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case report

Restoring anterior aesthetics with two-piece zirconia implants

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Dr Rolf Vollmer
First Vice President
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Implantology in the team

Dear colleagues and friends,

At the very beginning of oral implantology at the end of the sixties and beginning of the seventies of the past century, it was already clear that implantology is a team effort, and this is just as relevant today.

The challenges of the early days are certainly very different from those of the present time, and the associated tasks for the team are just as varied. Whereas in the past the focus was on insecurities regarding a successful implantation, today completely different requirements such as technical conditions, patient expectations or the digital workflow are coming to the fore.

Therefore, I am pleased to invite the international implantological community on behalf of the DGZI to this year's 52nd Annual Congress in Hamburg on 6 and 7 October.

The event will take place this time under the motto "Implantology in the team", the focus will be on the dentist, his practice team, and the dental technician. The congress offers a unique international platform for the exchange of expertise, experience, and best practices. Traditionally, at the beginning of the congress we will look into the future and offer our young DGZI friends a podium. Regarding the scientific programme, we have also succeeded not only in attracting renowned speakers, but also in setting up a programme that covers the entire range of facets of dental implantology. Naturally, the popular "Table Clinics" will not be missing either, a format with a unique possibility of directly imparting expert information in small groups and direct implementation of what has been learnt.

Especially in recent years, the annual congress of the DGZI has been established as an important, international scientific and practice-relevant event.

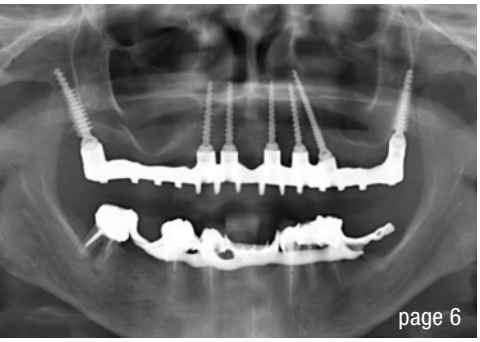
In addition to the scientific programme, the host city of Hamburg offers a rich culture, a picturesque landscape and excellent gastronomy. Take the opportunity to network and explore this impressive city!

We are looking forward to meeting you again and to a vivid collegial interchange.

Yours,

Dr Rolf Vollmer

First Vice President and Treasurer of DGZI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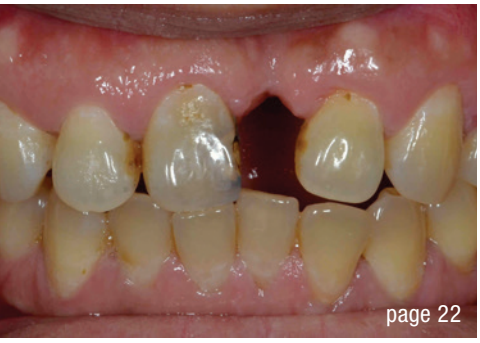
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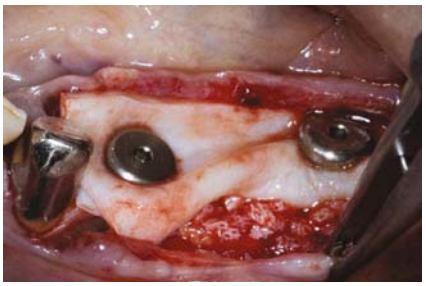
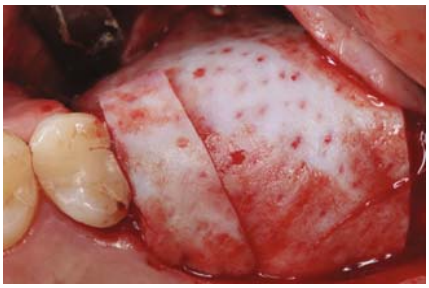


Ridge reconstruction



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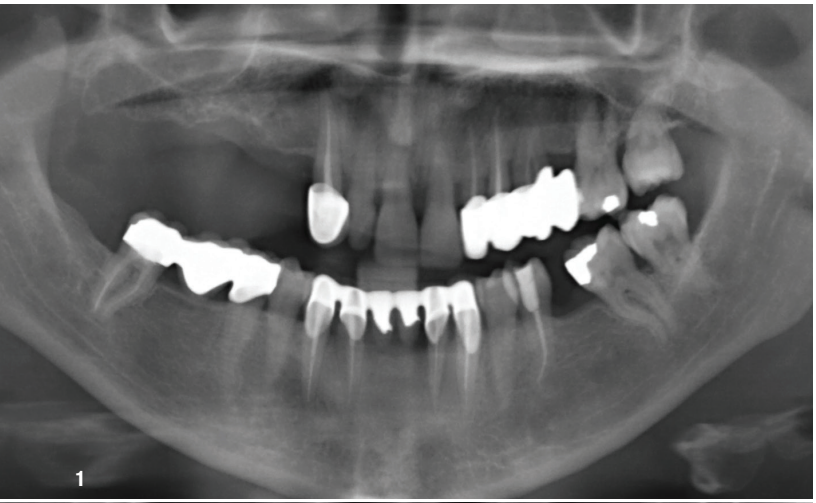
The added value of the pterygoid implant in the management of edentulous patients

Dr Henri Diederich, Luxembourg

Pterygoid implants were first proposed by Linkow in 1975, and the method was first described by French maxillofacial surgeon J.F. Tulasne in 1992.[1,2] Tulasne and Tessier were the first to describe the technique for implant placement in the pterygoid plate. Pterygoid implants are relatively long and specifically manufactured with the characteristics of the pterygoid region in mind.[3]



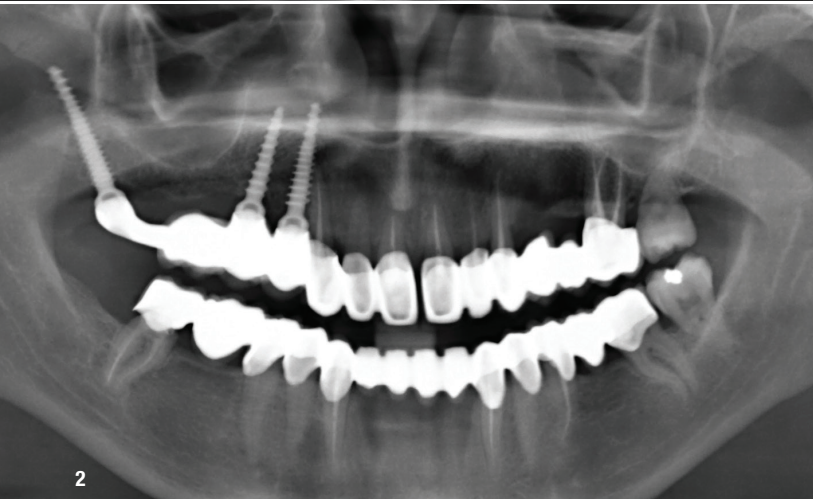


Fig. 1: Case 1—panoramic radiograph of the patient at presentation. **Fig. 2:** Radiograph of the patient after bridge delivery.

The pterygoid implant enables rehabilitation in the posterior maxilla in cases of poor and limited bone quantity as well as the presence of the maxillary sinus when such cases cannot be treated with standard implants.[4–6] Expertise and a thorough understanding of the anatomy of the posterior maxilla are crucial for successful placement of pterygoid implants. The pterygoid implant placement method has been previously documented in the literature.[7]

The following case studies showcase the use of pterygoid implants to restore function in patients with edentulous jaws. The pterygoid implant employed in this case series is a new generation of pterygoid implant, designed by the author in collaboration with the Swiss company TRATE. It is a one-piece tissue-level conical implant with compressive threads and undergoes a surface treatment with hydroxyapatite and tricalcium phosphate. The implant neck has a wide thread profile, providing compression in areas of low bone density, such as the maxillary tuberosity. Its pointed, self-tapping apex ensures strong anchorage when inserted.[3,8] The pterygoid implant ranges from 16 to 26 mm in length, ensuring that the implant apex engages the cortical bone of the medial wall of the pterygoid plate[9] and is 3.5 or 4.5 mm in diameter.

Case presentations

Case 1

A 45-year-old female patient sought to have missing teeth on the right side of her upper jaw replaced (Fig. 1). Owing to the narrow width of the upper jaw ridge, conventional implant options were not feasible. The patient also had a history of chronic sinus infection and did not wish to undergo a sinus lift procedure. To rehabilitate her missing teeth, ROOTT C3516m, C3514m and C3520mp implants were placed in positions #18, 15 and 14. The procedure was performed under local anaesthesia after flap elevation, and a 2.5 mm pilot drill was used to prepare all three osteotomies. The implants were loaded after a three-month delay, and a screw-retained metal–ceramic bridge

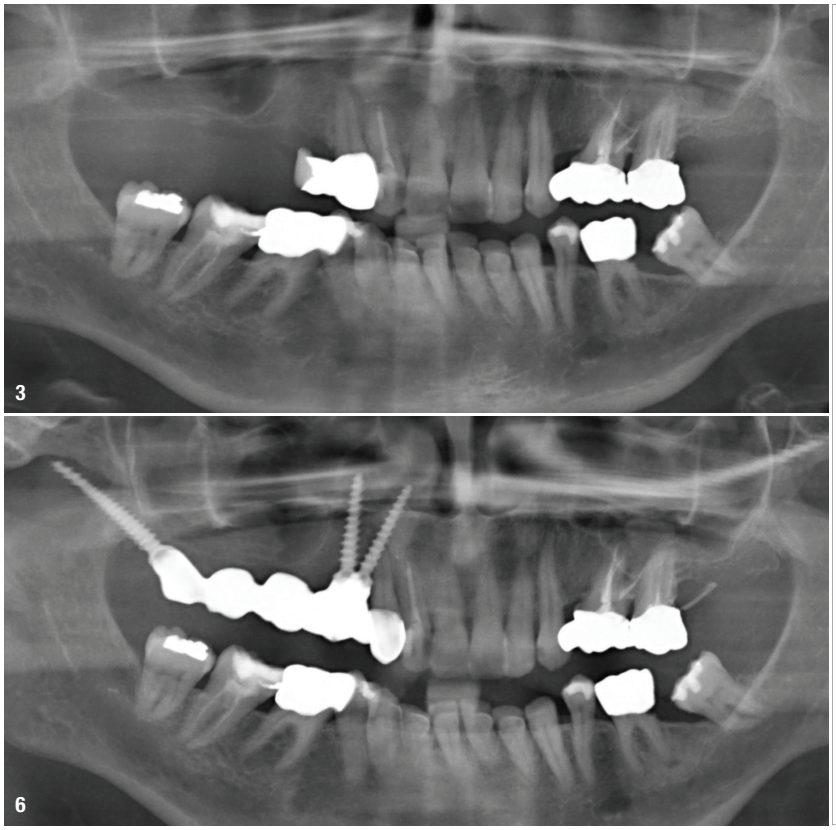


Fig. 3: Case 2—panoramic radiograph of the patient at presentation. **Figs. 4 & 5:** Traditional implant options were not feasible owing to the narrow ridge. ROOTT C3016ms implants were placed in positions. **Fig. 6:** Radiograph of the patient after bridge delivery.

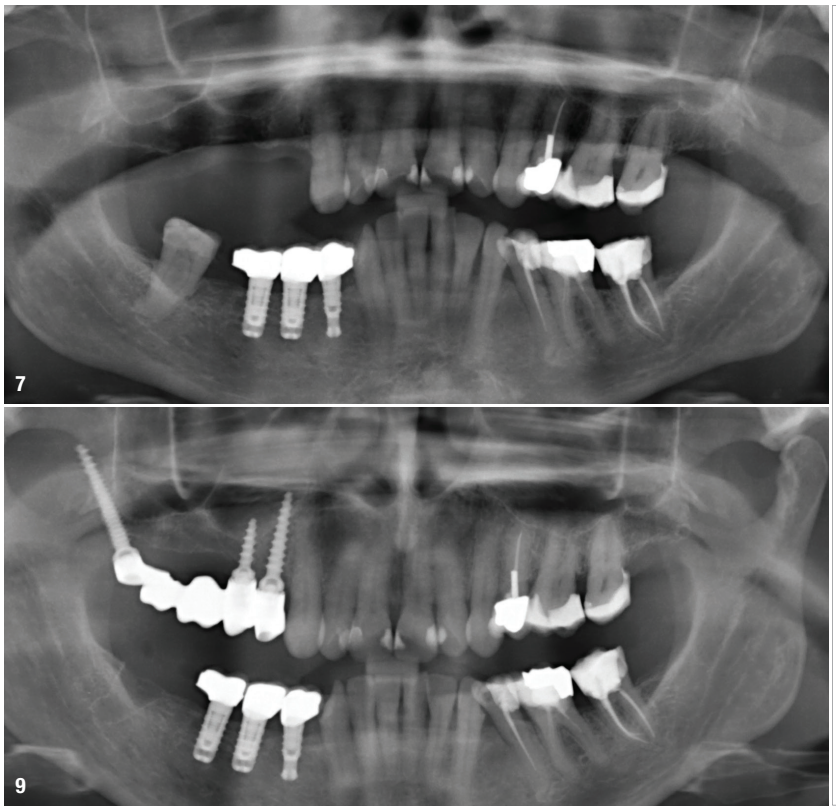
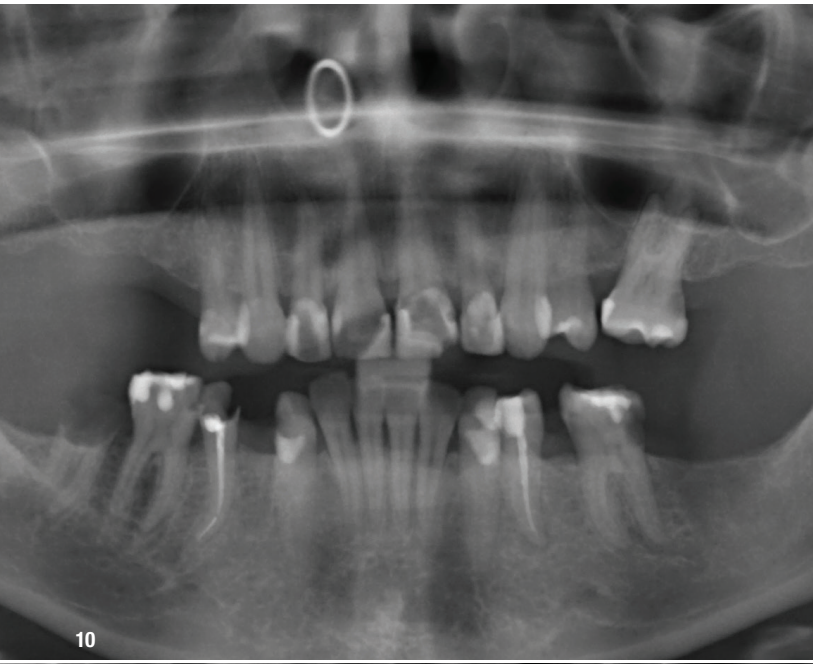


Fig. 7: Case 3—panoramic radiograph of the patient at presentation. **Fig. 8:** Placement of pterygoid implant into the maxilla. **Fig. 9:** Radiograph of the patient after bridge delivery.

was seated 14 days after impression taking with screwed impression copings (Fig. 2).

Case 2

The next case involved a 64-year-old female patient who sought to have missing teeth on the right side of her upper jaw replaced (Fig. 3). The patient had extensive maxillary sinus pneumatisation and a narrow alveolar ridge. Owing to her history of chronic sinus infection, a sinus lift procedure was not a desired option. Traditional implant options were not feasible owing to the narrow ridge. ROOTT C3016ms implants were placed in positions #15 and 14 (Figs. 4 & 5). The patient received an immediate temporary bridge constructed at the chairside after the surgery (Fig. 6). Three months after the surgery, impressions were taken with screwed impression copings, and a screw-retained metal bridge was seated three weeks later.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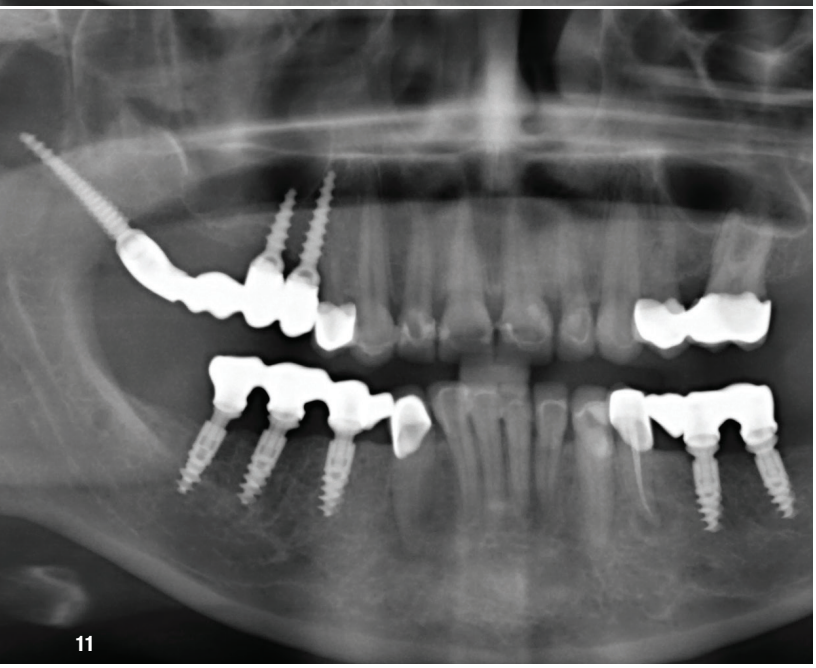
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Fig. 10: Case 4—panoramic radiograph of the patient at presentation.
Fig. 11: Radiograph of the patient at the completion of treatment.

Case 3

In a similar case, a 54-year-old female patient sought a solution for missing teeth on the right side of her upper jaw (Fig. 7). ROOTT C3514m, C3008ms and C3520mp implants were placed in positions #18, 15 and 14 (Figs. 8 & 9).

Case 4

A 34-year-old female patient presented with missing teeth in her right upper jaw (Fig. 10). A similar treatment approach was taken to that used in the previous cases, involving the placement of ROOTT C3512m, C3508m and C3520mp implants in positions #18, 15 and 14 (Fig. 11).

Case 5

A 54-year-old female patient sought to have her complete denture replaced with a fixed solution, without undergoing extensive surgical procedures such as bone grafting or sinus lift (Fig. 12). Owing to her narrow alveolar ridge, it was decided to use standard one-piece tissue-level implants and pterygoid implants for rehabilitation of the upper jaw. The procedure was performed under local anaesthesia after flap elevation. A 2.5 mm pilot drill was used for preparation of all the osteotomies. ROOTT C4520mp implants were placed in positions #18 and 28, ROOTT C3016ms implants with short necks were placed in positions #13, 12, 22 and 23, and a ROOTT C3522mp implant was placed in position #24 (Fig. 13). Early loading was carried out with a temporary denture fabricated at the chairside (Fig. 14). After five days, the key was tried in. One week later, a trial of the metal frame was done, and a further week later, an aesthetic trial was conducted. At the fourth appointment, the metal–resin denture was screwed in (Fig. 15). The patient left the clinic with a fixed solution without having to undergo extensive surgical procedures.

Discussion

These case reports demonstrate the use of pterygoid implants for restoration of the maxilla in various cases. With this approach, atrophic jaws could be rehabilitated without the need for additional surgical procedures such as sinus lift and bone grafting.[1] The use of pterygoid implants allows for the resolution of many cases that cannot be managed with standard implants within a short period, effectively solving the patients' problem of edentulism.[3,6,8,10–12] The high success rates of pterygoid implants in patients with minimal bone levels and minimal complications make them an attractive option for treating such patients.[6,13,14]

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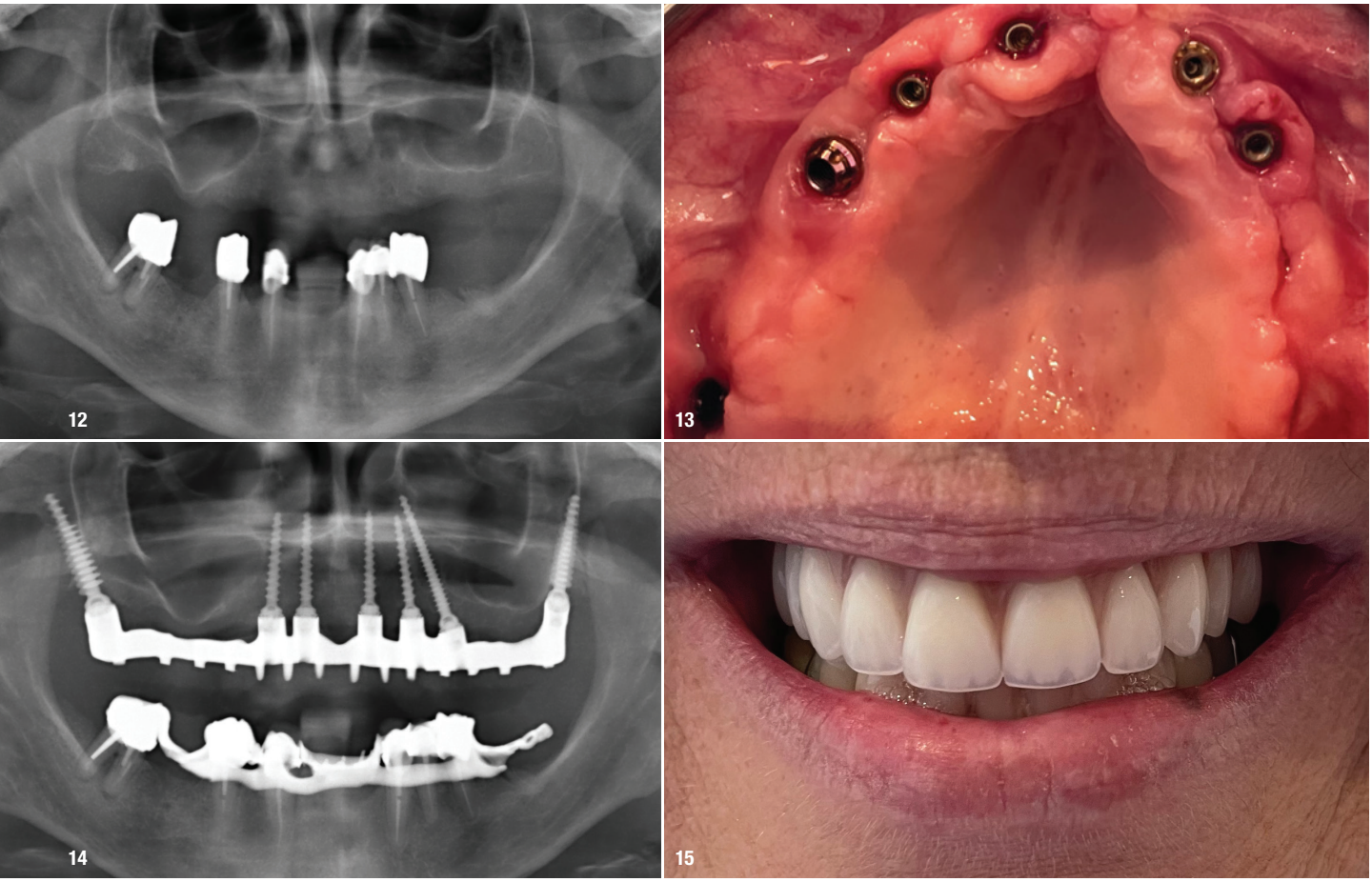

Fig. 12: Case 5—panoramic radiograph of the patient at presentation. **Fig. 13:** Healed situation after pterygoid implant placement in the maxilla. **Fig. 14:** Radiograph of the patient at the completion of treatment. **Fig. 15:** Clinical photograph of the patient at the completion of treatment.

about the author

Dr Henri Diederich is a highly accomplished dentist with over 35 years of experience. He received his doctorate in dentistry from the Free University of Brussels (ULB) in 1985, after which he established his own successful dental clinic in Luxembourg. As a Sworn Expert at the Luxemburgish Court of Justice, Dr Diederich has gained a reputation as a leading authority in legal dentistry. He is also the founding member and President of the Implantoral Club Luxembourg and President of the Open Dental Community. In addition to his extensive involvement in professional organisations, Dr Diederich has also held the position of Maître de stage at the University of Nancy, France, and is responsible for regular training seminars for the management of implantation in atrophied bone at Queen Mary University in London. Dr Diederich is a renowned international lecturer and has published numerous papers on immediate loading in atrophied bone. He is the inventor of the CF@O protocol and the Hybrid Plates HENGG-1/4, for which he holds patents (Nr 93019 and 93186). His memberships in various professional organisations, including ICOI, DGOI, BDIZ EDI, DGZMK, and BAFO, attest to his dedication and expertise in the field of dentistry.

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Literature

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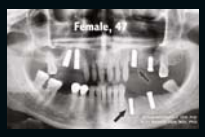

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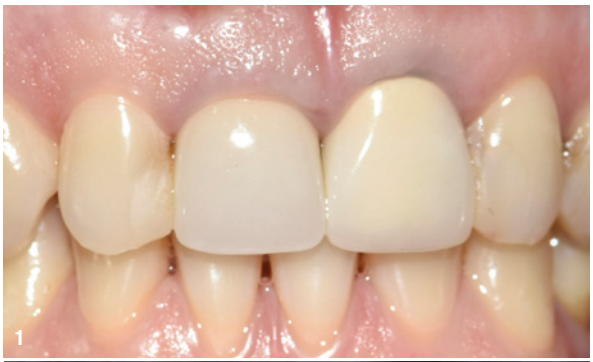
Restoring anterior aesthetics with two-piece zirconia implants

Dr Saurabh Gupta, India

Zirconia implants are one of the newest and most exciting developments in dental implantology. Multiple studies have proved that zirconia implants induce little to no peri-implant tissue inflammation and allow for high levels of epithelial attachment. Additionally, these implants look more natural; hence, they provide improved aesthetics. Furthermore, they do not have metal components, which makes them ideal for people with metal sensitivities and patients who would prefer their implants to be metal-free.[1–3]

Aesthetics around natural teeth can be challenging under normal circumstances. When teeth are to be replaced with implants, especially in the aesthetic zone, gingival tissue can complicate the desired results. In a patient with a thin gingival biotype, the grey of a titanium implant will show through, leading to a darker gingiva overlying that area and decreasing the aesthetics of the patient's smile. A patient who has had a missing anterior tooth for a period, resulting in resorption of the facial plate even with a thicker gingival biotype, will have less bone over the implant on the facial aspect of the ridge. The result, like with a thin gingival biotype, will be a shadow over the underlying implant that hampers the aesthetic result and does not blend with the adjacent tissue around the natural teeth.[4–7] In the following, a clinical case is described to demonstrate the use of two-piece ceramic implants in the anterior aesthetic zone to avoid this aesthetic difficulty.



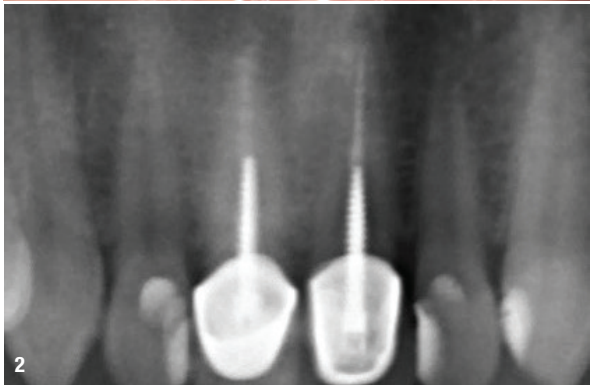


Fig. 1: Initial situation. **Fig. 2:** Initial radiograph.

Case presentation

A 44-year-old male patient presented to our office to learn about options for replacement of his failing maxillary central incisors after undergoing partial root canal therapy. He also complained of greyish gingiva around the endodontically treated teeth and desired a metal-free solution (Figs. 1 & 2). Photographs of his teeth when smiling were taken to assess the overall aesthetic risk of the case. Treatment options were then discussed with the patient. After reviewing the options, the patient chose to have the endodontically treated teeth extracted and replaced with two-piece zirconia implants and metal-free crowns.

Surgical procedure

The guidelines for zirconia implant placement in the anterior zone and the drilling protocol specified by the manufacturer (Zeramex XT, Dentalpoint) were followed. It is important to note that implant sites must be prepared adequately to prevent excessive implant insertion torque and that the use of a bone tap is necessary. Both the vertical and transverse insertion depth of the zirconia implant are important for prosthetic success. The implant can be placed between 1.6 and 0.6 mm supra-crestally because the neck section (0.6 mm) is smooth. The insertion depth is determined by the height of the gingiva and the existing bone around the adjacent teeth.

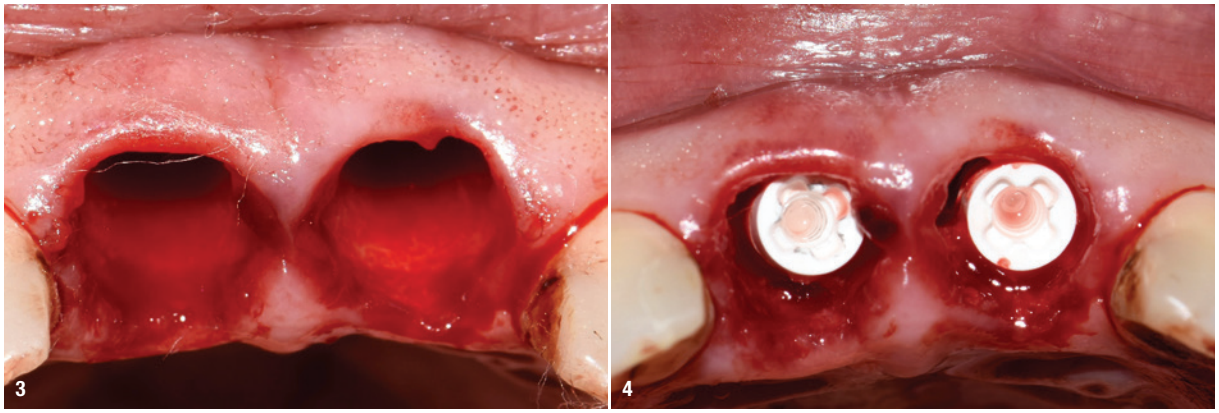


Fig. 3: After atraumatic extraction of teeth #11 and 21. **Fig. 4:** Immediate placement of Zeramex XT implants.

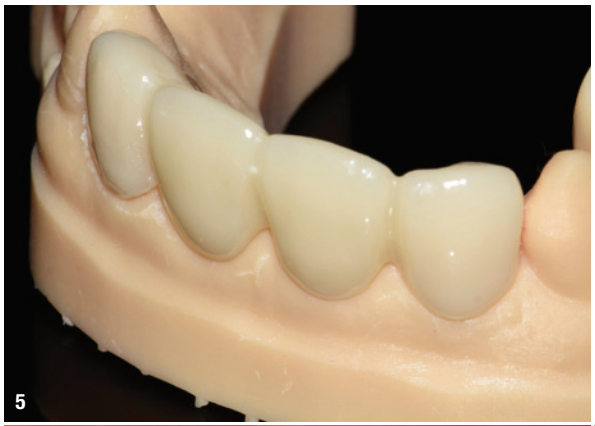
After atraumatic extractions and laser curettage, two-piece zirconia implants (4.2 × 12.0 mm) were placed in sites #11 and 21 under local anaesthesia, cover screws were placed and the sites closed to allow for healing (Figs. 3 & 4). After 72 hours, the PMMA temporary crowns were inserted (Fig. 5).

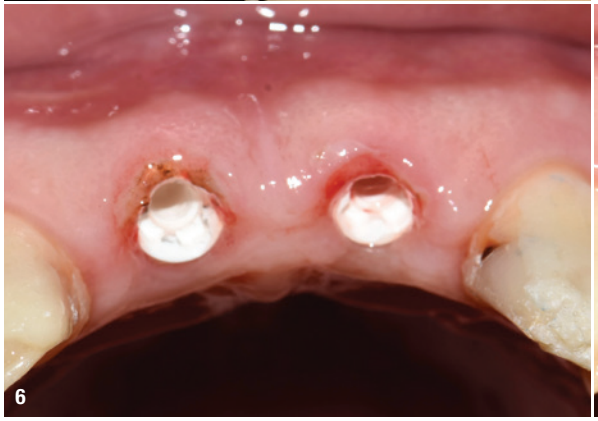
After a four-month healing period, the second-stage surgery was performed with a 940 nm diode laser, the cover screws were removed and healing abutments were placed for a period of two weeks. Reduced inflammation of the peri-implant soft tissue was noted, demonstrating excellent biocompatibility and host response (Fig. 6).

Angulated abutments (15°), also made of alumina-toughened zirconia like the implants, were placed on the implants with Zeramex XT VICARBO screws (Figs. 7–9). This screw, which is made of longitudinal carbon fibre strands and moulded slightly larger than the internal aspect of the implant, allows absorption of the forces of mastication and provides a hermetically sealed connection. A digital impression was taken for the fabrication of the final crowns (Fig. 10). Zirconia crowns were cemented to the abutment heads with glass ionomer cement to provide natural aesthetics. Instructions were given for maintenance and periodic recall (Figs. 10–12).

Discussion

Owing to rising complications observed in some clinical situations involving the use of titanium dental implants and the growing incidence of peri-implant mucositis and peri-implantitis affecting both the short- and long-term





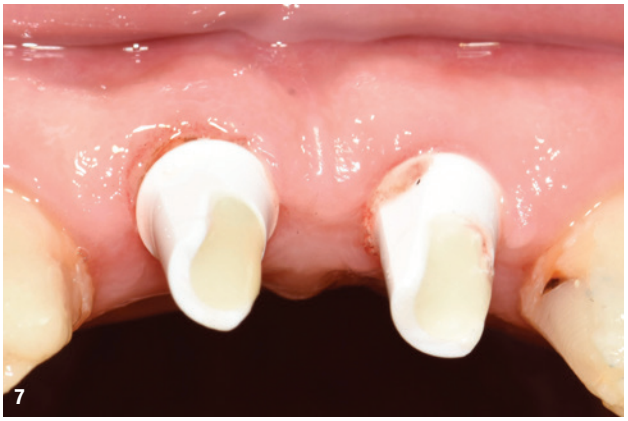


Fig. 5: PMMA temporary crowns placed one week after surgery. **Fig. 6:** Healing after four months. **Fig. 7:** Example of a Zeramex XT implant, abutment and VICARBO screw (metal-free solution).

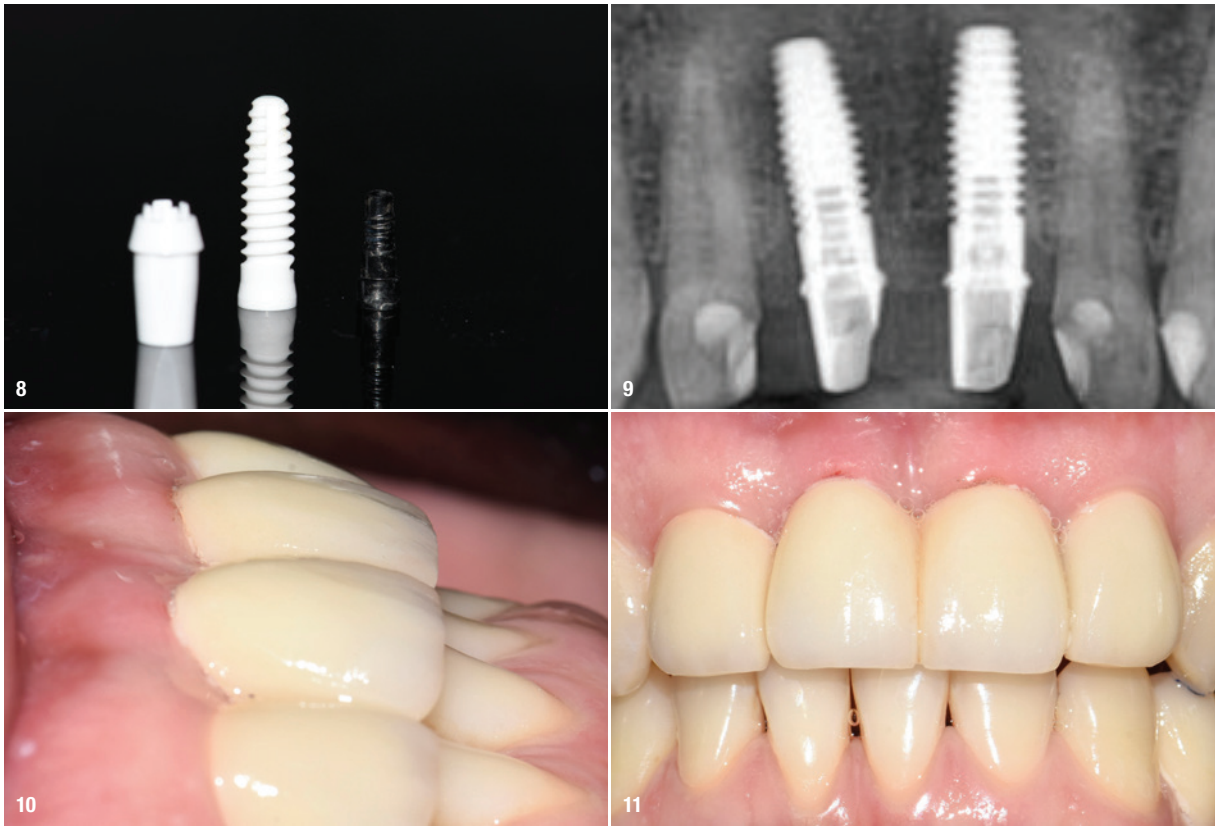


Fig. 8: Angulated zirconia abutments in position. **Fig. 9:** Four-month post-op radiograph. **Fig. 10:** Zirconia crowns *in situ*, lateral view. **Fig. 11:** Zirconia crowns *in situ*, frontal view.

survival rates of titanium dental implants, the development of alternative materials to address these has been pursued. Zirconia has been shown to have similar osseointegration success to titanium, offer a soft-tissue response that is superior to that of titanium and have less of an affinity for plaque collection compared with titanium surfaces.

Also, the peri-implant soft tissue around titanium and zirconia abutments has been shown to have colour differences compared with the soft tissue around natural teeth, and the peri-implant soft tissue around zirconia has been demonstrated to have a better colour match to the soft tissue than titanium. This can be extrapolated to the aesthetics of the colour of the implant itself. Zirconia implants can be used in aesthetic situations, the white shade of the implant eliminating any potential for darkening of the gingival tissue and providing a more natural final aesthetic result than is possible with titanium implants. Long-term studies are necessary to continue to evaluate the effectiveness and success rates of two-piece zirconia implants.

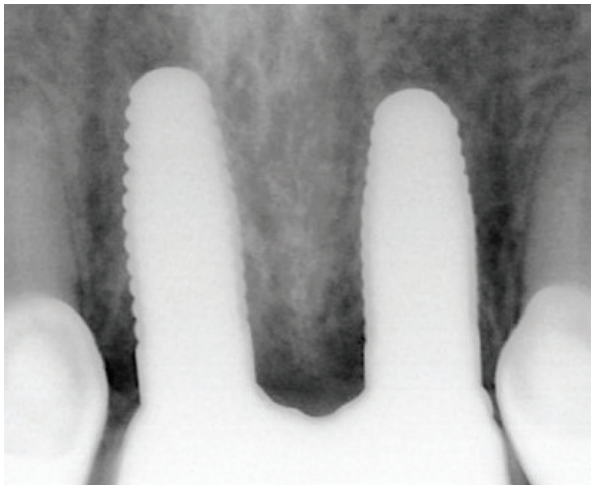


Fig. 12: Radiograph of implants and final crowns.

Literature

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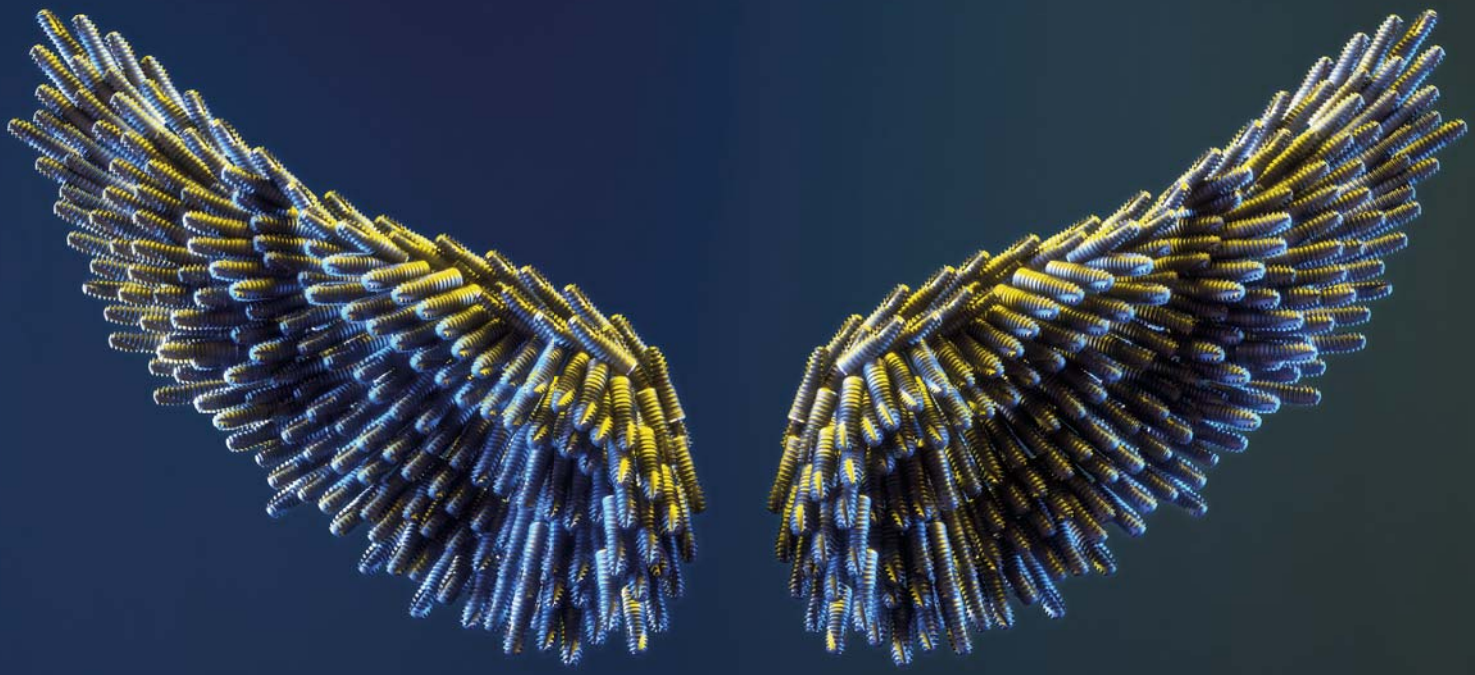

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Resective peri-implantitis therapy with implantoplasty in Crohn's disease

Lucas A. Greilich, Dr Mischa Krebs, PD Dr Maximilian Moergel, Germany

In 1977, Per-Ingvar Brånemark defined osseointegration as a functional ankylosis of the bone on the surfaces of titanium implants.[1,2] Since then, dental implants have evolved and now offer most patients a predictable option for long-term rehabilitation of their masticatory function. However, despite high healing rates of 90 to 95 per cent, certain risk factors predispose to peri-implant inflammation with bone resorption (peri-implantitis).[3,4] This article reviews peri-implantitis and describes resective therapy with implantoplasty in a patient with Crohn's disease.

The risks that can lead to implant failure can be categorised as either generalised systemic factors or localised factors. Table 1 provides an overview of these factors.

Some of these factors can be influenced by the patient (e.g. oral hygiene, smoking); others can be avoided by the clinician through advance treatment planning (e.g. cement residue, implant position). Still others, however, cannot be influenced (e.g. osteoporosis, diabetes mellitus). However, no valid therapy has been established that would result in complete healing of the progressive bone loss.

Prevalence

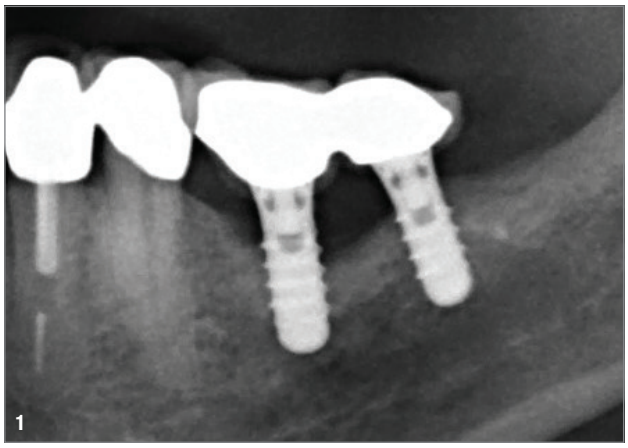
Peri-implantitis affects a significant number of patients.[5] Derks et al. reported the prevalence of peri-implant mucositis to be 19 to 65 per cent and peri-implantitis to be 1 to 47 per cent. The wide variation in the literature is due to the high degree of variability in the underlying definition of peri-implantitis, particularly with regard to the type and extent of bone resorption.[6,7]

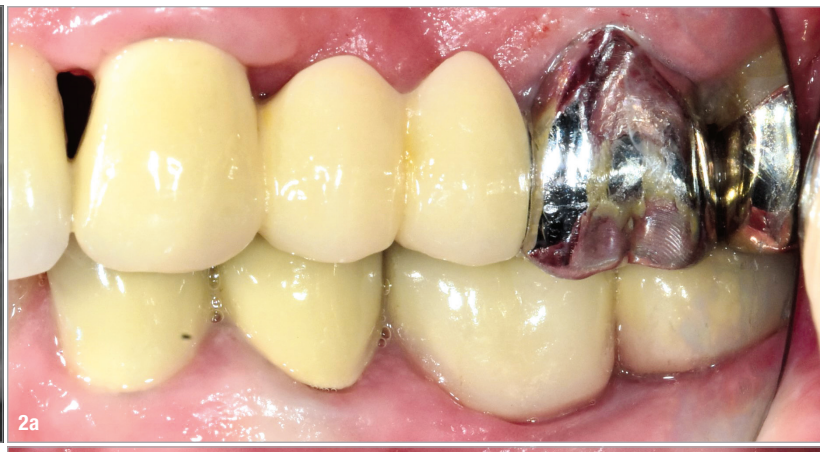
Aetiology

Peri-implantitis is primarily caused by anaerobic oral pathogens (e.g. *T. forsythia*, *P. nigrescens*, *A. actinomycetemcomitans*, *P. gingivalis*, *T. denticola*).[8–12] Titanium-

Generalised systemic risk factors	Localised risk factors
Diabetes mellitus	Incorrect implant position
Rheumatoid arthritis	Locally limited oral hygiene ability
Osteoporosis	Keratinised mucosa < 2 mm
Periodontitis	Cement residue
Radiation exposure	Mechanical overload
Antiresorptive drugs	Frequently replaced abutments
Crohn's disease	Abutment emergence profile too steep (< 30°)
IL-1 polymorphism	
Previous implant loss	
Poor oral hygiene	
Irregular recall schedule	
Nicotine abuse	

Table 1: Factors that can lead to peri-implantitis.





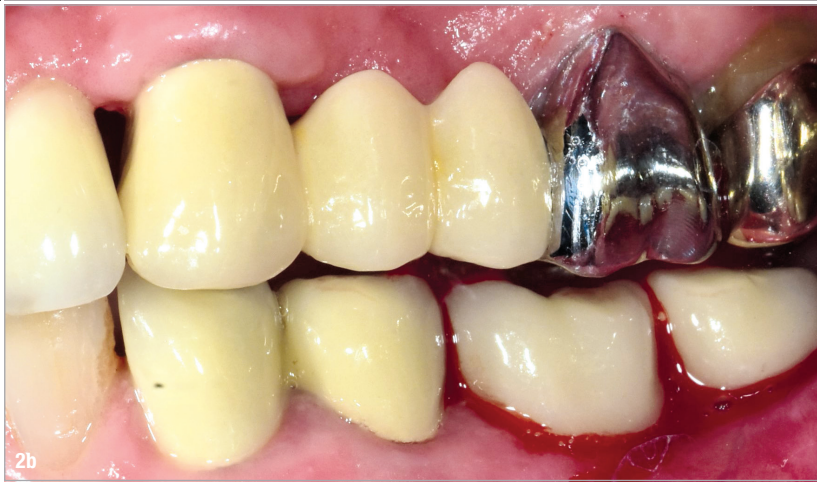


Fig. 1: Panoramic radiograph. Bowl-shaped peri-implant bone resorption at implant 36, less pronounced horizontal bone resorption at implant 37, splinted crowns on implants 36 and 37. **Fig. 2a:** Initial situation (photographed indirectly with a mirror). Narrow keratinised mucosa at sites 36 and 37. **Fig. 2b:** Ten seconds after probing with a WHO probe. Bleeding on probing as a sign of an inflammatory event in combination with radiographic bone resorption > 2.0 mm; diagnosis of peri-implantitis.

affine *S. aureus* also appears to play an important role in the development of peri-implantitis.[13] Histological analysis also shows that leukocytes, B cells, and T cells are significantly increased.[14,15]

Definitions

In 2017, at the World Workshop in Chicago, USA Schwarz et al. defined peri-implantitis as a pathological inflammatory condition in the peri-implant soft tissue that induces progressive bone resorption.[16] Bleeding on probing has been established as a mandatory finding for the diagnosis of mucositis, while radiographic evidence of bone loss, in combination with clinical signs of inflammation, is indicative of peri-implantitis.[16–20]

Untreated mucositis can progress to peri-implantitis.[20–22] The distinction is important because mucositis may be reversible with consistent plaque removal, whereas peri-implantitis cannot be brought to long-term healing. Progressive bone resorption subsequently poses a risk of implant loss.[16]

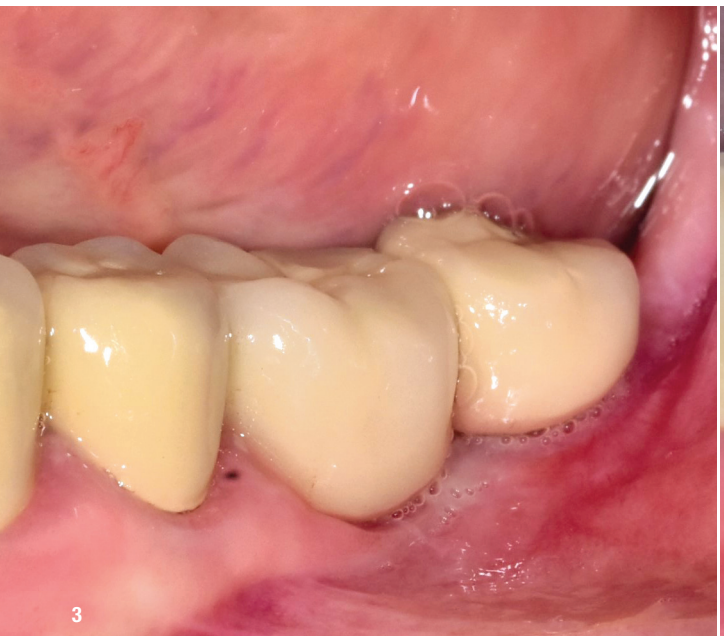
In daily clinical practice, the diagnostic problem is to decide when the extent of bone resorption can still be considered bone remodelling or when peri-implantitis must be assumed. In the absence of baseline radiographs after implant placement, Sanz and Chapell recommend diagnosing peri-implantitis at 2.0 mm vertical bone loss. If baseline radiographs are available after implant placement, a more sensitive value may be used. Krebs et al. compared different definitions of peri-implantitis. They recommend a threshold of 1.5 mm of radiographic bone loss in the presence of postoperative radiographs.[7]

Treatment

Treatment of peri-implantitis can be divided into conservative and surgical approaches; the latter of which may be regenerative or resective in nature. Derived from periodontology, the core issue is adequate plaque control.[12] Plaque reduction is performed with plastic or carbon curettes to avoid damaging the delicate titanium surfaces with metal curettes.[23,24] Other plaque reduction options include ultrasound, air-abrasive devices, diode lasers, or antiseptics (e.g. citric acid or chlorhexidine).[25–27] Treatment may be combined with topical or systemic antibiotics.[28]

The surgical therapeutic approach to peri-implantitis is derived from that of open periodontal surgery.[29] Regenerative therapy approaches form a narrow range of indications, namely those in which (mainly) three-wall defects—which must be sufficiently steep and deep—can be filled with bone substitute.[30] The therapeutic success of these regenerative measures is largely determined by whether complete decontamination of the implant surface has been achieved.

Often, however, generalised bone resorption occurs with successively exposed implant threads. Here, implantoplasty is an option. In this procedure, the contaminated



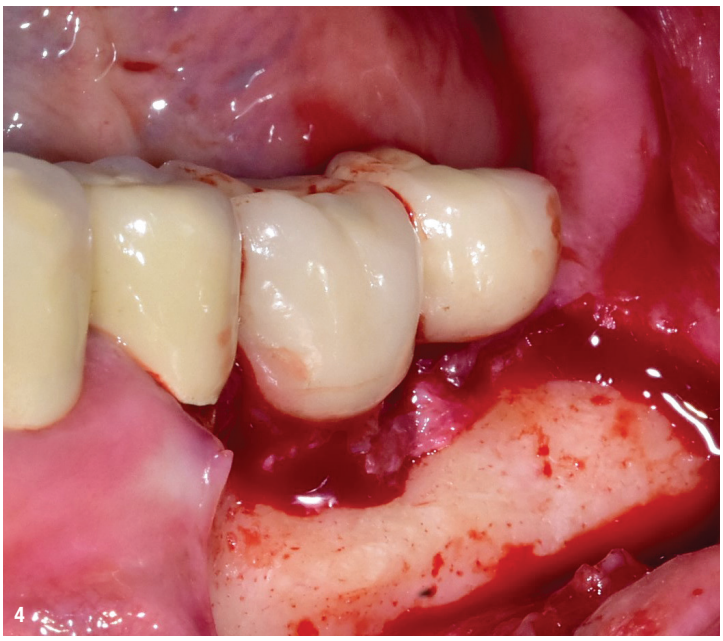


Fig. 3: Preoperative situation. Hyperaemic peri-implant mucosa with inflammatory changes at sites 36 and 37. **Fig. 4:** Mobilisation of a mucoperiosteal flap after a trapezoidal incision. Granulation tissue infiltrating the pronounced bone defect at site 36. Adequate individualised plaque control is no longer possible for this patient. The exposed, submerged implant threads provide optimal conditions for pathogens.

implant surface is smoothed by ablation of the exposed implant threads (red diamonds, yellow diamonds, Arkansas stones), making it more difficult for plaque to accumulate.[31]

It is important not to treat the implant surface with silicone polishers ("brownie", "greenie"), as silicone residues in the peri-implant soft tissue are not biocompatible and can lead to foreign body reactions and reinflammation.[32] Free titanium particles do not interfere with cellular activity (based on research to date), but may cause metallic discoloration of soft tissue, which constitutes an aesthetic compromise.[33–35]

Case report

Medical history

A 61-year-old female patient was referred to our day clinic for maxillofacial surgery. She presented with complaints related to implants placed in 2009. The patient's medical history included Crohn's disease, which had been diagnosed in adolescence and was currently well controlled. She had been in remission for eight years and was not taking any medication at the time.

Clinical findings

After clinical examination and evaluation and a panoramic radiograph, peri-implantitis was diagnosed on the splinted implants 36 and 37 based on clinical bleeding on probing and radiographic bone loss > 2.0 mm (Figs. 1 & 2). The width of the keratinised mucosa was less than 2.0 mm on implant 36 and completely lost on implant 37. The surrounding free mucosa showed reactive hyperaemic changes with associated oedematous swelling (Fig. 3).

> "In daily clinical practice, the diagnostic problem is to decide when the extent of bone resorption can still be considered bone remodelling or when peri-implantitis must be assumed."

Treatment

After detailed consultation and explanation, the patient was scheduled for resective peri-implantitis therapy by implantoplasty. Under local anaesthesia (Articaine 1:200,000), a strictly marginal incision was made (to preserve the remaining keratinised mucosa) and a trapezoidal flap was elevated with distal relief incisions at implant 37 and mesial relief incisions at tooth 35 (Fig. 4). After mechanical decontamination with a curette, an implantoplasty was performed on the exposed implant surfaces (Fig. 5). The implant threads were removed until a smooth implant surface was achieved with less risk of plaque accumulation and recontamination. During an implantoplasty, it is important to strictly level only the im-

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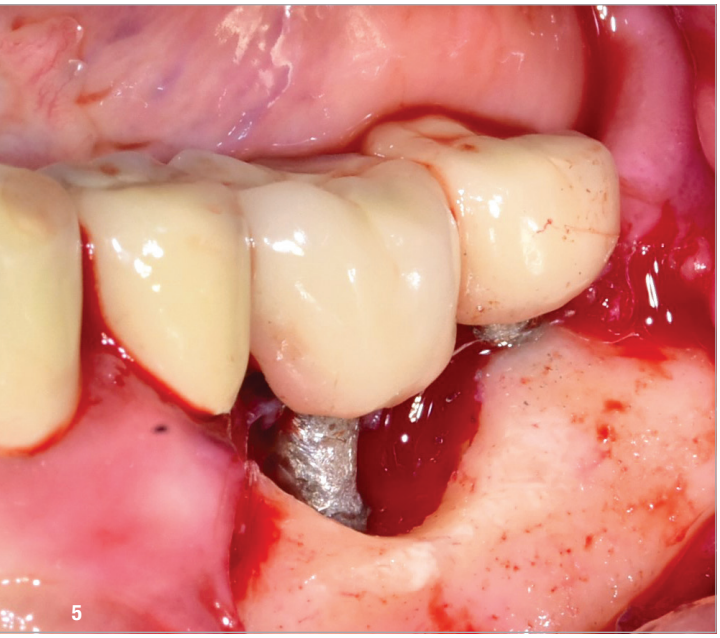

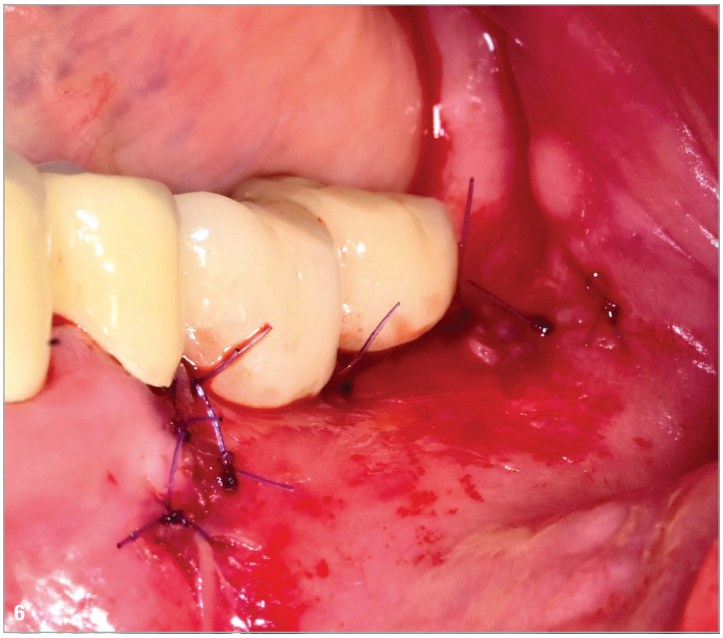

Fig. 5: After decontamination and implantoplasty of implants 36 and 37. The levelling of the implant threads is intended to prevent early recontamination of the implant surface by pathogens. Leaving the superstructure in place makes an implantoplasty more difficult. **Fig. 6:** Wound closure. Monofilament sutures (Monofast; mectron) are used for tension-free and saliva-tight adaptation of the wound margins.

plant threads, so as not to reduce the implant diameter (risk of fracture). Finally, the surface was polished with an Arkansas stone. The wound was closed with a 5/0 monofilament suture material (Monofast; mectron) after thorough irrigation with chlorhexidine (Chlorhexamed forte alcohol-free 0.2%; GSK) and saline solution (Fig. 6).

The patient received postoperative instructions and analgesic therapy (paracetamol 1 g). Sutures were removed after seven days. The patient was referred back to the referring general dentist with the request to re-evaluate the case and to perform regular dental prophylaxis in six months at the earliest. Further appointments were scheduled at our day clinic for expansion of the keratinised mucosa with a free mucosal graft after healing. Figure 7 illustrates the situation 20 days postoperatively.

Discussion

This case report demonstrates how risk factors (reduced height of keratinised mucosa, splinted superstructure, limited hygiene ability, Crohn's disease) can influence the development of peri-implantitis.

Crohn's disease and ulcerative colitis have become more prevalent in developed industrialised countries in recent decades, making this condition increasingly relevant for dentists. In Germany, 322 new cases of Crohn's disease are diagnosed per 100,000 inhabitants per year. Patients in their third and fourth decades of life are the most likely to develop the disease, although apparently young and healthy people can also be affected.[36]

Crohn's disease is an inflammatory bowel disease characterised by transmural ulcers of the bowel wall. Unlike Crohn's disease, ulcerative colitis can affect the entire digestive tract (from the mouth to the anus). In the dental office, therefore, close examination of the oral mucosa should be performed in these patients in order to detect any lichenoid/leukoplakic changes, lip and gingival swelling, pseudo-polyps or aphthoid/ulcerative lesions ("cobblestones") at an early stage.[37]

The disease progresses in phases, being completely asymptomatic in remission, while patients suffer from abdominal cramps, diarrhoea, weight loss, vomiting and fever during an active phase. The disease is treated with various pharmacological drugs, prescribed according to a graduated scheme.

Therefore, when examining the patient's medical history, the dentist should pay close attention to immunosuppressants (prednisolone, mesalazine, azathioprine, methotrexate) and biologics (infliximab, adalimumab, vedolizumab, ustekinumab). Given the patient's chronic inflammatory bowel disease, non-steroidal anti-inflammatory drugs (ibuprofen, aspirin, diclofenac) should be avoided, as they may irritate the gastric mucosa and trigger an episode.

In a systematic review, Voina-Tonea et al. identified a statistically significant association between Crohn's disease and early implant loss.[36] Malnutrition has been implicated as a cause of impaired osseointegration; autoimmune inflammatory events may have a direct effect on bone formation. In addition, possible side effects of long-term

cortisone therapy on implant survival are conceivable. Other known side effects that may directly or indirectly affect implant survival include hypertension, diabetes mellitus, gastritis type C, osteoporosis, glaucoma, and an increased risk of infection.

Three retrospective studies and one prospective study were evaluated In the above-mentioned review, although the studies by van Steenberghe et al. and Alsaadi et al. were limited by the very small number of participants of n = 2 and n = 3, respectively.[38,39] The extent to which Crohn's disease played a specific role in the development of peri-implantitis in the present case remains hypothetical, but must be considered in the search for a therapy.

Due to the horizontal (site 37) and bowl-shaped (site 36) bone defect configuration, a regenerative therapy approach was not considered promising (Figs. 1 & 5). Shallow bone defects create extremely poor conditions for a regenerative therapeutic approach and are difficult to augment stably over the long term.[40,41] To slow down peri-implantitis, especially outside the aesthetic zone, a resective therapeutic approach was chosen, which facilitates complete decontamination by "levelling" the implant threads and makes early recontamination of the implant surface more difficult.

> "In a systematic review, Voina-Tonea et al. identified a statistically significant association between Crohn's disease and early implant loss."

Removal of the superstructure should always be discussed with the patient and the general dentist prior to any proper implantoplasty. Leaving the superstructure in place will make levelling the exposed implant threads much more difficult and may compromise the result. In complex cases, it may even be advisable to close the implants with cover screws and allow them to re-heal subgingivally after bone grafting. In the present case, the patient chose not to have the superstructure removed for economic reasons.

The clinical and radiographic success of peri-implantitis therapy can only be evaluated retrospectively after several years, and the patient and clinician should be aware that long-term implant retention depends on many factors. Because peri-implantitis is a multifactorial process, there are factors that are beyond the control of either the patient or the clinician (Table 1), and despite the best efforts of both, implants may ultimately have to be explanted.

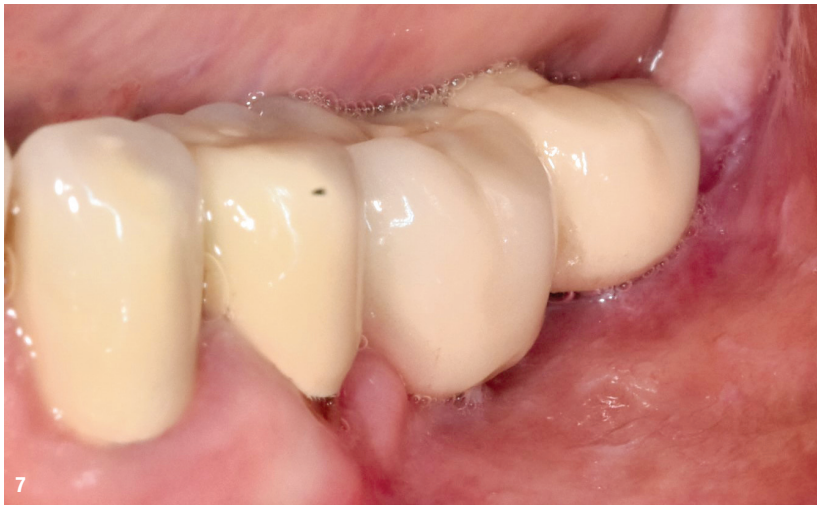

Fig. 7: Progress of wound healing after 20 days.

Note: This article was not funded by any external source. The authors report no conflicts of interest. The clinical case presented here is a recent case for which the long-term evaluation (follow-up) is still pending.

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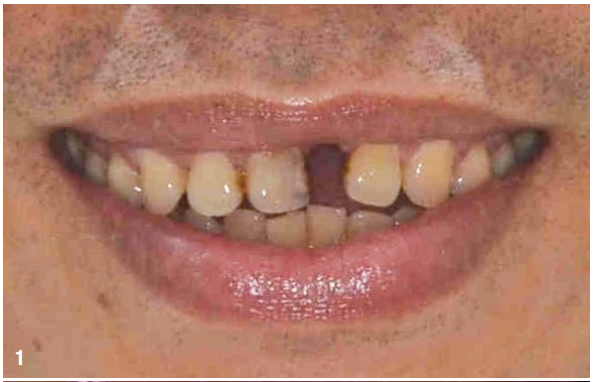
Interdisciplinary approach for a missing maxillary incisor

Dr Tran Hung Lam, Vietnam

Implant therapy aims to provide patients with a highly predictable treatment outcome, good long-term stability of the treatment results and a low risk of complications during the healing and follow-up phases. The growing demand for functional and aesthetic restoration of missing teeth has become an important challenge. This is especially true in the anterior zone, as various local risk factors can compromise the predictability of the results. Therefore, the clinician must carefully examine the patient's risk profile before establishing the treatment plan.[1]

The International Team for Implantology recommends immediate implant placement (Type 1) in the presence of ideal anatomical conditions. This includes (i) a fully intact facial bone wall with a thick-wall phenotype (> 1 mm) at the extraction site, (ii) a thick gingival biotype, (iii) no acute infection at the extraction site and (iv) a sufficient volume of bone apical and palatal to the socket to allow implant insertion in the correct 3D position with sufficient primary stability. When these ideal conditions are not met, it is suggested to place implants after four to eight weeks of soft-tissue healing (Type 2). If primary stability cannot be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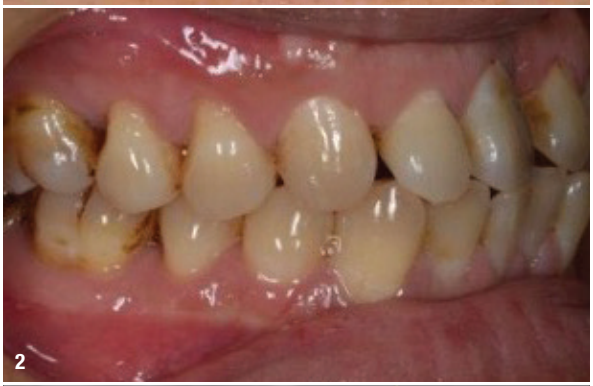
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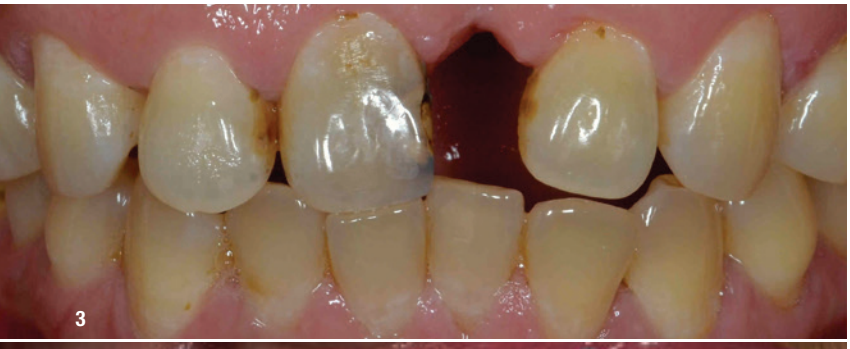
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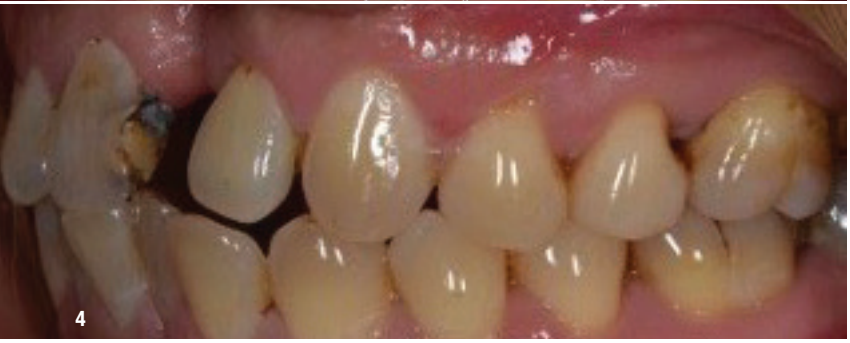
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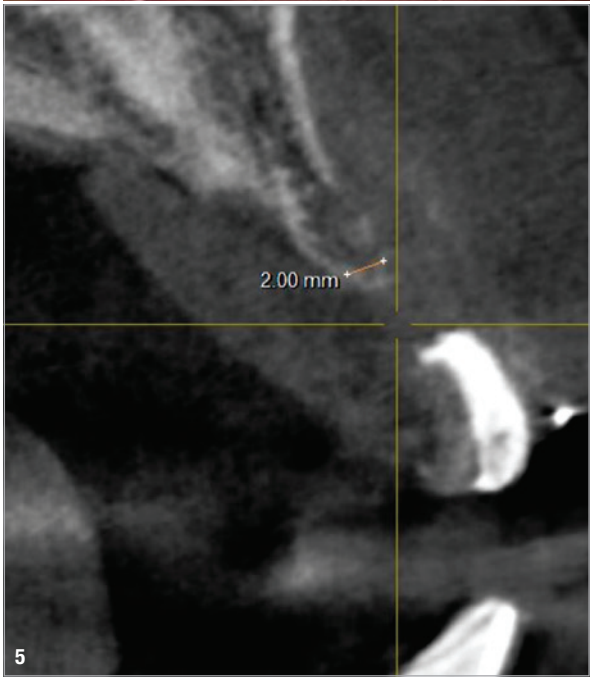

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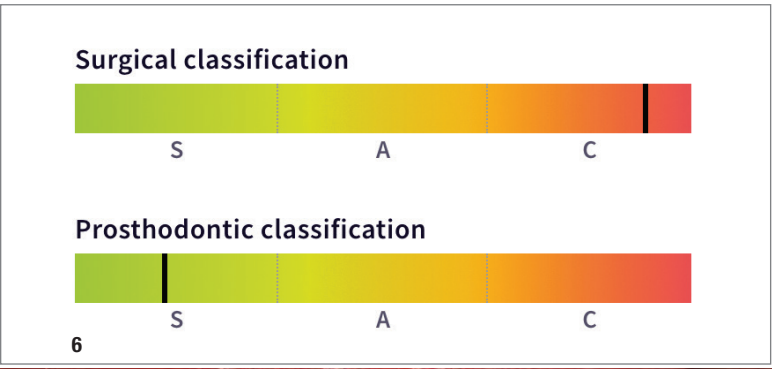

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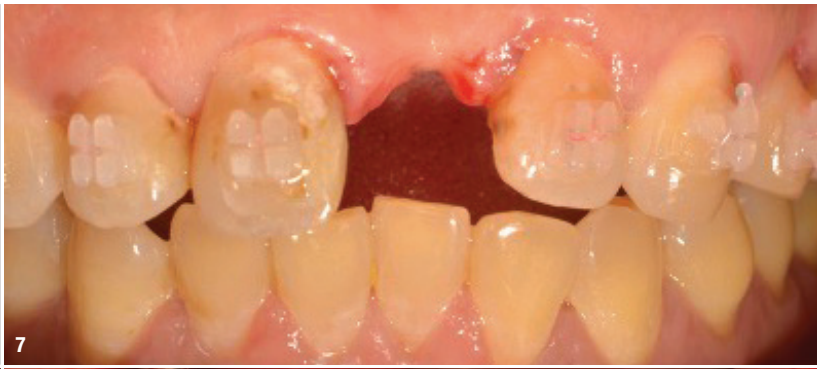
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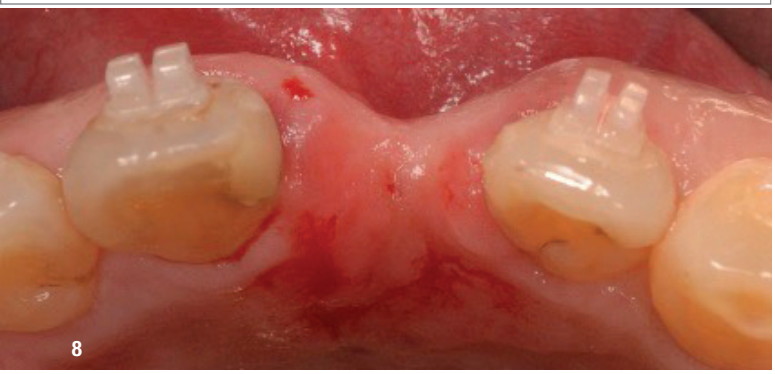
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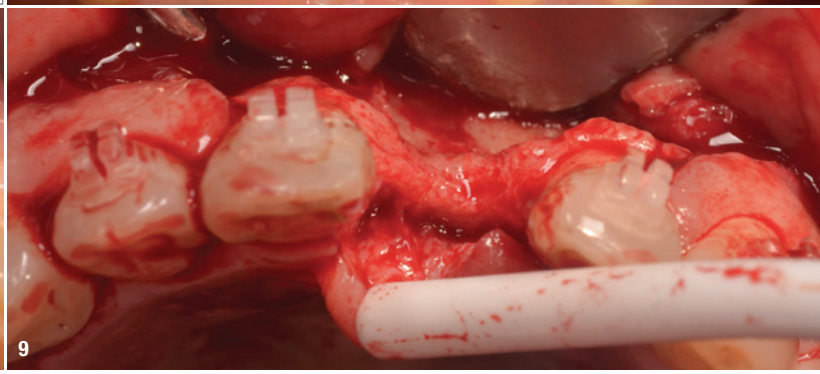
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achieved after four to eight weeks, the post-extraction healing period should be extended to allow for partial bone healing (Type 3).[1] Type 4 is the placement of the implant into a fully healed site.[2]

An adequate amount of bone is needed to be able to place the implant in an ideal prosthetically driven position. If adequate bone volume is not available, guided bone regeneration (GBR) techniques should be used for ridge augmentation before implant placement.[3]

The following case report describes an interdisciplinary treatment that included orthodontic therapy, GBR, implant placement and fixed restorations. A fixed orthodontic appliance with ceramic brackets was used to level and align the teeth and to gain space for implant placement in a central incisor location. Because of the complexity of this clinical case, GBR was first carried out with a non-resorbable membrane and a bovine bone grafting material, and after six months, an implant was placed.

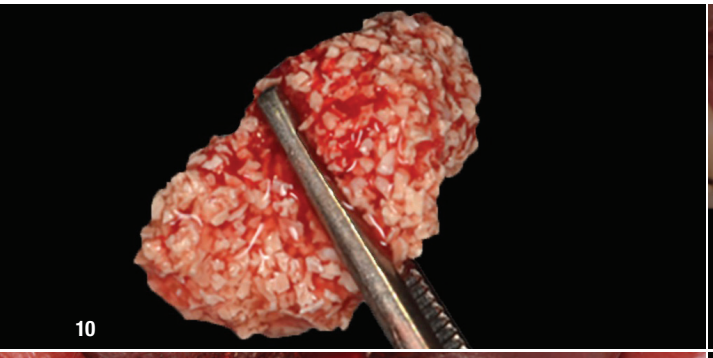
Initial situation

A systemically healthy 48-year-old male patient came to our clinic seeking an aesthetic and functional treatment for a missing anterior tooth. He reported being a non-smoker, taking no medication and having no allergies. His chief complaint was feeling very embarrassed to talk and smile in public because of his missing tooth. He desired a fixed restoration and an attractive smile. His dental history revealed the loss of tooth #21 during an accident over 20 years before. It had been restored with a provisional restoration. Since then, he had noticed that the space left by the central incisor was slowly being closed by the adjacent teeth.

The extra-oral examination revealed a medium smile line with an impaired mesiodistal proportion of the anterior teeth. Owing to the limited mesiodistal space at position #21, the provisional restoration looked small and narrow. Moreover, the anterior teeth were not level, resulting in a reverse smile. For the intra-oral examination, the provisional restoration was removed. The neighbouring teeth were mesially tilted (Fig. 1). Since the residual ridge was atrophic, a severe horizontal ridge defect was apparent, and secondary caries was present in tooth #11 distally (Figs. 2–4). The radiographic assessment (CBCT) revealed a narrow crestal bone width at position #21 and no local infection (Fig. 5).

The SAC classification assessed the potential difficulty, complexity and risk of the implant-related treatment. The case was classified as surgically complex and prosthodontically straightforward (Fig. 6).

After evaluating the patient's wishes and discussing the treatment options, it was decided first to perform orthodontic treatment and then GBR and finally to place a Straumann BLX implant. Straumann BLX implants are made from the material Roxolid and have the SLActive surface. These unique properties enable enhanced control over insertion torque to achieve optimal primary stability, which is a fundamental feature in treating this type of clinical scenario.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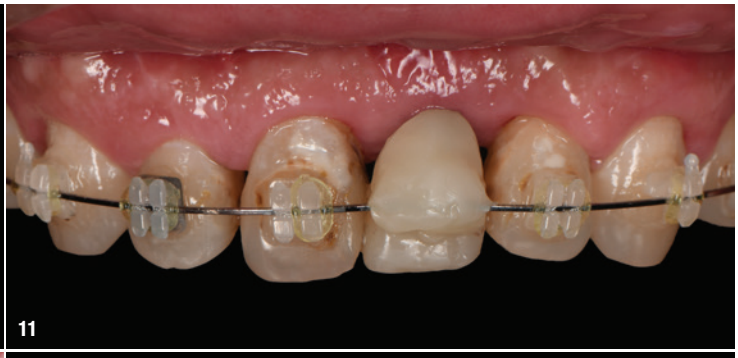
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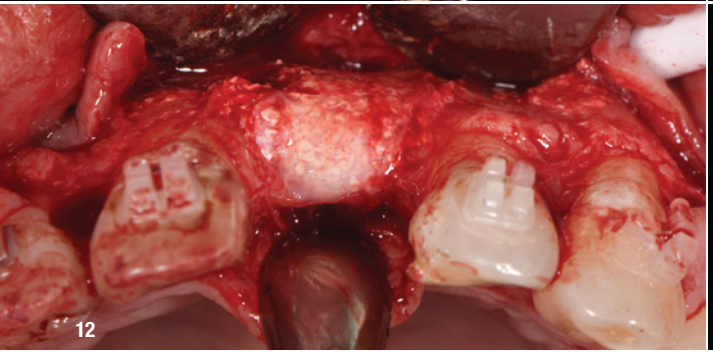
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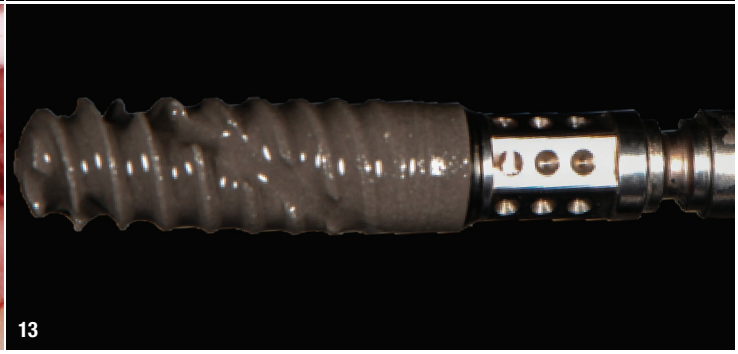
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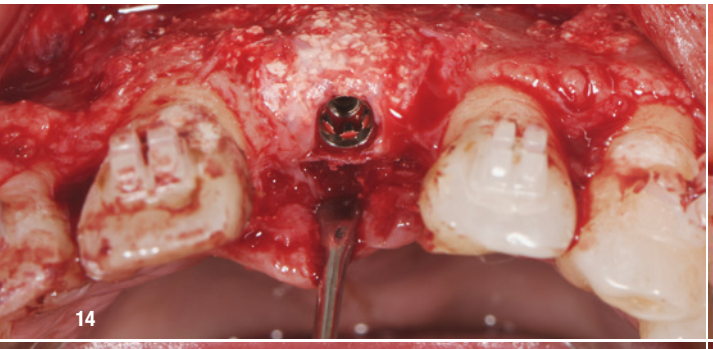
Treatment planning

Treatment would involve the following:

1. provision of oral hygiene instructions and non-surgical periodontal treatment;
2. digital planning of dental space distribution and aesthetics;
3. restoration of the carious teeth and orthodontic treatment to increase the mesiodistal gap at position #21 and to level and align the smile curve (Figs. 7 & 8);
4. GBR using a non-resorbable membrane and bone grafting material;
5. membrane removal after six months and implant insertion in a prosthetically driven position;
6. delivery of a screw-retained temporary crown on implant #21;
7. crown preparation and restoration of tooth #11; and
8. delivery of a screw-retained definitive crown on implant #21.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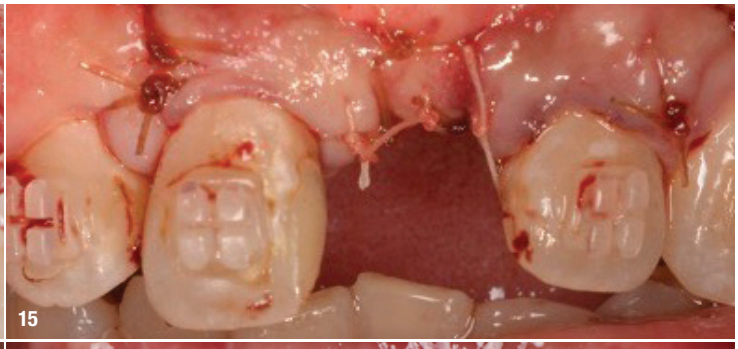
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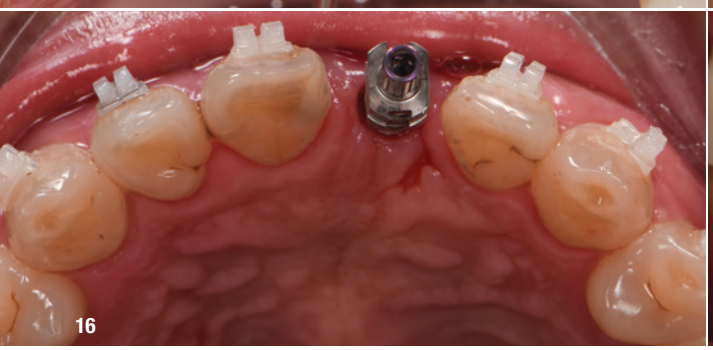
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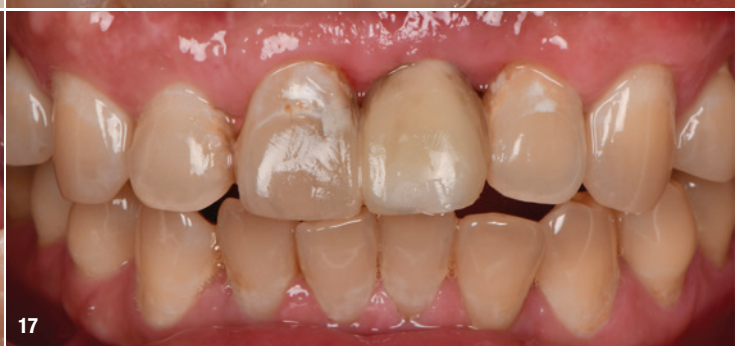
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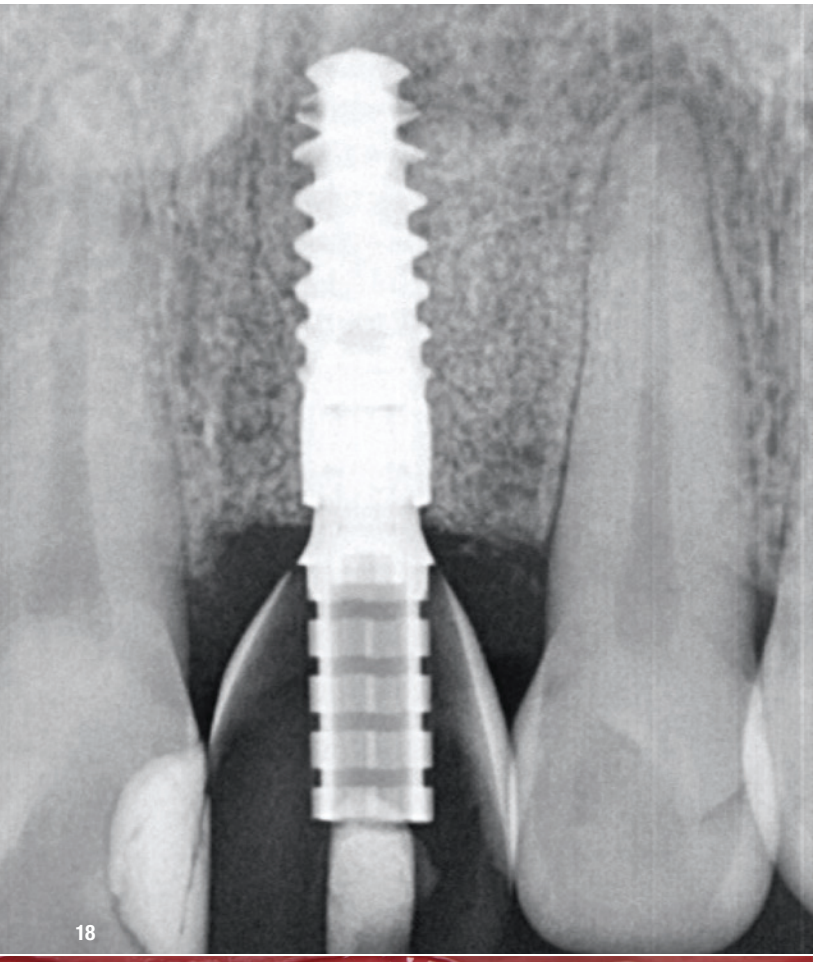
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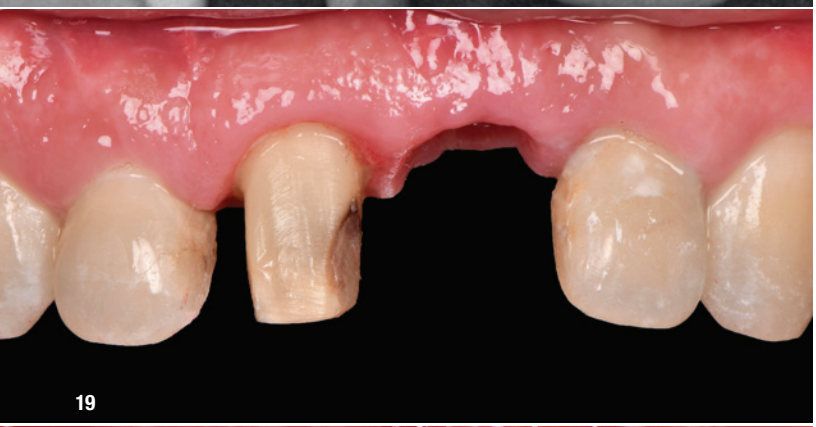
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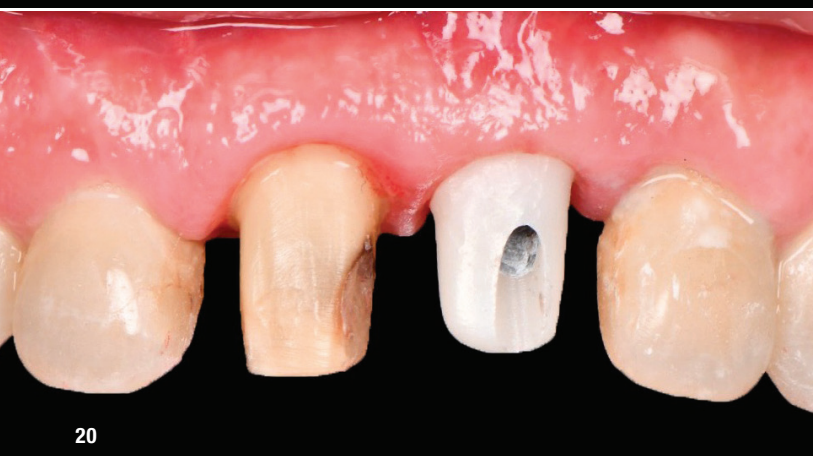
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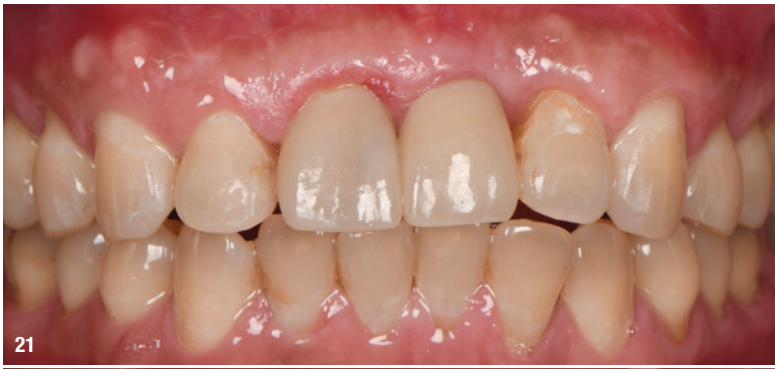
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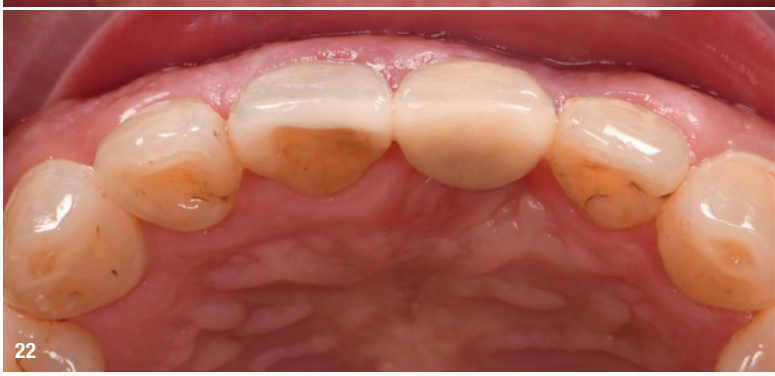
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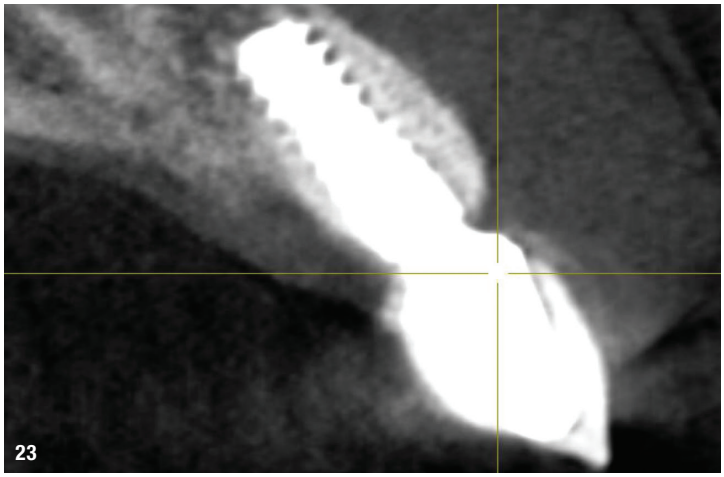
Surgical procedure

Owing to the limited bone availability, the first step of the surgical procedure was GBR using a non-resorbable membrane and bone grafting material. Local anaesthesia was performed with 2% lidocaine and 1:100,000 adrenaline, and a mucoperiosteal flap with a crestal incision was raised. The flap was carefully separated from the bone, and the surgical access confirmed the limited availability of bone (Fig. 9).

Afterwards, GBR was performed using the bovine material cerabone (botiss biomaterials) for bone grafting. In addition, a non-resorbable membrane to prevent non-osteogenic tissue from interfering with bone regeneration was used (Fig. 10).

The patient was advised to follow a soft diet and use ice packs on the area for the first 48 hours. Moreover, the postoperative prescription included rinsing with an antiseptic solution (0.2% chlorhexidine for 1 minute twice a day for one week), an analgesic (600 mg ibuprofen up to four times a day as required) and an antibiotic (500 mg amoxicillin three times a day for five days).

Two weeks later, at the suture removal appointment, the patient reported no complications with healing. The patient returned six months after surgery for a follow-up evaluation. Healing had continued to progress well, and oral hygiene was good. Furthermore, there was an adequate mesiodistal gap at position #21 for implant placement, thanks to the orthodontic treatment (Fig. 11).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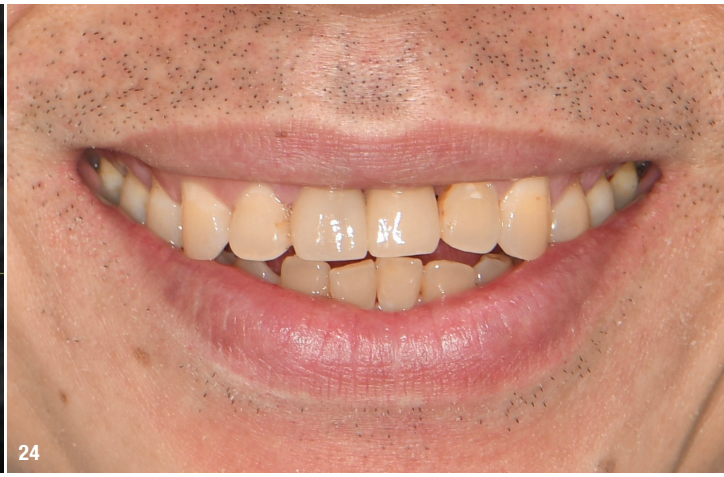
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The implant placement was planned. After local infiltration anaesthesia, the area was reopened with a full-thickness flap for membrane removal. The bone morphology and dimensions were assessed and found to be optimal for implant insertion (Fig. 12).

A 3.75 × 12.00 mm Straumann BLX implant was selected (Fig. 13). The surgical bed was prepared, and the implant was placed in a prosthetically driven position following the manufacturer's instructions (Fig. 14). Next, the mucoperiosteal flap was adapted and closed with interrupted sutures, achieving primary closure (Fig. 15).

At the suture removal appointment, since healing had been uneventful, the fixed appliance was removed, and a screw-retained temporary restoration was delivered (Figs. 16 & 17). A periapical radiograph was taken to assess the correct fit of the restoration (Fig. 18).

Prosthetic procedure

Twenty weeks after implant surgery, the papillae were well formed and osseointegration of implant #21 had been achieved. Crown preparation of tooth #11 was performed (Fig. 19). The Straumann regular base Variobase and zirconia coping obtained by a CAD/CAM procedure for the final restoration of the BLX implant were placed (Fig. 20).

The final implant restoration was performed, and a lithium disilicate crown was placed on tooth #11 (Fig. 21). The soft and hard tissue demonstrated a natural contour (Fig. 22). The occlusion was checked, and oral hygiene instructions were reinforced.

The patient was involved in an annual maintenance programme in which soft and hard tissue were evaluated and oral hygiene instructions reinforced. The radiographic control after three years showed good maintenance of the peri-implant bone (Fig. 23).

Treatment outcomes

The outcome met our patient's expectations. In addition, the hard and soft tissue were well maintained over time (Fig. 24). At the three-year follow-up visit, the patient said that the treatment had greatly affected his life, restoring his confidence and self-esteem. Encouraged by his new smile, he had begun smiling far more than he ever had and everyone in his social circle had noticed.

Literature

about the author

Dr Tran Hung Lam graduated in odonto-stomatology from the University of Medicine and Pharmacy at Ho Chi Minh City in Vietnam. He received his PhD and training in fixed prosthodontics and implantology at the dental faculty of Aix-Marseille University in France. He is the founder of Elite Dental Group and the THL Academy.

Dr Tran is vice dean of research and international affairs at the Faculty of Dentistry at Van Lang University in Ho Chi Minh City. He is president of the Ho Chi Minh City Society of Dental Implantology, an International Team for Implantology (ITI) fellow, an ITI study club director, chair of the ITI's Vietnam section and a fellow of the International College of Dentists.

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Immediate or delayed loading in the fully edentulous maxilla

Drs Yassine Harichane, Rami Chiri & Benjamin Droz Bartholet, France

Although scientific and technical advancements have been made in the field of dentistry, there are still many patients who are either partially or fully edentulous. Edentulism has a negative impact on both dental and general health, leading to physical problems like inability to eat normally and mental health issues such as a decrease in self-esteem.

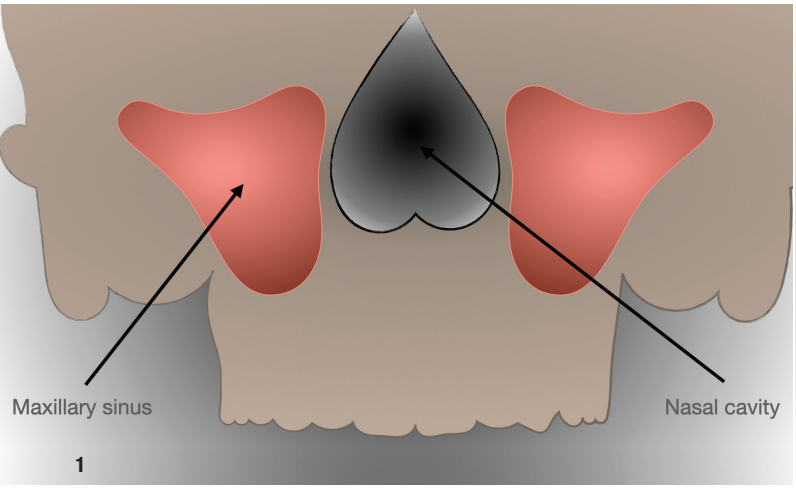
Oral implantology has made tremendous progress, allowing patients to have clinical outcomes similar to natural dentition. Implant-supported prostheses provide edentulous individuals with daily satisfaction, enabling them to enjoy food and social interactions. When a single tooth or multiple teeth are lost, fixed solutions are suggested, whereas in the case of complete edentulism, the patient can choose between an overdenture or a fixed complete denture on implants.

The McGill consensus statement recommends an overdenture supported on two implants as the first choice for the edentulous mandible. Numerous protocols describe technical aspects of implant surgery and prosthetic restoration, whether in immediate or delayed loading. While the McGill consensus statement considers a conventional tissue-supported denture for the maxilla to be problem-free, some patients may wish for a more comfortable solution to improve their dental health. Can we offer them a maxillary implant solution that is supported by scientific research? Can patient management be improved by modifying implant placement and loading protocols? These are the two questions we will aim to answer with the aid of recent scientific literature.

Surgical steps

In implant surgery, considering anatomical obstacles is crucial. Regarding the maxilla, the nasal cavity and maxillary sinuses pose challenges, while in the mandible, the inferior alveolar nerve and mental foramen can be problematic (Fig. 1). The two areas also differ regarding bone density, the maxillary bone usually being less dense than that of the mandible. To overcome anatomical obstacles like the maxillary sinus, either axial implants can be placed after sinus lift or zygomatic implants can be placed to bypass the obstacle (Fig. 2). Many implant designs have been developed to provide satisfactory primary anchorage, regardless of bone density.

Brånemark's work in oral implantology established success criteria that have become standard in implant practice. Scientific research has enabled advancements in oral implantology, such as immediate placement after extraction procedures for single or multiple teeth in both the maxilla and mandible.



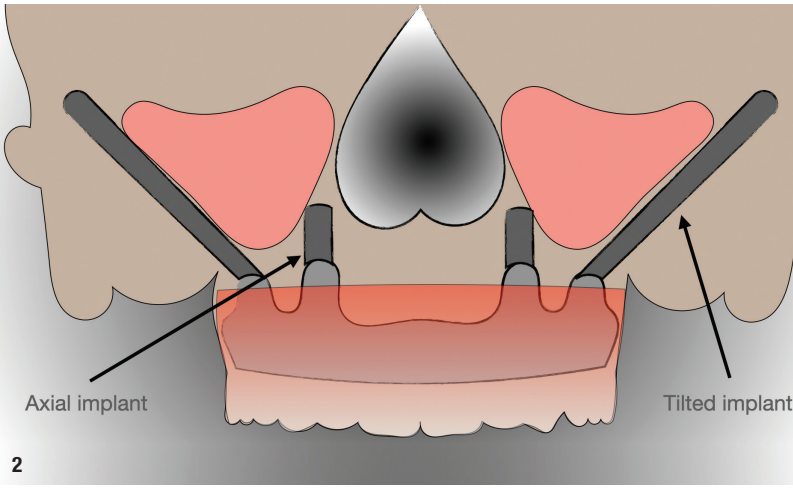


Fig. 1: Maxillary anatomical obstacles. **Fig. 2:** Maxillary prosthesis on axial and tilted implants.

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While the McGill consensus statement recommends an overdenture on two implants for the mandible, there is no established consensus for the maxilla. This is due to the heterogeneity of results and the difficulty of conducting systematic reviews on the subject. However, Malò et al. have pushed the clinical boundaries of maxillary implant treatment with the All-on-x procedure (Fig. 3), which is demanding but effective and satisfying for patients.

Digital workflows have also improved surgical protocols through static guides and dynamic navigation (Fig. 4). Static guides involve planning the implant position in software and reproducing it in a surgical guide, while dynamic navigation allows for real-time adjustments based on CBCT imaging during surgery, providing greater precision.

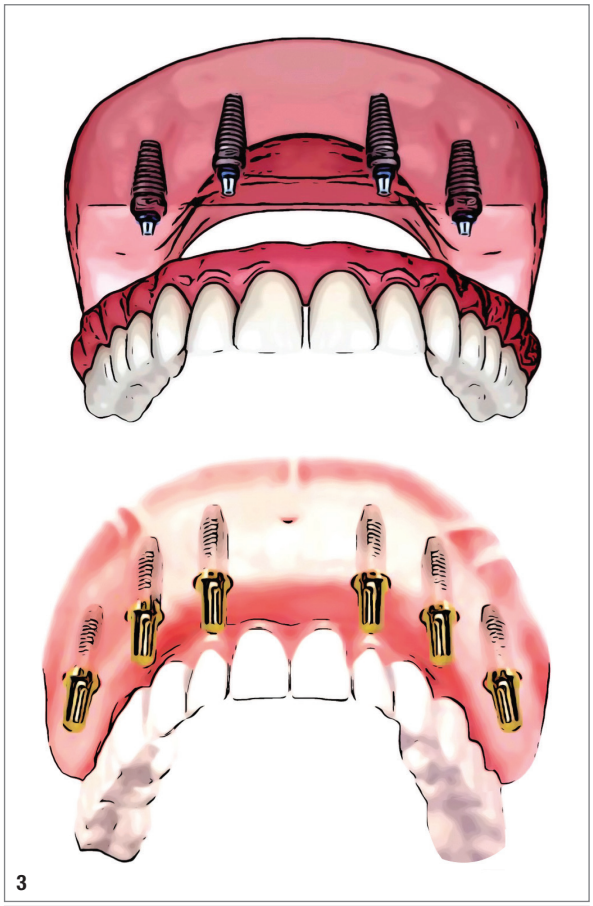
Prosthetic steps

Brånemark initially recommended allowing several months for implants to heal, but current literature supports the possibility of immediate loading, whether for a single implant or multiple implants in the maxilla or mandible (Fig. 5). Research has validated immediate loading in fully edentulous maxillae, whether using conventional or zygomatic implants, with high success rates. However, certain conditions need to be considered.

This accelerated-care approach has prevented patients from experiencing disabling edentulism and has been shown to improve their overall satisfaction and oral health-related quality of life. Studies have found that implant-supported overdentures can improve the general well-being of edentulous patients and that fixed implant prostheses are even more effective (Fig. 6).

The effectiveness of immediate loading of implants is comparable to that of delayed loading, although the evidence is not strong enough to make a definitive clinical recommendation. Studies have shown that there is no statistically significant difference in survival rates between immediate and delayed loading of implants and prostheses. However, it is worth noting that early implant failure in the maxilla is quite common, half of the failing implants being lost within the first six months. This is often attributed to poor bone quality of the mandible.

Patients may be more satisfied with a functional fixed prosthesis regardless of the time of loading, but there is limited evidence to support this. Prosthesis instability may also contribute to differences in loading times. For example, one study showed no difference in patient satisfaction between immediate and delayed loading after three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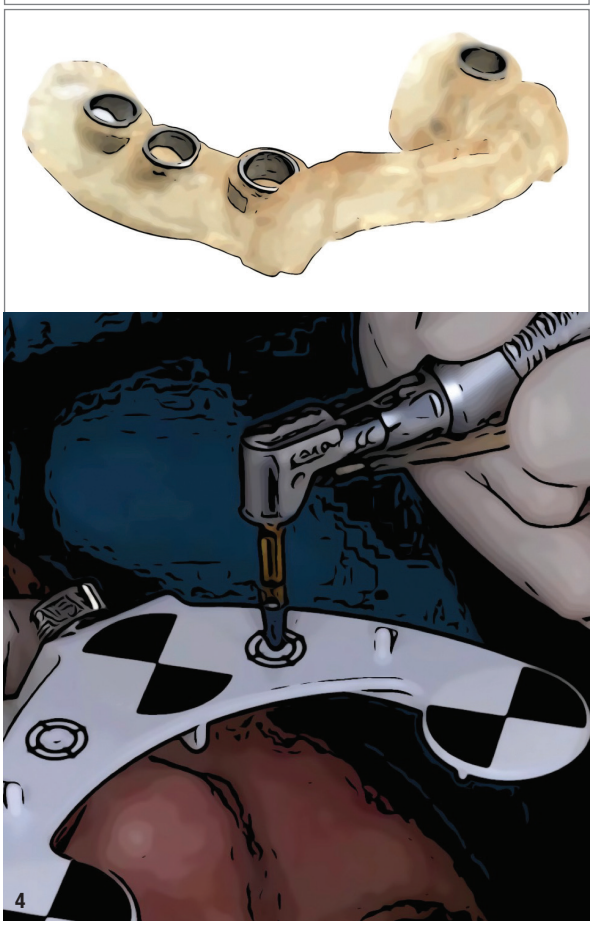
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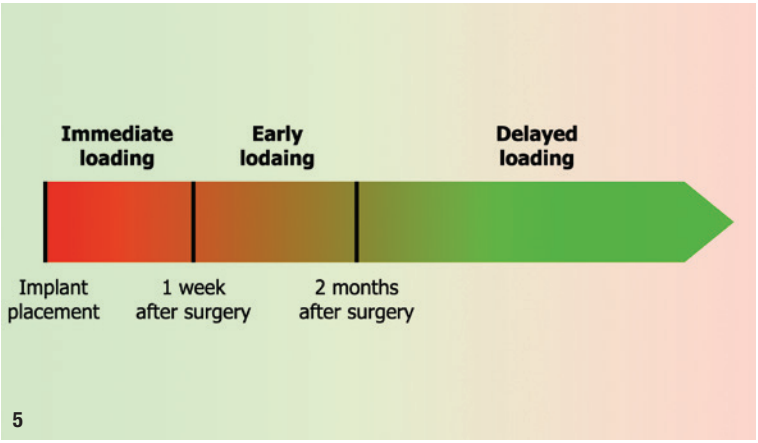
Fig. 3: All-on-4 and All-on-6 prostheses. **Fig. 4:** Surgical guide and dynamic navigation.



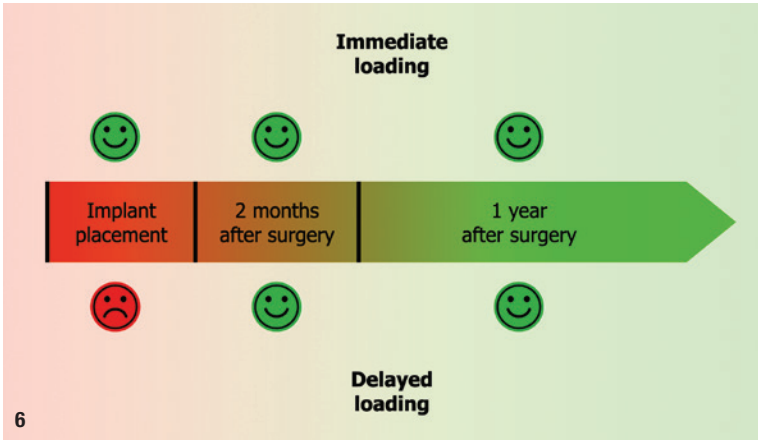


Fig. 5: Implant loading timeline. **Fig. 6:** Patient satisfaction timeline.

months, although patients in the delayed-loading group had relined provisional restorations. At 12 months, patient satisfaction levels were similar, suggesting that the perception of the prostheses does not change much over time. Studies have shown that patients have an excellent level of satisfaction with immediate loading, and the protocol is generally well tolerated with careful preoperative, perioperative and postoperative management.

Recent research has expanded the indications for zygomatic implants, which offer sufficient primary stability, but may still be susceptible to lateral forces that can cause implant fracture. This is particularly problematic in clinical cases in which the maxillary fixed prosthesis opposes natural mandibular dentition. One possible solution is to use a hybrid prosthesis on a bar.

Marginal bone loss data indicates a loss of 1.67 mm for the maxilla after ten years, regardless of the type of implant used. However, a more pronounced loss was observed around implants supporting acrylic prostheses than those supporting ceramic prostheses, beginning at the fifth year of follow-up. This underscores the importance of surface polishing to reduce plaque build-up when using acrylic prostheses.

Conclusion

Dynamic navigation is a promising technique that allows for precise implant placement in fully edentulous patients. Zygomatic implants are a reliable and predictable option for maxillary rehabilitation.

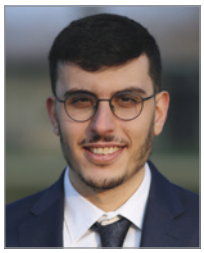
The existing literature provides limited evidence on the comparative efficacy of immediate versus delayed loading of implants. Evidence supports the effective use of immediate loading for fixed complete dentures without the need for augmentation. Immediate loading and fixed hybrid restorations are the most commonly used methods for their rehabilitation. However, delayed loading and bar overdentures are also effective and well tolerated by patients. Patients seem to be at least as satisfied with immediate loading, and clinical complications may be comparable to those of delayed loading. The choice of immediate loading should be based on the practitioner's expertise in providing such treatment and on patient selection.

Literature

about the authors

Dr Yassine Harichane holds a DDS, MSc and PhD and is in private practice in France.

Dr Yassine Harichane



Dr Rami Chiri holds a DDS and is in private practice in France.

Dr Benjamin Droz Bartholet holds a DDS and is in private practice in France.

Economic success in the implantology market in Germany

What role does the choice between two-piece implants with conical and non-conical internal connections play?

Andreas Halamoda, Germany

Since the first dental implant consensus conference a good 40 years ago, the development of modern implantology has been impressive, both scientifically thanks to the discovery of the biocompatibility of the titanium surface and economically: the number of dental implants placed in Germany has risen from 400,000 per year around 20 years ago to an estimated 1.3 million today—and the upwards trend is stable. Over the years, not only has an independent, innovation-driven industry developed, but also established global competitors in the dental industry want to participate in this solid market.

In Germany, there are currently more than 200 independent endosseous implant systems, an unusually high number are approved and accordingly many national and international suppliers are vying for the favour of the dental profession. There is no doubt that the German market is a key market in which every market participant wants to succeed, particularly in order to succeed globally. It is not easy for dentists to find their way around the selection of implant systems on offer, especially as the pricing of the products varies greatly. The same applies to the effort that suppliers put into the publication of studies, advertising, customer care and training events.

Unsurprisingly, the market is dominated by a manageable number of established providers, who are well known by the public thanks to extensive marketing and are often owned by listed companies. In addition, there are the smaller, often independent manufacturers who are characterised by their innovative spirit rather than advertising presence and large field service organisations. There are also numerous outsiders who are known neither for exceptional presence and pricing nor for innovation and customer proximity. Their market share is small.

The role of innovative spirit for success

In dental implantology, besides one-piece systems and the still young ceramic implant systems, the group of two-piece titanium implants has established itself as the dominant one on the market because it is the most versatile. Among their numerous further developments over the decades, the (not so recent) invention of the conical internal connection between implant and abutment is certainly the most significant innovation, dividing the market roughly into conical and non-conical internal connection implant systems. Some of the large established providers do offer a conical internal connection implant, some do not. Many of them offer both.

With the conical internal connection, the aim is to mitigate or even eliminate the system-inherent weaknesses of the rightly popular two-piece implant systems. These concern primarily the enormous mechanical stress on the connecting screw between implant and abutment and in the gap between these two parts triggered by masticatory forces, which can promote bacterial colonisation of the interior of the implant when positioned subgingivally. Conical internal connection designs aim to seal this gap or relieve the abutment screw, ideally achieving both.

Dental professionals' needs

Implant manufacturers must always be aware of limited time and limited staff, even in established and successful practices. Accordingly, dentists want lean and easily reproducible processes, especially with regard to teamwork, but without compromising quality. This does not apply only to implantology. While the differences in surgery between conical and non-conical internal connection systems are minor, they are sometimes clear when it comes to implant exposure and impression taking. Non-conical internal connection implants are usually placed crestally or supragingivally, which is advantageous for quick and easy exposure and impression taking. For implants with a conical internal connection, more care is required, especially in the correct positioning of the impression aids. The special features of optional subcrestal insertion, not recommended for non-conical internal connection implants, must also be taken into account.

At the time of restoration, the differences become greater: the butt joint or joint connections of non-conical internal connection systems enable, for example, a clear determination of the correct height for single crowns without the abutment screw being necessary at this point. With many conical internal connection systems, press fit with the connection screw is first required to determine the fit and occlusion in order to seal the implant and establish the correct fit of the crown. Special unscrewing instruments are often required here to make the extra work easier for the dentist.

Dental technicians too want standardised procedures in order to work economically and avoid mistakes. Furthermore, a diverse selection of abutments is required for modern and sustainable implant prostheses. Conical internal connection implant systems gained a poor reputation among dental technicians in this respect, as the prostheses are considered to be limited and the press fit between abutment and laboratory analogue on the model is considered to be a hindrance. However, many innovative conical internal connection systems now provide dental technicians with the tools to enable them to work as efficiently as with the butt joint. In particular, consistent digitalisation in the fabrication of dental restorations has led to impressive prosthetic possibilities in recent years—and this now applies equally to both designs.

Preventing complications

The enormous increase in the number of implants placed in Germany over the years automatically brought with it a significant increase in the number of high-risk patients treated. A decisive indicator of the predictability of long-term implant success is therefore whether an implant has the necessary design prerequisites to prevent peri-implantitis. With non-conical internal connection systems, it is inherent in the design that some play remains between implant and abutment, which inevitably results in micro-movements and gap formation. These factors are not suitable for preventing gingival recession and bone resorption in the case of subgingival implant positioning. Good results are nevertheless possible, but only if the surgeon pays the utmost attention to sufficient tissue volume, especially mucosa of at least 3 mm thick, which can seal the micro-gap from bacterial intrusion. High surgical effort is unavoidable in many cases.

Conical internal connection implant systems score points in the long term with their tightness and are accordingly more forgiving of tissue deficits. If the construction is designed to completely eliminate micro-movements between abutment and implant, subcrestal positioning is possible and thus a bony seal can form around the implant shoulder, providing the best conditions for stable soft tissue.

Complications include loosening or even fracture of the abutment screw. No one wants regular visits from their patients just to tighten or even replace the screw. It is inherent in the system of non-conical internal connection implants that the screw always has to cope with the force of the connection, and thus complications are latent. With conical internal connection systems, it is worth taking a closer look at the individual details. Especially a large Morse taper can significantly relieve the abutment screw by creating strong self-friction between implant and abutment.

Patients' needs

The patient's desires are ultimately a combination of perfect aesthetics, sustainability and tolerability, as the implantological solution has been recommended to him or her as the best for his or her case. Aesthetically, conical internal connection implants are usually at an advantage, as they are always placed crestally or subcrestally. However, non-conical internal connection systems can also deliver convincing results, provided they are positioned subgingivally, unlike tissue-level implants, and, for example, with a polished shoulder to allow soft tissue on top and bone underneath.

For the patient, the sustainability of the implantological restoration means not only the best possible prevention of peri-implantitis but also, of course, a high degree of tolerance with the aim of achieving the most biological solution possible. While it is up to the dentist to carry out careful patient selection and, in case of suspicion, to test for titanium intolerance, the implant manufacturer of a two-piece system can positively influence the long-term result with its individual design approach to the abutment connection. This is because micro-movements of the abutment in the implant involuntarily result in abrasion of titanium particles, which permanently enter the human organism unnoticed. This must be separated from possible intolerance to titanium surfaces.

The extent and effects of this titanium abrasion are the subject of initial studies, but it can already be said that highly biological solutions with titanium implants can only be achieved if this abrasion is eliminated. It is apparent that the conical internal connection has an inherent advantage here, since it avoids micro-movements.

Market development

The coming years will be characterised by numerous further developments of conical internal connections—which makes sense, because this principle is the more recent one. The much respected large established providers will also present innovations in this area, and thus the market share of conical internal connection systems will continue to increase, but will also soon reach a point where both designs converge in market share. Because of the efficient prosthetic restoration and the simpler workflow, non-conical internal connection systems will retain their supporters. The key to success will be keeping up to date with customers' wishes and responding to these. Customers will succeed in finding exactly the product that suits their philosophy, owing to the enormous diversity of the German implant market that becomes apparent upon closer inspection.

about the author

Andreas Halamoda has been Key Account Manager for the German-speaking markets at a medium-sized German implant manufacturer since 2012. He is also responsible for the areas of training courses with external speakers and internal staff training. He advocates demand-oriented sales and holistic customer care, starting with the surgeon, continuing with the prosthetic dentist and ending with the dental technician.

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“Clean” medical products

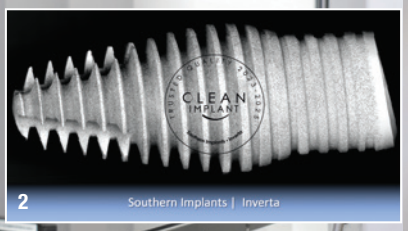

Fig. 1: SEM image SuperLine implant—Dentium. **Fig. 2:** SEM image INVERTA implant—Southern Implants. **Fig. 3:** Dr Dirk U. Duddeck placing an implant on the sample holder of the scanning electron microscope.

After the “Astra Tech EV” by Dentsply Sirona was awarded already this March, the coveted seal for Trusted Quality has now been given to two other implant systems: The renowned implants, “SuperLine” by Dentium and “INVERTA” by Southern Implants are now welcomed into the family of certified clean implants. The scientifically based seal of quality, which underlines the first-class surface purity of dental implants, is only awarded by the CleanImplant Foundation’s Scientific Advisory Board after a rigorous peer-reviewed analysis and testing process.

“This award is an objectively transparent proof that colleagues are using a residue-free medical device for their patients by manufacturers who implemented the highest quality standards,” explains Dr Dirk U. Duddeck, Founder and Head of Research at CleanImplant. To obtain this valid, objective proof, a so-called “five step approach” was established in cooperation with the eight-member Scientific Advisory Board:

CleanImplant Trusted Quality Seal – Five step approach

STEP 1	**Neutral sampling of 5 implants**	3 implants are ordered ex-factory + 2 implants of the same type are provided via mystery shopping from practices.
STEP 2	**Unpacking and scanning under clean room conditions**	All 5 collected samples are carefully unboxed, mounted, and scanned in a clean room environment according to Class 100 US Fed. 209, Class 5 DIN EN ISO 14644-1.
STEP 3	**Externally audited process of analysis**	SEM imaging and elemental analysis (EDS) are performed according to DIN EN ISO/IEC 17025 accreditation process (competence of testing and calibration laboratories) with external audits and multi-annual re-assessments.
STEP 4	**Full-size and high-resolution SEM images**	A special full-size, high-resolution SEM image—digitally composed of more than 360 single SEM images in a magnification of 500x—always shows the implant surface from shoulder to apex.
STEP 5	**Peer-review process**	Two members of the Scientific Advisory Board independently review the comprehensive report of analysis and sufficient clinical documentation or multi-annual PMCF studies (Post-Marketing Clinical Follow-up) of the analysed implant type showing survival rates of more than 95% for the device or device family.

Every quality award is valid only for two years and has to be renewed after this period. Currently, the following implant systems also carry the “Trusted Quality Seal”: Kontact S (Biotech Dental), whiteSKY (bredent group), UnicCa (BTI Biotechnology Institute), (R)evolution and Patent/BioWin! (Champions-Implants), In-Kone (Global D), ICX-Premium (medentis medical), AnyRidge and BLUEDIAMOND (MegaGen), T6 (NucleOSS), Prama (Sweden & Martina), SDS 1.2 and SDS 2.2 (Swiss Dental Solutions). Other testing and analysis results are pending.

Moreover, CleanImplant “Certified Production Quality” awards were received by the CeramTec Group and Komet Custom Made as contract manufacturers of ceramic implants.

More and more dentists are supporting the CleanImplant Foundation. Certified as “CleanImplant Certified Dentists”, they pass on the trust they gained in the products to their patients and referring dentists.

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Like the rest of the EV Implant Family, the DS OmniTaper Implant System features the OsseoSpeed implant surface and the conical EV connection that provides access to the harmonised and comprehensive EV prosthetic portfolio for restorative flexibility and immediate chairside solutions.

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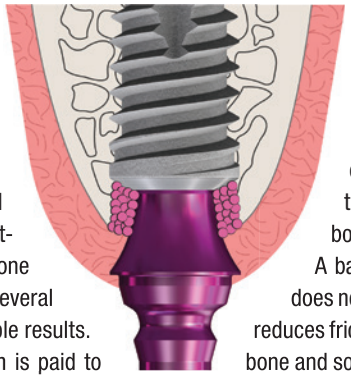
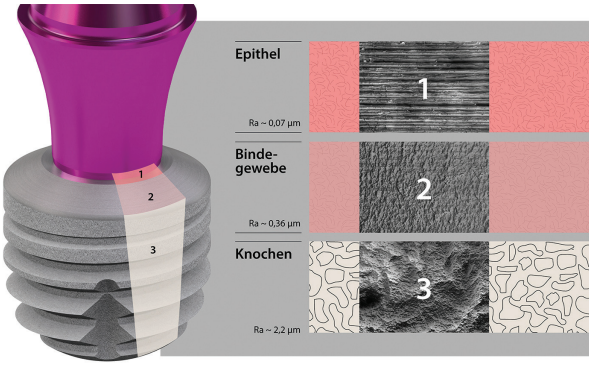
bredent medical

Improved osseointegration thanks to the bone growth concept



The design of implants plays a crucial role in implant treatment, as it can contribute to optimal osseointegration. That's why bredent has equipped its implants with a backtaper that provides more space for bone and soft tissue to attach.
Implant design helps to minimise risks and maximise chances of success in implant treatment. Especially at the passage point from bone to soft tissue, a functioning interplay of several factors is required to achieve long-term stable results. When designing bredent implants, attention is paid to ensuring that they meet the requirements for optimal healing in the jaw according to the bone growth concept. Therefore, most of bredent's implants have a backtaper: this crestal slope provides more space for bone and soft tissue to attach.

The backtaper is an advancement of the platform switch concept. With the platform switch, soft tissue is given more space to attach to the surface by reducing the abutment diameter in relation to the implant diameter. However, different results were obtained in clinical studies on the effectiveness of the platform switch, as the design can lead to cortical bone stresses and thus bone resorption processes.
A backtaper, such as those found in bredent implants, does not affect the mechanical stability of the implant body, reduces friction with cortical bone, and provides more space for bone and soft tissue to attach. Bone growth on the backtaper of bredent's copaSKY implants was confirmed in a recent clinical multicenter study.[1] The effect is supported by a microstructure of the surface in this area, as found in copaSKY implants, which is ideal for attaching connective tissue as well as bone.



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www.bredent-medical.com

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Cheers to new beginnings: celebrating oral tissue regeneration

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The 2023 International Osteology Symposium, held in Barcelona from 27 to 29 April, was a resounding success, bringing together 2,400 participants from 80 countries. Over 100 world-renowned speakers and international experts from research and practice explored the latest advances in the field of oral tissue regeneration on the occasion of the Osteology Foundation's 20th anniversary.

Getting hands-on and exploring new techniques

The event kicked off with the symposium's workshop programme, an early highlight and with the fully booked Osteology workshops covering a comprehensive range of topics: from modern techniques in soft-tissue management using autologous and substitute materials, to reconstructive procedures for peri-implantitis defects, and the latest in minimally invasive periodontal regeneration and recession coverage around teeth and implants—this symposium delivered it all.

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Founding Partner Geistlich and Gold Partners Dentsply Sirona, BioHorizons Camlog, botiss biomaterials, and Straumann also offered the attendees truly impressive hands-on opportunities to experience special techniques and materials. For those who missed out on the highly sought-after workshop seats, an exclusive pre-congress session in oral tissue regeneration was offered.

Opening of the regenerative marathon

Frank Schwarz, Vice President of the Osteology Foundation opened the congress officially together with the scientific chairs Pamela K. McClain and Istvan Urban on Friday morning. They set the stage for what promised to be an unforgettable marathon of highlights.

Over the course of the following two days, attendees got to enjoy a variety of lectures, panel discussions and interactive round-table discussions addressing all aspects of oral tissue regeneration: different strategies of hard- and soft-tissue augmentation around teeth and implants, prevention and management of complications and errors, as well as the all-time hot topic of peri-implantitis. These areas of interest were complemented by lectures about innovative technologies, blood products for tissue augmentation and regenerative approaches in interdisciplinary dentistry.

Bringing theory to life: Live surgery

The programme boasted two remarkable live surgeries performed by none other than the esteemed Istvan Urban and Sofia Aroca. They provided a unique and rare opportunity for attendees to witness these masters of oral tissue regeneration in action, as they performed complex procedures in real-time.

Urban's and Aroca's exceptional skills, precision, and expertise were on full display, as they shared their knowl-

edge and experience with the audience in an immersive and interactive setting.

Further highlights of the programme included:
- The research networking day and poster exhibition for young researchers including research and audience awards.
- A case session with six outstanding cases competing for the Osteology Case Award.
- A lively debate on the treatment of intact and compromised extraction sockets, with a focus on immediate versus delayed implant placement.
- Proceedings from the Osteology DGI SEPA consensus workshop.
- Osteology partner sessions from the AAP and SEPA.
- A practice-oriented wrap-up session “Oral Regeneration in a Nutshell”, covering various sub-topics.
- A jubilee evening as a platform for networking and exchange—celebrating oral tissue regeneration.


© Osteology Foundation

The 2023 International Osteology Symposium was a true celebration of the Foundation’s 20th anniversary. It was a testament to the Foundation’s unwavering commitment to advancing oral tissue regeneration. The jubilee edition of this lighthouse event brought together a global community of professionals who left the symposium with a wealth of new knowledge and practical skills that will undoubtedly shape their daily activities for years to come—not to mention the invaluable networking with like-minded colleagues.

For more information: www.osteology.org

contact

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Cutting edge science and innovation

Dentsply Sirona Implant Solutions World Summit 2023

From 8 to 10 June, the Dentsply Sirona Implant Solutions World Summit 2023 took place in Athens, Greece where science has its origins. Inspired by connection and future innovation, the event delivered immersive experiences to inspire and feed attendees' passion for implant solutions. Implant professionals from around the world who are passionate about elevating the dental industry and improving the quality of implant treatments and care for patients convened for three days of knowledge exchange, inspiration, and networking. They have been able to discover the latest innovations in implant solutions, including the EV Implant Family, digital dentistry, and bone regeneration. The summit's state-of-the-art educational programme was developed together with the scientific chairs—Dr Tara Aghaloo, USA and Dr Michael Norton, UK, and the programme chairs—Steve Campbell, UK; Dr Malene Hallund, Denmark; Dr Mark Ludlow, USA; Dr Stijn Vervaeke, Belgium; and Dr Martin Wanendeya, UK and featured 50 world-renowned speakers from 12 countries with inspiring main stage presentations, hands-on workshops, and break-out tracks on topics such as aesthetics and the digital dentistry ecosystem, half of them being new presenters at a Dentsply Sirona event.

The CLOUD session explored the new digital universe and its power to transform patient journeys from diagnosis to final treatment, with perspectives from two clinicians (Dr Martin Wanendeya, UK and Dr Stefan Vandeweghe, Belgium) and one lab technician (Steve Campbell, UK), a live demo, and a look at the advantages for clinicians and labs.

Meanwhile, the BATTLE session featured debates from two clinicians on a hot clinical topic, moderated by Dr Mark Ludlow, USA with the winner decided by the audience. In the first battle Dr David Barack, USA and Dr. Rodrigo Neiva, USA debated about biomaterials vs. implant selection. Battle two considered full arch digital vs. full arch analog, with Dr Mischa Krebs, Germany going head-to-head with Dr Gary Jones, USA.

"The Implant Solutions World Summit attracts some of the brightest and most passionate minds in implant dentistry," said Dr Malene Hallund, oral and maxillofacial surgeon and Dentsply Sirona Key Opinion Leader. "The programme dives deep into all the latest developments in our field while challenging pre-existing ideas and assumptions. I know that attendees will walk away feeling excited and inspired for what the future holds."

Attendees could visit the Inspiration Hub exhibition area spread across two floors. Participants gain hands-on experience with Dentsply Sirona's comprehensive implant portfolio and digital workflow. Dentsply Sirona's premium EV Implant Family—DS PrimeTaper Implant System, DS OmniTaper Implant System, and Astra Tech Implant System—were on display, as well as OSSIX regenerative solutions, DS Signature Workflows, and the cloud-based DS Core platform.

Moreover, the Implant Solutions World Summit featured two social evenings for attendees to network with peers and enjoy the best Athens has to offer.

"Peer to peer education is vitally important for our Implant Solutions community and we are thrilled to bring implant professionals together from around the world to explore the latest innovations and science transforming implant dentistry" said Tony Susino, Group Vice President, Global Implant Solutions at Dentsply Sirona.

DGZI „Implant Dentistry Award“ 2023

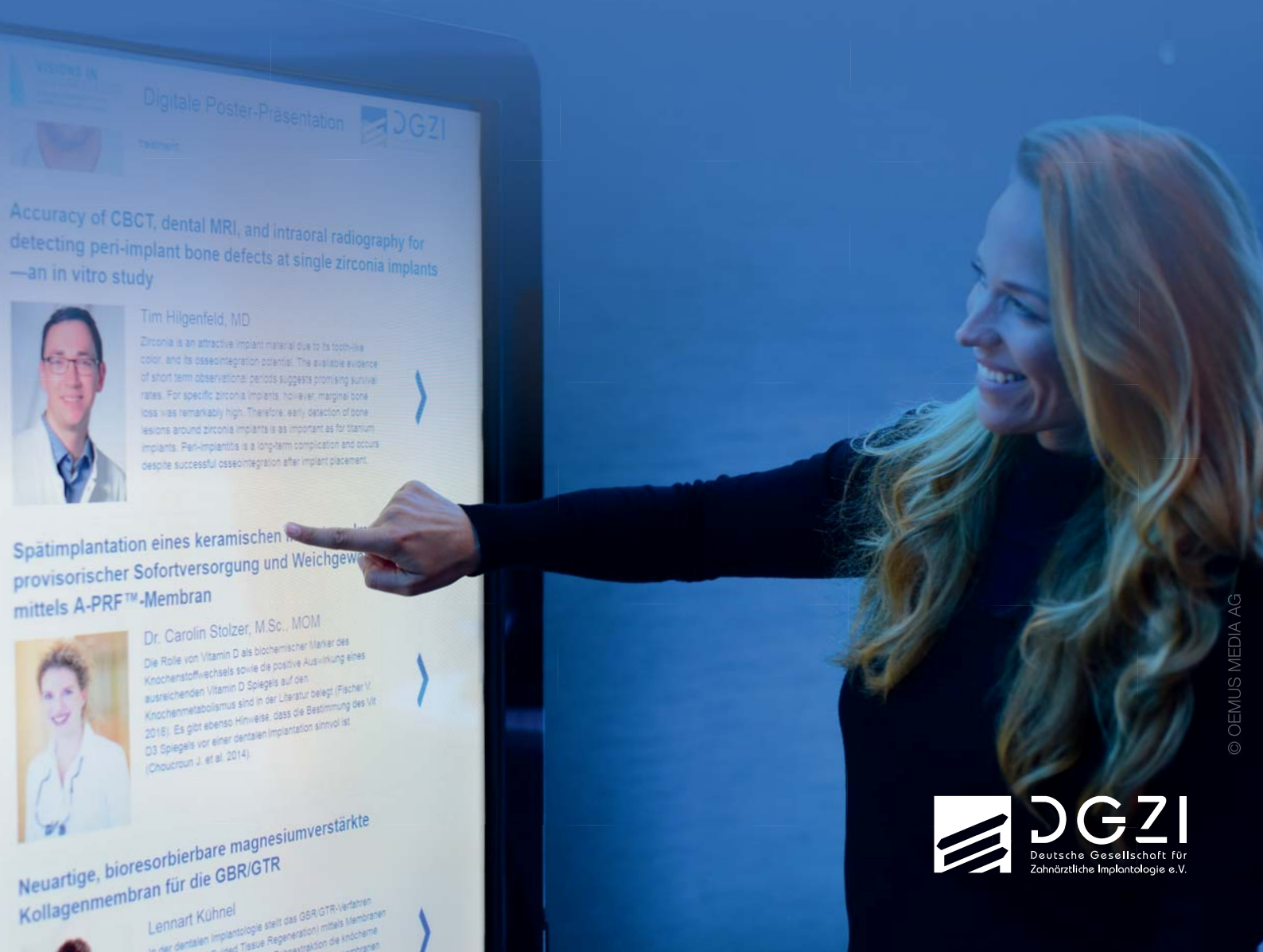
CALL FOR POSTERS!

On the occasion of the 52nd International Annual Congress of the DGZI on October 6 and 7, 2023 in Hamburg, the DGZI will again present its "Implant Dentistry Award". Prizes will be awarded for scientific work in the form of posters, which will be published internet-based in a Digital Poster Presentation.

DGZI will pay the congress fee and the conference fee for the obligatory participation in the congress. The posters will be presented digitally only, no other form of submission is possible.

CLOSING DATE:
15.8.2023

Scan QR code now or visit dgzi-2023.dpp.online/landing and submit abstract digitally!



DGZI
Deutsche Gesellschaft für Zahnärztliche Implantologie e.V.

Congresses, courses and symposia

International Esthetic Days

21–23 September 2023
Baden-Baden, Germany
www.estheticdays.com

FDI World Dental Congress 2023

24–27 September 2023
Sydney, Australia
www.fdiworlddental.org

30th EAO annual scientific meeting

28–30 September 2023
Berlin, Germany
www.eao.org

52nd International Annual Meeting of DGZI

6–7 October 2023
Hamburg, Germany
www.dgzi-jahreskongress.de/en

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Send us a text with length of 10,000 to 15,000 characters. We do not want to limit you in terms of article length, so please use the word count as a general guideline!

Numbered images in TIF or JPEG format, in a printable quality of at least 300 dpi.

Most important: we would like to introduce you/the mind behind the article. So please send us also your portrait photo with a short biography about your professional career and your contact information.

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