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CI ceramic implants

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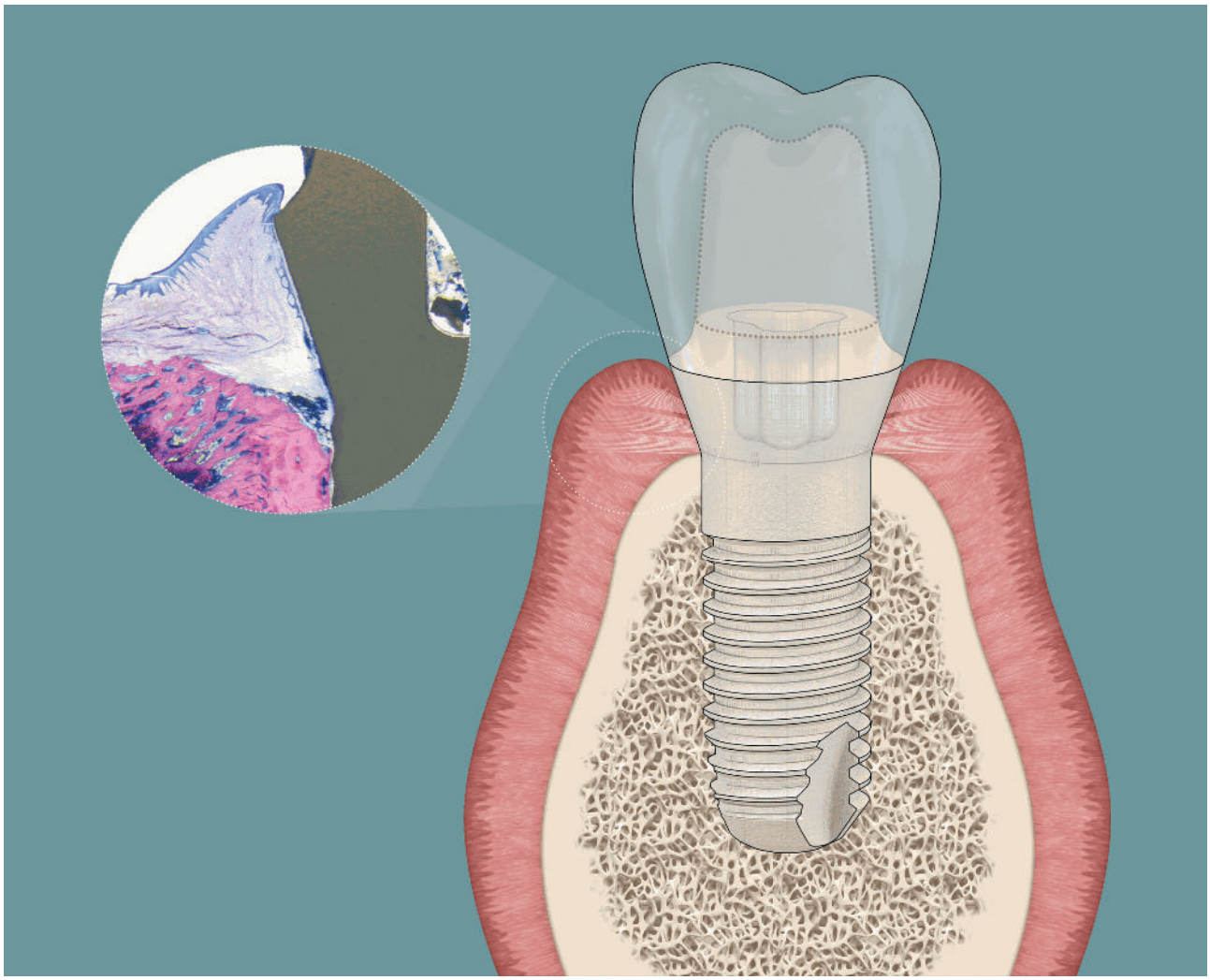

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Dr Sofia Karapataki
Dr Sofia Karapataki | Dentist, Periodontist, Ceramic Implantologist.

Dr Sofia Karapataki

A woman's look in ceramic implantology

Our generation is so busy trying to prove that women can do what men can do. Many times, us women lose the unique qualities that make us stand out. Women were not created to do what a man can do—women were created to do what a man cannot do. It is not a matter of competence but an equally important and different addition. A lioness is not trying to be the lion. She embraces her role as a lioness. She is strong, powerful, and nurturing.

Women in dentistry are nowadays minimum as many as their male colleagues. This is earned and not given after a long and difficult struggle during the years. For all the ladies who enter now into this field, there is no need of such a thing as competition. We are here certainly because we are qualified. My advice to the young female dentists: do not play the game of antagonism to the male col-

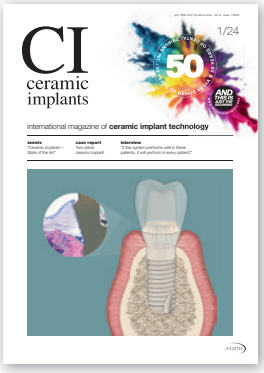
CONTENT

leagues, you don't need to prove anything. Do your job the best way you can and add your own perspective, your personal insight, your imagination, and way of thinking. The only person to compete with is yourself and only in to improve yourself and your skills. The only thing to balance is your inner self—to add one more task within the multiple ones a woman needs to fulfil, but this one here will be out of love and the most care for your patients.

The importance, influence, and role of women in this world has increased and will be much stronger as the years go by. The world needs more kind, compassionate, humble, loyal, persistent, confident, fierce, bold, pure, and loving women. This applies to every field and of course to oral implantology and to be more specifically in ceramic implantology. An open mind and flexibility as well as inner strength are the prerequisites in order to follow the path of ceramic implantology. It is discipline and vision at the same time. A clear look at ceramics with knowledge and respect on the material's nature together with the empathy and natural care of women can make a perfect combination on this field.

Sincerest regards,

Sofia Karapataki



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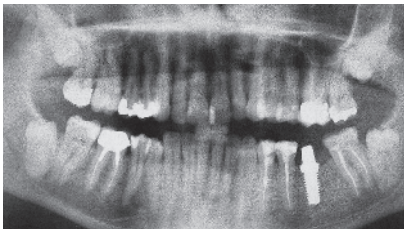

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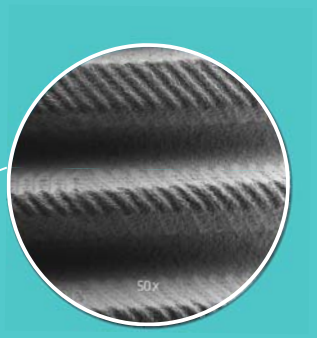

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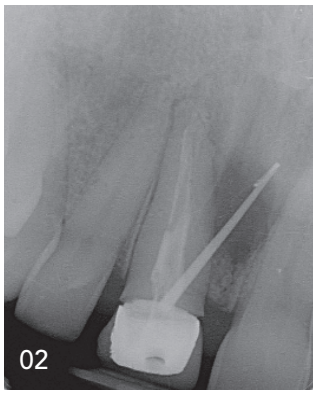
Dr Claudia Michl, M.Sc., Germany

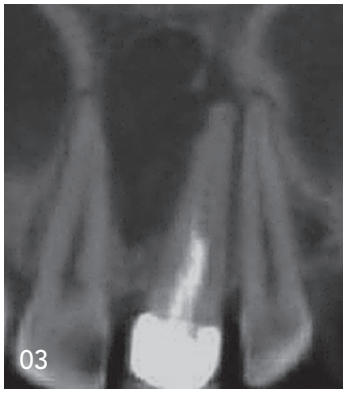
01
Tooth 11 before extraction.

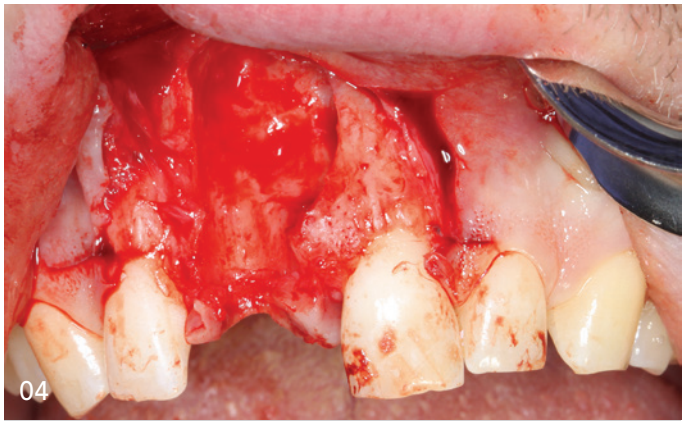
02
X-ray of tooth 11 before extraction.

03
CBCT of pre-op cyst.

04
Tooth extraction and cystectomy.







Introduction

Implants made of high-performance zirconia have now also become an established solution for patients with special aesthetic requirements. Replacing a front tooth with an implant places very high professional demands on the dentist. It is therefore particularly important to carry out precise planning in advance of tooth extraction and implant placement to ensure an attractive result.

However, the use of ceramic implants not only offers aesthetic benefits, but also provides patients with a metal-free restoration. In particular, patients with proven titanium intolerance and an increased individual genetic predisposition to inflammation have a sixfold increased risk of primary or secondary loss of the titanium implant.[4] Furthermore, the risk of peri-implantitis is significantly reduced due to the high biocompatibility of zirconia. Various studies have demonstrated a high implant survival rate of over 94% after nine years,[1] low BOP and stable gingival conditions around the implant even many years later.

Clinical situation and treatment planning

Initial situation
The 38-year-old patient presented to my practice on 3/11/2020. His main complaint was discomfort in tooth 11. He had undergone root canal treatment several years ago and had been experiencing discomfort for the past two years. This manifested as permanent latent bite pain in tooth 11 and sometimes also pressure on the neighbouring tooth 21. In addition, pus and blood sometimes appeared to be discharged from tooth 11.

Clinical examination
Tooth 11 had been restored with a metal-ceramic crown. The gingiva around the crown showed clear signs of inflammation. The BOP index on tooth 11 was positive, there was no plaque. The crown margin on 11 was insufficient. Apical to the tooth there was a prominent fistula, from which secretions and pus were discharged under pressure. Tooth 11 was clearly sensitive

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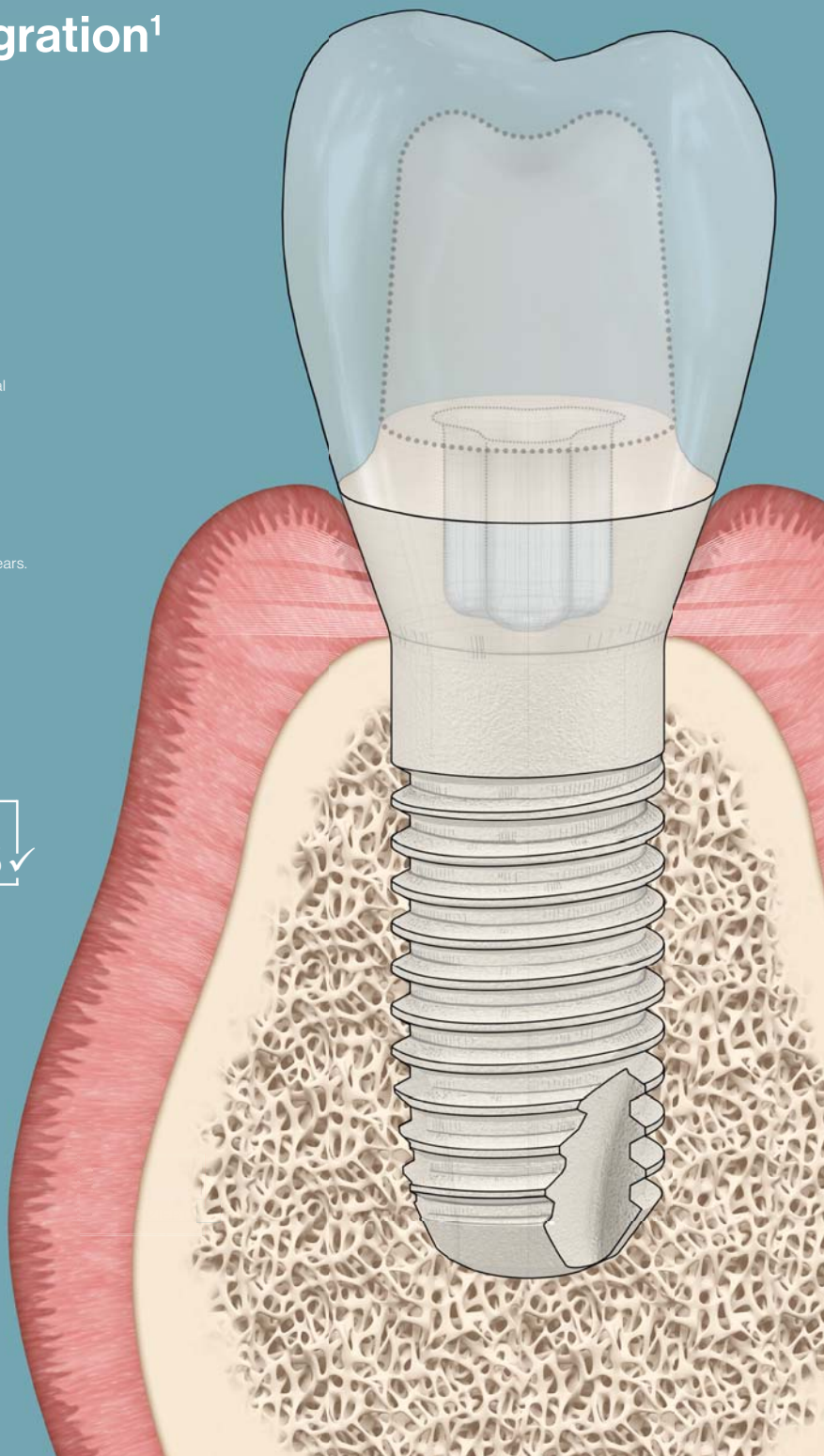
- **No Peri-Implantitis[2, 3]**



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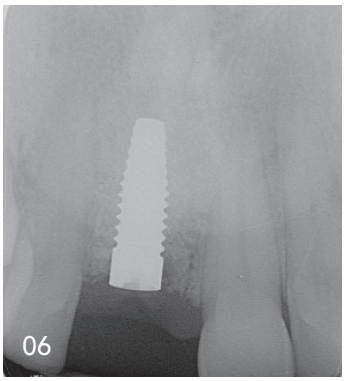
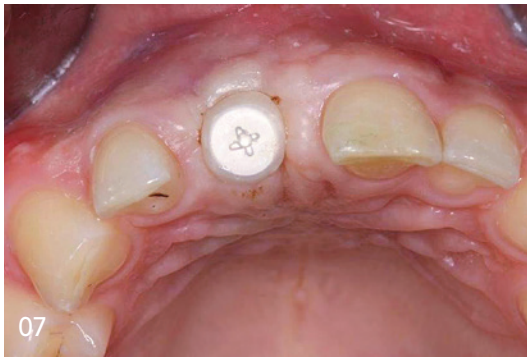
05
Socket preservation with Bio-Oss.



06
Implant *in situ* four months after bone augmentation.

07
Sealing with a 3 mm high gingiva former.

08
Customised abutment.



to percussion. The adjacent teeth were insensitive to percussion and sensitive to cold stimuli. The periodontal screening index was 2 in all sextants and oral hygiene was considered good. The occlusion showed Class 1 interdigitation with many gaps in the maxillary and mandibular anteriors. The vertical dimension was low. The overbite was 4 mm, and the overjet was 1.5 mm. The canines showed clear signs of wear. The Ahlers & Jakstat CMD screening test gave no indication of the presence of arthrogenic or myogenic dysfunction.

Radiological examination

The single-tooth image showed an endodontically treated tooth 11 with a gutta-percha point inserted into the fistula. Bone whitening was visible around the gutta-percha point which, starting apically from tooth 11, clearly occupied the interradicular space between 11 and 21. Based on these radiological findings, a CBCT scan with a FOV of 80 x 90 mm was performed.

The CBCT showed a very extensive interradicular hypodensity in the region 11, 21 starting from tooth 11. The dimension of the interradicular area with low bone density measured from coronal to apical is 19.4 mm and from mesial to distal is 10.9 mm. The buccal bone lamella was extremely thin, and no bone could be detected buccally in the area of root 11. A small hyperdense artefact, which can be interpreted as dispersed, overpressed root filling material, was prominent cranial to the whitening. Diagnosis was inadequacy of crown 11 and radicular cyst originating from tooth 11 with buccal fistula.

Procedure

Based on the findings and in consultation with the patient, the following treatment steps were taken:

1. Removal of tooth 11 with simultaneous cystectomy, reconstruction of the bone defect and fabrication of a temporary restoration (Erkodent aesthetic splint).
2. Placement of a two-piece ceramic implant (Zeramex XT, CeramTec Schweiz) four months after augmentation.
3. Restoration of the implant with a crown.

As the patient had several allergies, a lymphocyte transformation test (LTT) and a basophil degranulation test (BDT) were carried out in advance to rule out type I or VI allergies to the bone replacement material Bio-Oss (Geistlich Biomaterials). Blood samples were taken at our practice and analysed by the IMD laboratory in Berlin. No type I or VI allergy to Bio-Oss was detected. From five days preoperatively to five days postoperatively, the patient was premedicated with amoxicillin-clavulanate 500 mg x 3 daily, prednisolone 60 mg as a single dose one hour prior to surgery. For postoperative pain prophylaxis and anti-inflammatory therapy, a procaine base infusion (4 ml 2% procaine, 100 ml 8.4% sodium bicarbonate and 100 ml physiological saline solution) was administered during surgery and Ibuprofen 600 mg for four days postoperatively, as well as Pantoprazole 20 mg once daily to support the gastric mucosa.

Care was taken to ensure that the tooth removal and cystectomy were as atraumatic as possible and there were no complications. This resulted in a complete buccal fenestration, exposing a three-wall bone defect. This was reconstructed using Bio-Oss bone replacement material, which was biologised with autologous bone in a ratio of 2:1 and PRF (platelet-rich fibrin). In addition, metronidazole powder was added to the augmentation material for antimicrobial prophylaxis. After augmentation, an OSSIX Plus membrane (Regedent) and Plasmamatrix PRF, which

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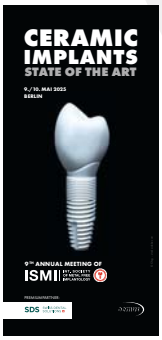

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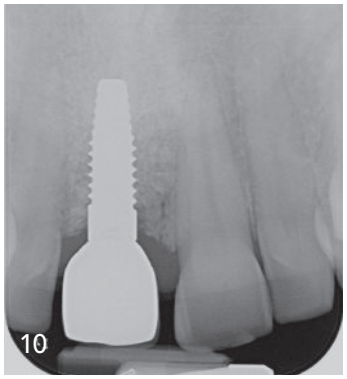
09
Implant crown after insertion.



10
X-ray image after insertion of the crown.

11
Region 11 after a one-year follow-up.

is rich in growth factors, were applied. To ensure tension-free primary wound closure, the periosteum of the buccal flap was stretched using the ST-UP Soft Brushing Kit from Joseph Choukroun.

Histological examination of the removed cyst tissue confirmed the suspected diagnosis of a radicular cyst. After the wound had healed without complications, the sutures were removed 14 days after surgery. The further healing process was uneventful and the CBCT image taken four months after surgery showed a well-consolidated augmentation. Both buccal and crestal bone continuity was almost completely restored. It was therefore possible to proceed with the placement of a two-piece ceramic implant made of alumina-toughened zirconia (ATZ; Zeramex XT, 10 mm RB, CeramTec Schweiz).

Prior to implantation, the patient was premedicated according to the protocol of J. Choukroun. This is as follows: 1,000 mg azithromycin on the eve of surgery, 60 mg prednisolone one hour before surgery, and 600 mg Ibuprofen three times a day and 20 mg Pantoprazole once a day for pain relief and anti-inflammatory therapy up to four days after surgery.

The implant bed was prepared according to the surgical drilling protocol. The pilot hole was drilled in a fully navigated fashion using a digitally designed and 3D-printed drilling template. The drilling template was designed based on a previous intraoral scan (TRIOS 3, 3Shape) and a CBCT image (PaX-i3D Green, VATECH) by the Norbert Delly dental laboratory in Bad Aibling using 3Shape's Implant Studio. The implant bed was drilled to a depth of 11.5 mm to accommodate a 10 mm implant. The implant biologised with PRF was placed at bone level with 30 Ncm. A primary wound closure was performed. Healing was uneventful.

After a healing phase of four months, a slight crestal vertical bone loss of approx. 0.6 mm was observed. This corresponds to the expected bone remodelling effect.[2] During exposure, the implant was sealed with a 3 mm high gingiva former. This was customised with flowable composite prior to placement to optimise the emergence profile. The implant impression was created using a 3D scan (TRIOS 3). For aesthetic reasons and to optimise the emergence profile, a restoration with a custom-made abutment was chosen and fixed to the implant with a VICARBO screw (carbon fibre-reinforced PEEK screw).

The abutment was fabricated from TZP ceramic in shade A3. The all-ceramic crown (made of zirconia ceramic), fabricated by the Norbert Delly dental laboratory, vestibularly veneered with silicone disilicate ceramic using the cut-back technique, was placed semi-permanently with TempBond (Kerr).

Clinical results

The result after insertion of the ceramic crown shows an inflammation-free soft-tissue condition. At the one-year follow-up, there was no inflammation or problems with the implant or the prosthetic restoration.

Discussion

The Zeramex XT implant system is designed for a wide range of indications. The two-piece design offers the usual advantages of titanium implants, such as unencumbered healing, primary wound closure, single-stage augmentation procedures and maximum flexibility in various surgical and prosthetic applications. The bolt-in-tube VICARBO screw connection (carbon fibre-reinforced PEEK screw) also provides a stable, secure abutment–implant

connection that optimally resists biomechanical forces. Low-risk soft-tissue management, customised shaping of the emergence profile and simple re-entry and repair options are also possible.

Strict adherence to biological principles as part of the pre- and postoperative protocol and the patient's individual and current immunological status (allergies, presence of chronic systemic diseases) play an important role in the success of the treatment. Proactive testing using LTT tests, BDT tests or effector cell typing to detect possible material incompatibilities is an important factor in the course of cases to be solved.

In this context, an optimal supply of micronutrients such as vitamins D3, C, B6 and B12, boron, manganese, and melatonin, as well as an "anti-inflammatory diet", including a special form of intermittent fasting, should also be mentioned. Also helpful are locally effective additives, such as the use of platelet-rich fibrin (PRF), which is rich in growth factors. Anti-inflammatory and immunomodulatory measures, such as the administration of specific antibiotics and anti-inflammatory drugs according to a fixed regimen, complete the holistic approach in dental implantology.[1]

All these measures ensure that the oxidative stress in the tissue is kept at a low level, thus providing the best possible support for bone remodelling during wound healing.

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About the autor

Dr Claudia Michl, M.Sc. is an implantologist and biological dentist specialising in preventive dentistry as well as conservative, prosthetic and surgical rehabilitation, with a practice in Kolbermoor (Germany). She is certified in general implantology (DGZI e.V.) and in environmental dentistry (DEGUZ e.V.). She also holds a Master's degree in dental functional analysis and functional therapy (University of Greifswald). She is a member of the DGZI, DEGUZ and DGAST.

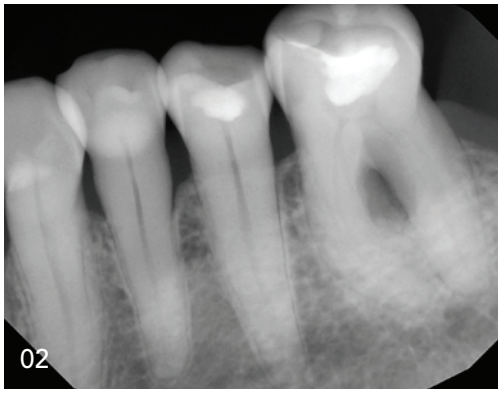
Dr Claudia Michl

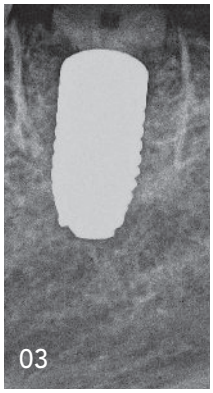
Robotic facilitation of ceramic implants in compromised alveolar ridges

Demonstrating the benefit of haptic guidance in ridge-splits and lateral sinus lifts

Clinicians are frequently presented with less-than-ideal bony or soft-tissue anatomy in patients desiring oral rehabilitation with dental implants. This presents challenges to implantologists who perform ridge or sinus augmentation techniques for their patients, or those who only do minor grafting at the time of placement and refer to colleagues or specialists. It can be harder for the placing surgeon to make the most of another practitioners' surgical outcomes. This report highlights how comprehensive dental therapy, and the use of robotic assistance and haptic guidance can maximise the bone and soft-tissue present, even in challenging ceramic implant cases.

Shepard DeLong DMD, USA





01
Pre-op photo.

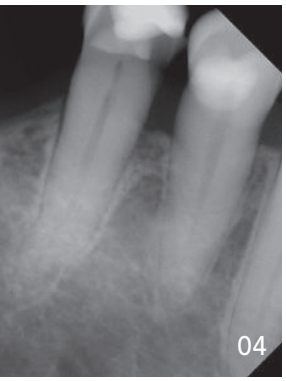
02
Tooth #36 periodontal infection and bone loss.

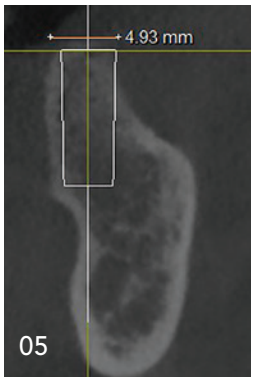
03
Site #36 post-op radiograph.

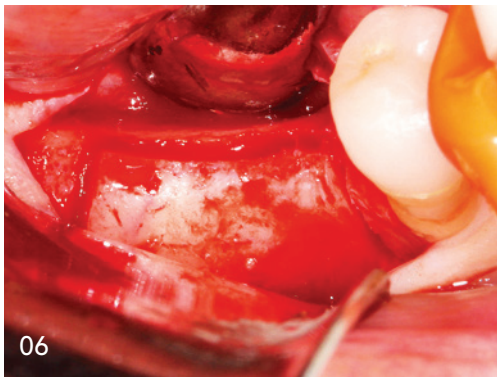
Case #1

A 79-year-old female patient with an unremarkable health history presented to Lotus Dental Wellness in Portland, OR, USA desiring a complete oral rehabilitation. She had numerous failing teeth and advanced periodontal disease in her lower molars and throughout the maxilla. She underwent extraction of all hopeless teeth and LANAP to re-establish health on a reduced periodontium. Her upper jaw is currently planned for an All-on-X type prosthesis supported by six or more ceramic implants which will be placed with haptic guidance. The lower dentition became stable after the periodontal treatment. Tooth #36 was the only tooth that had remaining advanced disease and was planned for extraction. Sites #46 and #47 had previously been extracted and grafted with 50/50 cortico-cancellous allograft. When the patient presented for placement at these sites each presented their own unique challenge.

Advanced bone loss and infection had to be mitigated on patient's left, while a very thin alveolar ridge was present on the right. Z5–BL (Z-SYSTEMS) were chosen for their proven clinical history and the ability to place them at bone level, either buried or loaded with a healing abutment. Local anaesthesia was administered, and an anterior Yomi-link was placed so that the robotic device could assist bilaterally in the posterior mandible without hindrance. A CBCT scan was exposed on the Axeos (Dentsply Sirona) with the link and fiducial array, to allow for digital implant planning. Tooth #36 was extracted without







04
Sites #46, 47.

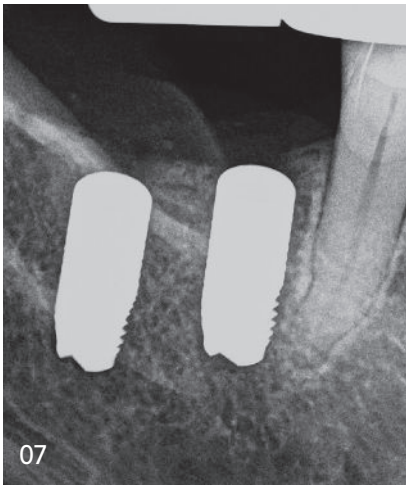
05
CBCT slice showing narrow alveolar ridge sites 46, 47.

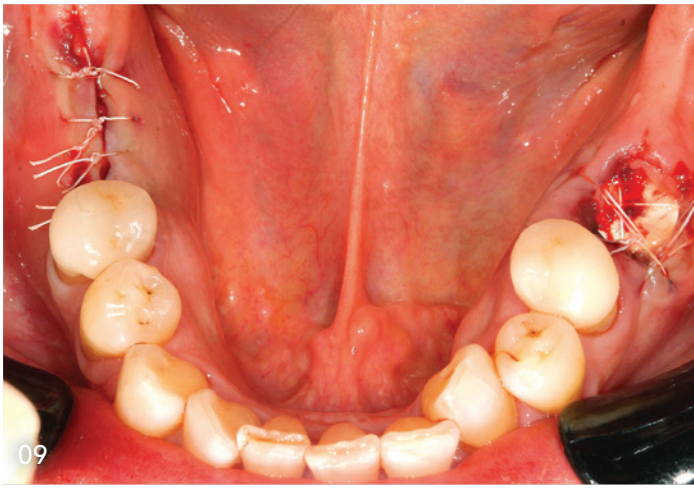
06
Ridge split.

07
Sites #46, 47 post-op radiograph.

08
Ridge split post-op photo.

09
Full-arch post-op photo.





trauma to adjacent soft tissue. The bone was thoroughly debrided of all infected tissue and there was no major dehiscence or fenestration. The site was irrigated with ozonated water and fumigated with ozone gas. A 5.0 x 10 mm implant was planned in Yomi-plan and the procedure on the left was completed with haptic guidance. The concentric osteotomy allowed for precision and the implant successfully engaged buccal, lingual, and apical bone. A large diameter healing cap was placed, and the site was grafted and closed with PRF, cortico-cancellous allograft and PTFE suture.

A full-thickness flap was laid on the right and the dimensions of the narrow ridge were exposed. A piezosurgery unit with a narrow diamond osteotomy tip was used. The crestal corticotomy was punctuated with pilot drill osteotomies in both the anterior and posterior positions. Vertical cuts were also made. Versah® drills were used sequentially to spread the cortices and accurately followed the initial drill path. The final drill was the 0.325 mm diameter ceramic drill from Z-SYSTEMS. Two 4.0 x 10 mm bone level ceramic implants were placed with cover screws. Additional grafting on the buccal and crestal with allograft and PRF was performed before the site was closed with PTFE suture. This case took approximately two hours to complete, and the patient remarked on the overall ease with which it was completed. This case has integrated successfully and is now ready to restore.

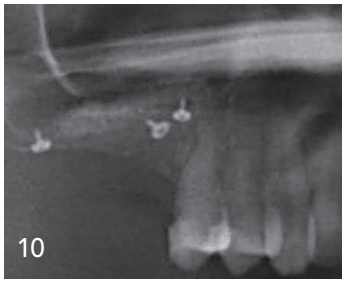
Case #2

A long-time patient of the clinic returned desiring an implant in the upper-right quadrant, tooth #16. She was fifty-five years old and in good health. She had been treated by an oral surgeon in her hometown for extraction and a lateral sinus lift which had to be revised due to postoperative infection. Upon initial CBCT the site was minimally viable with the planned placement of a 4.0 x 10 mm Zeramex XT (Ceramtec) likely still requiring additional grafting. The risk of failure or complication was discussed, and the patient consented to the following procedure.

She was sedated with oral triazolam and locally anaesthetised. A Yomi-link, CT scan, and intraoperative digital planning was completed. The site was opened and extended posteriorly for retrieval of surgical screws. The osteotomy was performed, and plan executed precisely following both the prompts in the Yomi software and the manufacturer's drilling sequence. The implant was placed with good torque and a 3 mm healing abutment. A similar grafting protocol was followed. Five months of healing time elapsed and the case was restored with a screw-retained crown composed of LiSi (GC) and a stock 1mm straight abutment from Zeramex. Occlusion was verified with shimstock and articulating paper. The patient was pleased with the result.

Discussion

Ceramic implants of various shapes, sizes and concepts have been used since the 1960s.[1] Zirconia has emerged as a promising biomaterial for many orthopaedic devices including dental implants.[2] There is recently published evidence that its use in the surgical and prosthetic replacement of infected natural teeth may reduce inflammation and reduce chromosomal degradation in humans.[3]



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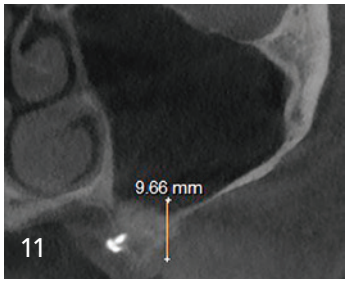
Post lateral sinus lift radiograph.



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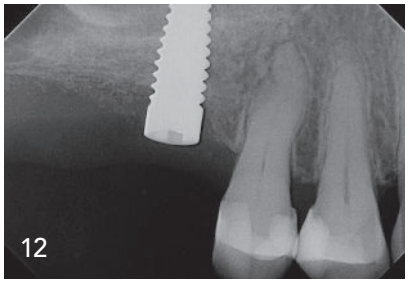
Post lateral sinus lift CBCT slice.

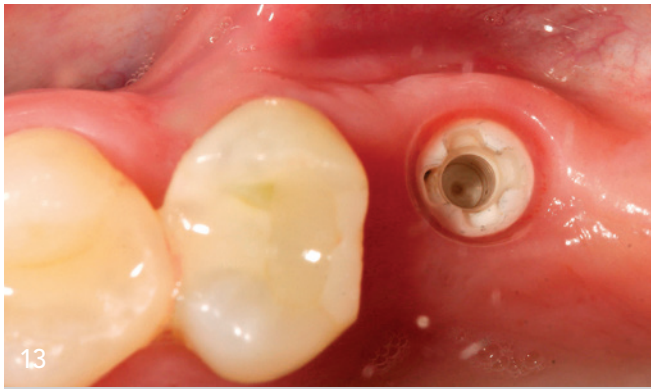


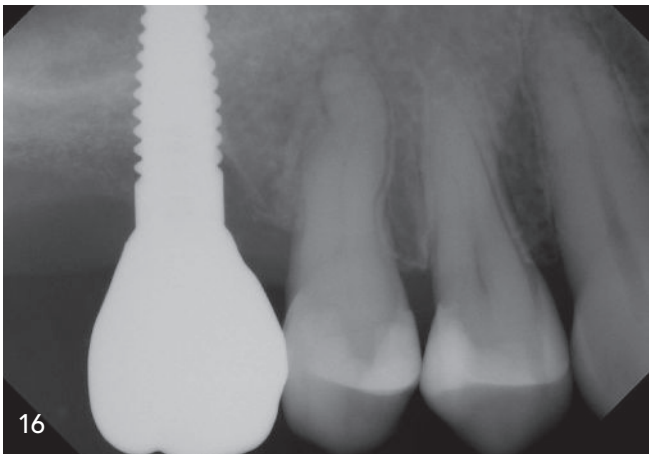
12
Post-op radiograph #16.

Robotics have had a major impact on modern surgical procedures beginning with the use of the DaVinci robot, Intuitive Surgical, for general surgery.[4] This is the first robot to have been used intra-orally for oral surgical procedures including cancer resection.[5] The Yomi robot from Neocis is the first robotic device designed for oral surgery. The X-guide from X-NAV Technologies, and Navident from ClaroNav, are both classified as semi-robotic systems of dynamic navigation. The distinction lies in the "active" arm which provides physical assistance, haptic guidance, to the hand of the surgeon. These devices provide accuracy comparable to static guides and significantly better than freehand surgery.[6,7] They also allow for the modification of surgical plans in real-time, improved ergonomics, and the separation, or connection between doctor and patient by an intelligent machine.

Conclusion

This case report showcases the advantages of robotically assisted guided implant surgery for the placement of ceramic dental implants in difficult surgical scenarios. Surgeons from all specialties benefit from the advancement of both material and technological means for performing procedures that lead to better patient health outcomes. Compromise, challenge, and ideals, are all concepts that define healthcare providers' daily and life-long work. As evidenced by the concepts presented here, doctors and medical industry professionals will not leave well enough alone but will continue the evolution of their methods to provide modern patients the best health outcomes possible.



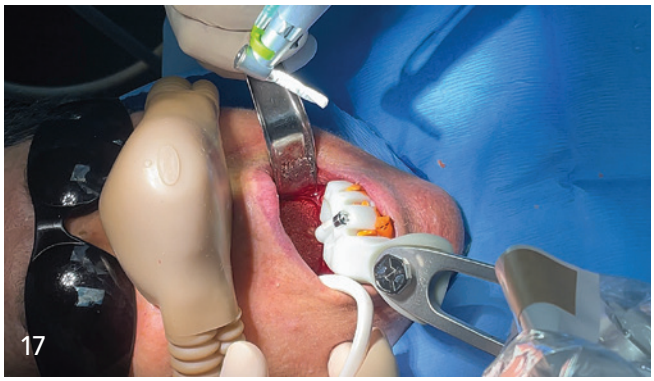


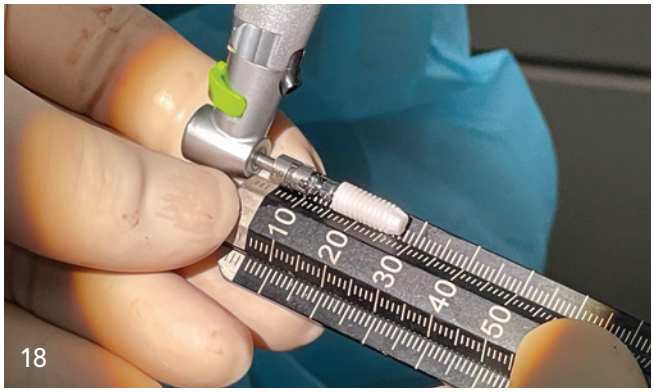
13
Post placement healed site.

14
Final restoration occlusal photo.

15
Final restoration buccal photo.

16
Final restoration radiograph.





17
Measuring ceramic drill for robotic osteotomy.

18
Z-SYSTEMS implant mounted on robotic handpiece ready for insertion.

19
Robotic situational photo.

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About the author

Shepard DeLong is a 3rd generation dentist in Portland, Oregon, USA. He holds a BS from Portland State University, DMD from Oregon Health and Sciences University and completed a General Practice Residency at The Queen's Medical Center in Honolulu, Hawaii. He is a member of AMED, IAOCI, EACim, IAOMT, and has served as a mentor for CEREC-doctors. He was formerly an associate at the first LEED certified, hi-tech, eco-friendly practice in the US. He is on the forefront of digital evolution, and development of novel technological workflows in dentistry. He has a part-time position at Pure Health Dentistry on the island of Maui, Hawaii and owns Lotus Dental Wellness, in Lake Oswego, Oregon. He is a residency site director for the MSc Implantology programme at the University of Jacksonville, and lectures on ceramic implantology, robotics, lasers, and digital dentistry. His latest project has been sharing the profound advantages of combinational technologies for the health of both doctor and patient. He can be reached at drdelong@lotusdentalwellness.com.

Shepard DeLong

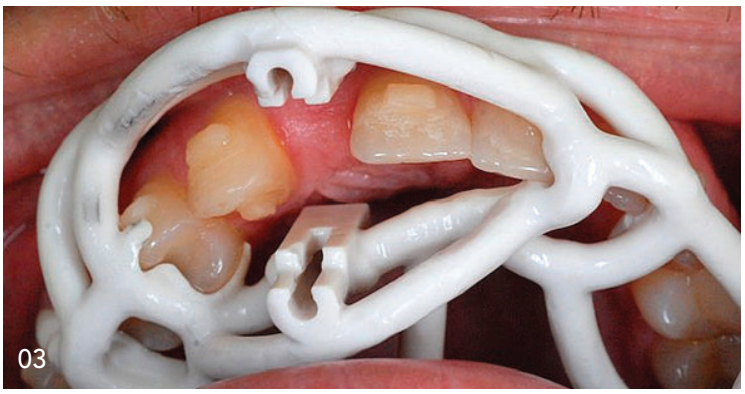
Lotus Dental Wellness

Reconstruction of a maxillary lateral incisor

Using an individualised narrow-diameter two-piece implant

Reconstructing a lateral incisor in the maxilla poses particular challenges to the treating clinician. These include a lack of space and the high visibility of this area, necessitating the use of an implant system capable of delivering reliable long-term function even with a narrow diameter while providing excellent aesthetics characterised by healthy and stable soft tissue. In this case report, the use of an individualised narrow-diameter two-piece implant is detailed that addressed these challenges effectively.

Dr Sofia Karapataki, Greece



01 + 02
Initial situation.

03
Surgical guide *in situ*.

Initial situation

The 40-year-old male patient presented with a congenital absence of tooth #12 (Figs. 1 & 2). He was a nonsmoker and presented with psoriasis and cataracts in both eyes. Additionally, his immunoglobulin E levels were elevated for no profound reason. The patient had undergone six months of clear aligner treatment (Invisalign, Align Technology; performed by Athens orthodontist Dr Katerina Samantara) to widen the space sufficiently for implant placement.

Implant planning

Clinical and radiographic diagnostics were conducted to determine the interdental space and available bone quantity. Based on this information, the ideal implant dimensions were determined to restore this case. A narrow-diameter two-piece implant of 3.5 mm in diameter and

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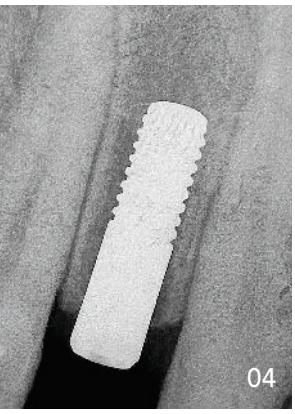

04
Inserted implant: radiographic view.

05
Inserted implant: clinical view.

06
Cemented and prepared glass fiber post.

07
After placement of the provisional crown.

11.0 mm in length (Patent™ Dental Implant System, Zircon Medical Management) was individually designed using software (ImplantDesigner, Zircon Medical Management). The implant was then fabricated at the production plant of the manufacturer. It was planned to be inserted utilising an open double-fixed surgical guide.

Surgical procedure

The surgical guide was placed in the mouth (Fig. 3), and a minimal semilunar incision was made to expose the bone crest. Bone quality classification revealed D2 for region #12. The osteotomy was then prepared according to the surgical protocol of the implant manufacturer for this specific bone class and under water cooling. The implant was then inserted with the scalloped finish line at the equigingival level and at a final torque of 15 Ncm (Fig. 4). Thereafter, the 3C connection was sealed with an A-silicone (Fig. 5). Thanks to the minimally invasive, flapless approach employed, no sutures were needed to stabilise the tissue after implant insertion. No antibiotics were prescribed for the postoperative period; however, the patient was instructed to rinse with a hydrogen peroxide solution before implant placement and for a period of three weeks thereafter.

Healing

Healing progressed uneventfully. At the follow-up appointment after four months, the soft-tissue condition was deemed healthy and stable. No periodontal pockets were observed around the implant.

Prosthetic restoration

After four months, the glass fibre post, serving as the retentive element of the implant system used, was cemented into the implant platform using a dual-polymerising cement (RelyX Unicem, 3M ESPE). Thereafter, it was prepared using high-speed diamond burs under water cooling (Fig. 6). The prepared post was then isolated with Vaseline oil and a provisional PMMA crown was cemented over it using temporary cement (Fig. 7). This crown was purposefully designed to provide interdental spaces to facilitate orthodontic refinement by the treating orthodontist. This final orthodontic treatment lasted three months. After a to-

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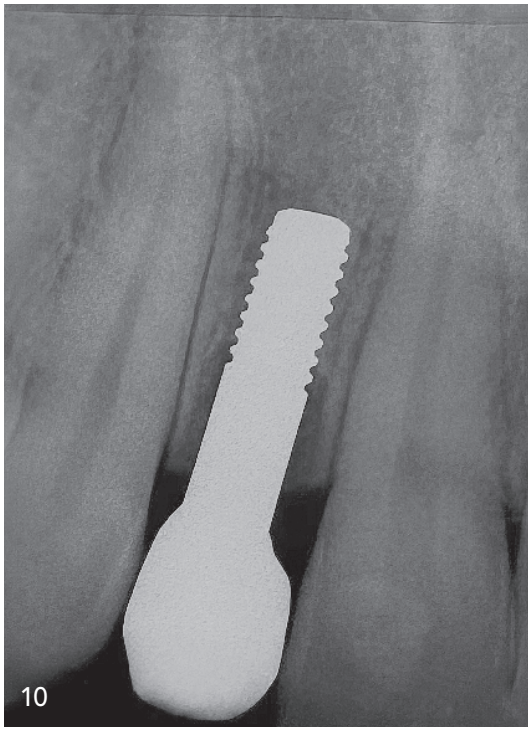
08 + 09
After placement of the final crown.

10
Final radiograph.



"Only vital bone can facilitate swift and undelayed healing, which is the foundation for successful osseointegration and long-term hard and soft-tissue preservation."

tal of seven months, the patient received a multilayer zirconia crown as a definitive restoration (fabricated by Athens-based dental laboratory IPS Markoglou; Figs. 8–10).

Discussion

Implant insertion to a low to moderate torque (< 35 Ncm) is crucial to minimise compression of the surrounding bone, which would compromise its vitality and lead to remodelling. Only vital bone can facilitate swift and undelayed healing, which is the foundation for successful osseointegration and long-term hard and soft-tissue preservation. Considering that the bone was quite hard in the present case, using a low insertion torque was especially crucial to avoid risk of fracture during insertion.

The implant used has a special cylindrical shape rather than the usual conical emergence profile of the standard implant shape to fit narrow spaces. Also, the platform has a scalloped design different from the usual flat one to follow the scallop of the soft-tissue to support the aesthetic outcome of the smile. A challenge lies in properly positioning this curved shape during surgery at the buccal and palatal surfaces.

Treatment planning with the prosthetic outcome in mind is crucial. The final crown position must always be determined before any kind of surgical procedure is carried out, as the crown position determines where the implant must be placed. Additionally, particular attention must be paid to the equigingival positioning of this implant, requiring that it be placed such that its platform is level with the free gingival margin. Placing the implant deeper would stimulate remodelling and subsequent bone loss. When placed correctly, however, this implant has been demonstrated in long-term studies to maintain the health and stability of the hard and soft tissue over a long period and to resist peri-implantitis effectively.[1, 2]

Conclusion

Thanks to its narrow diameter, the individualised two-piece implant system used was able to address the limited space in this case ideally. It promises to deliver excellent aesthetics over the long term in the highly visible anterior region thanks to its natural shade, equigingival design and optimised surface topography, which promotes healthy and stable soft tissue. Moreover, a minimal risk of biological complications such as peri-implantitis is expected with this implant system, as evidenced in independent long-term studies.

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Dr Sofia Karapataki

Full-arch: Full rehabilitation of the upper jaw—Part 2

The complete rehabilitation of a compromised residual dentition represents a major challenge in terms of implantology as well as function and aesthetics. There is a great desire for fixed dentures with a satisfactory aesthetic and functional realisation. In addition, patients are increasingly interested in biocompatible dentures and surgical concepts that take biological criteria into account. Biological dentistry with metal-free implants and zirconium oxide dentures can meet this demand at a high level. In the first part of the article, the authors dealt with the diagnosis and its special features, the preparation of the patient and the surgical procedure for implant placement. In the second part, the dental technical procedure is now explained.

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


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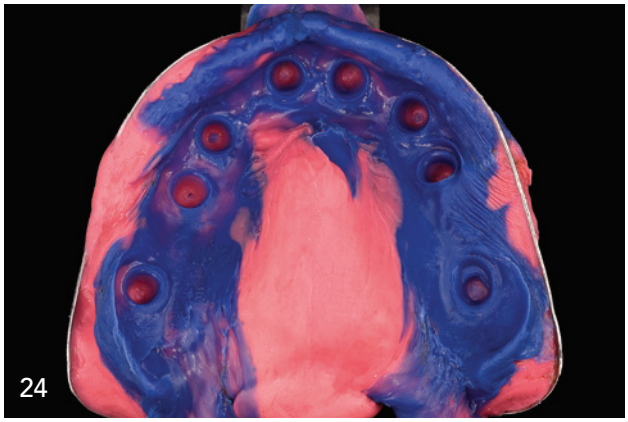
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As a reminder: the 41-year-old patient wanted a biologically neutral and metal-free overall rehabilitation of his compromised residual dentition in the upper jaw and caries treatment of his lower teeth. In the maxilla, there was a residual dentition in regions 15 and 17 as well as two root remnants in regions 13 and 15 *in situ*, on which a partial denture from 12 to 21 was located. All four remaining teeth had already undergone endodontic treatment and were no longer worth preserving. In the lower jaw, teeth 37, 36, 45 and 47 showed carious lesions. Tooth 46 was devitalised, decayed, and showed extensive apical whitening on radiographs. The remaining teeth in the mandible were vital. Moderate chronic periodontitis was found in both the maxilla and mandible.

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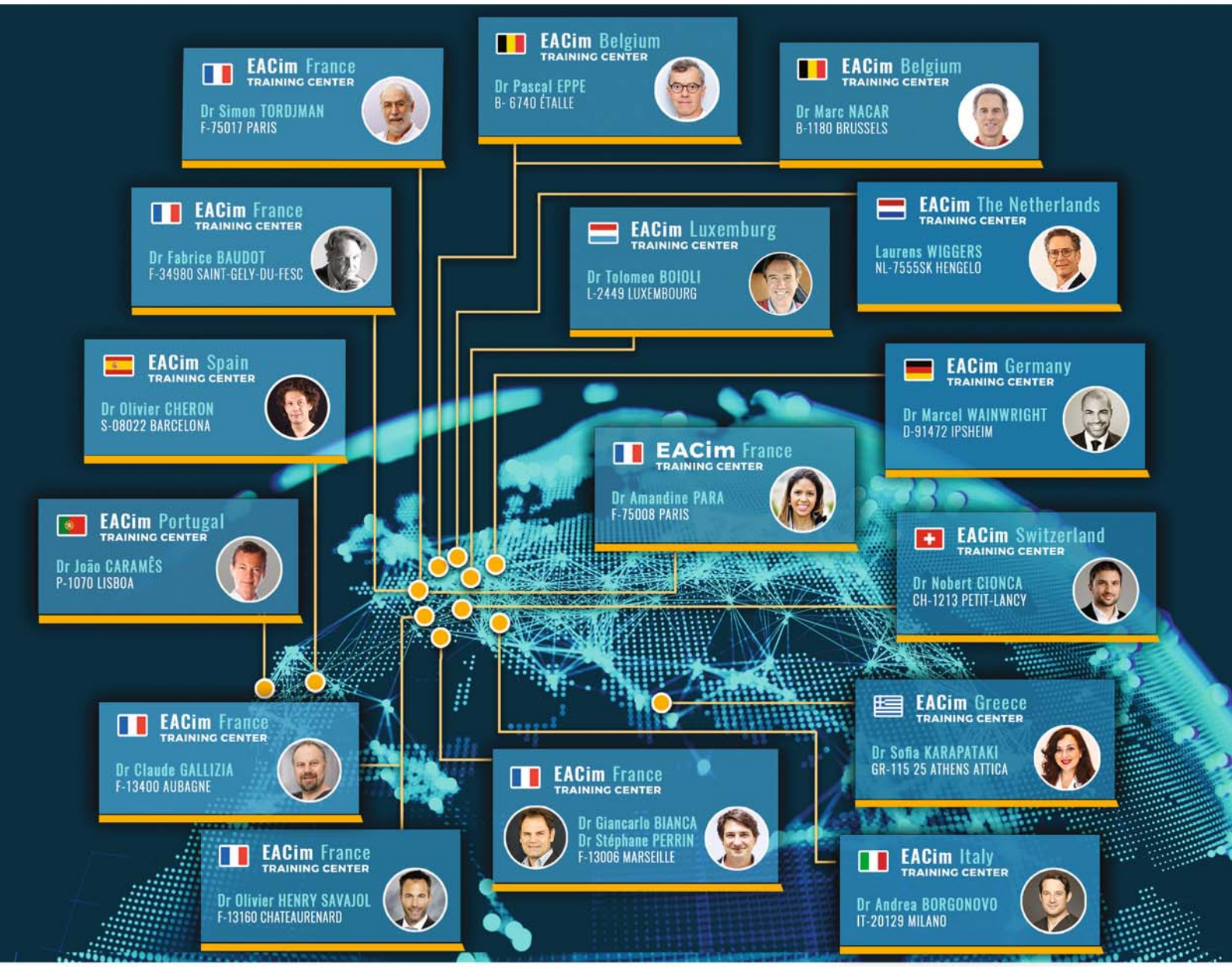

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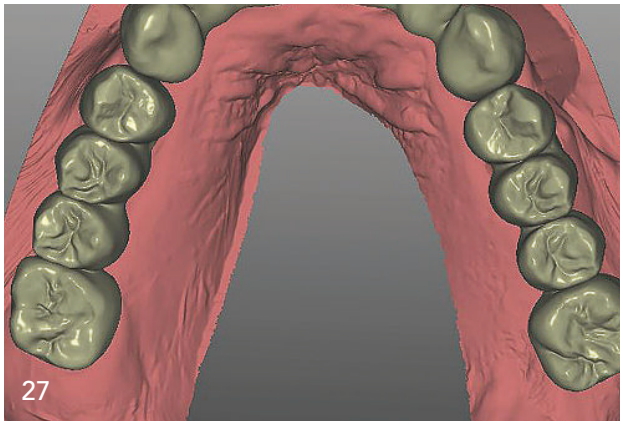
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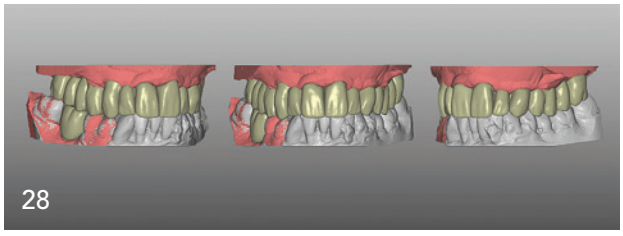
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Prosthetic rehabilitation of the patient

The success of a restoration is highly dependent on careful planning in advance. There is a lively exchange of information between the dentist, patient, and dental technician. Everything revolves around the following questions: what are the expectations? What is sensible and what is technically feasible? It is extremely important to involve the patient in the entire decision-making process—after all, it is the patient who will have to live with the finished work. Once all the important questions have been clarified, we realise the planned work as a dummy (prototype) and check everything again for "oral suitability".

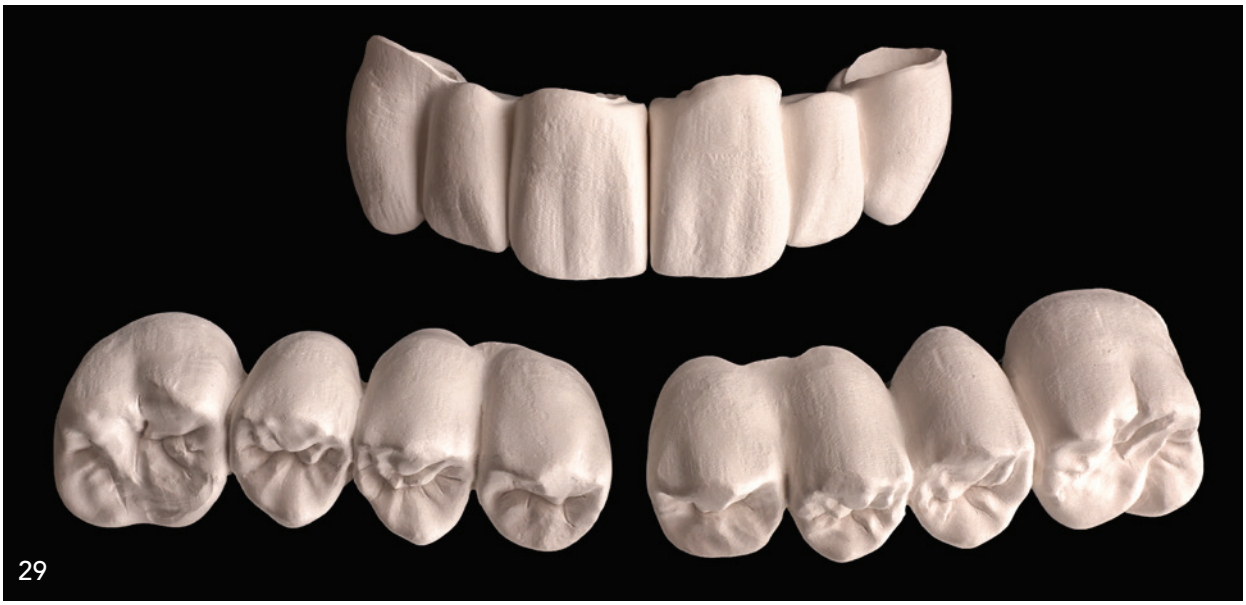
"Occlusion cannot be understood by looking at the morphology of individual teeth, but rather from the living structure (cybernetics) of the entire organism."

Carl Hildebrand, the founder of VITA Zahnfabrik, in the 1930s.

Procedure

Our focus is always on the whole person. Therefore, their posture and, above all, their "comfortable bite position" play a central role for us. Particularly with such a compromised maxillary residual dentition, it is important not to lose sight of the fact that the person may have become accustomed to an incorrect bite position over the years. We therefore check the posture and whether we need to intervene therapeutically in advance with the help of a splint treatment. We discuss the patient's wishes and select the desired tooth mold together. Based on all this information, we create a dummy in our laboratory that corresponds to the final restoration in terms of shape and design. This dummy is made of acrylic with the aid of the scanned actual situation of the patient with and without the inserted prosthesis and a conventional, fully adjustable articulator. A virtual wax-up was first generated from this data, from which we also prepared the various surgical aids—an orientation drilling template and various transparent control foils—as shown in the first part of the article. Practice shows us time and again that despite the immense technical, instrumental, and computer-assisted effort involved, there is always a discrepancy between the appliance and the biomechanical system of hard and soft tissue. Despite precise mathematically calculated joint paths and eccentric excursions of a virtual articulator, the measure of all things is still the patient's mouth.

An occlusal restoration is always a compromise. Occlusion is not something that can be measured. Occlusion is something individual. Even at the beginning of articulation research, dental technology greats such as Gysie, Hanau and Thielemann recognised that a "biological system" cannot be implemented on a mechanically, mathematically precise chewing simulator. Carl Hildebrand, the founder of VITA Zahnfabrik, said in the 1930s: "Occlusion cannot be understood by looking at the morphology of individual teeth, but rather from the living structure (cybernet-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ics) of the entire organism."[9] Following this guiding principle, we use our patient as the best articulator a dental technician could wish for. During the healing phase of the implants, the dummy used serves to memorise the eccentric movements. This grinding-in behaviour manifests itself in patient-specific grinding facets, which we can then transfer 1:1 to the final restoration. All we must do is scan our dummy *in situ* again when the patient visits the practice for a check-up and aftercare anyway. The dental practice sends us the data obtained in this way to the laboratory so that we can transfer the ground facets directly to the final restoration.

Follow-up appointment in the practice

The patient came back to our practice after a healing period of around three months. After scanning the dummy, we were able to remove it. Underneath, we found a completely irritation-free gingiva with beautifully healed implants (Figs. 22 & 23). We now molded this situation using silicone and placed the temporary restoration on the implants again (Figs. 24 & 25). We were then able to submit the documents generated in this way—i.e. scan and silicone impression—to the laboratory for completion of the final restorations.

The principle of cranial respiration

It used to be assumed that the skull was a kind of "bony steel helmet" that only served to protect the underlying parts of the brain. Today we know that the bony structures of the skull are a vibrating element in the organism. The skull itself is made up of a very complex structure of numerous cranial bones. These form a three-dimensional interlocking gear train, whereby each cranial bone moves in all three levels in two directions (back and forth, forwards, and backwards, from medial to lateral), i.e. in six directions. The cranial bones as a whole "oscillate" in a kind of "breathing movement"—this is also referred to as "cranial breathing". That means that they move rhythmically, alter-


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nating between shortening, expanding, lengthening, and narrowing over a certain period of time, without the volume of the skull changing quantitatively. Not only can this rhythm of movement be pathologically altered, i.e. increased or decreased, but individual cranial bones can also be jammed or displaced in such a way that their mobility and thus that of the entire system is restricted.[10]

Creation of final maxillary prosthesis

After we received the documents from the practice, we realised the fabrication of the final restorations in zirconia. We have favoured monolithic restorations in our laboratory since 2005. We see this as the greatest possible benefit for the patient. One of the main advantages of ceramic implants made of zirconia is their excellent biocompatibility. Compared to conventional titanium implants, zirconia offers several advantages. Firstly, zirconia is considered hypoallergenic, making it an ideal choice for patients with metal sensitivities or allergies. Unlike titanium, zirconia does not trigger any adverse reactions in the body, ensuring a comfortable and stress-free dental implant experience. In addition, zirconia ceramic implants have remarkable resistance to corrosion and plaque build-up. This reduces the risk of peri-implantitis, which is characterised by inflammation and infection around dental implants. The non-porous surface of zirconia prevents the adhesion of harmful bacteria, which leads to healthier gums and increases the overall longevity of the implant.[11] In order not to compromise the advantages of the inserted zirconia implants, the entire team has decided to favour zirconia for the dental part as well.

The entire prosthetic was divided into three segments and constructed as three bridges. In this way, we consider the cranial breathing described above so that we do not exert any pressure on the difficult masticatory and cranial bone system. Using the silicone impression, we produced a plaster model according to the usual procedure (Fig. 26). We scanned this and digitally created the desired constructions (Figs. 27 & 28). It is part of our philosophy that we always design all basal surfaces that rest on the gingiva to be closed from the outset. We then sent the data collected in this way to our milling cutter and initially obtained the three bridges from the raw material (Fig. 29). After the first burning, the advantages of the zirconium oxide used (VITA YZ ST, VITA Zahnfabrik) that we were aiming for were already evident in the impressive aesthetics (Fig. 30). The shade characterisation of the bridges was then carried out using the VITA AKZENT Plus shades. For even better aesthetics, additional shade individualisation was carried out with the VITA YZ EFFECT LIQUID infiltration shades. After the finalising wettability glaze firing, we polished all gingival areas to a high gloss as standard for the aesthetically visible areas (Figs. 31 & 32). In our opinion, this is the most gingiva-friendly version of dental work. The resulting advantage is described in bionics as the


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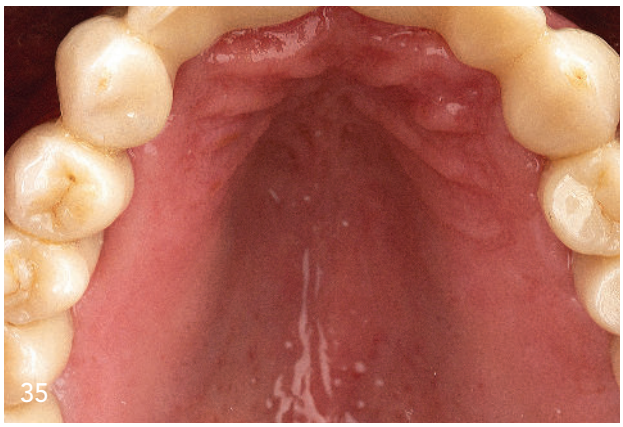
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lotus effect, which refers to the low wettability of a surface, as can be observed in the lotus plant Nelumbo. Water rolls off the leaves in droplets or slides off the leaves, taking all dirt particles on the surface with it. This is due to the complex micro- and nanoscopic architecture of the surface, which minimises the adhesion of dirt particles.[12] In principle, this surface coating not only improves aesthetics, but also reduces plaque adhesion to the restoration, promotes long-term stability and reduces abrasion processes on the (natural) antagonist.[13] This procedure enables us to completely dispense with any plaster niches. We see this as an absolute advantage, as constant interdental cleaning often only irritates the gingiva unnecessarily and we run the risk of it receding. Finally, the work was packed according to the standard plasma cleaning concept in the sense of "Highfield-Clean-Prostethics"[14], disinfected via plasma and handed over to the practice for the placement appointment.

Insertion date in practice

As soon as the final prostheses have arrived in the practice from the laboratory, the bridges are placed on the implants (Figs. 33–38), firmly cemented and the fit is visually checked once again. It is nice to see how harmoniously the overall situation integrates into its natural environment. The optimised aesthetics of the front also comes into their own (Figs. 39– 44). Finally, the situation was checked using an X-ray image (Fig. 45). The patient was already delighted with the new appearance of his temporary restoration. The fact that the final restoration made of zirconia integrates so harmoniously into the overall oral structure of the mouth and did not bother the patient unpleasant for a second as a foreign body, was not least because we had transferred his individual chewing behaviour as a grinding pattern from the temporary directly into the final restoration.


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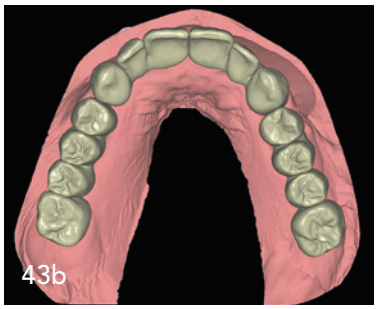
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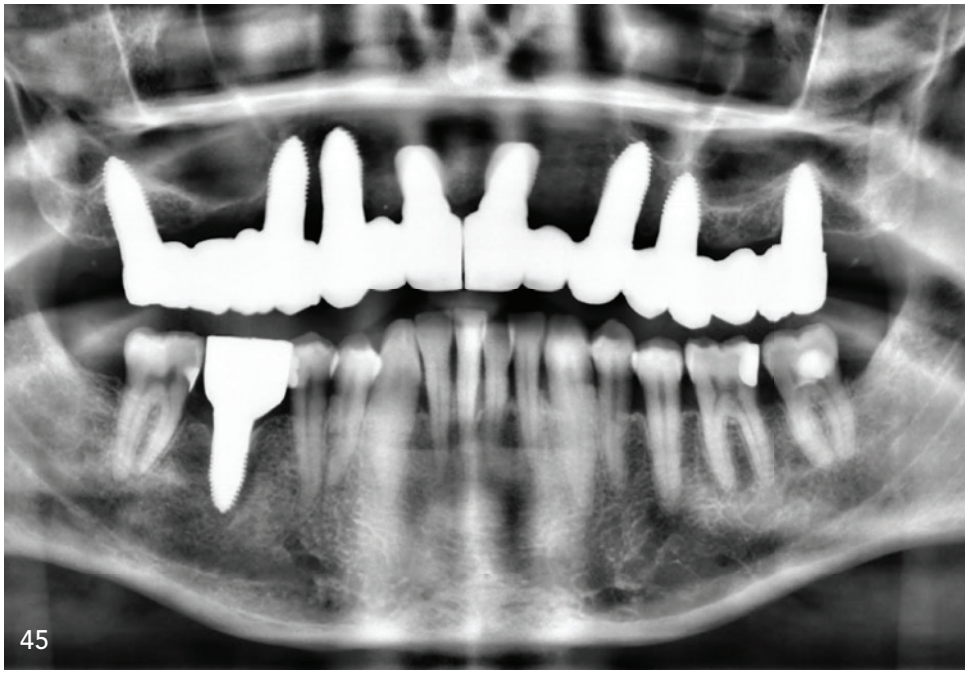
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Summary

For us, the patient case shown is a good example of the impressive results that are possible when the dentist, dental technician, and patient work together perfectly and all the tools available to us are used at the right time. We see disinfection via plasma as a central point—whether in the dental part during implant placement or as the final step in the fabrication of prosthetics. The cleaner the materials used, the more biological and the lower the risk of contamination of the materials jeopardising the longevity of the entire implant prosthetics system.

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Compromised patients, yet no peri-implantitis

Interview with Dr Sofia Karapataki on her new long-term study on Patent™ Implants

Conducted in collaboration with the Medical University of Graz, a new independent study followed patients treated with the two-piece Patent™ Dental Implant System for a minimum of five and up to 12 years and found no cases of peri-implantitis—even in those with compromised health. The study was led by Athens-based implant specialist and researcher Dr Sofia Karapataki, and in this interview, she talks about the need for a reliable tooth replacement solution that works in challenging cases too—and continues to perform well over the long term.

Congratulations on the publication of your long-term study on two-piece Patent™ Implants in the *International Journal of Oral and Maxillofacial Implants*, a renowned high-impact journal in implant dentistry. What surprised you the most about the results?
Everyday dentistry can be very challenging. In my private dental clinic in Athens, I treat every patient who walks through my practice doors. These patients in need of tooth replacements often present with typical risk factors for dental implant treatment—either local ones such as periodontitis or general health conditions such as osteoporosis or diabetes. These patients are usually considered far from ideal dental implant candidates. Commonly, these patients are under medication, have poor oral hygiene or are heavy smokers. Also, compliance—which is crucial for the longevity of implants—among these patients is often not as high as we would hope it to be.

Furthermore, even in "ideal" patients, we as practitioners cannot guarantee that their state of health will remain the same in the future. For instance, I have had patients who developed cancer and underwent intense medical treatments. These patients had dental implants and the challenge was to follow them up appropriately. My long-term study included exactly these sorts of patients that I treat daily in my practice. What surprised me the most was that, even in these challenging cases, the two-piece Patent™ Implants investigated yielded remarkable results. The most remarkable was that, even after 12 years, no instances of peri-implantitis and a very low number of cases of peri-implant mucositis were found.

Why did you choose Patent™ as your implant system?
I was determined to find a tooth replacement solution that works in the challenging cases I mentioned. It was difficult to find a system supported by extensive

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research. To my surprise, I learned that fewer and fewer implant systems today undergo comprehensive scientific evaluation before they are introduced into the market. This means less predictability and higher risk for patient and surgeon alike. In contrast, Patent™ has been extensively investigated in scientific studies, including long-term clinical trials.

Following up on the Patent™ Implants you placed, what did you observe?
I observed stable marginal bone levels and healthy soft-tissue completely free of inflammation during annual recalls—even in patients with preexisting health conditions and poor oral hygiene. For instance, I observed cases where the bone and soft-tissue around a Patent™ Implant remained unaffected by chronic tissue inflammation around both adjacent teeth, a sensational finding!

How can this be explained?
The key to success lies in the strong and intimate soft-tissue adhesion to the transmucosal surface of the Patent™ Implant, serving as an ideal defense barrier against bacteria. Additionally, fast healing has been observed around Patent™ Dental Implants in studies, ensuring greater safety in compromised patients, who typically show a pattern of slower healing.

Why did you initiate this long-term study on two-piece Patent™ Implants?
I found it remarkable how well this implant system performed in the patients encountered daily in my practice. That is why I wanted to validate my clinical experiences and analyse the performance of this tooth replacement solution in a scientific setting. The study results speak for themselves: no peri-implantitis after up to 12 years, only 7.7% peri-implant mucositis at the patient level, survival and success rates of 100%, and no prosthetic complications.

What is your conclusion based on these long-term results?
If Patent™ performs exceptionally well over the long term in my pool of compromised patients, as both the study findings and my clinical experience prove, then trust me: The results will last everywhere! In my opinion, this system is the best choice for every patient and dentist.

Dr Karapataki, thank you for the interview!

Patent

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Dr Sofia Karapataki

Z-SYSTEMS—a 17-year follow-up

Z-SYSTEMS

Kian Dilmaghani, MSc Impl., established his dental practice, namely Schifflände GmbH, in 2005 in Basel, Switzerland and was one of the first users of the zirconia implant developed by Z-SYSTEMS. He has extensive training in treating functional disorders of the masticatory apparatus and the musculoskeletal system. The focus of his professional expertise is the holistic approach to dental care, a pivotal factor in his preference for zirconia. Meanwhile, zirconia has solidified its position as a widely accepted and trusted choice in implant dentistry.

We aim to illustrate the outstanding long-term performance of Z-SYSTEMS' zirconia implant through two clinical cases. In both instances, a one-piece zirconia implant was utilised for a single-tooth restoration in the mandibular posterior region 17 years ago. Following surgical insertion of the implant and adaptation of the wound margin with single sutures, the exposed implant abutment was shortened by wearing off the outer hexagon. To protect the implant and its transgingival portion during the healing phase, an impression of the situation was taken in the same session to fabricate a protective temporary restoration. The protective temporary restoration, made of non-precious metal, was designed in the form of a double brace. It was manufactured in the dental laboratory within 24 hours and bonded to the adjacent teeth of the interdental gap on the subsequent day. The temporary restoration was designed with a depression in the area of the implant abutment to prevent external forces from acting on the implant during the healing process.

Further aspects that need to be considered, particularly in the mandible, are the biomechanical phenomena that occur in a unilateral loading situation due to the protection of the surgical site. Implant bed preparation primarily weakens the mandibular segment in the region of the interdental gap and subjects it to a greater torsional potential. This increased torsional potential in the affected area could be detrimental to the osseointegration process of the implant, representing a risk factor. By securely bonding the protective temporary restoration to the neighbouring teeth, it effectively splints and immobilises the mandibular segment that was weakened by the implant placement, thereby counteracting the torsional forces.

The two cases of single-tooth restoration using one-piece zirconia implants are presented in the following:

Case 1


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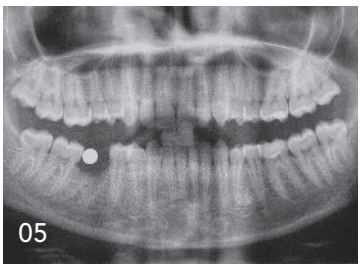
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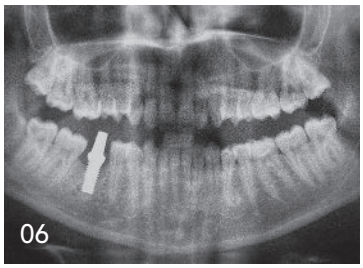
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Case 2


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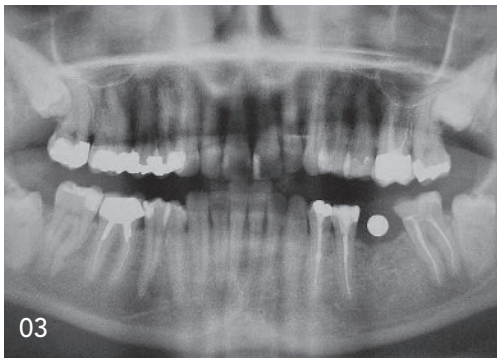
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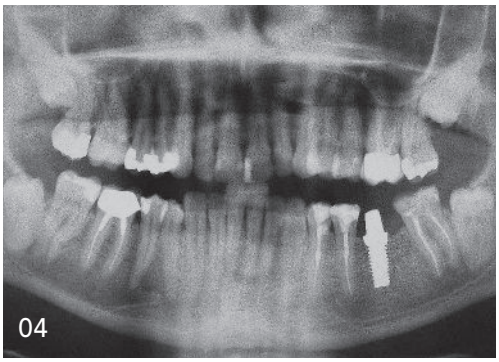
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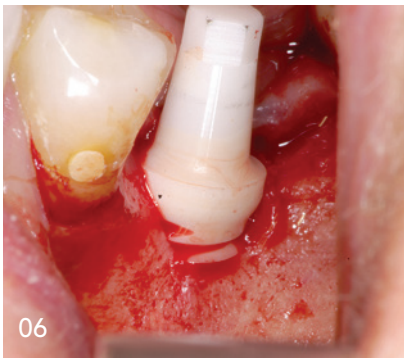
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Conclusion

These two clinical cases demonstrate that long-term success was achieved due to the surface quality and implant geometry of Z-SYSTEM implants. Despite suboptimal implant placement, vestibular bone supply and prosthetic restoration, both implants have maintained functionality for a period of 17 years!

In patient No. 1, the implant site in region 46 exhibited a vestibular bone deficit. While efforts were made to augment the defect using autologous bone obtained during site preparation, which was covered with a mucoperiosteal flap, the primary complete wound closure was not possible due to the transgingival portion of the implant. A comparable procedure with a titanium implant would be inconceivable. Additionally, the vertical position of the implant was suboptimal as it could have been placed 1.5 mm lower.

In contrast to patient No. 1, the implant in patient No. 2 was positioned approximately 1.5 mm under the recommended margin. Consequently, the transition from the implant crown to the implant shoulder was lower than the optimal biological width of the adjacent teeth. Exposure of the implant shoulder by lasering is not recommended, as this provokes unnecessary mucosal scarring and reduces moisture penetration.

This underscores the exceptional biocompatibility of Z-SYSTEMS' zirconia implants, which demonstrate remarkable resilience, even in cases where suboptimal conditions were inadvertently created. Indeed, this is a positive indication of the long-term stability of the implant site.

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"Ceramic implants—State of the Art"

Annual congresses of ISMI successfully being held in Hamburg

ISMI website

After the great success of the last year's concept, this year the International Society of Metal-Free Implantology (ISMI) once again joint forces with the German Society for Cosmetic Dentistry (DGKZ). On 3 and 4 May 2024 both societies invited to meet at EMPIRE RIVERSIDE Hotel in Hamburg, Germany. With a diverse and top-class programme, the organisers were once again able to inspire numerous participants about the topics of ceramic implants and aesthetic concepts.

Under the scientific direction of Dr Karl Ulrich Volz, Kreuzlingen, Switzerland and Dr Dominik Nischwitz, Tübingen, Germany for the ISMI and Prof. Dr Martin Jörgens, Düsseldorf, Germany at the DGKZ, both congresses offered participants an extremely complex, varied, and top-class programme that offered plenty opportunities for an interdisciplinary exchange.

On Friday, the joint podium was moderated by all three scientific leaders—Volz, Nischwitz and Jörgens. The participants had the opportunity to follow exciting lectures and to actively participate in the discussions. Afterwards ISMI and DGKZ highlighted their core topics in individual lecture blocks until the afternoon.

At the ISMI pre-congress symposium, Dr Volz lectured on the topic of "Modern ceramic implants in direct comparison". Dr Niels Hoffmann, Leipzig, Germany presented his concept "Smile Makeover in the digital workflow" in the DGKZ panel that took place at the same time. Prof. Dr Thorsten M. Auschill, Marburg, Germany spoke on the topic "Dark teeth, fluorosis, white spots and co.—How do we treat these professionally today?".

During the break between the first block and the following table clinic sessions, the attendees of ISMI and DGKZ congress had the opportunity to visit the accompanying industrial exhibition—collegial discussions and interdisciplinary exchange included.

In the second part of the day the participants could attend the table clinic sessions. Here, proven experts in the field of ceramic implantology and aesthetic dentistry shared and discussed their special knowledge and experience with the participating colleagues.

The first day of the congress came to a successful conclusion with the get-together in the industrial exhibition, where everyone involved was able to end the evening in a relaxed manner with wine, music and of course lively discussions between speakers, exhibitors, and participants.

The Saturday's session of ISMI and DGKZ congress was all about science in their corresponding fields, and was again presented in an exciting joint podium from both associations. One of the highlights of the morning was the lecture by Prof. Dr Nicole B. Arweiler, Marburg, Germany who spoke about "Biologisation in periodontology—what can blood concentrates, hyaluronic acid and the like do to the periodontium?" A topic that was worth discussing, and many participants brought up their questions and own opinions in the subsequent discussion. The lectures by Prof. Dr Dr Dr Shahram Ghanaati, Frankfurt am Main and Univ.-Prof. Dr Dr Ralf Smeets, Hamburg, both Germany were very well received. Both caught up on the topics of "Biologisation in Regenerative Dentistry" and on "Comparison of the use of PRF, PRP, PRP with hyaluronic acid, PRGF or hyaluronic acid alone—what makes sense and when?".

The second congress day continued with further lectures in two separated podiums. For ISMI, Dr Tobias Wilck, Hamburg, Dr Robert Bauder, M.Sc., M.Sc., Kitzbühel, Austria, Dr Dr Michael Rak, Bernried, Germany and DT Norbert Wichnalek, Augsburg, Germany shared their knowledge and in the DGKZ podium Prof. Dr Christian Gernhardt, Halle (Saale), Germany, Prof. Dr Thomas Weischer, Essen, Germany, Prof. Dr Thorsten M. Auschill, Dr Natalie Pütz, Halle (Saale), Germany and Dr Antje Diederich, Halle (Saale), Germany were holding their highly interesting lectures.

Next year, both ISMI and DGKZ will again hold their annual conferences together. The participants will then meet on 9 and 10 May 2025 in Dorint Kurfürstendamm in Berlin, Germany. Anyone interested should note the date in their calendar now and can register for the programme at **event@oemus-media.de**.

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EACim presents work and shares knowledge at DCIC—Dubai Ceramic Implant Congress

A delegation of the EACim went to the "DCIC 2.0" conference organised by the IAOCI, chaired by Dr Sammy Noumbissi from the USA, at Sheraton Dubai Creek Hotel & Towers on 25 April 2024. The EACim was represented by Prof. Andrea Enrique Borgonovo (Italy), Dr Olivier Henry-Savajol (France), Dr Philippe Duchatelard (France), and President of EACim, Dr Giancarlo Bianca (France).

Dr Philippe Duchatelard

In his opening speech, Dr Noumbissi gave a wonderful travel through the years of IAOCI, which was founded in 2010. He spoke about the past conferences, the IAOCI research groups, the +100 publications throughout the years, and about the impact of the pandemic which resulted in cancelling the congress planned in New Orleans in March 2020 but also about the initiation of the first virtual IAOCI congress in December of 2020. He mentioned the partnerships with the ACS (American Ceramic Society) for its 11th World Congress in May 2022 in Washington, DC, his city of heart and work, together with our EACim Academy, and the brand new Japanese academy JAOCI (Japan Association Of Ceramic Implants) represented by Dr Masanobu Saito (Japan).

01
Dr Saurabh Gupta,
Dr Giancarlo Bianca,
Dr Philippe Duchatelard (from left).

The choice of "2.0" in the title of these conference days in Dubai indicates the significant evolution of ceramic implantology in 2024 with the increase of the available products by a larger number of manufacturers, and the development of implant designs which join the titanium implants, "Tissue Level", "Bone Level" while preserving the one-piece.

Dr Saurabh Gupta (India) who is a reference in ceramic implantology and digital flow, directly addressed the clinical issue with the title of his lecture: "Are Ceramic Implants the revolutionary solution to the ongoing challenges in Implant Dentistry?" After discussing on peri-implantitis and the role of metal particles, he documented the very favourable response of the soft tissues in contact with zirconia; he showed the evolution of ceramic implant surfaces, especially the roughness, at the nanometric scale, one of the key factors for success in his opinion. He will be part of our speakers on this topic at our congress in Madrid.

Dr Vladimir Kokovic (UAE) spoke about: "Two-piece ceramic dental implants in daily practice: 10 years experience"; he related his experience with Straumann's ceramic implant Pure Tissue Level compared to the titanium homologue. He exposed his beautiful study published on the continuous increase of primary stability assessed using ISQ for this implant. "A new generation of ceramic one-piece implants based on long-term evidence" was the topic of the lecture of Prof. Borgonovo. He showed the design evolution of one-piece implants in the range of products of his use (bredent medical) with a clinical experience of more than ten years, and the opportunity of having reliable two-part options for the molars. He concluded that this choice was realistic, not just imaginative! Dr Henry-Savajol joined his partner and friend of the Loma Linda University (California), Sammy Noumbissi. After recalling this

02
Discussion between colleagues.

03
Dr Philippe Duchatelard, Dr Giancarlo Bianca and Prof. Andrea Enrique Borgonovo (from left) meet at DCIC 2.0.

04
Dr Sammy Noumbissi and colleagues in discussion.

05
Dr Sammy Noumbissi holding his lecture.

06
Dr Saurabh Gupta.

07
Prof. Andrea Enrique Borgonovo.

08
Dr Olivier Henry-Savajol.

09
Attendees of DCIC 2.0.

10
Dr Adina Landschoof.

11
Dr Regeane Kaniak.

period, and actually in charge of the EACim's international relationships, he presented our academy to the attending participants. His topic, "Full-arch immediate loading on ceramic implants", showed the use of bone-level (Z-SYSTEMS) ceramic implants for a full-arch rehabilitation using fixed ceramic prostheses on eight implants in the maxilla, with three years of follow-up, and after sharing his experience with titanium implants for this type of prosthesis.

The next session was moderated by Dr David Roze (UAE), and opened the stage to two strong ladies in ceramic implantology. At first, Dr Adina Landschoof (Germany) exposed her everyday practice using zirconia implants, and showed the quality of the contacting soft tissues during her lecture: "The beauty of soft tissue around white implants". The calligraphic style of her titles, the quality of the iconography revealed her keen sense of aesthetics, and a feminin approach to the topic. Dr Regeane Kaniak (Brazil) was holding her lecture basing on a highly sensitive issue on osteoimmunolgy (Arron and Choi): "Osteoimmunology and bone metabolism are important factors to avoid osseointegration failures". She managed to captivate the audience with her enthusiasm, and shared her vast knowledge on those current topics: the oxidative stress and osteonecrosing cavitations, BMDJ (bone marrow defects in the jawbone), FDOJ (fatty degenerative osteonecrosis in the jawbone) with RANTES (regulated on activation, normal T cell expressed and secreted), and other cytokines CCL5 (chemokine with chemotaxis effect and immune activation). She concluded that titanium particles

12
The congress attendees.

13
Dr Vladimir Kokovic (left) and Dr David Roze.

are immunogenic, not allergic. She is the Portuguese translator of Dr Johann Lechner's book *Cavitational osteonecrosis in jawbone*, also translated into French by Dr Joseph Choukroun and Dr Jérôme Surmenian.

The last lecture was held by Dr Iyad Abou-Rabii (France) and titled: "Beyond metal: exploring the effectiveness of ceramic dental implants". After a synthetic recall on the mechanical, physicochemical, and biological properties of zirconia, he shared his clinical experience illustrated by several single- or multi-unit implants with high confidence in the strength of the one-piece implants which he uses. After all lectures, a Q&A session with the audience allowed to share on various issues (problems) of this practice, such as, the maximum insertion torque for ceramic implants.

Dr Noumbissi concluded the day by expressing the wish of a greater cooperation between the American and European ceramic implant academies for promoting research and the development of this practice. We join this wish, and greatly thank him and his team for all the work performed to organise this symposium, and for his kind invitation to participate, as well as for promoting ceramic implantology.

A pleasant and friendly evening organised by Dr Kokovic in the form of a mini cruise in the Marina of Jumeirah allowed us to appreciate the overwhelming architectural dynamism of Dubai and its incredible all lit up "sky line" of sky-scrapers…

Dr Philippe Duchatelard Past President and Ambassador for France

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European Society of Ceramic Implantology (ESCI) presents its satellite symposium

"Ceramic Implantology" at the 6th Implant Congress of the Implant Foundation Switzerland

Dr Jens Tartsch

From 19 to 21 September 2024, the 6th Swiss Implant Congress of the Implant Foundation Switzerland will take place at Kursaal Bern, Switzerland, on the topic of implant health. With 600 to 800 participants expected, this is the largest implant congress in Switzerland. It is organised and held jointly with the four Swiss universities in Switzerland and the societies of SGI, SSOS, SSP and SSRD. The congress takes place every three years and includes a practice-oriented programme with many applications for everyday life as well as an industry exhibition.

The European Society of Ceramic Implantology—ESCI is delighted to have been invited to present its satellite symposium "Ceramic Implants" in the afternoon of Thursday, 19 September 2024. Ceramic implantology is thus taking another important step towards general recognition as an important component of dental implantology. The ESCI symposium will provide an extended platform to present the latest developments and groundbreaking research results in the field of ceramic implantology. Participants will also be able to familiarise themselves with the various implant systems through clinical case presentations.

The symposium brings together leading experts in ceramic implantology to provide insights into the current trends, challenges, and opportunities in this emerging field.

ESCI European Society for Ceramic Implantology

About ESCI:

The European Society of Ceramic Implantology—ESCI is a leading international professional society dedicated to promoting research, education, and innovation in the field of ceramic implantology. Through collaboration with experts from various disciplines, ESCI strives to improve patient care and further raise standards in ceramic implantology.

Symposium / Part 1

In the first part of the symposium, evidence-based backgrounds, and the latest study results of ceramic implantology will be presented in detail in exciting scientific presentations. The focus will be on the scientific underpinning of clinical applications in practice.

SCIENTIFIC LECTURES

Prof. Ronald Jung Dr Jens Tartsch	Welcome, Opening Symposium
Dr Jens Tartsch	Ceramic implants—just a trend?
Dr Stefan Röhling	Ceramic implants—a reliable alternative in everyday practice?
Prof. Ralf Kohal	Ceramic implants—stable enough for clinical use?
Dr Frank Maier, M.Sc.	Hard and soft-tissue management around ceramic implants
Prof. Andrè Chen	Digital Workflow with ceramic dental implants (en)

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The second part is a special feature in collaboration with the ESCI company partners:
In the session "my approach with...", long-standing users will present "their" implant systems and share their personal experiences with the auditorium—based on clinical cases. Participants will receive a comprehensive overview of the current ceramic implants and their possible applications.

Symposium / Part 2

CLINICAL LECTURES

Dr Jens Tartsch	my clinical approach with ... Zeramex XT and Nobel Pearl
Prof. Sebastian Kühl	my clinical approach with ... Straumann Pure
Dr Frank Maier, M.Sc.	my clinical approach with … CERALOG
Dr Lars Börner	my clinical approach with ... Z-SYSTEMS
	my clinical approach with … Patent

The ESCI Satellite Symposium thus offers a unique opportunity for dentists, oral surgeons, researchers, and industry partners to gain an in-depth insight into the world of ceramic implants, expand their implantological expertise, their network and help shaping the future of ceramic implantology. The Symposium will also help to further increase the successful use and acceptance of ceramic implants.

Take advantage of this unique opportunity to combine the ESCI Satellite Symposium and the Swiss Implant Congress, which will present further top-class speakers such as Prof. Bilal Al-Nawas, Prof. Tomas Albrektsson, Prof. Giovanni E. Salvi, Prof. Hannes Wachtel and others! Register today!

For the Symposium the number of participants is limited, an early registration is recommended. Registration for the ESCI Satellite Symposium is possible with or without the registration for the 6th Swiss Implant Congress. The symposium is free of charge for ESCI members. The congress language is German.

Dr Frank Maier M.Sc., Dr Stefan Röhling, Dr Jens Tartsch, Prof. André Chen, Prof. Ralf Kohal (from left).

Registration

Further information on the programme and registration can be found on the official website of the 6th Implant Congress of the Swiss Implant Foundation **www.implantatstiftung.ch/kongress** or the ESCI website **www.esci-online.ch.**

We look forward to an exciting afternoon with you!

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Long-awaited Digital Dentistry Show to premiere in Berlin in June 2024

Now is an exciting time for dentistry. Technological innovations lie at the heart of the profession and are significantly advancing personalised dental care. To provide a platform to celebrate digital innovations in the field and educate the dental team, DDS.Berlin has collaborated with the Digital Dentistry Society, and they are bringing a highly immersive experience to the capital of Germany—the Digital Dentistry Show. Scheduled for 28 and 29 June 2024 at the Arena Berlin, the event promises to deliver engaging educational and social opportunities with a special focus on digital products and the digital workflow in dentistry.

Through live product presentations, workshops, discussion sessions and an exhibition, the 2024 Digital Dentistry Show seeks to provide attendees with first-hand knowledge of digital dental products and services and to offer space for personalised advice and face-to-face interactions with industry leaders. With the focus on robust research evidence, the scientific programme will feature presentations by prominent opinion leaders, including Drs Henriette Lerner, Alessandro Cucchi, Raquel Zita Gomes, Paul Schuh and Marcus Engelschalk, and cover a wide range of topics, such as artificial intelligence, the digital workflow in maxillofacial surgery and full-arch rehabilitation, and digital bone surgery. Attendees will have the opportunity to earn up to 16 continuing education credits.

Besides a strong educational aspect, the 2024 Digital Dentistry Show will serve as a social hub for dental experts, professional organisations, manufacturers and publishers who are looking to form or expand their network of like-minded, future-oriented individuals. To be hosted at one of Berlin's industrial pearls, the unique event location offers a rich history and a distinctive modern feel. The adjacent Escobar and the Badeschiff spaces will enhance the relaxed and jovial atmosphere, underlining the informal and engaging nature of the show.

The 2024 Digital Dentistry Show is expected to attract over 2,000 eminent dental professionals from around the world. You are invited to be one of them!

02
Located in Berlin's Alt-Treptow inner-city district, the 6,500 m² Arena Halle offers high-quality professional infrastructure.

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01
The 2024 Digital Dentistry Show will offer cutting-edge knowledge and skills that will help dental professionals better navigate technological advancements in the field.

03
The Badeschiff is a picturesque floating public swimming pool area overlooking the Spree river.

04
The Escobar is an extension of the Badeschiff that includes a covered bar area.

05
Attendees will also have access to the Sonnendeck of the Escobar, where they will be able to enjoy delicious food and drinks.

More information on registration and the scientific programme can be found at **www.dds.berlin**. Admission to the event is free of charge.

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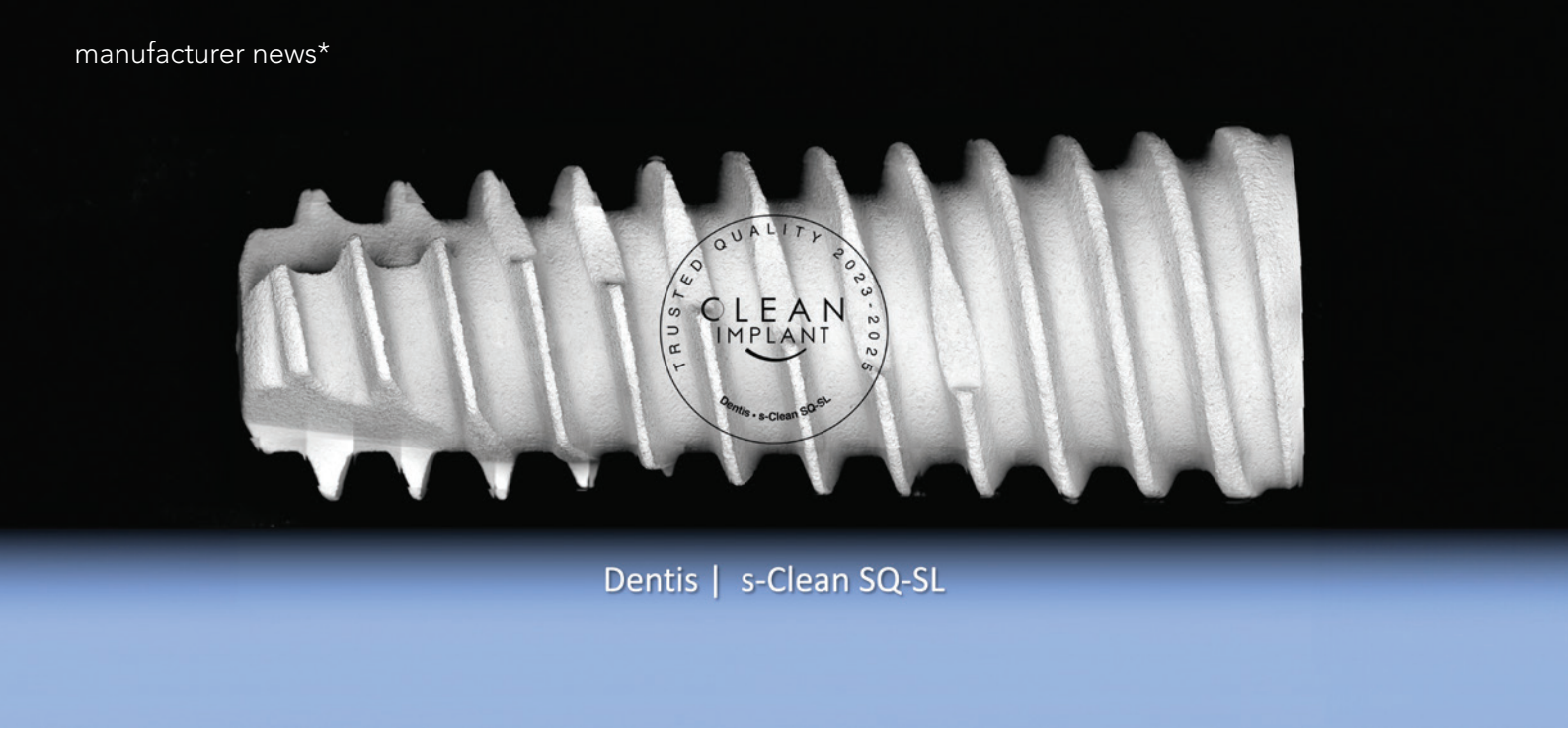
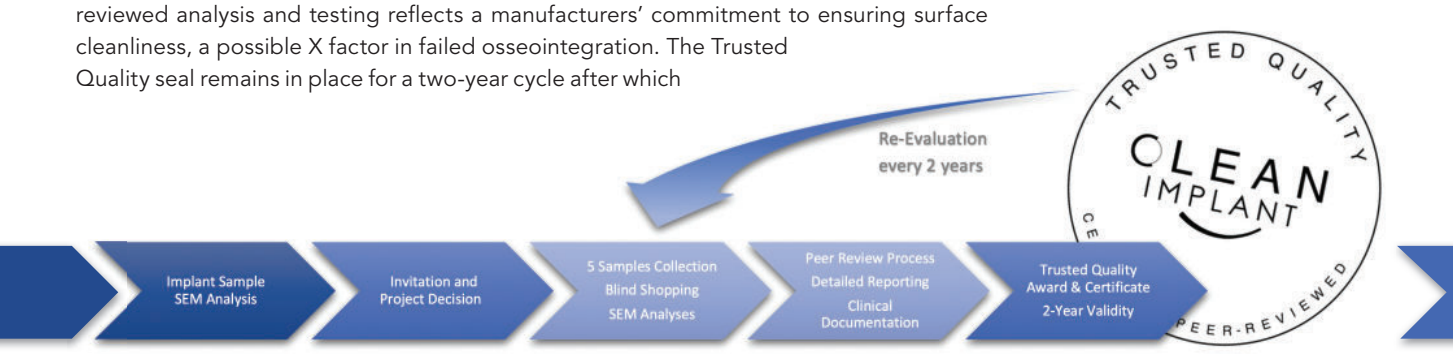


CleanImplant Foundation:

Celebrating extended and new "TRUSTED QUALITY" awards for oral implants from dedicated implant manufacturers. More and more implant manufacturers recognise the value that the CleanImplant award brings to practitioners and their patients.

The plethora of implants available from an increasing number of companies brings into question whether a universal standard of quality in production and packaging exists for surface cleanliness. This presents as a conundrum for dentists worldwide regarding their choice of fixture to provide optimal patient care. The increased incidence of peri-implantitis warrants a revisiting of critical thinking as to its source. The presence of surface contaminants is recognised as a contributing factor of the sequelae of biological complications that can occur.

Receipt of the Trusted Quality seal awarded by the CleanImplant Foundation after rigorous peer-reviewed analysis and testing reflects a manufacturers' commitment to ensuring surface cleanliness, a possible X factor in failed osseointegration. The Trusted Quality seal remains in place for a two-year cycle after which



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the implant must be retested to re-establish its surface cleanliness status determined within the framework of the CleanImplant consensus-based guideline. "After rigorous and extensive testing, we are pleased to extend the CleanImplant Quality seal for an additional two years to the products from Swiss Dental Solution from Switzerland and German manufacturer medentis medical, BTI from Spain and the Korean producer MegaGen", Dr Dirk U. Duddeck, Founder and Head of Research at CleanImplant pointed out. "The implant UnicCa from BTI and MegaGen's AnyRidge System went through a fourth re-evaluation process for which they were awarded the special CleanImplant award for "Long-Term Proven Excellence" recognising companies' continued pursuit of perfection in quality for their client base."

As well, the Foundation wishes to congratulate Ritter (Spiral SB/LA) and Dentis (s-Clean SQ-SL) who earlier this year received the Trusted Quality award. The presence of the CleanImplant team at the Academy of Osseointegration annual meeting in Charlotte, North Carolina, afforded the opportunity to present the seal in person to representatives of the companies.

Companies establish trust for their end users by following through on their professional commitments, by working to amend deficits in production standards, and by making changes where needed. The continuously updated CleanImplant Foundation website and the quarterly newsletters advise their subscribers and members whether that confidence is being earned. Dirk U. Duddeck concludes: "A duty of care must be sacrosanct for all, that is both mandate and responsibility for those in the industry and the profession."

Implant systems currently carrying the "Trusted Quality" award are: AnyRidge (MegaGen), Astra Tech EV (Dentsply Sirona), BLUEDIAMOND (MegaGen), ICX-Premium (medentis medical), In-Kone (Global D), Inverta (Southern Implants), Kontact S (Biotech Dental), (R)evolution (Champions-Implants), s-Clean SQ-SL (Dentis), SDS1.2 (Swiss Dental Solutions), SDS2.2 (Swiss Dental Solutions), Spiral SB/LA (Ritter Implants), SuperLine (Dentium), T6 (NucleOSS), T6 Torq (NucleOSS), UnicCa (BTI Biotechnology Institute), whiteSKY (bredent medical).

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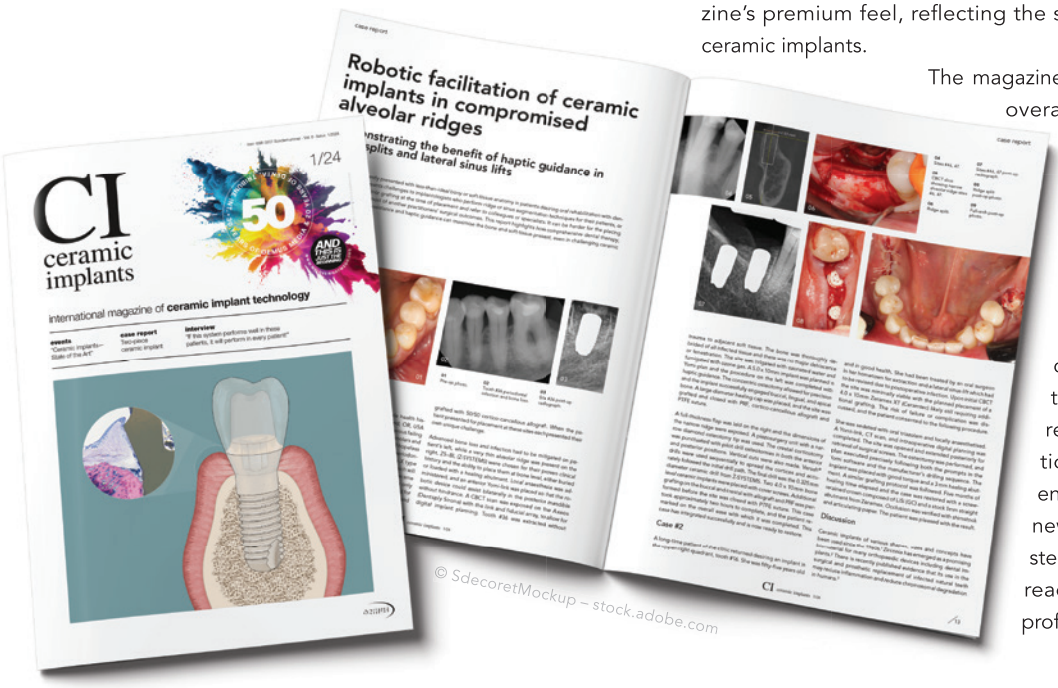
New design and layout of *ceramic implants* magazine—a new standard for dental publications

The latest edition of *ceramic implants* features a fresh, innovative design that sets new standards for dental publications. This redesign is more than just a visual update; it includes functional improvements that enhance the reader's experience.

A standout feature is the dynamic use of different photo sizes in case displays. This approach creates an engaging and visually appealing presentation of clinical cases, highlighting details with clarity and impact. Large, high-resolution images draw the reader's eye, while smaller, supporting photos provide additional context, making the content both informative and captivating.

The new cover design offers unprecedented flexibility, allowing for personalised and thematic covers for each issue. The cover's soft and smooth texture, achieved through special paper and finishing techniques, provides a tactile experience that is as pleasing to touch as it is to see. This attention to material choice enhances the magazine's premium feel, reflecting the sophistication and quality of ceramic implants.



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The magazine's new layout aligns with the overall refreshed look of OEMUS MEDIA AG publications, reinforcing the brand's commitment to high standards in both content and presentation. The redesigned *ceramic implants* is a testament to OEMUS MEDIA AG's dedication to innovation, ensuring that readers receive the most relevant, up-to-date information in a format that is both engaging and educational. This new design marks a significant step forward, promising a richer reading experience for dental professionals worldwide.

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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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High primary stability and aesthetic appearance

The whiteSKY implant system from bredent is among the best-documented zirconia implant systems worldwide. It has not only demonstrated excellent osseointegration and longevity in numerous studies but has also proven its efficacy in practice. In fact, the longevity of whiteSKY implants is comparable to that of titanium implants. The whiteSKY implant system offers two different implant types: the whiteSKY Tissue Line and the whiteSKY Alveo Line. The narrow whiteSKY Tissue Line implant provides sufficient space for both the hard and soft tissue and ensures an aesthetically pleasing appearance with its slightly tapered shape in the sulcus area, transitioning from the gingiva to the implant crown. The whiteSKY Alveo Line, on the other hand, is ideal for immediate loading as it fills the extraction socket. At the same time, it provides the treating doctor with the possibility to individualise the implant according to the specific requirements of the clinical case.

Optimal conditions for soft-tissue attachment and high mechanical stability

Both the Alveo and Tissue Line implants of the whiteSKY system offer optimal conditions for soft-tissue attachment due to their specially designed sulcus surface. The whiteSKY implants are made of hardened zirconia and are one-piece, which gives them particularly high mechanical stability. Thanks to the improved thread design and bone-quality-oriented surgical protocol, the whiteSKY implants achieve high primary stability, making them ideal for immediate loading. Studies have shown that immediate implant placement can improve the bone–implant contact by more than 50 per cent.

bredent medical GmbH & Co. KG, Germany
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Guideline on Ceramic Implants:

German Association of Oral Implantology

The German Association of Oral Implantology presents internationally the first guideline on this topic

"One-piece ceramic dental implants based on zirconium dioxide, whose success and survival rates have been positively evaluated in scientific studies, are a valid and mature therapy method and can be recommended as an alternative therapy option." This is recommendation number one from experts from 18 scientific societies and organisations under the leadership of the German Association of Oral Implantology (Deutsche Gesellschaft für Implantologie—DGI e.V.), who have developed the world's first guideline on ceramic implants.

Titanium implants as dental prostheses have been scientifically recognised in Germany since 1982 and have become an established option for patients following tooth loss. Extensive prospective long-term studies and experience have made them the gold standard in oral implantology. Nevertheless, many patients desire alternative treatment concepts with ceramic implants. Today, zirconia is the standard material for these implants.

Important: The manufacturer's competence. Unlike titanium implants, the essential properties of ceramic implants depend on the individual production processes of the manufacturers and the type and number of chemical additives used. Zirconium dioxide stabilised with the chemical element yttrium is now the most commonly used variant due to its special mechanical properties. The latest generation of ceramic implants also contains small amounts of aluminium oxide to increase flexural strength. However, the manufacturing process is equally important. "The manufacturer's expertise plays a significant role in ceramic implants," emphasise the experts.

The problem: lack of long-term data. The biggest issue when experts want to assess the quality and stability of ceramic implants is the lack of long-term data from studies. Advanced production methods, successor models with altered material compositions, and the discontinuation of implant types used in studies delay the acquisition of knowledge.

Research continues. "Despite promising material properties, the development of even more powerful ceramics does not seem to be complete," write the authors of the guideline. Optimised manufacturing processes and methods to provide implants with microrough surfaces, for example, appear to have a crucial impact on their long-term stability. Challenging conditions for guideline development. As positive as the continuous development of implant systems is, it poses problems for guideline work. The first statement of the experts in the new guideline states: "The long-term stability of zirconium dioxide-based ceramic implants beyond five years cannot be conclusively assessed due to the lack of clinical prospective long-term study data yet."

The second statement provides the rationale: the material composition, like the respective workpiece quality, is manufacturer-dependent and thus multivariate. Dynamic material modernisations and design changes often lead to replaced product innovations, reducing the value of existing study data.

The good news in Statement 3, a setback in Statement 4: Preclinical and clinical studies point to a similar behaviour in the osseointegration of ceramic and titanium implants (Statement 3). However, due to the current scientific evidence, an evidence-based statement regarding plaque accumulation and peri-implantitis risk in treatment with ceramic implants is not possible (Statement 4).

Ceramic implants can be recommended as an alternative therapy option. Despite all the difficulties, the experts emphasise in their first of two recommendations that commercially available monolithic ceramic implants based on zirconium dioxide, with success and survival rates positively evaluated in scientific studies, are a valid and mature therapy method and can be recommended as an alternative therapy option.

No final judgement on two-piece ceramic implants. Regarding the still "young" two-piece ceramic implants, the experts have formulated their second recommendation: "Commercially avail-

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02
Ceramics also play a role in a new DGI guideline, which was developed in 2024 and coordinated by Prof. Stefan Wolfart, Aachen, Germany. However, this is about the choice of material for fixed implant-supported restorations.

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01
DGI guideline conference 2021: Prof. Dr Dr Knut A. Grötz, Wiesbaden, Germany (right), coordinates the development of the guideline on ceramic implants, assisted by Prof. Dr Christian Walter, Mainz, Germany.

03
More than 50 delegates from 18 scientific medical and dental associations take part in the DGI's guideline conferences—as here in 2021.

04
After discussing a guideline, the delegates vote.

able two-piece ceramic implants based on zirconium dioxide appear to be a therapy option for replacing missing teeth. However, a final assessment is not possible due to the low level of evidence from clinical studies."

Special clarification required. Therefore, the experts emphasise that a special clarification is necessary when discussing with patients, where the therapy with two-piece ceramic implants—compared to that with titanium implants—is explained and highlighting the issue of the lack of long-term data so far.

Prof. Dr Dr
Knut A. Grötz

Dr Dr Daniel Thiem

Coordinator:
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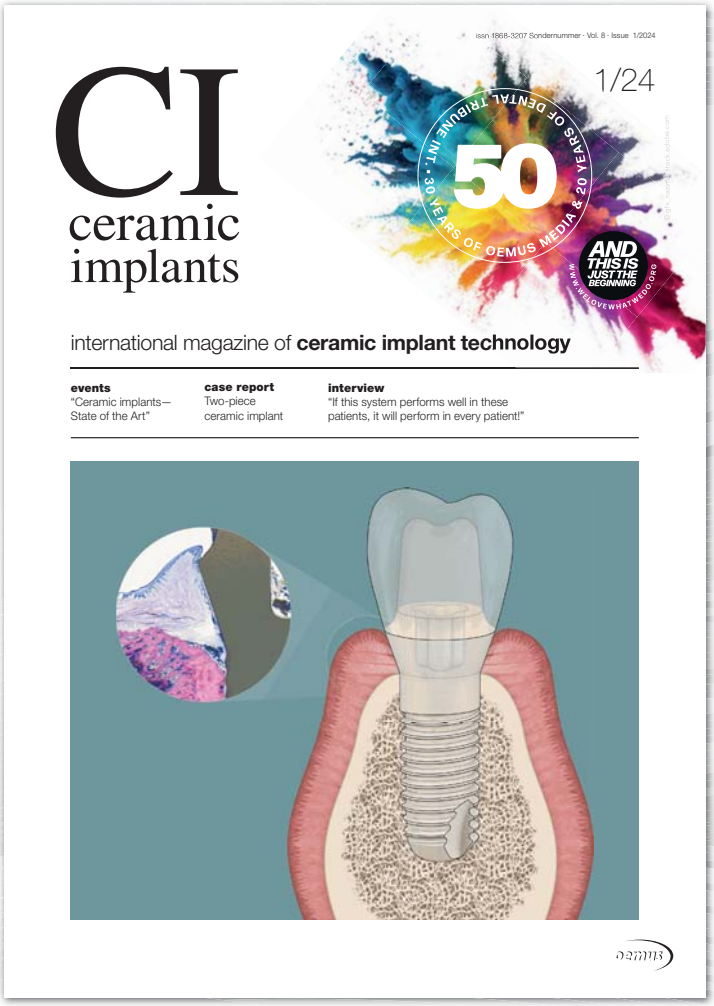

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s-Clean SQ-SL – **DENTIS**

AnyRidge – **MEGAGEN**

SuperLine – **DENTIUM**

T6 torQ – **NUCLEOSS**

In-Kone – **GLOBAL D**

T6 – **NUCLEOSS**

UnicCa – **BTI**

Scanning electron microscope images (BSE mode) of new implants after unboxing – Both implants were sterile packaged, FDA labeled and ready for clinical use.

Sterile does not mean clean. Far too many implant systems have concerning residual surface contaminants.

- Join in as a CleanImplant Certified Dentist.
- Gain access to exclusive membership benefits.
- Receive quality information about your implant in use.
- Gain new patients and provide more safety.

More information about this non-profit initiative:
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