, as a poor thermal conductor, cannot transfer the frictional heat to the core. On the other hand, with ceramic implants, you can lean much farther out of the window because they belong to the bio-materials: they heal inertly and do not activate tissue macrophages.

The learning curve when switching to SDS ceramic implants is very steep because as a surgeon I have designed an extremely reliable thread and developed simple and clear algorithms for use in all conceivable cases, which are taught in our education centre.

How is Swiss Dental Solutions facing the digital revolution underway in the dental world?

SDS is a very young and very modern company so we have implemented and promoted digitisation from the very beginning.

We provide a fully digital workflow and have designed a fully guided navigation system called SDSBOX. We are the first and only company to receive CleanImplant accreditation for it.

Next to the Swiss Dental Solutions headquarters, and together with your state-of-the-art dental centre, you have created the Swiss Biohealth Clinic. What are the purposes of this project? What are the benefits for the patient? Can you explain the philosophy behind the project?

In our Swiss Biohealth Clinic, we have combined dentistry with medicine in a unique way. Through our medical doctors, we expand our options and ensure the success of our dental therapy. This gives us the ability to perform larger and more risky surgeries with up to 10 hours of general anaesthesia.

FIG. 3 *Swiss Biohealth Clinic: reception.*

Because the patients live with us as inpatients and are provided with healthy, vegan, gluten-free and sugar-free food from our restaurant, we reduce their stress and provide a diet conducive to healing.

The overarching goal of this clinic is, on the one hand, that my surgeons and I would like to place a large number of implants to expand our experience. We also use this for training and have several hundred dentists shadowing with us every year. And, of course, we carry out many studies and developments in-house.

We thank Dr Ulrich Volz for taking the time to speak with DDS MAG. I am very happy that DDS can collaborate with Swiss Dental Solutions, and I personally can't wait to place my first zirconia implant!

Thank you for your visit – it was a great honour to welcome you. My team and I are very happy about the promising collaboration and look forward to your feedback on our implants!

Interview

Prof. Fernando **Zarone**

Full professor of Prosthodontics and Dental Materials/Lab Technologies, head of the ward of Prosthodontics at the Dept. of Neurosciences, Reproductive and Odontostomatological Sciences at the University "Federico II" of Naples & director of SUDD (Scientific Unit of Digital Dentistry)
His academic activity is accomplished in the Degree programs in Dentistry, Oral Hygiene, various Post-graduate, Master, PhD courses and in Continuing Education programs.
He is an active member of various scientific societies, founding member of SIPRO (Italian Society of Prosthodontics and Oral Rehabilitation) and member of the Scientific Committee & Italian Ambassador of the Digital Dentistry Society.
Author of relevant scientific publications, contributes as editor & reviewer to prestigious international scientific journals.

FALKO: discovering real-time, 3D digital *visualization* systems with Professor Fernando Zarone

FOR MANY YEARS, in his practice, Fernando Zarone has been using various advanced digital visualisation systems (3D visors for augmented and mixed reality and head-mounted visual displays) for both operative and didactic purposes. In this interview, we asked him some questions about these innovative systems

Prof. Zarone, how can these displays find proper utilisation in dentistry?
In my team, we have been using two different kinds of visors for some years with satisfaction and increasing enthusiasm, with different finalities. One typology is aimed at managing and displaying real-time video information incoming from medical imaging devices, such as surgical lamps with built-in cameras, stereomicroscopes, dynamic navigation systems in implant surgery, intraoral scanners and cameras, multi-parameter monitors, ultrasound scanners and many other medical instruments. I am talking about the FALKO system, using a very versatile visor.

What is FALKO aimed at?
It is an innovative head-mounted display installed on a dentist's headset, provided with a flip-up system. It was studied and designed by Tecnomed Italia for the medical practice, defining an innovative approach to real-time visualisation and offering quality and safety of medical procedures. FALKO is an open system, supporting a wireless transmission and reception of HDMI video signal HD uncompressed. No IP setting is required, and no internet network is needed, so it works autonomously. Its main feature is that it can switch between two connected video sources or show both of them simultaneously in a picture-in-picture (PIP) window or side-by-side arrangement.

How do you use FALKO in your practice?
Having two simultaneously available video sources inside an immersive video device can be a must in many different situations. For example, we can have simultaneously displayed, side-by-side, both the intraoral scanner (or the implant dynamic navigation system) PC view and at the same time the patient's mouth as framed by an extraoral camera, with the high ergonomic advantage of not looking away from the operative site. Or we can get the x-ray view as PIP during a surgical intervention. But what I find to be particularly interesting is the function of telecooperation, which means sharing the visor's view operating in real time with colleagues, assistants or students. Moreover, FALKO can be provided with an optional microcamera named OKKIO mounted onto the visor; with it, it is possible to share the main operator's POV with up to 300 people for distance teaching, telementoring or training. Finally, with an accessory

FIG. 1 *FALKO medical system.*

FIG. 2 *FALKO in daily practice.*

called FALKONNECT, a second visor worn by another staff member, like an assistant, can be connected, adding another POV of the surgical field with the active PIP function.

So, it is possible to have multiple viewing angles of the operative field.
Yes, the assistant wearing the second visor can see what the first operator sees from their perspective, in addition to their own POV of the surgical field. In turn, the lead operator can see what the assistant surgeon sees from the assistant's perspective. With such a dual configuration, a more ergonomic working setup and four-hand action are achieved.
Today, I use the FALKO system both in my university ward, with Prof. Roberto Sorrentino and all my team, and in my digitally updated dental office.

Is this system easy to use?
The FALKO system is provided with a precise ergonomic intra-pupil and dioptic setting to ensure the best visual and postural comfort. At the same time, a direct downward vision without obstacles is also allowed.
This possibility also eases and shortens the learning curve that, as for every new device, naturally is to be faced. In my opinion, this unit can be fruitfully employed in different fields like dentistry, maxillofacial surgery, aesthetic microsurgery, and many diagnostic and clinical applications in medicine.

“The exciting and innovative world of 3D holographic approach to distance teaching means an important step forward in the internationalisation of our schools”

And the other visor typology?
I am talking about the exciting and innovative world of a 3D holographic approach to distance teaching, which means an important step forward in the internationalisation of our schools. Thanks to the precious collaboration of FIFTHINGENIUM, a group of talented engineers, we have recently experienced an innovative, exciting teaching system, based on the use of mixed reality. Fully holographic 3D representations of teeth, prostheses, implants, bone components and whatever else can be implemented in a new method of learning, discussing clinical cases and sharing treatment plans with colleagues at a distance. The system is based on an innovative learning platform introducing the thrilling concept of the augmented classroom, thanks to the use of 3D holographic lenses. Studying and manipulating the same 3D objects in real time can be accomplished by teachers, students and operators from around the world, in an immersive and interactive experience that in our lessons has had a terrific impact on our students’ appreciation.

FIG. 3, 4 *Moments captured during an experience in collaboration wirh FIFTHINGENIUM, an Italy-based tech company. Prof. Zarone and his team tried an innovative teaching system, based on mixed reality.*

Interview

Akira **Schüttler**

As Global Head of System Integration, Akira Schüttler is leading exocad's System Integration team since 2015. He is responsible for hardware and software integration projects with exocad technology partners in the areas of dental materials, implants, components for implant prosthetic solutions, implantological instruments, tooth models, 3D printers, scanners, milling machines and more. His team forms the interface between exocad technology partners who supply hardware, production systems and components, and the other exocad departments. Additionally, Akira Schüttler is active in R&D development projects as a project manager and oversees the adjustments to the graphical user interface for resellers. What he particularly enjoys about his work: "I am always in contact with our strategic partners, resellers and users. They have very different requests and many innovative ideas – and that is very exciting."

exocad *comprehensive* implant libraries in exoplan 3.1 Rijeka: more than 14,000 implants from 130+ manufacturers *worldwide*

exocad has achieved a new milestone when it comes to product integration: in the exoplan 3.1 Rijeka* implant libraries, users can now find more than 14,000 implants from over 130 manufacturers worldwide.
exoplan's Guide Creator module for the in-house design of drill guides now offers over 4,000 surgical components.

Moreover, the comprehensive libraries contain more validated information that enables exoplan users to benefit from a seamless digital workflow.

Akira Schüttler, Global Head of System Integration at exocad, explains the details.

How comprehensive is the implant library for exoplan?
With exoplan, we currently support more than 800** implant systems with over 14,000** implants from more than 130** implant manufacturers worldwide.

This means that exocad offers a leading selection of implant systems that are available for implant planning all around the world. An implant system can be incorporated regardless of the treatment planning location, even when the system is not sold locally.

That enables implantology teams made up of dentists, dental technicians and surgeons to work together on a case regardless of their physical location – even if they are in different countries or continents.

What kind of information do exoplan users have access to regarding the 14,000+ implants?
Our goal is to include all information from the official manufacturer documentation in the libraries where possible. Numerous parameters are stored for every implant, ranging from the manufacturer's article number and website, through the interface and platform type, all the way up to the manufacturer-dependent features of each specific implant. If an implant system is available with two different surfaces, for example, both implant types are listed.

We validate this information to offer exoplan users a seamless workflow with all the freedom of an open system.

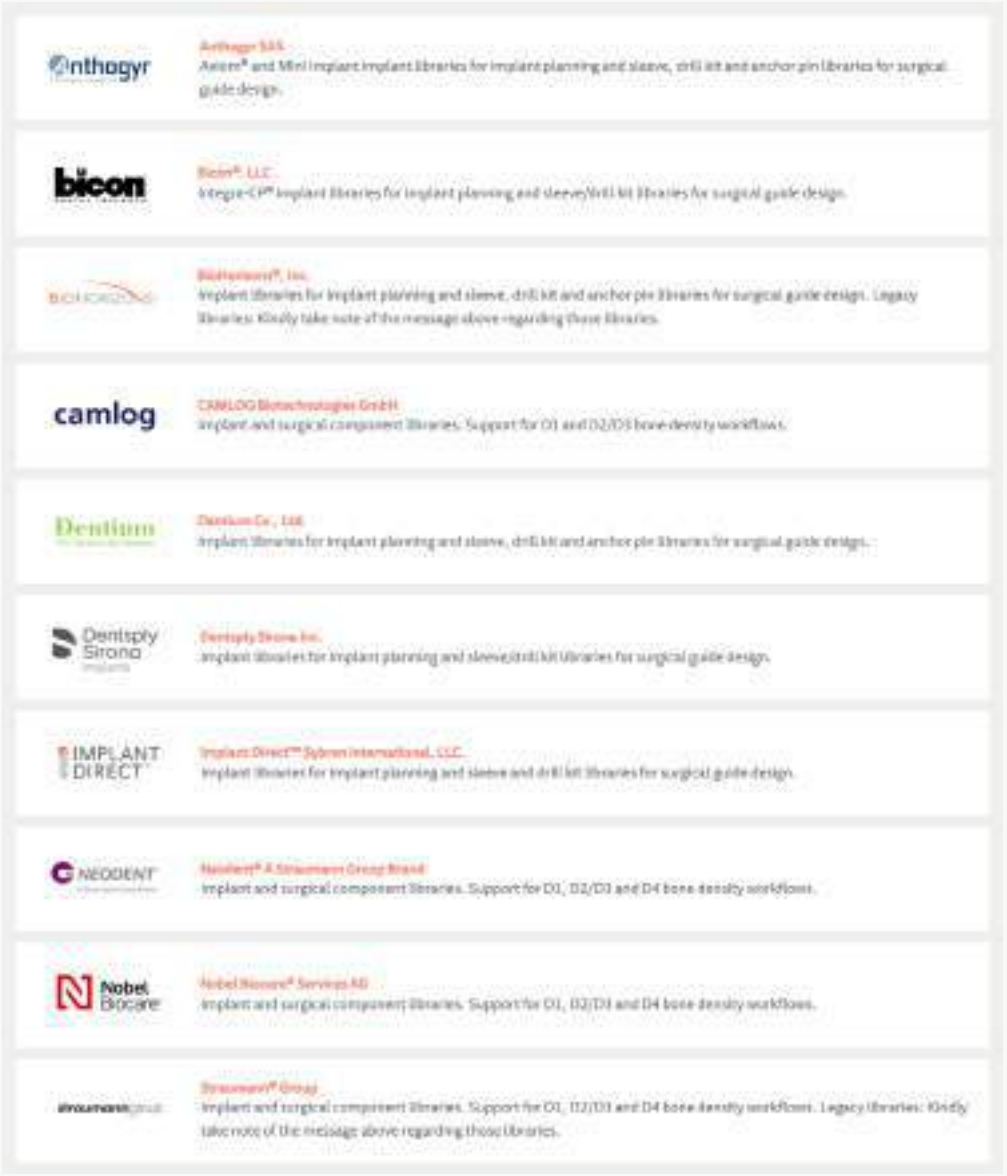


FIG. 1 *The exoplan implant planning software from exocad currently supports more than 800** implant systems containing more than 14,000** implants from 130+** implant manufacturers worldwide. (** dynamic number subject to change on a daily basis)*

"exocad offers a leading selection of implant systems that are available for implant planning all around the world"

For Guide Creator, the software module for designing surgical guides, there are further comprehensive library types for drill kits, sleeves, anchor pins and drill workflow protocols. Here, the goal is also to support many different options.

The workflows specified by the implant manufacturers, from guided pilot drilling to the fully guided insertion of implants, are available for different bone densities. Innovative, manufacturer-specific solutions, such as multi-guide or sleeveless workflows, are also included. In Guide Creator, users can select the drill protocol, while taking the bone density into account, and they have access to more than 4,000 validated surgical components. For selected surgical procedures, we even provide full drill sequence information from site preparation to implant insertion.

The outcome is a concise, user-friendly, single-page overview of the entire surgical drill sequence, generated automatically. This overview is specifically crafted to provide additional assistance to the implantologist during the actual surgical procedure.

How are users guided through these complex libraries?

The new release also provides implant, sleeve, prosthetic component and anchor pin placements combined into one step. The wizard workflow guides users through the selection process step by step. The software automatically suggests the drills, sleeves, drill protocols and other components to match the chosen implant, ensuring a smooth implant and compatible component selection.

“In Guide Creator, users can select the drill protocol [..] and they have access to more than 4,000 validated surgical components”

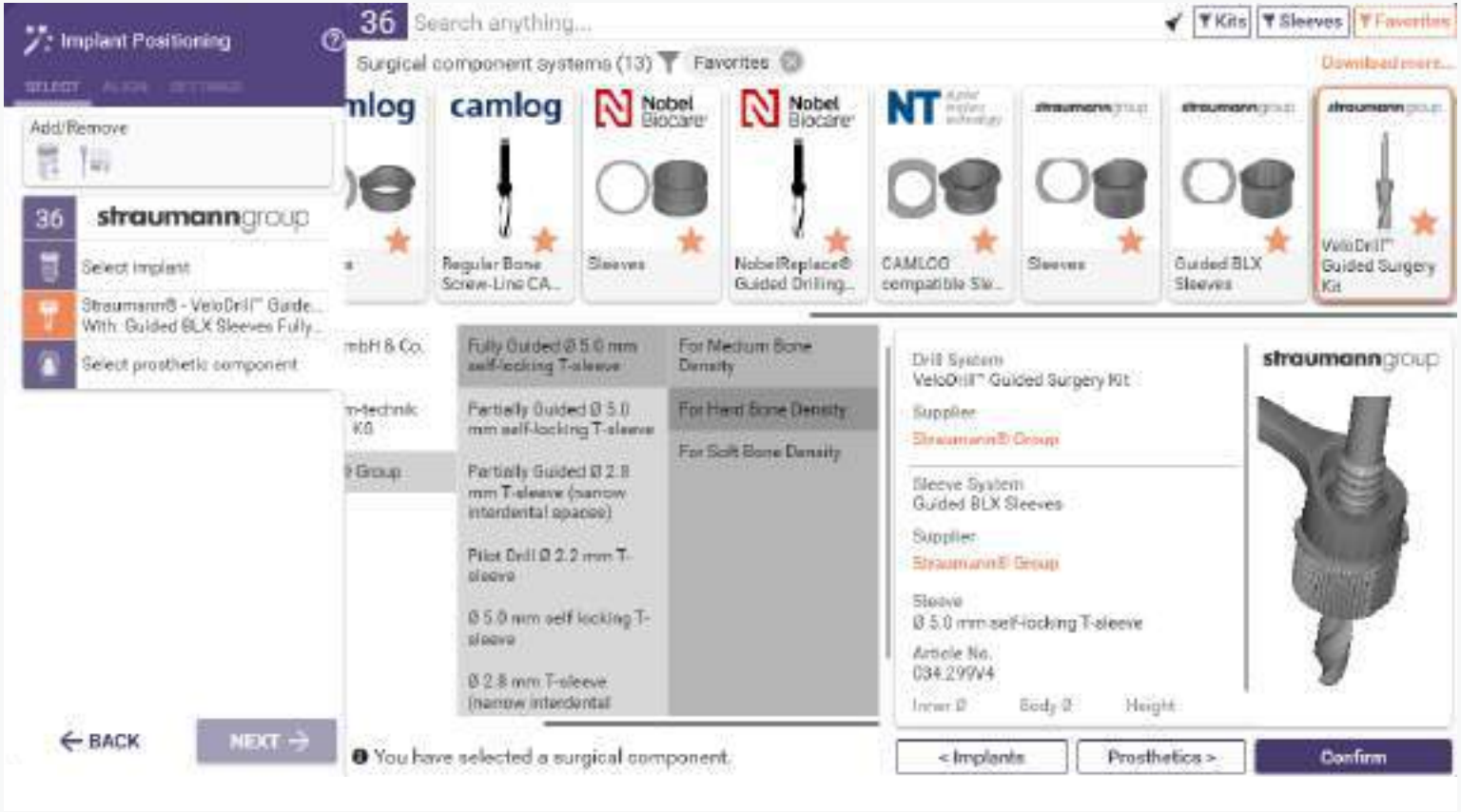


FIG. 2 *Further comprehensive libraries can be accessed via the Guide Creator module for designing surgical guides. These contain the workflows, sleeves, drill keys and drills specified by the implant manufacturers, as well as manufacturer-specific parameters. This allows users to select the drill protocol and the type of guided surgery when designing the surgical guide, for example, while taking bone density into account.*

How are the prosthetic components integrated?

Users can select and place the matching prosthetic components directly in the exoplan software, and then send the planned situation to the laboratory. Comprehensive prosthetic component libraries, including libraries from compatible third-party providers, are available in the download portal “Implant libraries for CAD” on the exocad website***. To enable the software to automatically display the matching components in each case, exocad validates prosthetic components in relation to the implant interface. The result is a seamless transition from exoplan to the DentalCAD software. Users can continue with the design of the restoration directly in DentalCAD.

NOTES

** exoplan 3.1 Rijeka is available in the EU and other selected markets.*

*** dynamic number subject to change on a daily basis*

****Complete URL: https://exoc.ad/cadlibsforplanning*

Interview

Dr. Arash **Zarrinpour**

- Doctor in Dental Surgery
- Master of Biological and Medical Sciences
- Postgraduate Certificate in Biomaterials
- Postgraduate Certificate in Fixed Prosthetics
- PhD in Biology and Biomaterials of the oral and bone environment
- Centre for Orthodontic treatment studies
- Postgraduate in clinical advance orthodontics (NY University)

Exclusive digital workflow integration in Smilers Expert global *treatment* planning

How does Smilers® integrates digital workflows?

Smilers® Expert has a very clear goal of making it simple and efficient for everyone.

You upload oral scans STL files from any scanners brand, CBCT DICOM files, jaw tracker data, and photos or face scans on a web-based portal called LaGalaxy.

From there Smilers® and Biotech Dental teams will integrate and overlaid all the records to your patient files and make them available for any kind of planning regarding your prescriptions. Very easy and convenient.

They have a top-notch team of orthodontist experts that take care of the setups and do treatment plans for all the cases.

What makes Smilers® different from other aligners brands?

Well, one of the main differences between Smilers® and other aligners brands is that Smilers® is part of the Biotech Dental Group which offers not only orthodontic solutions but also other dentistry solutions such as surgery, implants, prosthetics, smile designs and more. As a result, the treatment planning made by Smilers® team integrates a complete multidisciplinary solution. So, the practitioner becomes some kind of project architect, simulating the whole treatment plan. This is much better for the patients who don't need to consult several different doctors, different specialists using many different brands and systems, which is often confusing and time consuming.

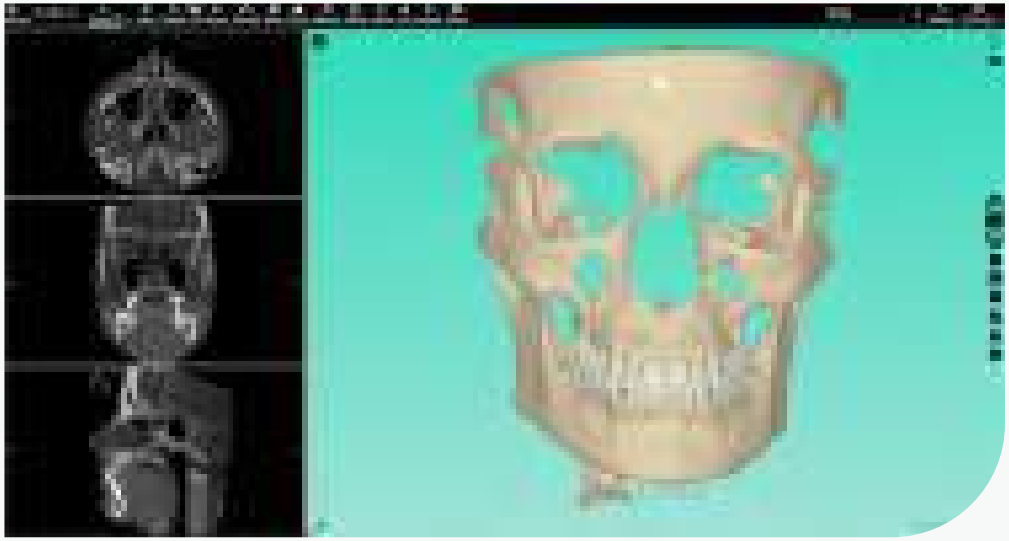


FIG. 1 *Smilers® Expert: Integration of CBCT.*

What are the advantages of CBCT and photos superimpositions, or bone and root segmentations, on treatment plannings?

Thanks to NemoStudio software owned by Biotech Dental, Smilers® has been one of the first brands to offer CBCT, STL and photo superimposition for almost 5 years now. This is allowing to have root and bone segmentations which lead to a much better simulation and accuracy of teeth movements and intelligent calculations of mandibular and condylar positioning.

The result is a better predictability of movements, better 3D orientation of models and plans, and a much more precise inter maxillary planning. A whole new world of possibilities for us.

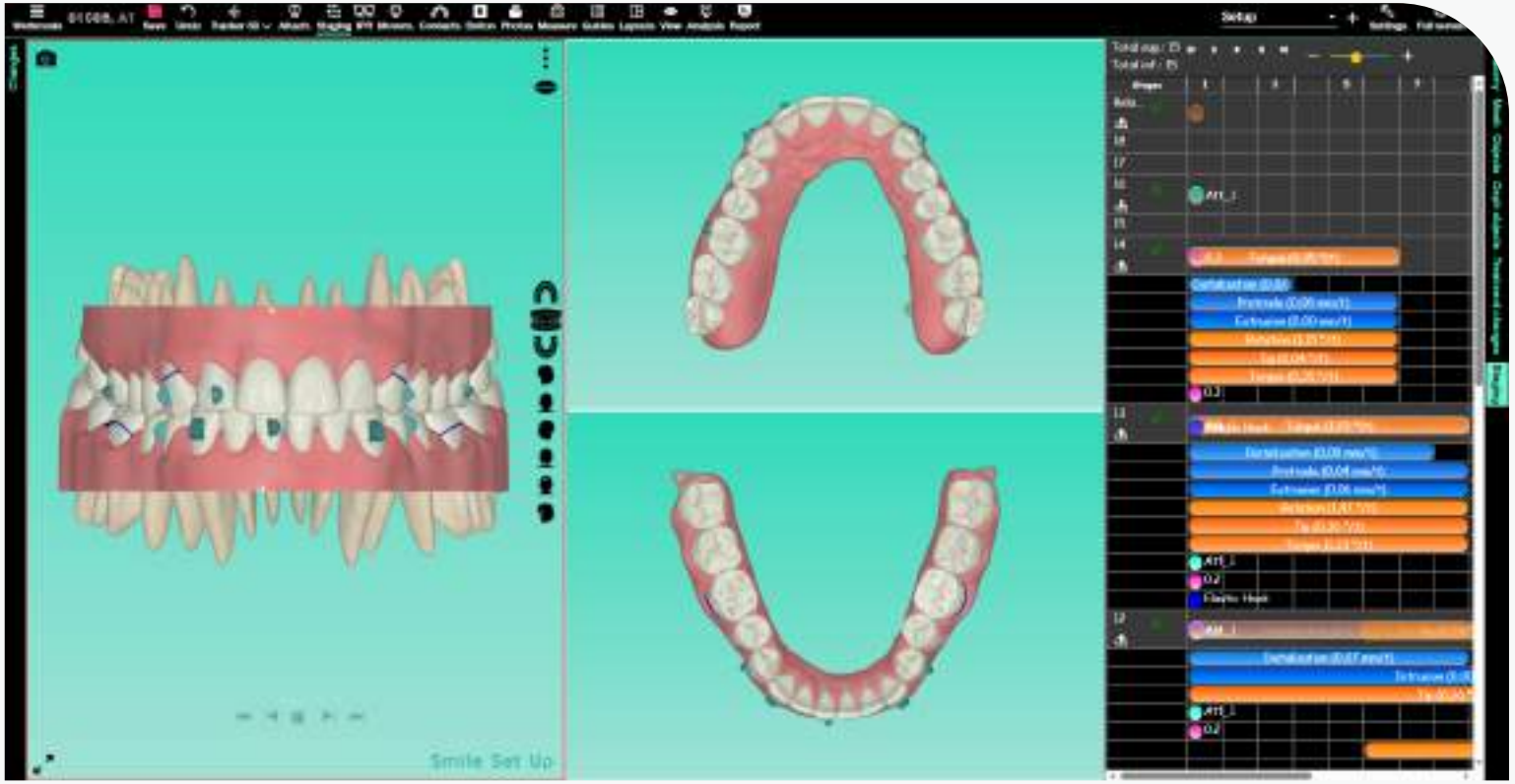


FIG. 2 *Smilers® Expert: Timeline and Root Segmentation.*

What is the Smilers® Expert's Smile Set Up software?

The Smilers® Expert Smile Set Up software is a web-based solution allowing orthodontists to check the 3D treatment plans dynamic simulations, and do any modifications needed on the patient's setups. It is a wonderful, simplified version of NemoCast free of charge for Smilers® Expert clients. Orthodontists can do the whole setup by themselves if they want, or let Smilers® Expert orthodontists prepare one for them and then if needed, modification of attachments, movements, IPR, incredible staging possibilities.

Doctors will also have access to the whole solutions offered by Smilers® through LaGalaxy and check everything with the Smile Set Up software: bone and root segmentations, mini screw or implants positioning, smile designs and mock-ups, overlays, mandibular repositioning and more.

Dr. Zarrinpour, you have been working with Smilers® for more than 7 years, in your opinion how do you think digital technology has revolutionised the aligners market? The I have treated more than 3,000 cases with Smilers® for 7-8 years I believe, and I saw the digital technology evolving at a tremendous speed. Nowadays using oral scans, CBCT, photography software and monitoring, 3D printers is becoming common for many offices like mine. It has completely changed our way of working and serving patients. We changed our organisation, our chair time, delegate more, the prices are getting lower, competition is tougher, and patients can buy aligners over internet now, as if it was a game! The everyday challenge is very interesting, we focus on giving the best and Smilers® is truly helping us for it.

Could you share an experience in which working with Smilers® was truly useful?

I am thinking of a difficult 16-year-old girl case. She had lot of issues with her smile, missing teeth, remaining temporary teeth, TMD with clicking, opening restriction and pain: no one knew exactly what to do and so prevented from treating her. Thanks to the Smilers® experts we did a complete outcome smile simulation, including new vertical dimension, bite, orthodontics, extractions, implants, crowns, and veneers.

Then they sent us a digital 2D photo simulation of her future smile, and a 3D mockup model with a try on template that we could adapt to her teeth for motivation and validation! Then we did all the different treatment steps with a multidisciplinary team. All the element - bite, aligners, surgical guides, temporary prostheses, permanent ones - were prepared and sent by Smilers® for over 20 months or so, it was hell of a great job with a fantastic result. No other brand of my knowing is offering this kind of complete and integrated solutions.

FIG. 3A, B *(A) Before; (B) After.*

Quality Forum

DDS Certifications

Certifications

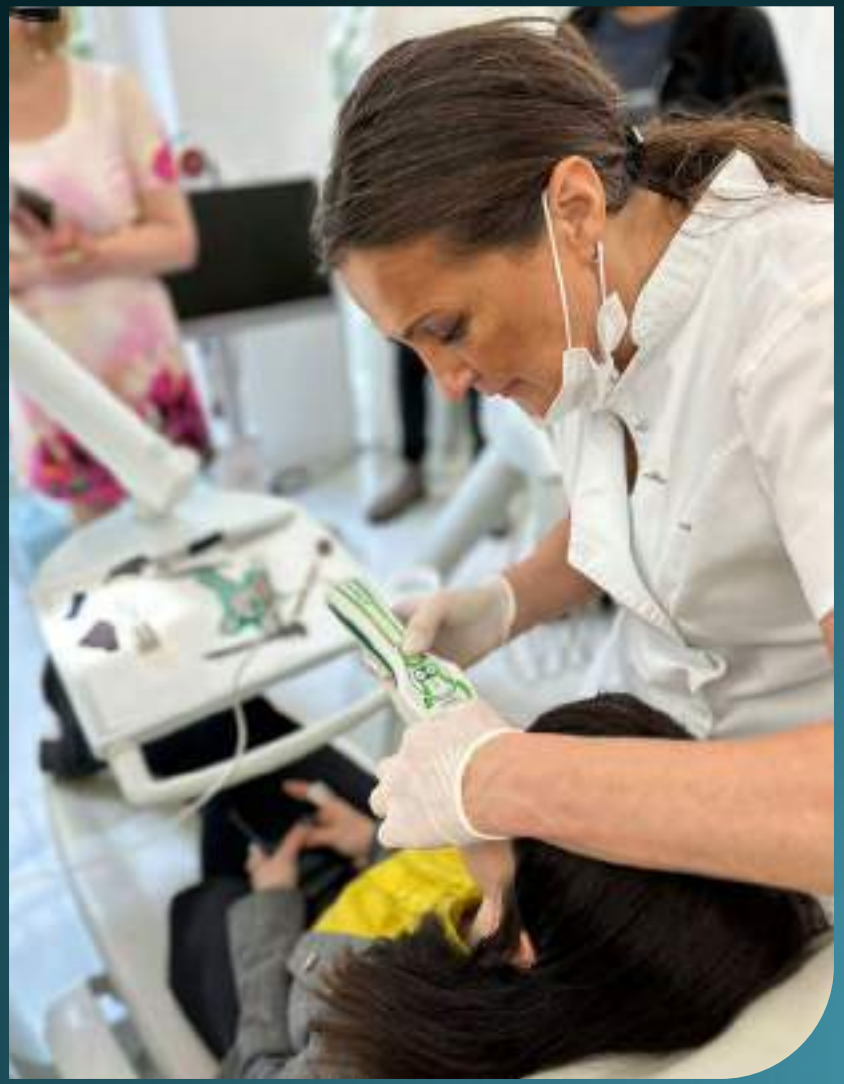
THE Digital Dentistry Society aims to promote and certify the quality of digital workflows in dentistry, and has appointed Internal Commissions for the evaluation and certification of the quality of workflows and products today available on the market.
Hence, the Digital Dentistry Society International wants to offer its Partner Companies a product validation and certification process, based on clinical and scientific evidence. More to come soon.. *stay tuned!*

Certifications

DDS *Certified* Training Centres

THE Digital Dentistry Society International promotes education in the field of Digital Dentistry all over the world, through collaborations with the most prestigious Universities and with the best Centers Specialized in clinical training. If you have an advanced Training Center and want to certify it, to enter the network of DDS Certified Centres, write here to know more about the opportunity and special conditions: *info@digital-dentistry.org*

The Digital Dentistry Society International will help you in the creation of high quality educational programs, and will promote the activities of your Center through its web and social channels.



Certifications

Become a *Certified* Digital Dentist!

DO YOU WANT to learn the best techniques from the world's leading experts in Digital Dentistry?

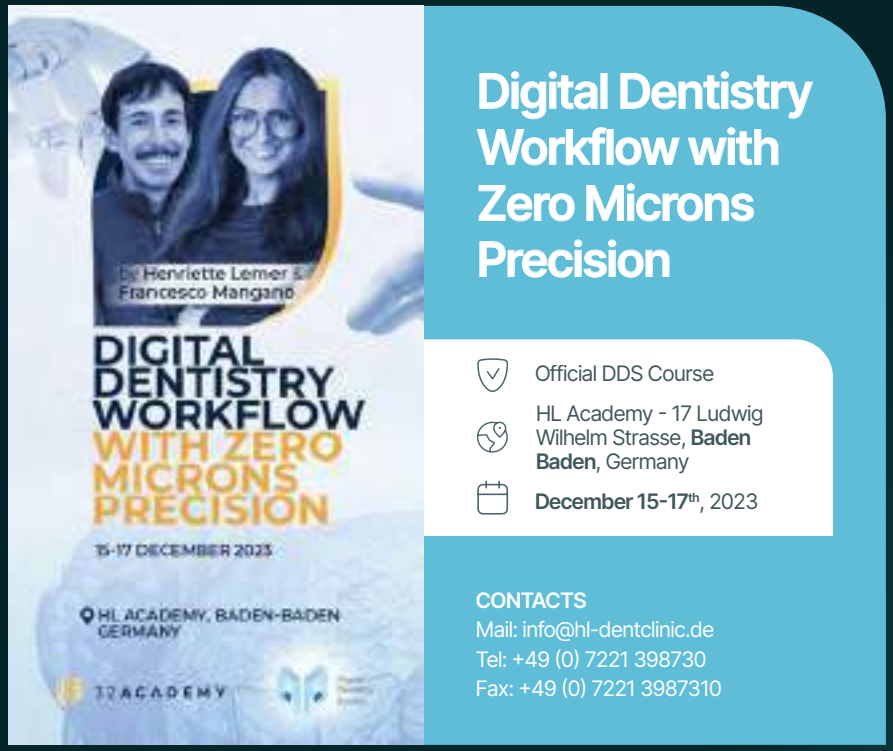
Join one of the Digital Dentistry Society International Courses in one of our **Certified Training Centers**, and become a *CERTIFIED DIGITAL DENTIST* with visibility on the DDS website and a special plate for your Dental Clinic.

More information in our website.
Please visit *www.digital-dentistry.org*

Certifications

DDS *Certified* courses

Learn the best techniques from the world's leading experts in Digital Dentistry. Join one of the Digital Dentistry Society International Courses and become a Certified Digital Dentist with visibility on the DDS website and a special plate for your Dental Clinic.



Digital Dentistry Workflow with Zero Microns Precision

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Partner News

BTK celebrates its 25th *anniversary* with the Opera Congress

BTK, a leading company in the field of dental implantology, is celebrating its 25th anniversary this year.

This important milestone will be celebrated from September 28th to 30th with the organisation of the international Opera congress, which will take place in the magnificent setting of the Procuratie Vecchie in Piazza San Marco in Venice.

The title of the congress will be *Modern Dental Surgery: From Osseointegration to the Most Complex Cases*. It will see the participation of eminent surgeons from the international dental panorama and the presence of many DDS speakers.

Among them stands out the Lectio Magistralis of Prof. Rickard Branemark, the son of the famous and iconic Per-Ingvar Branemark, inventor of dental implantology. The congress will represent a unique opportunity to deepen the most current themes of the sector and come into contact with other professionals in the field.

Btk has always made research and innovation its strengths, and this congress will be another demonstration of the company's commitment to promoting modern dental surgery, increasingly effective and low-impact for patients.

The meetings will be structured in seminars and workshops, in which topics concerning the latest surgical techniques, future developments of dental prostheses and novelties in digital solutions will be addressed.

The congress will be an opportunity for operators in the field to discuss the major themes of dental surgery and learn the most advanced techniques and methodologies.

For information and registration, visit the company's website: **www.btk.dental**

Partner News

Growing patients – Changing *expectations*: meeting the *challenge* with digital transformation

FIG. 1 *Dr. Guy Deeming.*

THE FOURTH WEBINAR of the 2023 Digital Excellence Series from Align Education took a closer look at treating children and adolescents. Dr Guy Deeming and Dr Simonetta Meuli detailed how they approach younger patients, the technology they rely on and why treating them is entirely different from treating adults.

Setting the scene for his view on the importance of a digital workflow, Dr Deeming explained that a large gap now exists between adolescents and middle-aged adults. He stressed that Generation Z (those born between 1997 and the mid-2000s) and Generation Alpha (youngsters born after 2012) are a "visual demographic", adding: "They want everything on-demand and they want it to adapt to their needs in a very dynamic fashion, and we, as orthodontists and as service providers must try to find a way to embed that visual, on-demand element into their experiences…"

"Being a digitally adept and dynamic organisation that can evolve and recognise the need to change is absolutely essential if we are going to future-proof ourselves for the needs of Generation Alpha and beyond." This includes using social media to reach younger patients, he stressed, because they look to their contemporaries on social platforms for advice and reviews.

"Half of Gen Z use YouTube to search for opinions and information before they make a purchasing decision. And 40% use TikTok and Instagram in a similar way… our practices are now on TikTok. 90% of traffic is now coming from mobile phones, with a massive skew towards that younger generation. So, if your services are not accessible via a mobile device in an instant, in that on-demand fashion, you are going to be missing all the opportunities to serve that younger and growing community," said Dr Deeming.

Technology, he pointed out, offers not only treatment in a form that suits younger patients but also the all-important customer experience. "That's about virtual care… it's about using the different technologies to engage the patients throughout the treatment, monitor their progress with you so they can see how their teeth are moving, so they feel involved and feel like their treatment will be more successful."

In terms of specific technologies, Dr Deeming highlighted Invisalign Smile View™, which allows patients to generate their own virtual smile improvements via a selfie. "A tool that builds that hope, excitement and engagement with the process so that the patient can then take that next step."

"Using technology in front of our patients helps them to feel like we're part of their world. The next part of that is the Invisalign® Outcome Simulator Pro. Once we have our scans, we can then demonstrate how our skills come into play by modifying that simulation in real time on the iTero scanner to show them the tweaks and the artistry of orthodontic tooth movement to create that excitement."

Invisalign® Virtual Care allows for effective, efficient interaction throughout the treatment journey "because teenagers don't want to be inconvenienced… we can give them that always-on feeling through the app, and we can give our younger patients control over their treatment, through the ability to share and communicate and have interaction directly with your team without always having to go through their parents. Align is now making it so much easier for us to engage our patients in the way they want to be engaged."

INTERCEPTIVE ORTHODONTICS WITH INVISALIGN FIRST

In her detailed presentation, Dr Simonetta Meuli explained that she relies heavily on digital tools to support her consultancy work, particularly the iTero Element™ 5D Plus Mobile imaging system, whose Cloud capabilities allow her to work more flexibly, even when travelling. Even more important for younger children, a scan is pain-free.

She favours using interceptive orthodontics incorporating Invisalign First™, which she said has advantages such as reducing the incidence of pre-molar extractions, orthognathic surgery and root reabsorption while increasing the long-term stability of the alignment of the lower incisors. She also stressed that interceptive orthodontics made it unnecessary to solve every issue immediately, instead recommending a concise focus using the digital planning workflow to plan simple procedures, beginning with the upper arch.

Dr Meuli uses iTero NIRI technology to detect interproximal cavities and the iTero scanner's SnapShot feature to help patient communication and acceptance of treatment. Echoing Dr Deeming's views on how teens are the visual generation, she added: "Communication through images has become an important language that can influence people's minds – transmitting strong emotions… they are also one of the most powerful means of virtual storytelling."

FIG. 2 *Dr. Simonetta Meuli.*

Dr Meuli also stressed the importance of planning using ClinCheck® Pro when embarking on an Invisalign First treatment to enable informed decisions, which she said is particularly relevant for early orthodontic treatment in mixed dentition.

She is also an advocate of monitoring patient progress and underlined what she sees as a responsibility to keep track of young patients' cases over extended periods as they grow. In conclusion, she said that all patients respond positively to the digital environment, and children in particular, who accept it as "the norm".

Partner News

Align Tech funds research grants to universities *worldwide* for advancing orthodontic and dental research

$275.000 IN RESEARCH GRANTS to be funded in 2023 as part of its ongoing annual Research Awards Program.

Align Technology believes in enabling research and innovation within the dentistry industry, with a goal of improving orthodontic and dental treatment for communities around the globe.

In 2010, Align Technology began its annual Research Award Program to support clinical and scientific orthodontic and dental research in universities worldwide. Since its inception, approximately $2.7 million has been funded in research awards.

Research has provided insights into various areas including tooth movement efficacy with clear aligner therapy, oral hygiene and microbial bacteria presence or absence with clear aligners, and comparisons in quality of life with aligners as compared to fixed appliances.

FIG. 1 *Align Awards.*

FIG. 2 *Align Awards.*

In June 2023, Align announced the award of 11 research grants to universities under the company's 13th annual Research Award Program.

"Align is committed to the advancement of the orthodontic and dental fields, and we are pleased to support university research around the world", said Dr. Mitra Derakhshan, Align Senior Vice President, Global Clinical. *"We are excited to see the findings and future clinical insights about Invisalign® clear aligner treatment and its applicability for a broad range of clinical case types for patients of all ages. Continued research around all aspects of clear aligner treatment will increase awareness within the dental community about the efficacy of clear aligner treatment as compared to traditional appliances."*

AWARDS

The Americas research award recipients for 2023 are:

- University of Washington (Seattle, USA) – Primary Investigator, Dr Greg Huang.
- University of the Pacific (San Francisco, USA) – Primary Investigator, Dr Heeyeon Suh.
- University of Alberta (Edmonton, Alberta, Canada) – Primary Investigator, Dr Camila Pacheco-Pereira.
- Uniderp (Campo Grande-MS, Brazil) – Primary Investigator, Dr Paula Vanessa Pedron Oltramari.

The European research award recipients for 2023 are:

- UniCamillus, International Medical University (Rome, Italy) – Primary Investigator, Dr Roberta Lione.
- Mohammed Bin Rashid University (Dubai, United Arab Emirates) – Primary Investigator, Dr Sabarinath Prasad.
- Johann Wolfgang Goethe University of Frankfurt (Frankfurt, Germany) – Primary Investigator, Dr Babak Sayahpour.
- University of Milan (Milan, Italy) – Primary Investigator, Dr Francesca Gaffuri.

The Asia Pacific research award recipients for 2023 are:

- Sichuan University (Chengdu, China) – Primary Investigator, Dr Hu Long.
- School of Stomatology Wuhan University (Wuhan, China) – Primary Investigator, Dr Sanjie Yeweng.
- Mahidol University (Bangkok, Thailand) – Primary Investigator, Dr Narudol Treethanya.

FIG. 3 *Align Awards.*

"Over the years, it has been rewarding to see the evolution of research projects and the results that have advanced understanding and awareness of the various approaches for the treatment of malocclusion," said John Morton, Align Vice President, Technical Fellow. *"Align is proud to support these research studies that have directly impacted advancements in clear aligner treatment and provided the scientific information that doctors need to interpret the efficacy of Invisalign® clear aligner treatment."*

The 2023 funded research studies will cover a wide range of topics for projects seeking to better understand treatments in orthodontics and dentistry, including:

- ClinCheck® treatment-planning software and cone-beam computed tomography (CBCT) integration.
- Curve of Wilson in the lower arch using aligners vs fixed appliances.
- Comparing the pre-treatment characteristics, demographics, efficiency and effectiveness, prevalence and extent of white-spot lesions in adolescents treated with aligners vs fixed appliances in an academic setting.
- Comparing the maxillary and mandibular arch changes with aligners vs removable palatal expansion and Schwarz appliances.
- Evaluating the treatment outcomes with clear aligner therapy during mixed dentition in transverse and vertical dimensions.
- Comparing the microhardness values of the resin composite attachments using different light-curing protocols.
- Three-dimensional characteristics of facial soft tissues with Angle Class II malocclusion clinical effectiveness of virtual root and bone model system.
- Orofacial and smile changes with mandibular advancement, precision bite ramps and craniofacial changes induced by maxillary expansion.

All award applications received were first reviewed and prioritised in a blind evaluation by an independent academic committee. The final recipients were then determined by Align Technology.

Partner News

An *innovation* born of scientific research

The ATP38® is an innovative, high-tech medical device that uses photobiomodulation to improve your patients' well-being.

Photobiomodulation (or low light level therapy; LLLT) involves using natural wavelengths to stimulate the cell regeneration process. Discovered by NASA in the early 90s and applied to the treatment of astronauts' injuries, LLLT benefits from major scientific experience.

Thanks to its stimulating, anti-inflammatory, analgesic and healing properties, confirmed over the last three decades by numerous studies, photobiomodulation is now being extended to many medical areas, including dentistry.

CAPTURE THE ENERGY OF LIGHT

ATP38® enables cells to benefit from the energy of light (only visible and invisible light, not harmful ultraviolet light) and act on living organisms without altering them. Painless and non-invasive, its multiple benefits apply to most dental care processes.

Invisible orthodontics:
- Reduces inflammation and pain
- Helps bone healing
- Reduces the duration of treatment.

Implant surgery:
- Bone surgery: better bone regeneration
- After implant placement: improved osseointegration
- After complicated surgery: analgesic and anti-inflammatory effect.

Periodontology:
- Accelerates healing and reduces inflammation.

General practice:
- TMJ pain, oral mucositis, herpes, lichen planus, gingivitis, extraction, oedema, prosthetic injury and more.

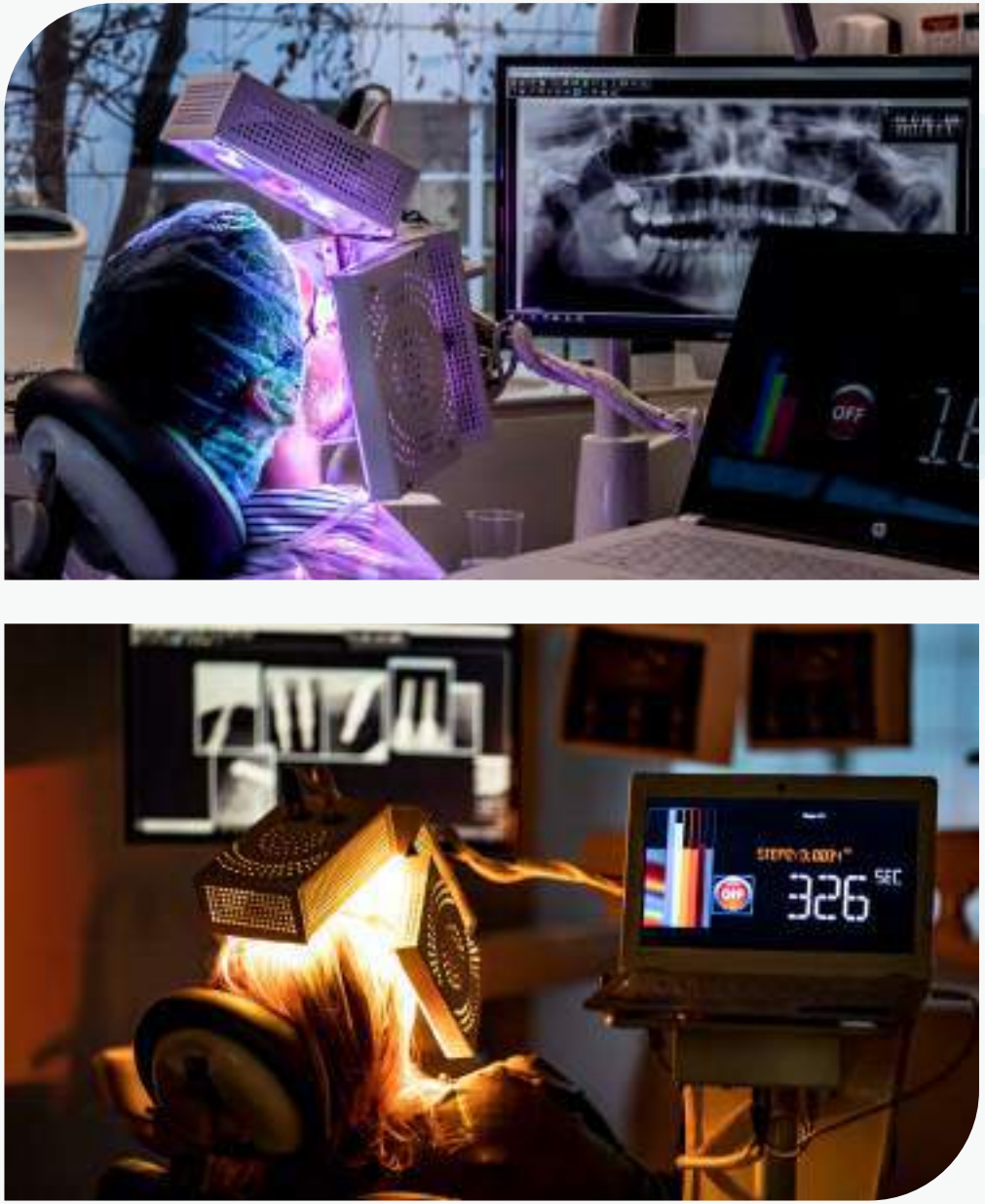

FIG. 1, 2 *The ATP38® medical device.*

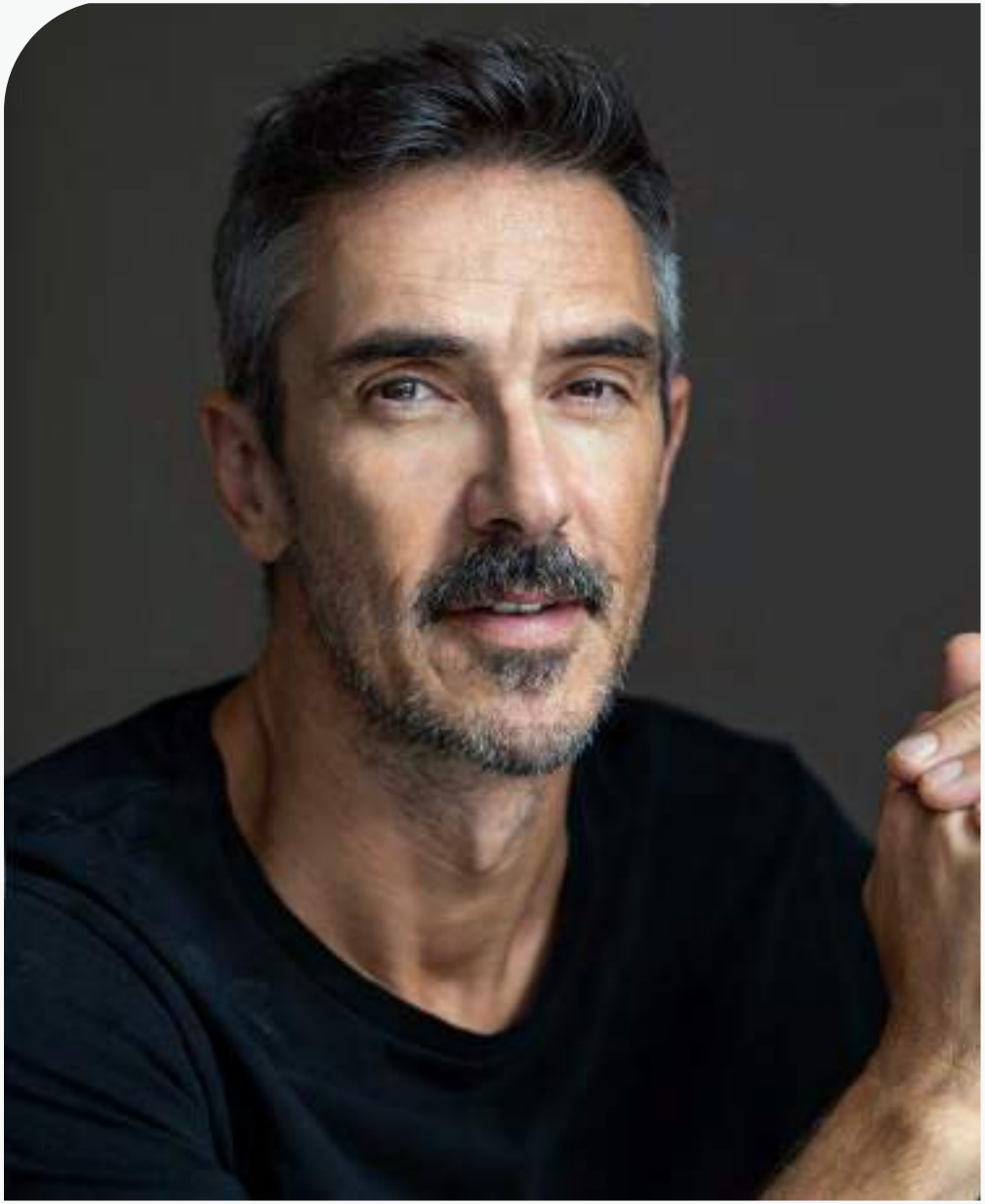

FIG. 3 *Dr. Miguel Stanley.*

"It is something we simply cannot live without! [..] The ATP38® capacity to promote advanced wound healing and reduce pain is unparalleled"

The ATP38® is recommended by **Dr. Miguel Stanley**:
"It is something we simply cannot live without!
There is absolutely no doubt that the ATP38® is an essential technology at the White Clinic. We use it for every surgical case and all post-op wound management , no matter how simple the procedure, and also to accelerate orthodontic movements as well as for facial aesthetics. Our patients love it! The ATP38® capacity to promote advanced wound healing and reduce pain is unparalleled by any other technology on the market today.", we have been using it consistently since 2016.

TECHNOLOGY AT THE SERVICE OF YOUR DENTAL PRACTICE

Guided by a microprocessor and supplied with software containing various treatment protocols (already installed in the computer supplied with the machine), the ATP38® is a genuine digital innovation that fits in perfectly with the evolution of our professions and plays a full part in the construction of a new connected dentistry.

Integrating this technology into your daily practice will allow you to diversify the care you provide, reduce treatment time, and offer your patients a modern, soothing therapeutic experience.

ATP38
PHOTOBIOMODULATION

Partner News

Scott **Evans**

Product Manager

- Software Regional (EMEA) Product Manager at Carestream Dental
- He has vast experience of the importance software plays in the clinical workflow.
  This comes from his former background as a dental technician but also his keen interest in the advancement of dental technology. In particular, how this relates to dental software and imaging solutions, recognising their potential to enhance patient care.

What's new in the Carestream Dental imaging *portfolio*? Scott Evans talks about the latest features available

Scott Evans, Software Regional Product Manager, talks about the latest features available in the CS Imaging portfolio of software.

AS WE EXPAND our award-winning portfolio of both intraoral and extraoral equipment, our software portfolio and capabilities have also grown significantly. Even if you haven't updated your equipment recently, there is an option to update your software, which will enhance your daily working experience (*check compatibility of your hardware before upgrading your software*).

THE LATEST GENERATION OF OUR DENTAL IMAGING SOFTWARE

Introducing the latest generation of our dental imaging software, CS Imaging version 8.0.22. This platform offers a convenient one-stop access to manage all your 2D images, 3D images, and CAD/CAM data, making your digital workflow more efficient.

With CS Imaging, you can easily import and export images in standard formats like JPEGs and STLs, making data sharing hassle-free. Additionally, our CS DICOM module ensures optimal integration into any medical imaging environment.

By choosing CS Imaging, you can transform your dental office into an imaging hub with seamless integration. It works harmoniously with most practice management software worldwide, including our Sensei portfolio. To ensure compatibility, please check with your practice management software provider.

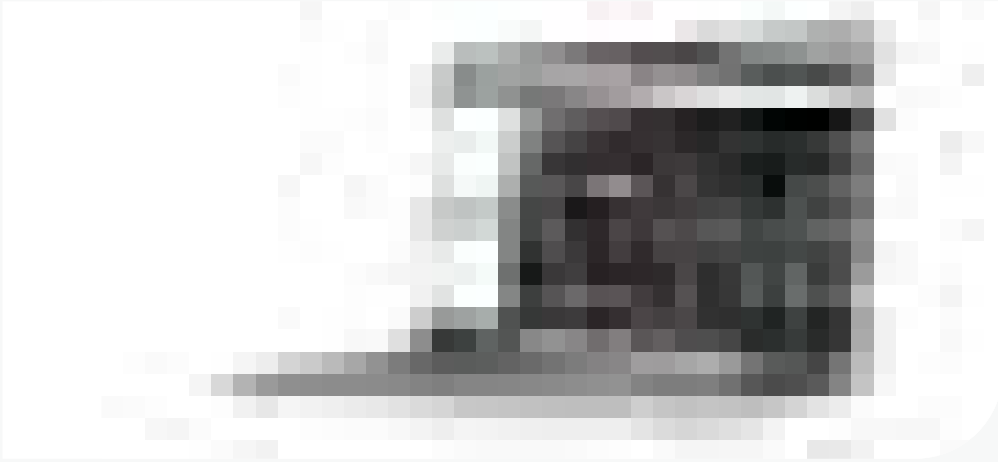

FIG. 1 *CS Imaging 8.0.22 Dashboard.*

OPEN YOUR PRACTICE TO SEAMLESS SCANNER INTEGRATION

IO Scanner Link presents an open solution, enabling users to directly connect CS Imaging software with various leading intraoral scanner acquisition software. This grants users the flexibility to utilise their preferred scanner.

The seamless integration with CS Imaging software offers an enhanced workflow for practitioners who utilize third-party scanners.

As of now, the system supports integration with 3Disc, Dexis, and Medit scanners, and additional integrations are in the pipeline.

FIG. 2 *IO Scanner Link.*

FIG. 3 *CS 3D Imaging 3.10.38.*

MAKE THE MOST OF YOUR 3D INVESTMENT: maximise the potential of your 3D investment with our latest release of CS 3D Imaging 3.10.38. Our recent update to the 3D imaging software has been met with positive reception from our users. We listened to the feedback from our customers to improve the workflow.
The new enhancements include:

- **Simplified User Interface:** in this update, we have made significant enhancements to the software's layout. The tabs have undergone a complete redesign, resulting in a more streamlined view. Additionally, a new toolbar has been introduced at the top of the interface to enhance user navigation.
- **New annotation and drawing tools:** we have consolidated commonly used features, ensuring quicker access to the toolbox. Following valuable user feedback, we have incorporated new indicators, freehand drawing capabilities, and measurement tools.
- **Advanced capabilities to jaw arch tracing**: our latest improvements allow for the optimisation of arches and reconstructed images by efficiently tracing two distinct arches.
- **Lock/unlock implants, crowns, wax-ups:** reducing errors by enabling locking on selected items when objects overlap.

PROSTHETIC-DRIVEN IMPLANT PLANNING AND SURGICAL GUIDES

The Prosthetic-driven Implant Planning module puts successful implant planning right at your fingertips. With a streamlined workflow aimed at efficiency, you can take advantage of our vast implant library that includes over 100 manufacturers, giving you the ability to create and manage your preferred libraries.

This optional add-on module simplifies the implant planning process, allowing practitioners to achieve predictable and precise results in fewer appointments. Moreover, the module now supports STL/PLY files from leading intraoral scanners, offering you even more flexibility and choices for your implant planning needs.

ONE-CLICK TRANSFER TO SURGICAL GUIDE SOFTWARE

Our software offers direct integration with leading surgical guide providers, including smop, enabling you to plan your cases using the PDIP module and then transfer 3D data to the surgical guide software with a single click.

Smop is the cloud-based solution from Swissmeda, the clinical software brand of Carestream Dental, that revolutionises the implant surgery process from start to finish. its core is on enhancing treatment efficiency, achieving optimal outcomes, and promoting effective communication and collaboration among dental professionals. Whether you prefer designing your own cases or uploading files directly to the cloud-based portal, where the Swissmeda team takes charge of the digital planning, ultimately reducing patient chair time. For more complex cases, our new stackable guide provides a comprehensive step-by-step solution, facilitating multi-stage surgeries.

MEET US IN CASABLANCA

We're pleased to share that **Hugo Patrao** will host a '**Predictable Digital Implant Planning: CS 3D Imaging & SMOP Workshop**.' at the **DDS Global Congress** showcasing the power of CS Imaging and Smop.

FIG. 4, 5 *PDIP: Prosthetic-Driven Implant Planning and Surgical Guides.*

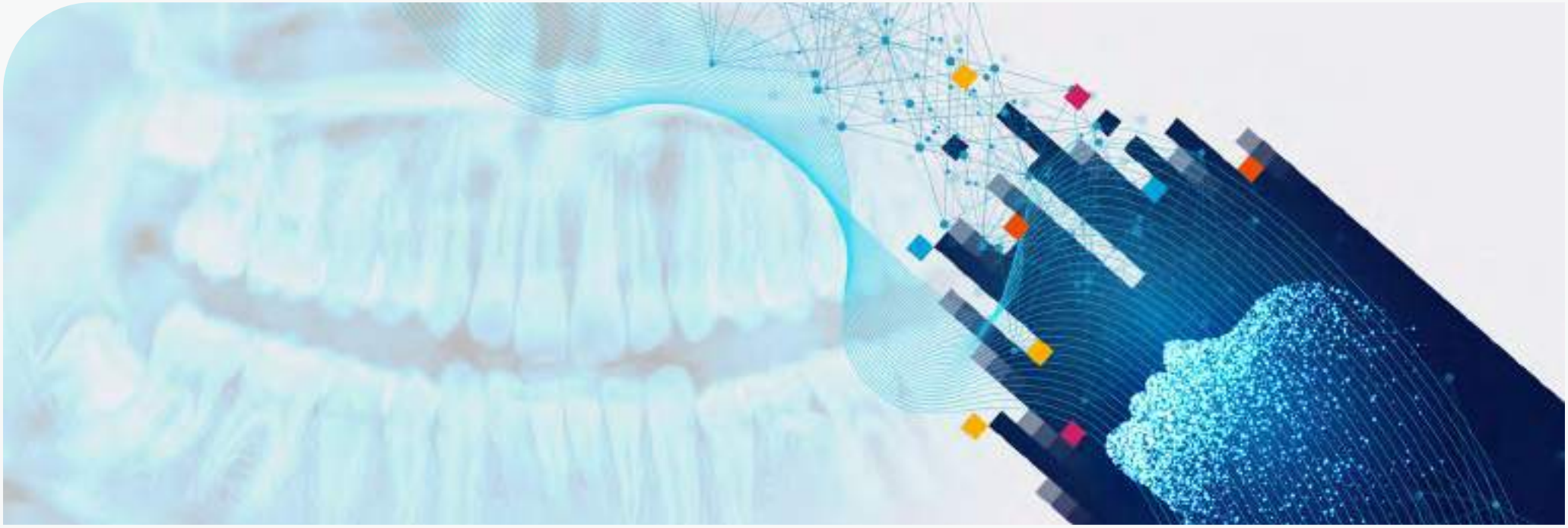

FIG. 6 *Open the door to new opportunities with AI Insights. AI Insights is powered by dentalXrai GmbH.*

UNLOCK THE POWER OF ARTIFICIAL INTELLIGENCE IN YOUR PRACTICE WITH AI INSIGHTS

AI Insights, a powerful new tool, combines the capabilities of artificial intelligence and cloud-based technology to automatically detect a wide range of pathological conditions and non-pathological structures in panoramic images.

Integrated seamlessly with CS Imaging software to deliver consistent results and automates the reporting process. This streamlines your workflow, saving time and increases case acceptance.

The automated reporting enhances patient communication by presenting clear visual information, which in turn boosts their trust in your treatment recommendations. Further additions are on the horizon for AI Insights' reporting capabilities, including mandibular canal proximity detection and perio pro detection.
Be sure to visit our booth at the DDS Global Congress to experience firsthand the power of AI insights.

FIG. 7 *AI Insights: reliable X-ray analysis and automatic radiographic reports.*

CS AIRWAY MODULE MAKES AIRWAY ANALYSIS FASTER THAN EVER

The CS Airway module aims to simplify airway analysis with colourful 3D renderings. Within seconds, it efficiently segments and measures upper airways—making it easier for you to analyse them, as well as share your treatment recommendations with patients. All significant measurements are automated and dynamically displayed; ensuring real-time updates whilst browsing slices or changing angulations.

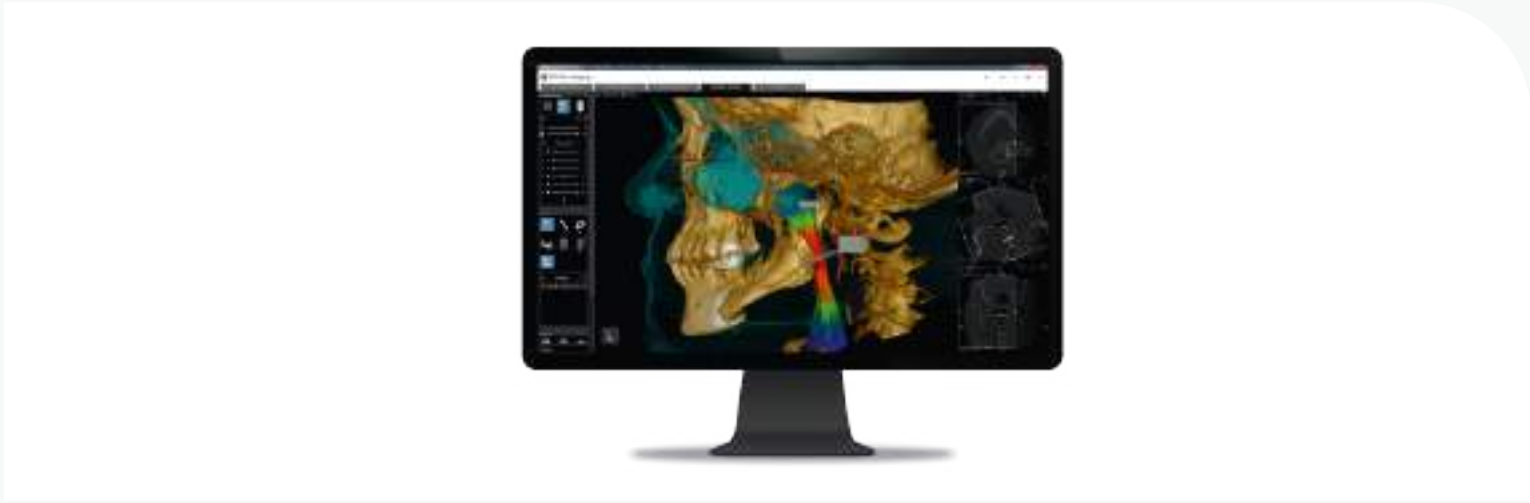

FIG. 8 *CS Airways.*

ORTHODONTIC CAPABILITIES WITH OUTSTANDING IMAGES AND TRACINGS IN SECONDS: our expertise in orthodontic software analysis comprises of cephalometric measurements, superimposition and growth predictions.

Auto Tracing Software: Transform your cephalometric images into precise tracings in just 90 seconds with our exclusive auto tracing software program. With our automatic tracing feature, you can now complete images tracing in seconds—saving you significant time and enhancing patient communication. The software caters to a wide range of analysis requirements, including Ricketts, McNamara, Steiner and Tweed.

FIG. 9 *Automated Tracing Software.*

MEET US IN CASABLANCA

As **Global Gold Sponsors** of the Digital Dentistry Congress in Casablanca, Morocco we are excited to showcase our emerging trends and future developments.

One of the highlights is the **Innovation Forum** session (Thursday 12th Ocrober, 2023) which will be presented by **Yann Amauger, Carestream Dental's head of research and development**. He will share his thoughts on the **transformative impact of AI** in the field of dental technology. During this session, we will share valuable insights into how AI is shaping our technologies and provide a glimpse into the promising future of Carestream Dental.

Partner News

Newest intraoral *scanner* AS 260 from Alliedstar that facilitates digital dentistry

AS 260 is the latest intraoral scanner model designed and manufactured by Alliedstar™ that features a user-oriented scanning experience which allows for easy and precise reconstruction of deeper objects and interproximal areas while further simplifying the setup process by enabling single USB cable connection.

A major advancement that sets AS 260 apart from previous Alliedstar™ models is a full-scale upgrade towards the optical structure, which has completely lifted the depth of field to another level and improved much of the data quality with better fidelity and a solid accuracy.

Designed with a mindset centering users' day-to-day need, AS 260 minimalizes the workflow from start to finish with its every feature crafted for intuitive operation and streamlined use in actual dental practice. The realization of remote control liberates practitioners from having to touch the keyboard/screen to move on with the process, while the lightweight body (175g) and duo button design release much of the burden on users to ensure a comfortable experience even during long-time use.

Full-arch accuracy		
AS 260	Trueness	(16.6±1.1μm)
	Precision	(7.9±1.5μm)

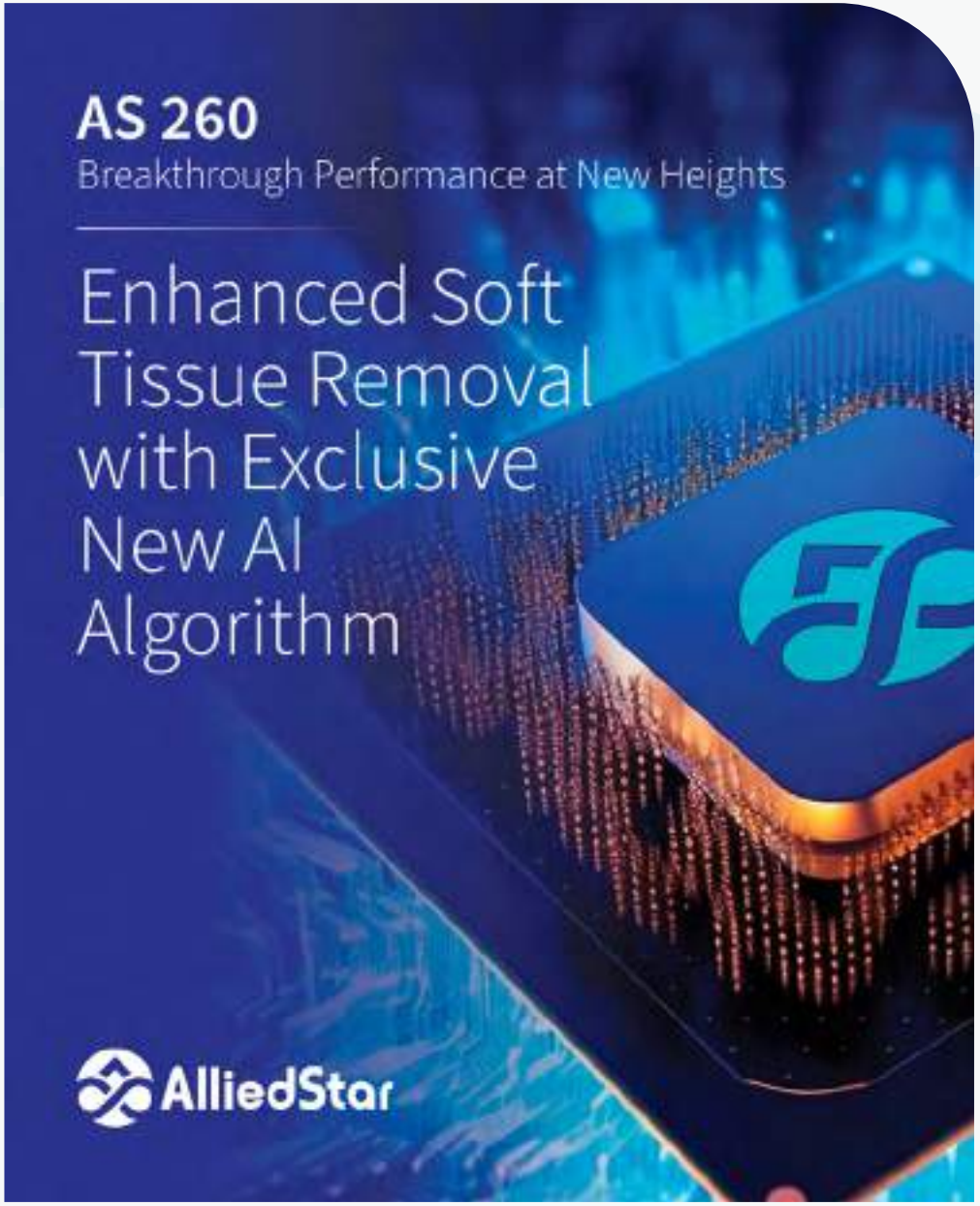

FIG. 1 *(Left) Accuracy Test Results of AS 260*.*

FIG. 2 *(Up) AS 260: powered by AI.*

FIG. 3 *The AS 260 intraoral scanner.*

Being automatically adaptive to different scenarios, the device distinguishes itself by having its algorithms built around realistic intraoral settings so that the need for manual adjustment and retakes has been minimized when AS 260 is used across various kinds of cases. That said, when employed for intraoral scanning, the model does not require a seasoned specialist for a successful scan – it is designed to provide a smooth digitalized workflow for all users, despite their levels of adeptness.

Adopting a software platform called AS Connect developed by the same manufacturer, the Alliedstar™ portfolio is able to offer a feature-rich ecology for different dental care services including tooth implant, restoration and orthodontics. With AS Connect, users are empowered to quickly access and conveniently manage cases stored in the platform, the compatibility of which allows for the export of multiple formats so that a seamless integration with third-party applications like CAD/CAM in subsequent procedures is made possible. Cloud storage is also available for frequent revisits via other devices.

As a calibration-free intraoral scanner, AS 260 eliminates the hassle of keeping an extra piece of calibration equipment in the toolkit, removing

unnecessary time and efforts to maximize the work efficiency for dental practitioners. Alliedstar believes the future of digital dentistry pivots around accessibility, ease of use and convenience. To better match a modern dental clinic that emphasizes a comfortable and stress-free patient experience, AS 260 comes with a replaceable cable to contribute to a truly clean and tidy environment with less of a clutter of wires and cords.

Digital dentistry presents practitioners with a chance to step up the overall quality of their diagnosis and treatment. Display of an illustrative and convincing reconstruction of their intraoral environment assists dentists in building an efficient conversation with the patients. With the digitalizing trend continuously surging on a global scale, it is undeniable that a digital dental workflow reveals an opportunity to benefit both the industry and people seeking a trustworthy treatment solution.

NOTES

Accuracy Test Methods

For evaluation of the accuracy, two aspects (trueness and precision) were tested respectively employing methods commonly adopted by the industry.

A gypsum dental model was scanned beforehand by an industrial grade scanner to generate a dataset as reference for trueness testing where a single, trained operator used AS 260 to scan the same model for 10 separate times to obtain datasets (all STL formatted).

The datasets were then superimposed to the reference dataset for 3D comparisons to acquire 10 average error values, the mean of which was calculated to describe the trueness.

In terms of precision measurement, pairwise comparisons between the 10 datasets were operated and the average error of each comparison was calculated to generate 45 different values, the mean of which was then used to represent precision.

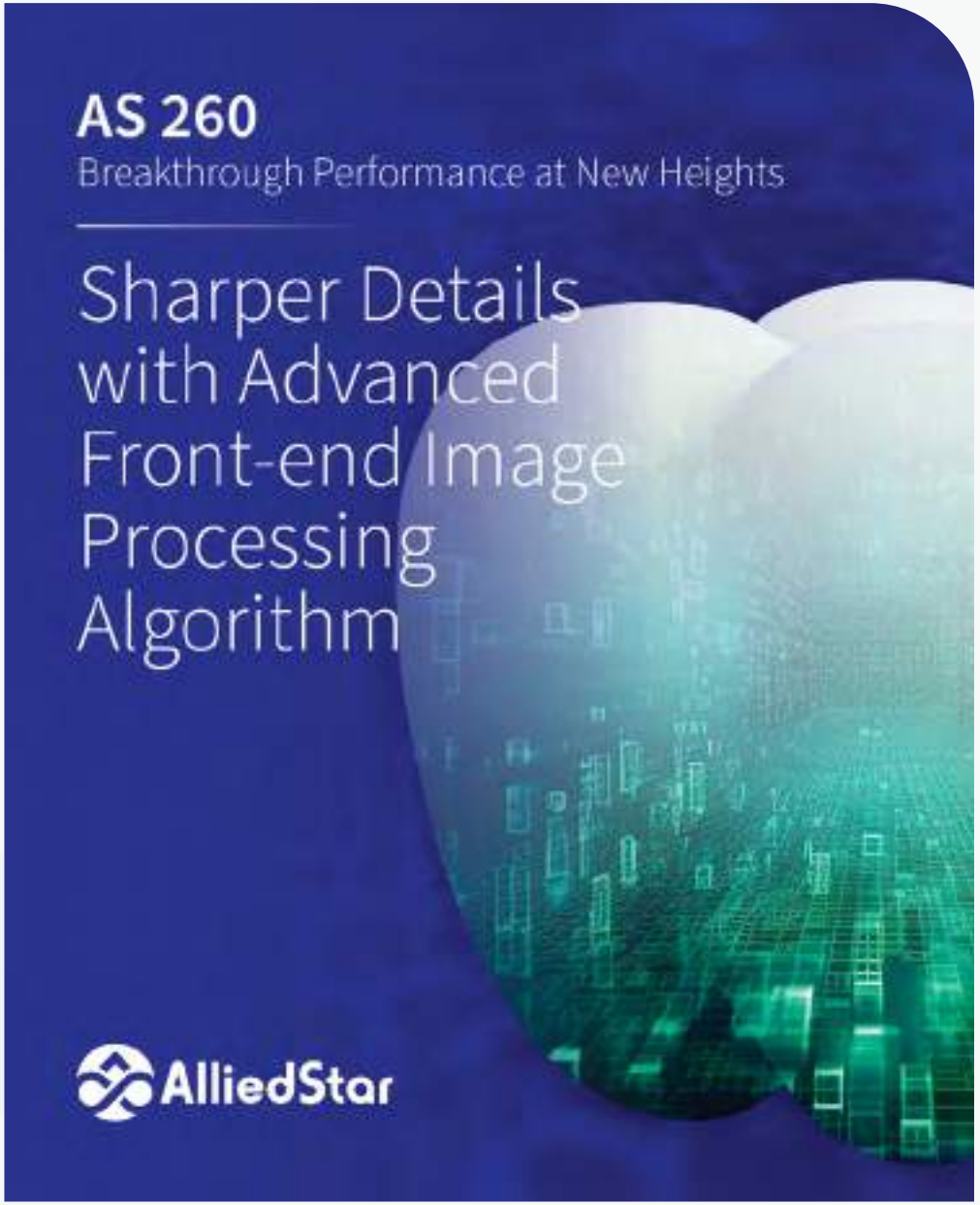

FIG. 4 *AS 260: performance at new heights.*

Partner Companies

Carestream DENTAL

KeystoneDentalGroup

MEGAGEN

DSD Digital Smile Design

btk Implanting Trust, Smile Again!

zebris Medical GmbH

DGSHAPE A Roland Company

Ray

MEDIT

SprintRay

Envista

Nobel Biocare · Kerr · Ormco · SPARK · ORASCOPTIC · IMPLANT DIRECT · Metrex · AlphaBio · DEXIS · DTX

fifthingenium

BIOTECH DENTAL

align

Diagnocat

AlliedStar

LYRA E.T.K DIGITAL DENTAL PROTOCOLS Single. Safe. Accessible

MODJAW

ZEISS

INFODENT

Tecno Med ITALIA Group

VELMENI

Navident

SDS SWISS DENTAL SOLUTIONS

Announcing two *photographic* contests: win prizes and be on our cover!

Dentistry with a view

1 Cash Prize: **€500**

AN AMAZING opportunity for every DDS MAG reader: "Dentistry with a view" is a photographic contest where *you* can win prizes and feature on our MAG.
It's easy: send us a photo of the view from your dental practice and that's just about it. Send the beautiful view from your dental office here: *info@digital-dentistry.org*
We will contact you!

The Digital Dentist

1 Cash Prize: **€500**

ANOTHER COOL opportunity for every DDS MAG reader: "The Digital Dentist" is a photographic contest where *you* can win prizes and feature on our MAG.
It's easy: send us an artistic photo of digital dentistry and that's just about it. Send your picture here: *info@digital-dentistry.org*, your picture could become the cover of the next issue of our MAG!

The Magazine of the Digital Dentistry Society International

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