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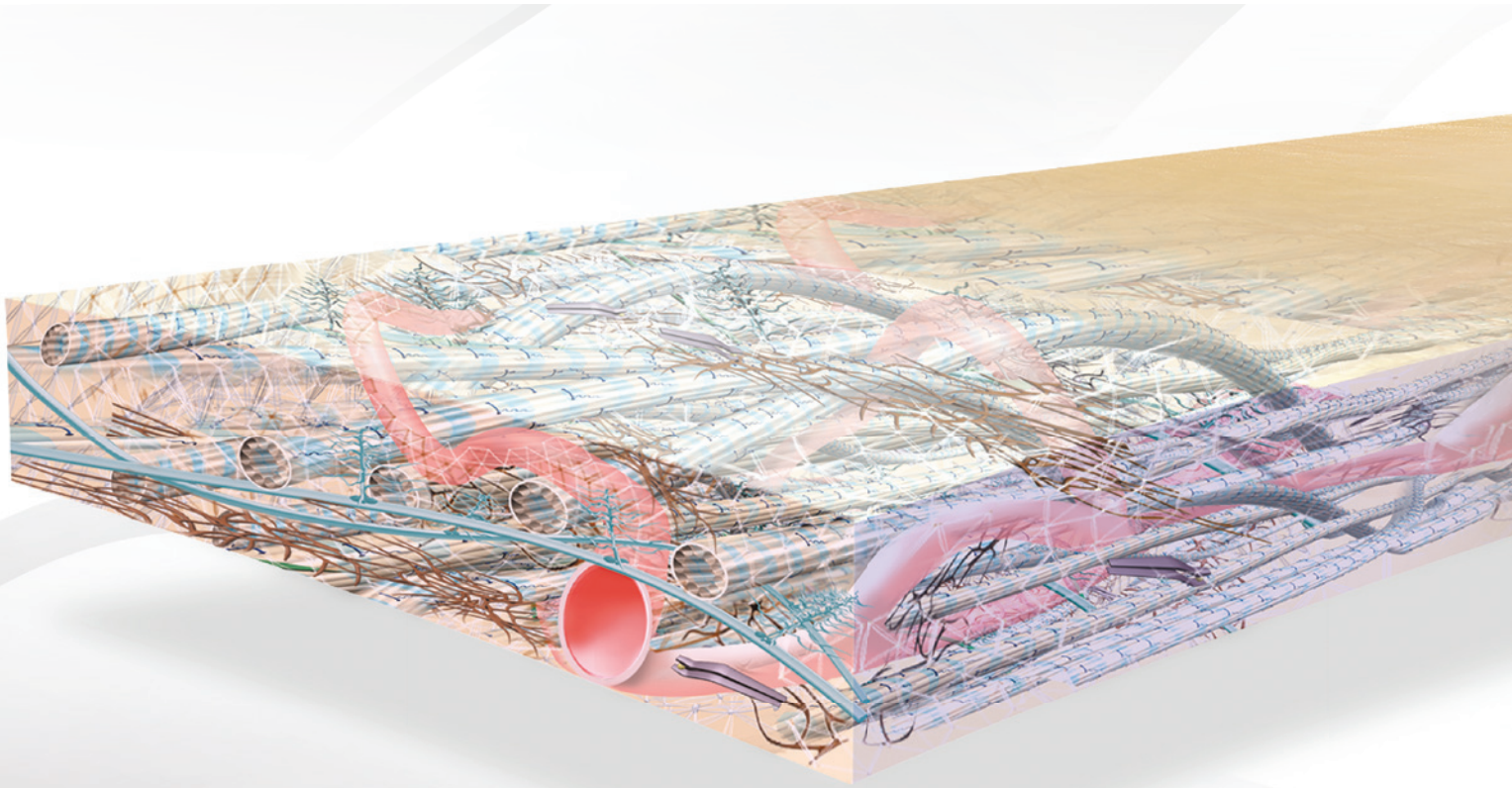
implants

international magazine of oral implantology



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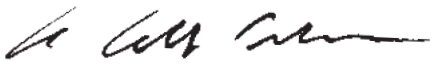
"The bone sets the tone and the tissue is the issue"

The quotation by Dennis Tarnow should be the benchmark for implant treatment. Advancing knowledge and the possibilities of digital techniques are making it increasingly possible to develop the ideal implant treatment plan effectively. This makes it all the more important to work together with your dental technician as a team in order to analyse the examination findings exactly and to implement them in the best possible way according to the patient's desires.

On 1 and 2 April, we had the opportunity to go through and discuss the possibilities of a digital workflow with a group of colleagues as part of a course in the curriculum of the German Association of Dental Implantology (DGZI). Digital planning according to CBCT data and intra-oral scans can be ideally coordinated. In addition, it can be found out very quickly whether bone augmentation measures should be carried out. If this is the case, the choice of bone grafting material should be based on the experience and results of the guideline conferences, in which the DGZI is involved by provision of its expertise. As far as bone augmentation is concerned, such guidelines are very helpful and give clinicians greater confidence in the treatment process. According to the recommendations, defects of 3–5 mm in size can be built up with a wide variety of bone grafting materials. The limits become apparent when, for example, a vertical alveolar ridge elevation is necessary. In these cases, autologous or allogenic bone block grafting should be considered. Here too, a digital workflow can be implemented, for example in model printing before grafting and in planning of individually milled block grafts. The current issue of implants—**international magazine of** oral implantology takes a closer look at this topic, and I wish you an enjoyable read.

Yours,



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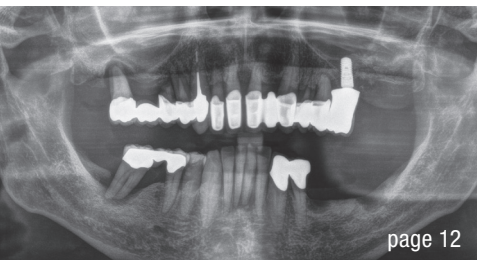
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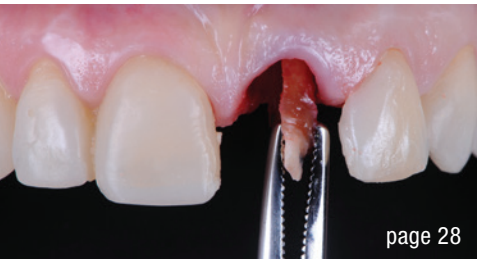
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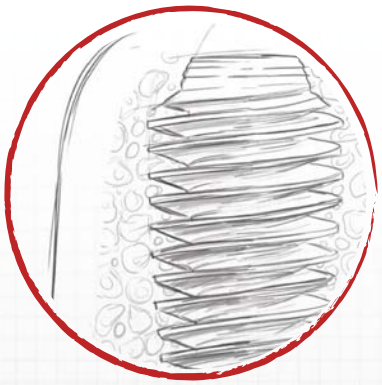

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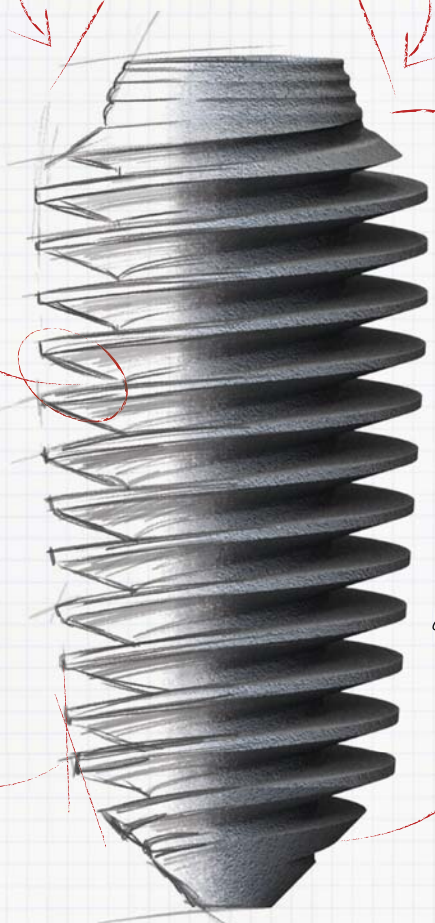

Implant design allows the use of reduced diameter Final drills, according to the bone quality

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How clean do sterile implants have to be?

Analysis and clinical relevance of factory-related contaminations

Dr Dirk U. Duddeck, Germany

The initial phase of the biological response to a placed implant is primarily determined by the implant's surface characteristics. The properties of any implant surface are an essential factor of its non-irritant integration into surrounding tissue structures.[1] Undisturbed osteoblast proliferation and osteoblast differentiation at the implant surface depend decisively on the microstructure of the surface.[2] Since the 1980s, however, there have also been growing demands for flawless cleanliness of the implant systems used.[3] In this context, it is a logical step not only to look at current analytical techniques but also to take a critical look at the clinical significance of avoidable contamination on brand-new sterile-packaged implants.

SEM imaging

Imaging in the material contrast mode of a scanning electron microscope (SEM) has proved to be very useful for the analysis of particulate and film-like contaminants on sterile-packaged dental implants. Back-scattered electrons from the implant surface have typical energy of up to 10 keV. The intensity of these signals depends on the average atomic number of the sample material in focus. Compared with titanium or zirconium, heavier elements, such as iron or nickel, show more intense back scattering so that corresponding image areas appear bright (Fig. 1). In contrast, locations with lighter elements, such as carbonaceous plastic particles, are displayed darker than areas with titanium or zirconium (Fig. 2).

The image generated by the back-scattered electron detector thus allows conclusions regarding the distribution of foreign materials or elements in the imaged section of the implant surface. For a valid assessment of the particle load of an implant, a SEM image of the entire implant should always be acquired. In order

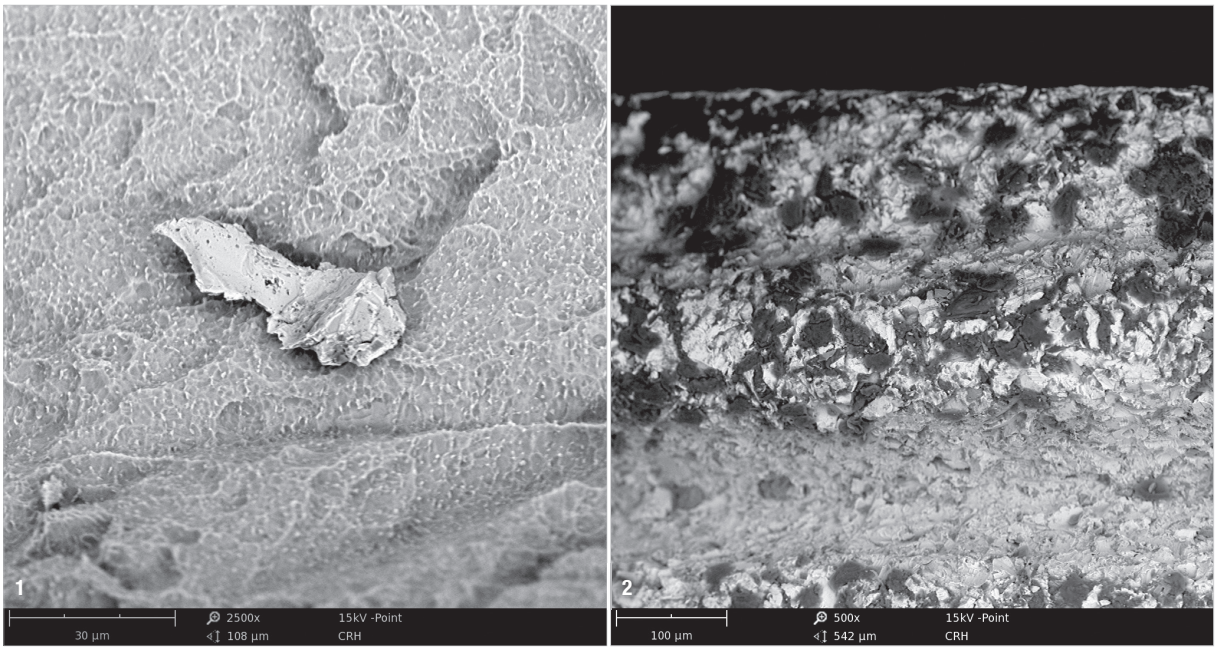

Fig. 1: Metal particle of iron, chromium and nickel on the surface of a titanium implant (Adin). SEM 2,500× magnification. **Fig. 2:** Numerous organic particles on the entire implant shoulder (OCO Biomedical). SEM 500× magnification.

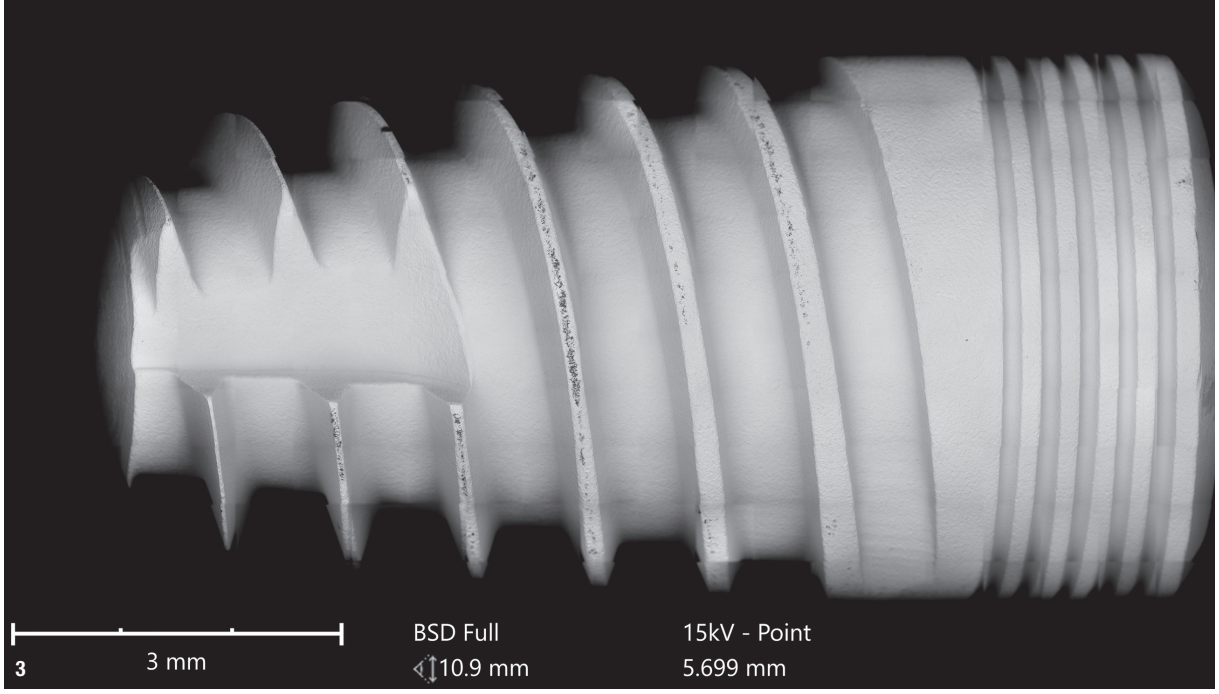

Fig. 3: Factory-related contamination of entire implant threads (Ritter Implants). Full-size SEM image of the implant electronically compiled from hundreds of single images at 500× magnification using the material contrast technique (back-scattered electron mode).

to depict details at high magnification without pixelation, up to 600 individual SEM images must be electronically stitched together in high resolution for these comprehensive overview images. The resulting SEM image in material contrast provides a detailed overview and allows the quantitative detection of individual particles (Fig. 3).

Identification of impurities

Energy-dispersive X-ray spectroscopy (EDS) provides information about the exact elemental composition of an impurity and thus provides hints about its origin. When fast electrons hit the sample surface, X-rays are emitted inter alia. The energy of these X-rays is characteristic of each chemical element present in the sample or contaminant. The energy and the number of X-ray quanta emitted in this way are measured over a defined time and output as an EDS spectrum.

Time-of-flight secondary ion mass spectrometry (ToF-SIMS) provides even more precise information about the chemical composition of an impurity. The method provides information on the atomic and molecular structure of the uppermost monolayers of a substrate on an analysis area of $500 \times 500\,\mu m^2$ with sensitivity in the parts per million range and a lateral resolution of up to 100 nm. Comparison of the spectra with known substances allows precise material determination of the respective contamination (Fig. 4).

Too many implants of inferior quality

In a study from 2017 to 2020, the CleanImplant Foundation, a non-profit organisation based in Berlin in Germany, analysed sterile-packaged implants from various manufacturers. In cooperation with Charité—Universitätsmedizin Berlin in Germany, a total of 14 ceramic implant systems and 86 implant systems made of titanium and its alloys were examined under the SEM. The protocol of analysis used in this quality assessment study was published in a 2019 pilot study by Duddeck et al.[4] The samples were examined for contaminants under the SEM in a testing laboratory accredited according to the DIN EN ISO/IEC 17025:2018 standard. For the study, the implants were unpacked in a particle-free environment (Class 5 clean room according to the DIN EN ISO 14644-1 standard) and subsequently scanned in the same clean room to exclude any laboratory interference with the test samples. To an unexpected extent, that is, in more than one-third of the samples examined, the analysis revealed factory-related residues and contamination. SEM imaging identified not only carbonaceous contaminants in significant quantities (Fig. 5) but also foreign metals such as chromium, iron, tungsten, nickel, copper and tin. Implants made of titanium and zirconium dioxide were affected, regardless of price, market position, size of the manufacturer or production location. Subsequent to the SEM/EDS analysis, selected contaminated implant samples were additionally examined by a detailed ToF-SIMS analysis. Polysiloxanes, that is, synthetic polymers (Fig. 6), thermoplastics and residues of dodecylbenzene sulphonic acid were found on the implant surfaces. This cytotoxic surface-active chemical is one of the most aggressive components in many cleaning agents and is classified as a hazardous substance.

Clinical relevance

In particular, organic carbonaceous foreign materials have been associated with initial bone loss or even peri-implantitis in the literature.[5] Increased osteoclast activity associated with a possible foreign-body reaction, resulting in peri-implant bone resorption, could be the cause.[6] Exposure to foreign particles induces macrophages to secrete tumour necrosis factor-α, interleukin-1β, interleukin-6 and prostaglandin E2, which in turn stimulates the differentiation of osteoclast precursors into mature osteoclasts. This response would explain clinically striking bone loss during the initial healing phase or the early onset of peri-implantitis. All particles found in the study

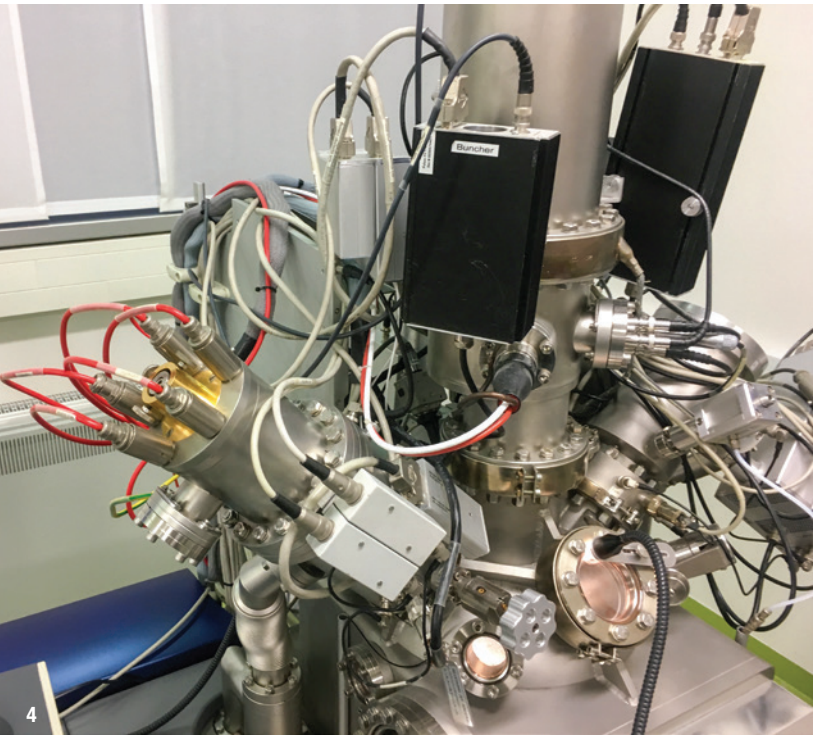

Fig. 4: Time-of-flight secondary ion mass spectrometry instrument (tascon).

appear to have survived the wet chemical cleaning procedures in the manufacturing process or contaminated the implant in the handling and packaging process. Especially foreign particles with a size of 0.2–7.2 µm are classified as pro-inflammatory.[7–9] If they detach from the surface during the insertion of the implant, macrophages take up the particles by phagocytosis and subsequently release pro-inflammatory cytokines. The result is an expanding zone of soft-tissue damage and inflammation.[6]

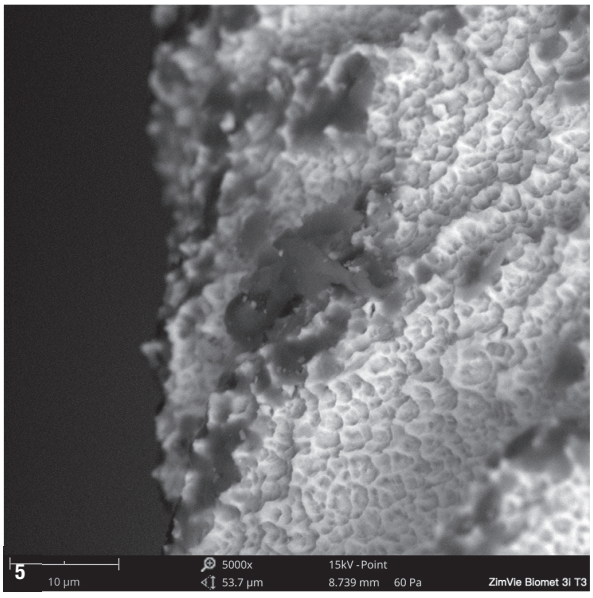

Fig. 5: Carbonaceous particles (polysiloxanes) on a titanium implant at the implant apex of a titanium implant (T3, ZimVie). SEM 500× magnification.

Independent test procedure provides safety for dentists

All implants examined in the recent quality assessment study, including those significantly contaminated, showed the CE mark on the packaging or carried the U.S. Food and Drug Administration logo for marketing clearance on the US market. With the introduction of a worldwide quality seal for clean implants, the "Trusted Quality" mark, the CleanImplant Foundation addressed this issue years ago. Criteria for implants that are largely free of foreign particles were defined in a guideline in 2017 and published as a consensus paper involving renowned scientists such as Prof. Tomas Albrektsson, Prof. Ann Wennerberg, Prof. Hugo de Bruyn, Prof. Florian Beuer, Prof. Jaafar Mouhyi, Dr Michael Norton, and Dr Luigi Canullo.[10] These scientists also form the foundation's scientific advisory board, which ultimately decides on the awarding of the above-mentioned quality seal. For the testing procedure of an implant system, a total of five samples are included. A maximum of three implants are obtained from the respective manufacturer and at least two implants from implantology practices. This procedure ensures random selection during sampling and reliably prevents the acquisition of potentially specially treated test samples. The independent and thorough analysis of the samples must be renewed every two years in specially accredited testing laboratories. The same protocol of analysis described in the *Journal of Clinical Medicine* in 2019 is to be applied.[4]

Before the seal can be awarded, proof of a multi-annual survival rate of at least 95% must be provided for the respective implant system, as well as proof of the absence of a significant number of particles. The results of the analysis and the sufficiently reliable clinical documentation of a system are always checked independently by two members of the scientific advisory board in a peer-review process and compared with the requirements of the guideline. Not until all criteria are met can an implant system be awarded the seal for a period of two years. To date, the following systems have been awarded the foundation's "Trusted Quality" seal after rigorous peer review (in alphabetical order): AnyRidge and BLUEDIAMOND (MegaGen), blueSKY (bredent medical), CONELOG (CAMLOG), ICX-PREMIUM (medentis medical), In-Kone (Global D), Kontact S (Biotech Dental), NobelActive (Nobel Biocare), Patent/BioWin! (Zircon Medical/Champions), Prama (Sweden & Martina), SDS1.2 and SDS2.2 (SDS Swiss Dental Solutions), T6 (NucleOSS) and UnicCa (BTI). Other implant systems are currently undergoing the testing process of the foundation.

Discussion

The evaluation of the CleanImplant quality assessment study revealed both light and shadow with regard to the current quality level and sustainable quality control of dental implants. This creates a problem for the careful

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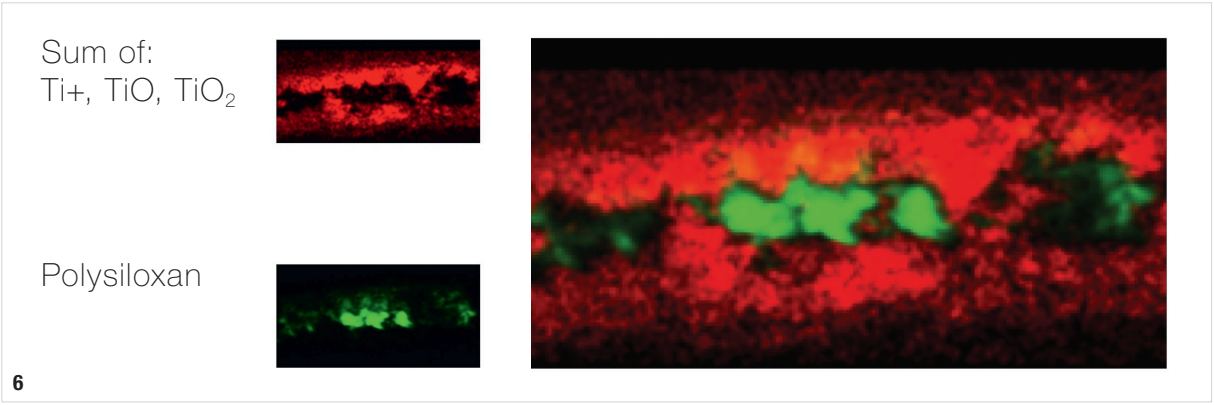

Fig. 6: Time-of-flight secondary ion mass spectrometry detection of polysiloxane on a titanium implant.

practitioner: he or she usually does not know whether the implant system of his or her choice has already been contaminated at the factory. This is because information or warnings about possible foreign particles that could cause peri-implantitis or about residues of cleaning agents is not provided on the implant packaging or on the package insert.

Fig. 7: Significant plastic material (polyacetal) on the shoulder of a ceramic implant (vitaclinical, VITA Zahnfabrik) from abrasion from the packaging.

Unfortunately, implant systems do not have consistent, comparable quality, as summarised in 2020 by Dr Norton, a past president of the Academy of Osseointegration, in an opinion piece in the *British Dental Journal* that is well worth reading.[11] The use of factory-contaminated implants not only may lead to inferior clinical outcomes but also carries the risk of legal implications. The problem of possible factory-related contamination concerns not only implants made of titanium or titanium alloys but also ceramic implants, as scientists from the universities of Gothenburg, Malmö and Berlin impressively described in a study published in 2021.[12] The bottom line of the study is that just because the material of ceramic implants is white does not necessarily mean that they are clean (Fig. 7).

Suppose a clinician chooses a ceramic implant as a metal-free alternative and it has been demonstrably contaminated by packaging residues across batches. In that case, he or she is, unwittingly, doing a disservice to precisely those patients who place great value on particularly biocompatible materials in their bodies. In a remarkable article decades ago, Wahl and Tuschewitzki employed an apt term for factory contamination of dental implants: they referred to it as “sterile dirt”.[3]

Conclusion

The placement of foreign metals and packaging residues or cleaning agent residues in the osseous site of an implant can lead to an uncontrolled foreign-body reaction, resulting in bone recession and even the loss of implants. Contamination of sterile-packaged dental implants can be largely avoided by the manufacturer. However, if individual manufacturers, when asked, say that they consider the amounts of foreign particles found on their products to be harmless according to their own judgement, it would be appropriate for them either to scientifically verify this or to warn users and patients accordingly.

about the author

Dr Dirk U. Duddeck studied biology and dentistry and specialised in oral implantology. He is a guest researcher at Charité—Universitätsmedizin Berlin and founder and head of the non-profit organisation CleanImplant Foundation, both in Berlin in Germany.

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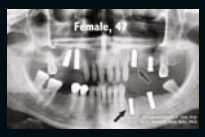

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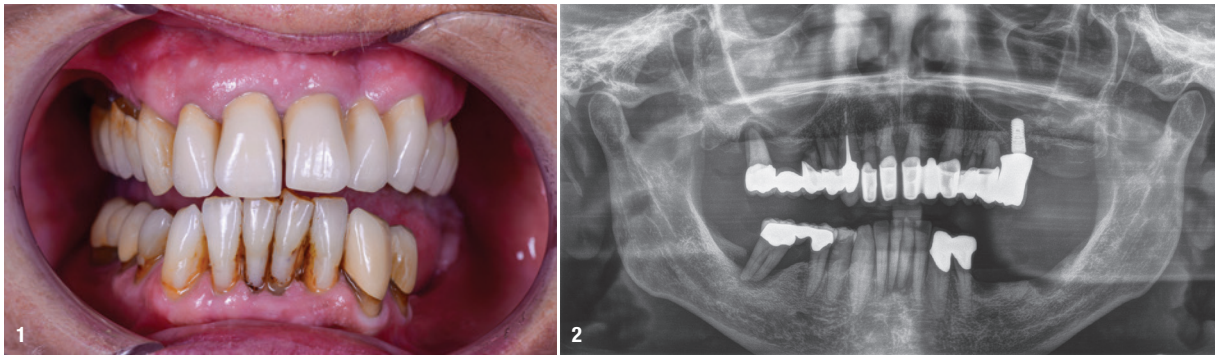
Complex rehabilitation of periodontally compromised dentition

Drs Sangeeta Pai & Romy Dech, Germany



Figs. 1 & 2: Clinical and radiographic representation of the initial situation, showing progressive generalised, chronic periodontitis and significant loss of soft and hard tissue.

During the complete rehabilitation of the severely periodontally compromised dentition of a 69-year-old female patient, the treatment team had to consider various aspects in making treatment decisions for ethical as well as forensic reasons. The patient wanted a functional and aesthetic restoration of the upper and lower jaws that would be stable in the long term and make use of her own teeth that were worth preserving. Thus, the questions arose as to what her potential risk of loss of implants because of her previous periodontal disease would be and whether the intervention could achieve the most permanent improvement possible in her oral health-related quality of life.[1] The patient's age and state of health had to be assessed in terms of how long her manual dexterity for oral hygiene would be maintained.

Initial situation and patient's desires

The patient, a non-smoker, suffered from generalised chronic periodontitis in the upper and lower jaws with loosened (Grades II and III) and painful residual dentition, extensive vertical loss of attachment and considerably limited chewing ability. The molars already showed furcation involvement. However, teeth #13, 23, 33 and 43 were worthy of preservation. There was no craniomandibular dysfunction. The patient wanted a fixed denture with the shortest possible treatment time. As she had lost four implants placed two years previously, she was sceptical about a new implant-supported prosthetic restoration, but did not rule it out. However, she rejected clasp-retained dentures or overdentures in principle. Full-arch implant-supported prostheses was also out of the question because it would require the extraction of teeth worth preserving. In addition, the patient feared the risk of aesthetic restrictions with exclusively implant-supported prostheses, such as long tooth crowns or recognisable transitions from pink ceramic, as well as more difficult cleaning. In a detailed consultation between the treatment team and the patient, the advantages and disadvantages of the respective treatment options—in particular concerning teeth to be extracted and teeth worth preserving—were discussed openly and in a way that the patient could understand. In this manner, the patient's trust could be fostered, and for the purpose of shared decision-making, the decision on combined tooth- and implant-supported hybrid prostheses as the best possible form of therapy for the individual patient profile could be made together.[2] The primarily psychological advantage of the patient of being able to retain the feeling of her own teeth and a certain proprioceptive control over her remaining teeth was also decisive. This can reduce the stress on the implant-supported restoration and thus improve its prognosis (Figs. 1 & 2).[3]

Treatment plan

Tooth extraction solely for the purpose of avoiding hybrid prostheses is contra-indicated.[4,5] However, severely periodontally damaged teeth, especially in the case of planned hybrid prostheses, pose risks that necessitate extraction, appropriate periodontal treatment of the remaining teeth, and targeted hard- and soft-tissue management.[6] Given these considerations, telescopic hybrid restorations are a treatment option with predictable therapeutic success and high patient satisfaction.[7–9] Therefore, after extraction of the teeth in the maxilla and mandible not worth preserving and

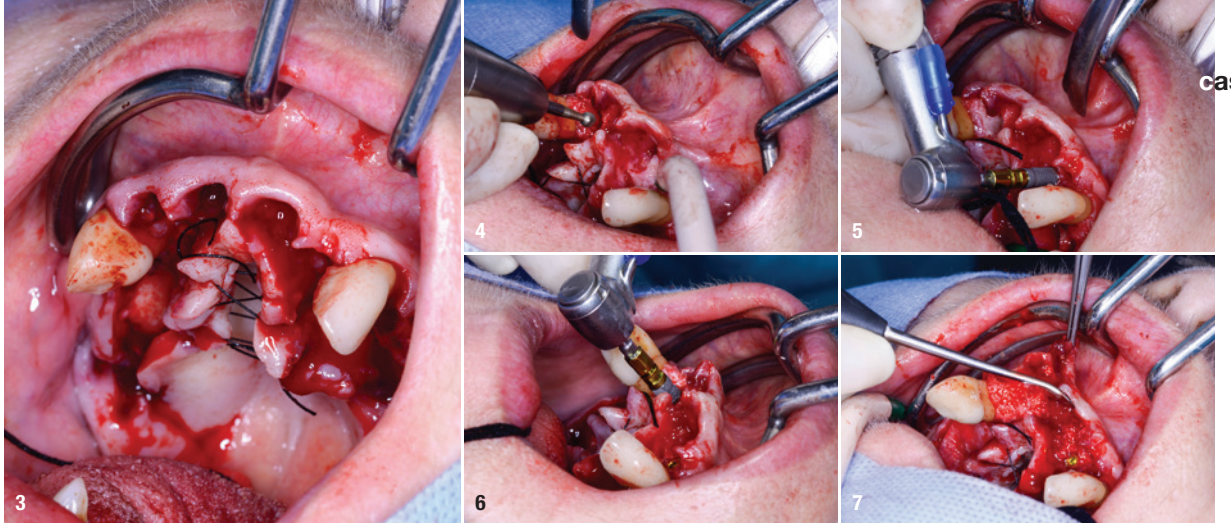


Fig. 3: Situation in the anterior region after extractions in the maxilla. **Fig. 4:** Smoothing of the alveolar ridge with the ball bur. **Figs. 5 & 6:** Placement of the two implants in regions #22 and 12. **Fig. 7:** Augmentation of the ridge defect in region #12 with bone grafting material.

immediate implant placement of four implants in the anterior and posterior regions (regions #15, 12, 22, 25, 36, 34, 44 and 46) was planned.[10–12] CAMLOG SCREW-LINE implants (4.3 × 11.0 mm; CAMLOG) were planned. If the implants are positioned quadrangularly, the telescopic prosthesis remains fully functional even if a tooth or implant is lost. The canines were to be included in the telescopic work as natural abutments. Since this would give the support polygon an even larger surface area, a statically more secure support would be achieved. In addition, secondary splinting of the telescopic prosthesis distributes extra-axial masticatory forces to all abutments and does not overload the natural abutments.[13]

Furthermore, the intra-oral situation required periodontal treatment of the canines and, as a result of vertical bone loss, extensive augmentation, including a simultaneous internal sinus lift and vestibuloplasty to thicken the soft tissue in the mandible. Because of the extensive surgical procedures, the implants were to heal under telescopic interim prostheses. Ready-made teeth were planned for the definitive restoration.

Implantation and bone augmentation

The treatment took place under intubation anaesthesia. First, impressions were taken of the intra-oral situation in the upper and lower jaws for documentation and planning after professional dental cleaning and periodontal therapy. The situation models were articulated in the laboratory, the teeth not worth preserving were erased on the plaster model and two telescopic dentures were fabricated on the canines, the maxillary denture with a palatal plate, as immediate temporary prostheses in an idealised set-up. The assessment of the hard tissue and the planning of the implant positions were carried out using a dental panoramic tomogram and CBCT scan.

Upper jaw

In order to avoid worsening of the existing bony defects, the teeth that were not worth preserving were gently extracted while preserving as much bone as possible and their extraction sockets were carefully trimmed under magnification. After the alveolar ridge had been smoothed with a ball bur, the two anterior implants were first placed in regions #12 and 22 according to the protocol. The bone around both implants was

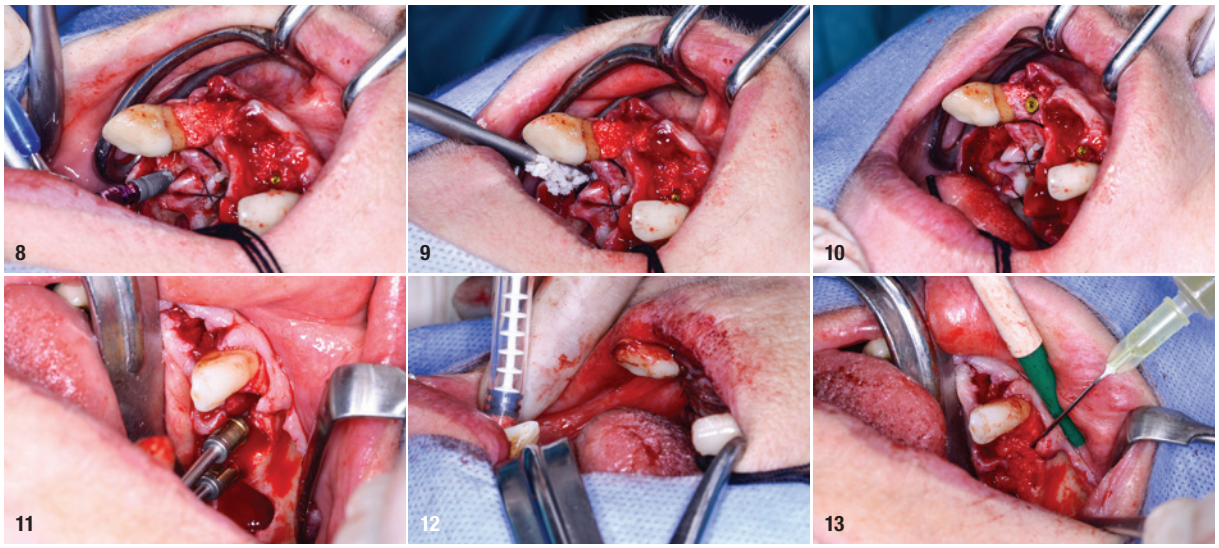


Fig. 8: Insertion in region #25 after internal sinus lift. **Fig. 9:** Placement of bone grafting material for ridge augmentation. **Fig. 10:** Covering of the bone augmentation material with porcine membrane. **Fig. 11:** Situation after extractions and implant placement in regions #44 and 46. **Fig. 12:** Application of porcine MinerOss® XP (CAMLOG) with the applicator. **Fig. 13:** Subsequent biofunctionalisation of the bone grafting material with L-PRF.

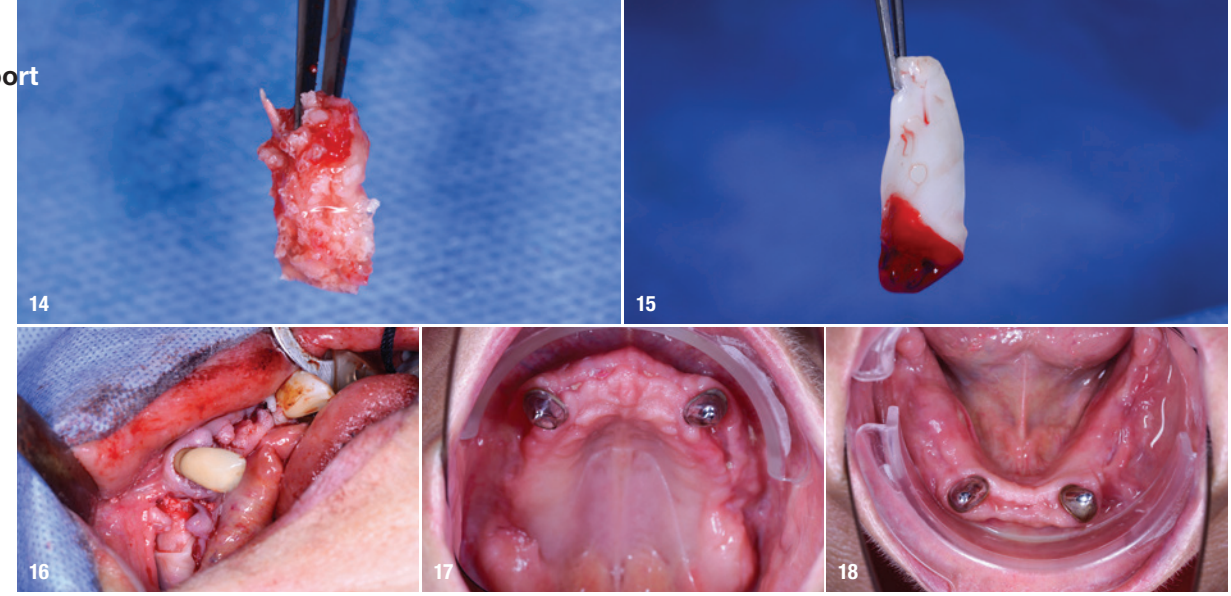


Fig. 14: Autologous bone chips mixed with the bone mineral matrix. **Fig. 15:** "White clot" (A-PRF) obtained from venous patient blood for biofunctionalisation. **Fig. 16:** Fibrin matrix placed over the membrane acting as a "separation layer" distal to region #33. **Figs. 17 & 18:** Irritation-free healed hard- and soft-tissue structures in the maxilla and mandible two months after implant placement.

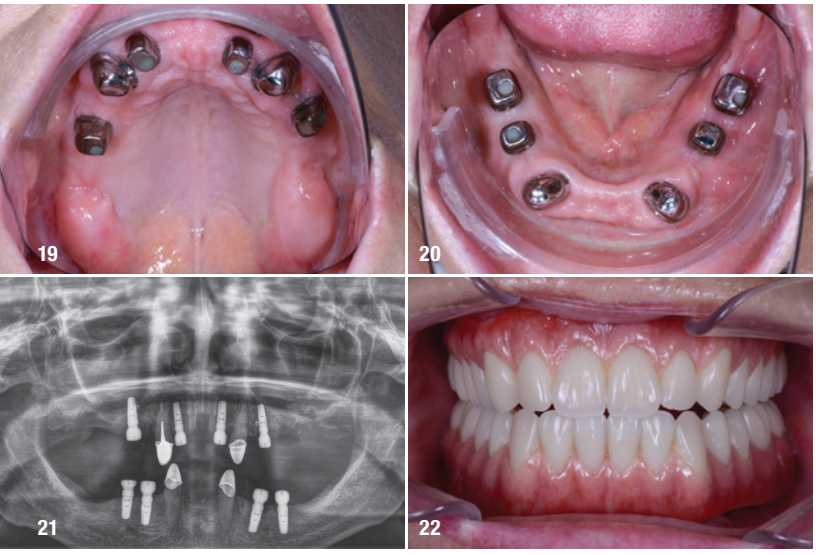
augmented with bone mineral matrix mixed with autogenous bone chips that had accumulated during smoothing. The porcine material (MinerOss XP, CAMLOG) used for this purpose is osteoconductive and accelerates revascularisation because of its porosity, which is structurally similar to that of human bone.[14] The extraction sockets in the anterior region were also stabilised with porcine bone grafting material and autologous bone chips for the purpose of rich preservation (Figs. 3–7).

Owing to the pneumatisation of the maxillary sinus, vertical bone augmentation was required for the implant placement in region #15. This was carried out as an internal sinus lift simultaneously with the implant placement. Drilling and elevation of the Schneiderian membrane were performed with the Crestal Approach Sinus Kit (Osstem Implant). MinerOss XP was then biofunctionalised with leucocyte- and platelet-rich fibrin (L-PRF), the cavity filled and the implant carefully placed. Because of its high porosity and structural similarity to human tissue, the porcine bone grafting material not only accelerates revascularisation, but also limits dimensional changes after extraction and promotes rapid wound healing, which is further promoted by proteins and growth factors contained in the PRF.[14–16]

Bone grafting material mixed with autogenous bone chips was also placed palatally and on the ridge and covered with a resorbable porcine membrane (Mem-Lok Pliable, BioHorizons) to increase the volume of the adjacent hard-tissue structures. Being pliable, it can be easily applied to the tissue.[17] The implant in region #25 was subsequently inserted, MinerOss XP was placed in the implant site and the site was covered with Mem-Lok Pliable. The membranes were then fixed with pins, and the surgical site was sutured in a saliva-tight manner with single button sutures, completing the intervention in the maxilla (Figs. 8–10).

Lower jaw

In the mandible, all four implants were positioned in the posterior region. To fill the defect in the extraction socket posterior to the two implants in the fourth quadrant, MinerOss XP was again applied and biofunctionalised with liquid L-PRF (Figs. 11–13).[18] The extraction socket distal to tooth #33 was augmented with sticky bone. For this purpose, autologous bone chips, obtained with the Safescraper from the retromolar region, were mixed with the bone mineral matrix and liquid L-PRF. The coagulated L-PRF allows the mass to be modelled well and comfortably placed in the defect. The granulate material was again covered with Mem-Lok Pliable for the purpose of a vestibuloplasty. This allows slowly proliferating regenerative cell types such as osteoblasts and periodontal cells to be separated from rapidly proliferating epithelial and connective tissue cells. In order to positively influence wound healing, a fibrin matrix (A-PRF) obtained from the patient's venous blood and thus highly enriched with platelets, leucocytes and growth factors was placed on top.[19] Finally, the surgical site in the mandible was also sutured saliva-tight and tension-free. The maxilla and mandible healed covered under the removable tooth-supported temporary prostheses (Figs. 14–18).



Figs. 19 & 20: Stable soft tissue structures before insertion of the telescopic dentures. **Fig. 21:** Radiographic control image two months after implant placement, also showing the patrices on the abutment teeth. **Fig. 22:** Maxillary and mandibular telescopic prosthesis *in situ*.

Fig. 23: Finalised hybrid prostheses for the mandible and maxilla. **Fig. 24:** Final situation with a happy patient. *(All images: © Marita Heeren, m.c. Zahntechnik, Oldenburg)*

Prosthetic work

Owing to the physiological mobility of natural teeth on the one hand and the rigidly osseointegrated implants on the other, a tension-free (passive) fit and thus an exact fit of the telescopic prostheses was of decisive importance. For the definitive restoration, the titanium abutments were designed as screw-retained primary crowns by the laboratory according to open impressions with individual trays and precision milled by the DEDICAM scan and design service (CAMLOG), as were the four patrices for the natural teeth. The patrices were conventionally cemented on intra-orally. The advantage of screw-retained primary crowns is uncomplicated revision on the implant if necessary. The further steps, such as the fabrication of the galvanic secondary crowns, the tertiary structure and the tension-free intra-oral bonding, were carried out in the conventional way. Until the telescopic dentures had been completed, the patient was fitted with travel dentures that were hollow-ground at the positions of the patrices. After checking the fit, friction and occlusion, the definitive restorations with ready-made teeth and patient-specific finalisation of the red aesthetics were seated.

The patient was carefully instructed in the hygiene of her restoration. Regular periodontal monitoring as part of a systematic recall makes it possible to keep the risk of peri-implant inflammation low or to detect it at an early stage and thus stabilise the restoration in the long term (Figs. 19–23).

Discussion

The patient's desire for a functional and aesthetic restoration including residual teeth worthy of preservation can be fulfilled with a hybrid restoration. Studies show parity in both survival and complication rates for hybrid prostheses and purely implant-supported prostheses.[5,20] There are no fundamental biomechanical concerns regarding the differing mobility of osseointegrated implants and vital teeth.[21] With appropriately built-up hard-tissue structures and the retention of suitable residual teeth, the number of implants can be reduced with an enlarged support polygon. At the same time, biofunctionalisation supports the formation of new hard and soft tissue.[22,16] Based on the experience gained so far, the combination of bone grafting materials and bioactive growth factors from the patient's own blood concentrate represents an optimal combination for the regeneration of the jawbone.[23]

Conclusion

The long-term success of such restorations carried out in parallel in the maxilla and mandible in a periodontally compromised patient requires detailed planning and a structured approach. In the end, however, it was only possible thanks to the close, constructive and trusting cooperation between the surgeon, prosthodontist and dental technician. The patient's desire for aesthetics and stability as well as a high level of chewing comfort and good hygiene could be fully met with the hybrid restoration chosen (Fig. 24).

Dr Sangeeta Pai

Dr Romy Dech

Literature

about the authors

Dr Sangeeta Pai is specialised in implant dentistry, minimally invasive sinus lift, bone augmentation procedures, full mouth rehabilitation, aesthetic restorations, functional diagnostics and digital workflow (intra-oral scanning, CAD/CAM procedures). She is an author of specialist dental articles as well as a continuing education speaker for various companies worldwide and a member of various international societies. She has been practising in a group practice in Oldenburg since 2017.

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Fabrication of a screw-retained implant-supported maxillary restoration

A completely digital workflow

Prof. Sven Rinke & Dr Holger Ziebolz, Germany

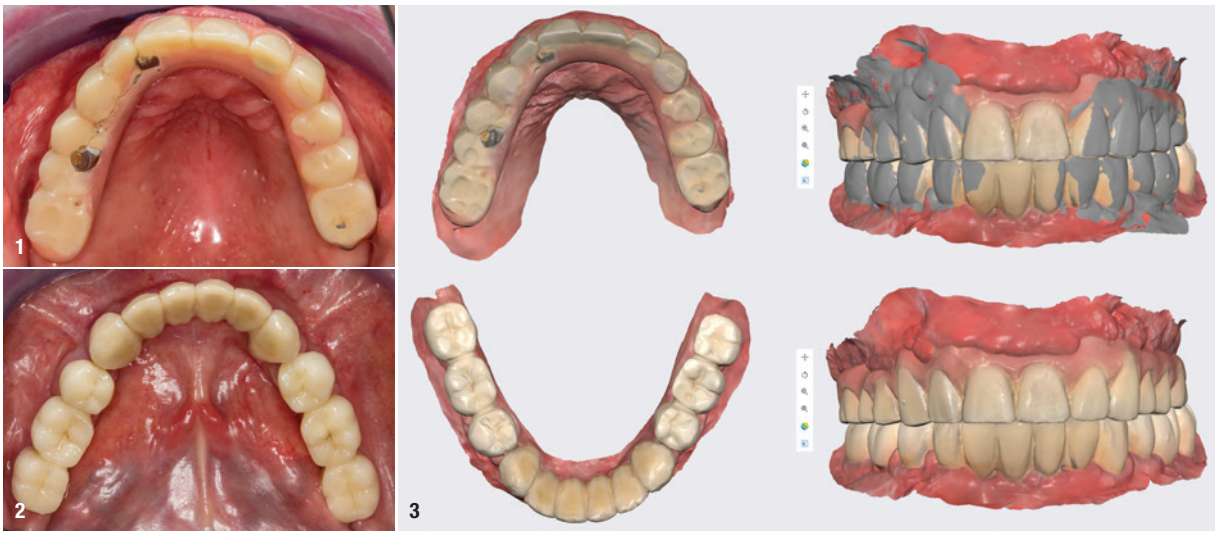


Fig. 1: Initial clinical situation showing inadequate implant-supported maxillary restoration. **Fig. 2:** Occlusal view of the implant-supported mandibular fixed dental prostheses (FDPs). Each of the lateral segments had been restored with a three-unit metal–ceramic FDP. In the anterior segment, a six-unit metal–ceramic FDP had been placed. **Fig. 3:** Basic scans of the existing maxillary and mandibular restorations.

The fabrication of implant-supported full-arch restorations requires maximum precision, whether employing analogue or digital impressions, to achieve a perfect and passive fit. In this context, the application of intra-oral scanners has been a topic of much debate. Through the development of new scanner systems and specially adapted scan gauges for these indications as well as the application of appropriate scanning techniques, these systems allow for improved precision. The EVO+ system (Modern Dental Europe) incorporates these optimisation strategies into a purely digital workflow for the fabrication of removable and fixed implant-supported restorations in edentulous patients.

The present case report describes the fabrication of an implant-supported screw-retained fixed dental prosthesis (FDP) which provided a high level of fitting accuracy and could be fabricated in three appointments only. The patient was highly satisfied with the aesthetic and functional outcome. The main advantage of this technique is the reduced number of treatment steps compared with conventional procedures. However, the lack of long-term clinical data is a current limitation of the EVO+ system.

Introduction

Implant-supported FDPs on four to eight implants or implant-retained overdentures on a minimum of four implants are commonly and scientifically accepted for restoration of the edentulous maxilla.[1,2] The long-term clinical success of these types of restorations has been documented in several clinical studies with observational periods of more than ten years.[1,3,4] Especially the impression taking of multiple implants for the fabrication of a fixed, ideally screw-retained, FDP requires maximum precision in order to guarantee the passive fit of the restoration.[3,4] With regard to biomechanical aspects, an imprecise fit of wide-span FDPs is believed to be a possible source of technical complications in screw-retained implant-supported full-arch FDPs. In this context, a causal connection between an inaccurate fit and screw loosening, screw fracture and fracture of veneering ceramics can be assumed.[5,6]

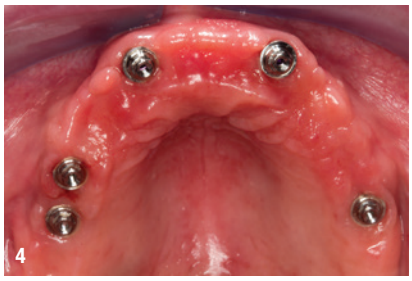
Over the last several years, different techniques have been introduced in order to improve the passive fit and the precision of a conventional impression (e.g. rigid splinting of the impression copings). These procedures mostly combine screw-retained impression copings, a custom open impres-

sion tray and a two-stage procedure; therefore, they are quite time- and cost-intensive.[7] At the same time, inaccuracies in fit due to conventional dental technique fabrication of complex implant-supported FDPs (e.g. distortion and internal tension) could be reduced by CAD/CAM processing.[7,8] In the meantime, CAD/CAM procedures for full-arch FDPs have been clinically evaluated over observational periods of up to ten years, demonstrating lower technical complication rates than conventionally fabricated implant-supported FDPs.[1,3,9]

To date, most cases with complex implant constructions are restored using a hybrid workflow, that is, conventional impression taking, followed by model construction and digitalisation of the model for further CAD/CAM fabrication of the FDP.[1,9] Thus, digital intra-oral impression taking could facilitate the process and eliminate possible sources of error. Furthermore, several studies have shown that patient acceptance and satisfaction rates are higher for digital impressions compared with conventional impressions.[10]

Although current systematic reviews in the last five years agree that the precision of intra-oral impressions for the fabrication of tooth- and implant-supported single crowns and small (three- to four-unit) FDPs equals or exceeds the results of conventional impressions, the precision of full-arch scans is a controversial subject.[9,11,12] On the one hand, the achievable precision depends significantly on the type of scanner and the software used. Up-to-date systems demonstrate improved results compared with previous versions.[13] The precision of full-arch scans depends on various other parameters, as documented in clinical and laboratory studies. The number and angulation of and distance between the implants are decisive:[14,15] an increased number and different angulations of implants and a larger distance between them lead to reduced precision.[15,16]

On the other hand, it has also been reported that the precision of full-arch scans is significantly dependent on the design and material of the scan bodies and the software algorithm that composes (matches or stitches) a full-arch scan from the single scanner images.[16–18] In several studies, it has been documented that the increased reference areas of the scan bodies or the application of additional reference



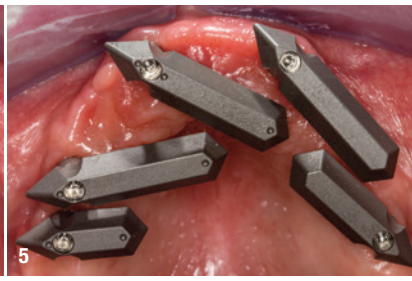
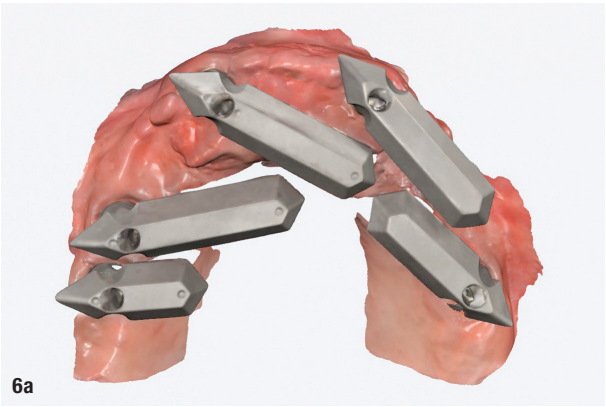


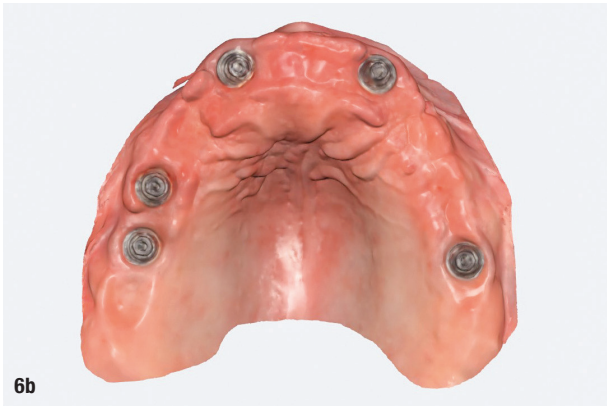
Fig. 4: Occlusal view of the five maxillary implants with multi-unit abutments compatible with the scan bodies. **Fig. 5:** Occlusal view of the scan bodies aligned along the ridge to achieve maximum overlap of the reference surfaces.

marks leads to the greater precision of full-arch scans.[16,17] This is exactly the opportunity to optimise a full-arch scan. Most of the commercially available scan bodies are rotationally symmetric; their size is optimised for the most frequent indication, a single-tooth gap. Therefore, the reference surfaces are comparably small. This is no problem for single-tooth restorations, as additional reference surfaces (e.g. adjacent teeth) are available and allow stitching of intra-oral scanning images with sufficient overlap.[16,19,20] However, if scan bodies are used in the edentulous jaw, the risk of matching errors increases, especially in situations of larger implant distances and/or angulated implants.[13,14,16] This issue could be solved using asymmetric scan bodies with larger reference surfaces, thus reducing mismatches in the edentulous jaw by achieving a scan body layout with wide overlap.[16,19,21]

Another optimisation approach could be the application of a modified strategy to scanning of implant positions. The position of the scan gauge is determined by a high-resolution two-step scan, choosing a scanning path in which the camera is moved in one direction only.[18,20,21] One scanning process is directed from the left to the right, and the second one is directed in the opposite direction. Owing to the design of the scan gauges, only minimum panning of the camera is required to capture the reference surfaces.[17,19,21]

Evo+ combines scan gauges (Nexus iOS, Osteon Medical) developed for use in edentulous jaws with an indication-related scanning strategy employing a state-of-the-art





Figs. 6a & b: High-definition scan of the scan bodies **(a)** and separate scan of the soft-tissue situation **(b)**.

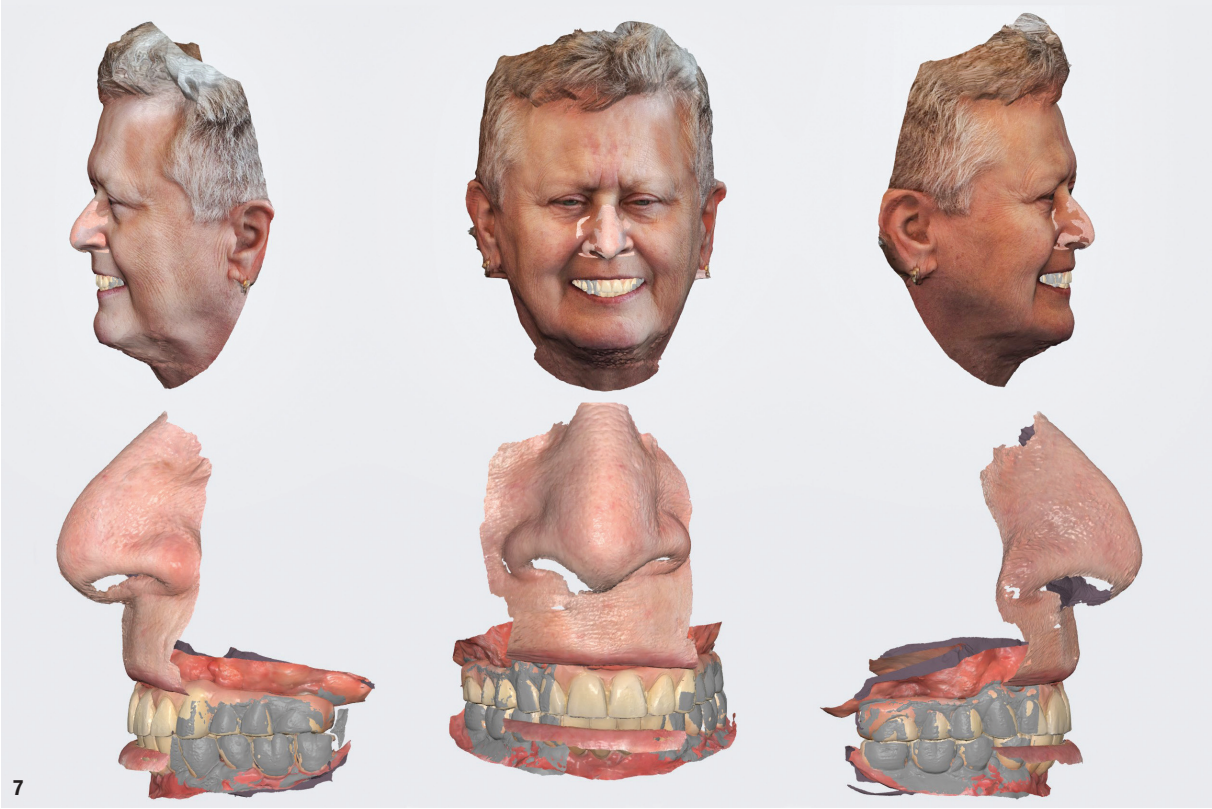


Fig. 7: Facial scan with separate scan to match the basic scans. The facial scan allows for a transfer of the relevant aesthetic reference lines (interpupillary line, centre line and smile line).

scanner, thus creating a completely digital fabrication system for removable and fixed restorations. The following case report describes the clinical and technical procedures required for the fabrication of a screw-retained implant-supported FDP with the Evo+ system.

Case report

A 65-year-old female patient came to our dental clinic requesting the renewal of an implant-supported maxillary FDP that had been inserted six years before. The resin-veneered restoration was cemented on five implants and showed pronounced fractures of the veneering resin, as well as limited accessibility for oral hygiene (Fig. 1). In addition to the aesthetic limitations, the patient mentioned limited chewing ability. The mandible had been restored with three cemented metal–ceramic FDPs on six implants (Fig. 2). The patient was offered two options for prosthetic restoration: a screw-retained FDP or a bar-retained, palate-free overdenture. The patient opted for the screw-retained full-arch FDP. The restoration was fabricated with the Evo+ system in three appointments, using an intra-oral scanner (i700, Medit Corp.) and system-specific scan gauges (Nexus iOS).

First appointment

Full-arch maxillary and mandibular scans were taken with the existing restorations in place (Fig. 3). In addition, two lateral scans were required for fixation of the bite. When using the scanner, a patient case is first opened and the orthodontic option setting is chosen for the full-arch scans. This data is stored and dispatched separately.

In a second step, the existing superstructure was removed. The fixed restoration with the Evo+ system is always fabricated on multi-unit abutments, as the special scan gauges only fit on this type of abutment. In the present case, the multi-unit abutments (Astra Tech EV Multibase, 3.6 mm; Dentsply Sirona) were fixed on five implants with cone connection (Astra Tech EV, Dentsply Sirona). The height of the abutments was chosen to allow a slightly subgingival location of the abutment shoulder, that is, the transition between the abutment and the superstructure (Fig. 4). The scan gauges, which are available in various lengths and heights, were then inserted. When choosing the scan gauge, it is important to avoid pressure on the subjacent soft tissue; ideally, there should be a small gap between the basal surface of the scan gauge and the soft tissue. The scan gauges should be chosen accordingly and aligned along the ridge, resulting in the largest achievable overlap of the reference surface (Fig. 5).

After the scan gauges have been fixed in the appropriate position, the next step of the scanning process is performed by selecting a new case with the orthodontic option in the high-definition scan mode. Data collection of the scan gauges is performed in a unidirectional scanning path from

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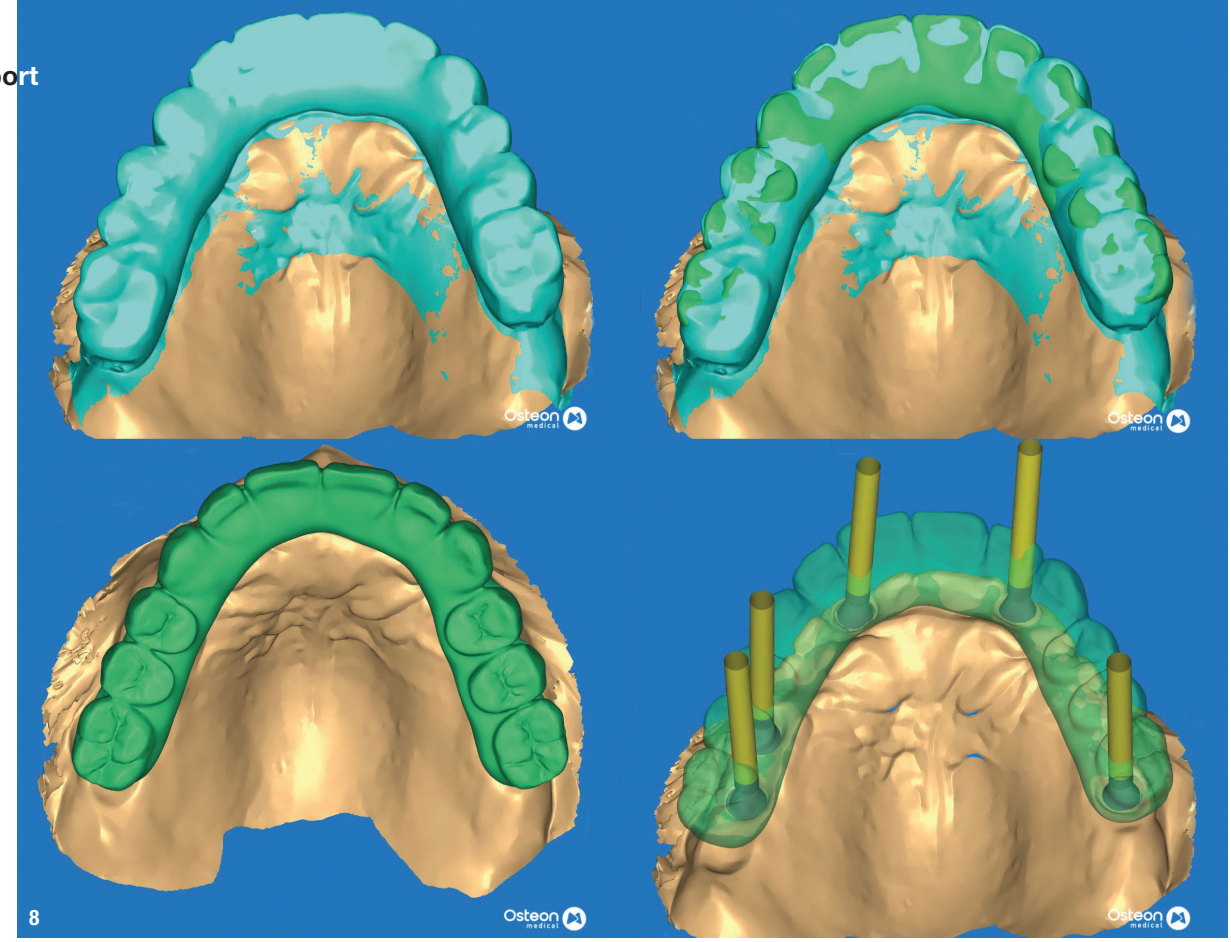

Fig. 8: Data set for the design of the screw-retained temporary restoration.

left to right. It is essential to move the camera in one direction only and to cover all reference surfaces of the scan gauges with slight panning of the camera. After this step has been completed, a new scanning window is opened and a new high-definition scan is performed in the opposite direction. At this point, the scan gauges should have been recorded completely in two separate scans. This data is also stored and sent separately (Fig. 6a). The third and last scanning process with the scan bodies removed again required selecting a new case with the orthodontic option. This clinical situation (implants with screwed multi-unit abutments) was captured in a full-arch scan (Fig. 6b), stored separately and dispatched. This scan can be performed in regular mode; it records the soft tissue of the jaw to be restored.

To determine the relevant aesthetic reference lines and structures (interpupillary line, centre line, lip profile and smile line), a facial scan was taken. In this facial scan, the scans of the existing prosthetic situation were matched (Fig. 7). Alternatively, digital portraits can be sent together with the scan data.

For the fabrication of this fixed restoration, a total of four sets of data were sent to the production facility (Permadental):

- scans of the existing situation: maxilla and mandible with existing restorations, and lateral scans for bite registration;
- two complete high-definition scans employing the correctly aligned scan gauges;
- full-arch scan of the edentulous jaw (with the multi-unit abutments) to be restored for soft-tissue documentation; and
- a facial scan, matched to the scans of the existing prosthetic restorations.

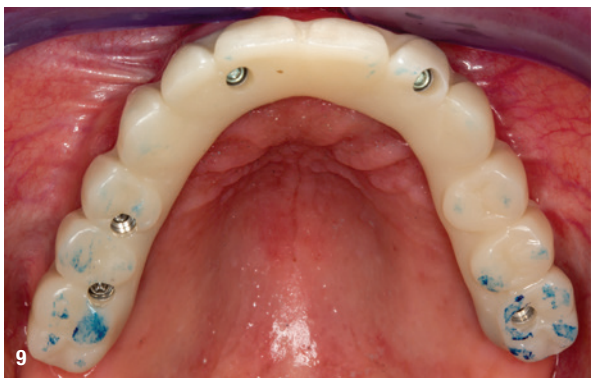

Fig. 9: Fixed temporary restoration with marked occlusal contacts. Minor adjustments were only required in the distal region.

Fabrication of the temporary restoration

Based on the data collected during the first appointment, a digital design was prepared, and after approval, a temporary restoration was fabricated. In the present case, no modification of the position or alignment of the teeth was necessary compared with the existing restoration, so the temporary restoration could be fabricated accordingly. The scan of the existing restoration was used as a shell for designing the temporary restoration. The screw channels were positioned at the same time. At this point, it is possible to design the screw channels with an angle of up to 30° to the implant axis (Fig. 8). The temporary restoration is fabricated as a screw-retained FDP in an additive production process (3D printing) from a tooth-coloured polymer-based material. The fabrication of the temporary restoration is usually completed within five working days, allowing for a second appointment after approximately ten days.

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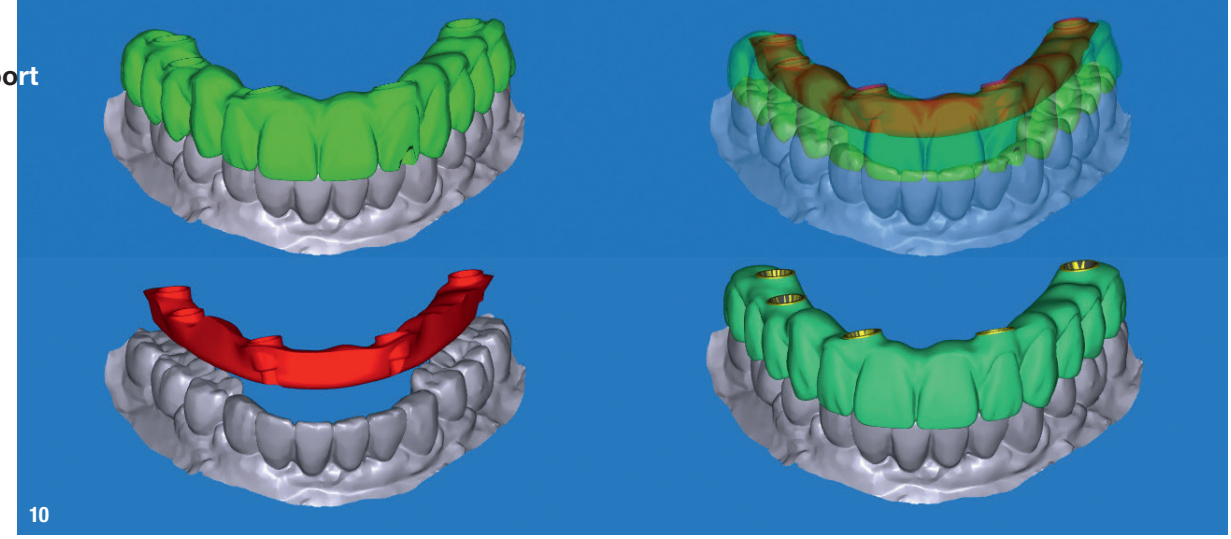


Fig. 10: Design data for the fabrication of the definitive prosthetic constructions: metallic substructure and tooth-coloured overlay construction based on the data of the temporary restoration fabrication.

Second appointment

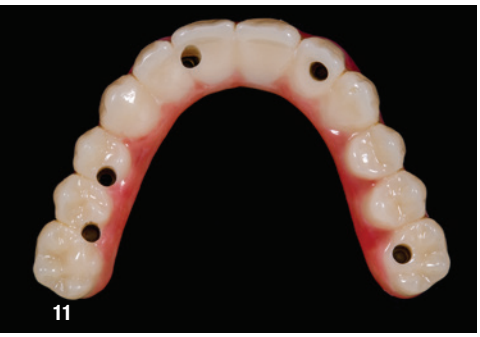
During the second appointment, the aesthetic and functional aspects of the digitally fabricated temporary restoration are evaluated. First, the static and dynamic occlusion of the screw-retained temporary restoration are checked. In the present case, only minor adjustments in the distal region were required (Fig. 9). The shape and position of the teeth were in accordance with the previous restoration and could be adapted to the definitive restoration. If modifications are required, they can be performed either by grinding the temporary restoration or by application of a composite material. If the temporary restoration is scanned again, all modifications can be digitally transferred to the production facility; however, in the present case, two lateral scans are required for bite registration. In this phase of the fabrication process, full-face photographs of the patient (smiling and not smiling) and detailed shade information should be transferred. Of course, the modified situation of the temporary restoration can be matched with the existing facial scan—this procedure was chosen for the present case, as it allows good digital transfer of the aesthetically relevant parameters (interpupillary line, lip line and shape of the face). If no alterations of the temporary restoration, or like in the present case only minor ones, are required, the definitive restoration can be fabricated.

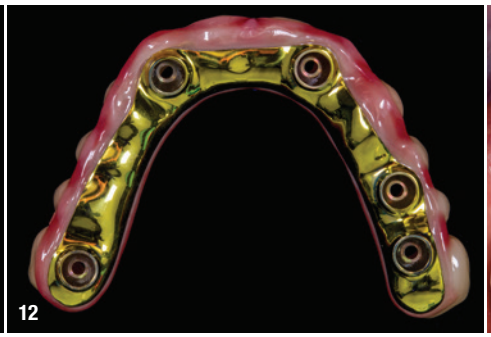
Fabrication of the definitive restoration

A screw-retained FDP fabricated with the system used consists of two components. First, a stabilising substructure is milled from pure titanium. It forms the basal surface of the FDP, holds the connections with the implant abutments and splints the implants on primary level. This titanium structure is typically anodised and has a golden yellowish colour. The metallic substructure allows for high precision of fit of the implant–abutment connection and stabilises the entire structure. The surface of the metallic construction is designed with conical and plane fitting areas without undercuts so that an overlay construction made of different materials can be cemented to the construction.

The overlay construction mimics the missing hard and soft tissue and the full dental arch with polymer-based or zirconia materials. In the present case, the overlay construction was fabricated from a multilayer composite material. In *in vitro* studies, this combination of a metallic substructure with a monolithic composite overlay construction has been shown to have a significantly increased fracture strength compared with conventionally manufactured implant-supported metal–composite FDPs.[22]

The data required for the fabrication of the metallic substructure and the overlay construction is produced by a separation reduction of the data used for the fabrication of the temporary restoration (Fig. 10). To produce the definitive restoration, a total of 15 working days should be scheduled. The definitive restoration is delivered with the required fixation screws (Figs. 11 & 12).





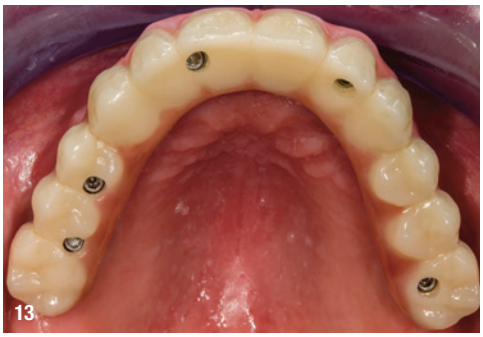


Fig. 11: Occlusal view of the definitive prosthesis. Angulated screw channels allow access to the palatal screw channel in the anterior region. The overlay constructions were fabricated from a multilayer composite material. The gingival parts were coloured with appropriate staining materials. **Fig. 12:** Basal view showing the anodised titanium structure and milled metal implant–abutment connections. **Fig. 13:** Occlusal view of the screw-retained maxillary prosthesis. The access screw channels are sealed after a trial period of seven to ten days after insertion.

Third appointment

During the third appointment, the definitive restoration is inserted. After removal of the temporary restoration, the FDP was fixed to the multi-unit abutments with screws. Here, an additional check of the passive fit according to the Sheffield test is recommended with only one fixation screw inserted into a distal abutment. For this test, the whole construction must not lift off from the other abutments when one screw is hand tightened. If this precondition is met, all fixation screws can be hand tightened (Fig. 13). The patient was highly satisfied with the aesthetic results of the restoration.

It is recommended that the patient is given a five- to seven-day trial period. During this time, he or she can assess chewing ability and gain a deeper experience of the aesthetic result. Above all, during this trial period, the patient can test the accessibility of the restoration for oral hygiene. Therefore, it is recommended that oral hygiene instructions be refreshed and that the patient be provided with a choice of suitable instruments (interdental brushes).

At the following check-up appointment (seven days after insertion), the patient did not report any discomfort. The restoration was removed and cleaned once again, a good opportunity to check the accessibility for home oral hygiene, which revealed no problems at all. Therefore, the restoration was reinserted and the fixation screws were tightened to the required torque (15 Ncm). The access cavities were then closed with a 1–2 mm thick layer of PTFE tape on top of the fixation screw. Finally, the access cavities were adhesively sealed with a filling composite material in a matching shade.

Discussion

The Evo+ system allows for the fabrication of implant-supported screw-retained FDPs in a fully digital workflow. The core of this system is the application of indication-specific scan gauges with significantly enlarged reference surfaces and the use of a modified high-resolution scan strategy. In the present case, this technology led to a good fit of the full-arch restoration. However, up to now, regarding the improved quality of fit, only manufacturers' studies have been available; validation by external studies is pending.

Using the Evo+ system, an implant-supported FDP can generally be fabricated in three appointments. This means a significant reduction in the number of appointments compared with conventional fabrication of this type of restoration. However, it must be considered that necessary modifications of the temporary restoration may lead to additional appointments. Moreover, the procedures described in this case report are tied to some general preconditions. First of all, it has to be considered that a fabrication is only possible on multi-unit abutments that are compatible with the system-specific scan gauges. It is necessary to check the compatibility of the implant system used. A universal scan gauge kit is available for the 15 most used implant brands, and for other systems, a specific kit can be used. Moreover, the system is only approved for up-to-date intra-oral scanning devices.

The FDP is fabricated as a combination of a metallic substructure and a custom monolithic tooth-coloured overlay construction. This leads to a significantly increased fatigue strength and a lower risk of material fracture compared with conventional FDPs.[22] PMMA, composite or zirconia materials are suitable for milling the monolithic overlay construction, which is adhesively connected to the substructure. The choice of material should be based on the indication, considering the respective advantages and disadvantages.[8,23] PMMA and composite-based structures are less expensive and can easily be modified and repaired.[4] However, they have a higher risk of material wear and discoloration.[4,23,24] Whereas monolithic zirconia materials offer the advantage of durable aesthetics without any risk of discoloration or wear, they are limited in terms of modifications and repairs. Furthermore, if monolithic zirconia restorations are inserted, it must be considered that veneered ceramic restorations in the opposing jaw have an increased risk of fracture of the veneering material.[6,8] In the present case report, a composite restoration was chosen because the patient had been restored with veneered implant-supported metal–ceramic restorations in the opposing jaw. In summary, the system used in this case offers a useful expansion of the possible applications in a digital workflow. However, the collection of sufficient data on long-term clinical success is important.

about the author

Prof. Sven Rinke is specialised in implantology and periodontics, holding an MSc in oral implantology (through the German Association of Oral Implantology) and an MSc in periodontics (through the German Society of Periodontology). In June 2013, he completed his habilitation qualification at the medical school of the University of Göttingen in Germany. In 1997 to 1998, he was a visiting assistant professor at Harvard School of Dental Medicine in Boston in the US. In 2017 and 2019, he was granted the research award of the AG Keramik, a scientifically active working group based in Germany, and in 2019, he was awarded the science prize of the Zahnärztekammer Niedersachsen (Lower Saxony dental association). In September 2021, he was appointed associate professor at the University of Göttingen. Since 2002, he has been practising in a group practice.

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Literature

Rehabilitation of a failing central incisor

A periodontal and restorative success formula

Dr Rita Singh, Nepal

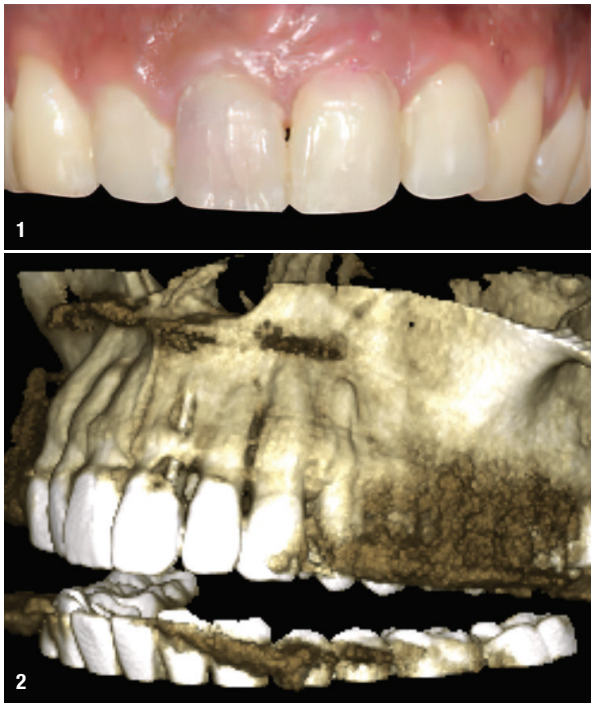

Fig. 1: Pre-op clinical image showing the affected teeth #11 and 21.
Fig. 2: CBCT evaluation showing fenestration at tooth #21.

Introduction

Rehabilitation in the anterior zone with implant-supported restorations is a daunting task. Implant-supported rehabilitation in the anterior maxilla requires seamless merging of the restoration with the existing gingival architecture. Therefore, prosthetically driven implant placement is of utmost importance in achieving the aesthetic goal. Implant success is not limited to osseointegration alone but is mainly dependent on the aesthetic outcome. Another important factor influencing success of the procedure is the quality of hard and soft tissue available at the time of treatment planning. This periodontal assessment is the crux of aesthetic zone management in cases which require augmentation procedures with immediate implantation. The hard and soft tissue form the peri-implant seal which is crucial for the long-term success of the implant restoration. Immediate implantation has become the preferred option for cases in the anterior zone, as it prevents post-extraction ridge collapse and hence maintains optimum bone and soft-tissue quantity and quality for favourable outcomes. Immediate provisionalisation of the implant maintains acceptable function and aesthetic appearance simultaneously, providing a template for soft-tissue contouring and maturation until a definitive restoration can be integrated. The implant also serves as a placeholder to prevent migration of neighbouring teeth and extrusion of opposing teeth. Favourable implant success, peri-implant tissue response and aesthetic outcomes can be achieved with immediately placed and provisionalised maxillary anterior single implants.[1] A favourable visual result is a combination of a well-planned and executed surgical technique along with good prosthetic choices and operator skill. The following case report showcases the complete rehabilitation of an ailing maxillary central incisor with an implant-supported restoration.

Case report

The patient presented with the chief complaint of discomfort and mild mobility of the maxillary left central incisor and gave a history of trauma to the same jaw region about ten to twelve years before. This had led to avulsion of the same tooth, following which the tooth was replanted. The right central incisor showed purple discoloration and required endodontic retreatment (Fig. 1).

Radiographic investigations

A CBCT scan was done for planning the treatment. Tooth #21 revealed a fenestration in the middle third of the root (Fig. 2). Based on the clinical and radiographic findings, extraction of tooth #21 with immediate implant placement and loading was decided on. A putty index was made to record the existing morphology of tooth #21. Guided bone regeneration and soft-tissue surgery were planned for the fenestration defect and augmentation of the thin gingival tissue to ensure a good peri-implant seal.

Procedure

The procedure was flapless in order to minimise hard- and soft-tissue trauma. The fractured portion of the tooth was gently removed with a tweezer and the remaining root was

atraumatically luxated (Fig. 3). Thorough curettage was done to ensure the total removal of the granulation tissue (Figs. 4a & b). To ensure complete disinfection of the site, antimicrobial photodynamic therapy was done using the HELBO laser (bredent medical). Blue photosensitiser (methylene blue) was applied inside the socket and left *in situ* for 60 seconds to stain the bacteria. After the dye had been rinsed off, the socket was then exposed to the HELBO TheraLite diode laser for 1 minute (Fig. 5). This ensures focused antibacterial action by singlet oxygen molecules, destroying bacteria in the biofilm.

The implant osteotomy site was prepared with sequential drills, and 3D position verified with paralleling tools (Fig. 6). The implant (copaSKY, 4 × 12 mm; bredent medical) was placed with sufficient primary stability (torque of 45 Ncm), facilitating predictable immediate loading of the implant. The implant was placed 4 mm below the gingival margin to accommodate biologic width (Fig. 7).

A free gingival graft was harvested from the palate, de-epithelialised and stabilised under the labial gingiva, as the existing labial tissue appeared thin (Fig. 8). The connective tissue graft was then stabilised with a sling suture using #6/0 DemeDIOX polydioxanone resorbable monofilament thread (DemeTECH; Fig. 9).

The extracted tooth was relined with flowable composite and used for the provisionalisation on an copaSKY exso abutment using the previously fabricated putty index (Figs. 10a & b). The screw-retained provisional restoration was polished extra-orally and the abutment screw torqued to 15 Ncm (Fig. 11). The screw access channel was plugged with PTFE and composite and kept out of occlusal contact.

Guided bone regeneration was done at the site of the fenestration to ensure bone filling of the defect. Guided bone regeneration provides an environment conducive to bone formation. A membrane is applied to exclude non-osteogenic tissue from interfering with bone regeneration. A semilunar incision was made on the mucogingival junction to expose the area of fenestration (Fig. 12). After debridement, 50/50 NonDemin mineralised cortical and cancellous human allograft (0.5 cm^3; Impladent), along with autogenous

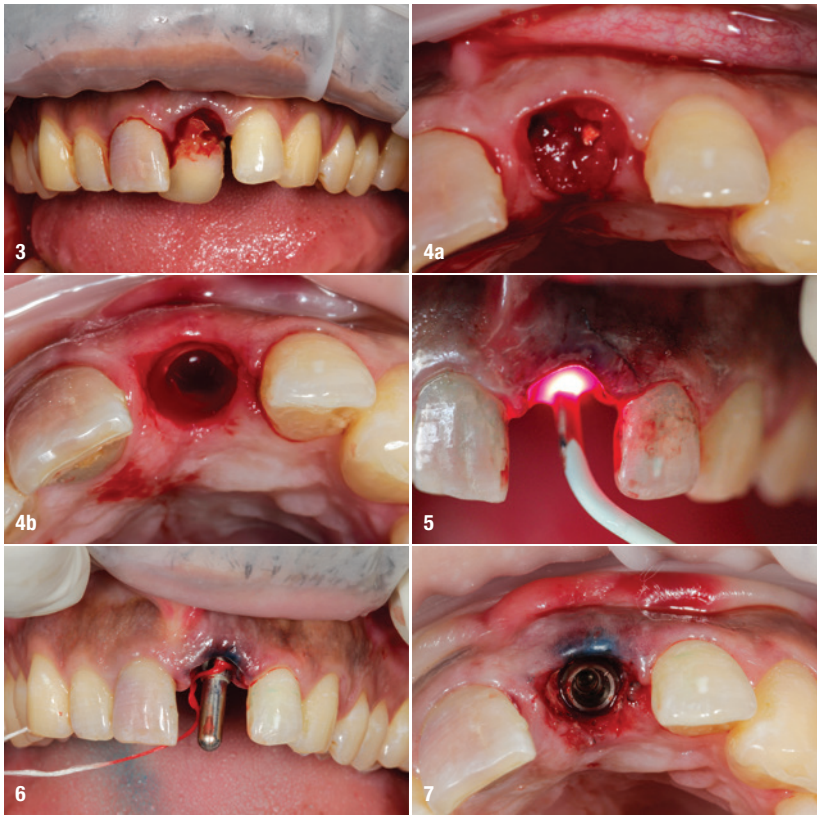

Fig. 3: Fractured cervical portion of tooth #21. **Fig. 4a:** Granulation tissue after extraction. **Fig. 4b:** Extraction socket after mechanical debridement. **Fig. 5:** HELBO antimicrobial photodynamic therapy. **Fig. 6:** Verifying implant position and angulation. **Fig. 7:** Implant placement 4 mm below the gingival margin, respecting the biologic width.

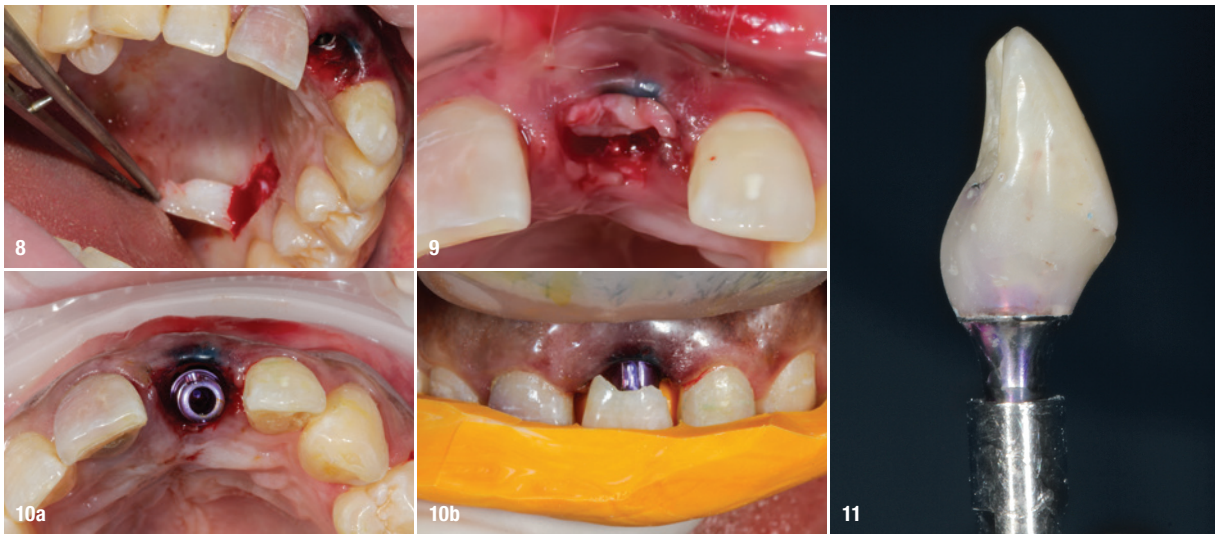

Fig. 8: Free gingival graft obtained from the palate. **Fig. 9:** De-epithelialised free gingival graft (connective tissue) stabilised in a pouch. **Fig. 10a:** CopaSKY exso abutment placed for provisionalisation. **Fig. 10b:** Putty index with extracted tooth for relining over the abutment. **Fig. 11:** Provisional crown highly polished extra-orally.

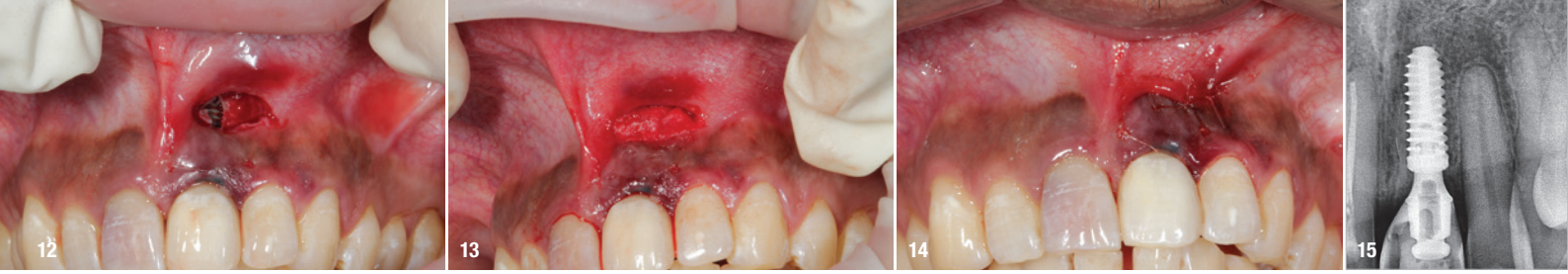

Fig. 12: Fenestration exposed with semilunar incision. **Fig. 13:** Guided bone regeneration done with bone grafting material and a membrane. **Fig. 14:** Tension-free closure. **Fig. 15:** Immediate post-op radiograph after seating of the provisional crown.

bone, was mixed together with injectable platelet-rich fibrin to make sticky bone, which was then packed on the exposed implant side and later covered with a resorbable collagen bilayer membrane, and the flap was sutured with the same aforementioned suture thread (Figs. 13 & 14). An immediate postoperative radiograph was taken (Fig. 15).

Instructions regarding diet and oral hygiene were given to the patient. The patient was also instructed to avoid any wedging force on the anterior teeth. Subsequently, during the osseointegration period, endodontic re-treatment of the right central incisor was completed, enabling fabrication of both crowns together during the restorative phase.

Prosthetic phase

The screw-retained provisional crown was removed after four months, revealing healthy underlying tissue with well-maintained gingival contours (Figs. 16 & 17). The resonance frequency analysis performed with the bredent penguinRFA revealed an implant stability quotient value of 86, indicating sound osseointegration and implant stability. An analogue impression was taken with customised impression copings to register the soft-tissue contour (Fig. 18). The crowns were digitally fabricated by the technician (Fig. 19). For the implant crown, a titanium base was used and a single zirconia crown with a palatal screw access channel was fabricated. In addition, the adjacent tooth #11 was prepared for a definitive zirconia crown. The definitive implant crown was cemented extra-orally, steam-cleaned, torqued to 25 Ncm and plugged with PTFE and composite intra-orally (Fig. 20). A postoperative radiograph was taken after the definitive restoration, and an excellent aesthetic outcome was achieved (Figs. 21 & 22).

Clinical examination after six months revealed a healthy peri-implant mucosa and no bleeding on probing. The patient was satisfied with the results (Fig. 23). Furthermore, a six-month postoperative radiograph revealed maintained crestal bone levels (Fig. 24).

Discussion

Post-extraction ridge collapse is an inevitable process. Human re-entry studies have shown horizontal bone loss of 29–63% and vertical bone loss of 11–22% six months after tooth extraction.[2] Type 1 implant placement was planned and executed in this case.[3] Apart from preventing this bone collapse, immediate placement and restoration of a single implant in the aesthetic zone has several proposed benefits, including reduced overall treatment time, fewer surgical procedures, less traumatic surgery and greater patient satisfaction.[4] However, immediate placement of implants in infected sockets is debatable. This may be indicated for replacing teeth lost because of chronic periapical lesions with a history of endodontic failure when appropriate preoperative procedures are undertaken to clean and decontaminate the surgical sites.[5] The use of antibiotics and chemotherapeutic agents has been suggested as adjuncts, but they have limitations related to their release mechanisms and the induction of bacterial resistance over time.[6,7] Antimicrobial photodynamic therapy has gained much attention as a non-invasive and biocompatible approach that can be

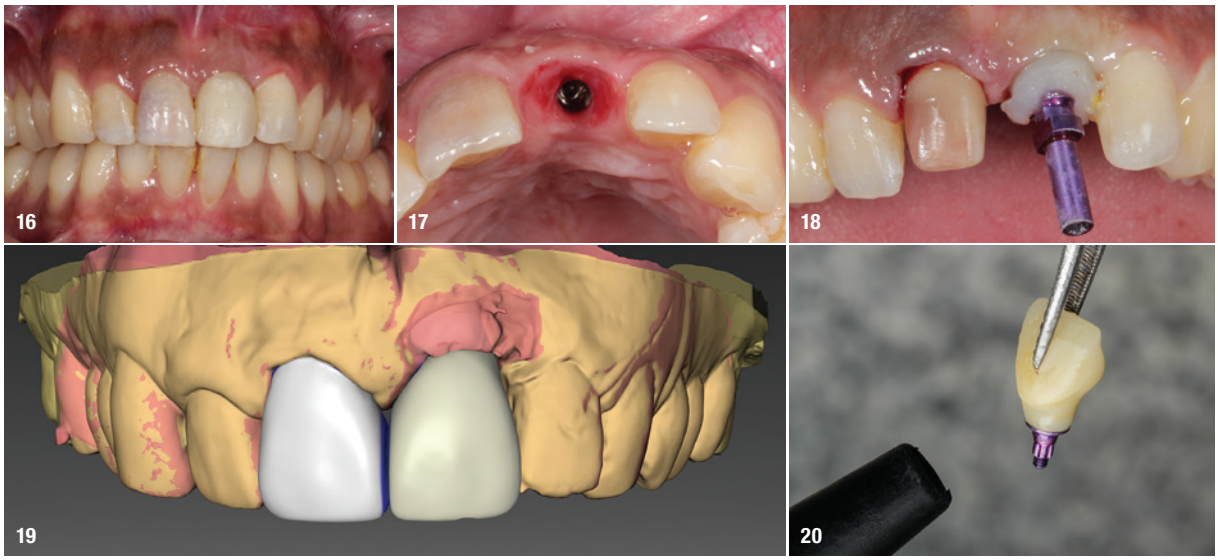

Fig. 16: Four-month post-op clinical evaluation, showing maintenance of the gingival contours. **Fig. 17:** Removal of the prosthesis revealed healthy underlying tissue. **Fig. 18:** Customised impression coping for recording soft-tissue contour. **Fig. 19:** Digital fabrication of crowns. **Fig. 20:** Steam-cleaning of the definitive implant crown.

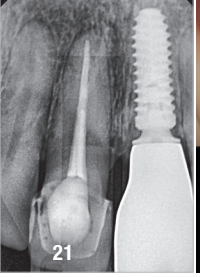
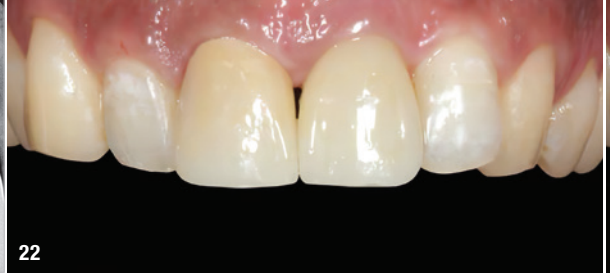
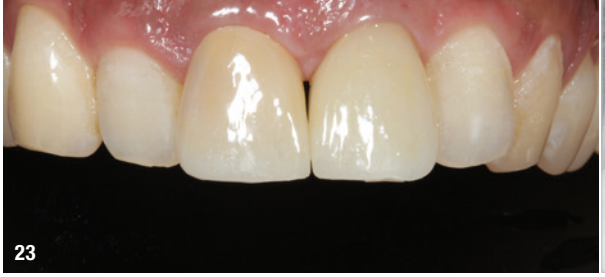
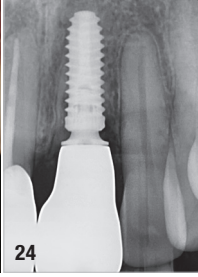

Fig. 21: Immediate post-op radiograph after placement of the definitive crowns. **Fig. 22:** Definitive restorations of teeth #11 and 21. **Fig. 23:** Six-month follow-up clinical image. **Fig. 24:** Six-month follow-up radiograph.

employed to prevent biological complications associated with implants.[8] HELBO antimicrobial photodynamic therapy was done as an adjunct to mechanical debridement of the granulation tissue in this case. Novaes et al. showed better results for immediate implants placed in sites decontaminated by debridement associated with antimicrobial photodynamic therapy.[9] The sites treated with mechanical debridement and antimicrobial photodynamic therapy led to osseointegration of the implants without evidence of inflammation; conversely, evidence of peri-implantitis was observed where antimicrobial photodynamic therapy was not used.[9]

Since the primary stability in this case was 45 Ncm and ISQ of 86, immediate loading was done. Studies have demonstrated that insertion torque value alone can be used as a benchmark for single crown immediate loading of implants placed in fresh extraction sockets if the attested insertion torque value score is >30 Ncm.[10] Excellent primary implant stability is an absolute requirement for immediately loading an implant with a provisional restoration. It is dependent on bone density and quality, implant design and surface, as well as the technique and accuracy of the osteotomy preparation.[8]

The implant system used was selected due to its virtue of an unique osseo connect surface, owing to which the neck of the implant supports soft-tissue attachment, thereby preventing bacterial infiltration and providing protection for the implant. The sandblasted and etched surface enhances rapid osseointegration. It features a back-taper design, which has a positive influence on the marginal bone level, and a self-tapping double thread, which is important for the predictable attainment of high primary stability. The copaSKY implant system employs platform switching. Platform switching refers to placement of an abutment of a smaller diameter than that of the implant platform. This minimises crestal bone loss, as the inflammatory infiltrate is moved away from the crestal bone.[11] The self-tapping double thread achieves faster insertion of the implant with lower heat generation and bone condensation.[12] Sandblasted and etched implants with a self-tapping thread in a cylindrical and conical hybrid design show statistically higher insertion and removal torque values compared with machined implants, along with enhanced primary stability.[13]

Soft-tissue augmentation with a de-epithelialised free gingival graft was done, as the gingival biotype was thin. Autogenous soft-tissue procedures ensure good blood supply to the graft with predicable results. The long-term stability of pink aesthetics around dental implant prostheses has been strongly correlated with adequate peri-implant soft-tissue thickness, that is, a thick peri-implant biotype.[14, 15] When a thin biotype is diagnosed, a subepithelial connective tissue graft or a free gingival graft can be used to prevent potential long-term recession of the facial mucosal margin or permeation of a greyish discoloration from the implant.[16–18]

The case in discussion, shows satisfactory short-term results at six months based on all the above-mentioned clinical procedures and scientific considerations.

Conclusion

Complexities of anterior implant rehabilitation can be combated with thorough diagnosis and holistic treatment planning. Immediate implant placement with immediate loading is made more predictable with photodynamic therapy, especially in infected sockets. Guided bone regeneration and soft-tissue augmentation reinforce the foundation of the peri-implant seal, which is essential not only for long-term implant success but also for the harmony of the gingival architecture. Successful anterior implant rehabilitation is a combination of periodontal and restorative mastery.

Acknowledgements

Thanks go to prosthodontist Dr Sanjay Sah. I am also grateful to Roshan Shrestha and Aanand Makaju from Proficient Dental Lab in Kathmandu.

about the author

Dr Rita Singh completed her postgraduate degree in periodontics from Rajiv Gandhi University of Health and Sciences in Bengaluru in India in 2001. She was an associate professor in the department of periodontics at the Kathmandu University in Nepal until 2018 and is the director of Oracare Periodontal Clinic, a multi-specialty state-of-the-art dental clinic in Kathmandu specialising in implantology and periodontics. Dr Singh actively pursues implantology courses presented by different associations all over the globe and is focused on implant aesthetics and soft-tissue management, lecturing internationally on these topics. She is the president of the Nepalese Society of Implant Dentistry. She is a member of Zonta International, empowering women through service and advocacy in Nepal.

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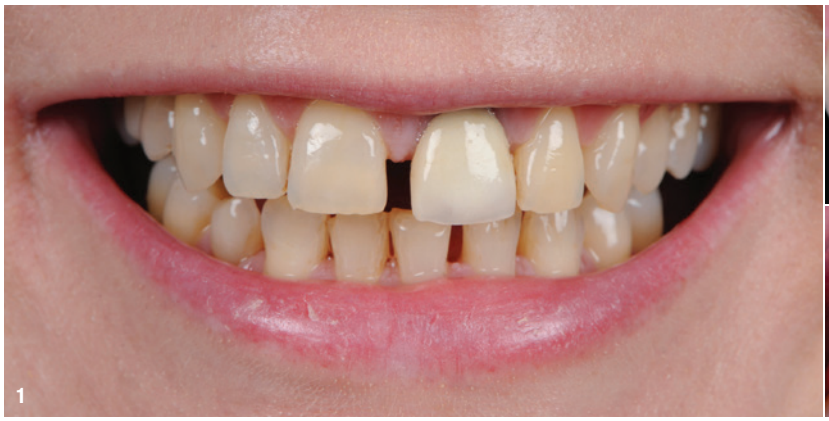
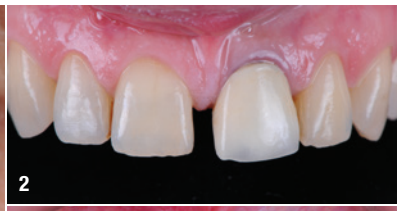
Literature

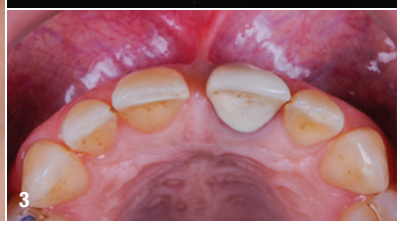
Interdisciplinary approach to treating the aesthetic zone in a young patient

A clinical case report

Dr David Garcia Baeza, Spain

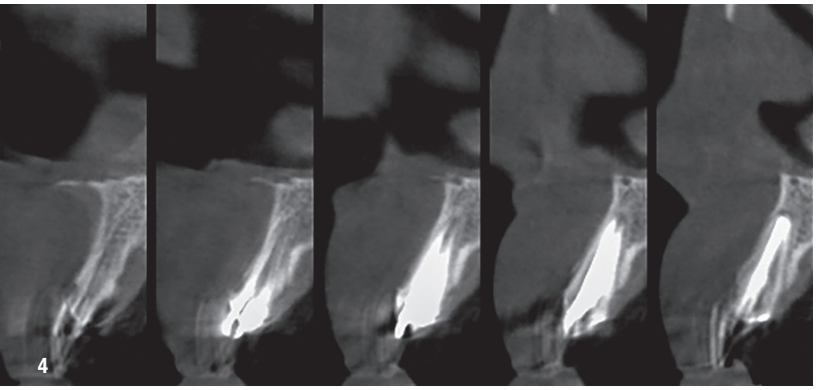






Introduction

Implant dentistry demands an interdisciplinary approach that incorporates all of dentistry's knowledge, experience and skills to aid in delivering a comprehensive treatment plan. Aesthetics in dentistry is frequently the motivation for seeking dental care and treatment. In my private practice, it is usual to receive patients who demand natural-looking results. Before beginning therapy, our team examines all aspects that may influence the treatment outcome. With growing patient expectations, today, we cannot focus only on one tooth. That is the reason why an interdisciplinary approach involving all dental specialties should be employed to create a complete treatment plan and will produce undoubtedly better results.

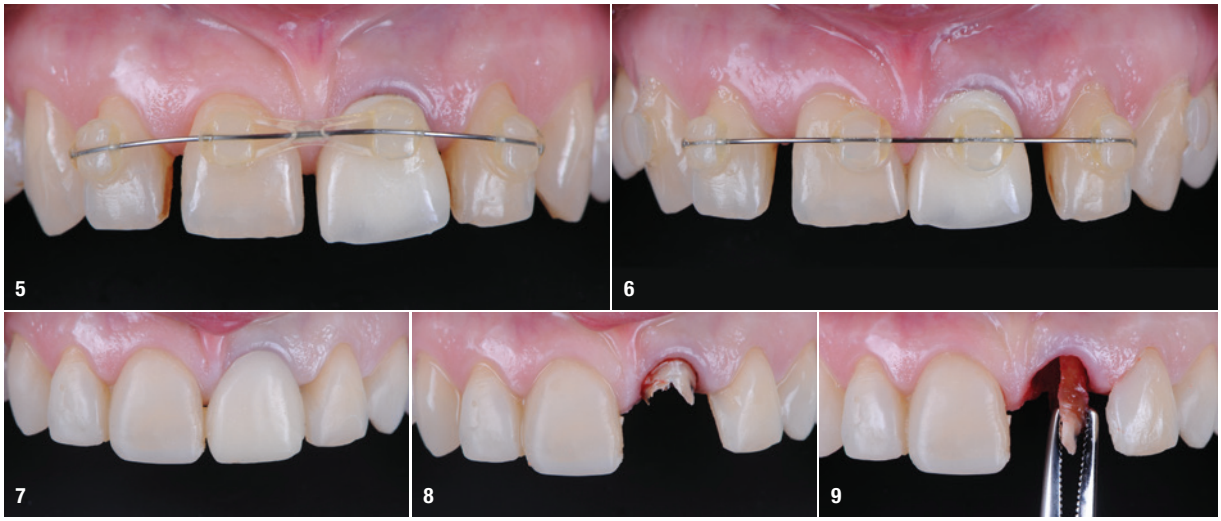


The following case report describes the successful interdisciplinary treatment of a hopeless maxillary central incisor in a young patient with very high expectations. The treatment included orthodontics, smile design, Straumann BLX implant placement, soft-tissue augmentation and aesthetic restorations.

Initial situation

A 27-year-old healthy female patient who was a non-smoker visited our dental office seeking aesthetic solutions in the anterior zone. She was dissatisfied with the crown she had worn for years and disliked the large spaces between her teeth. She emphasised her desire for a uniform, brighter smile with a minimally invasive treatment approach.

The extra-oral examination found a symmetrical, slightly convex face and a slightly high smile line (Fig. 1). The intra-oral examination revealed irregular interdental spaces in the maxillary and mandibular anterior region and a Class I dental malocclusion (Figs. 2 & 3). The patient was



periodontally stable and had sufficient soft and hard tissue at the prospective implant site. The radiographic assessment also revealed adequate bone availability for implantation of a standard length implant (Fig. 4). The casts revealed tooth size discrepancy. After a thorough discussion of the various treatment options, an implant-supported fixed prosthesis and aesthetic restorations on the adjacent teeth were chosen after orthodontic treatment to reduce the mesiodistal distance of the diastema between teeth #11 and 21.

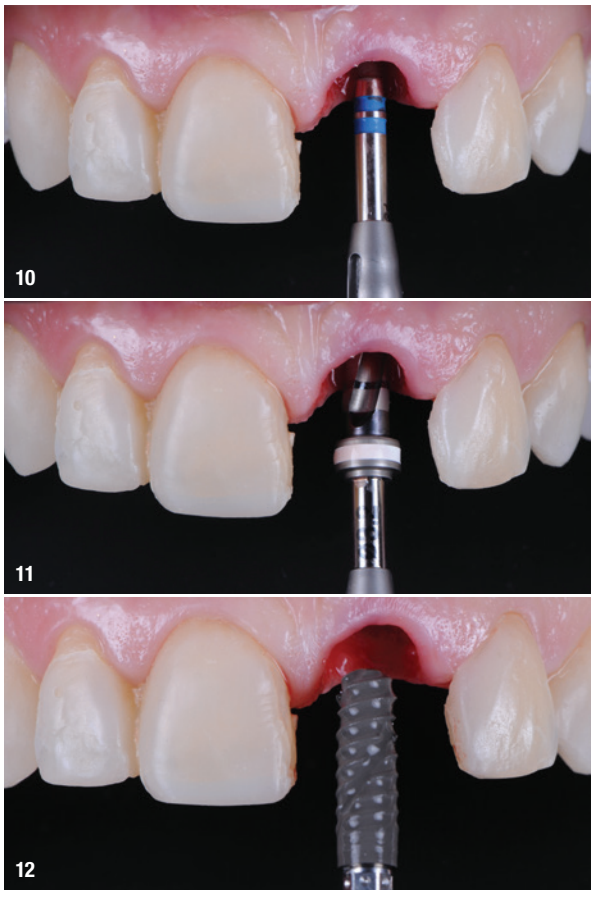
"State-of-the-art dentistry requires an interdisciplinary approach using the best available materials and focusing on our patients' needs."

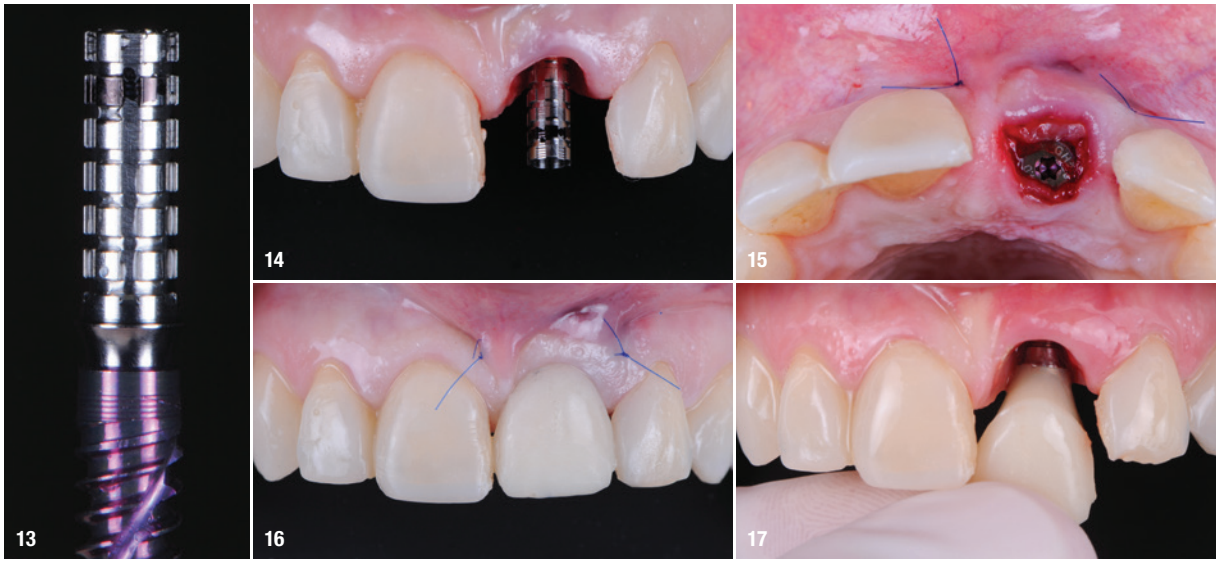
Treatment planning

Taking into account the significant aesthetic and functional factors, the planning was performed as follows. Orthodontic treatment would be performed to position the teeth in the most aesthetic and functionally optimal position. Aesthetic brackets were to be used for all the maxillary incisors, leading to space closure for the anterior teeth. Aligning and levelling were planned with 0.014 in. and 0.016 in. nickel–titanium sectional archwires, followed by 0.016 in. and 0.018 in. stainless-steel archwires. Space closure was to be achieved with elastomeric power chains (Figs. 5 & 6).

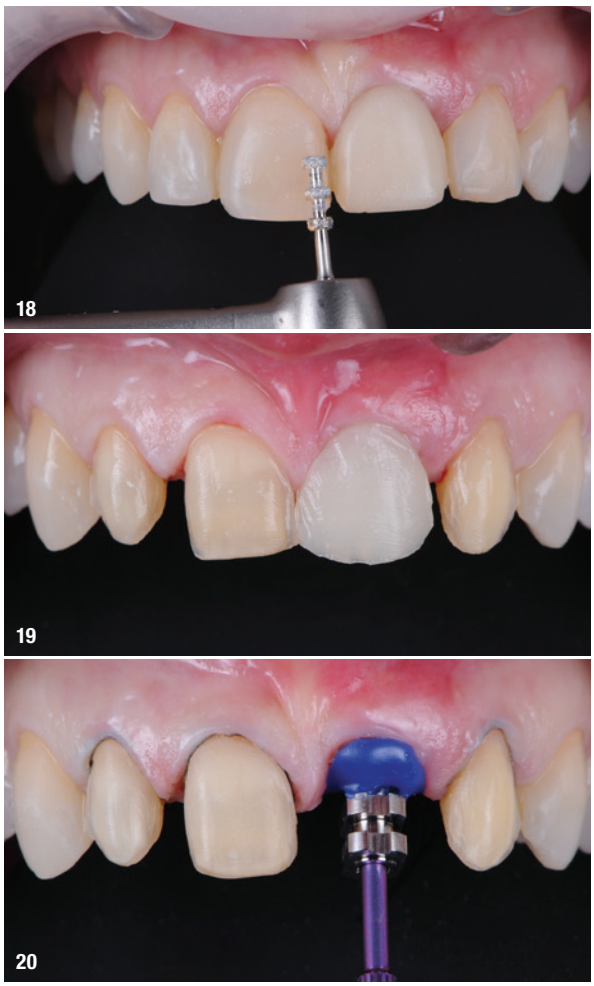
Digital aesthetic planning was performed four weeks after the orthodontic treatment using the Digital Smile Design system. First, a diagnostic wax-up was made and used for the preparation of the silicone guide. Then, a direct mock-up with composite resin was placed in the mouth, evaluated, discussed and approved by the patient (Fig. 7). The mock-up in the patient's mouth enables a preview of the treatment outcome and evaluation of the aesthetic result the patient is expecting. Moreover, we also evaluated the functionality, phonetics, harmony and position of the lips.

Atraumatic extraction of tooth #21 prior to the removal of the unaesthetic restoration was planned and was to be





followed by immediate implant placement in position #21 and provisionalisation. After six weeks of healing, impression for the definitive restorations would be taken. Porcelain veneers would be placed on teeth #12, 11 and 22, and a crown would be placed on implant #21.



Surgical procedure

On the day of surgery, the patient was instructed to rinse her mouth with 0.12% chlorhexidine gluconate. The surgery was performed under local anaesthesia with 2% lidocaine and 1:100,000 adrenaline. The atraumatic dental extraction was focused on the gentle removal of the root. The goal was to preserve alveolar crestal height in all three dimensions, maintaining the buccal hard- and soft-tissue integrity. The procedure was initiated by syndesmotomy with a periotome with gentle movements (Fig. 8). Subsequently, the root was split into two parts and carefully removed with rotational movements to prevent damage to the surrounding tissue (Fig. 9). To eliminate any inflammatory or infectious tissue that may have remained in the socket, the periapical region was carefully curetted and extensive irrigation with physiological saline was performed.

The freehand and flapless surgery involved the immediate placement of a Straumann BLX implant (diameter: 3.75 mm; length: 12.0 mm; regular base; SLActive; Roxolid) in position #21 following the manufacturer's instructions to ensure primary stability (Figs. 10–12). The drilling was performed in the centre of the extraction socket in the palatal wall, and the implant site was oriented to the palatal side in a prosthetically driven position. Primary implant stability was achieved, and subsequently, a prefabricated titanium temporary abutment (regular base/wide base) was hand tightened on to the implant for immediate provisionalisation. The height of the temporary abutment was measured, and it was then removed and adjusted extra-orally (Fig. 13). After that, the temporary abutment was reseated on to the implant and hand tightened, and the height was rechecked (Fig. 14).

Tooth #21 was placed into the silicone jig that had previously been constructed. The jig was placed in the

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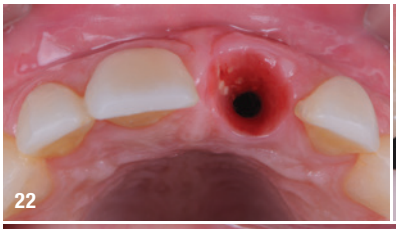
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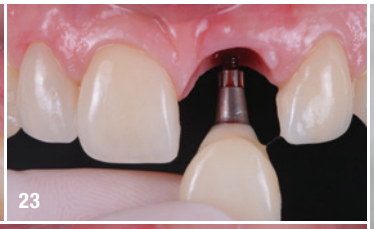
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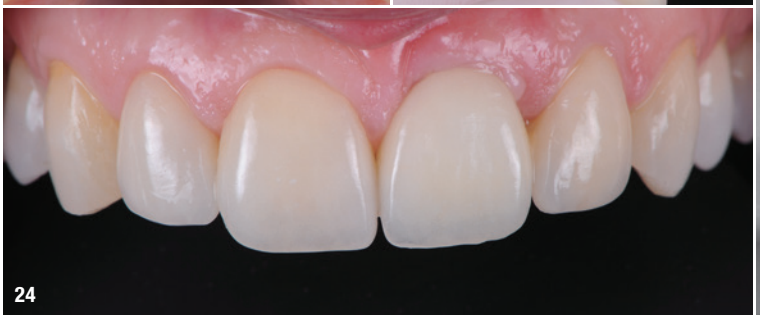
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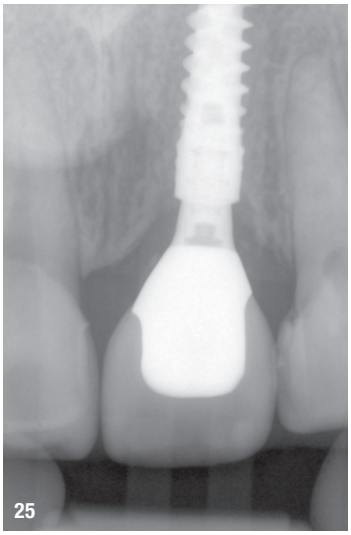
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patient's mouth, and the tooth was attached to the temporary abutment with light-polymerised composite resin. The abutment was removed, the excess was cleaned and the transitions were carefully polished and finished. The healing abutment was placed and screwed on prior to the graft transplantation.

A subepithelial connective tissue graft was obtained from the palate and was adapted to the implant site with the aim of increasing the thickness of the keratinised mucosa. Lastly, the graft was fixed with #5/0 nylon interrupted suture thread (Fig. 15). The provisional crown was then screwed on to the implant, and the access hole was sealed (Fig. 16).

After a six-week healing period with stable osseointegration and no post-surgical complications, the healing abutment was removed and the site irrigated with 0.12% chlorhexidine gluconate. It was verified that the healing was satisfactory (Fig. 17).

Prosthetic procedure

Conservative preparation of the adjacent incisors for the porcelain veneers was performed (Figs. 18 & 19). The transfer impression coping was placed and hand torqued. Retraction cords were used to ensure an optimal impression of the prepared adjacent teeth. A polyvinylsiloxane impression with an open tray transfer technique for the implant-supported restoration was taken. This information was sent to the laboratory (Fig. 20).

The implant-supported restoration and veneers were delivered. The provisional restoration was removed, and an ideal emergence profile and appealing aesthetics were observed. These adequate tissue dimensions were achieved thanks to soft-tissue augmentation and provisional restorative therapy. The implant-supported crown was screwed on and the veneers cemented (Figs. 21–23).

Treatment outcome

The patient has been recalled for prophylaxis and follow-up every year. After three years, the clinical and radiographic outcomes have shown good aesthetics, osseointegration and maintenance of peri-implant tissue. The patient was delighted with the aesthetic and functional result and presented no mechanical nor biological complications (Figs. 24 & 25).

Dr David Garcia Baeza

Complete online gallery

about the author

Dr David Garcia Baeza obtained his DMD from the European University of Madrid in Spain in 2002 and was awarded his specialist qualification in implantology and oral rehabilitation specialist from the same university in 2006. He runs a private practice (CIMA DENTAL) in Madrid dedicated to aesthetics, restorative dentistry and implantology. Dr Garcia Baeza has held multiple courses in aesthetic dentistry throughout Spain and has given more than 100 national and international lectures on aesthetic and restorative dentistry.

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Prosthetic rehabilitation with short GTB implants

A case report with nine-year follow-up

Dr Nicola Vanuzzo, Italy

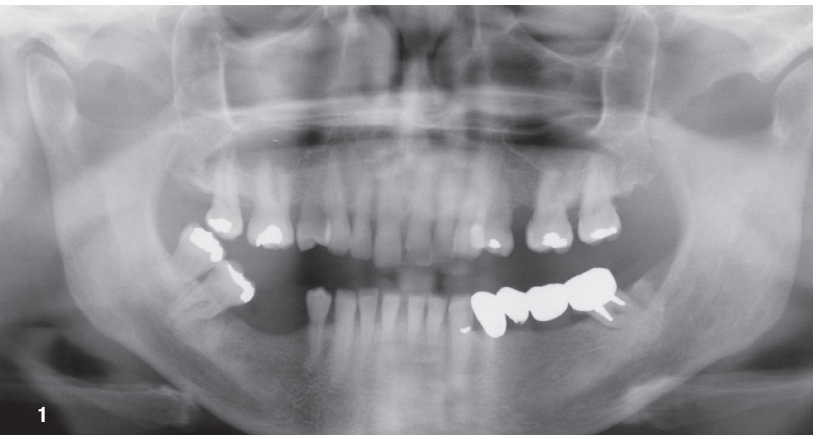


Fig. 1: Radiographic evaluation with a dental panoramic tomogram of the dental arches.

Implant-prosthesis systems have continuously evolved regarding osseointegration, implant size reduction and long-term predictability results, guided by the stability and absence of inflammation of the peri-implant tissue. The following case report demonstrates the results that are obtainable today.

Introduction

Recently, we saw an evolution in the macro-geometries of dental implants and prosthetic components that has led to a significant, sometimes radical, increase in the biological yield of dental implants, a modified surgical approach and varied protocols. The use of short implants has become a predictable therapeutic alternative and is sometimes able to avoid complex vertical regeneration procedures. Now, we have evidence of the marginal bone response after years of short implant loading, including with unfavourable levers and crown–root ratios (2:1 or more). In the following case report, I will present a follow-up of nine years after the insertion of GTB implants (Advan) in positions #34 and 36, on which a bridge from implant #34 to 36 was retained.

Case presentation

The female patient was 59 years old and had no noteworthy medical history, except for degenerative osteoarthritis of the left hip joint and compensated hypertension. She complained of chewing pain in the third quadrant. On physical examination, she presented with an old-fashioned bridge prosthesis with partial mobility, loaded on natural teeth. After radiographic evaluation with a dental panoramic tomogram of the dental arches, tooth #34 appeared devitalised, and tooth #37 appeared devitalised and a fused post-abutment and was mesialised and considerably inclined (Fig. 1).

It was evident that tooth #34 had to be extracted. Despite the overload of tooth #37, the patient refused its extraction because it was not painful. We therefore proceeded with the separation of the existing bridge, maintaining the coverage of tooth #37 and the exposure of the edentulous part. Subsequently, the extraction of tooth #34 was performed. A CBCT assessment of the mandibular dental arch was performed, and the insertion of a 3.6 mm diameter and 9.0 mm long GTB implant in position #34 and of a 4.3 mm diameter and only 6.0 mm long GTB implant was planned (Fig. 2). This last choice was necessary not to avoid contact with the inferior alveolar nerve but because of the presence of a very high mylohyoid line and the consequent inclination of the lingual bone wall of the mandible below that line. We favoured the prosthetic axis of the implant rather than a greater length of the implant, which is obtainable by tilting it in a lingual–buccal direction. The surgical planning was performed according to the surgical protocol for GTB implants, which provides for the flattening of the knife blade ridge, the positioning

> “The soft tissue with its connective fibres around the abutment collar must be respected and maintained as far as possible, in both quantity and quality.”

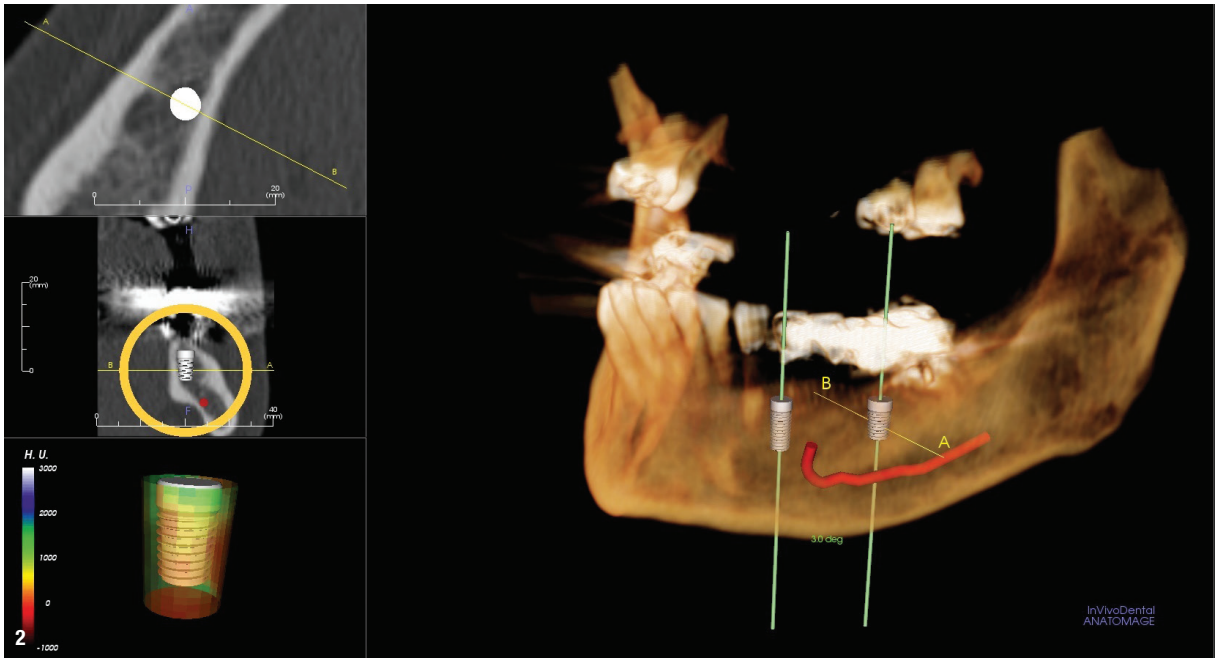


Fig. 2: Digital planning with CBCT for implant size.

of implants in the prosthetic axis and sinking the implant to the subcrestal level of 1.5 mm. During surgery, we obtained an insertion torque of 25 Ncm in position #34 and of 20 Ncm in position #36.

The soft tissue appeared to have little attached gingiva, which was dissected with the opening of the flap and then sutured with interrupted sutures, and these were removed after ten days. Two healing abutments with a height of 4.5 mm were positioned above the implants immediately after surgery.

After 70 days, radiographic control was performed and the healing abutments were replaced with two easy abutments directly in order to comply with the one abutment, one time protocol. The abutments were torqued to 30 Ncm according to the implant's prosthetic protocol. This is necessary for the activation of the conical coupling between implant and abutment and for a sterile connection that prevents micro-movements and bacterial infiltration between implants and abutments in the subcrestal area and the resulting bone resorption. Thereafter, we took a polyether impression on snap-on copings directly inserted on the abutments and fabricated a traditional cemented metal–ceramic bridge. In the following months, the patient initially underwent regular check-ups and professional hygiene, but thereafter kept extending the check-up times and neglecting her oral hygiene.

Results

After three years, a panoramic radiograph was performed, highlighting excellent maintenance of the bone trophism and closure of the osteotomies created with the insertion of the implants (Fig. 3). Results of this type testify to the ideal biomechanical situation created above the implants, which are then protected from any bacterial infiltration, not only by the mucosa, which appeared stable and healthy, but also by the bone bridge created to protect the implant necks.

A further radiographic check was carried out seven years after the implants had been placed and showed growth of the bone level and the formation of a curved bone profile to support the interdental papillae, which is typical of natural teeth. Caries occurred under the crown of tooth #37, but the patient did not wish to have it treated. Upon physical examination, the soft tissue appeared stable and of excellent trophism.

After nine years, a new radiograph was performed which highlighted how the scallop had not only been maintained

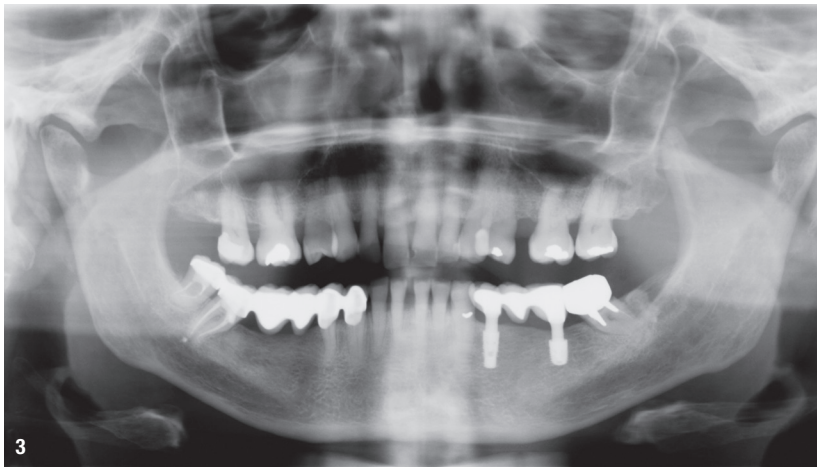
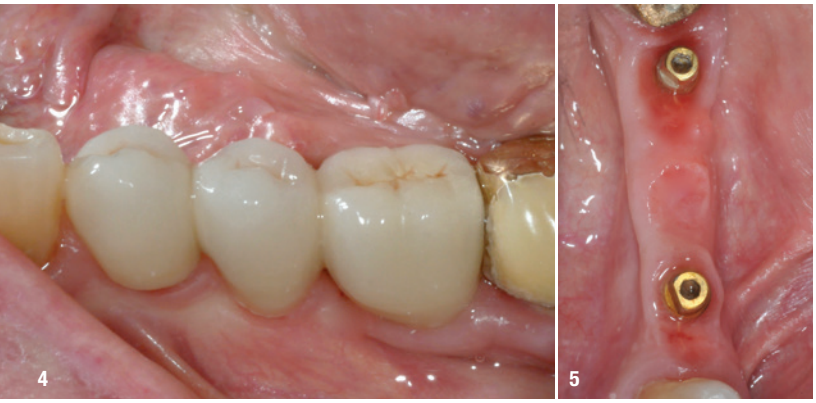


Fig. 3: Radiographic control three years after implant insertion.



Figs. 4 & 5: The scallop had been maintained and remodelled, and the supra-implant bone appearance presented a hyper-dense and extreme continuity with the abutment neck.

but even remodelled. The supra-implant bone appearance around the abutments presented a hyperdense and extreme continuity with the abutment neck, despite the non-punctual hygienic maintenance, highlighted by the state of the soft tissue and by the caries affecting tooth #37, then in the terminal stage (Figs. 4 & 5). After removal of the bridge, we tried probing, but it was absolutely impossible owing to the thickness of the soft tissue.

Discussion and conclusion

The GTB implant system, through the adoption of particular macro-geometries and micro-geometries of the implants, is able to obtain great biological yield, enabling the use of short implants in the molar area and their use even as bridge abutments. The accurate execution of the surgical protocol with subcrestal positioning and non-excessive insertion torque of the implants were indispensable conditions for obtaining the behaviour of the tissue seen in the case described, in order to avoid compressive stress during the integration phase and to achieve an insertion axis as synchronous as possible with the prosthetic axis. The subcrestal positioning of the implants, as can be seen from the most recent literature, can only be pursued with a system that provides for a sterile implant–abutment connection, free of micro-movements (conical connection), otherwise that bone would be lost in a short time after loading. Again, maintenance of tissue trophism over time (and in this case its improvement) can only be achieved with a prosthetic protocol that maximally respects the peri-implant tissue, both in quality and quantity. For this reason, the one abutment, one time protocol and the switching platform are considered essential. Only with scrupulous attention to all the steps described above and with an implant system that allows their implementation is it possible to obtain, in my opinion, long-term results such as those reported in this case. The stability of the tissue above the implants is the best evidence of the excellent health of the biological bone–implant system.

The closure of the bone on the neck of the abutment was complete, evident both from the radiographic point of view and from the inability to probe the tissue. The difference in biological behaviour between the crown–implant system and the natural crown–root system is apparent. In fact, it is clear that, to maximise the performance of implant-prosthesis-systems, it is no longer sufficient to imitate nature with canonical crown ratios and soft-tissue emergence profiles that simulate natural teeth. An implant normally has a diameter smaller than that of the root system, and it must respect the bone width while maintaining a quantity of surrounding bone in proportion to the load to be supported, and this should be higher than is normally the case around natural roots.

The soft tissue with its connective fibres around the abutment collar must be respected and maintained as far as possible, in both quantity and quality. This is achievable with a switching platform, a thin implant collar and a minimal emergence profile. Where possible, like in the molar area, aesthetics must therefore be sought at the supra-gingival level. By systematically adopting these strategic measures, typical of the implant-prosthesis system as opposed to that of the natural tooth, it is probably possible to maintain this type of result long term.

about the author

Dr Nicola Vanuzzo received his dental degree magna cum laude from the University of Padua in Italy in 2003. In 2004 and 2006, he participated in the Advanced Techniques and Biological Aspects in Implantology course at the then University of Medicine and Dentistry of New Jersey (now Rutgers School of Dental Medicine) in the US. He completed his master's degree in forensic odontology at the University of Florence in Italy in 2012. In 2013, he attended the specialisation course in operative dentistry using the microscope at the University of Genoa in Italy and, in 2014, a course in using the laser and new technologies in dentistry. He has dedicated himself mainly to oral surgery and prosthodontics, in particular using a microscopic approach. Since 2009, he has been actively engaged in digital dentistry with particular attention to the surgical and prosthetic aspects. He is an adjunct professor at the University of Genoa and co-author of several publications related to surgery and forensic medicine and runs a private practice in Padua.

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Complete case report

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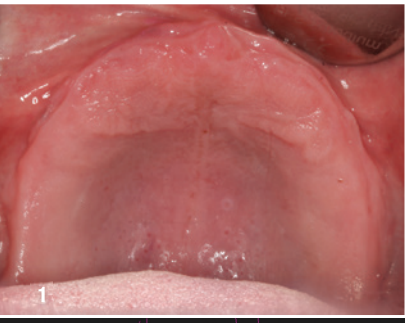
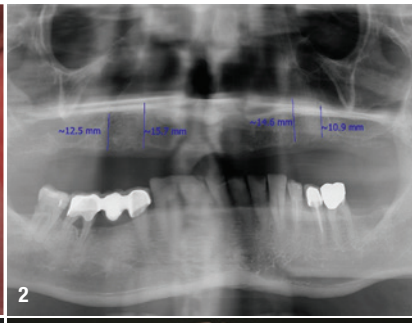
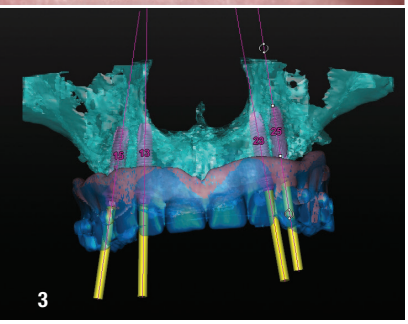
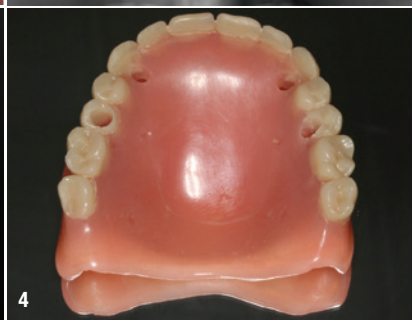
Immediate restoration of an edentulous upper jaw

Dr Mischa Krebs & Alexander Müller, Germany

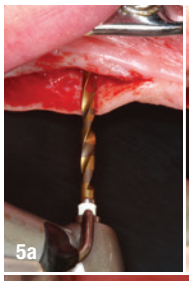


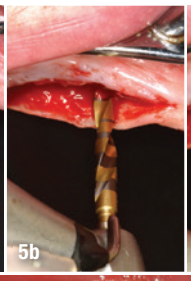


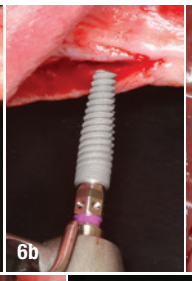


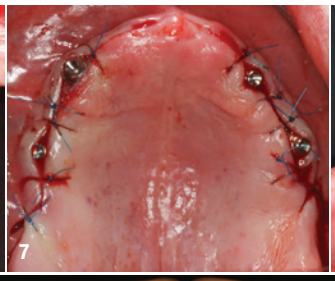


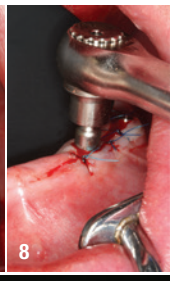
The following case report, presented in images, concerns the treatment of a 55-year-old male patient, who complained about the poor retention of his maxillary complete denture and requested a fixed solution (Figs. 1 & 2). The dual-scan protocol was used to visualise bone, soft-tissue thickness and denture position in Simplant software (Dentsply Sirona; Fig. 3). Four DS PrimeTaper EV 3.6 mm diameter implants (Dentsply Sirona) were planned according to the position of his denture and four Multibase abutments (Dentsply Sirona) were visualised accordingly. Prior to surgery, intra-oral scans of the edentulous upper and the dentate lower jaw were performed. The denture was used first as a surgical guide and then as a provisional prosthesis, after removing the palate (Fig. 4). Immediately after implant placement (Figs. 5–10), abutment position was registered with an intra-oral scan (Figs. 11–13). A definitive prosthesis consisting of an Atlantis BridgeBase (Dentsply Sirona; Fig. 14) and zirconia was placed eight weeks after implant insertion (Figs. 15–18).

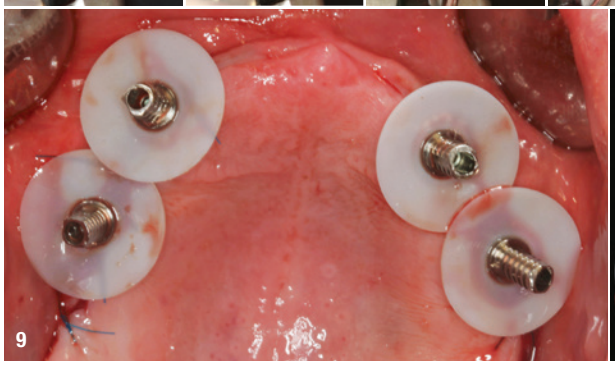












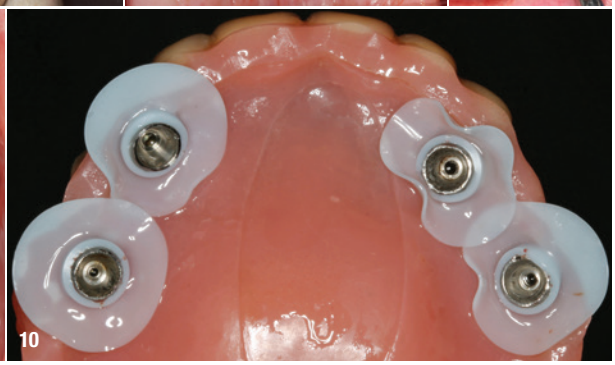


Fig. 1: Pre-op situation showing the edentulous upper jaw. **Fig. 2:** Pre-op radiograph. **Fig. 3:** Implant treatment planning in Simplant using the dual-scan protocol to visualise tooth position as well as abutment position. Four DS PrimeTaper EV implants were planned for immediate restoration. **Fig. 4:** The existing denture was adapted to be used as a surgical guide and provisional prosthesis for immediate loading. **Figs. 5a & b:** Implant bed preparation following the recommended drilling protocol for the planned implant using drill #1 **(a)** and drill #3 **(b)**. **Figs. 6a & b:** Coronal perforation of the cortical layer with drill #4 **(a)** and implant insertion **(b)**. **Fig. 7:** Multibase abutments inserted for immediate loading. **Fig. 8:** The abutments were torqued to 25 Ncm. **Fig. 9:** Temporary cylinders prepared with SynCone silicone sleeves (Dentsply Sirona) for intra-oral gluing. **Fig. 10:** Intra-oral gluing of the temporary cylinders to the existing denture.

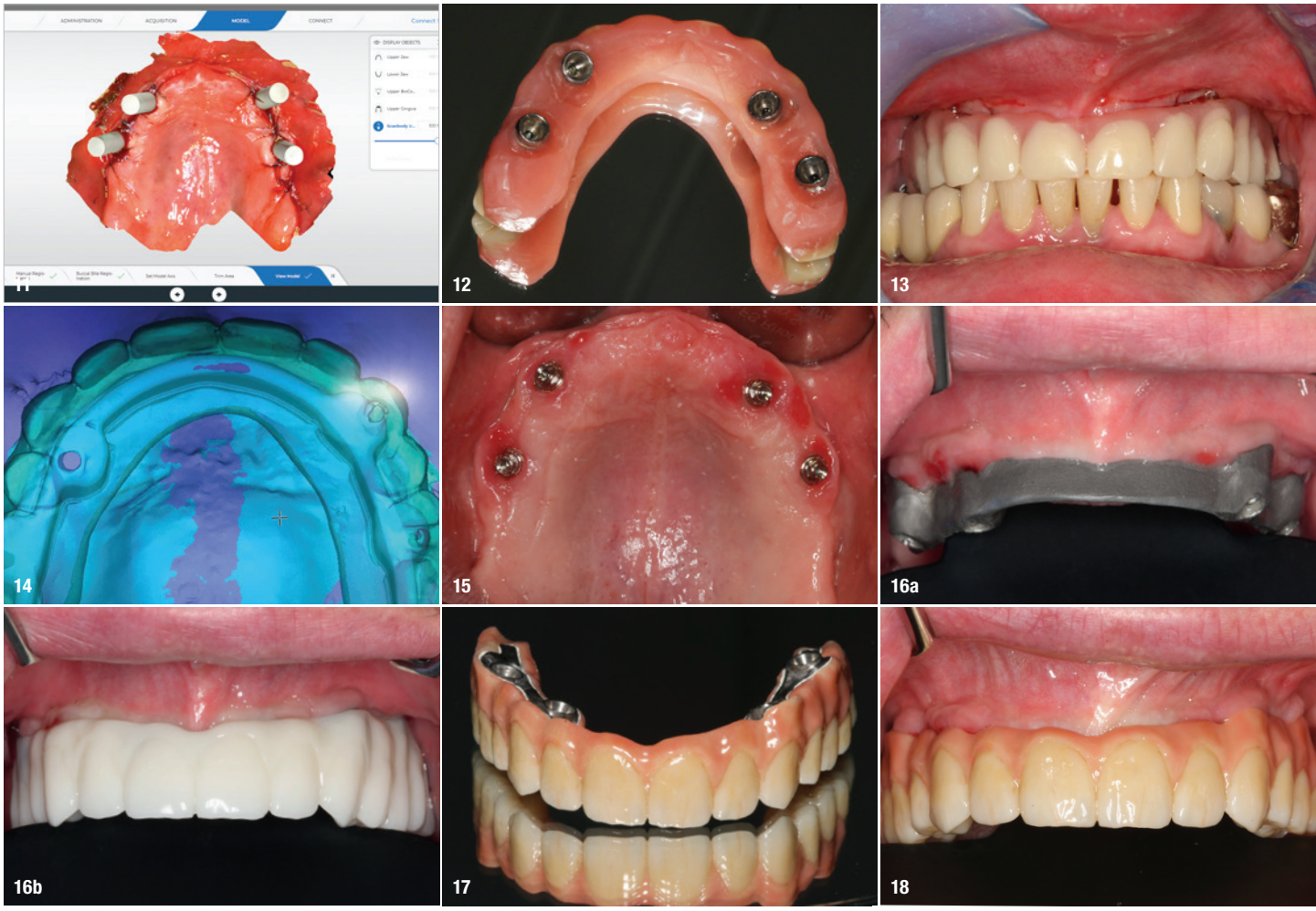


Fig. 11: Intra-oral scan of the abutment position, antagonists, provisional prosthesis and jaw relation for the manufacturing of the definitive prosthesis. **Fig. 12:** Seating surface of the provisional prosthesis. **Fig. 13:** Provisional prosthesis in place. **Fig. 14:** Design of the Atlantis BridgeBase. **Fig. 15:** Healed soft tissue eight weeks after implant placement. **Figs. 16a & b:** Try-in of the Atlantis BridgeBase without **(a)** and with **(b)** a printed wax-up, which was to be copy milled in zirconia. **Fig. 17:** Definitive prosthesis consisting of an Atlantis BridgeBase and zirconia. **Fig. 18:** Definitive prosthesis seated eight weeks after implant placement.

about the authors

Dr Mischa Krebs is a specialist in oral surgery. In 2006, he specialised in implantology and has since then regularly lectured at the Frankfurt university hospital in Germany on the topics of oral surgery and implantology. Since 2007, he has been running the oral surgery group practice Dr. Krebs & Kollegen in Alzey in Germany, which has been accredited as an academic teaching and training institution of Goethe University in Frankfurt am Main. He is a lecturer in the MSc programmes in oral implantology and dental technology of the Goethe University. Dr Krebs is a member of several associations, for example the Berufsverband Deutscher Oralchirurgen (professional association of German oral surgeons), German Association of Oral Implantology and Digital Dentistry Society.

Alexander Müller works as a dental technician. His work includes implant prosthetics as well as the production of dental restorations made of high-performance ceramics such as zirconium dioxide and lithium disilicate. Since 2019, he is a lecturer for aspiring master dental technicians.

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Dr Mischa Krebs

Delayed immediate implant placement and direct soft-tissue management

A 12-month follow-up

Dr Haki Tekyatan, Germany

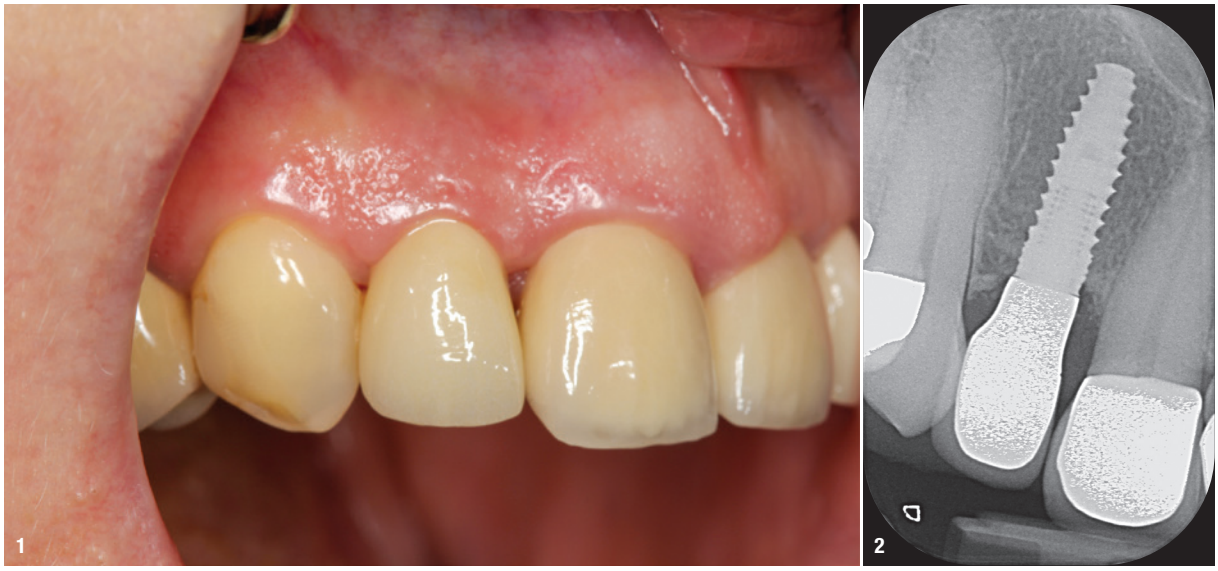

Fig. 1: Clinical situation 12 months after restoration. Stable, non-inflamed soft-tissue conditions. Distally almost complete and mesially partial formation of papillary structures. **Fig. 2:** Radiograph 12 months after restoration. Stable, well-developed osseous structures could be seen around the implant, along with complete integration of the implant. CERASORB Foam had been completely resorbed and replaced by endogenous bone.

This follow-up after 12 months concerns the current clinical and radiological condition of a case previously documented in a published report,[1] more specifically an implantological treatment in region #12. In summary, endodontic treatment of tooth #12 had failed, the tooth was not worth preserving and it was thus extracted in a minimally invasive manner. Local bone and alveolar management were carried out using bio-functionalised (injectable platelet-rich fibrin or A-PRF) CERASORB Foam (curasan), a biomimetic, regenerative β-tricalcium phosphate collagen matrix. Six weeks after the alveolar management, delayed immediate implantation was carried out using a surgical guide and implant position was confirmed via an intraoperative scan. The scan was used to produce a new, special individualised PEEK healing abutment. Another six weeks later, implant exposure and direct soft-tissue management took place in the healing phase with the special PEEK healing abutment. Finally, the fitting of a ceramic crown was carried out. This allowed the creation of favourable conditions under appropriate circumstances and with targeted procedures in order to achieve an aesthetic, prognostically reliable and predictable result. A clinical examination and a radiographic follow-up were carried out after 12 months (Figs. 1 & 2).

Conclusion

The expectations of our implantology patients are very high, particularly in the aesthetically relevant area. It is of particular importance to use targeted procedures and methods to preserve soft tissue and bone for long-term functional and aesthetic success and to ensure the prerequisites for this. In our case, the 12-month follow-up showed stable clinical and radiological conditions to continue ensuring an aesthetic, safe and predictable result.

About CERASORB Foam

The precise filling of bone defects has an important influence on bone regeneration. In this context, the biomimetic, fully resorbable, hydrophilic and malleable β-tricalcium phosphate collagen matrix CERASORB Foam scores highly in every respect.

CERASORB Foam is a matrix of porcine collagen (Type I) and highly porous pure-phase β-tricalcium phosphate granules (CERASORB M, CERASORB Classic) of different sizes and densities. The granules are embedded in the collagen and are fixed by its fibres.

Convenient to use

The collagen gives CERASORB Foam its particularly user-friendly properties. Moistened with blood from the defect or mixed with platelet rich fibrin (PRF), the initially dry material can be modelled and then positioned precisely and comfortably in the defect.

Synergy effects through the CERASORB collagen matrix

Collagen has a high binding capacity for physiological fluids. The resulting large area of contact with the surrounding vital bone allows bone-forming cells to integrate the material and facilitates the absorption of nutrients and proteins. This allows collagen to support bone regeneration early on.

The special CERASORB collagen matrix can hold a granulate content of 85% by weight and thus ensures high volume stability after degradation of the more quickly resorbable collagen. The high porosity of the granules in turn offers a stable scaffold for the newly forming bone.

Complete bone regeneration

CERASORB Foam is completely degraded and replaced by autologous bone. Degradation of the biomaterial with the simultaneous formation of new bone leads to the restoration of healthy bone. Resorption occurs in several phases and can easily be followed using radiography.

Literature

1. Tekyatan H. Delayed immediate implant placement and direct soft-tissue management. implants. 2021;3:6–12.

Dr Haki Tekyatan

Case report *implants 3/21*

contact

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New directions in implantology—where is the journey heading?

An interview with Dr Georg Bach, President of DGZI, Germany

Fig. 1: Dr Georg Bach.

Like in our own lives, no path is straight in implantology. Again and again, there are forks in the road and one is faced with the decision of whether to go left or right or perhaps continue straight ahead. In everyday practice, new treatment methods, innovative implantology concepts and new materials form these different paths. The 51st international annual congress of the German Association of Dental Implantology (DGZI) will take participants on a journey on 30 September and 1 October in Berlin in Germany, showing them which of the many paths ultimately lead to successful treatment. In this interview with DGZI President Dr Georg Bach, readers can find out what they can particularly look forward to this year.

Dr Bach, the DGZI has been in existence for 51 years, making it the oldest European professional society in dental implantology. Where does the DGZI stand today?
The DGZI was founded in Bremen in 1970, so we are actually in our 52nd year of existence. Regarding the current standing of the DGZI, one could say that everything and nothing has changed at the DGZI. Compared with the initial situation at the beginning of the seventies, simply everything has changed; indeed, one could say that our founders, under the leadership of Prof. Hans Grafelmann, clearly had greater vision and courage than therapeutic options. Millions of inserted implants, 3D diagnostics, digital planning and insertion aids, and many other implantological therapy options that we take for granted today could only have been dreamed of back then. As a professional society, the DGZI has not only witnessed and understood all these significant changes but also always played an active role in shaping them.

These fascinating new options in implantology have been accompanied by a serious need to gain expertise through learning practical skills and being taught theory. Against the background of this realisation, the DGZI has set up a large number of continuing education formats to meet the constantly increasing demands in dental implantology. In this respect, to come back to your question, the DGZI is very well positioned.

When I said before that nothing has changed, I meant that we have remained true to the values of our founders over half a century ago. Our credo is still to present dental implantology with all its fascinating facets to the practitioner and to equip him or her for this special discipline. That was true in 1970 and is still true in 2022!

Last year, the DGZI held its anniversary congress in Cologne in Germany. Will this year's congress repeat that success?
We intend to have another great success with our congress this year, which, by the way, will be hosted in the federal capital of Berlin. But it is clear that we cannot repeat such an event as we experienced last year. The 2021 event in Cologne was a great congress with truly wonderful moments! It is definitely not possible to repeat this on demand, because in addition to the who's who of German oral implantology speaking there and panel discussions in which all three presidents of the major German implantological societies came together on one stage and exchanged ideas, our 50th congress was also marked by other, almost magical moments. Something like that is unique, just like our half-century of the DGZI, and we want to keep it that way! But what we continue to focus on, and this should also be the aspiration for this year's congress in Berlin, is setting the guidelines in implantology. Our visitors should not only know where our joint implantological journey is going, but also be able to play a significant role in shaping the route. We have had this aspiration for the past 50 years and will continue to have it for the next 50 years!

Fig. 2: Prof. Ralf Smeets, Prof. Knut A. Grötz, Dr Georg Bach, Prof. Daniel Grubeanu and Prof. Bilal Al-Nawas (from left). **Fig. 3:** The table clinics: a wide variety of implantology topics will be discussed at 25 tables.

In implantology, there are often subjects of great debate, such as bone augmentation and choice of material. Will such topics also be addressed?
The fact is that every patient is a challenge! As individual as our patients are, so too are their initial conditions, expectations and therapy options. We are all aware that against this background very difficult decisions have to be made. We will be addressing this in Berlin in autumn, presenting, illuminating and questioning such areas of conflict regarding bone augmentation, implant prostheses and choice of implant material and giving practice-relevant evaluations, and we will also be consciously asking the question of whether the high-end solution is always the best choice.

What can participants look forward to in Berlin?
They can look forward to a challenging two-day training event, packed with knowledge and tips. We have been able to engage a top-class university team of speakers, as well as numerous practitioners, for the lectures and live broadcasts. I have already mentioned that so much has changed in dentistry and in implantology. One thing, however, has remained unchanged: expertise in implantology depends primarily on practical experience but also on innovative products. During the table clinics, participants will have the opportunity for intensive discussions with the speakers, who will be giving their views on a wide range of special implantology topics at 25 table clinics. Our English-speaking guests will have the benefit of simultaneous interpretation.

The aim of our programme for young dentists, for example Dr Jochen Tunkel speaking on social media and Dr Eik Schiegnitz on current implantological developments, is to give congress participants something to take away, namely the latest findings on the current top topics in implantology.

Beyond this goal of information provision, however, is our desire to ask participants what they would like to learn more about: we have asked the young generation in the DGZI what is on their minds. And that's not all! We not only have listened to our young colleagues, but are also letting them have their say. The last part of our future podium on the Friday, which bears the designation "Young Generation DGZI" for the first time this year, will be a discussion. In past decades, this discussion has always been very lively and highly interesting, and I expect the same this year. The message we hope to convey with it is: young implantologists—we listen to you, we take your needs seriously and we want to accommodate you!

Finally, what goals does this year's annual meeting of the DGZI have for dentists working in implantology?
Our aspiration in this regard is clearly defined. We have two goals. Firstly, we aim for our participants to be able to apply some of the knowledge that they have gained during the two days of training in practice on the following Monday. Secondly, we want dentists to be able to rely on the durability of what is presented and evaluated at a DGZI congress.

As an implantological society, we pride ourselves on being authentic, honest and reliable.

Dr Georg Bach

DGZI

Registration & programme

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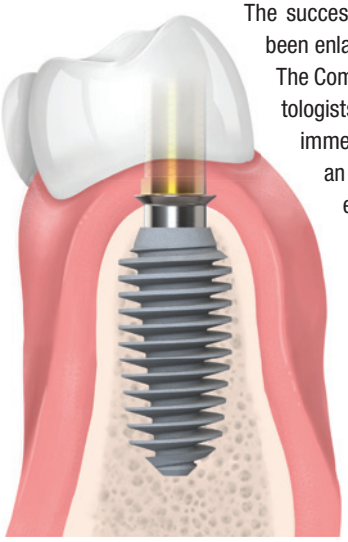
Argon Medical

A combination of main healing aspects and desirable aesthetics



The successful K3Pro implant line from Argon Medical has been enlarged last year by an additional innovation, namely The Compress Implant. The dire need of discerning implantologists to provide their patients with stable provisionals immediately after implantological operations, requires an implant with exceptionally high primary stability—especially in the case of soft bone. For immediate implantations, however, it is often necessary that self-tapping thread flanks secure the implant with the alveolar wall. Also and of much importance is a generous free space for healing through blood coagulation. The new Compress Implants fulfil both aspects mentioned above without neglecting the classic virtues of optimisation for subcrestal insertion for outstanding aesthetics. Furthermore, the anti-bacterial seal, as well as the micromovement-free connection for sustained tissue preservation is also given in this well-rounded idea of the Stable Tissue Concept. The compressive and progressive self-tapping thread for easy and precise insertion in soft bone has a plateau design and offers added primary stability for immediate loading. The implant diameter is measured according to the width of the thread flank, whereas the implant body remains similarly slim. Therefore, the choice of diameter regulates the degree of primary stability.

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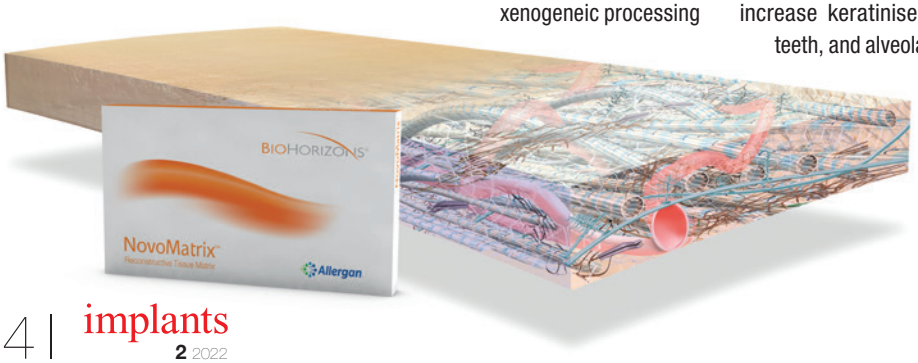

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In April 2022 Fotona hosted a Photobiomodulation (PBM) and Pain Management online event joining in a worldwide effort to improve the quality of life for countless people and enable a faster healing process with the help of Fotona's innovative PBM and Pain Management therapies.

The initiative provided practitioners with useful information, videos and materials on how these treatments work and how they are applied in various medical fields including dentistry. Fotona introduced its MarcCo handpiece line specifically engineered to enable fast and simple non-invasive PBM treatments for numerous clinical indications, to ensure faster healing with reduced pain and inflammation. The highlight of the campaign was undoubtedly the live Meet the Expert Q&A Session with Dr Jason Pang and Dr Linhlan Nguyen who provided first-hand information and answered practitioner questions.

MarcCo handpieces are available in three sizes (up to 43 mm spot diameter), utilise sterilisable spacers and are compatible with Fotona's LA adapter for greater user-friendliness and safety when used intraorally.

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Immediate implant placement: Better than ever

With its SKY fast & fixed implant system, bredent paved the way for its international success some 15 years ago. Since then, the company has continuously developed its system together with users. It is not only a new product, but also a very special and innovative form of therapy: patients who become edentulous can be completely restored with a small number of implants. And this can be done in just one day and with a success rate of over 98 per cent. This is because, in contrast to delayed implant placement, immediate implant placement preserves the surrounding soft and hard tissue and achieves correspondingly better osseointegration. The components of the SKY fast & fixed system have undergone a continuous development process since its market launch. For example, the abutments have become increasingly narrower and more tailored so that there is no longer any bone collision during insertion. Users can count on the company as a competent partner throughout the entire workflow. On the one hand, because bredent, with its product diversity, can offer practice groups and MVZs solution packages that fit together smoothly. On the other hand, because the READY FOR USE platform also makes communication with external partners such as laboratories child's play. For more than 15 years, the use of SKY fast & fixed has led to a win-win situation for all involved. The patient benefits from a short treatment with the best prospects of success. For the practice, the investment in the immediate restoration brings the maximum increase in added value.

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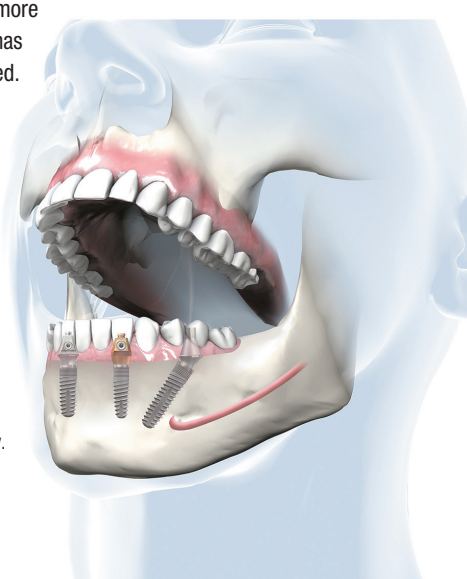

More than 500 dental practices and clinics in more than 20 countries offer SKY fast & fixed immediate restoration therapy.

1

2

Intensive implantology that inspires—now for the whole world!

Andreas Halamoda, Germany

An outstanding dentist and speaker, innovative and quality products developed and made in Germany, a brand-new implantology training centre with a clinic in the heart of Europe in a region rich in beauty, history and culinary delights—that is the secret of success of the master class in implantology, one of the best dental training courses in Germany.

Dr Kai Zwanzig is one of Germany's most renowned implantologists. He is young and digitally savvy and has been committed to the predictability of treatment success, uncompromising aesthetics and the sustainability of his implant therapy from the very beginning of his career. "I love teeth," said Dr Zwanzig, "and my patients love them too. If a tooth cannot be preserved, I am never satisfied with mere tooth replacement. The goal is always an optimal aesthetic and clinically convincing result as beautiful as the natural tooth that is sustainable for the rest of the patient's life." After years of evolution of his art, he found an ideal partner in the Argon Medical group. Together, they conceived the "Stable Tissue Concept", along with new revolutionary products. This holistic implantological philosophy considers all aspects of treatment—from implant placement and augmentation to soft-tissue surgery and the perfection of prostheses—with the aim of creating a large amount of healthy tissue around and above the implant that is maintained over time.

The Argon Medical group has always invested heavily in science and training. Its beautiful and modern implantology training centre with lecture halls, practice rooms and an operating room with 3D radiographic diagnostics was created under one roof at the company's headquarters in the region of the UNESCO World Heritage Site of the

4

Figs. 1 & 2: Hands-on part of the master class in implantology. **Fig. 3:** Dr Bogdan Bâldea, Dr Kai Zwanzig and Alexandru Iurasco (from left). **Fig. 4:** Dr Kai Zwanzig. **Fig. 5:** Andreas Halamoda (Head of Training, Implants and Bonegraft, Argon Medical) during product consultation. **Fig. 6:** The course participants from Moldova.

Upper Middle Rhine Valley—not far from Frankfurt Airport. An adjacent dental laboratory with innovative digital technology is also available. Dr Zwanzig has been teaching innovative German implantologists there for five years, so in the summer of 2021, it was time for the next, long-awaited step: the master class went international for the first time!

From 20 to 22 August, an enthusiastic group of 25 of the best implantologists from Moldova were guests, led by the Argon representative Alexandru Iurasco (Global Biomarketing Group) and accompanied by the well-known dental consultant and associate professor at the State University of Medicine and Pharmacy "Nicolae Testemiţanu" Dr Bogdan Bâldea from Timișoara in Romania. The participants were trained by Dr Zwanzig in intensive lectures and hands-on exercises according to the Stable Tissue Concept. Of course, the participants also enjoyed a well-known wellness resort and a boat trip on the renowned Rhine.

Dr Zwanzig and the Argon Medical group have many plans for the future of implantology training. After this successful trial run, the master class will now be held regularly in English and Arabic as well as in German, and the Stable Tissue Concept will be established internationally.

contact

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Curriculum Implantology 2.0

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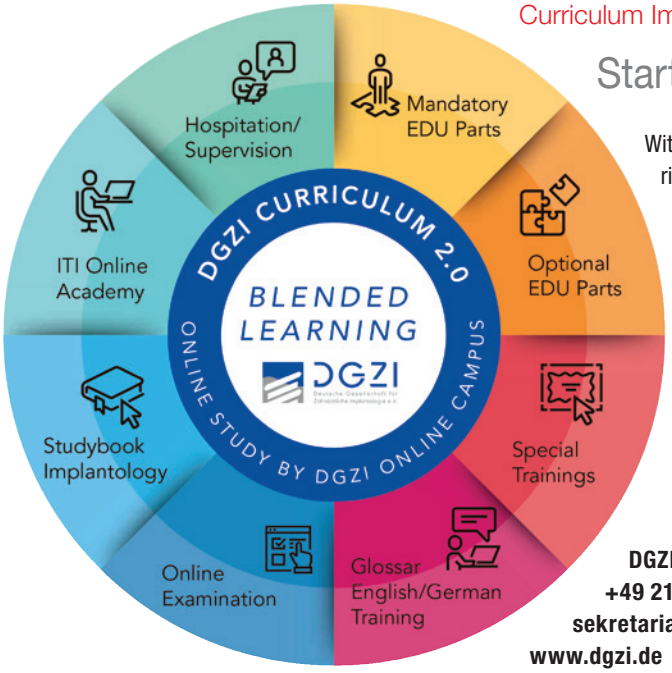

With its ONLINE Campus, the DGZI already adjusted the specialist theoretical curricular training two years ago to a contemporary and, above all, convenient solution for the participants. After the market launch of the German DGZI ONLINE Campus, the English version for international DGZI members followed in 2020.

Especially in times when face-to-face training is almost impossible, online offers are playing an increasingly important role in the education and training of dentists. Initially developed only for curricular training at home and abroad, the DGZI is now opening the ONLINE Campus to all interested dentists and offering this continuing education opportunity to a wider circle. All information on the content and costs can be obtained from the DGZI.

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EuroPerio10

Congress programme with over 130 top speakers

The tenth edition of EuroPerio returns in 2022 after having been postponed from last year because of the Covid-19 pandemic. Organised by the European Federation of Periodontology (EFP), EuroPerio10 will take place on 15–18 June in Copenhagen, Denmark. It features a top-level scientific programme packed with sessions covering all the latest trends and topics for oral-healthcare professionals, with 135 well-known speakers from over 30 countries in the main programme. The scientific programme features a wide variety of innovative formats, including live mucogingival and bone-regeneration surgeries, interactive sessions, so-called nightmare sessions (worst-case scenarios), video sessions, debates, interviews, symposia, and more. Considerable attention will be also given to the EFP's S3-level clinical guidelines on the treatment of periodontitis—the newest guideline, on stage IV periodontitis, will be presented at the congress.

David Herrera and Phoebus Madianos are looking forward to the EuroPerio10.

"The scientific programme addresses the interests of every member of the dental community and provides them with an updated snapshot of what perio is today," explains David Herrera, scientific chair of EuroPerio10. "We have a great faculty, complete and diverse, addressing the main challenges of our profession with the most engaging session formats. So, we are proud to have prepared an exciting congress up to the task of bringing dental professionals up to date in terms of knowledge, skills, trends and solutions, but also in terms of personal interaction and networking with colleagues," says Phoebus Madianos, chair of EuroPerio10. Registration for EuroPerio10 is possible at the EFP website and has been open to all professionals since August last year.

EuroPerio10
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www.efp.org/attendance/registration

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Congresses, courses and symposia

EuroPerio10

15–18 June 2022
Copenhagen, Denmark
www.efp.org/europerio

6th Annual Meeting of ISMI

24–25 June 2022
Berlin, Germany
www.ismi-meeting.com

29th annual scientific meeting of EAO

29 September–1 October 2022
Geneva, Switzerland
www.eao.org

51st International Annual Congress of DGZI

30 September–1 October 2022
Berlin, Germany
www.dgzi-jahreskongress.de

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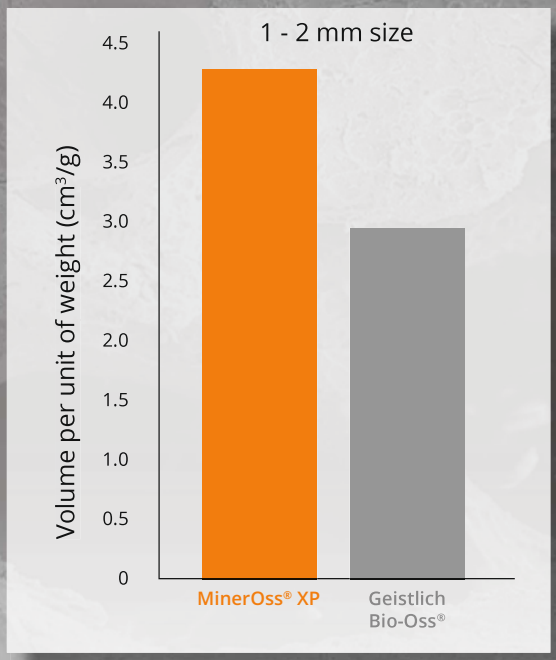

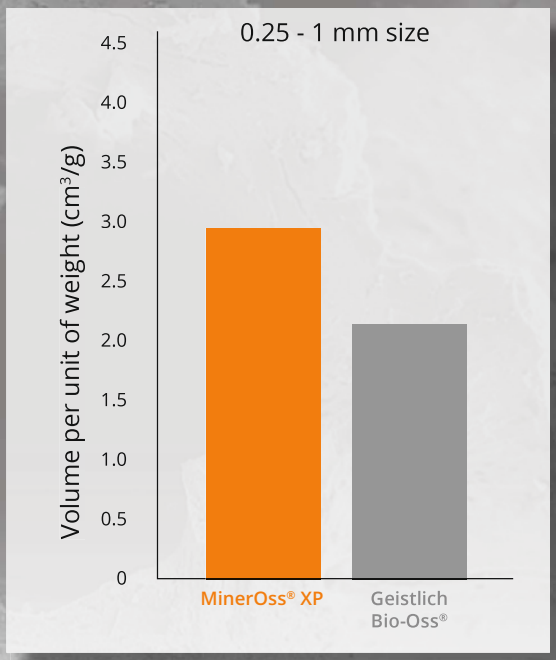

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