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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

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

Dr Paul S. Petrungaro
Expert in the field of Periodontics and Implantology,
Start Smiling Dental Implant Centers, USA

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. Petrungaro


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

Dear ZrO_2-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.

Sincerest regards, Janine Conzato & Timo Krause

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German S3 guidelines: https://pubmed.ncbi.nlm.nih.gov/36190587/
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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 cavitational 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.[1] 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-

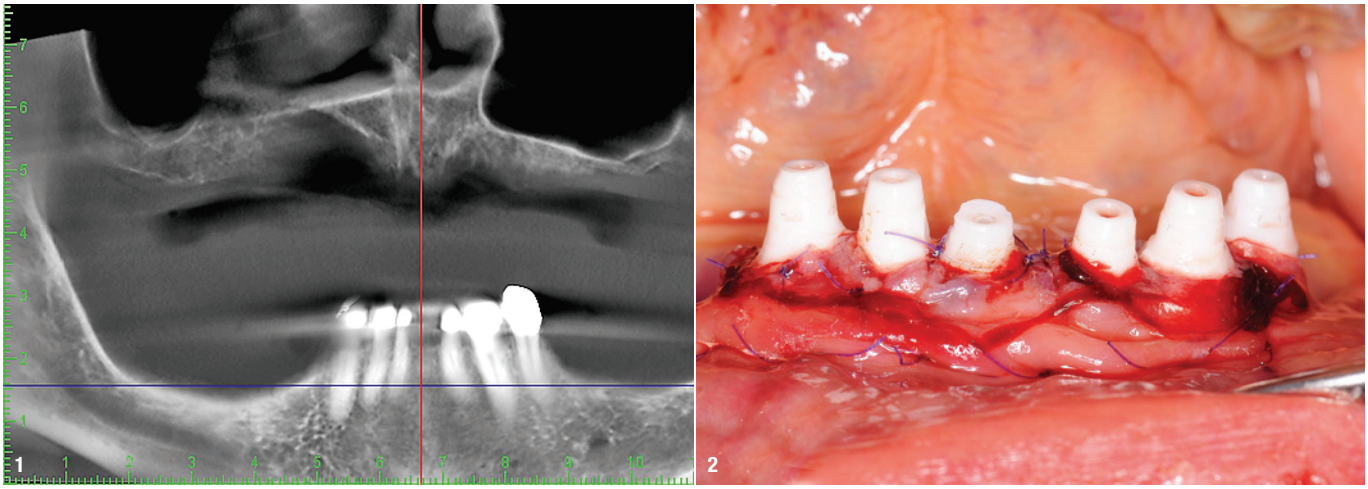

Fig. 1: Dental panoramic tomogram showing six devitalised mandibular anterior teeth with partial apical osteolysis, secondary caries and horizontal bone loss in the posterior region. **Fig. 2:** The six ceramic implants placed immediately into the extraction sockets. The wounds covered with A-PRF membranes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

SWCC

STRAUMANN
WORLD CLASS CUP
2022

straumann

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!

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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
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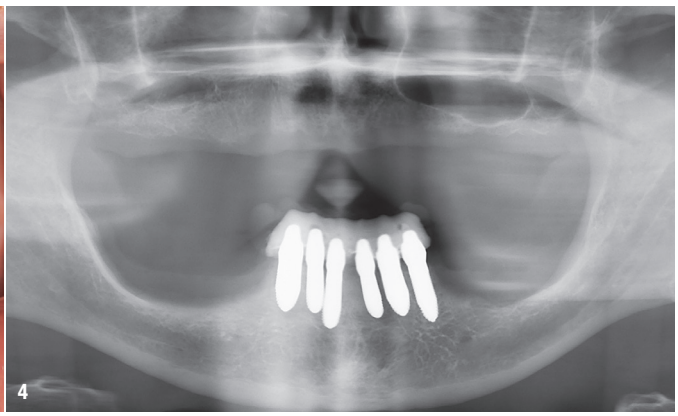


Fig. 3: Immediate provisional restoration placed on the implants of the same height as the old denture. **Fig. 4:** Post-op dental panoramic tomogram with the provisional restoration on the implants.

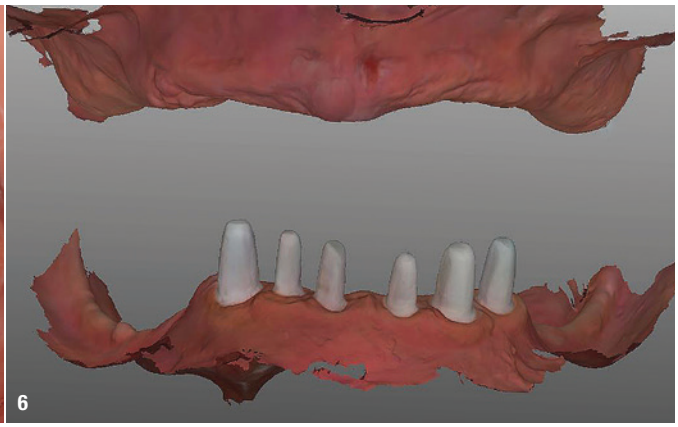
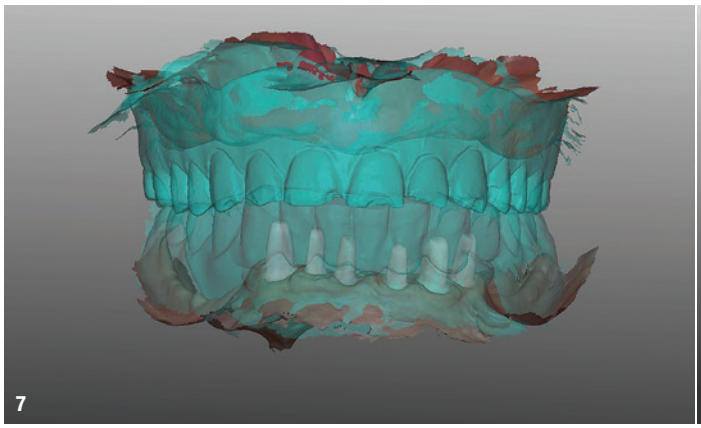


Fig. 5: The healed and trimmed ceramic implants in an irritation-free environment. **Fig. 6:** Intra-oral scan of the ceramic implants and the edentulous maxilla.

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.[2]
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.[3]

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-



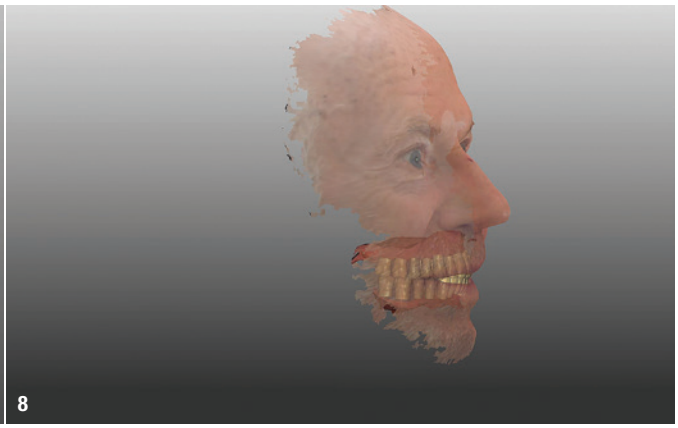


Fig. 7: Matching of the intra-oral scan with the scan of the old prosthetic situation. **Fig. 8:** The digital impression from the practice integrated into the facial scan taken in the laboratory.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Figs. 9 & 10: The individual created trial dentures around the gingival area and the 3D-printed resin models.


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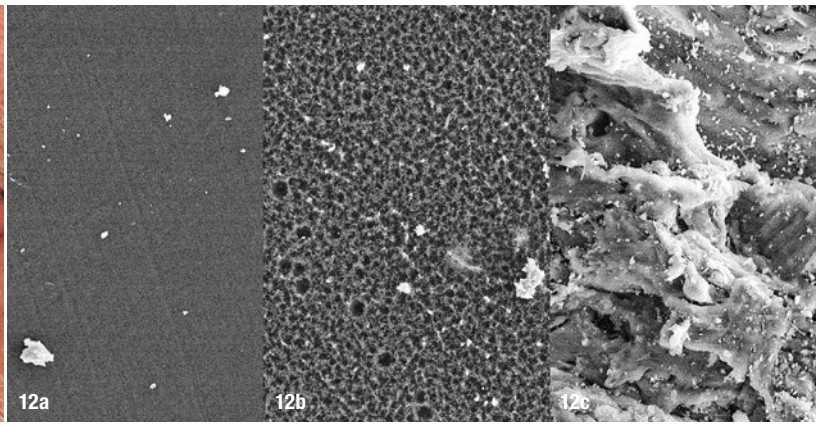
12a 12b 12c

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.[4] The combination of the various active principles of plasma has a strong antibacterial and wound healing effect.[5]

Use of plasma in dentistry

In dentistry, the natural gas ozone is used in a concentration compatible with health to kill bacteria and viruses.[6] 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 super-hydrophilicity could be achieved, although plasma


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