

# ceramic implants

international magazine of ceramic implant technology



## case report

Biological dentistry,  
environmental  
dentistry and plasma—  
a combination for health

## industry

Superior osseointegration  
success of Patent™  
Implants scientifically  
proved

## events

Second European  
Congress for Ceramic  
Implant Dentistry



# Zeramex XT

The two-piece screw-retained ceramic implant system

Experts  
with **17 years**  
experience in  
ceramic  
implants

Get to know the proven Zeramex XT ceramic implant system with the metal-free Vicarbo® screw that counteracts tensile and bending forces.

Convincing osseointegration, excellent red-white aesthetics, low plaque affinity, no material-related inflammatory reactions, optimal for conventional & digital workflow.

**Made in Switzerland**  
– since 2005

Learn more on [www.zeramex.com](http://www.zeramex.com)

[www.zeramex.com](http://www.zeramex.com)

**ZERAMEX**

# The evidence on ceramic implants is positive: Advancing into the future

As we approach the end of 2022 and look forward to a new year with its fresh challenges and goals, it is appropriate to review the state of ceramic implants and their future. Professionally, the emergence of zirconia implant technologies presents a dynamic aspect of focus for the contemporary surgical and/or prosthetics dental implant practice. With their growing share of the dental implant market worldwide, their multiple benefits when compared with titanium cannot be overlooked. For savvy clinicians who embrace this newer technology, the future is incredibly bright!

In the past, when discussing and evaluating zirconia as an alternative to titanium in the implant field, conventional wisdom tended to frown upon zirconia. However, the old misconceptions regarding design, premature implant fixture fractures and failures, cumbersome prostheses and needing special clinical protocols to utilise zirconia implants are now being dispelled.

As more and more clinicians are adopting this exciting technology and more research is appearing in various peer-reviewed journals, dentists with a focus on implant dentistry are noticing. The validation of ceramic implants in the field is continuing to grow through the dissemination of findings on them by key opinion leaders presenting at major dental implant conferences. This is all helping to secure a firm position in the overall field.

There have been significant recent advancements in zirconia, including new implant designs, bone-level options, simplified prostheses, and digital workflow options with appropriate components. Regarding two-piece designs, there are definitive centre screw options that can be torqued, non-cementable abutments and cementable centre screws to provide stable fixation for permanent function. These all allow for ease of use clinically.

As patients become more aware of metal-free options for natural tooth replacement, they will continue to ask their dentist about them. This is happening routinely in my multi-specialty practice. In closing, zirconia implants have a definitive place in modern implant dentistry. The future for this exciting technology is here!

Yours,  
Dr Paul S. Petrunaro



**Dr Paul S. Petrunaro**

Expert in the field of Periodontics and Implantology,  
Start Smiling Dental Implant Centers, USA



page 18



page 22



page 36

Cover image courtesy of Zircon Medical Management/Patent™  
www.mypatent.com



Background: © 19 STUDIO/Shutterstock.com

**editorial**

The evidence on ceramic implants is positive: Advancing into the future 03  
Dr Paul S. Petrunaro

**case report**

Biological dentistry, environmental dentistry and plasma—a combination for health 06  
Dr Michael Rak, Arbnor Saraci, Lukas Wichnalek & Norbert Wichnalek

Zirconia implants for natural tooth replacement in the aesthetic zone 14  
Drs Paul S. Petrunaro, Zeljko Atagic, Jardin Yousef & Tanner Hauptman

Fully guided four-unit ceramic restoration on two implants 18  
Dr André Chen

Ceramic implants for aesthetic transformations 22  
Dr Paresh B. Patel

**industry**

Superior osseointegration success of Patent™ Implants scientifically proved 28

**interview**

A holistic approach to treatment with ceramic implants 30  
An interview with Dr Thomas Franke

**events**

Ceramic implantology summit at the second JCCI 34

Second European Congress for Ceramic Implant Dentistry 36

**news**

manufacturer news 38

news 40

**about the publisher**

imprint 42



Dear ZrO<sub>2</sub>-community, what a year! We are so happy for these three wonderful issues this year. Our thanks go to all our friends and partners from science, practice, and industry. We are proud once more to have gathered such great people. Let us continue all our work. On behalf of OEMUS MEDIA AG, we wish you a wonderful season and a good start into 2023. We wish you joy and peace. Let us be grateful for what we have and let us set all the best example for a life. We are looking forward to new horizons in ceramic implant dentistry.

*Janine Conzato* *Timo Krause*

Sincerest regards, Janine Conzato & Timo Krause



© veronikalove/Shutterstock.com



# VALU€



Implant + Abutment Post  
for only 395 €

## The new Two-in-One implant from SDS

THE **SDS2.1\_VALUE** IMPLANT:  
MORE VALUE THROUGH THE **2-IN-1** COMPLETE SOLUTION

**2**<sub>in</sub>**1**

Implant + Abutment Post



130.000 times  
proven thread



6 Implants  
12 Possible applications



compatible with SDSBOX full guided  
navigation system

### German S3 guidelines:

<https://pubmed.ncbi.nlm.nih.gov/36190587/>

FULL RECOMMENDATION: **One-piece** zirconia implants are a valid and ready-to-use therapeutic procedure and **can be used** as an alternative treatment option.



All SDS implant shapes, including the two-piece 2.1 and 2.2, fall into the ONE-PIECE category, as the abutment is fixed **in** the implant and the crown is fixed **on** the implant.



A cost-effective ceramic implant combined with the experience and safety of the world market leader? As the world market leader for ceramic implants, we have developed and launched a ceramic implant which is delivered including the post „2-in-1“ and, in addition, can be used either as a two-phase unloaded implant or as a one-piece implant for immediate restoration through immediate cementation of the

post supplied. Ceramic implantology has never been easier or more cost-effective, and with a complete price of €395, the VALU€ implant should not only be more affordable than its ceramic competitors, but also than many premium titanium implants.\* Visit the free online course “2.1 Fast Lane Certification Course” today and start safely into the future of ceramic implantology!



Scan QR code for the entire  
VALU€ Implant product  
catalog!



FREE COURSE!  
2.1 FAST LANE CERTI-  
FICATION COURSE  
**REGISTER NOW!**

**SDS** SWISS DENTAL  
SOLUTIONS 

SDS Deutschland GmbH  
Bückerstrasse 5a  
78467 Konstanz | Germany

Hotline +49 7531 89 16 86 0  
info@swissdentalsolutions.com  
www.swissdentalsolutions.com

\* Total cost of all implantological and prosthetic components excluding the crown.

# Biological dentistry, environmental dentistry and plasma—a combination for health

Dr Michael Rak, Arbnor Saraci, Lukas Wichnalek & Norbert Wichnalek, Germany

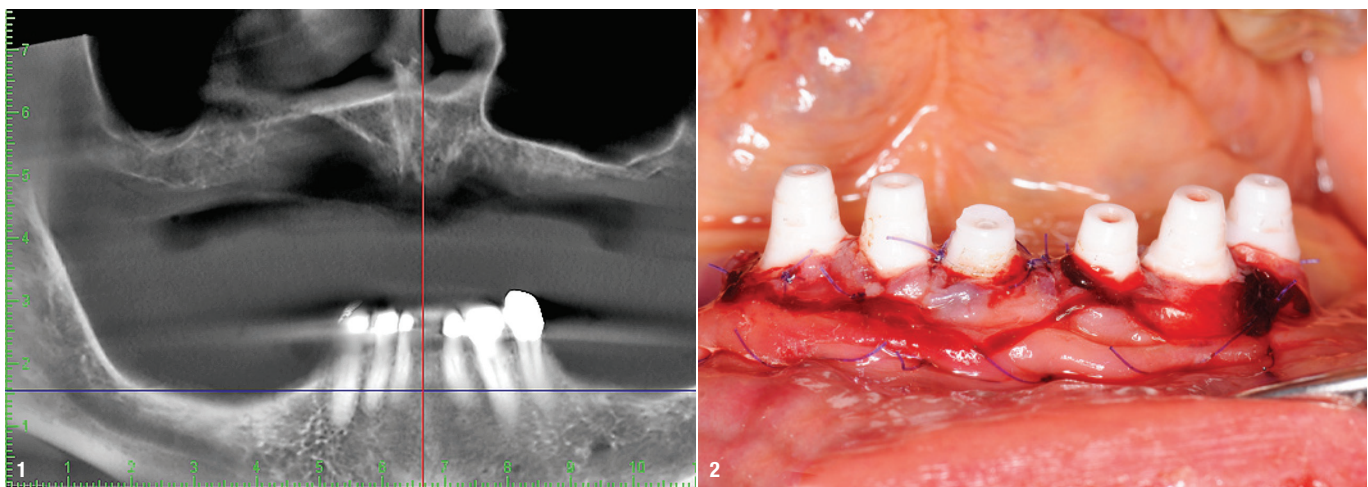
**Teeth, like all other organs** of the human body, have their own blood, nerve and lymph supply and are among the closest to the brain because of their localisation. A wide variety of materials, some of which are critical, are routinely inserted into this sensitive region with a view to technical longevity. The consequences can often be stressful for the entire organism. After all, the oral cavity plays a key role in prevention and recovery, as many factors that may modulate disease are associated with the oral cavity. How these challenges can be met is presented in this article by means of a case in which the health of the patient was restored with the help of ceramic implants made of zirconia and metal-free dental restorations.

Chronic cavity-forming diseases of the jaw such as fatty degenerative osteolysis of the jawbone (FDOJ), or neuralgia-inducing cavitation osteonecrosis, are still controversially discussed in oral and maxillofacial surgery today. FDOJ in the medullary cavities of the jaw bones can be identified as a lesser-known source of RANTES overexpression. The chemokine RANTES interferes with bone metabolism, leading to osteolysis in

the jaw areas affected by FDOJ. Adipocytes act pathogenetically via RANTES expression in local FDOJ and systemically on the immune system.<sup>1</sup> Biological dentistry offers healthy people adequate treatment options that have little to no effect on the organism. Even chronically ill people can be treated sustainably by means of biological dental therapy concepts that address the individual causes, gently eliminate the impairing factors and restore the original situation in a biologically compatible way without impairing the aesthetics of the teeth and the oral and maxillofacial region. For this reason, we have been combining biological dentistry with the advantages of plasma processing of all medical products (since 2017) in our dental and technical team since 2013, thus adopting a holistically oriented treatment approach.

## The fourth state of matter: Plasma

Plasmas are gases such as argon or helium whose molecules are split by electricity or heated into negatively charged electrons and positively charged ions. Cold plasma generates highly reactive nitrogen or oxygen radicals and UV radiation in the ambient air. These reac-



**Fig. 1:** Dental panoramic tomogram showing six devitalised mandibular anterior teeth with partial apical osteolysis, secondary caries and horizontal bone loss in the posterior region. **Fig. 2:** The six ceramic implants placed immediately into the extraction sockets. The wounds covered with A-PRF membranes and sutured.



**STRAUMANN  
WORLD CLASS CUP  
2022**



### **DIGITAL DENTISTRY**

The Straumann World Class Cup (SWCC) teams have progressed to Round 3 where a leading group of international Speakers will be showcasing Digital workflows. Join us online on November 8th–11th from 1 to 2:30 pm CET for this one-of-a-kind hybrid event!

### **READY TO USE IN YOUR DAILY PRACTICE**

The Straumann World Class Cup is a high-profile competition between clinicians that began online on September 6th and will conclude with a championship round on December 2nd.

Eighty experienced clinicians share their best cases as they compete to win the World Cup. Twenty teams – each composed of 4 clinicians – demonstrate their expertise and clinical skills. Matches will consist of a clinical case

presentation by each team that applies evidence-based treatments and showcases valuable clinical applications ready to use in your daily practice. The variety of clinical approaches and topics will open new perspectives and present tools for more efficient and predictable solutions for your patients.

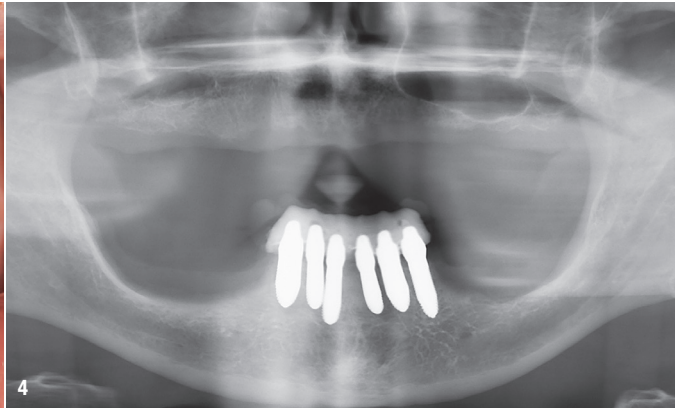
In the Digital round, our experts will present workflows that optimize accuracy through improved diagnosis, treatment planning, and surgical execution. Digital workflows are fast becoming the standard of care in dentistry, and Straumann is here to be your trusted partner in this journey.

Do not forget to continue to vote for your favorite SWCC team! Public voting allows teams to accumulate extra points. Points that just might help them qualify for the championship round! If you missed voting in Rounds 1 and 2, it's not too late to register.

Make sure to mark your calendar with the final championship round on December 3rd. The Esthetics round where the best teams will compete face to face while you watch from the comfort of your home or clinic!



**REGISTER NOW ON**  
[www.straumann.com/swcc](http://www.straumann.com/swcc)



**Fig. 3:** Immediate provisional restoration placed on the implants of the same height as the old denture. **Fig. 4:** Post-op dental panoramic tomogram with the provisional restoration on the implants.

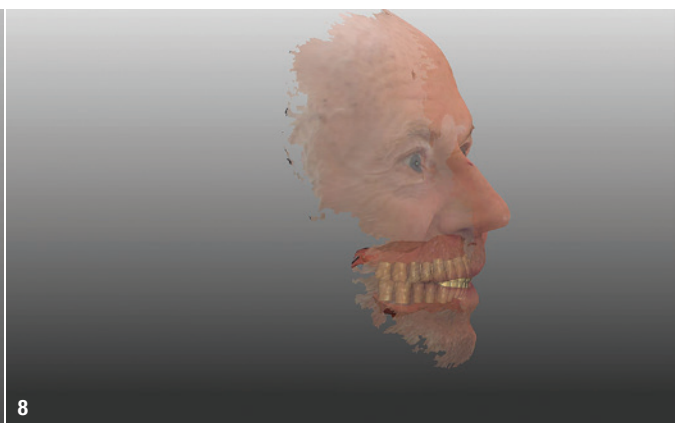
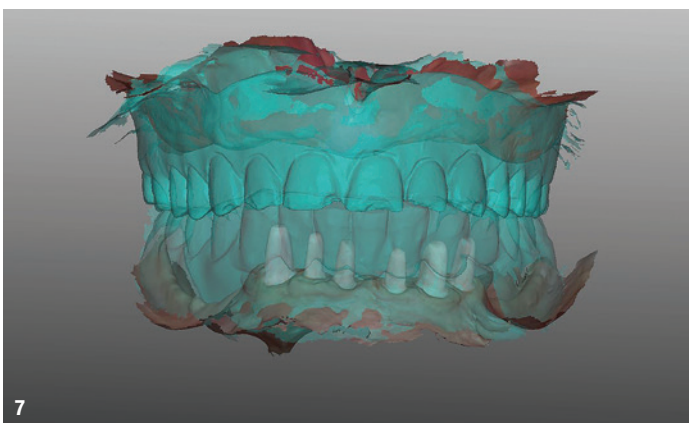


**Fig. 5:** The healed and trimmed ceramic implants in an irritation-free environment. **Fig. 6:** Intra-oral scan of the ceramic implants and the edentulous maxilla.

tive substances can penetrate bacteria and human cells because holes are torn in their membranes by the simultaneously generated electromagnetic field. In the process, bacteria die faster than cells because their genetic material is not protected by a cell nucleus. In human cells, no damage occurs with a short exposure time.<sup>2</sup> In medical applications, two plasma effects are used in particular (as of 2022):

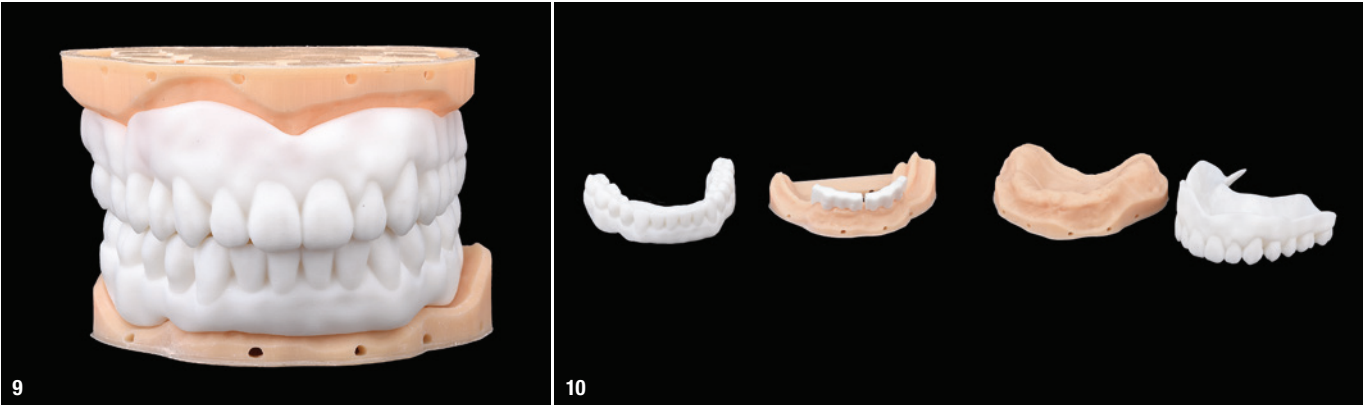
1. inactivation of microorganisms, including multiresistant pathogens;
2. stimulation of cell proliferation and microcirculation, resulting in the regeneration of destroyed tissue.<sup>3</sup>

Cold atmospheric plasmas are complex mixtures of various active agents such as ozone, charged atoms, molecules and electrons, UV radiation and high electric fields. The compo-



**Fig. 7:** Matching of the intra-oral scan with the scan of the old prosthetic situation. **Fig. 8:** The digital impression from the practice integrated into the facial scan taken in the laboratory.





Figs. 9 & 10: The individual created trial dentures around the gingival area and the 3D-printed resin models.

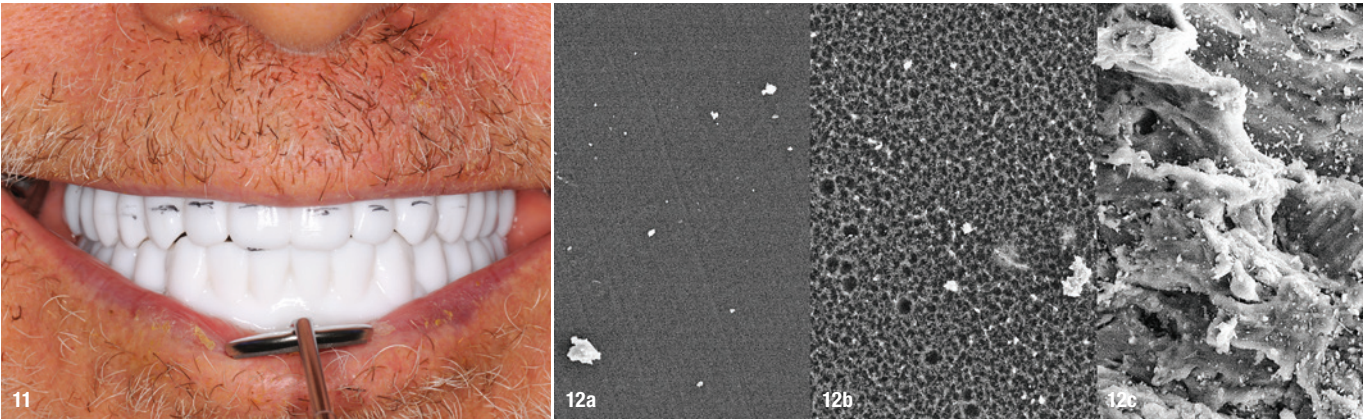


Fig. 11: Taking the bite using printed prostheses, having already considered the new bite position and aesthetics. Figs. 12a–c: For comparison, the different surfaces. Untreated (a). Irradiated with 110 µm (b). Surface of the PEEK framework etched with the oxygen–argon mixture (c).

nents act synergistically on the tissue to be treated, having a range of different positive effects. The blood circulation-promoting, bacteria-reducing and skin-regenerating effects of cold plasma are relevant in the context of the wound healing process, for example in preoperative and postoperative or chronic wounds, as well as in the treatment of skin diseases.<sup>4</sup> The combination of the various active principles of plasma has a strong antibacterial and wound healing effect.<sup>5</sup>

### Use of plasma in dentistry

In dentistry, the natural gas ozone is used in a concentration compatible with health to kill bacteria and viruses.<sup>6</sup> In their 2020 study of the effects of treating nano-ZR implants with cold atmospheric plasma, Takao et al. documented another positive effect, finding that superhydrophilicity could be achieved, although plasma



Figs. 13 & 14: The finished prostheses with the integrated bars.



**Fig. 15:** Packaged prostheses after undergoing the laboratory's standard plasma cleaning. **Fig. 16:** Cemented bars *in situ* on three implants each.

treatment does not affect the roughness of the implant.<sup>7</sup> Their *in vitro* and *in vivo* studies measured faster and better protein, cell and bone adhesion, suggesting that plasma treatment is useful as a prosthetic treatment option for patients with metal allergy.<sup>7</sup> Plasma surface activation also improves the conditions for complete osseointegration.<sup>8</sup>

### Use of plasma in the dental laboratory

Plasma enables a form-fitting and gap-free combination of high-performance plastics, such as PEEK, with other materials, for example zirconia. By activating and etching the surfaces with an ionised oxygen–argon gas mixture, the use of primers can be dispensed with in many cases. Oxygen radicals increase the surface tension, and the bombardment with argon atoms creates a micro-sandblasting effect that topographically changes the surface at the nanoscale and forms a retention base. If bonding agents are omitted, the risk for allergy patients is minimised. The ion bombardment generated in the low-pressure plasma causes the removal of organic contaminants at the nanoscale through physical and chemical processes. Bacteria and viruses are killed. The use of plasma offers an effective supplement to hygiene management in the laboratory and practice—particularly in light of the legal requirements that are becoming increasingly stricter. Abutments, superstructures, dental auxiliaries, dentures, other dental prostheses, splints and orthodontic appliances can be disinfected with low-pressure plasma. This also applies to repairs, worn dentures, acrylic dentures and implant dentures with possible fungal infestation.<sup>13</sup>

### Case presentation

The 75-year-old male patient presented to our practice with the request for a new restoration. He wore an insufficient complete denture in the upper jaw and a removable partial denture in the lower jaw on a small number

of remaining teeth in the anterior. The mandibular anterior teeth were found to be devitalised and to be affected by subtle partial apical osteolysis and extensive secondary caries which affected only some of the teeth. The patient refused endodontic treatment. Instead, he expressed the wish for restoration with ceramic implants. The assessment of the patient's general condition revealed various health complaints, including frequent nocturnal urination and extensive paraesthesia and pain in his shoulders and arms. The craniomandibular dysfunction screening was within normal limits. Neural therapy with 5 ml of 1% procaine in regions #18, 17, 13, 23, 27, 28 and 43 to 34 resulted in an immediate reduction of the paraesthesia and pain symptoms. In addition to the inconspicuous apical osteolysis affecting tooth #42 and the pronounced vertical and horizontal bone loss in the posterior region, the CBCT findings revealed a bone density reduction, indicating FDOJ in regions #18, 17, 13, 23, 27 and 28 (Fig. 1).

### Therapy

Before the surgical procedures, the situation with and without the prostheses in place was recorded using an intra-oral scanner, and a digital duplicate of the prostheses was made. The first step was FDOJ restoration in regions #18, 17, 13, 23, 27 and 28, which resulted in an immediate, significant improvement in the shoulder and arm symptoms and a complete reduction in the paraesthesia. In the second step, the remaining teeth were carefully extracted, and everything was prepared for the immediate implantation of the planned six one-piece ceramic implants (SDS Swiss Dental Solutions) in the extraction sockets of regions #43 to 34. For this purpose, the implants were cleaned using plasma directly before insertion in order to achieve the highest possible bacterial reduction for the patient.

### Insertion of implants

After cleaning the extraction sockets with ozone, the six implants were inserted along with advanced platelet-

# Patent ➤

## Superior osseointegration, unmatched long-term stability. **Proven by science.**

Together with leading scientists and highly experienced material experts, Zircon Medical Management, manufacturer of the Patent™ Dental Implant System, has mastered the complex process of manufacturing zirconia implants. Only through the proprietary manufacturing process, a surface roughness (Ra 5,7 µm) is achieved that is up to five times rougher than conventional zirconia implant surfaces. In the subsequent sintering stage, potential process-related microcracks are eliminated. Moreover, the design of the two-piece Patent™ Implant was purposefully engineered to complement the material characteristics of zirconia.

The result is a soft-tissue-level zirconia implant that is unparalleled in terms of **osseointegration success** and **long-term stability**.



Fast healing, healthy soft tissues, stable marginal bone levels: The long-term success of the Patent™ Implant has been scientifically proven. To learn more, visit [www.mypatent.com](http://www.mypatent.com)





**Figs. 17 & 18:** The overall situation harmoniously integrated into the mouth and face, and the optimised aesthetics in the anterior beautifully accentuated.

rich fibrin (A-PRF) membranes. For this purpose, the implants were wetted with the A-PRF exudate and inserted, and the A-PRF membranes were filled into the gap between the bone and the implant. The advantages of A-PRF are its high protein and platelet content. Platelets in particular contain a high amount of growth factors that accelerate bone regeneration. Various studies have shown the advantages of A-PRF wetting in extraction sockets. In guided bone regeneration or guided tissue regeneration, the A-PRF membrane provides improved dimensional stability of the bone compared with the natural healing process. It has been shown that filling the extraction sockets with PRF reduces the risk of osteomyelitis almost tenfold. Thus, the PRF membrane ensures improved and accelerated bone regeneration and healing, as well as maintains the quality and density of the residual alveolar ridge. The risk of infection is also significantly reduced.<sup>9-12</sup> This method of preparation created the best conditions for the healing of the inserted implants without complications. Finally, the wounds were closed with resorbable suture (Fig. 2). For the healing phase, a chairside-fabricated provisional restoration was placed on the implants with a discreet attachment in region #44 and a pontic in region #31, achieving an even occlusion and the best possible aesthetics (Fig. 3). The provisional restoration was of the same height as

the removable mandibular denture. Finally, the correct fit of the implants with the provisional restoration in place was checked radiographically, and the patient was discharged (Fig. 4).

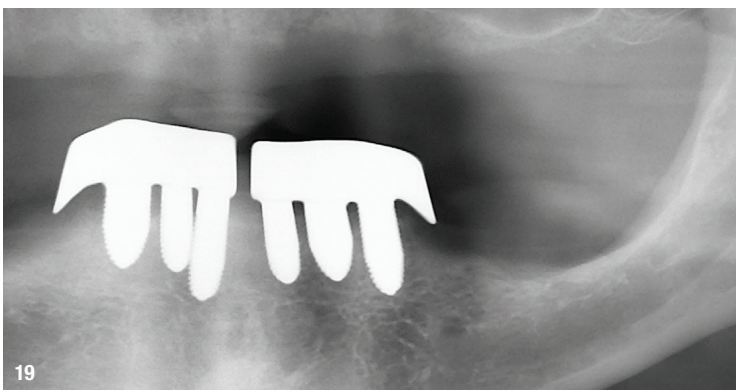
We checked the situation again about 14 weeks later. After removal of the provisional restoration, the gingiva was free of irritation and the implants were osseointegrated (Fig. 5). The Periotest (Medizintechnik Gulden) and the insertion test to between 15 and 20 Ncm did not cause any rotation or pain. We then scanned the implants with an intra-oral scanner, matched the new situation with the scan of the initial situation and sent the patient to the laboratory (Figs. 6 & 7).

**Facial scan and fabrication of the dentures**

A telescopic mandibular prosthesis made of PEEK on zirconia bars and a complete maxillary denture made of PMMA were planned. First, a facial scan was taken in the laboratory, and the digital impression from the practice was integrated into it (Fig. 8). Based on this data, the facial analysis and the correct positioning of the dentition were carried out. Based on the results, the mandibular bars were designed using backward planning and milled from the ultra-hard zirconia VITA YZ T White (VITA Zahnfabrik). The gingival area was then added to the individual set-up, and the trial dentures and resin models were 3D-printed (Figs. 9 & 10). These were used by the practice for bite checking and bite taking (Fig. 11). The unfavourable aesthetics in the anterior were digitally optimised, and the anterior teeth in the upper jaw were lengthened. After minimal corrections of the occlusion, the bite was encoded, and the trial dentures were sent back to the laboratory. A functional impression was taken of the bar frameworks.

At the next appointment, we were already able to check the wax-up of the maxillary and mandibular dentures. The occlusion was checked again, fine-tuned and coded again by means of bite registration.

In order to prepare the smooth surfaces of the PEEK framework for secure bonding to the ready-made teeth,



**Fig. 19:** Confirmation radiograph after insertion of the complete denture in the lower jaw.

everything was exposed to an oxygen–argon mixture in the vacuum chamber of the DENTAPLAS plasma unit (Diener electronic) according to a specially stored and reproducible program. The result was an etched, wonderfully retentive surface (Fig. 12). In the finished telescopic prosthesis, the receptacles for the friction parts with the integrated bars were sealed with composite (Figs. 13 & 14). If necessary, these could be easily reopened and supplemented with the zirconia resin friction parts. Finally, the prostheses were disinfected via plasma and packaged according to the laboratory's standard plasma cleaning concept and handed over to the practice for insertion (Fig. 15).

### Insertion in the practice

As soon as the final prostheses arrived in the practice from the laboratory, the bars were placed on the implants and firmly cemented in place (Fig. 16). The prostheses were then inserted, and the fit was visually checked once again. It was satisfying to see how harmoniously the overall situation integrated into the mouth and face. The optimised aesthetics of the anterior also turned out beautifully (Figs. 17 & 18). Finally, the situation was checked with the help of a radiograph (Fig. 19).

### Conclusion

In 2013, Canullo et al. compared the clinical results of two different procedures of preparing abutments before they were placed in patients. In one group, the abutments were treated with hot steam, and in the other group by means of an argon plasma reactor. After two years, significantly higher peri-implant bone resorption was found in the group with abutments treated with hot steam compared with the group with abutments treated with plasma.<sup>14</sup> In a statement by the German working group for hygiene in dentistry (Deutscher Arbeitskreis für Hygiene in der Zahnmedizin), the question was raised of whether the results of the study by Canullo et al. were due not to different microbial contamination but to surface changes of the abutments as a result of the plasma treatment, which had led to more stable peri-implant tissue attachment.<sup>15</sup> It is known that treatment of implants with certain plasmas, in addition to cleaning and disinfection, can lead to surface modification, the effect of which is better interaction with the surrounding tissue (bone or soft tissue) and ultimately better osseointegration of the implants. Such an effect has also been discussed in various publications regarding implants treated with argon plasma. It can be assumed that such a change in the surface of the abutments also took place through the argon plasma treatment used by Canullo et al., influencing wound healing.<sup>16</sup> Based on Canullo et al.'s positive results, we decided in the team not only to completely dispense with any metals, but also to thoroughly clean and disinfect with plasma all medical devices that are incorporated into the body.

## contact

### Dr Michael Rak

info@praxis-dr-rak.de

www.praxis-dr-rak.de



### Arbnor Saraci



### Lukas Wichnalek



### Norbert Wichnalek

info@wichnalek-dl.de

www.wichnalek-dl.de



# Zirconia implants for natural tooth replacement in the aesthetic zone

Drs Paul S. Petrunaro, Zeljko Atlagic, Jardin Yousef & Tanner Hauptman, USA

**Replacing the natural tooth** with dental implants has become the standard of care in the practice of dentistry.<sup>1, 2</sup> From single-tooth replacement to complete maxillary and mandibular implant-supported restoration, patients all around the world enjoy the benefits of implant dentistry.<sup>1, 2</sup> The success rates of implants have been well documented in the dental literature over the last 50 years. Advances in surgical techniques have allowed for a more conservative, minimally invasive protocol to ensure that soft-tissue contours are preserved.<sup>3-8</sup> Advancements in digital workflow procedures, prosthetic and cosmetic protocols, and reconstructive materials has allowed the implant team to deliver not only aesthetic but also biologically sound implant-abutment restorations that can preserve bone and soft-tissue attachment levels long term.<sup>3-8</sup>

However, there are some potential problems with modern two-piece titanium implant designs and maintenance of such implants, affecting not only long-term success rates

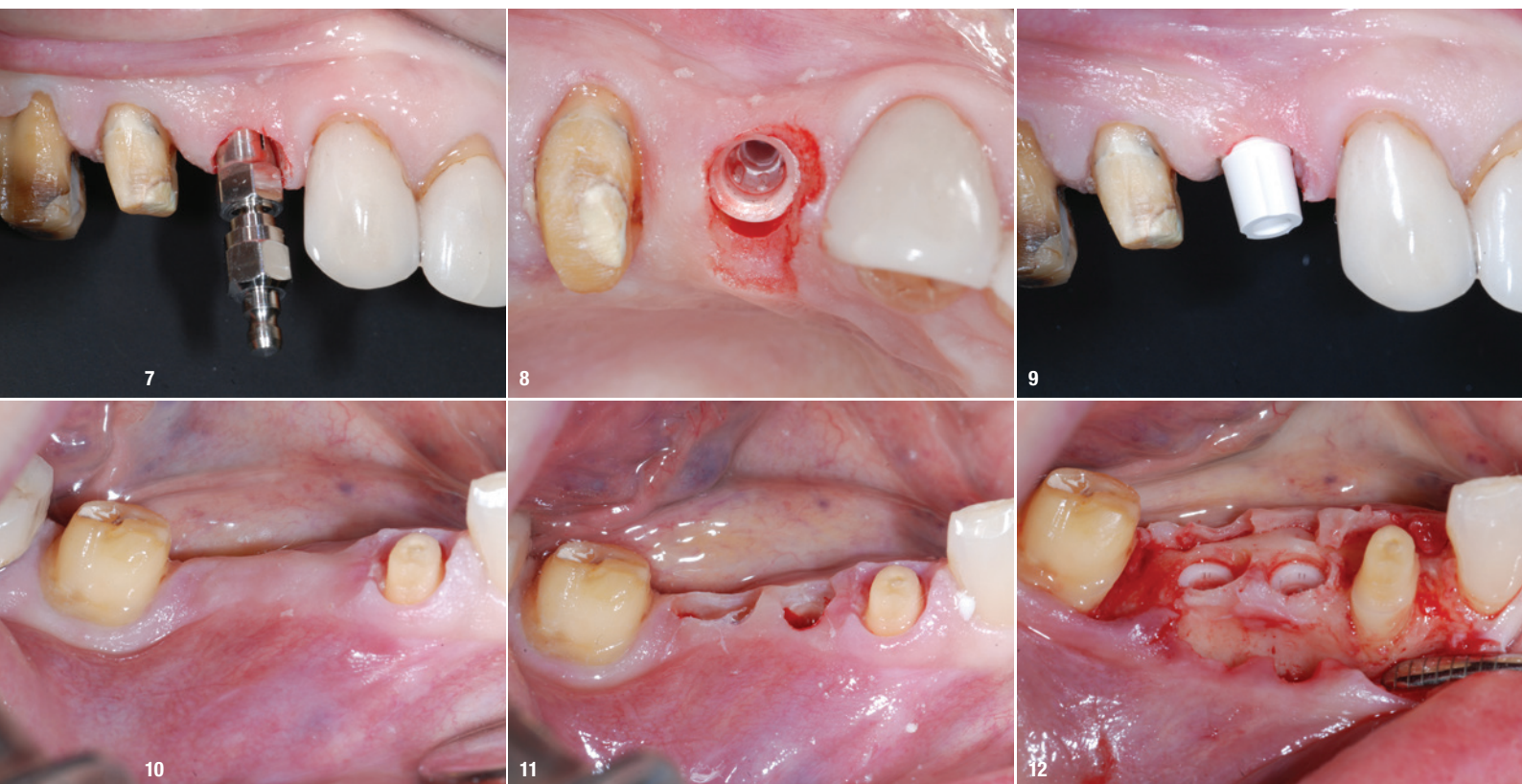
but also short-term observation periods.<sup>9, 10</sup> Titanium implants with surface enhancements, alterations and various coatings have been shown to present the dental implant team with challenges in maintenance schedules when portions of the implant become exposed to the oral cavity, for example as a result of breakdown of the soft-tissue seal around the abutment or implant collar, enabling bacterial biofilm to form on the surface and initiating peri-mucositis and/or peri-implantitis.<sup>11-14</sup> Additionally, in areas where there is a deficiency of attached keratinised tissue, a thin tissue biotype or recession of the peri-implant tissue around the definitive implant restoration, this can contribute to the initiation of peri-mucositis and/or peri-implantitis.<sup>15-17</sup>

Other factors that can contribute to peri-implant disease include:

- lack of oral hygiene, causing inflammation and bone loss;
- tobacco use;



**Fig. 1:** Pre-op clinical view, right view. **Fig. 2:** Pre-op clinical view, anterior view. **Fig. 3:** Pre-op clinical view, left view. **Fig. 4:** Pre-op CT scan, panoramic view. **Fig. 5:** Edentulous site #14 before correction. **Fig. 6:** Creation of a naturally contoured emergence profile preceding implant placement.



**Fig. 7:** Minimally invasive zirconia implant placement with the carrier mechanism attached. **Fig. 8:** Implant placed in site #14, occlusal view. **Fig. 9:** PEEK provisional abutment seated, prior to preparation. **Fig. 10:** Pre-op clinical view of the mandibular right posterior. **Fig. 11:** Creation of the sculpted osteotomies in the mandibular right posterior. **Fig. 12:** Zirconia implants placed sub-crestally within the sculpted osteotomies created in the alveolar ridge.

- genetic factors; and
- corrosion of the base material of the titanium implant.<sup>18–21</sup>

When the peri-implant tissue lacks volume and thickness, aesthetic complications can also occur with titanium implants.<sup>15–17</sup> Discoloration of the facial tissue can lead to premature breakdown of the titanium implant complex.

Zirconia has been used in complete crowns, prostheses and final abutments for many years. It has a high strength, its white colour avoids the unaesthetic grey appearance of the peri-implant tissue associated with metal-containing abutments and restorations, and it has been shown to be a successful alternative to titanium for dental implant designs.<sup>22–25</sup>

Additional benefits of zirconia as a dental implant material are the following:

- a high level of biocompatibility and fracture toughness;
- reduced bone resorption and inflammatory response around zirconia dental implants;
- reduced biofilm levels around zirconia implants; and
- flexibility of preparation of the collar and implant body, allowing for resolution of critical surgical placement issues that can arise with regard to implant placement depth, spatial arrangement and trajectory.<sup>26–29</sup>

In patients with increased potential for peri-implant disease and infection, a metal-free dental implant option should be considered.<sup>30</sup> Patients who have diabetes, patients who have undergone radiation therapy or chemotherapy, patients with a history of taking any bisphosphonates and younger individuals suffering from premature tooth loss should all be considered for zirconia dental implants.<sup>31, 32</sup> The following case report will outline the use of zirconia dental implants to replace the natural teeth in various edentulous sites and teeth requiring immediate extraction and implant placement in a patient undergoing full-mouth rehabilitation.

A 64-year-old non-smoking female patient presented for rehabilitation of previous restorations, teeth in which endodontic treatment had failed and edentulous spaces (Figs. 1–3). Radiographic examination revealed that teeth #14, 45, 46 and 35 were missing and confirmed the failed treatment of teeth #25 and 26 (Fig. 4).

The patient agreed to new complete zirconia crowns on the previously treated teeth, excluding the remaining third molars, and consulted for implant treatment in sites #14, 25, 26, 46, 45 and 35. After reviewing the benefits of metal-free dental implants and ceramic restorations, especially when placed adjacent to remaining natural teeth, the patient chose zirconia dental implants and an immediate restoration protocol. Prior to the commencement of treatment, records were taken, involving a series of facial

and intra-oral digital photographs, 3D intra-oral scanning and smile design consultation.

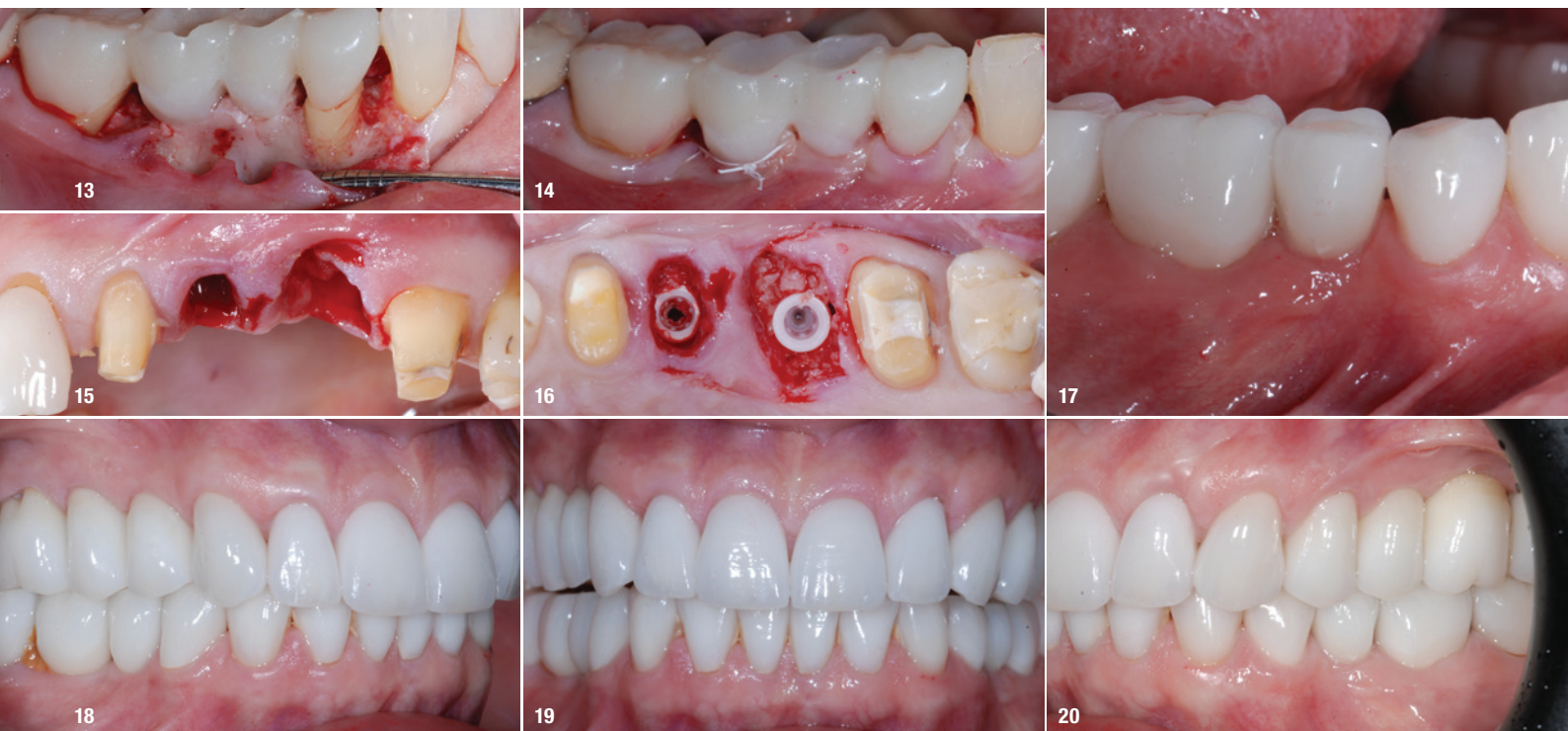
Based on the patient's desired aesthetics, function and treatment sequence, a master diagnostic design file was created and used to guide the surgical guides, fabrication of the provisional restorations, and implant length and diameter selection, and as a preview of the patient's initial design criteria. The restorative clinician prepared the posterior sextants for aesthetic provisional restorations to be used as surgical guides and a template for creation of the provisional restorations and pick-up of the provisional abutment (Figs. 5 & 6).

Following a minimally invasive placement protocol, a 4.3 × 11.0 mm two-piece implant (Zi, Neodent) was placed in site #14 to an initial torque of 50 Ncm (Figs. 7 & 8). A PEEK provisional abutment was placed (Fig. 9), prepared and picked up into the provisional restoration. The margins and contours of the implant–restoration complex were adjusted outside of the mouth, and the provisional restoration was seated with temporary cement over the previously prepared teeth #16 and 15 and screwed on to the implant #14.

Proceeding with the mandibular right posterior quadrant, after an appropriate local anaesthetic had been administered, the previous provisional restoration was removed (Fig. 10). Utilising a #8 round surgical length diamond bur,

sculpted osteotomies were created, laying the foundation for natural soft-tissue contours to be formed (Fig. 11). Once these had been created, a crestal incision was made and a full-thickness flap was raised to reveal the underlying alveolar crestal contours to help support the natural soft-tissue contours that start undergoing maturation at the initial surgical placement. After this, two zirconia implants were placed, a 4.3 × 11.0 mm implant in site #45 and a 4.3 × 10.0 mm implant in site #46, both to an initial torque of 50 Ncm (Fig. 12). After the placement of PEEK provisional abutments, the aforementioned retrofitting protocol was performed to complete the immediate provisional restoration (Fig. 13), followed by closure utilising a continuous sling suture technique with #4/0 e-PTFE suture material (Fig. 14).

Following the surgical plan, the maxillary left posterior sextant was next to be treated. Extraction of teeth #25 and 26 was accomplished using a minimally invasive protocol (Fig. 15). Debridement of all soft tissue in the extraction sockets was followed by site preparation. After the internal sinus lift protocol at site #26 had been completed and a small amount of platelet-rich fibrin and grafting material had been placed into the elevated sinus area at the apex of site #26, two 4.3 × 13.0 mm zirconia implants were placed to an initial torque of 50 Ncm. Platelet-rich fibrin and grafting material were placed around the implants to fill in the defects that remained after implant placement (Fig. 16). Following the provi-



**Fig. 13:** Retrofitting of the surgical guide–provisional complex to the prepared PEEK abutments. **Fig. 14:** Continuous sling sutures. **Fig. 15:** Atraumatic extraction of teeth #25 and 26. **Fig. 16:** Zirconia implant placement with grafting complex seated, using minimally invasive protocols. **Fig. 17:** Definitive restorations on implants #46 and 45. **Fig. 18:** Final clinical view, right view. **Fig. 19:** Final clinical view, anterior view. **Fig. 20:** Final clinical view, left view.





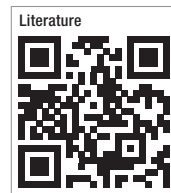
**Fig. 21:** Final smile. **Fig. 22:** Final digital periapical radiograph of implant #14. **Fig. 23:** Final digital periapical radiograph of implants #25 and 26. **Fig. 24:** Final digital periapical radiograph of implant #35. **Fig. 25:** Final digital periapical radiograph of implants #46 and 45.

sionalisation procedure previously outlined, the site was provisionalised and the entire provisionalised dentition adjusted.

After an observation period of four months, the patient was scheduled with the restorative clinician for placement of the final custom abutments and zirconia restorations (Figs. 17–25). Natural-looking soft-tissue aesthetics was achieved, and the soft-tissue contours of the implant sites exhibited balance and symmetry with those of the natural teeth.

## Discussion

Compared with older, conventional tooth replacement options, dental implants are the preferred method for managing edentulous areas, from single-tooth replacement to full-mouth rehabilitation. Additionally, using a metal-free implant option significantly reduces the incidence of peri-implantitis, tissue discoloration, aesthetic complications, and soft-tissue irritation and inflammation. Advancements in zirconia implant designs and protocols have simplified zirconia implant placement and restoration procedures, which follow common procedural techniques, similar to those of titanium implants. Less biofilm formation is a significant benefit observed with zirconia implants placed in single and multiple sites adjacent to the remaining natural dentition. We and other clinicians worldwide have observed significant reduction of tissue inflammation, crestal alveolar bone loss and aesthetic complications. We recommend additional clinical studies and case reports and continue to demonstrate the benefits of zirconia as an implantable material compared with titanium.



## about the author



**Dr Paul Petrunaro** has been in private periodontics and implantology practice since 1988. He is a fellow of the International and American College of Dentists and a diplomate of the International Congress of Oral Implantologists. Dr Petrunaro is renowned for his diversified seminars and lectures on advanced periodontal, oral surgery, implant surgery and reconstruction, and digital dental procedures. He is also considered an expert in the treatment of severe maxillary atrophy, use of zygomatic implants, management of previous failed implant procedures and rapidly growing field of metal-free implant dentistry. Dr Petrunaro has educated clinicians around the world for the last 25 years and continues to contribute to developments in technology and pave the way for more efficient methods of treatment for patients seeking to have their missing teeth restored with dental implants.

## contact

**Dr Paul S. Petrunaro**  
 startsmilingdentalimplantcenters.com  
 info@startsmilingchicago.com



# Fully guided four-unit ceramic restoration on two implants

Dr André Chen, Portugal

**Patients nowadays** are more self-conscious than ever about their appearance and overall health. From their perspective, an excellent aesthetic result is often seen as a suitable end to their dental issues. Various reports have shown that biological complications can occur during treatment with dental implants, and infections may arise. These clinical scenarios may require challenging, time-consuming and expensive peri-implant infection treatment. On this matter, the rise in recent patient-reported outcome measures publications demonstrates the importance of also considering patients' perspectives and psychological factors when evaluating implant dental treatment outcomes.<sup>1-3</sup>

The Straumann PURE Ceramic Implant represents an advantage for patients with a thinner mucosal biotype or a high smile line.<sup>4</sup> Moreover, it is biocompatible, which makes it an ideal alternative to titanium implants for patients who need or request metal-free solutions. Compared with titanium surfaces, zirconia (yttria-stabilised tetragonal zirconia polycrystals) exhibits favourable epithelial attachment and has shown less bacterial concentration in various clinical trials.<sup>5,6</sup> This characteristic is significant, as clinical studies have shown that bacterial adherence to implant surfaces can result in peri-implant bone loss.<sup>7</sup> In addition, the surface of the Straumann PURE Ceramic Implant, Straumann ZLA, features a topography characterised by a macro- and micro-roughness similar to that of the proven Straumann SLA surface. The following clinical case report describes a fully guided four-unit ceramic restoration on two Straumann PURE Ceramic Implants (two-piece design). The soft- and hard-tissue outcomes and the fulfilment of the patient's expectations demonstrate how reliable this system is.

## Initial situation

A 71-year-old female patient presented to our clinic seeking a smile makeover. Her medical history was unremarkable: she was a non-smoker with no systemic disease (ASA I). Furthermore, she reported not taking any medications or having allergies. The clinical as-

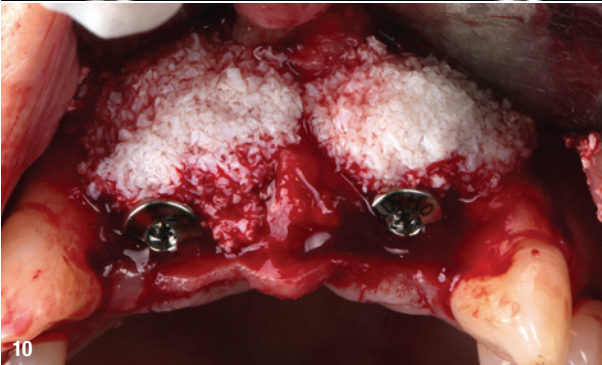
essment found an unaesthetic restoration in the anterior sextant that created the appearance of the teeth being extruded and tilted to the vestibular area. In addition, the cervical surfaces of the crowns of teeth #12 and 22 were visible, and there were dark spaces between the teeth, which the patient did not like (Fig. 1). She explicitly stated that she wanted a predictable, minimally invasive metal-free solution to recover the aesthetics of her smile. The clinical intra-oral and radiographic examination after removing the bridge revealed the presence of a hopeless dentition, teeth #12, 11 and 22 having vertical root fractures and an active infection and loss of the buccal plate (Fig. 2).

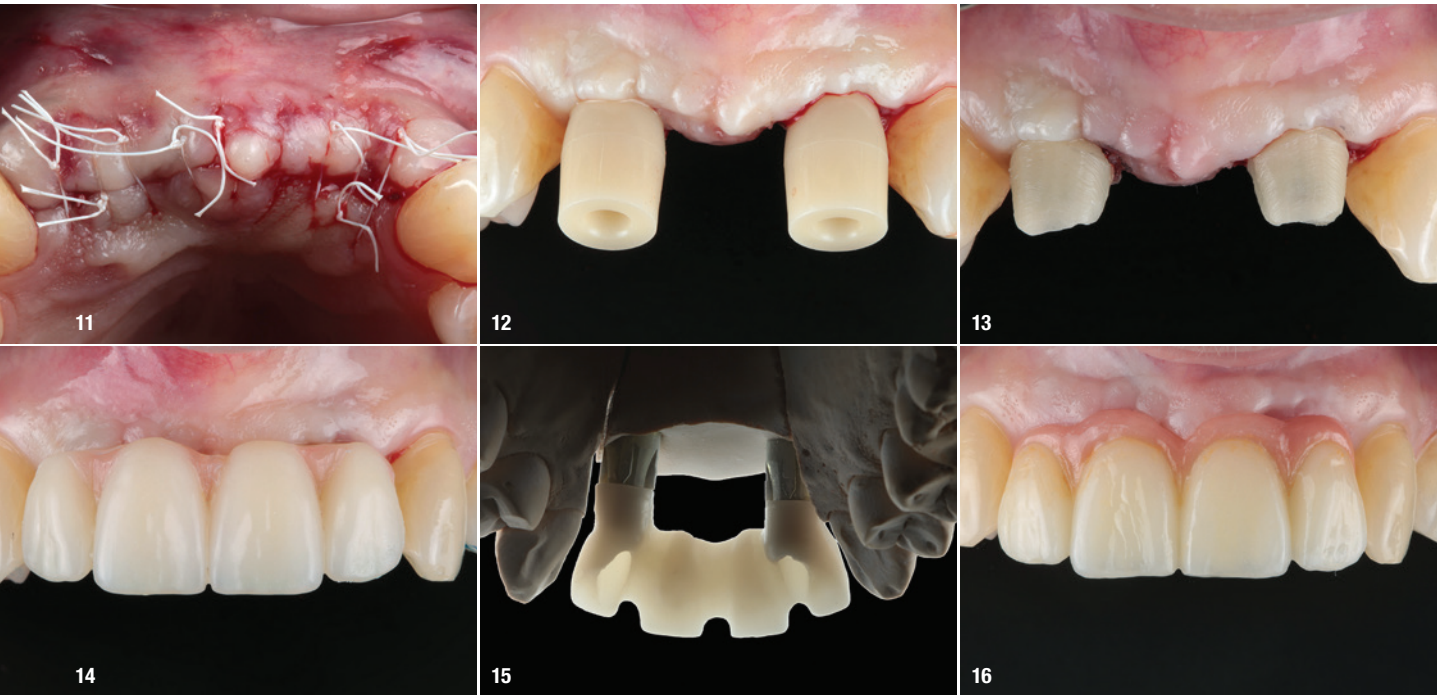
## Treatment planning

After a thorough discussion of the various treatment options with the patient, delayed implant placement was decided on owing to the active infection in the area to be treated. As a first step, the root remnants were extracted with minimal trauma, intending to preserve the remaining bone, and since aesthetics was an essential factor for the patient, a removable prosthesis replacing teeth #12-22 was prepared and placed on the day of extraction (Figs. 3 & 4).

At the follow-up visit 12 weeks later, healing was found to have proceeded uneventfully (Figs. 5 & 6). After the clinical examination, a CBCT scan was used to determine the amount of bone in the edentulous area. The CBCT examination confirmed bone availability for implant placement in combination with bone augmentation, and an intra-oral scan was taken, and this information was sent to the laboratory.

The DICOM files and STL were merged for implant planning, the static guided pilot drilling digital workflow and surgical guide production (P20+, Straumann). Two ceramic implants in locations #12 (4.1 × 10.0mm) and 22 (4.1 × 10.0mm) to support a four-unit screw-retained bridge from implant #12 to implant #22 were planned. In addition, PEEK temporary abutments for the provisional bridge were planned for the postimplant healing





phase. The surgical guide was planned and fabricated based on the information for ideal prosthetically driven implant positioning.

### Surgical procedure

Before surgery, the surgical guide was evaluated to ensure the proper fit (Fig. 7). Local anaesthesia with 2% lidocaine and 1:100,000 adrenaline was administered. A mucoperiosteal flap with a crestal incision was raised. To prepare the osteotomy, the manufacturer's drilling protocol was followed. The osteotomy was prepared to a diameter of 2.2 mm and then widened to a diameter of 2.8 mm, and the final preparation depth was checked with the 3.5 mm diameter depth gauge. The final osteotomy preparation involved profile drilling and subsequent tapping (Fig. 8). The implants were then held by a ceramic pin and placed with the aid of

the handpiece in a clockwise direction at a speed of 15 rpm and to a torque of 35 Ncm (Fig. 9).

Two cover screws were inserted to allow optimal sub-mucosal healing. In addition, as planned, guided bone regeneration with a xenograft and a resorbable membrane was performed (Fig. 10), and the mucoperiosteal flap was carefully adapted and sutured with #4/0 suture for healing by first intention (Fig. 11). A follow-up visit was scheduled for 14 days later, and the healing was uneventful.

### Prosthetic procedure

Three months after healing of the peri-implant tissue, the implants were located, and a conservative horizontal crestal incision was made to access the closure screws. These were removed, and an open-tray impression for the ceramic implant system was taken. A



screw-retained provisional restoration on temporary abutments (Straumann) was prepared. The temporary abutments were individualised and polished on implant analogues according to the clinical situation. The provisional restoration was placed on the implants and tightened to between 15 Ncm and 35 Ncm. Finally, the occlusion was assessed (Figs. 12–14).

For the final restoration, ceramic abutments were used for the restoration of the ceramic implants. A four-unit zirconia prosthesis (zirconia framework with feldspathic veneering) was made to fulfil the aesthetic and functional requirements of the patient. Once it had been loaded, the access holes were filled with composite restoration and PTFE, the occlusion was checked and periapical radiographs were taken. Finally, the patient received detailed oral hygiene instructions and was involved in a yearly maintenance programme (Figs. 15–18).

### Treatment outcomes

The final aesthetic and functional outcomes and the health of both hard and soft tissue fulfilled the patient's requirements. In addition, they increased her quality of life, as she was able to chew and smile again without any limitations.

### about the author



**Dr André Chen** graduated in 2004 from the University of Lisbon in Portugal and received his PhD in oral surgery and medicine from the same university. He currently works in oral surgery and implant dentistry at the university's Faculty of Dental Medicine. He does research in implantology, dental surgery, and oral and maxillofacial surgery,

and his current project is implant aesthetic protocols. He is co-founder and director of the implantology and oral surgery department of International Advanced Dentistry in Lisbon and an oral surgery specialist at the OMD College of Portugal. He serves on the board of directors of the European Society for Ceramic Implantology.

### contact

**Dr André Chen**  
tsouchen@gmail.com



# SUBSCRIBE NOW

ceramic implants—international  
magazine of ceramic implant technology



www.oemus-shop.de

Fax: +49 341 48474-290

I would like to subscribe for the following journals:

ceramic implants 3 issues p.a. €40\*

implants 4 issues p.a. €44\*

\*All prices include VAT, plus shipping and handling.

Terms & Conditions: The subscription may be cancelled in written form without due justification within 14 days of order by contacting OEMUS MEDIA AG, Holbeinstraße 29, 04229 Leipzig, Germany. Dispatching notification in good time will suffice. The subscription is automatically extended by another twelve months if it is not cancelled in written form 6 weeks prior to the end of the reference period.

\_\_\_\_\_  
Last Name, First Name

\_\_\_\_\_  
Company

\_\_\_\_\_  
Street, ZIP, City, Country

\_\_\_\_\_  
E-mail

\_\_\_\_\_  
Credit Card Number

\_\_\_\_\_  
Expiration Date

\_\_\_\_\_  
Security Code

Stamp

\_\_\_\_\_  
Signature

# Ceramic implants for aesthetic transformations

Dr Paresh B. Patel, USA

With new emerging technology, ceramic implants have become innovative products that provide an alternative to traditional titanium implants. They have been shown to be strong, aesthetic and peri-implant tissue-friendly. Some modern ceramic implant systems allow for a metal-free solution for long-term success. This offers a choice to those patients who have a titanium sensitivity or otherwise wish to use a non-metal solution.<sup>1-3</sup> In the aesthetic zone, the maxillary anterior region, placing any type of implant can be challenging, especially with adjacent natural teeth. Ceramic offers an inherent white colour, avoiding the grey show-through of titanium. A thin periodontal biotype is a characteristic that especially poses an aesthetic risk, and this can be minimised with an innovative ceramic implant system and its natural tooth colour. Zirconia has also been shown to provide optimal blood circulation around the implant body, thus increasing the long-term stability of the periodontium-implant complex. The following clinical case demonstrates the use of the Zeramax XT two-piece ceramic implant (Dentalpoint), which uses a unique carbon fibre fixation screw to offer a truly metal-free solution for the aesthetic zone and which has a reversible screw-in prosthetic connection. The implant is made of alumina-toughened ceramic (ATZ), and it is sandblasted

and etched on the body to create a micro-roughened surface with a zone near the neck of the implant that is to not allow for true tissue adhesion.

## Case presentation

A 54-year-old female patient presented to our office to learn about options to restore her failing partially endodontically treated maxillary right central incisor (Fig. 1). The tooth was extracted using instruments to reduce the risk of a buccal fracture and to thus preserve the alveolar bone. The site was preserved with a corticocancellous allograft and allowed to heal for five months (Fig. 2). After healing, smile photographs were taken to assess the overall aesthetic risk of the case. Treatment options were discussed with the patient. Having a ridge width of less than 6.5 mm, the patient opted for a ceramic implant to avoid the potential for grey show-through (Fig. 3). We proposed a veneer graft and a connective tissue graft to minimise these risks were a titanium implant to be placed. The patient declined these surgical interventions.

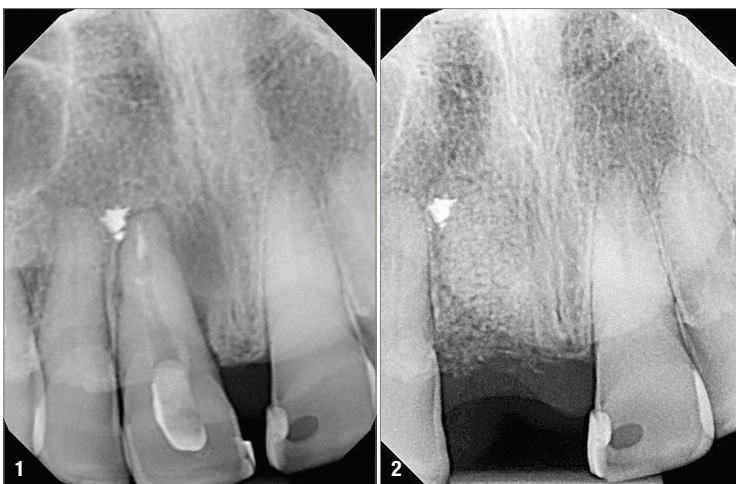
## Surgical phase

Following the protocol suggested by the manufacturer, the site was prepared for ceramic implant placement in a manner very similar to that of a titanium variant. It is important to note that the site must be prepared adequately to prevent excessive implant insertion torque and that the use of a bone tape is necessary. The ceramic implant must also be placed 1.6–0.6 mm supra-crestally, and the connection point is to be above the bone crest.

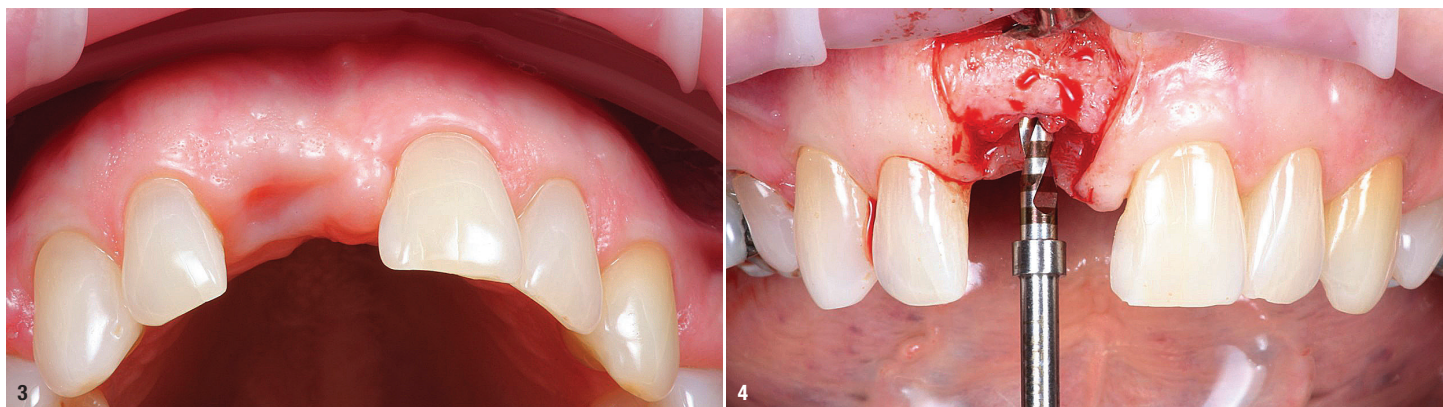
A Zeramax XT implant with a reduced diameter of 4.2 mm and a length of 12.0 mm was placed under local anaesthesia with minimal flap formation (Figs. 4–8). A cover screw was then placed, and the tissue was repositioned and sutured (Figs. 9–11).

## Soft-tissue management and final prosthetic restoration

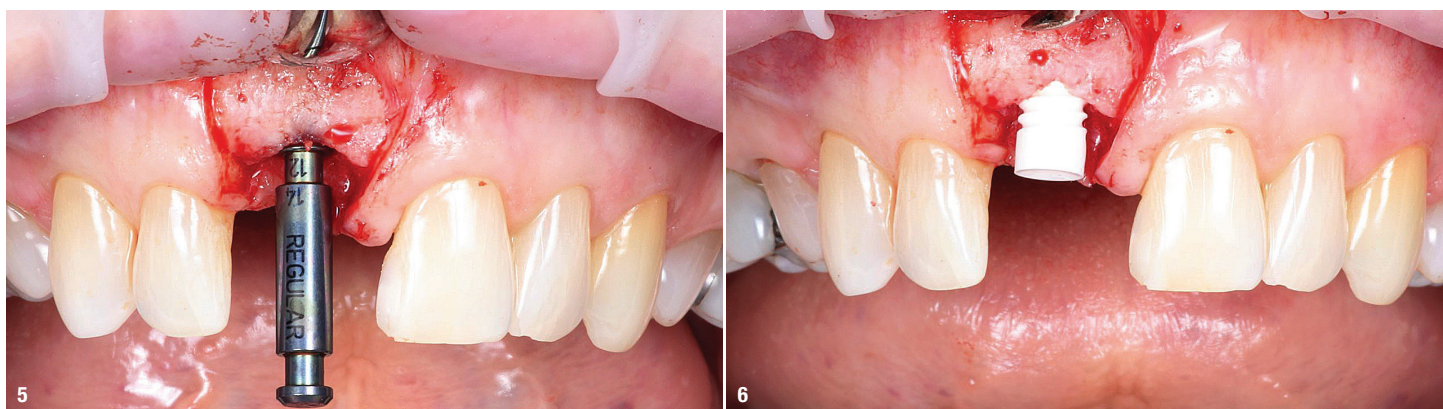
After the healing phase had been completed, the implant was exposed with a diode laser and a 3 mm high Zeramax PEEK healing abutment was placed (Figs. 12 & 13).



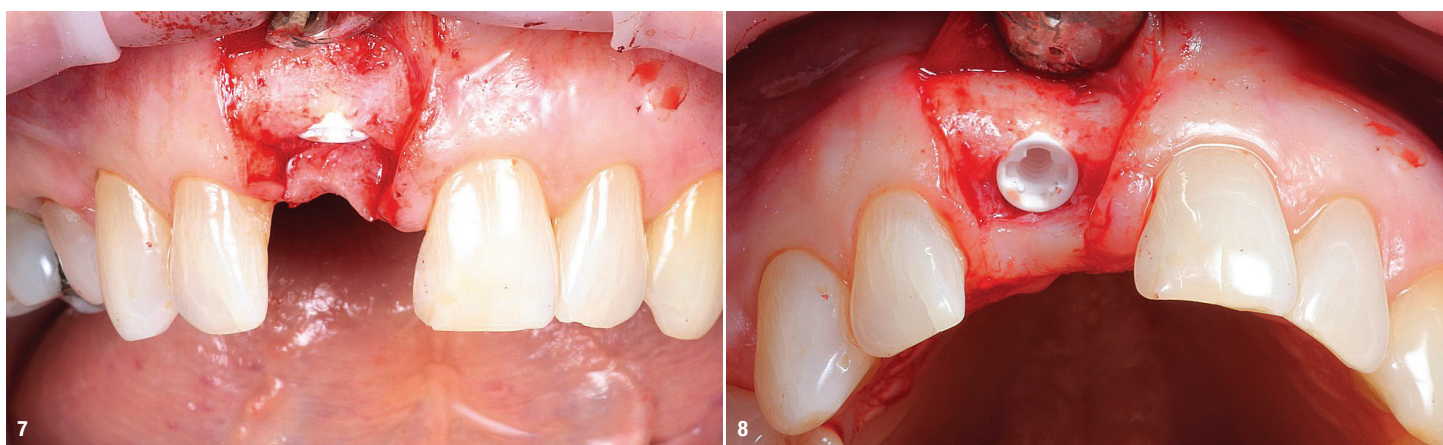
**Fig. 1:** Pre-op situation: a failing endodontically treated tooth with a poor prognosis for retreatment. **Fig. 2:** Healing five months after tooth extraction and placement of corticocancellous bone.



**Fig. 3:** Healed site pre-op situation, occlusal view. **Fig. 4:** Papilla-sparing incision to visualise the reconstructed site and initial osteotomy to depth.



**Fig. 5:** Regular-platform final shaping drill taken to depth. **Fig. 6:** The two-piece ceramic implant with a carbon fibre final abutment screw in place.

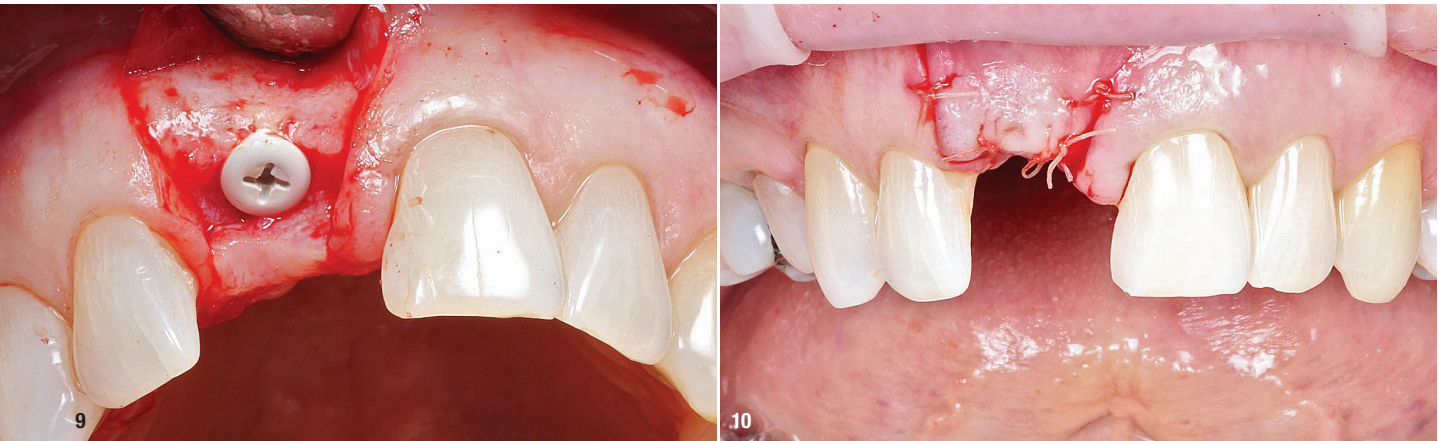


**Fig. 7:** Buccal view of the final implant placement 0.6 mm supra-crestally. **Fig. 8:** Occlusal view of the final implant placement.

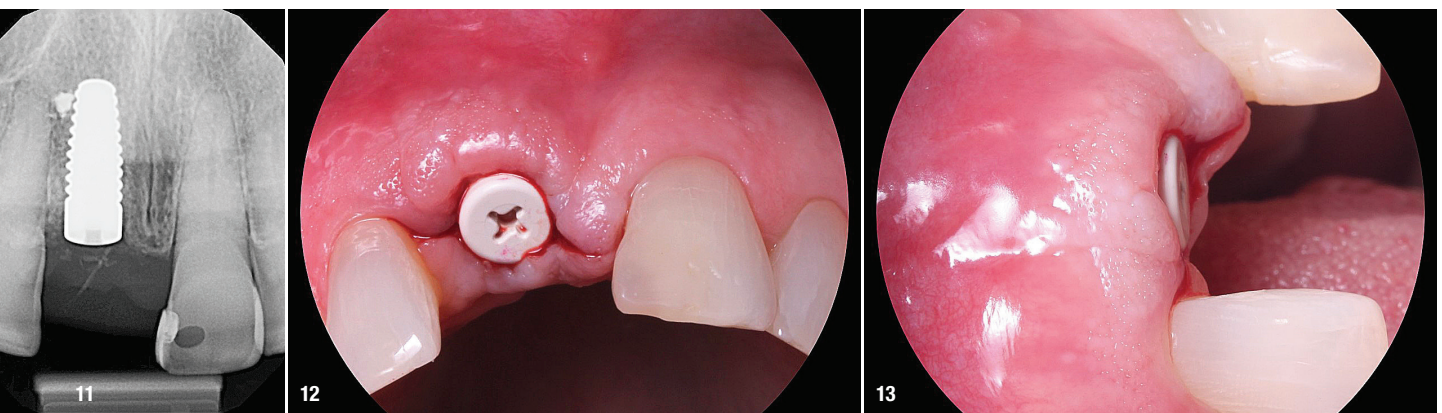
Healing was allowed to continue for another two weeks (Figs. 14 & 15). After the soft-tissue healing phase, the gingiva was evaluated. It showed no signs of inflammation, demonstrating the excellent biocompatibility of the materials.

A standard restorative process using a closed-tray impression coping was planned. After verification with an intra-oral periapical radiograph, a polyvinylsiloxane impression was taken. This was sent to the laboratory to

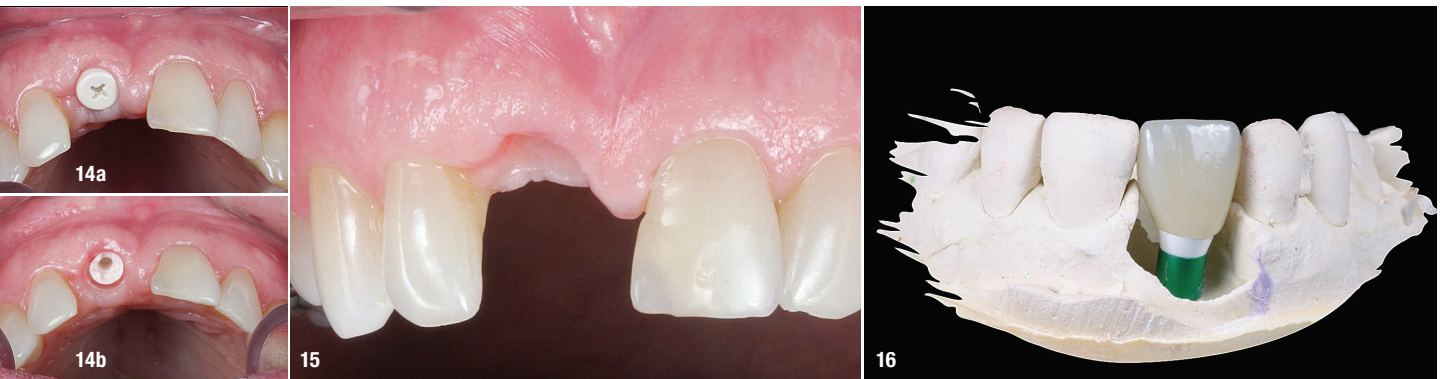
fabricate an all-zirconia crown (Fig. 16). A Zeramex standard abutment also made of ATZ was fixed in the implant with a VICARBO screw (Zeramex XT). This screw is made of carbon fibre longitudinal strands and moulded slightly larger than the internal aspect of the implant, allowing transmission of the forces of mastication to be absorbed while providing a tight, hermetically sealed connection. The carbon fibre screw gives this complex almost twice the tensile strength of a titanium fixation screw. The final crown was tried in and cemented (Figs. 17–19).



**Fig. 9:** Flat cover screw installed into the implant and hand tightened. **Fig. 10:** Closure with resorbable suture.



**Fig. 11:** Final radiograph verification of implant placement 1.5 mm from the adjacent tooth and outside of the nasopalatine canal. **Fig. 12:** Uncovering of the implant and healing abutment placed. **Fig. 13:** Uncovering of the implant (buccal view), showing robust tissue health with no grey show-through of the material.



**Figs. 14a & b:** Situation at two-week healing check of tissue health, occlusal view. With (a) and without (b) healing abutment. **Fig. 15:** Situation at two-week healing check, buccal view. **Fig. 16:** Final crown on a customised stock abutment.

## Discussion

As the number of titanium-based implants being placed per year continues to rise, so does the clinically observed incidence of peri-implantitis. Since the osseointegration rate of ceramic implants closely approximates that of titanium, an alternative exists that can offer a viable solution for reducing the amount of biofilm around the fixture and the peri-implant soft tissue.

With the inherent grey colour of titanium-based fixtures, colour matching and blending into the soft and hard tissue will remain a challenge. This has been minimised with the use of ceramic abutments; however, this does not always reduce the darkened appearance of the peri-implant soft tissue. Ceramic implants, with their white colour, offer optical properties that allow for more natural, lifelike aesthetic results similar to that of the natural tooth.



# ISMI

# INT. SOCIETY OF METAL FREE IMPLANTOLOGY



The innovative specialist society for modern metal-free implantology

## Become a member now!

### Benefits



#### Effective public relations

Benefit from a strong community that elevates the marketing of your practice through effective public relations strategies.

#### Personal online member profile

ISMI provides a personal profile of all active members on their website—free of charge. In addition, the ISMI patient platform provides important information for patients and features a search tool with which patients can find their perfect dentist.



#### Discount on congress fees

Come and join us! Attend the Annual Meeting of ISMI in Munich on 5 and 6 May 2023 and benefit from first-rate continuing education. ISMI members receive a special discount on the participation fee.

#### Online archive for specialists

Get exclusive access to ISMI's extensive online archive. Discuss all relevant questions regarding metal-free implantology with experts and colleagues from around the world and enjoy free access to the online archive where you will find informative training videos and clinical case reports.



#### Newsletter

The ISMI newsletter keeps you up to date with the latest scientific trends, products, and events on a regular basis. It also features user reports as well as a wide range of information and tips on the subject of metal-free implantology.

#### Specialist magazine

As a member of ISMI, your membership fee includes a subscription of the independently published English language magazine *ceramic implants*—international magazine of ceramic implant technology. Published three times per year, the magazine offers specialist articles and event reports as well as industry- and science-related news from the international world of metal-free implantology. In addition, *ceramic implants* provides information about manufacturers and their latest products.



ISMI e.V. Office Leipzig  
Holbeinstraße 29 | 04229 Leipzig | Germany  
Phone: +49 800 4764-000 | Fax: +49 800 4764-100  
office@ismi.me | www.ismi.me

Become a  
member of ISMI now!





**Fig. 17:** Tissue profile on the day of delivery of the customised ceramic abutment and BruxZir crown (Glidewell). **Figs. 18a & b:** Final aesthetic outcome.

## Conclusion

In conclusion, ceramic implants now have overcome the limitations of previous generations by being milled from ATZ to offer high strength. A strong, metal-free connection has been designed to minimise bacterial colonisation and deposition on the surface of the abutment. The naturally white colour avoids dark show-through and promotes optimal blood circulation that is more similar to that of a natural tooth, thus promoting inflammation-free gingival tissue.

These are very positive clinical results, but long-term studies are necessary to further verify the effectiveness and success rates of zirconia implants. As zirconia implants have a remarkably similar surgical and prosthetic protocol to those of titanium implants, most clinicians can transition to offering patients another choice with minimal training and practice. This treatment offered the patient a natural aesthetic result with minimal additional procedures while maximising gingival health and bone health.

### Literature

1. Möller B, Terheyden H, Açil Y, Purcz NM, Hertrampf K, Tabakov A, Behrens E, Wiltfang J. A comparison of biocompatibility and osseointegration of ceramic and titanium implants: an in vivo and in vitro study. *Int J Oral Maxillofac Surg.* 2012 May;41(5):638–45. doi: 10.1016/j.ijom.2012.02.004.
2. Wachi T, Shuto T, Shinohara Y, Matono Y, Makihira S. Release of titanium ions from an implant surface and their effect on cytokine production related to alveolar bone resorption. *Toxicology.* 2015 Jan 2;327:1–9. doi: 10.1016/j.tox.2014.10.016.

3. Addison O, Davenport AJ, Newport RJ, Kalra S, Monir M, Mosselmans JF, Proops D, Martin RA. Do “passive” medical titanium surfaces deteriorate in service in the absence of wear? *J R Soc Interface.* 2012 Nov 7; 9(76):3161–4. doi: 10.1098/rsif.2012.0438.

## about the author



**Dr Paresh B. Patel** is a graduate of the University of North Carolina at Chapel Hill Adams School of Dentistry and the Medical College of Georgia and American Academy of Implant Dentistry (AAID) MaxiCourse, both in the US. He is a clinical instructor at the Reconstructive Dentistry Institute in Las Vegas in the US. Dr Patel has placed more than

5,000 implants, published numerous articles in leading dental journals, and worked as a lecturer and clinical consultant on dental implants and prostheses for various companies. He belongs to a number of dental organisations, including the American Dental Association, the North Carolina Dental Society and the AAID.

## contact

**Dr Paresh B. Patel**  
 Lenoir, USA  
 lenoirdentistry@gmail.com



*Aesthetic.  
Functional.  
Safe.*

white  
SKY

*Reshaping clinical  
and scientific success*



*Open for next*

Mistake and subject to change reserved

DENTAL INNOVATIONS  
SINCE 1974

bredent  
group

# Superior osseointegration success of Patent™ Implants scientifically proved

Zircon Medical Management, Switzerland



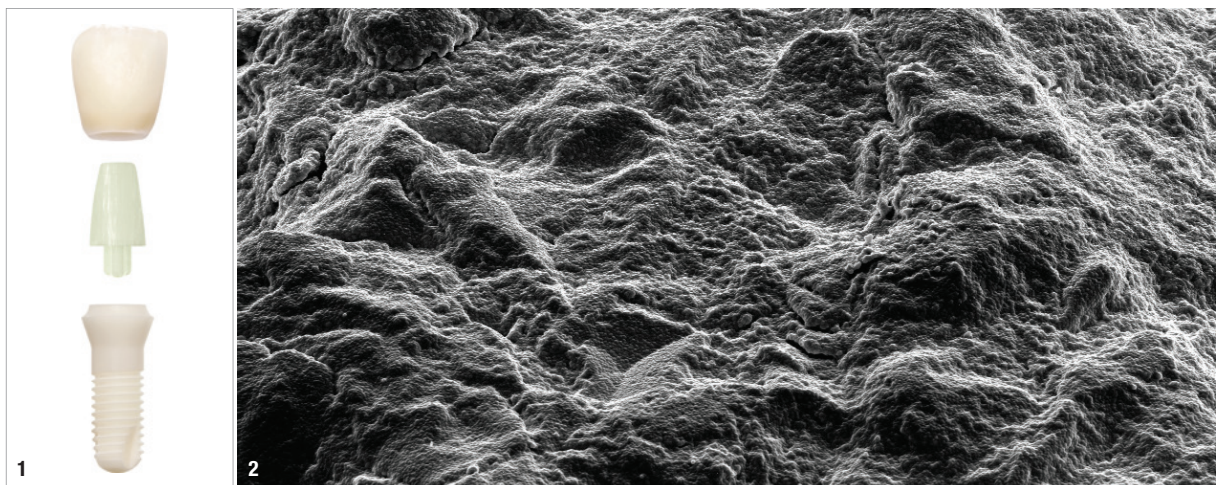
For a long time, the main challenge with zirconia dental implants was their ability to successfully osseointegrate. For years, researchers and manufacturers were concerned with finding ways with which osseointegration of zirconia implants could be improved. In recent years, the scientific community has reached the consensus that the surface roughness of a zirconia implant determines its ultimate ability to integrate into the bone. Studies have found that zirconia implants with smooth endosseous surfaces are associated with comparatively long healing periods.<sup>1-4</sup> Cionca et al. argue that the endosseous surface of a zirconia implant should be as rough as possible to achieve reliable osseointegration.<sup>5</sup>

## High surface roughness—the key to success

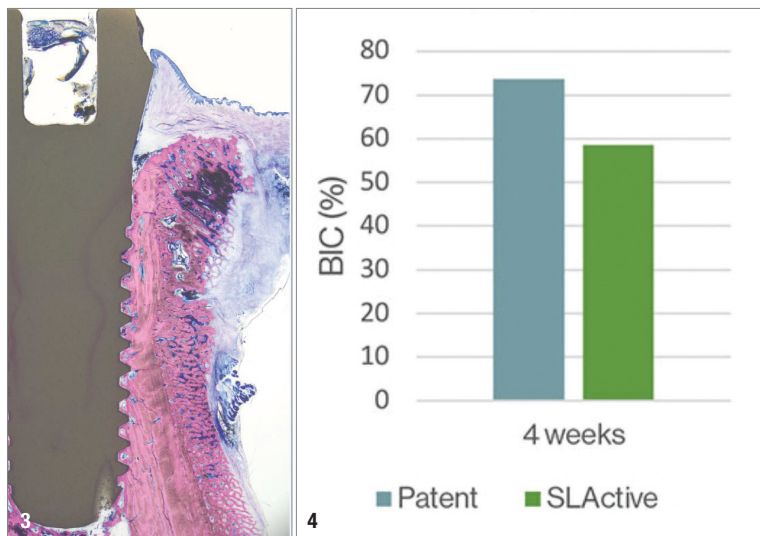
When it comes to surface roughness, Zircon Medical Management, manufacturer of the Patent™ Dental Implant System (Fig. 1), is leading the way. For the manufacture of Patent™ Implants, made from yttria-stabilised zirconia, the company employs a revolutionary

patent-protected process in which all surface-machining steps are carried out prior to sintering. Only in this way is a surface roughness (5.7  $\mu\text{m Ra}$ ) achieved that is up to five times greater than other documented zirconia implant surfaces.<sup>6, 7</sup> Thanks to their highly rough endosseous BBS (blasted before sintering) surface, Patent™ Implants achieve fast and predictable osseointegration—this has now been definitively proved (Fig. 2).

In order to evaluate whether a high endosseous surface roughness leads to accelerated and reliable osseointegration of zirconia implants, Drs Roland Glauser and Peter Schüpbach conducted a preclinical animal model study, in which they examined the early bone formation and bone healing mechanisms around two-piece zirconia Patent™ Implants.<sup>8</sup> They found that the Patent™ Implant, thanks to its highly rough BBS surface, outperforms all other dental implants that have been investigated in comparable studies to date regarding bone healing speed and success and overall tissue stability. Their study has been published in the *International*



**Fig. 1:** The tissue-level design and prosthetic concept of the two-piece Patent™ Implant is in perfect harmony with the unique material properties of zirconia. A highly stable yet flexible glass fibre post with dentine-like properties is cemented into the 3C connection of the Patent™ Implant. The post is then prepared to form using a high-speed diamond bur and restored with the prosthetic superstructure. **Fig. 2:** The endosseous BBS surface of the Patent™ Implant is up to five times rougher than other documented zirconia implants, ensuring fast and predictable osseointegration (2,500 $\times$  magnification). (© Dr Peter Schüpbach)



## “The Patent™ Surface may be classified as highly osteoconductive”—Drs Roland Glauser and Peter Schüpbach

**Fig. 3:** Histological analysis after four weeks of healing. The soft tissue had grown into close contact with the transmucosal implant collar. (© Dr Peter Schüpbach) **Fig. 4:** The bone–implant contact (BIC) determined for Patent™ Implants after four weeks of healing was higher than 70%.

*Journal of Implant Dentistry*<sup>9</sup> and is summarised in this article.

### Method

Six premolars were extracted in four miniature pigs. Five Patent™ standard two-piece zirconia soft-tissue-level implants (diameter: 4.1 mm; length: 11.0 mm) and one titanium tissue-level control implant (Straumann Standard; regular neck; Roxolid; SLActive surface; diameter: 4.1 mm; length: 10.0 mm) were immediately placed in the extraction sockets of each animal under full sedation. In addition to their highly rough endosseous surface, Patent™ Implants incorporate a transmucosal portion with a machined surface. The titanium control implants have an endosseous surface roughness of 2.2 µm Ra, and a machined transmucosal portion. After implant placement, the flaps were closed with sutures and the implants were left for transmucosal healing. No levelling of the bone was performed, and no grafting procedures or membranes were used. No implants were lost during the healing phase. Two animals were sacrificed after four weeks and two after eight weeks. Histology samples were analysed using Leica light microscopes. Bone–implant contact (BIC) was measured from the most crestal BIC point to the apex of the implant.

### Results

The Patent™ Implants investigated demonstrated high rates of osseointegration four and eight weeks after insertion. After four weeks, the BIC reported was 73.7% (SD: ± 16.8) for the Patent™ Implants and 58.5% for the control implants (Figs. 3 & 4). After eight weeks of healing, both implant types were completely osseointegrated, having BIC of 82.4% (SD: ± 16.9) and 93.6% (SD: ± 9.1), respectively. Contact osteogenesis was observed directly on and along the surface of the Patent™ Implants.

The authors concluded that the Patent™ Surface may be classified as highly osteoconductive. They also stated that the presence of bone debris is of vital importance to accelerate the initial bone formation process.<sup>10</sup> During implant placement, a rough implant surface scrapes off bone along the walls of the osteotomy. This creates a micrometre-thick smear layer of bone debris and blood, covering part of the implant surface immediately after placement.<sup>11, 12</sup> The bone debris guides new bone formation by distance osteogenesis towards the implant surface. The authors suggest that the highly rough surface of the Patent™ Implants may have generated more osteogenic bone debris and smear layer compared with the control implants, contributing to the high BIC ratio at four weeks of healing.

### Conclusion

Based on the findings of their preclinical study, Drs Glauser and Schüpbach concluded that the endosseous surface roughness of a zirconia implant has a decisive influence on its ability to integrate into the surrounding bone. They reported that the immediately placed two-piece Patent™ Implants achieved fast and predictable osseointegration thanks to their highly rough endosseous BBS surface. The mean BIC ratio reported for the Patent™ Implants investigated in this animal model study was higher compared with previous studies evaluating other surface-modified zirconia implants in similar animal models.

### contact

**Zircon Medical Management AG**  
+41 78 8597333  
www.mypatent.com





# A holistic approach to treatment with ceramic implants

An interview with Thomas Franke, MD, DDS, Germany

**The team at Dr Thomas Franke's** private dental centre for biological oral and maxillofacial surgery in Charlottenburg in Berlin regards the body as a complex system of interacting and influencing components. The close interplay between oral disease and chronic bodily disease supports a holistic and interdisciplinary approach to treatment. Dr Franke has many years of experience and extensive interdisciplinary knowledge, which he skilfully combines for the centre's holistic treatment approach. In the following interview with *ceramic implants*, he explains why he pursues a biological treatment approach to implant treatment that considers the entire organism.

**You have had a fascinating interdisciplinary career and, as a maxillofacial surgeon, cover numerous specialist areas. So how did your passion for dental implantology develop?**

I have loved working with my hands ever since I was a child. Even as a little boy, I loved to make things with my grandfather. During my training as a maxillofacial surgeon, I learned a great deal about various areas of sur-

gery. My path started with general surgery and progressed to abdominal surgery, orthopaedic trauma surgery and ENT [otorhinolaryngology] surgery, ultimately leading me to maxillofacial surgery. What I find so fascinating about dental implantology is that it makes restoration of function possible. This is where several specialist areas come together: occlusal rehabilitation, phonetics and aesthetics. Nowadays, with implants, controlled bone regeneration and soft-tissue management, we can help patients in ways we were never before able to.

**You have been practising your holistic concept at your clinic since 2017. What does this entail regarding patient treatment?**

Our patients now come from all over the world and are enthusiastic about our minimally invasive fast-track concept. This approach initially entails significantly more work for us as a team. However, the shorter downtime, significantly less pain and swelling, faster healing, increase in well-being and general improvements in our

patients' health make it worth the extra effort. We as a team had to change and had to modify our processes as a whole, completely rethink medicine and dentistry, and adapt our treatments. If necessary, this also includes the provision of nutritional supplements, infusion therapies, stress reduction and stimulation of the parasympathetic nervous system.

### What is the main thing you look for in the patient examination?

The patients who come to us usually have a long history of suffering. Often, their complaints have not been taken seriously, and they have been stigmatised and even traumatised. In a disproportionate number of cases, we have observed multiple chemical intolerances, multiple chemical sensitivities, autoimmune diseases such as Hashimoto's disease and multiple sclerosis, burn-out, fibromyalgia and other diseases that are often unfairly attributed to a psychological component. Before treatment, we try to obtain a very detailed patient history. Previous findings by general practitioners, orthopaedists, internists, dermatologists, rheumatologists, gastroenterologists and non-medical practitioners are a huge help in this regard. We look closely at specific and non-specific inflammatory markers, such as low-density lipoprotein, thioalcohols and thio-ethers, C-reactive protein, haemoglobin A<sub>1c</sub>,

RANTES, and platelet count and function, and many other markers. Hormone status, trace elements, minerals and vitamins also play a major role in preoperative diagnostics.

### What are the reasons for this?

Over time, we have clearly observed that there is a direct correlation between a body that is in equilibrium with itself and well cared for and a good postoperative outcome. Long-term follow-ups show less discomfort, less bone loss and less inflammatory reactions in the den-toalveolar area in patients with a balanced and healthy body. This also has positive effects on the entire gastro-intestinal tract. Gastritis and duodenal ulcers are measurably ameliorated when inflammation from the upper aerodigestive tract is reduced.

### How does inflammation of the oral cavity and teeth affect the human body as a whole?

As I have already suggested, local inflammation—no matter where in the body—always has a systemic effect. Take a panaritium, for example: in a suppurated ingrown toenail, many different chemotactic messenger substances are formed to attract immune cells to protect the body in this area. We can detect these messenger substances in the form of cytokines, interleukins, etc. in the blood. It also results in nociceptive pain, which is caused by the

# CERAMIC IMPLANTS STATE OF THE ART

7TH ANNUAL MEETING OF

ISMI

INT. SOCIETY  
OF METAL FREE  
IMPLANTOLOGY



5-6 MAY 2023

H4 HOTEL MÜNCHEN MESSE



[www.ismi-meeting.com](http://www.ismi-meeting.com)

SAVE THE  
DATE!

tissue reaction. Anyone who has ever experienced anything like this can attest that it can have a general effect on the entire body. The same is true in the dentoalveolar area. We actually see inflammatory effects that originate in the jaw and tooth area throughout the human body. For example, we see referred inflammation, such as a non-vital maxillary molar leading to chronic sinusitis via spiral granulation. This maxillary sinusitis causes swelling of the lymph nodes and increased secretion, which is produced in greater quantities at night when the patient is at rest or sleeping, but no longer swallowed like normal. Instead, it is aspirated, flows into the lungs and into the bronchi and thus causes sinubronchial syndrome, which can then lead to chronic asthma. However, we also find inflammation that is transmitted haematogenously: just think of endocarditis or idiopathic joint inflammation in the knees and hips. There are interesting studies that show that colon inflammation may be caused by an inflamed periodontium, that is, periodontitis. Why this might be is logical: the bacteria are swallowed several times a day and colonise their new biological niche in the rectum.

**There is clinical evidence for better biocompatibility of ceramic implants. Can you confirm this from your everyday clinical experience?**

When I worked in a hospital, we used to place lots of implants exclusively made out of titanium. This worked well in many cases, but local inflammatory reactions repeatedly led to peri-implantitis and implant losses which we could not explain. We tried to save these implants by brushing, but it usually just made things worse. Now we know what caused it: in the best case, a manifest intolerance to titanium dioxide. In order to reduce our patients' overall tendency towards inflammation, we have changed our therapy regime to 99.9% ceramic implants. With our preferred ceramic implants, we see a wonderful emergence profile before prosthetic treatment and later great red-white aesthetics.

**Are patients who are generally vulnerable more likely to need metal-free implants?**

The patients who come to our practice are highly educated and well informed when it comes to health. They have already adjusted their diet and lifestyle to biological and natural requirements. Organic foodstuffs are the rule rather than the exception. The same goes for any materials and substances that are to be introduced into the body. These patients attach great importance to biologically compatible, anti-inflammatory and endogenous substances and request them specifically. Their acceptance of and demand for a biological approach can already be seen in their prevention of possible illnesses. A

healthy lifestyle is not only reflected in diet, physical exercise, restful sleep and mindfulness, but also in implants that are introduced into the body.

**In which situations, apart from immunologically justified cases, do you prefer to use ceramic implants?**

Today we use ceramic implants for all classic indications—from single-tooth replacements to full-mouth rehabilitation. Ceramic implants also have clear advantages in immediate implant placement. Patients also really appreciate it if they only need to undergo a single operation. This reduces time, cost and pain.

**You perform regular follow-ups on patients treated with ceramic implants. Can you share your observations with us?**

With good care, we see fantastic long-term results, with hardly any soft tissue and bone loss. It sometimes appears to be the case that ceramic implants are superior to natural teeth, especially in the aesthetically sensitive anterior area. Of course, there are also losses with ceramic implants, just like with titanium implants. We often see these right at the start of osseointegration or upon exposure and shortly thereafter. Unfortunately, ceramic implants are often handled incorrectly in dental practices. Metal probes are used to manipulate the ceramic implant shoulders, the gingiva is worked on with dental brushes until it disappears and probes are used to dig around for the supposed pocket depth until it is found.

**What advice would you give to dentists who have not yet used ceramic implants?**

Speak to colleagues who are familiar with ceramic implants. Ceramic implants are not simply an extension of titanium implants in white. Ceramic implants are the next level in implant dentistry, and like always, advancing to a higher level and developing your skill and knowledge take practice. Trust yourself to take this step forward.

“With our preferred ceramic implants, we see a wonderful emergence profile before prosthetic treatment.”

**contact**

**Dr Thomas Franke, MD, DDS**  
+49 30 31808302  
www.dr-franke.berlin





# ceramic implants

is **ONLINE!**

e-paper · news · articles · community · newsletter



Visit us at: [ceramic-implants.online](http://ceramic-implants.online)



SDS Swiss Dental Solutions

## Ceramic implantology summit at the second JCCI

**On 14 and 15 October**, the second JCCI JOINT CONGRESS for CERAMIC IMPLANTOLOGY was held in Kreuzlingen in Switzerland and continued the success of the event premiere. For the year's event, recognised scientists and more than 160 ceramic implantologists from 17 nations and five continents came together to jointly discuss the latest trends, innovations and findings in the field.

Via an online survey, attendees had voted for the fundamental topics the year before, and the JCCI organisers drew up the programme accordingly. Dr Amerian D. Sones, President of the Academy of Osseointegration, opened the congress with an overview of the August 2022 consensus meeting in Chicago in the US, followed by two exciting live surgeries presented by Straumann (Drs Markus and Mathias Sperlich) and SDS Swiss Dental Solutions (Dr Josephine Phillips) in the affiliated SWISS BIOHEALTH CLINIC.

That same day, Prof. Tomas Albrektsson, a member of the Royal College of Physicians and Surgeons of Glasgow, spoke online on the topic of marginal bone loss around oral titanium implants due to particle abrasion and contaminated surfaces. Prof. Etyene Schnurr presented the problem of the lack of consensus on study protocols between manufacturers and researchers and presented the solution of a set-up of consensus on studies on ceramic implants, which was adopted in a separate breakout session by the scientists present. Prof. James Rutkowski, a diplomate and past president of the American Board of Oral Implantology/Implant Dentistry and an honoured fellow of the American Academy of Implant Dentistry, shone with his presentation on how the inflammatory response can influence bone and soft-tissue healing. Dr Dirk U. Duddeck, founder and managing director of the Clean-Implant Foundation, more than impressively conveyed the underestimated factor of clean surfaces in implant



dentistry and certified a whole series of CleanImplant Certified Dentists directly afterwards.

On the Saturday, JCCI Congress Director and President of the International Society of Metal Free Implantology (ISMI) Dr Karl Ulrich Volz explained the most important findings on ceramic implants and biology, as well as the influence of Generation Babyboomer to Gen Z on user behaviour and the required user experience. Prof. Jörg Neugebauer, Vice President of the Academy of Osseointegration, presented his impressive 15 years of experience in ceramic implantology and a digital workflow, followed by Prof. Georgios E. Romanos, a diplomate of the American Board of Periodontology and the International Congress of Oral Implantologists, and Prof. Florian Beuer, President of the German Association of Oral Implantology, who captivated participants with remarkable presentations on the topic of peri-implantitis affecting titanium implants and the state of the art in ceramic implantology. Prof. Shahram Ghanaati, President of the Society for Blood Concentrates and Biomaterials, spoke about the advantages and disadvantages of 3D titanium cages versus freely modellable titanium cages for the treatment of atrophic jaws, and Prof. Wael Att, chair of the Department of Prosthodontics at Tufts University School of Dental Medicine in Boston in the US, inspired participants with his presentation “Ceramic implants—the new kids on the block”. All presentations were interpreted simultaneously into both German and English and livestreamed to online attendees on all continents.

The SWISS BIOHEALTH EDUCATION CENTER provided the appropriate professional setting for the high-level congress. The cooperation of leading professional societies, leading expertise and the accompanying dental exhibition exposed participants to a broad range of knowledge. This year, well-known heavyweights of the innovative market segment participated in the congress: Straumann, CeramTec/Dentalpoint, SDS Swiss Dental Solutions, the CleanImplant Foundation, mectron and CaviTAU. Between the lectures, the congress breaks offered ample opportunity for exchange and visits to the industry exhibition.

The JCCI stands for professionalism, smooth procedures and cordiality and offers a platform for discussion and exchange and promotes new ways to achieve the goal of metal-free implantology. This holistic approach was very well received by the audience this year again. Many praised the compelling atmosphere as well as the lively professional discussions.

In a breakout session, pioneers and scientists sat down with Prof. Schnurr to discuss and agree on the next steps for studies on ceramic implants. Terminologies, patient-reported outcome measures and oral health impact profiles were also defined, and these will include the improved quality of life of patients as a result of rehabilitation with ceramic implants. In the future, this consensus on studies on ceramic implants will ensure that all studies conducted on ceramic implants will be classified as relevant and be comparable with each other. This will enable us to obtain quality data on ceramic implantology in the next five to ten years, which is one of the main goals of Dr Volz as President of the International Society of Metal Free Implantology.

The entertainment too was extraordinary. At WHITE NIGHT on Friday evening, TomX the saxophonist, DJ Matt Nautique, magician Jordane Dewost and other highlights whisked visitors away to another world and created an extraordinary atmosphere on the dance floor. Ice-cold drinks, gourmet food stations and live music guaranteed an unforgettable party.

Dr Volz concluded enthusiastically, “Anyone who knows us knows that we always want to go one better. I think we have succeeded once again, and we are already working on the third JCCI to achieve this goal again next year!” The third JCCI will take place on 13 and 14 October 2023 at the SWISS BIOHEALTH EDUCATION CENTER. Mark your calendars now and book your tickets!

**contact**

**SDS Swiss Dental Solutions AG**  
[www.swissdentalsolutions.com](http://www.swissdentalsolutions.com)



© 32 pixels/Shutterstock.com



The next European Congress for Ceramic Implant Dentistry will take place in 2024.

# Second European Congress for Ceramic Implant Dentistry

## Ceramic implantology is on a par with titanium implantology

**At the second European Congress** for Ceramic Implant Dentistry, which was held from 20 to 22 October, more than 180 participants from over 25 countries and internationally known speakers engaged on the theme of “Facts of Ceramic Implants”. “We are very pleased to have succeeded in setting a milestone for dental implantology with ceramic implants with this event,” said Dr Jens Tartsch, President of the European Society for Ceramic Implantology (ESCI), which presented the congress. The historic Bocken Estate on Lake Zurich in Switzerland, offering a special ambience and state-of-the-art event technology, provided the perfect setting for the congress.

The goal of the ESCI as a European and worldwide network is to create an international bridge between scientific research and the clinical application of ceramic implants. Practical insights were therefore provided at the start of the fully booked workshops. Prof. Sebastian Kühn (Straumann), Dr Joseph Choukroun (Purgo Biologics), Dr Elisabeth Jacobi-Gresser (Zeramex) and Dr Frank-Michael Maier (Camlog) presented the respective implant systems and clinical concepts to the participants.

The main programme was divided into three sessions: biomaterial ceramics, biological aspects and clinical aspects. Top-class speakers answered current questions and provided background information on implantology with ceramic implants in exciting presentations. The congress was opened and moderated by Dr Tartsch.

### Biomaterial ceramics

The main topic on the Friday morning concentrated on the background on evidence, material and implant design.

The first speaker, Prof. Ronald Jung, explored the question of whether ceramic implants should be considered at all. Subsequently, Vice President of the ESCI Dr Stefan Röhling and Dr Michael Payer reported on long-term clinical studies and research results on ceramic implants—which, according to Dr Röhling, are unequivocally positive.

Other internationally recognised experts in biomaterials research, such as Profs Jérôme Chevalier and Ralf Kohal, focused their presentations on the transformation and ageing processes of zirconia and the development of new bioceramics and manufacturing processes. Prof. Bilal Al-Nawas presented the first important results of the German Association of Oral Implantology’s guideline conference on the topic of ceramic implants and answered questions about the implant surface and hardware. The first session was concluded by Prof. Tomas Albrektsson explaining the special importance of the roughness and purity of implant surfaces for all types of implants.

### Biological aspects

In the second session, Prof. Owen Addison and Dr Matthias Pettersson presented research results on the corrosion processes of titanium and titanium implants, metal accumulation in peri-implant tissue and the immunological response. Dr Jacobi-Gresser established the clinical connection with basic research and addressed the immunological diagnostic possibilities. Pathological findings regarding the maxillary sinus in CBCT and the differences between titanium and ceramic implants in 2D and 3D radiographic diagnostics were presented by Prof. Michael Bornstein. This session was concluded by the developer and inventor of advanced platelet-rich fibrin proce-



**Fig. 1:** ESCI President Dr Jens Tartsch giving his opening speech. **Fig. 2:** Prof. Bilal Al-Nawas presenting the first results of the German Association of Oral Implantology's guideline conference on the topic of ceramic implants to a full auditorium. **Fig. 3:** From left: Dr Jens Tartsch, Prof. Tomas Albrektsson, Prof. Jérôme Chevalier, Prof. Bilal Al Nawas and Prof. Ralf Kohal. **Fig. 4:** Prof. Ronald Jung giving his presentation answering the question "Why talking about ceramic dental implants" by comparing the advantages and disadvantages of titanium and ceramic implants. **Fig. 5:** Prof. Ralf Kohal presenting on the evidence in recent studies showing the stability of ceramic implants for clinical use. **Fig. 6:** Vice President of the ESCI Dr Stefan Röhlings (left) and member of the board Dr Frank-Michael Maier during the open stage forum closing the two-day event. **Fig. 7:** "Ceramic in Focus" was the subject of the open stage discussion with the speakers.

dures, Dr Choukroun, who discussed osteo-immunology, oxidative stress and the immunology of peri-implantitis.

### Clinical aspects

The third session was dedicated to the practical application of ceramic implants. Prof. Marc Quirynen explained the various applications and advantages of leucocyte- and platelet-rich fibrin in oral surgery as well as the correct application. With many practical examples, the new open healing method based on the use of platelet-rich fibrin was presented by none other than Prof. Shahram Ghanaati. Dr Maier concluded the topic of hard- and soft-tissue regeneration using many examples from his practice and showed that augmentative measures are also necessary for ceramic implants and which ones are promising. Prof. Michael Gahlert impressively demonstrated the many indications for ceramic implants and treatment approaches using ceramic implants, especially for restorations in the aesthetic region, based on his substantial experience. In his multimedia lecture, Dr André Chen explained the use of a digital workflow for ceramic implants.

Although the ESCI is a European professional society, it has global relevance. Its ESCI guests from North and South America, Drs Dan Hagi and Rodrigo Beltrão, presented on how complex restorations and full-arch restorations can be realised with ceramic implants.

The ESCI sees itself as a hub for outstanding scientific research and for clinical, practical experience in dental implantology with ceramic implants. At the congress, young researchers and all ESCI members were therefore given the opportunity to present their research results and clinical cases in short lecture sessions. The ESCI's scientific advisory board, acting as the award jury, selected the best presentations to receive the 2022 ESCI Award, which was presented by Prof. Mutlu Özcan and

Prof. Gahlert as representatives of the advisory board. The 2022 ESCI Award for best scientific short lecture was given to Dr Erica Roitero and for best clinical case presentation to Dr Konrad Borer.

A special moment at the end of the event was the open stage forum, when all congress speakers gathered on stage to address critical questions from the audience and discuss the future of ceramic implantology, led by Prof. Kohal. Although more data on ceramic implants is certainly needed, there was unanimous agreement that ceramic implants can be recommended for clinical use today—provided the right indications are chosen and the manufacturers' guidelines are followed.

The supporting programme had plenty to offer. At the welcome reception on the Friday, the participants mingled in the old, vaulted cellar of the country estate, enjoying the musical ambiance of the saxophone. The ESCI gala dinner brought Swiss tradition closer to the international participants with the sounds of the alphorn and Bündner roast beef. The singer Kelly Kaltsi, who was especially flown in from Mykonos for the congress, ensured an exuberant party mood.

In summary, valuable insights were provided for both the beginner and the experienced user. Ceramic implantology is on a par with titanium implantology, and scientifically sound evidence on ceramic implants was presented regarding their wide application. The congress was at the same high level of major events for titanium implantology, not least thanks to its renowned international speakers.

### contact

**European Society for Ceramic Implantology**  
 info@esci-online.com  
 www.esci-online.com

Zeramex XT

## The aesthetic implant

Zirconia, the dental material of the future, the two-piece design of the implant, the unique implant–abutment connection, the conventional and digital workflow, the outstanding clinical results and the know-how from 17 years of research and development are the pillars of success of the Swiss ceramic implant system Zeramex XT.

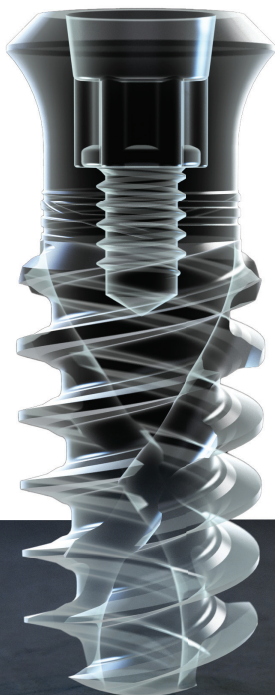
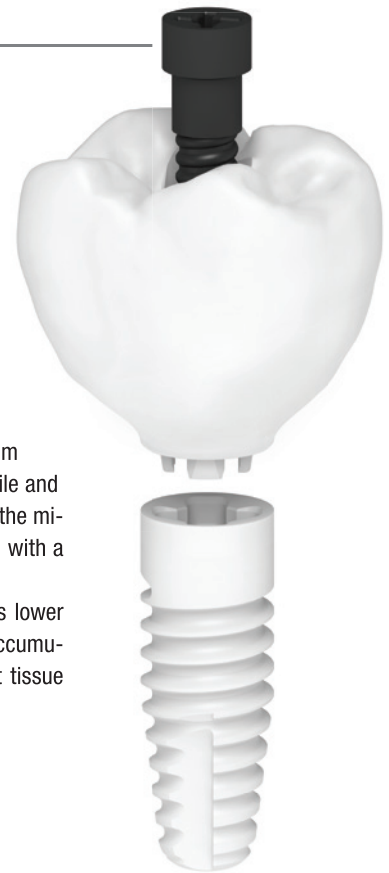
The heart of the implant–abutment connection is the VICARBO® screw made of carbon reinforced high-performance PEEK. The principle: the implant made of zirconium dioxide absorbs the compressive forces, while the VICARBO screw counteracts tensile and bending forces. The design of the external thread ensures high primary stability and the microrough and hydrophilic Zerafil® surface demonstrates convincing osseointegration with a success rate of 98 per cent.

Studies show decisive advantages of zirconium dioxide over other materials: it has lower plaque accumulation, lower bacterial adhesion as well as reduced thickness of the accumulated biofilm. It also contributes to better blood circulation in the peri-implant soft tissue which results in healthier gingiva and improved aesthetics.

**Dentalpoint AG, Switzerland**

**+41 44 38883636**

**info@zeramex.com**



Straumann

## Iconic Tissue Level meets immediacy

Straumann® has built on and perfected its well established Straumann® TL system, to take the science of tissue-level implants to the next level.

The Straumann® TLX system combines a neck design mimicking the natural anatomy and respecting the biological distance in all dimensions with Straumann's latest innovative endosteal design, optimised for primary stability.

The Straumann® TLX System combines is designed to significantly reduce the risk of inflammation and bone resorption as the implant–abutment interface is moved away from the bone. It is developed for optimal primary stability and immediate protocols in all bone types and lets you increase efficiency with a one-stage, straightforward workflow. Furthermore, it forms the perfect complement to the Straumann® BLX system for bone-level implants. Both systems use one common drill set and TorcFit™ connection for maximum compatibility with minimum investment.

**Institut Straumann AG, Switzerland**

**www.straumann.com**



**bredent medical**

## The choice is yours

The first generation whiteSKY implant system has proven itself clinically and scientifically since its introduction in 2006. It is also one of the best documented zirconia implant systems.

Clinical and scientific examinations were carried out from the very beginning and histologic examinations confirmed the good osseointegration of the implants. These results were also confirmed clinically. The long-term survival rate is on par with titanium implants. The bone level is stable in the long-term and the red-white aesthetics is superb. The second generation whiteSKY retains the proven success factors and introduces improvements requested by the customers. Prof. Andrea Borronovo et al. evaluated the ten-year success rate of 26 one-piece whiteSKY zirconia implants of the first generation. The success rate was 100 per cent with an average marginal bone loss (MBL) of less than 1 mm, an average periodontal probing depth (PPD) of 3 mm with no bleeding on probing (BOP). In a few cases, there was a slight bone gain less than 1 mm. Compared with titanium implants, the whiteSKY zirconia implant achieves similar or even better long-term results.

The one-piece whiteSKY Alveo Line gives you the possibility to fill the alveolus during immediate implant placement and individualise the implant depending on the requirements of the clinical case. In this case you can handle the implant like a natural tooth during impression taking and prosthetic restoration.

**bredent medical GmbH & Co. KG, Germany**

**info@bredent.com**

**www.bredent-implants.com**

### Zircon Medical Management

## Superior osseointegration, unmatched long-term stability

Together with leading scientists and highly experienced material experts, Zircon Medical Management, the manufacturer of the Patent™ Dental Implant System, has succeeded in mastering the complex process of manufacturing zirconia implants—employing a process that has been protected by 14 patents. Only through this proprietary process, in which all surface-machining steps are carried out prior to sintering, a surface roughness is achieved (Ra 5,7 µm) that is up to five times higher than other documented zirconia implant surfaces. As a result, the Patent™ Implant achieves unparalleled osseointegration success, as impressively demonstrated in a new study by Drs Roland Glauser and Peter Schüp-

bach, who found bone-to-implant contact (BIC) of over 70 per cent for Patent™ Implants after only four weeks to healing. In the subsequent sintering stage, potential process-related microcracks are eliminated. Moreover, the design and prosthetic concept of the Patent™ Implant were purposefully engineered to complement the material characteristics of zirconia. The result is a true soft-tissue-level zirconia implant that is rare in terms of osseointegration success, fracture resistance, and long-term stability.

**Zircon Medical Management AG, Switzerland**

**+41 78 8597333**

**www.mypatent.com**



Research led by School of Dental Medicine scientists

## Microbes that cause cavities can form superorganisms able to “crawl” and spread on teeth

A research team from the University of Pennsylvania has found that, within hours of growth, groupings of bacteria were able to “leap” more than 200 times their own body length across dental surfaces, offering an insightful explanation into the mechanism behind rapid bacterial colonisation and dental caries.

In a university press release, co-author Prof. Hyun (Michel) Koo, founding director of the Centre for Innovation and Precision Dentistry at the university, stated that, although the organisms comprising the biofilm in the laboratory were non-motile, the combination of bacteria and fungi created a “superorganism”: an assemblage that was far more difficult to remove from teeth than either of its two constituents alone. The

research team was originally studying severe childhood caries in toddlers when they were shocked to find that the blend of bacteria and fungi actually developed the ability to “walk” and “leap”, when neither could do so before. The organisms in question, *Streptococcus mutans* and the fungus *Candida albicans*, were identified as the main components of the biofilm causing the severe caries in toddlers. The bacteria and fungi were able to develop unexpected levels of adhesion and microbial tolerance. The fungi sprouted hyphae, which enabled the bacteria to better attach themselves and prevent removal. Despite the secure attachment, the new assemblage was still able to move itself forward, “like bacteria hitch-hiking on the fungi,” said Prof. Koo. This ability meant that, once the assemblages were tested on human teeth in a laboratory model, the biofilm spread much faster than anticipated, because the organisms were able to move as they grew. The findings could not only help dentists better understand the levels of prevention necessary to stave off severe caries but could also help clinicians understand bacterial proliferation in other areas of medicine. The study, titled “Interkingdom assemblages in human saliva display group-level surface mobility and disease-promoting emergent functions”, was published in the 11 October 2022 issue of the Proceedings of the National Academy of Sciences.

**Source: University of Pennsylvania**

Real-time microscopy enabled researchers to track the movement and behaviour of a grouping of fungi and bacteria in the saliva of children with severe tooth decay. The interspecies cluster took on new functions and caused more severe decay than either species alone. (Image: Penn Dental Medicine)

Researchers induce bone regeneration

## A special hydrogel mimics the bone’s natural environment

An innovative technology developed at Tel Aviv University may enable bone regeneration to correct large bone defects by means of a special hydrogel. Following successful tests in an animal model, the researchers now plan to move forward to clinical trials.

The study was conducted by experts from TAU’s Maurice and Gabriela Goldschleger School of Dental Medicine, led by Prof. Lihi Adler-Abramovich and Dr Michal Halperin-Sternfeld, in collaboration with Prof. Itzhak Binderman, Dr Rachel Sarig, Dr Moran Aviv, and researchers from the University of Michigan in Ann Arbor. The paper was published in the *Journal of Clinical Periodontology*.

According to Prof. Adler-Abramovich small bone defects, such as fractures, heal spontaneously, with the body restoring the lost bone tissue. The problem, however, begins with large bone defects.

The researchers explain that the extracellular matrix is the substance surrounding our cells, providing them with structural support. Every type of tissue in our body has a specific extracellular matrix consisting of suitable substances with the right mechanical properties. The new hydrogel has a fibrillary structure that mimics that of the extracellular matrix of the natural bone. Furthermore, it is rigid, thus enabling the patient’s cells to differentiate into bone-forming cells.

“At first, to test these properties, we grew cells in a 3D model of the gel. Then we examined the impact of the hydrogel on model animals with large bone defects that could not heal spontaneously. We monitored them for two months with various methods, including Micro CT. To our delight, the bone defects were fully corrected through regeneration, with the bones regaining their original thickness, and generating new blood vessels,” explains Adler-Abramovich. The innovative gel has extensive clinical applications in both orthopaedic and dental medicine. “When we lose teeth due to extensive damage or bacterial infections, the standard treatment is dental implants. Implants, however, must be anchored in a sufficient amount of bone, and when bone loss is too substantial, physicians implant additional bone from a healthy part of the body—a complex medical procedure. Another option is adding bone substitutes from either human or animal sources, but these might generate an immune response. I hope that in the future the hydrogel we have developed will enable faster, safer, and simpler bone restoration,” so Prof. Adler-Abramovich.

**Source: Medical Express**



## CleanImplant Foundation

# Dr Ken Serota will be the representative of the non-profit CleanImplant Initiative in North America

The CleanImplant Foundation, based in Berlin, Germany, has a North American office in New York City since 1 September 2022. Dr Ken Serota is acting as the Foundation's representative. He is responsible for bringing the Foundation's information campaign to the profession and the industry to ensure the highest standard and duty of care.

"We are very pleased that Dr Serota, as a dedicated ambassador of our initiative, will bring awareness of the problem of preventable, manufacture-created contamination of medical devices to the North American dental community. Together with Ken, the Foundation will be able to reach more of our colleagues, as well as implant manufacturers and distributors to foster understanding of the importance of a residue-free implant surface as an indispensable quality criterion," explains Dr Dirk Duddeck, Managing Director and Head of Research at CleanImplant.

Dr Serota will represent the CleanImplant Foundation at trade shows, conferences, and congresses. As a speaker, he will educate not only colleagues about the CleanImplant Foundation's study results, their clinical relevance, and the legal implications of using substandard implants. He will be the point of contact for North American implant manufacturers who are involved in the CleanImplant quality assessment studies. Dr Serota is "... deeply convinced of the CleanImplant Foundation's mission and the unimpeachable scientific standards of its studies. Throughout my career, I have been fascinated by how the synergy of clinical skills, research studies, and ethical standards can ensure that patient centric care is guided by the highest scientific canons of quality control. It is my great pleasure to bring the CleanImplant Foundation as a 'Partner in Science' to the profession and the industry in the United States and Canada."

**Source: CleanImplant Foundation**

© CleanImplant Foundation

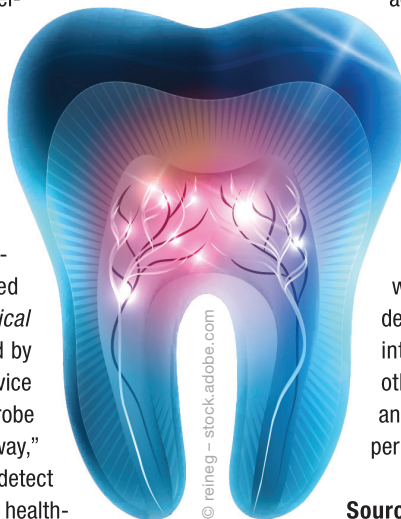
## Rapid test for periodontal disease

# Researchers are developing a device to rapidly determine the presence and progression of periodontal disease

The link between periodontal disease and a range of systemic health conditions such as cardiovascular disease, Type 2 diabetes and rheumatoid arthritis is well established at this point. Researchers from the University of Birmingham are in the process of developing a rapid test for identifying the presence of periodontal disease in the hope of benefiting the overall health of patients with these comorbidities. The device is being developed by Prof. Tim Albrecht from the university's School of Chemistry, together with Dr Melissa Grant from the university's School of Dentistry. It consists of a specialised probe and detector that provides a measurement of certain protein-based biomarkers that indicate both the presence and progression of periodontal disease. This biomarker panel was discovered and validated in a study published in the *Journal of Clinical Periodontology* by a team of researchers led by Dr Grant earlier this year. "We believe the device we are prototyping will be the first dental probe that can identify periodontal disease in this way," Prof. Albrecht said in a press release. "It will detect periodontitis quickly and easily in a variety of health-

care settings, opening up opportunities for monitoring and early intervention in the patients with comorbid disease, who would benefit most from rapid treatment for periodontitis."

"The ability to detect and profile disease biomarkers in real time will allow monitoring for disease severity, and in particular the transition between milder and more severe forms of gum disease," added Dr Grant. "This will benefit not only dental health, but also reduce costs and capture patients for whom periodontal treatment may, in the long run, be life-saving." The researchers recently received funding from UK Research and Innovation's Engineering and Physical Sciences Research Council impact acceleration account, and they plan to develop a prototype of this device within a year. In the long term, they hope to develop a probe small enough to be inserted into interdental spaces that will allow dental and other healthcare professionals to collect saliva and gingival crevicular fluid and measure the periodontal disease's progression.



**Source: Dental Tribune International**

# Congresses, courses and symposia



## CERAMIC IMPLANTOLOGY WEEK incl. SUCCESS DAY

12–17 December 2022  
Kreuzlingen, Switzerland  
[www.swissdentalsolutions.com](http://www.swissdentalsolutions.com)



## IDS – International Dental Show 2023

14–18 March 2023  
Cologne, Germany  
[www.ids-cologne.de](http://www.ids-cologne.de)



## 12<sup>th</sup> IAOCI World Congress

13–15 April 2023  
Atlanta, USA  
[www.iaoci.com](http://www.iaoci.com)



## 7<sup>th</sup> Annual Meeting of ISMI

5–6 May 2023  
Munich, Germany  
[www.ismi-meeting.com](http://www.ismi-meeting.com)

# ceramic implants

international magazine of ceramic implant technology

## Imprint

### Publisher

Torsten R. Oemus  
[oemus@oemus-media.de](mailto:oemus@oemus-media.de)

### CEO

Ingolf Döbbbecke  
[doebbecke@oemus-media.de](mailto:doebbecke@oemus-media.de)

### Member of the Board

Lutz V. Hiller  
[hiller@oemus-media.de](mailto:hiller@oemus-media.de)

### Chairman Science & BD

Jürgen Isbaner  
[isbaner@oemus-media.de](mailto:isbaner@oemus-media.de)

### Editorial Council

Dr Michael Gahlert (Germany)  
Dr Sofia Karapataki (Greece)  
Dr Franz-Jochen Mellinghoff (Germany)

### Editorial Management

Janine Conzato  
[j.conzato@oemus-media.de](mailto:j.conzato@oemus-media.de)

### Executive Producer

Gernot Meyer  
[meyer@oemus-media.de](mailto:meyer@oemus-media.de)

### Product Manager

Timo Krause  
[t.krause@oemus-media.de](mailto:t.krause@oemus-media.de)

### Art Director

Alexander Jahn  
[a.jahn@oemus-media.de](mailto:a.jahn@oemus-media.de)

### Designer

Aniko Holzer  
[a.holzer@oemus-media.de](mailto:a.holzer@oemus-media.de)

### Customer Service

Sarah Schröter  
[s.schroeter@oemus-media.de](mailto:s.schroeter@oemus-media.de)

### Customer Service

Marius Mezger  
[m.mezger@oemus-media.de](mailto:m.mezger@oemus-media.de)

### Published by

OEMUS MEDIA AG  
Holbeinstraße 29  
04229 Leipzig, Germany  
Phone: +49 341 48474-0  
Fax: +49 341 48474-290  
[kontakt@oemus-media.de](mailto:kontakt@oemus-media.de)

### Printed by

Silber Druck oHG  
Otto-Hahn-Straße 25  
34253 Lohfelden, Germany

[www.oemus.com](http://www.oemus.com)



## Copyright Regulations

ceramic implants international magazine of ceramic implant technology is issued three times a year and is a special edition of **implants international magazine of oral implantology** — the first issue was published in October 2017. The magazine and all articles and illustrations therein are protected by copyright. Any utilisation without the prior consent of editor and publisher is inadmissible and liable to prosecution. This applies in particular to duplicate copies, translations, microfilms, and storage and processing in electronic systems.

Reproductions, including extracts, may only be made with the permission of the publisher. Given no statement to the contrary, any submissions to the editorial department are understood to be in agreement with a full or partial publishing of said submission. The editorial department reserves the right to check all submitted articles for formal errors and factual authority, and to make amendments if necessary. No responsibility shall be taken for unsolicited books and manuscripts. Articles bearing symbols other than that of the editorial department, or which are distinguished by the name of the author, represent the opinion of the aforementioned, and do not have to comply with the views of OEMUS MEDIA AG. Responsibility for such articles shall be borne by the author. Responsibility for advertisements and other specially labelled items shall not be borne by the editorial department. Likewise, no responsibility shall be assumed for information published about associations, companies and commercial markets. All cases of consequential liability arising from inaccurate or faulty representation are excluded. General terms and conditions apply, legal venue is Leipzig, Germany.

**ZIBONE** Being Natural  
Being Beautiful

**IMPLANT**

**SYSTEM**



**Roughened surface enhances osseointegration!**

**COHO BIOMEDICAL TECHNOLOGY CO.,LTD.**

**[www.zibone.com](http://www.zibone.com)**

# CAN'T BUY ME LOVE

The CleanImplant quality seal\* is not for sale.  
It must be earned.



\* These implant systems were awarded the CleanImplant „Trusted Quality“ seal after an unbiased and peer-reviewed quality assessment.

- Receive quality information about your implant in use.
- Provide more safety for your patients and avoid negligence claims.
- Win new patients as a CleanImplant Certified Dentist.
- Find out more. Join in and support the charitable initiative.



More information about this non-profit initiative:  
[www.cleanimplant.com/dentists](http://www.cleanimplant.com/dentists)

CLEAN IMPLANT  
FOUNDATION