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Dr Dana Adyani-Fard
Executive Advisor
CleanImplant Foundation

Dr Dana Adyani-Fard

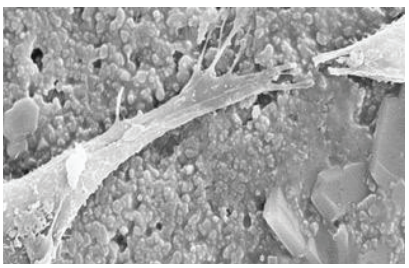
Change is an inevitable part of life—challenges and opportunities included.

As Eric Hoffer wrote: "In times of change, learners inherit the earth, while the learned find themselves beautifully equipped to deal with a world that no longer exists."

In dentistry, this mindset of continuous learning is essential. The field is constantly evolving, driven by new research, materials, and treatment concepts. Embracing these changes means embracing a more holistic approach to care. One that sees the patient not as a collection of teeth, but as a whole person whose oral health is intimately connected to their overall wellbeing.

One of the most exciting aspects of our field today is the fast-growing developments on new devices and their advanced technologies. Yet understanding the source material, and the impact of modern-day production on aspects, such as the implant's surface cleanliness and biocompatibility, plays a significant role. Throughout the

CONTENT



process from manufacturing, placing and maintaining a state-of-the-art restoration, we know that these details, often invisible to the naked eye, can profoundly impact the short term and long-term success of implants and their connected restorations.

Healthy integration with surrounding tissues are the key factor to reduce the risk of complications and support the body's natural healing processes.

This understanding pushes us to go beyond technique. To consider how every choice we make, from the materials we select to the precision of our workflows, can have a lasting impact. It reminds us that progress in dentistry is not just about adopting new tools and techniques but about refining our awareness and our commitment to patient-centered care.

Patient-centered in times of me-centered values—it seems more important than ever.

As a female dentist, I also see how the field is becoming more inclusive and diverse. Different voices and experiences are shaping the conversation, bringing ideas and perspectives to our practices. This diversity enriches our understanding of what it means to care for patients in a truly holistic way.

Beyond technical excellence, our work is about building trust and nurturing health in all its forms.

In today's world, which is always shifting, dentistry offers a place where precision and empathy come together. Here, we have the chance to contribute to something larger than ourselves: to a profession that respects the individual and celebrates the power of small, thoughtful and mindful choices.

Let us continue to learn, to share, and to support one another in this journey. By doing so, we not only advance our own practices, but also strengthen the foundation of a more mindful, human-centered healthcare system.

Yours sincerely,
Dr. Dana Adyani Fard

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CONTENT

PART III FACTS of CERAMIC Implants 25.-27.Sept. 2025 Zurich-Switzerland

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25th–27th September 2025 – Zurich / Switzerland

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Pre Congress Workshop in cooperation with the Centre for Dentistry University of Zurich ZZM; Straumann Pure, Zeramex XT and Camlog Ceralog Progressive Line System introduction and overview; three live surgeries and three practical hands-on workshops

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Kreuzstraße 2
CH 8802 Kilchberg
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+41 (0)44 715 48 77
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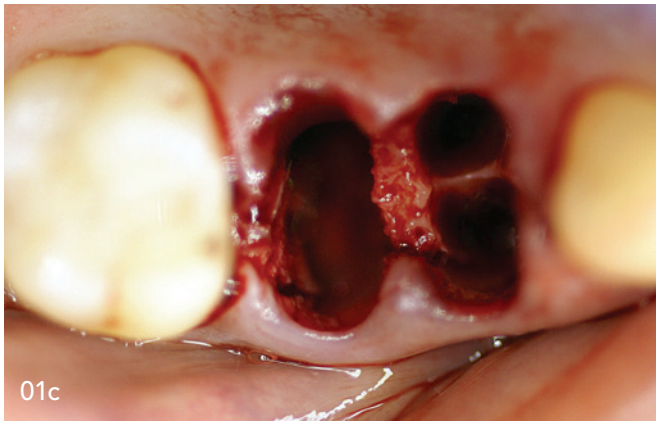
One-piece AWI G-Line ceramic implants in the premolar region

Clinical use of the AWI single-unit implant system following delayed implantation

Bozhidar Hristov Savev, Germany


01a


01b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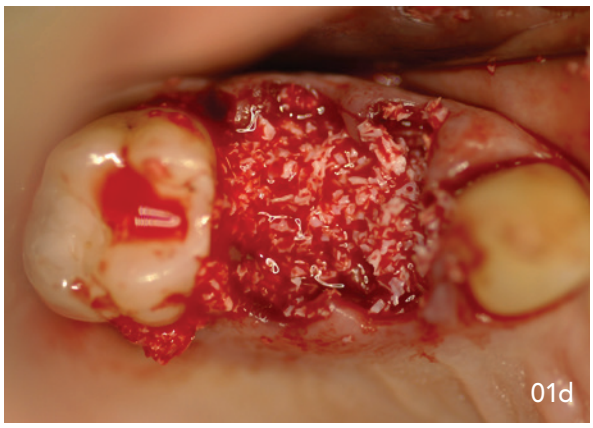
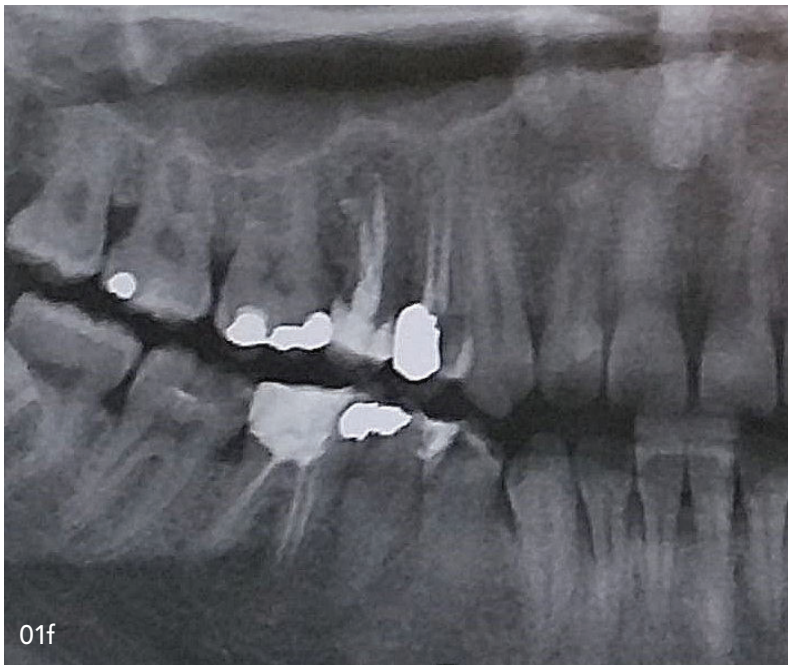
Abstract

Patients who smoke are at increased risk of implant failure. Thorough pretreatment and a consistent prophylaxis and recall programme are essential. In addition, both clinician- and patient-related considerations regarding implant system and material selection must be taken into account. This case report describes the rehabilitation of a patient smoking more than ten cigarettes per day. Following invasive tooth extraction and simultaneous socket preservation, one-piece AWI G-Line zirconia implants and all-ceramic single crowns were used for prosthetic restoration.

Smoking and implant success

Tobacco use is a known risk factor for complications associated with dental implants. Although smokers have a higher risk of implant loss, successful treatment is achievable with appropriate prophylaxis management (Figs. 5c+d). Due to nicotine-induced calcium depletion, bone quality in smokers is often reduced.





„Although smokers have a higher risk of implant loss, successful treatment is achievable with appropriate prophylaxis management."

This calcium loss accelerates bone resorption and increases the risk of both osteoporosis and periodontal disease. To mitigate these effects, stable periodontal conditions, control of systemic and lifestyle-related risk factors, and excellent oral hygiene must be ensured (Figs. 1a–c).

According to current DGI/DGZMK guidelines, ceramic implants are considered a viable treatment option in cases of titanium intolerance and in smokers. Zirconia used in ceramic implants is biologically compatible, does not trigger allergic reactions or inflammatory responses, and thus supports oral health. Lower plaque and bacterial accumulation reduce the risk of infection and gingival inflammation. In this case, one-piece AWI G-Line (WITAR) zirconia implants with a bioferrite coating were placed.

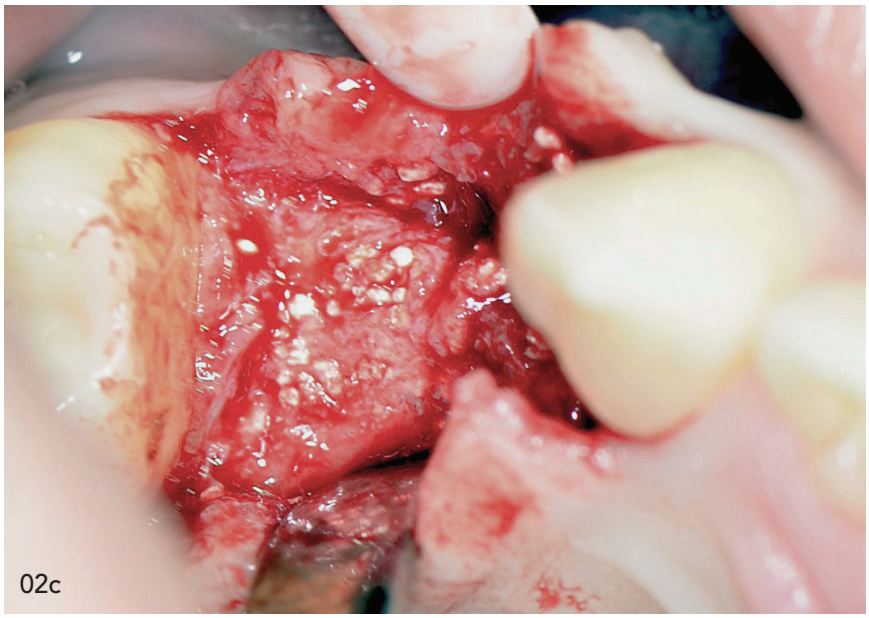
Case report

Medical history and pretreatment

A 31-year-old male patient presented with pain in teeth 14 and 15, both of which had undergone endodontic treatment. Radiographic findings revealed periapical radiolucencies indicating chronic apical periodontitis, as well as large coronal restorations on both teeth. The patient had no relevant systemic conditions (Fig. 1f).


02a


02b


02c

The treatment plan involved the extraction of the non-restorable premolars, followed by thorough professional cleaning. Socket preservation was performed to maintain the alveolar ridge. Implantation was planned approximately six months post-augmentation. To reduce microbial load, the patient rinsed twice daily with chlorhexidine for one week following the initial cleaning.

Extraction and socket preservation

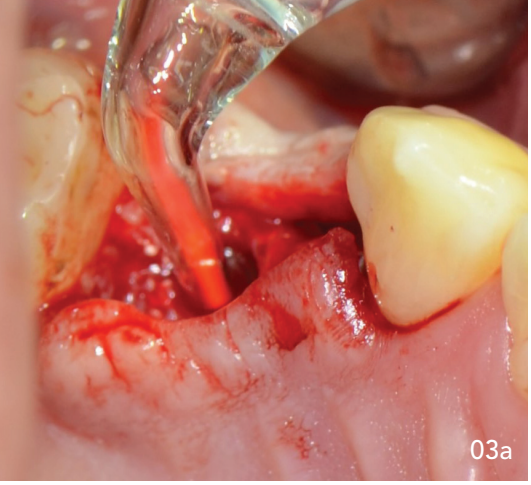
Figure 1a shows the pre-extraction clinical status of teeth 14 and 15. Due to ankylosed roots, osteotomy was required for removal. During luxation with Bein elevators, the buccal plate fractured (Fig. 1c). Following extraction, the sockets were filled with a mixture of autologous bone chips and bovine xenograft. To ensure volume preservation and favourable soft-tissue healing, the sites were covered with a resorbable collagen membrane before suturing (Figs. 1d+e).

Implantation

The patient requested a fully metal-free solution, including the prosthetic restoration. Six months later, the alveolar ridge was assessed as suitable for implant placement (CBCT and clinical pre-op: Figs. 2a+b). A crestal incision with a releasing cut at tooth 13 was made, and a mucoperiosteal flap was elevated (Fig. 2c). Two one-piece AWI G-Line zirconia implants (AWI 394010R, gingiva-coloured) were inserted (Figs. 3a–h).

Simultaneous lateral augmentation was carried out using ß-TCP Easy Graft and PRGF membranes to cover both the graft and the implants, enhancing wound healing. A postoperative radiograph confirmed correct implant placement (Fig. 4c).

Due to the low thermal conductivity of zirconia, frictional heat from implant insertion dissipates more slowly than with titanium.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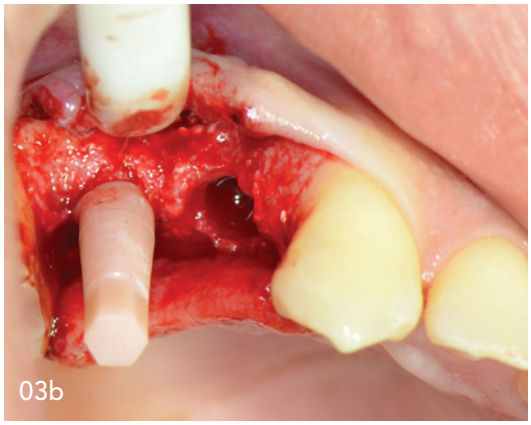
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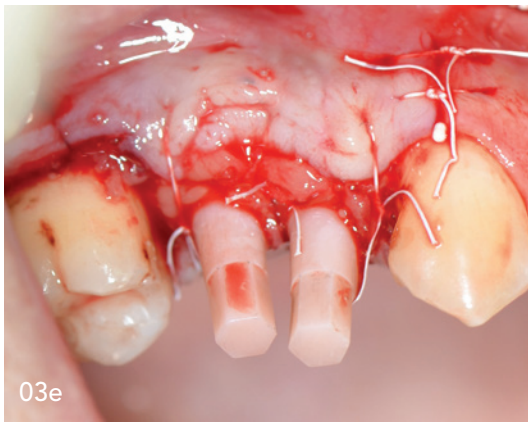
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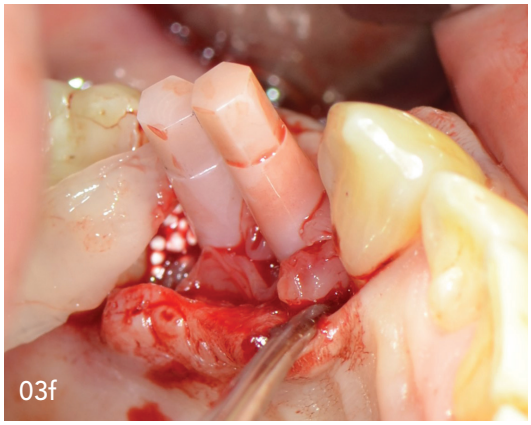
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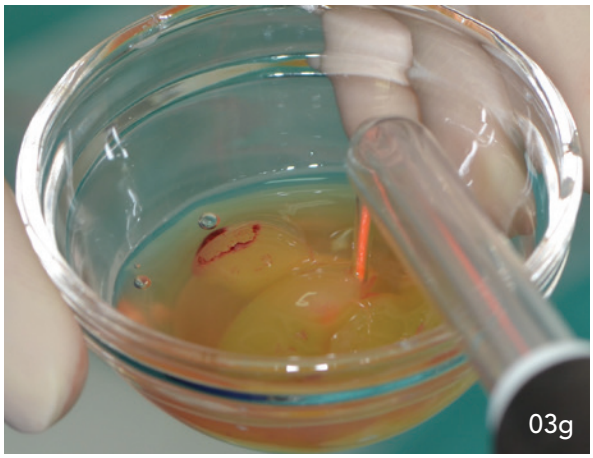
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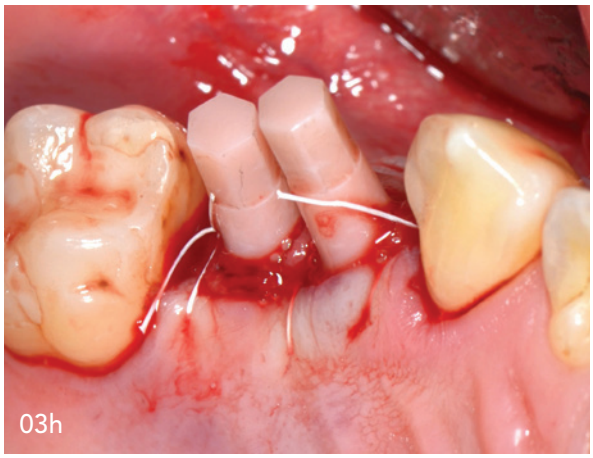
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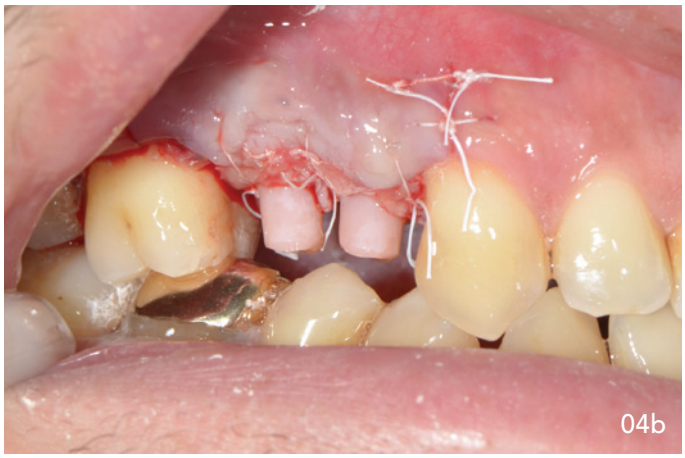
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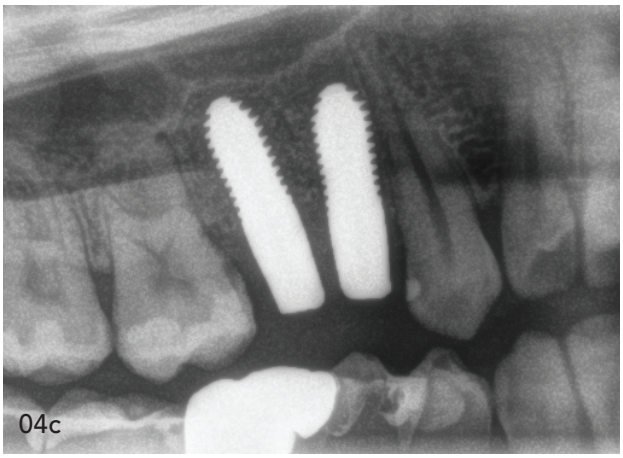

04c

„By avoiding titanium and opting for all-ceramic restorations, potential risk factors such as peri-implant inflammation, bone loss, and gingival recession were significantly reduced."

Therefore, ceramic implants must be inserted at a slower rotational speed to avoid excessive interface temperatures. Post-insertion, the implants were shortened and shaped using a red contra-angle handpiece and ceramic polishing instruments (Figs. 4a+b). Healing was performed transgingivally over four to six months.

Prosthetic restoration

Figures 5b and c show well-healed soft tissue around the implant sites. If necessary, the implant shoulder can be positioned 1.5–2 mm subgingivally in a scalloped fashion to match the natural gingival architecture.

In the same appointment, tooth 16 was prepared for a partial crown. A conventional impression was taken using Honigum Heavy and Light materials (DMG). Final restoration was performed using pressed monolithic e.max crowns. The final result in the upper jaw is shown in Figures 5c and d.

Conclusion

This case illustrates the successful use of one-piece AWI G-Line zirconia implants in a smoker, following professional debridement and socket preservation. The resulting bone structure supported anatomically shaped, aesthetically pleasing all-ceramic implant crowns.

The AWI G-Line implants made of TZP zirconia in gingiva colour offer:
- Excellent long-term durability
- A straightforward insertion protocol
- Outstanding aesthetic integration due to their natural pink hue

The prognosis in this case is very favourable. By avoiding titanium and opting for all-ceramic restorations, potential risk factors such as peri-implant inflammation, bone loss, and gingival recession were significantly reduced.

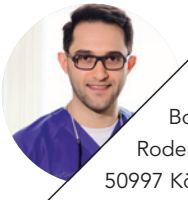

05a


05d


05b


05c

Bozhidar Hristov Savev



Bozhidar Hristov Savev
Zahnarzt Köln Rondorf
Mundkultur BAG, Köln
Bozhidar Savev, Max Bou
Rodenkirchener Straße 148
50997 Köln
+49 2233 939962
www.zahnarzt-koeln-rondorf.de

Implant treatment of canine agenesis with a full zirconia PATENT™ implant

Dr Fabrice Baudot, France

Introduction

Full zirconia implants are now considered a valid alternative to titanium in certain indications, such as metal intolerance and reconstructions in aesthetic areas.[1,2] Osseointegration of these implants and success rates comparable to titanium implants have been demonstrated.[3] On the other hand, their white colour unquestionably gives them an aesthetic advantage. Their ZrO_2 structure and physical properties give zirconia implants a very favourable biological behaviour towards peri-implant soft tissues.

The challenges of modern implantology are increasing as patients demand more natural-looking reconstructions.

With zirconia implants, we have the tools to achieve this challenge, and in certain critical situations we can meet patients' demands thanks to advances in tissue engineering, developments in microsurgical protocols and the properties of zirconia implants.

In this article, the case presented illustrates this evolution and the potential offered by the combination of minimally invasive peri-implant surgery and the use of zirconia implants.

Initial situation

The patient comes to my consultation to consider replacing her lacteal canine, which has been showing signs of weakness for some years.

This patient is particularly keen to have a reconstruction that respects the adjacent teeth, which she does not want to be touched. She wants a prosthesis that fits naturally into an aesthetic and functional context that she doesn't want to change. Quite simply, she wants a definitive canine that nature could have given her if she hadn't had agenesis.

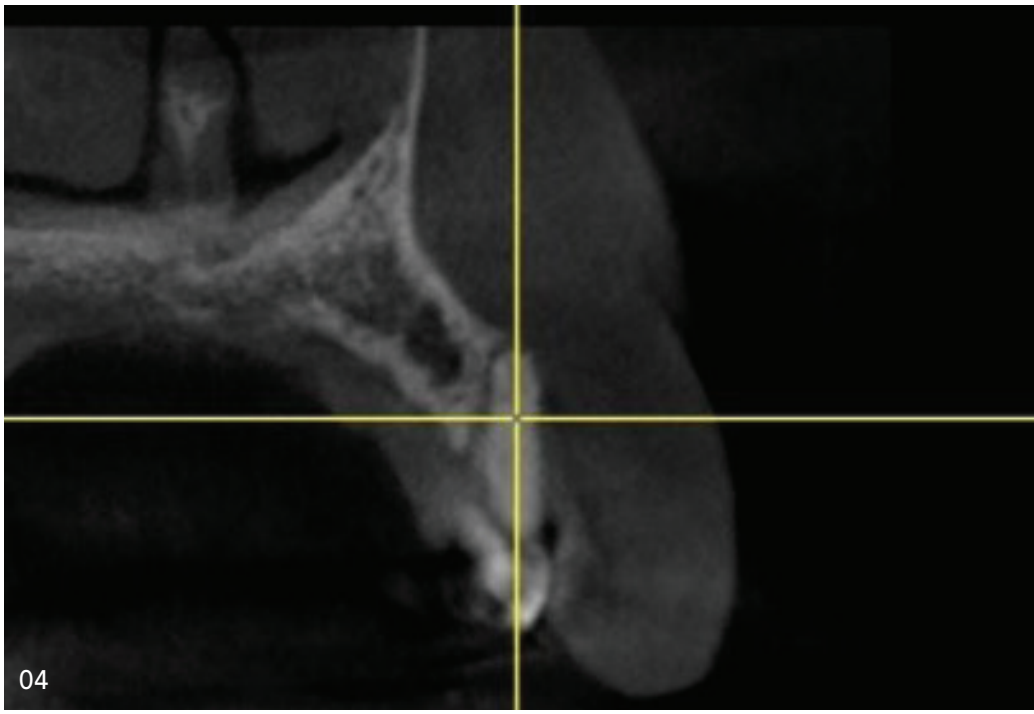
01
Reconstruction of the peri-implant environment of a canine tooth to treat agenesis with a full zirconia implant.

"The goal is simple, but the challenge is great."

The canine is a difficult tooth to reconstruct in implantology, because its position on the arch is always highly vestibular at root level: forming the canine hump, which is very complex to reconstruct. The vestibular cortical bone is often very thin. This situation requires surgeons to carry out extensive invasive bone reconstruction and/or place implants in the palatal position. For their part, dental technicians modify the emergence profile and axes of the prostheses to offer patients an aesthetically acceptable solution.

In the present case, the situation is even more complex, as the agenesis is accompanied by a total absence of cortical bone and a basal bone volume incompatible with the prosthetic axis that the canine must have. We cannot benefit from the natural bone volume of a permanent canine in place, which could be preserved by an extraction and immediate implantation procedure with vestibular filling.

02+03
Placement of a full zirconia implant driven by the prosthetic project to reconstruct the natural anatomy of the canine.



04
Preoperative 3D examination showing the natural position of the lactate canine. To restore the natural prosthetic axis, the bone volume must be largely reconstructed.

"In this case, everything must be reconstructed."

The reference for implant reconstruction is given by the prosthetic project elaborated in the preoperative planning. This planning determines the ideal implant position in 3D. It will be used to produce a surgical guide that will enable the surgeon to control the position of the implant in the prosthetic axis.

Preoperative examinations

Clinical examination shows a thin periodontum and close dental relationships. The patient wishes to preserve the "natural aesthetics" of her teeth, and does not accept any interference with adjacent teeth, nor any modification of her smile.

CBCT examination

We see here that the situation is complex and risky. The implant position must be completely outside the natural bone volume. Only the coronal part of the bone volume can stabilise the implant in native basal bone.

The correct choice of a zirconia implant to meet the patient's requirements

In this high-risk aesthetic and anatomical context, the indication of a zirconia implant that can be milled like a natural tooth seemed the best alternative. Thanks to a patented manufacturing process, the Y-TZP zirconia implant (PATENT™) can be milled.[4] This represents a real paradigm shift in implantology. This technical option gives us flexibility and aesthetic safety margins: implant-prosthetic reconstructions are treated like natural teeth. The ability to mill the implant and prosthetic abutment offers the prosthetist an infinite range of possibilities for adapting to the clinical situation of the implant-supported reconstruction. In a case such as the one presented here, this advantage provides us with decisive security in meeting the patient's requirements.

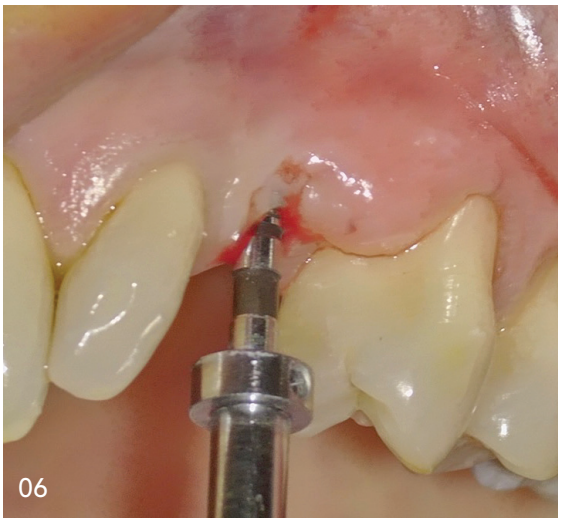
The white colour of the implant, which allows light to pass through partially, does not dull the appearance of thin peri-implant soft tissue in the absence of bone cortex. In such a critical case the risk of tissue and peri-implant recession is high; and the colour

of the implant provides comfort and security for better integration of the implant-supported restoration.

As part of the informed consent process, the patient was informed and involved in the therapeutic choices and materials used. In particular, the delicate subject of peri-implant bone reconstruction was discussed in detail. A minimally invasive tunnel approach was chosen for peri-implant filling. This subperiosteal tunnelling technique enables us to take full advantage of the healing potential, while preserving the vascular supply as far as possible, particularly that of the micro-incised periosteum.

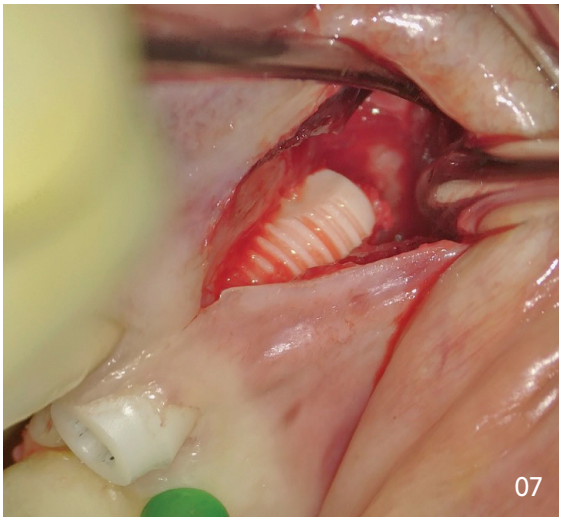
05
The surgical guide to control implant site preparation according to the prosthetic project.

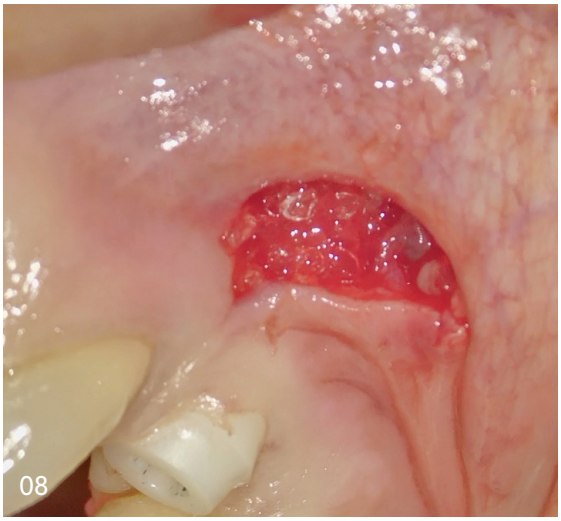
06
Checking the prosthetic axis and integrity of the implant bed. Here, the drilling is outside the cortical bone. The periosteum left in place prevents any slippage in the drilling sequence and alteration of the bone cortex.

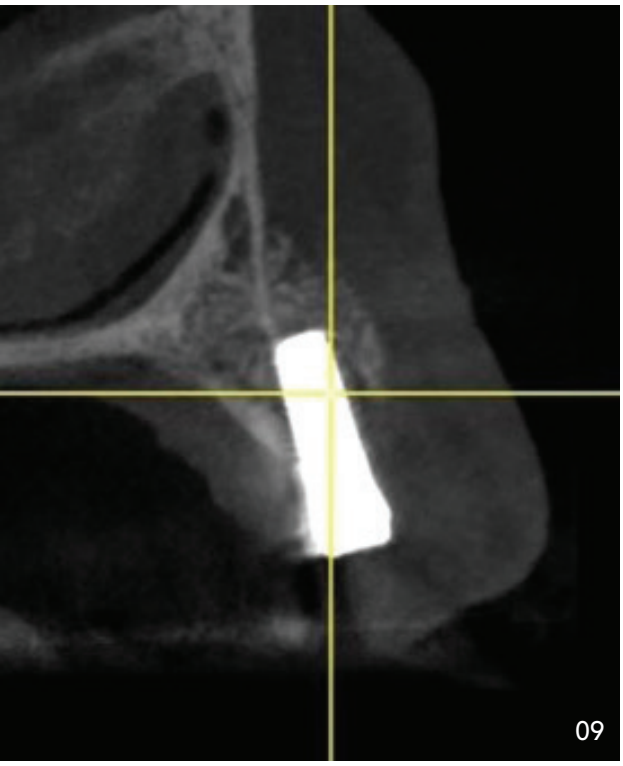


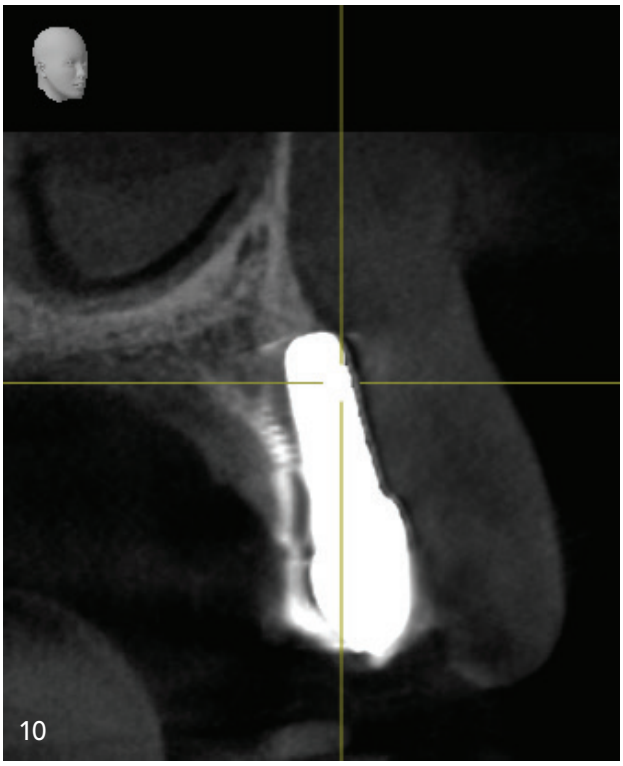
08
The filling is covered by the mucoperiosteal layer, which is sutured with three simple stitches.

07
Tunnelling of the periosteum to ensure subperiosteal filling around the widely exposed implant.









09
Immediate postoperative filling. An overcorrection is performed.

10
3D view at four months postoperative. Significant bone apposition at the implant apex and a very thin, radiolucent bone layer on the implant surface: a highly biomimetic bone regeneration process.

This approach was chosen in this case because the concave bone environment was ideal for stabilising the filling. Filling is performed using tissue engineering. It is obtained using a mixture of autogenous plasma and 45S5 resorbable silica[5]:

- Autogenous plasma (PRF) stimulates angiogenesis and is a source of stem cells and growth factors that help enhancing the osteogenesis process.
- Through its ionic dissolution, 45S5 possesses osteogenic and antiseptic properties[6], and stimulates angiogenesis[7,8], all of which contribute to its improved integration. It is a totally resorbable material that leaves room for fully formed natural bone.[9]

Surgical sequences

The case was performed entirely under an operating microscope (Altion 550) to increase precision and perform minimally invasive procedures.

Surgical protocol

As we have seen, preoperative planning was carried out to produce a surgical guide for placing the implant in the strict prosthetic axis. The guide is used for flapless drilling to maintain control of the peri-implant tissues and the actual situation of the adjacent teeth: this flapless approach allows the surgeon to visualise a projection of the prosthesis during implant placement.

The reaming drill and implant site preparation sequence is carried out without the guide, taking care to maintain the prosthetic axis. This procedure is carried out without detaching the periosteum, whose toughness provides maximum protection for the very thin cortex. As the drills pass through and the implant is placed, the presence of the unstripped periosteum stabilises the fine bone cortex and maintains the correct implant axis. This prevents deviation due to lack of vestibular support.

Planning allows us to know exactly where the implant will be located: here, outside the bone cortex.

11+12
Preparing the implant and abutment by gentle, controlled milling to adapt the implant-prosthetic structure to the clinical situation. A prosthetic protocol very similar to that used on natural teeth.

13+14
Digital workflow and prosthetic fabrication on the full-zirconia implant.

15+16
Integration of the prosthetic restoration on the full zirconia implant in a reconstructed osteo-mucosal environment. The emergence profile of the canine is very close to that of the natural tooth. A new paradigm in implantology, thanks to zirconia implants that can be milled.

Tunnel preparation

Through a lateral mucoperiosteal incision of a few millimetres, the periosteum is gently peeled away over the entire surface of the site to be filled by using a micro-detacher. The laxity of the mucosa gives us a perfect view of the implant and the site to be filled, enabling us to insert and pack the silica/PRF mixture under the periosteum. The tunnel is closed by three simple stitches on the stabilised filling.

Prosthetic preparation of the implant

After four months of healing and osseointegration, the peri-implant volume is assessed by 3D examination and the prosthetic green light is given.

A glass-fibre abutment is bonded to the implant, and the abutment–implant complex is milled to achieve prosthetic requirements. Note that a ferrule effect is created by milling a coronal part of the implant for around 2 mm. This ensures that the prosthetic reconstruction is mechanically stable and adapts naturally to the peri-implant tissue environment.

A simple optical impression is used to provide the prosthetic laboratory with the elements required to produce the crown, which in this case is made of layered zirconia.

We can see here that the prosthetic management of this implant-supported reconstruction is very close to that of a natural tooth. The biomimicry of this system simplifies and secures the approach to complex implant therapies, as in this case. We succeeded in completely reconstructing the canine hump and placing the implant in the exact position required by the prosthetic plan.

Conclusion

With millable zirconia implants, we are experiencing a paradigm shift that extends the scope of implant reconstruction. We are moving away from the rigidity of implant-prosthetic fittings, which attempt to adapt, often in complex ways, to a variety of clinical situations by multiplying the number of prosthetic parts. The zirconia implant system presented here offers greater simplicity: it is infinitely adaptable, because it can be milled like a natural tooth. Biomimicry brings a new dimension to implantology and new perspectives, and that perfectly illustrates the hope that the future of implantology is written in white.

Dr Fabrice Baudot

Literature

Dr Fabrice Baudot
Impasse des Trois Pointes 65
34980 Saint-Gély-du-Fesc
France
+33 4 99060060
dr.baudot34@orange.fr
www.dr-baudot-fabrice-chirurgiens-dentistes.fr

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Peri-implantitis: the ongoing challenge in implant care

The topic of peri-implantitis is far from new in dental care. From its definition and prevalence statistics to ongoing discussions about prevention and treatment strategies, the debate continues to evolve.

Dr Mariane Sordi, DDS, MSc, PhD

What stands out is the substantial volume of publications on the subject. A quick search for "peri-implantitis" in PubMed, as of April 2025, reveals an impressive 4,858 articles, a number that continues to grow exponentially, particularly in the last 15 years. Besides, these numbers only reflect the articles indexed in PubMed, not even considering the vast range of other scientific databases or grey literature sources. In total, we are likely looking at thousands of research papers addressing every aspect of peri-implantitis.

But with such an overwhelming amount of literature, one must ask: What conclusions can be drawn from all these studies? Is the prevalence of peri-implantitis still on the rise, or are we seeing signs of stabilisation? What are the most effective strategies for preventing this disease? What are the underlying causes of the inflammatory breakdown that leads to implant failure? And perhaps most crucially, have researchers and practitioners come to a consensus on the best treatment options available? These critical questions remain at the forefront of ongoing research as we attempt for more effective solutions for managing peri-implantitis.

There is no doubt that the topic of peri-implantitis is a constant concern for every clinician, particularly those involved in implant care. In fact, peri-implantitis is one of the most challenging conditions to treat. Moreover, studies show that between 20 and 47 per cent of implants placed in patients will eventually develop some form of peri-implantitis.[1] This alarming statistic means that, at the very least, two out of every ten patients will return to their dental practices complaining of a problematic implant, leading to not only dissatisfaction from the patient but also significant frustration for the dentist. Such occurrences can be particularly distressing, as they represent a collapse in the expected success of what is considered a state-of-the-art dental treatment.

Zirconia implants were initially introduced to the market with the primary goal of achieving improved aesthetics in clinical practice. Indeed, white zirconia implants offer a more aesthetically pleasing option compared to traditional grey titanium implants, particularly in visible areas where the colour contrast might be noticeable. However, titanium implants, when placed with a proper approach, deliver excellent aesthetic results, achieving high patient satisfaction.

More recently, there has been a growing shift toward biocompatible and metal-free treatment options. Therefore, zirconia has gained popularity due to its perceived its perceived biological benefits for the peri-implant tissues. But once again, the question arises: **how much does a material change truly impact the overall health and well-being of the patient?** While zirconia implants may be a promising option for some, it is crucial to assess whether the shift to metal-free materials offers significant long-term health benefits or if it is more of an aesthetic and philosophical preference.

There is growing evidence highlighting the release of metallic particles from titanium implants into peri-implant tissues and its impact on both the biological response and the long-term stability of dental implants.[2] Throughout the entire implant treatment process, titanium devices continuously release metallic particles into the surrounding tissues due to several factors, including drill wear, friction between the implant and bone surface, wear caused by biomechanical load, and the biological corrosion effect.[3] These titanium particles can accumulate in the peri-implant tissues over time, and the role of these particles in the progression of peri-implantitis may be significantly underestimated.[3] Animal experiments based on a murine implant model have shown that the titanium implant itself promoted peri-implant inflammation and dysregulated mucosal homeostasis. Titanium ions that were released from the implant acted as a mediator in this process.[4] Therefore, it is already known that the

„In fact, peri-implantitis is one of the most challenging conditions to treat. Moreover, studies show that between 20 and 47 per cent of implants placed in patients will eventually develop some form of peri-implantitis."

presence of titanium particles in the peri-implant area triggers an immune response that exacerbates inflammation, thus accelerating the breakdown of bone and soft tissues surrounding the implant.

As a researcher, I studied an inflammatory process known as pyroptosis. The term is derived from the Greek "pyro," relating to fire or fever, and "ptosis," denoting a falling, which together describe the remarkable pro-inflammatory process of cell death in pyroptosis. This intense inflammatory response overwhelms the host's immune system, leading to irreversible tissue damage.[5] Initially described in the context of rheumatoid arthritis, pyroptosis has more recently been linked to periodontitis and, by extension, peri-implantitis.[5] In my research, I concluded that pyroptosis is a caspase-dependent catabolic process that plays a significant role in periodontal disorders, where inflammation is central to the disease's pathophysiology. Furthermore, I suggested that preventing pyroptosis by removing periopathogen virulence factors—those that trigger pyroptosis—may serve as a potential strategy to combat periodontal disease and restore tissue homeostasis.[5,6] Transferring this knowledge to the context of peri-implantitis, it seems plausible that reducing the presence of peri-implant metallic particles could diminish the activation of inflammasomes, the protein complexes responsible for initiating inflammatory responses. This would likely lead to reduced inflammatory reaction and tissue destruction.

Likewise, findings from various research groups consistently point to a connection between microbial dysbiosis, titanium particle release, and peri-implantitis. Although it remains unclear whether biomaterial breakdown and titanium release precede, coincide with, or follow the dysbiotic shift in the peri-implant microbiota, one conclusion is evident: **titanium particles are omnipresent in peri-implantitis**.[7] Hence, restricting the release of metallic particles in the peri-implant environment is likely to reduce the inflammatory load and tissue breakdown.

There is growing interest in exploring alternative materials, such as zirconia, which is known for its superior biocompatibility, reduced biofilm formation, and lower corrosion rates in challenging environments such as the mouth.[8,9] Zirconia implants, due to their ceramic, stable composition, are unlikely to release particles into the surrounding tissues, consequently leading to a reduced incidence of peri-implant inflammatory reaction. In fact, zirconia implants trigger less inflammation and result in reduced marginal bone loss.[10] This suggests that zirconia implants could offer a promising alternative to reduce the incidence of peri-implantitis in the near future.

However, claiming that zirconia implants will completely eliminate peri-implant inflammatory reactions is an overstatement. After all, even a natural tooth, with its perfect anatomy, can fail when exposed to certain virulence factors. Likewise, an implant may fail, regardless of its material quality. Moreover, it is important to consider the technical complications that are inevitably associated with any type of dental treatment.

Moving forward, if zirconia implants will lead to cases of peri-implantitis, clinicians will need to learn how to manage it, as there are currently no established guidelines or protocols for treating peri-implant inflammation around zirconia implants. While some knowledge from the management of periodontitis or peri-implantitis associated with titanium implants can certainly be applied, the unique properties of zirconia may necessitate specific adjustments in treatment approaches.

To conclude, and returning to my previous question "How much does a material change truly impact the overall health and well-being of the patient?"—It appears that zirconia implants can indeed offer improved well-being, primarely due to their biological benefits. With excellent tissue acceptance, low biofilm formation, and a reduced prospect of inflammatory and biological complications, zirconia implants contribute to enhanced patient satisfaction and long-term oral health.

Literature

Dr Mariane Sordi, DDS, MSc, PhD
Periodontics & Implant Dentistry
Solothurn, Switzerland
Liverpool, United Kingdom
marianebsordi@gmail.com

Exploring the impact of hydroxyapatite coatings on zirconia dental implants: A short review

Saurabh Gupta BDS MDS, India

Abstract

Zirconia biomaterials have been used in dentistry for replacing missing teeth due to their superior biocompatibility, high mechanical properties, and higher corrosion resistance. These implant materials have a high modulus of elasticity, high stability, and great optical properties for aesthetic purposes. Nevertheless, the higher elastic modulus results in stress shielding effect of the hard tissue, leading to local bone resorption around the dental implant.

Various subtractive techniques have been used in the past two decades to modify the implant surface for better integration with the hard and soft tissue. With very limited additive techniques and few drawbacks, surface coatings are hardly being used over zirconia implants to improve the performance.

Hydroxyapatite (HA) is one of the ceramic biomaterials considered as an ideal material for coating on biomaterials as it possesses very close similarity in chemical composition and better biocompatibility with natural bone. Recently, the hydroxyapatite coating has increasingly drawn attention to improve the stability and adhesion quality of zirconia biomaterials. This short review presents the current progress in the adhesion qualities of hydroxyapatite coatings on zirconia biomaterials. The structural implant surface and microstructure of hydroxyapatite-based coating are also reviewed in this paper. Hydroxyapatite coated zirconia dental implant has a great potential for better integration with tissue. However, hydroxyapatite has certain drawbacks, including fracture toughness, brittle nature and lower tensile strength, which if overcome could be the promising additive surface coating for zirconia dental implants.

Keywords: ceramic implant surface, hydroxyapatite coating, osseointegration, zirconia implant

Introduction

Zirconia is a bio-inert ceramic which doesn't react with living tissues nor cause any allergy or immune reactions. Particularly, an yttria-stabilised zirconia (YTZP) demonstrates excellent flexural strength and fracture resistance. Due to its superior mechanical and aesthetic properties, zirconia has been used in dentistry for decades for crowns and bridges. Also, from the past two decades, it has been used successfully to produce zirconia dental implants.[1,2] However, to achieve superior osseointegration zirconia is difficult to treat for surface modifications due to its hardness. Accordingly, many studies to overcome these problems through surface modification have been actively conducted in recent years.[3]

There are different surface modification techniques that have been applied to zirconia such as sandblasting, acid etching, polishing, bio-functionalisation, laser treatment, coating, and ultraviolet light treatment. The purpose of surface modification is to alter the surface properties to enhance the biological performance of the surface, without changing the bulk properties of the material.[3–5]

Yttrium-stabilised zirconia reinforced hydroxyapatite coating has been used to enhance the stability of the coating and to increase the adhesive strength with the bone. Hydroxyapatite (HA) provides a stable zirconia implant surface into its bioactive form, enhancing its osseointegration with the surrounding bony tissue.[6]

There are various ways by which hydroxyapatite coating could be applied on implants. The various methods include electrochemical deposition, Sol gel dip coating, plasma spray, biomimetic deposition etc. Apart from this, the accuracy at which the coating is applied is the key.[2,3,7]

Factors favouring hydroxyapatite coating:

a. Thickness

It should not be too thin or thick. The ideal thickness of HA coating must be used to provide the expected results.

b. Texture of the surface

Texture and roughness define the quality of the bone and growth of blood capillaries around the zirconia dental implant. It is measured as the roughness (Ra) and porosity over the zirconia dental implant surface.

c. Homogeneity

Next factor is of course the uniform thickness of the HA coating. Throughout the zirconia dental implant, the uniform thickness must be maintained as the unevenness could impact on its performance.

d. Antibacterial/germicidal properties

HA with anti-bacterial properties produced to fight against an infection, which is considered to be one of the common reasons for zirconia dental implant failure. Thus, the antibacterial hydroxyapatite coating on zirconia dental implants can lower the failure rate.

Literature review

Calcium phosphate (CP) is considered bioactive and stimulates bone regeneration due to their chemical composition somewhat like that of the mineral phase of human bone commonly referred to as biological apatite. But the purest form of CP coatings have shown poor attachment and stability with a weak bonding strength to the implant. To overcome these difficulties of pure CP coatings, studies have used tri-calcium phosphate reinforced hydroxyapatite coatings on zirconia surfaces, with open pores which are larger than 100 µm, a bonding strength of 24 MPa showing a high interfacial bonding between coating and substrate. In addition to this, the coatings exhibited bioresorbable and osteoconductive bone properties.[8,9]

CP based coatings are produced by plasma spraying techniques in industries due to its versatility. Despite its several problems such as variation in coating bond strength with implant and modification of hydroxyapatite structure, this technique provides a good deposition rate and lower cost. New techniques for surfacing CP based coatings are

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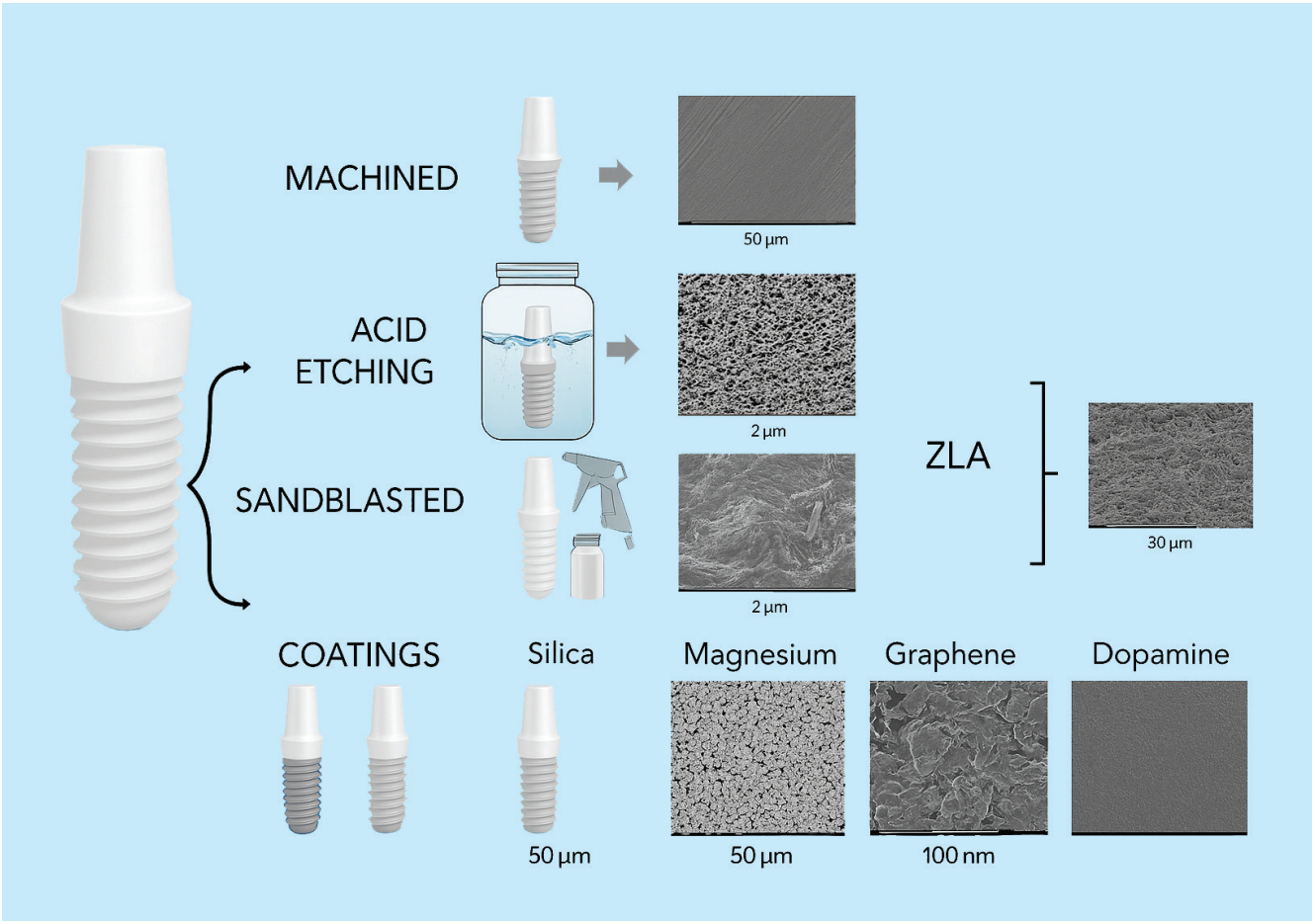
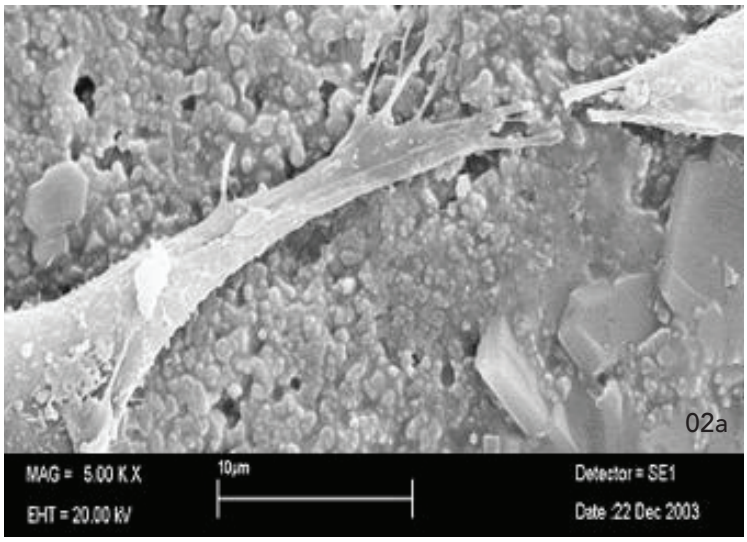
Schematics and SEM images on different zirconia surface modifications: machined, acid etched, grit blasted, ZLA, and multi-layered coatings.





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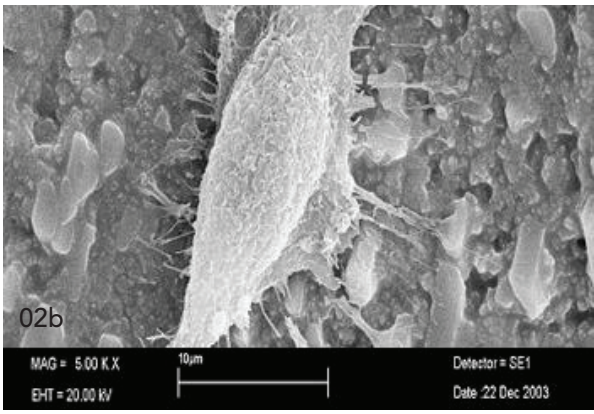
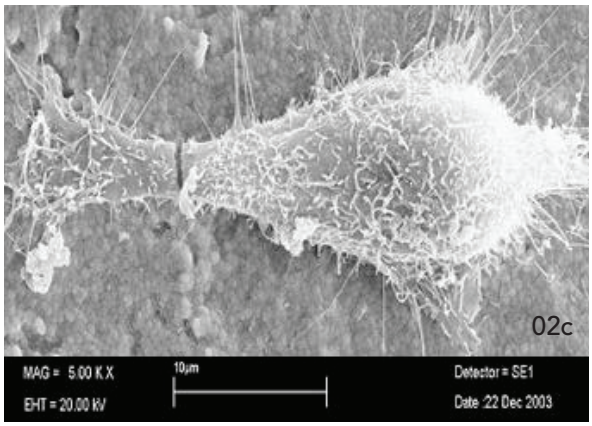
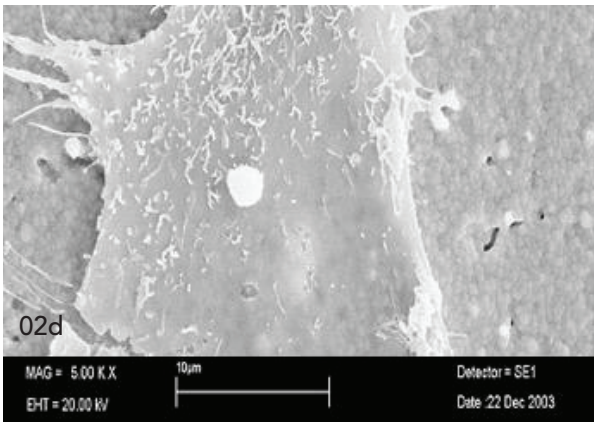
SEM image of Osteoblast morphology on Bioverit-coated zircon dioxide with a heavily roughened surface **(a)**, Osteoblast morphology on Bioverit-coated zircon dioxide with a heavily roughened surface **(b)**, Osteoblast morphology on zircon dioxide **(c)**, Osteoblast morphology on zircon dioxide **(d)**.







constantly being produced to address the problems associated with plasma spraying. In an *in vitro* study by Pardun et al., proposed a HA coating by wet powder spraying using a double action airbrush spray over zirconia. The added advantage of WPS is its versatility in coating curved surfaces with varying thickness. These experiments revealed that the hydroxyapatite dissolution stimulated the adhesion and proliferation of osteoblast cells.[10]

Electrophoretic deposition has been developed as a better option to the traditional techniques due to its high versatility and simplicity. A novel approach that combines both plasma electrolytic oxidation and electrophoretic deposition has been used to produce and coat HA film on zirconia.[11]

Hydroxyapatite has been used to coat zirconia to achieve a stable zirconia implant surface into a bioactive form, enhancing its osseointegration with the surrounding bone. In a study by Kim et al., the structure and crystal phase of the sol–gel-based HA coating layer were controlled by adjusting the sintering temperature. The optimised HA coating demonstrated superior coating stability as well as osseointegration without showing byproduct phases, which is one of the major problems of HA-coated zirconia systems. The results of this study suggested that a low-temperature sintered sol–gel-derived HA coating would increase the potential of zirconia in dental implant application.[12]

Aboushelib and Shawky in a study evaluated the osteogenic activity of hydroxyapatite filled porous zirconia

scaffolds resulted in a significantly higher amount of new more formation than the scaffolds without hydroxyapatite. In addition to this, it has been known that the bioactivity can be increased to a fair extent by filling the prepared porous zirconia with hydroxyapatite. Porous zirconia filled with hydroxyapatite by physical diffusion can release hydroxyapatite particles within the bodily environment.[13]

In another study by Hun Kim, zirconia discs along with screws were produced by hot press injection moulding technique (IMT) using granular zirconium dioxide of dia 200–500 nm. To elevate the bioactivity of the produced zirconia, nano-hydroxyapatite of dia 20–70 nm was chemical bonded with the surface and then type 1 collagen was chemically bonded on it. Hydroxyapatite along with type 1 collagen was successfully coated to the zirconia through covalent bonding (chemical). It was confirmed that both nano-hydroxyapatite immobilised zirconia and type I collagen immobilised zirconia exhibit superior bioactivity through *in vitro* osteoblastic cell experiments.[14]

An ideal hydroxyapatite coating should be thin (< 50 µm) and uniform, have high adhesive/attachment strength to withstand heavy shear forces, greater hardness to reduce wear, and along with sufficient roughness and porosity to promote inward growth of the bone.[15]

A hybrid laser engraving combined with laser sintering of HAp resulting in the mechanical interlocking of apatite in the grooves created was suggested for zirconia dental implant applications. But the defects created at the surface below the HAp coating could be detrimental to strength. Recently D. Faria et al., suggested green state laser surface texturing and laser sintering as a promising alternative for a mechanical interlocking assisted improvement in bond strength between the zirconia substrate and HAp coating. Cho et al. reported a novel aerosol coating technique to deposit a thin, dense, and uniform coating of highly crystalline HAp on zirconia surfaces with good wettability and osteogenic response.[16,17]

In a recent study by Seesala et al., proposed a novel ceramic dough processing technique to form a gradient composite coating of HA in a zirconia matrix, on net shaped zirconia dental implants without compromising the features like threads. Initially, the dental implants were near net shaped on alumina-toughened zirconia (ATZ) green blanks produced through extruding ceramic dough. After sintering and cooling to room temperature the implants were coated with a slurry containing 10 Vol% HAp in the ATZ, which is also produced through the same ceramic dough processing to facilitate a quick uniform dispersion of HAp secondary phases in zirconia matrix. The final sample after drying was heat treated at a comparatively lower sintering temperature facilitating a HA zirconia composite coating on net shaped zirconia substrate. This approach is compatible and a promising solution for currently available bioinert zirconia implants.[18]

Some innovative methods of coating include a study by Yuan and Golden, where they used HA coating with the help of electro deposition. The substrates were coated with double layers to reduce the contact of the implant with body fluid. After this, heat treatment was carried out to samples in a vacuum (800 °C) or in the presence of air (600 °C). The benefit of double layer coating was to increase the uniformity with high adhesion between surface and HA. One more innovative method where the oxide layer was introduced in

between the implant and HA. The oxide layer protects the surface and prevents the release of toxic ions from the top layer. The oxide layers covered with HA coatings enhance the adhesion of oxide and HA. This coating also enhances the biological performance of the implant.[19]

Another innovative technique was the combination of two coating methods to produce HA films performed by Jia et al. The researchers coupled micro-arc and sol-gel processes together to form coating layers. The micro-arc improved the biocompatibility of the implant, and the bioactivity was enhanced further by the sol-gel HAp coating.[20]

To avoid implant associated infections, the medical implants are coated for antimicrobial behaviour. Ferritin, an iron storage protein, is also being explored for use in implant coatings to potentially enhance bone growth and reduce inflammation.[21]

Discussion

The main target of this review is to gather a literature bank associated with the hydroxyapatite coatings for the development of metal-free zirconia implants. HA coatings, especially nano crystals of HA, enhance the biocompatibility of zirconia implants more which mimic the implant-like natural bone.

The thickness of the coating varies up to several microns with minute carbide formation providing porous surface and acceptable strength to coating. Sol-gel method can provide a range of HA precursors in aqueous form for coating on any shape of the zirconia implant. Electrochemical deposition also uses raw material in aqueous form for coating over zirconia implant. The concentrations in a wide range can be used for coating on various designs of the implants.

Ceramic implant materials have a high elastic modulus, chemical stability in the human bone, and good optical properties for aesthetics. The high modulus of elasticity results in stress shielding effect of the hard tissue, leading to local bone resorption around the implant. Hydroxyapatite coated bioactive zirconia are reactive to the surrounding tissue and establish chemical bonds with adjacent tissues. Also, these bioactive materials exhibit comparable modulus of elasticity to hard tissues (bone, enamel, or dentine), which reduces the stress shielding effect. The osteoconductive CP glass coating speeds up the osseointegration process and prevents micromotion of the interface between zirconia and bone. In addition, the outer surface of this layer acts as an encapsulation, preventing hydrothermal degradation of the YTZP.

Another important area that needs to be explored is the use of HAp in combination with other calcium magnesium phosphates naturally present in bones. These other phases have important functions during bone tissue healing. Whitlockite is one of the calcium magnesium phosphates that is naturally present in bone and plays an important role because of its osteogenesis properties. Synthesis of whitlockite is a very critical process and requires extensive optimisation of parameters like pH and temperature. It can therefore be the reason for not exploring the coating involving different other phases, particularly whitlockite that has not been investigated comprehensively. Following this, HAp in combination with different ions substituted whitlockite can also provide better osteogenic properties.

Coating implants with hydroxyapatite and bioferritin can enhance osseointegration and bone healing by mimicking natural bone structure and potentially delivering iron for bone formation, improving bioactivity and biocompatibility of the zirconia implants.

Few drawbacks of HA-coated bioactive ceramics is that they are relatively weaker and unstable, which reduces the performance of zirconia implants. Also, the stability of coating was reduced by a byproduct, which is produced during the high temperature sintering process.

Conclusion and future perspectives

The scope of surface modification techniques on zirconia, especially hydroxyapatite, to improve cellular response in implant dentistry, is still ongoing, but very promising. Hydroxyapatite coating is one of the simplest ways to enhance the osteoconductivity of zirconia dental implants. Thus, the use of HA coating and the use of biphasic coatings, particularly combining HAp with other available calcium magnesium phosphates, are prospective options in this area for the future. Hydroxyapatite and bioferritin coating are yet another field which needs to be explored for effectiveness and safety.

Hydroxyapatite has certain drawbacks, including fracture toughness, brittleness and low tensile strength, which if overcome could be the most promising surface technique for ceramics/zirconia dental implants.

Saurabh Gupta
BDS MDS

Literature

Saurabh Gupta
BDS MDS
Oral & Maxillofacial
Surgeon & Implantologist
IAOCI Educational Director
Bangalore, India
+91 9916203455
saurabh@iaoci.com

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Where science meets practice

The 3rd European Congress for Ceramic Implant Dentistry 2025 sets a new benchmark in Zurich

From 25 to 27 September, Zurich will become the international hub of ceramic implantology as the European Society for Ceramic Implantology (ESCI) will host the 3rd European Congress for Ceramic Implant Dentistry. This premier event brings together scientific excellence, clinically relevant education, and elite networking in a single, world-class forum. Dental professionals, implantologists, and researchers from across Europe and beyond are invited to experience a dynamic and forward-thinking congress rich in innovation, interdisciplinary exchange, and clinical mastery.

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Three days of high-level knowledge exchange

The ESCI Congress presents a robust scientific programme featuring 25 internationally renowned speakers, each delivering cutting-edge insights into the latest research, time-tested clinical strategies, and emerging treatment paradigms. Whether you're seeking to deepen foundational knowledge or explore advanced interdisciplinary approaches, the congress offers a compelling blend of academic rigor and practical application.

A variety of lectures, case presentations, and workshops will equip participants with actionable knowledge for everyday clinical practice. A key highlight: hands-on training sessions led by global experts, where attendees can refine their skills in surgical techniques and the integration of ceramic implants in aesthetic and functional dentistry.

Live surgeries, expert training, and hands-on learning

The congress opens on September 25 with a comprehensive full-day pre-congress workshop, hosted in collaboration with the Center for Dental Medicine at the University of Zurich (ZZM). This exclusive programme offers a unique clinical experience, featuring three live surgeries performed by renowned experts: Prof. Dr Ronald Jung, Dr Marc Balmer, and Dr Jens Tartsch.

The focus will be on three state-of-the-art ceramic implant systems—Straumann PURE Ceramic, NobelPearl, and the CERALOG PROGRESSIVE-LINE. Combining theoretical foundations with hands-on practice, this workshop delivers in-depth insights into contemporary ceramic implant protocols for both beginners and seasoned clinicians. With a limited group of just 20–40 participants, this immersive format ensures personalised instruction and meaningful interaction.

Elevated networking in an exclusive setting

Beyond its educational value, the congress also serves as a distinguished networking location. Attendees will enjoy a welcome reception and an elegant gala dinner at one of Zurich's exclusive venues—ideal opportunities to engage in meaningful dialogue

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with colleagues, speakers, and thought leaders in a relaxed, sophisticated atmosphere. All of this set against the backdrop of Zurich—a city celebrated for its commitment to excellence, cultural richness, and warm hospitality.

A Swiss metropolis where innovation meets precision

As the host city, Zurich perfectly embodies the spirit of the congress: a global hub of scientific innovation, Swiss precision, and world-class quality. Situated in the historic old town and near the University of Zurich, the venue offers a unique blend of academic vibrancy and serene charm—providing the ideal environment for professional growth and international exchange.

Redefining the future of ceramic implantology

With its ambitious scientific agenda, hands-on training opportunities, and refined social programme, the 3rd European Congress for Ceramic Implant Dentistry 2025 is far more than a continuing education event. It is a defining moment in the evolution of ceramic implantology—shaping the future of the field across Europe and beyond.

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A celebration of science, innovation and collaboration

EuroPerio11: Four unforgettable days in Vienna

EuroPerio11, the world's leading congress in periodontology and implant dentistry, ended on 17 May after four days of outstanding science, hands-on innovation, and vibrant networking in Vienna. Organised by the EFP, the triennial event once again set a new benchmark for excellence in dental congresses.

With over 10,000 participants from 107 countries and many more joining virtually, EuroPerio11 proved the enduring global relevance of periodontology. More than 100 sessions took place across the VIECON congress centre, with cutting-edge research presented by top international experts, alongside lively debates, live surgeries, and hands-on workshops.

"EuroPerio11 has surpassed our expectations," said Prof. Anton Sculean, chair of EuroPerio11. "We've seen how the global perio community continues to grow in strength, diversity, and ambition. The science presented here will influence how we practise, educate, and think about gum health for years to come. A particular highlight for me was the session with the World Health Organization (WHO), which underscored how periodontal health must gain recognition on the global health agenda. Other personal favourites included the joint symposia between the EFP and the American Academy of Periodontology (AAP), the International Academy of Periodontology (IAP), and the Osteology Foundation; the special session on Women's Oral Health; and last but not least, the three live surgeries, streamed in top-notch quality."

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"EuroPerio11 has surpassed our expectations, ... We've seen how the global perio community continues to grow in strength, diversity, and ambition."

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EuroPerio11 scientific chair Prof. Lior Shapira added: "The quality of the science has been exceptional. We've heard groundbreaking data on the perio-systemic connection, innovations in regenerative techniques, and practical insights into sustainability and digitalisation. We were especially proud to host an outstanding line-up of speakers at EuroPerio11, with 45 per cent of them being women. One of the most memorable moments for me was the Women and Oral Health session: the hall was full, and the audience deeply engaged with this important and often underexplored topic. Another standout was the Patient's Point of View session, which brought a truly unique perspective to the congress. After three years of dedicated work, it was incredibly rewarding to see it all come together so successfully!"

Beyond the lecture halls, EuroPerio11 provided attendees with a rich programme of social and networking opportunities. Highlights included the EuroPerio11 Charity Run on Thursday morning joined by more than 400 participants and the spectacular congress party at Weitsicht Cobenzl on Friday night, where 2,000 guests danced, mingled, and celebrated against the stunning backdrop of Vienna's vineyards.

Thanks to its hybrid format, offering full virtual access to live-streamed and on-demand content, participants from around the world were able to experience the congress remotely, reinforcing the EFP's commitment to accessibility and innovation in continuing education.

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"The quality of the science has been exceptional. ... We were especially proud to host an outstanding line-up of speakers at EuroPerio11, with 45 per cent of them being women."

EuroPerio11 content is now available to all participants on the virtual platform with their individual logins. Delegates received an e-mail with the details at the end of the meeting.

As participants return home, the EFP looks ahead to building on the momentum of EuroPerio11. The congress may be over, but the work continues, with fresh knowledge, renewed connections, and a shared commitment to promoting gum health as a cornerstone of general health.

"Thank you to everyone who made EuroPerio11 possible: the speakers, delegates, sponsors, volunteers, and organising team. Your passion and participation are what make this event truly exceptional," concluded Prof. Sculean.

"We look forward to seeing you at EuroPerio12 in 2028 in Munich, Germany!"

Source: EFP


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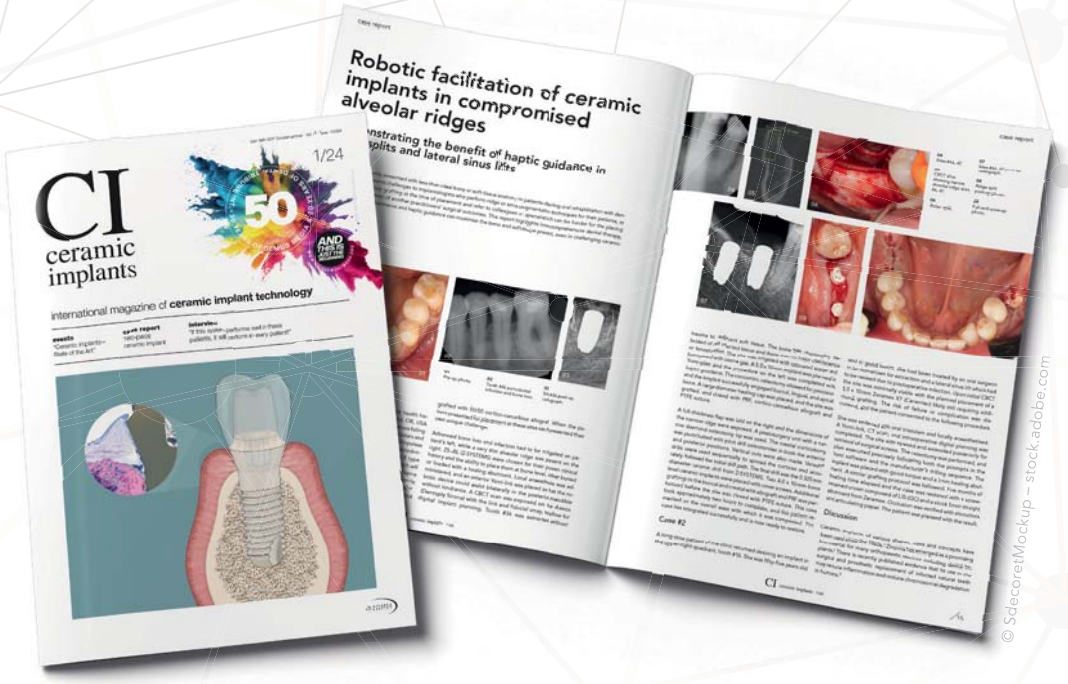

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t.krause@oemus-media.de
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Joint venture succeeds again

Ceramic implants and aesthetic concepts enthrall attendees in Berlin

With a multifaceted programme and renowned speakers, the organisers once again succeeded in captivating numerous participants with the themes of ceramic implants and aesthetic concepts in the capital on 9 and 10 May.

The second weekend of May at the Dorint Hotel on Berlin's Kurfürstendamm could not have gone better for the many attendees. As in previous years, the professional societies ISMI (International Society of Metal Free Implantology e.V.) and DGKZ (German Society of Cosmetic Dentistry e.V.) combined their annual conferences and made use of the potential of shared podiums to set trends in both disciplines.

Ceramic implants—state of the art

The International Society of Metal Free Implantology e.V. focused its 9th annual meeting on future trends, clinical evidence, and best practices in the field of metal-free implantology under the scientific leadership of Dr Karl Ulrich Volz and Dr Dominik Nischwitz. Ceramic implants remain highly popular and are gaining increasing significance—not only for aesthetic reasons, as the exciting and multifaceted programme clearly demonstrated.

What does the current data landscape look like? What new studies have been published or are underway? Are ceramic implants still a future-proof solution? The speakers presented the currently favourable conditions in their area of expertise and offered an optimistic outlook. In addition to clinical case studies and presented evidence, the focus was on sharing experience—also on an international level.

During the ISMI pre-congress symposium, Dr Robert Bauder lectured on "Ceramic immediate implants as a time-efficient game changer for enhancing overall health and longevity," while Dr Dominik Nischwitz presented "From technician to health expert—the evolution of dentistry and the rise of bio-dentistry 3.0." The symposium was further enriched by contributions from Moritz Kneer, Dr Adina Landschoof, and Ralf Petersen, offering hands-on insights and room for expert discussion.

The accompanying industry exhibition received high praise—not only for showcasing product innovations but also as a space for collegial exchange. As in the previous year, it naturally served as the venue for the evening reception featuring food, drinks, soft music, and engaging conversations. Saturday also offered ample opportunity for in-depth exchange on specialised topics through the popular table clinics.

The ISMI Saturday was dedicated to science, with presentations by Dr Dominik Nischwitz, Prof. Dr Dr Dr Shahram Ghanaati, Dr Peter Gehrke, Dr Thomas Franke, Dr Markus Sperlich and Dr Mathias Sperlich, Dr Susanna Zentai, Dr Gregor Hočevar, and Dr Rebekka Ellenrieder.

Dream smiles meet reality

"Aesthetic concepts with substance" was the thematic focus of the DGKZ's annual conference, held under the scientific leadership of Prof. Dr Martin Jörgens. This year's content was driven by the evolving desires and expectations of patients. In addition to restoring natural, functional conditions in the oral and jaw area, these needs are increasingly reflected in both simple and complex aesthetic solutions.

On the main topic of "Aesthetic concepts," speakers and panelists included Prof. Jörgens, Prof. Dr Christian R. Gernhardt, Anh Duc Nguyen, Dr Natalie Pütz, Dr Theodor Thiele, and Dr Petra Schumacher. Both specialists in cosmetic and aesthetic dentistry as well as general dentists were able to take home valuable insights from the presentations.

The lively atmosphere among the guests, the harmonious collaboration between the two societies, and the resulting depth of content once again created a remarkable win-win situation for all participants. The shared stage encouraged active participation and discussion, while the individual presentation sessions allowed for an in-depth exploration of core topics.

ISMI—International Society of Metal Free Implantology
Bücklestraße 5a, 78467 Konstanz
Germany
www.ismi.me

ISMI

4th EACim International Congress—A milestone in ceramic implantology

The 4th International Congress of the EACim took place in Madrid on 13 and 14 June 2025, under the high patronage of the new president Prof. João Caramês. The event marked an important milestone in the advancement of ceramic implantology in Europe.

EACim, Fabrice Baudot

The pre-congress day featured four practical workshops led by renowned experts and industry partners, offering participants valuable hands-on experience with various ceramic implant systems. These sessions promoted lively discussions and allowed direct interaction with innovative clinical solutions.

The congress on 14 June brought together over 140 participants from around the world under the theme of Bio-Immuno-Osteointegration. The programme reflected the increasing momentum of ceramic implantology and its role in shaping the future of biological and aesthetic dental care.

International speakers delivered insightful presentations throughout the day. Dr Saurabh Gupta (India) highlighted the preventive potential of ceramic implants in managing peri-implantitis. Dr Olivier Henry-Savajol (France) demonstrated a full-arch zirconia case, confirming that immediate loading protocols commonly used with titanium are now also feasible with ceramics. Dr Roland Glauser (Switzerland) presented compelling histological images showing how soft tissues integrate with zirconia surfaces, suggesting biological harmony at the tissue level.

Dr Adina Landschoof (Germany) focused on soft-tissue aesthetics and showed how ceramic implants create natural-looking restorations, particularly in immediate post-extraction cases.

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The congress closed with student presentations, giving the stage to three young researchers from Italy and France. Greta Previdere was awarded best poster for her 18-year follow-up on a zirconia implant case. Special thanks were extended to the congress moderators: Dr Fabrice Baudot, Prof. Jordi Cargalo, Laurens Wiggers, and Prof. Andrea Borgonovo.

Prof. Jorge Cortes (Spain) offered a critical comparison of one-piece and two-piece zirconia implants, outlining current limitations and future directions for research and development.

Drs Markus and Mathias Sperlich (Germany) shared their expertise on immediate zirconia implant placement. Using digital workflows, they showed how this approach can preserve peri-implant tissue and deliver outstanding aesthetic outcomes. Dr Regeane Kaniak (Brazil) introduced the concept of osteo-immunology, emphasizing how the immune system and bone healing processes influence long-term implant success. She stressed the importance of tissue management and material selection.

Prof. Robert Rivest (Switzerland) explained a practical blood test protocol for identifying patients' immunological sensitivity to metals, aiding in safer implant planning. Later in the day, Dr Joseph Choukroun made a surprise appearance, presenting new clinical indexes—Systemic Immune Index and Systemic Inflammatory Response Index—that use basic blood parameters to assess healing potential. These tools may become important in surgical prognosis and planning.

Unfortunately, Prof. Assaf Zelensky could not attend due to geo-political circumstances in the Middle East. The EACim hopes to welcome him at a future event.

This congress once again confirmed that ceramic implants are a serious alternative to titanium and represent a promising path for the future of implantology. EACim remains committed to promoting biologically respectful, aesthetic solutions in dental implantology. The 5th EACim Congress is already planned for 2027 in Portugal, the homeland of President João Caramês and a key centre for implant innovation in Europe.

More information:
www.eacim-ceramic-implantology.com.

EACim

EACim—European Academy of Ceramic Implantology
www.eacim-ceramic-implantology.com


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Neodent—From Brazil into the world

An interview with Dr Geninho Thomé and Dr Sérgio Bernardes

Timo Krause

01
Zi Ceramic Implant System: A new mindset combining esthetics, stability, and flexibility.

Looking back at Neodent's journey over the past three decades, what have been the most impactful developments related to the Zi Ceramic Implant System since its introduction in 2022? In what ways has this innovation influenced Neodent's position in the global implant market?

Thomé: Since its launch in 2022, the Zi Ceramic Implant System has marked a turning point in our portfolio. Initially introduced to meet growing demands for metal-free and aesthetic solutions, it quickly evolved into a robust system capable of addressing clinical challenges in both anterior and posterior regions. With the 2025 introduction of the Zi Transmucosal Ø5.0, we expanded our ceramic indications to high-load areas, a segment often avoided with ceramics due to concerns over mechanical resistance.

Bernardes: This shift positioned Neodent not just as a pioneer in accessibility and immediacy, but now also as a reference in aesthetic-driven and digital solutions. Our presence in new markets and the adoption of the Zi System by a growing number of clinicians globally reflects its impact in enhancing our market leadership.

Could you elaborate on the advancements made in the Zi Ceramic Implant System since its launch and what future enhancements can we expect in this product line?

Thomé: The Zi Ceramic Implant System has undergone continuous evolution. Originally launched with bone level options, we addressed flexibility with a two-piece connection and expanded prosthetic workflows. In 2025, the introduction of the Zi Transmucosal Ø5.0 brought innovations in macrogeometry—wider diameter for large sockets, shorter lengths (as short as 5.0 mm) for complex cases, and a redesigned internal connection (ZiLock) for improved load distribution and stability.

The portfolio was further strengthened with the introduction of the abutment for bridge, extending the range of indications beyond single-tooth cases. This addition significantly increased the clinical versatility of the Zi system, especially for clinicians aiming to deliver aesthetic and metal-free rehabilitations in more complex situations.

Bernardes: And the launch of the guided surgical cassette for Zi allowed clinicians to have more precision and accuracy for the implant placement, according to the treatment planning. All the benefits from guided surgery are very important for ceramic implantology and the incorporation of guided surgery protocols via the Zi MultiKit was another milestone, simplifying adoption and improving clinical predictability. Future developments will focus on expanding prosthetic options, optimising surface characteristics for faster biological integration, and deepening

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integration with digital planning tools. The goal is to continue delivering a ceramic system that offers strength, aesthetics, and versatility across a broad spectrum of cases.

Global networking seems central to Neodent's philosophy. How has Neodent leveraged these aspects to expand its influence globally, particularly following the full acquisition by the Straumann Group in 2015? In which way did the company benefit from the takeover?
Thomé: The acquisition by the Straumann Group in 2015 was a strategic catalyst that accelerated Neodent's full global potential. Through Straumann's established international infrastructure, Neodent combined forces, and gained immediate access to broader markets, advanced research and increased its development capabilities. We were able to scale production, expand our product range, and align with high regulatory standards in new countries. The collaboration also strengthened our innovation pipeline, exemplified by the Zi Ceramic Implant System—an outcome of combining Neodent's pragmatic and agile development culture with Straumann's global expertise and scientific excellence.

Bernardes: This synergy allowed us to go further: by combining Neodent's strengths—our philosophy of immediacy and Brazil's spirit of accessible innovation and clinical excellence—with Germany's technological leadership and the precision of Swiss engineering, we created a ceramic implant system that is both high-performing and straightforward.

Thomé: Global synergy has been essential to achieving bigger results, not only by expanding our presence, but also by enhancing the way we innovate and collaborate across borders—delivering aesthetic, reliable, and efficient outcomes for clinicians and patients around the world.

As Neodent continues to grow what role does the global network of experts and customers play in shaping the future of your products and services, especially in the context of the Zi Ceramic Implant System?
Thomé: Our global network of clinicians, researchers, and partners is a cornerstone of our innovation strategy. The feedback we receive from over 98 markets where Neodent is present directly shapes the evolution of our products. The Zi Ceramic Implant System is a prime example—its transmucosal expansion and integration with guided surgery stemmed from clinical demands for robustness in posterior zones and workflow efficiency. We engage this community not only through structured clinical studies but also via real-time channels such as beta testing, work-

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02

03

02+03
Dr Geninho Thomé and Dr Sérgio Bernardes at IDS 2025.

shops, and advisory boards. This dialogue ensures that our innovations stay grounded in everyday clinical reality while pushing technological boundaries.

IDS 2025 in Cologne has just passed, was it a success for Neodent? Where did you put focus on this year in Cologne?

Thomé: Definitely, IDS 2025 was a remarkable success for Neodent. More than just presenting new products, it was a moment to reflect our evolution as a global provider of complete treatment solutions. This year, our focus was on integrating digital workflows, ceramic innovations, and immediate protocols—a powerful trio that defines modern implant dentistry. A key highlight was the Zi Guided Surgery Protocol, which brings unmatched precision and simplicity to guided procedures, expanding the indications for the Zi Ceramic Implants into more complex clinical scenarios.

Bernardes: Beyond the innovations, what truly stood out was the connection with clinicians and partners from all over the world—reinforcing our position as a brand that listens, evolves, and delivers. IDS is always a landmark event, and this edition reaffirmed our commitment to driving the future of aesthetic, accessible, and reliable implant solutions.

Neodent—
A Straumann Group Brand
www.neodent.com

Dr Geninho Thomé
Founder and Scientific President & Chairman of the Board, Neodent

In 1993, Dr Geninho Thomé founded Neodent, a company dedicated to developing innovative dental implant solutions focused on aesthetic and functional rehabilitation. He also founded the Latin American Institute of Dental Research and Education (ILAPEO), which is committed to scientific research, academic training, and promoting public health. Through these initiatives, he has made a lasting impact on both Brazilian and global dentistry. Dr Geninho Thomé continues to perform surgeries at ILAPEO and, at Neodent, serves as Founder and Scientific President & Chairman of the Board. He remains at the forefront of developing solutions that reflect his lifelong mission: to create new smiles and improve people's quality of life.

Dr Sérgio Bernardes
New Product Development & Clinical Practice Director, Neodent

Dr Sérgio Bernardes began his journey at Neodent in 2005 as a Scientific Consultant. In 2012, he took on the leadership of the Medical Marketing team, playing a key role in Neodent's global expansion and in advancing the clinical practice of dentists worldwide. In 2018, he joined the Innovation team, further strengthening his connection with product development and helping transform ideas into real market solutions. In his current role, he leads a multidisciplinary team, focusing on efficient communication, resource optimisation, and agile decision-making to ensure each innovation enhances treatment excellence and supports the company's strategic goals.

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Advancing implant safety and quality: The role of CleanImplant in a changing regulatory landscape

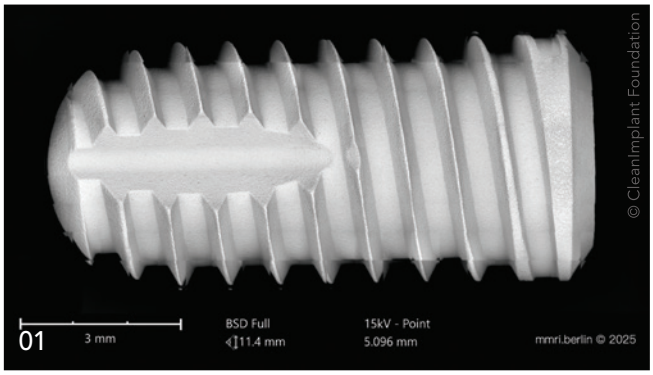
Dental implantology has seen remarkable advancements, but with innovation comes the critical responsibility of ensuring implant safety, biocompatibility, and quality. Regulatory frameworks like the US Food and Drug Administration (FDA) and the European Medical Device Regulation (MDR) establish stringent requirements for manufacturers. In this landscape, CleanImplant has emerged as a vital mediator, bridging the gap between patient care, scientific research, and industry collaboration.

The FDA's regulatory process involves various submission pathways, with the 510(k) premarket notification being common. Recent FDA guidance now recommends advanced analytical techniques such as scanning electron microscopy (SEM) and energy-dispersive spectroscopy (EDS) to evaluate particulate contamination. These measures aim to enhance patient safety by ensuring higher purity standards and reducing the risk of adverse immune responses or implant failure.

In parallel, the European MDR has imposed stricter controls, requiring more comprehensive clinical evidence, increased post-market surveillance, and higher accountability. Manufacturers must now provide more extensive documentation and independent assessments to demonstrate compliance.

Recognising concerns about factory-related contamination, the CleanImplant Foundation has taken a proactive role in independently assessing and verifying implant cleanliness. By conducting rigorous scientific evaluations, CleanImplant provides objective, transparent data. This helps dental professionals and patients make informed decisions.

Commissioned studies by the CleanImplant Foundation have repeatedly identified particulate contaminants on new, sterile implants. These can trigger immune responses leading to peri-implantitis and ultimately, implant failure. Collaborative research further highlights the impact of surface contamination on cell viability, reinforcing the need for stringent quality standards.



Beyond its role as an independent institution, CleanImplant has evolved into a platform that unites stakeholders across the dental implant industry. The initiative fosters collaboration between manufacturers, researchers, and clinicians, ensuring that advancements in technology align with patient safety.

With the introduction of the new platform CleanImplants4.me, the directory serves as a bridge, connecting certified clinics with individuals seeking reliable, certified implant solutions. By creating a network of trusted providers, CleanImplant enhances access to superior treatments while encouraging manufacturers to meet elevated quality benchmarks.

Industry support for CleanImplant has grown, reflecting a shared commitment to transparency and patient well-being. As regulatory requirements become more stringent, manufacturers partnering with CleanImplant can proactively reinforce their credibility and commitment to excellence.

The dental implant industry is undergoing a significant transformation. Credibility and collaboration are essential for progress in an era demanding greater transparency and accountability. CleanImplant plays a crucial role in fostering this trust by providing independent assessments, facilitating industry dialogue, and advocating for higher standards in patient care.

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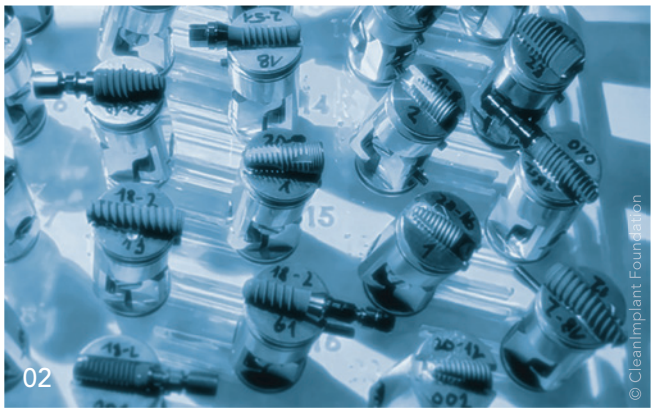

01
Example of a particle-free dental implant in the scanning electron microscope (high-resolution SEM mapping image electronically compiled of up to 400 single SEM frames).

02
Implant samples mounted for SEM inspection (medical materials research institute).

Dr Dana Adyani-Fard
Berlin, Germany
info@cleanimplant.org
www.cleanimplant.org

Dr Dana Adyani-Fard

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ZiBone zirconia medical device: revolutionising dental implants for straight smiles

With our state-of-the-art products, we aim to equip dentists with the tools they need to create beautiful, natural-looking smiles for their patients. We will delve into the key features and benefits of our products, and how they can enhance your practice and patient outcomes.

ZiBone zirconia implants represent the pinnacle of dental implant technology. Crafted with precision and passion, our implants boast superior biocompatibility, promoting seamless integration with the jawbone. The aesthetic appeal of zirconia perfectly complements the natural dentition, creating a lifelike appearance that leaves patients with renewed confidence in their smiles. ZiBone zirconia implants are engineered to offer outstanding mechanical properties, ensuring lasting durability and stability, setting new standards for implant success rates.

Biocompatibility: Zirconia's biocompatibility reduces the risk of allergic reactions and inflammation, fostering a healthy healing process.

Optimal osseointegration: The advanced design of ZiBone zirconia implants with Ra 0.6 µm surface treatment, facilitates reliable osseointegration, promoting stable and successful implant placements.

Versatility: Our products cater to a wide range of dental cases, enabling you to provide personalised solutions for each patient's unique needs. Implant dimension 3.6, 4.0, 5.0 with different length 8, 10, 11.5, 13, 14.5.

Join us in revolutionising dental implantology—together, we create smiles that inspire confidence!

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Ideal solution for all indications

AWI ceramic implants from WITAR offer superior aesthetics, stability, accuracy and healthy osseointegration. A sophisticated design combined with modern materials make for an ideal solution for all bone classes and indications. Made of zirconium dioxide, AWI dental implants are metal-free and thus fully biocompatible. The cemented zirconia abutment allows an individual design. The transgingival shoulder has an ideal surface for interacting with soft tissue for any type of indication. The conical micro-thread allows great primary stability and axial loading. Studies have shown that the thread roughness of 1.7 µm leads to optimal osseointegration. Also, the surface is coated with a bioactive BIOVERIT I nano-coating. This surface-thread combination enables superior osseointegration for all bone classes. The self-tapping implant tip provides space for bone chips and low-compression insertion. AWI ceramic implants are now available in gingiva colour too, which leads to even better aesthetics and optimised risk areas.

WITAR Consulting GmbH, Germany
www.witar.de

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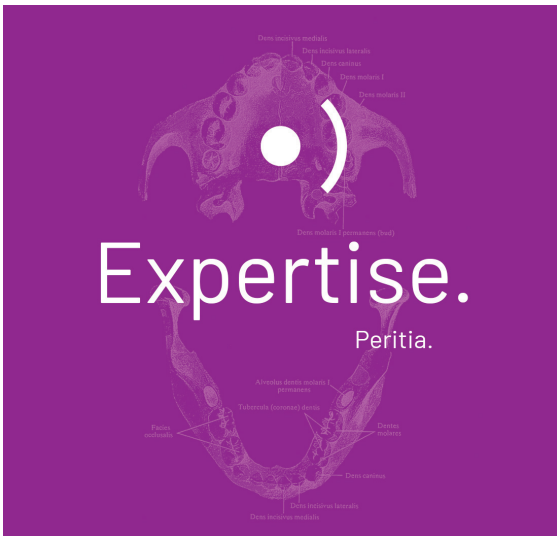
A global network for biological dentistry, scientific evidence and innovation

Biological dentistry is experiencing a global surge. With growing demand for biocompatible, metal-free solutions, ceramic implants have taken center stage. At the heart of this movement stands the ICBI—International Circle for Biological Implantology: a global network dedicated to evidence-based, holistic dentistry.

ICBI combines scientific depth with clinical relevance and promotes interdisciplinary exchange in the field of biological implantology. Whether systematic research, practice-oriented education, or international collaboration—ICBI offers a platform for dental professionals who want not only to follow the biological approach, but actively shape it.



What is the ICBI?
The ICBI is an international professional organisation with a clear mission: to promote and advance the field of biological implantology—with a strong focus on ceramic implants and a holistic, patient-centered treatment philosophy. More than a conventional association, the ICBI sees itself as an inspiring, global network driven by a true sense of community.

Your benefits as an ICBI member

Access to the latest scientific evidence
- Exclusive studies, systematic reviews, and international consensus processes
- Publication of high-quality clinical guidelines and recommendations
- Preferred access to the results of the ICBI Consensus Conferences—such as the upcoming 2025 event in Nice, France

Top-level continuing education
- Hands-on courses, case discussions, and webinars with internationally recognised experts
- Local study clubs & international training formats
- Practical, collegial, and always up to date

Global networking & community
- Join a dedicated international network of dental professionals
- Development of regional ICBI sections in Europe, North and South America
- Exchange, inspiration, and mutual support—beyond traditional organisational structures

ICBI Consensus Conference:
Evidence. Excellence. Impact.
A key highlight of ICBI's work is the ICBI Consensus Conference, set to take place for the first time in September 2025 in Nice. Leading independent experts from around the world will develop joint, evidence-based standards for the use of ceramic implants based on the latest data. This structured, transparent consensus process not only enhances clinical practice, but also strengthens the credibility of the entire discipline.

Become a member:
Welcome to the future of implantology
ICBI is now open to new members—regardless of prior association affiliation. Through its new partnership with ISMI, all ISMI members automatically gain access to the ICBI. Yet, all other professionals interested in joining this forward-thinking network are warmly invited to get involved.

More information & registration: www.icbi.org
ICBI—your gateway to a biologically oriented, international implantology community. Join us.

ICBI

International Circle for Biological Implantology
www.icbi.org

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Publisher
Torsten R. Oemus
oemus@oemus-media.de

Board
Ingolf Döbbecke
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Editorial Council
Dr Michael Gahlert (Germany)
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Editorial Manager
Timo Krause
t.krause@oemus-media.de
Dr Alina Ion
a.ion@oemus-media.de

Executive Producer
Gernot Meyer
meyer@oemus-media.de

Product Manager
Timo Krause
t.krause@oemus-media.de

Art Director
Alexander Jahn
a.jahn@oemus-media.de

Designer
Aniko Holzer
a.holzer@oemus-media.de

Customer Service
Marius Mezger
m.mezger@oemus-media.de

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04229 Leipzig
Germany
Phone: +49 341 48474-0
Fax: +49 341 48474-290
kontakt@oemus-media.de

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