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ceramic implants

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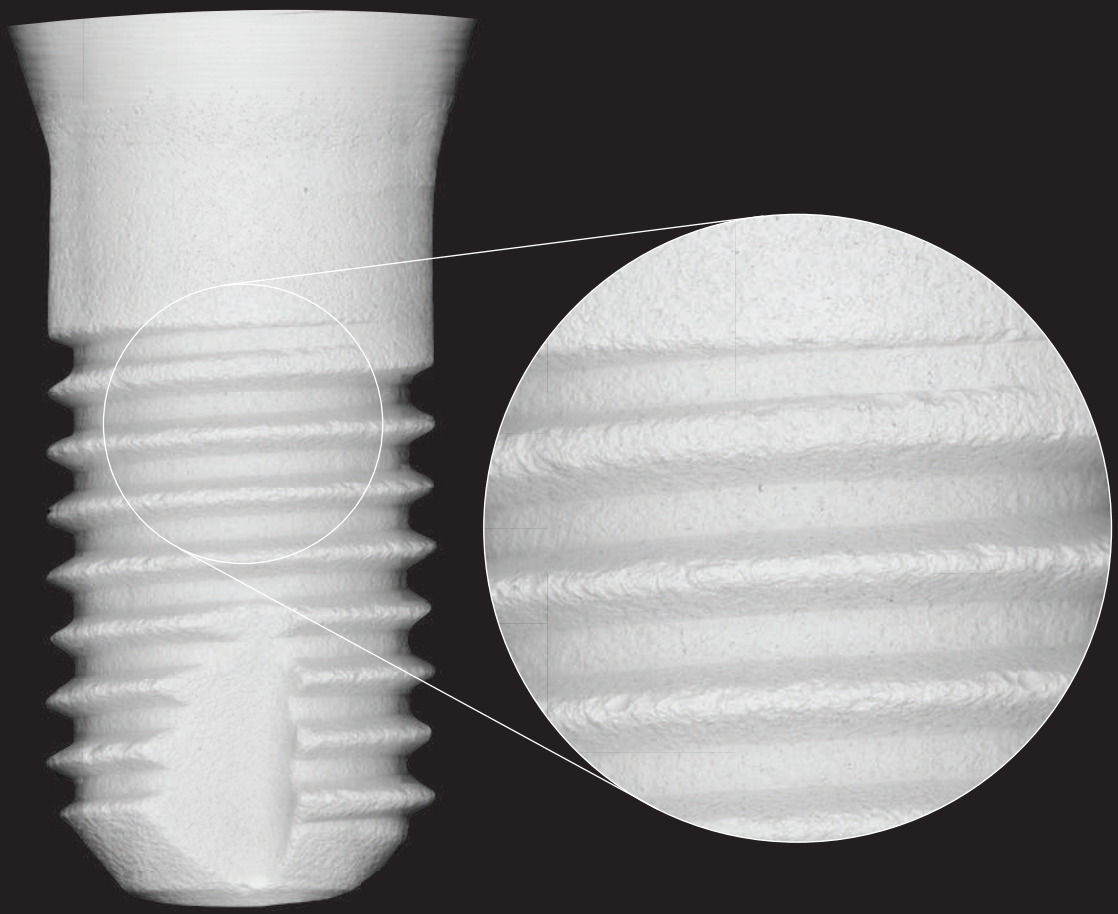

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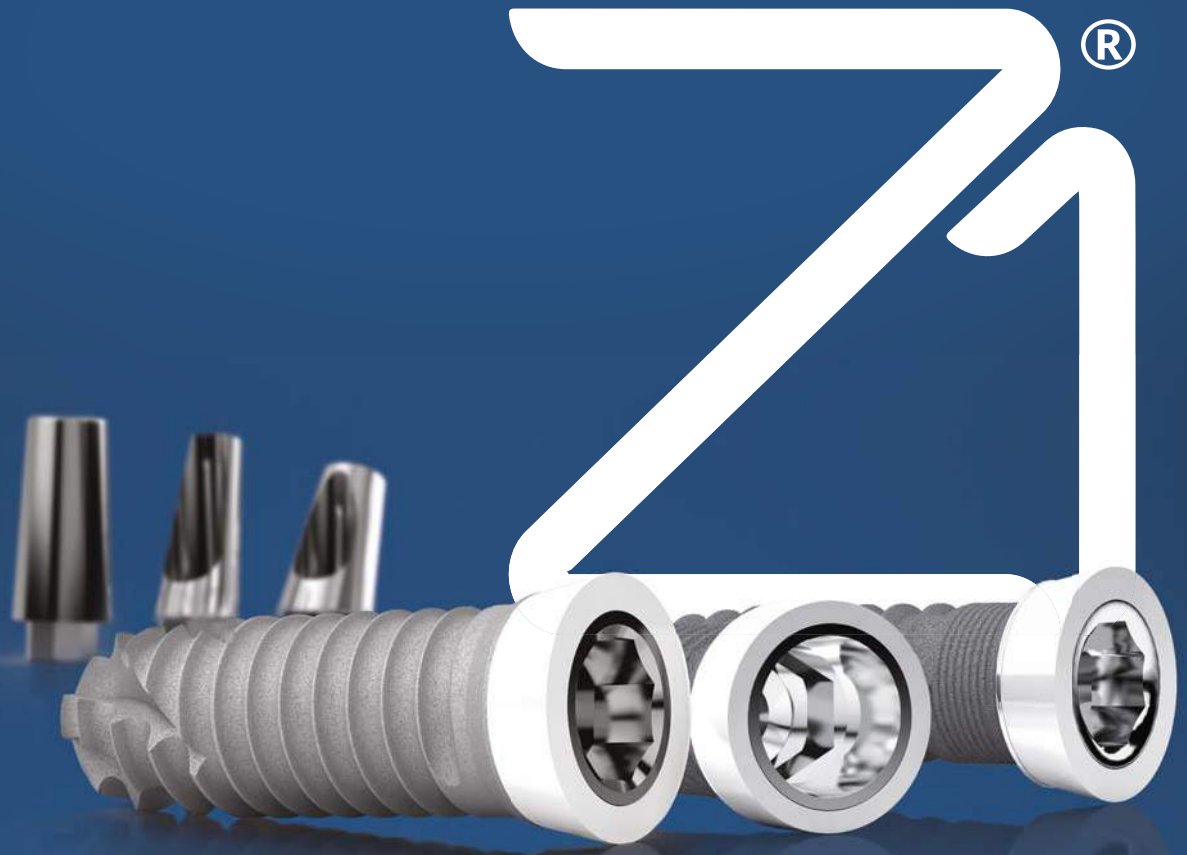

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Georg Isbaner

Managing editor

Keeping up the momentum of ceramic implants

Dear friends,

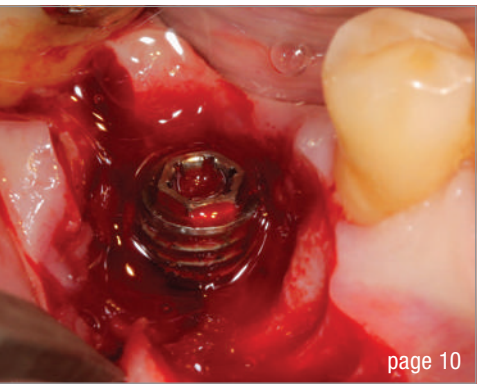
Around the world, fresh initiatives regarding ceramic implants technologies are being launched. In this issue of *ceramic implants*, we introduce two start-up companies from Poland and Spain which are developing entirely new ceramic systems and will be establishing them on the market in the months and years to come. We spoke to Dr Jarosław Pospiech, implantologist, engineer and inventor of the Polish implant system OriCera, about its novel screwless, detachable connection that requires neither adhesive nor cement. From Lidia M. Goyos Ball, medical devices division manager at Nanoker, we learn how the Spain-based company utilises two specific materials for its original ceramic implant system: a bioceramic composite on the one hand and a specific bacteriostatic bioglass coating on the other. The endeavours of these two companies prove that there is a continuing evolution of ceramic implant systems from being mere titanium copycats to becoming independent, customised solutions that respect the physical properties of the materials employed.

This trend towards independence is also reflected in the work of scientific expert societies. The incredibly active ceramic societies in the US and Europe—IAOCI (US), ISMI (Germany, Europe), ESCI (Europe) and EACim (France, Europe)—are joined by initiatives by Dr Enrique Reinprecht (SADIC) in Argentina and Dr Rodrigo Gomes Beltrão (ABICeram) in Brazil, who will be supporting implantologists in their respective regions with information and further training opportunities regarding ceramic implantology in the near future. We are excited about news from these energetic organisations and we look forward to fruitful collaborations. Furthermore, it is no secret that there is another ceramic system heading for market approval in Argentina, the US and Brazil (approvals for Asia, Europe and Africa are to follow): Z7. This zirconia implant system draws on the expertise and the components of a start-up company, MABB Biomaterial, that advances crucial ceramic implant technologies. Founded by Daniel Miguez in Buenos Aires, MABB aims to make the manufacturing processes of modern, highly precise ceramic systems both faster and more cost-effective by utilising ceramic injection moulding and nanotechnology, with triple impact purposes and a global mission to fulfill.

In short, we are in the early stages of a seismic shift in dental implantology, which is primarily being shaped by modern ceramic implant systems. If one takes into consideration that health-conscious and sophisticated patients with high aesthetic demands especially will only consider therapeutic options employing ceramic systems, we know exactly where the future is headed.

But for now, enjoy the read. Stay tuned. We will keep you posted!

Georg
Managing editor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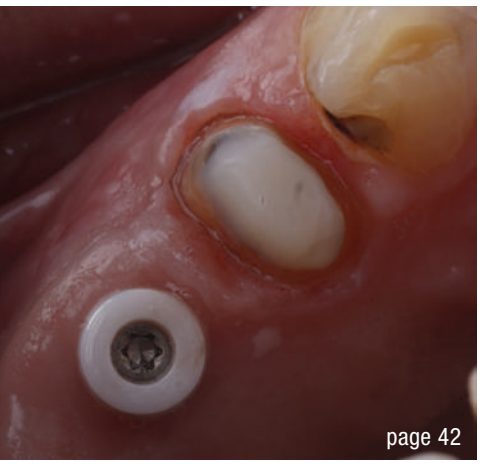
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Cover image (SEM) courtesy of medical materials research institute (accredited testing laboratory for the CleanImplant Foundation) www.mmri.berlin

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Hard tissue augmentation

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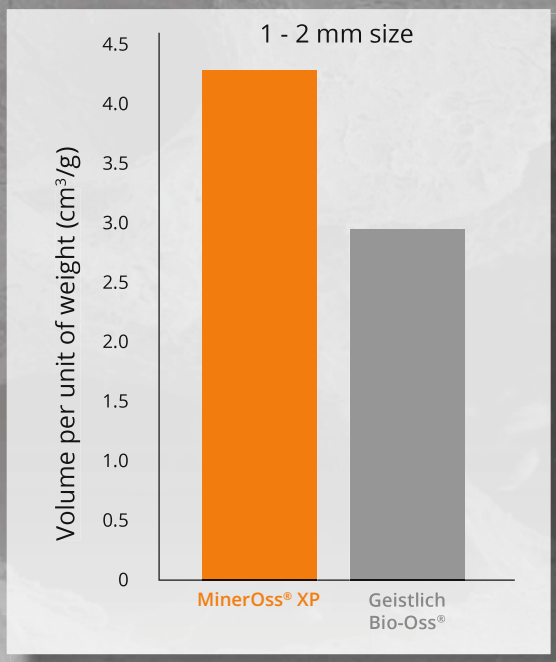

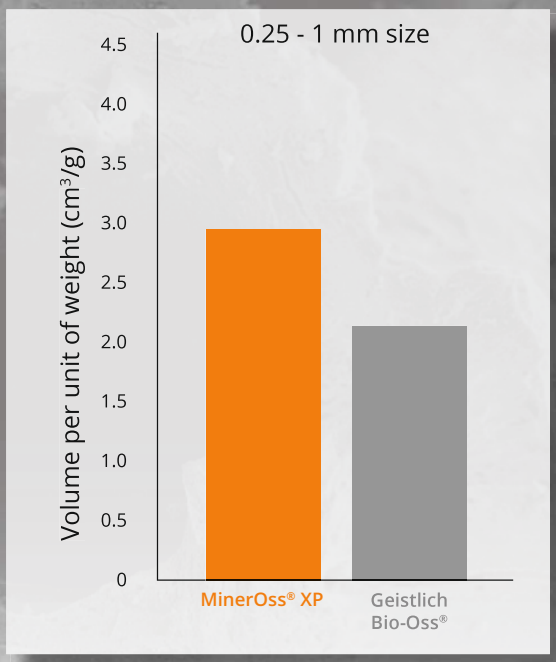

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Promoting osseointegration of ceramic implants

Optimised diet and targeted intake of micronutrients

Dr Dominik Nischwitz, Germany

Fig. 1: A clinical case example of a multiple tooth replacement with ceramic implants: initial clinical situation **(a)**, panoramic radiograph pre-op **(b)**, panoramic radiograph after healing **(c)**, view of the inserted implants after healing **(d)**, view of the definitive restoration **(e)**.

In traditional oral surgery and implantology, the focus lies mainly on the healing of an implant and the local factors that are necessary to preserve or grow bone and soft tissue. However, the view is still rather confined to the oral cavity. Classically, four methods of bone augmentation are considered: osteoinduction (growth factors), osteoconduction (bone grafting material as space holder), distraction osteogenesis and guided tissue regeneration by means of membranes or the shell technique, among others. In biological dentistry, we utilise the experience and the knowledge from functional medicine and nutritional science and conduct targeted therapies with micronutrients in order to create optimum systemic conditions for a scheduled surgery and to promote subsequent bone and soft-tissue regeneration.

Local factors

There are different local factors of intelligent bone and soft-tissue regeneration to be considered. Among them are the decontamination of a surgical site (from breathing or saliva), the activation of local growth factors such as insulin-like growth factor-1, osteoblasts and plasma proteins by drilling and creating bleeding spots for refreshening bone and for stimulating osteoblastic activity, and the application of intelligent biomaterials such as platelet-rich fibrin membranes in order to improve the extracellular matrix and to optimise bone and soft-tissue conditions. In addition, the use of microinvasive techniques such as piezo-surgery, ozone therapy, technologies for guided implant surgery and improved imaging by CBCT has elevated our medical profession in terms of both dental skill and technical expertise.

There is a clear trend towards aesthetics and general health. Dental implants made of ceramics are no longer a controversial subject, but rather the future of implantology. However, as of today, only 1% of all oral surgeons are placing ceramic implants. Based on ten years of experience and placement of over 4,000 ceramic implants personally, I would argue that further surgical and systemic information is required in order to elevate the success rate of ceramic implants. Ceramic implants heal with

the surrounding tissue without initiating inflammatory processes, which is actually the crux of the matter, since hardly anyone of us dental professionals have comprehensive knowledge about the biochemistry of the entire human body. In ceramic implantology, it is vital to integrate the knowledge obtained from functional medicine and nutritional science and on micronutrients in order to prepare the body for a transitional phase. Hence, we put an overarching focus on the lifestyle of our patients. In this context, the systemic preparation for the day of surgery and targeted postoperative care are equally important.

Preparation for surgery: Change of diet

Following an unhealthy diet that includes the intake of sugars, wheat products, refined edible oils and conventional dairy products and other foods that can trigger possible intolerances leads to a general inflammation susceptibility of the body, as well as to macro- and micronutrient deficiency. Proteins and amino acids, fat-soluble vitamins A, D3, E and K, water-soluble vitamins B and C, minerals like zinc and magnesium, and healthy omega-3 and omega-6 fatty acids are lacking for the formation and the regeneration of soft tissue and bone.[1] It is our goal to prepare patients as effectively as possible for surgery. In this context, the focus is on the supply of the vital macronutrients as well as the avoidance of as many stressors as possible. The four core dietary ills mentioned earlier in this paragraph should be avoided at all costs. Over 100 years ago, Dr Weston Price conducted research on different peoples and tribes all around the world. He documented his findings in his book *Nutrition and Physical Degeneration*,[2] in which he states that people who maintain a species-appropriate diet are virtually immune to dental caries. Their descendants, who had already come into contact with industrially processed foods and liquids, started to develop typical signs of degeneration, since they were lacking nutrients. The most vital macronutrient for the formation of human tissue such as bone, soft tissue and muscular tissue is protein.

Proteinogenic amino acids—building bricks of life

Based on my personal experience, I would argue that more than 90% of our society has a protein deficiency and, as a result, an amino acid deficiency. Although 20 proteinogenic amino acids exist, only seven of these are obtained through dietary intake. These essential amino acids are isoleucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine. From these seven amino acids, the human body is capable of creating every protein, given that enough resources are available in the body for doing so. Numerous studies have shown a link between deficient bone formation, reduced bone density and the delayed healing of bone fractures, and protein and amino acid deficiency. The older the patient, the more significant the connection.
Already in 2006, Dayer et al. presented their findings from an animal study in which they reported reduced osseointegration of titanium implants in rats with a protein deficiency (< 1 g/kg of body weight). The force necessary to explant an implant from the bone after six to eight weeks was 43% less in rats with a protein deficiency compared with rats with sufficient protein in their diet (1 g/kg of body weight).[3] In addition, based on the data of 391 women and 224 men over the course of four years, obtained from the Framingham Osteoporosis Study, Hannan et al. suggested a significant connection between a deficiency in animal-based protein in a diet and bone loss. The greater the protein deficiency, the great the loss of bone quantity of the femur and spine. A negative effect of a protein surplus and bone healing could not be detected.[4] As a logical consequence, our overriding focus is on adequate supply with protein. Since there should not be macro- and micronutrient deficiency in the phase of acute regeneration, we recommend a daily protein intake of 1.5–2.0 g/kg of body weight. In order to alkalise the body, one serving of vegetables is additionally recommended. Healthy fats like omega-3 fatty acids as well as a variety of monounsaturated and polyunsaturated fatty acids are vital in this context. Collagen powders, essential amino acids, bone broths and protein

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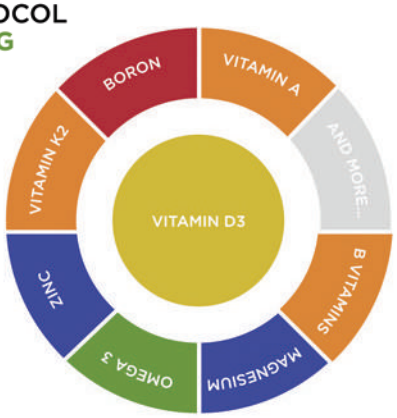

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Fig. 2: The author puts an overriding focus on the systemic support of his patients by means of a targeted diet rich in protein, healthy fats and vegetables in order to alkalise their bodies and to promote their autologous bone healing mechanisms. (© Dr Dominik Nischwitz) **Fig. 3:** Vitamin D3 in high doses is the basis of the Bone Healing Protocol (BHP®) according to which patients are prepared for implant surgery through the targeted intake of micronutrients in the practice of the author. (© Dr Dominik Nischwitz)

shakes are great tools for patients to easily reach the desired protein intake. In our practice, the systemic support of patients by means of a targeted diet (Fig. 2) and supplementation of the important nutrients has established itself as a standard in the field of oral surgery.

Micronutrients

Vitamin D3 in high doses is the basis of the bone healing protocol (Fig. 3). Ahead of surgery, we evaluate the vitamin D3 levels in the blood of our patients. In order to be able to treat them in the best possible way, we target a preoperative value of at least 60 ng/ml.[5] A myriad of studies indicate that vitamin D3 is a decisive factor for the regeneration of bone and teeth.[6–10] Vitamin D3 activates two enzymes that are vital for the mineralisation of bone: osteocalcin and matrix Gla protein. In order for calcium not to calcify the arteries, these enzymes are activated by another important co-factor: vitamin K2 (Subtype MK-7).[11] A further important co-factor is magnesium, which contributes to over 400 metabolic processes in the human body.[12] Zinc contributes both to maintaining the immune system as well as to activating the vitamin D3 receptors as a co-factor.[13] Apart from that, the trace element boron doubles the half-life period of vitamin D3.[14] Since micronutrients operate in a synergetic way, sufficient vitamin B and C, digestive enzymes and omega-3 fatty acids need to be present in the organism throughout the postoperative phase.

Summary

In addition to the traditional, rather fine surgical craft that is dentistry, we utilise knowledge from functional medicine and nutritional science. In doing so, we support the endogenous healing capabilities of patients and enable improved tissue and bone healing and, as a consequence, improved healing of ceramic implants as well. The result is fewer failures and even healthier and happier patients.

References

about the author

Tübingen-based **Dr Dominik Nischwitz** is a specialist in Biological Dentistry and ceramic implant dentistry. He is a founding member and the current Vice President of the International Society of Metal Free Implantology (ISMI). Together with his father, he founded the DNA Health&Aesthetics – Center for Biological Dentistry in Tübingen, Germany, in 2015. Dr Nischwitz is frequently invited as a speaker to dental conferences around the globe. In addition, he recently published his first book titled *It's All in Your Mouth: Biological Dentistry and the Surprising Impact of Oral Health on Whole Body Wellness.*

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