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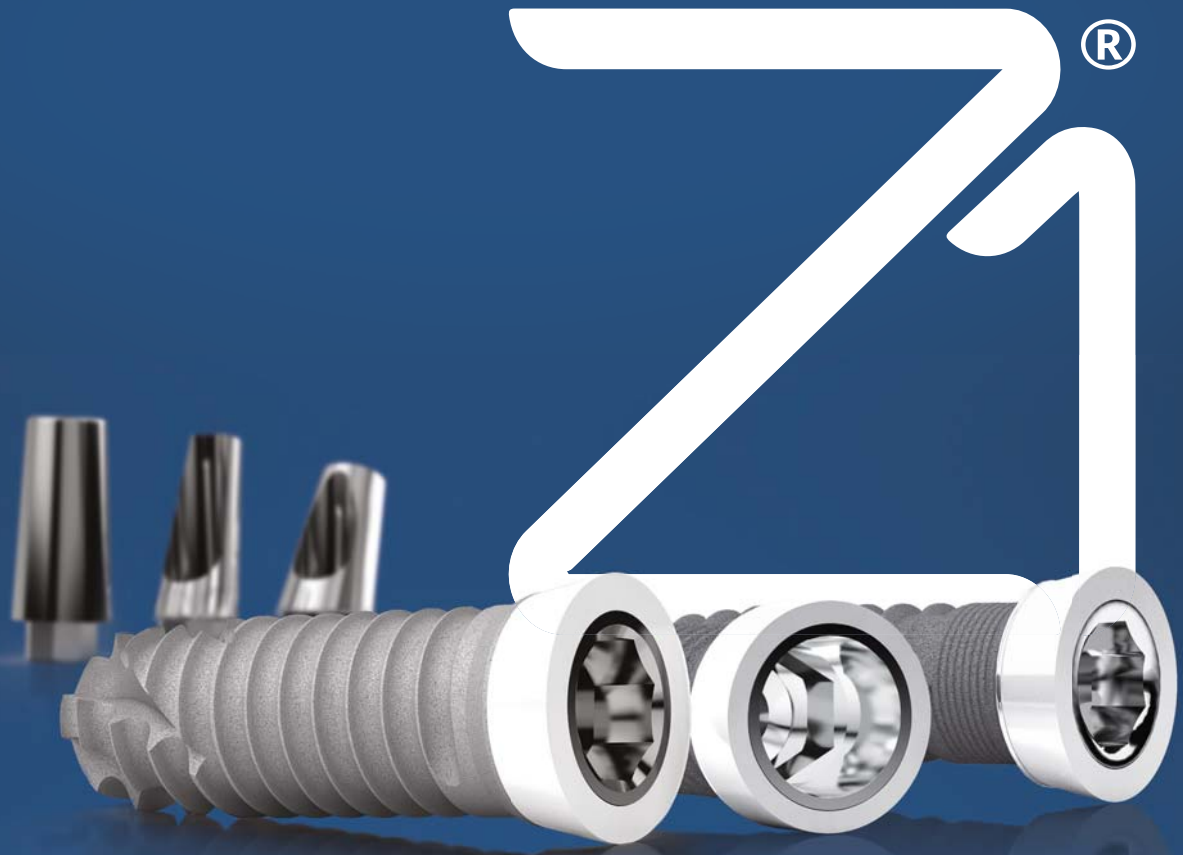

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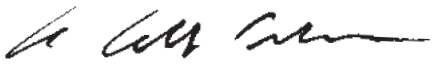
The agony of choice: To bone graft or not to bone graft?

Dear colleagues, in dental implantology, we are quite often faced with cases involving reduced bone volume. When treating these challenging cases, we need to ask ourselves whether to employ bone augmentation techniques or not. Let us take a look back at the founding years of our association: In the seventies, we placed implants in sites where the jawbone would allow it. During this time, especially quite narrow blade implants were utilised, according to the principle of "implant follows bone". In the eighties, there was a shift towards a "bone follows implant" approach, meaning that, during that time, clinicians tried to create the ideal implant positioning by means of bone grafting in sites when there was only little bone or none at all. This method, however, was found to be rather time-consuming with regard to overall treatment time and was especially prone to certain risks.

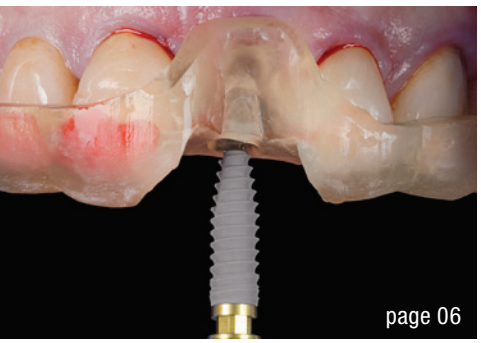
The logical conclusion from past experiences is that nowadays there is a tendency to perform bone augmentation procedures rather in areas where it is necessary for aesthetic reasons. In this context, we utilise autologous bone blocks, for instance, or materials of allogenic and xenogenic origin—always with a view to the optimal prospective outcome. Modern digital technologies aid in implant placement by means of guided surgery, and it is even possible to fabricate customised blocks from allogenic material based on corresponding CBCT data, for example, and to insert these into defects in a custom-fit way. In some cases in which coverdenture prostheses and screw-retained protheses according to Malo's principle are to be fabricated, one can refrain from employing augmentative measures altogether without compromising on cosmetic aspects and aesthetics.

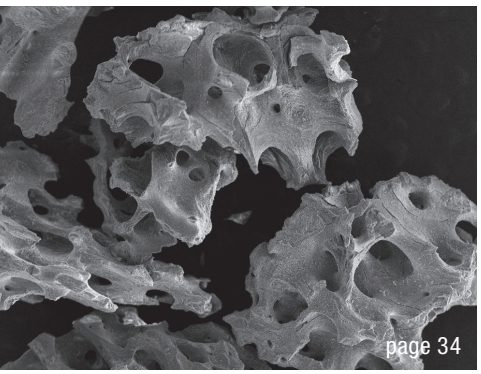
Ultimately, we as implantologists must always decide between one or the other solution, based on the individual indication. With this in mind, I hope you enjoy reading the new implants—**international magazine of** oral implantology, and I am looking forward to meeting you in person at our third Future Congress for Dental Implantology, which is to be held in October in Cologne, where we will be celebrating the 50-year anniversary of the German Association of Dental Implantology (DGZI).

Sincerely yours,



Dr Rolf Vollmer





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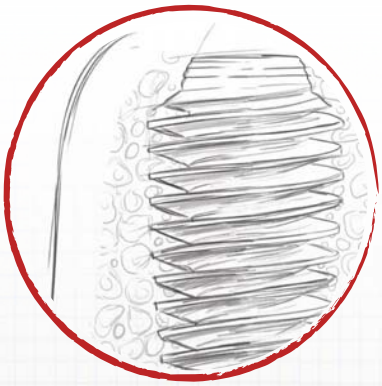

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Successful immediate implant loading—According to the Socket Shield Technique

Dr Ramón Gómez Meda, Spain

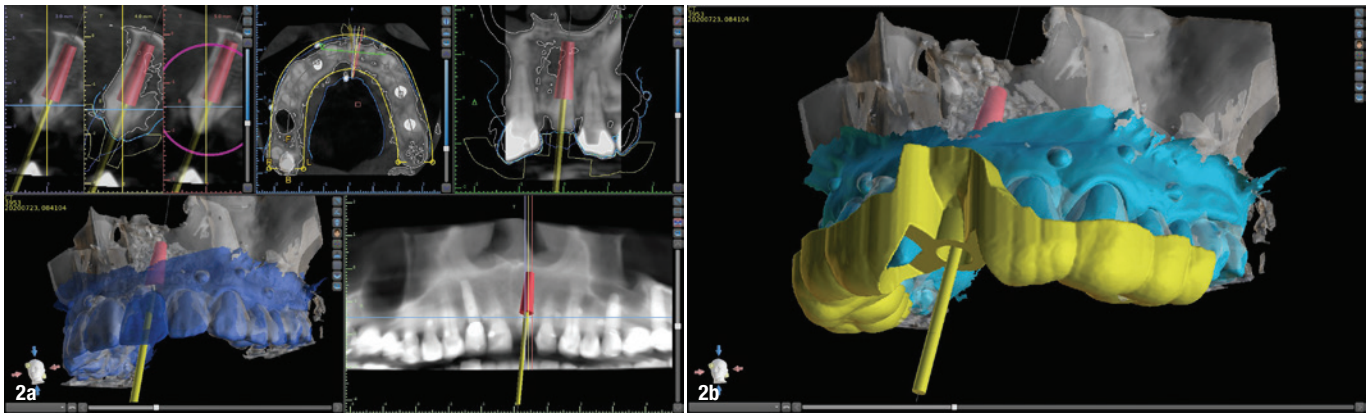
Figs. 1a & b: Initial situation before partial extraction of the fractured tooth and immediate implant placement. The epigingival fracture made a horizontal reduction of the root unnecessary.

Introduction

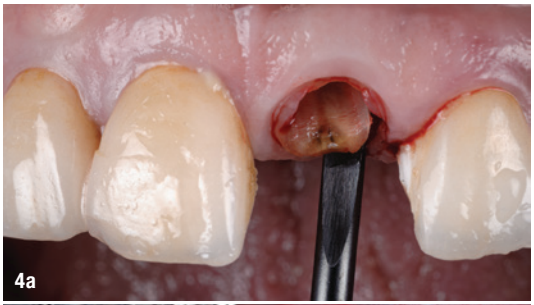
In 2010 a novel approach to preserve the soft and hard tissues following tooth extraction was reported.[1] Clinical studies had suggested that retaining roots of hopeless teeth may avoid tissue alterations after tooth extraction. The authors proposed the retention of a buccal aspect of the root during immediate implantation to prevent alveolar bone loss following tooth extraction. The proof-of-concept study in beagle dogs showed that retaining the buccal aspect of the root during implant placement does not appear to interfere with osseointegration and may be beneficial in preserving the buccal bone plate. Since then, the Socket Shield Technique has been further evaluated clinically in its application as originally described by Hürzeler et al. or in complex situations such as multiple adjacent implants with pleasing aesthetic results.[1–4] The latest critical literature review by Blaschke et al. about the clinical data support on the Socket Shield Technique summarised promising outcomes with the Socket Shield Technique, its high potential to reduce the need for invasive bone grafts around implants in the aesthetic zone, but also concluded that clinical data to support is very limited.[5] Nevertheless, this technique cannot be implemented in routine dental practice without caution as it is quite technique-sensitive and thus, should be reserved for the experienced surgeon. The following case report describes an immediate implant placement, fully guided applying the Socket Shield Technique as an efficient treatment concept, with a favourable cost-benefit ratio and highly aesthetic outcome.

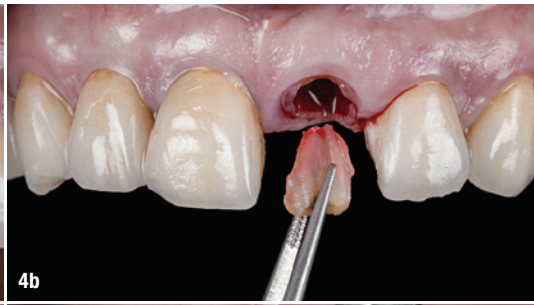
Clinical case

In the following case a 69-year-old male with good health condition (ASA I) presented in the office with a fracture of a central incisor. The full mouth had been previously restored with lithium disilicate crowns due to the severe attrition the teeth suffered as a consequence of the intense bruxism and clenching the patient reported. Anterior crowns were



Figs. 2a & b: The DICOM files as well as the intra-oral STL files were imported into a software (Blue Sky Bio) to plan the ideal implant position. Finally, a surgical guide was printed.





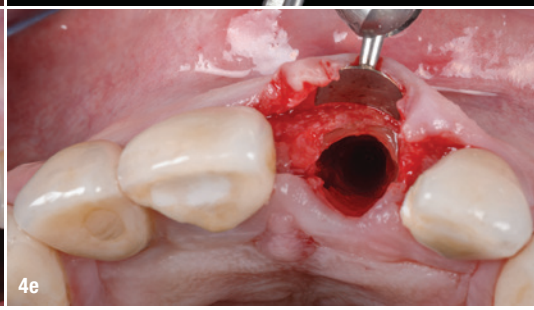
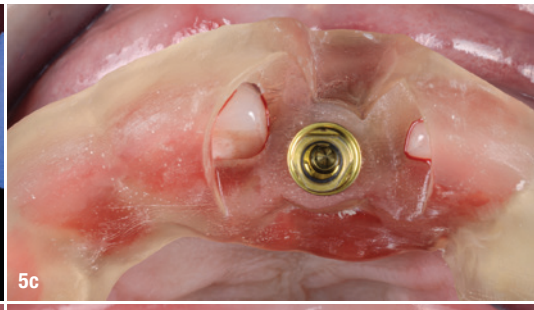
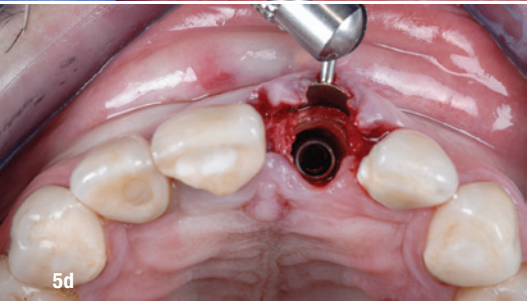


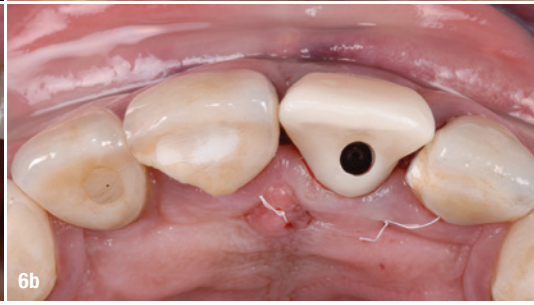
Fig. 3: After impression taking, the fractured crown was sent to the laboratory technician to copy the shape and colour. **Figs. 4a–e:** Partial tooth extraction with Socket Shield approach: bisection of the root, extraction of the palatal parts and contouring of the buccal shield.

splinted but even so the crown of the tooth broke horizontally at gingival level. The pulp sensitivity test of the fractured tooth with CO_2 snow was negative, the peri-coronal tissue was irritated, but showed absence of active purulent infections. Hard and soft tissue showed no signs of bone loss or recession, in comparison of the soft tissue and bone support of the two maxillary quadrants there was no difference from one quadrant to the other. Radiologically the root remnant showed no alterations or signs of fracture (Figs. 1a & b). Oral hygiene was good. Tooth conservation was assessed to be feasible but seemed rather unpredictable due to the lack of enough dentine to predictably support a crown in the long term. Another alternative was to extract the root and to retreat the adjacent teeth with a fixed bridge. After a discussion of the treatment options and the respective risks and benefits, the patient agreed to substitute the tooth by an implant. The crown of the fractured tooth was temporarily positioned in place with the help of flowable composite.

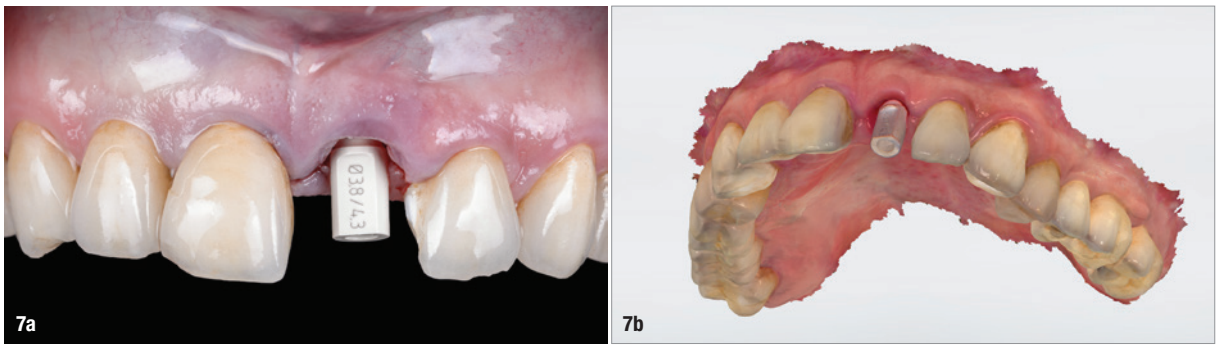
An intra-oral scan of both maxillary and mandibular jaw (3Shape, TRIOS) to produce the guide template was taken. For planning of the implant position a CBCT scan was done







Figs. 5a–d: Fully guided placement of the implant into the exact 3D prosthodontic position, in distance to the root shield. Care was given to not change the position of the buccal root shield. **Figs. 6a & b:** The interim restoration had been designed based on the intra-oral scan. It could be screwed onto the implant immediately after the surgery to close the extraction wound and preserve the soft tissue.

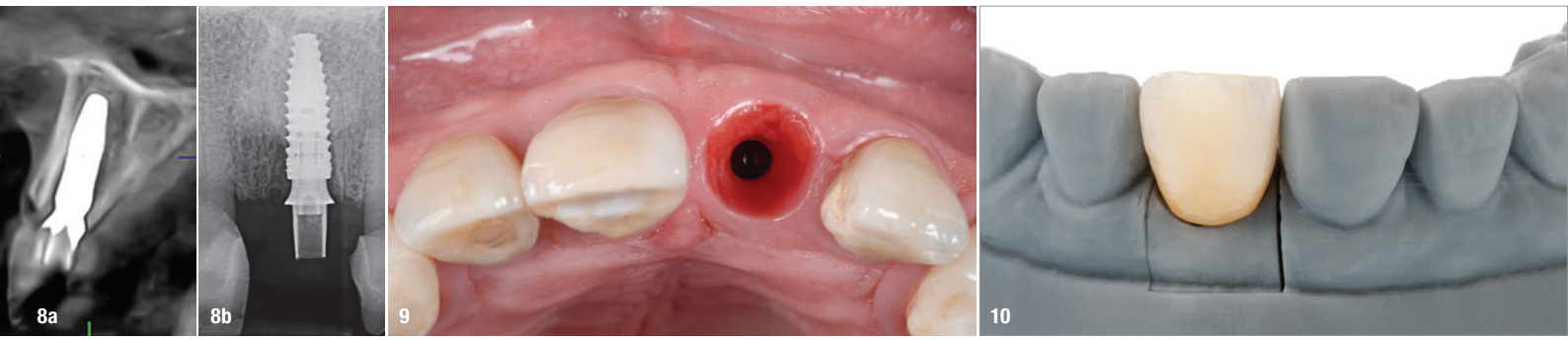


Figs. 7a & b: A scan body is used to immediately register the 3D position of the implant.

(Planmeca Promax 3D Plus) paying special attention to the integrity of the cortical plate and the quantity of bone present in the apical area to be able to properly stabilise the implant. The DICOM files as well as the intra-oral STL files were imported into a software (Blue Sky Bio). These files were superimposed and a virtual wax-up helped to create the exact virtual position of the implant with an ideal prosthodontic emergence profile. Finally, a surgical guide was designed and immediately printed at the office with the help of a high-quality 3D printer (Nextdent 5100, 3D Systems; Figs. 2a & b). An alginate impression was taken to elaborate a thermoplastic vacuum formed provisional and the patient was released with a crown integrated into the removable template to temporarily solve the aesthetic problem. Antibiotics and AINEs were prescribed for the day of the surgery. Also, the patient was advised to rinse his teeth with an antiseptic solution (0.2% chlorhexidine, DENTAID) the day before the surgery to reduce the bacteria load in the mouth. The crown of the fractured tooth (Fig. 3) was handed to the dental technician for orientation to build the screw-fixed temporary restoration on the implant for day of surgery.

The guide template—previously designed by superimposing the intra-oral scan. STL file and the CBCT.DICOM files—was tested for exact fit and after local anaesthesia (4% articaine with 1:200,000 epinephrine) partial tooth extraction was performed. Weighing tissue resorption due to flap mobilisation against good overview on the surgery site, a very small dimensioned buccal full thickness flap preserving the papilla was mobilised in order to better control later tooth fragment preparation and the surrounding tissue. Before implant bed preparation, the root was bisected vertically and the palatal aspect of the root was removed (Figs. 4a–e). Further dentine parts were removed in individual pieces, focusing to extract the entire root tip. The guide template was seated to prepare the implant bed through the root remnants. Sterile saline coolant was used during the entire drilling procedure. Only a small part of the root in the crestal area on the buccal side was intentionally left in place preserving the facial part of the periodontal ligament and as a consequence the bundle bone (Fig. 4e). As accurate tooth fragment preparation and implant placement is the key to successful treatment with the Socket Shield Technique,[6] the buccal root piece needed a little reshape with a lancet drill to thin it and such to guarantee that the dentine would not be in direct contact with the implant for proper bone formation.

A PROGRESSIVE-LINE (CONELOG 3.8 x 13 mm) implant was placed fully guided in the palatal part of the extraction socket in the correct 3D prosthodontic position (Figs. 5a–d). As being an apically tapered implant and threads down to the apex, this implant was chosen for the surgery as it enables to anchorage well within the basal bone but still not endangering the buccal lamella in the apical area. Also, the pronounced thread design makes it easy to reach very good primary stability even in situations with poor quality bone. Reaching an insertion torque of more than 35 Ncm, the implant qualified to be restored immediately with a screw-



Figs. 8a & b: Radiological control of the position of the buccal root remnant and the implant. **Fig. 9:** After 8 weeks and removal of the provisional restoration the peri-implant region impresses by a voluminous and healthy soft tissue. **Fig. 10:** The final zirconia crown was produced following a fully digital workflow.

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Figs. 11a & b: After seating the final prosthesis, slightly chipped adjacent crowns were repaired with composite. **Fig. 12:** Final situation the day the crown was delivered. **Fig. 13:** Follow-up 6 months later.

retained one-piece provisional crown (Figs. 6a & b). Therefore, a scan body had been screwed in immediately after implant placement to register the 3D position of the implant and scanned digitally (Figs. 7a & b). The interim restoration was designed in the office after importing the STL file into a professional software (Exocad dentalCAD) and after half an hour the provisional was manufactured with a milling machine (Ceramill Motion 2 5X, Amann Girrbach). Afterwards the wound was microsurgically sutured (Cytoplast 6/0 PTFE) to fix the flap in position. The interim restoration was cemented onto a Ti-base (CONELOG Titanium base CAD/CAM crown, CAMLOG) with a resin cement (SpeedCEM plus, Ivoclar Vivadent). This provisional customised healing abutment placed immediately after the implant placement covered exactly the extractions wound and helped in maintaining the soft-tissue contours. A control radiograph confirmed the right position of the implant, the position stability of the shield and the correct distance from the tooth shield to the implant (Figs. 8a & b). After 2.5 months of healing, an optimal soft-tissue emergence profile was obtained (Fig. 9) and final restoration was delivered after 10 weeks (Figs. 10–12). Six months after insertion of the final restoration the crown is perfectly integrated (Fig. 13).

Conclusion

This case illustrates an experimental technique for preserving a buccal root segment in conjunction with immediate implant placement and provisionalisation. The Socket Shield Technique shows to be a valuable technique to minimise buccal contour changes after tooth extraction, leading to increased volume stability of the mucosa adjacent to the inserted implant. Even if the clinical application of the Socket Shield Technique is still difficult to perform and very technique sensitive, with an apically tapered implant geared to high primary stability like PROGRESSIVE-LINE, the dentist has good control of the implant position and can reach a rather favourable cost-benefit ratio when using this technique. With this case it is also shown that the implant used is a reliable option for immediacy cases with fully-guided options, taking advantage of a fully digital workflow.

about the author

Dr Ramón Gómez Meda holds a degree in dentistry from the University of Santiago de Compostela. In addition, he holds a Master's degree in Occlusion and Temporomandibular Dysfunction and has completed a Postgraduate course in Periodontics and Implantology. Since 2001, he has been leading a private practice in Ponferrada in Spain. Dr Meda is an international lecturer on Periodontics, Implantology, Aesthetics and multidisciplinary treatments.

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Literature

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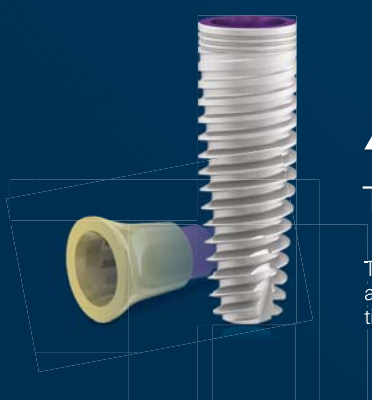

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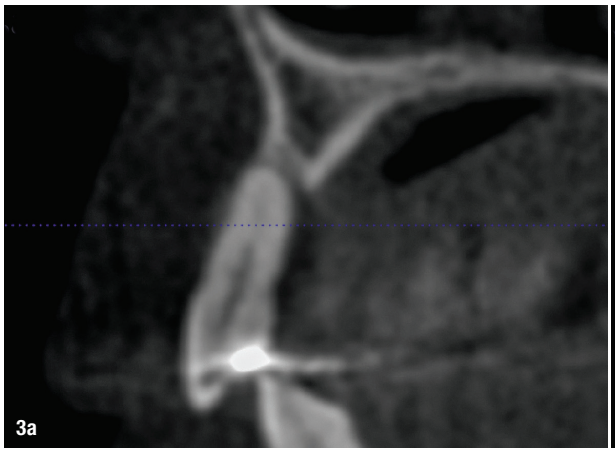
Rehabilitation of the anterior maxillary area with immediate implant placement

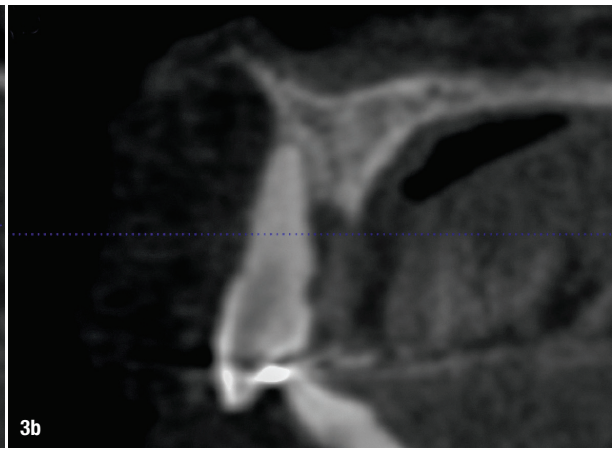
Drs Perla Della Nave & Alberto Vericat Queralt, Spain

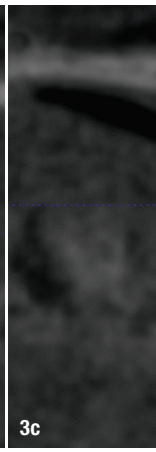
Figs. 1 & 2: Initial clinical situation.

Introduction

The alveolar process and other tissues of the periodontium are tooth-dependent anatomical elements;[1] in fact, tooth loss is followed by a cascade reaction of biological phenomena that cause progressive atrophy of both hard and soft periodontal tissue.[2] Such atrophy is characterised on one hand by a total loss of the attachment fibres of the root cementum, the periodontal ligament and the bundle bone and on the other hand by vertical and horizontal volumetric alteration. It has been seen that the resorption of the alveolar ridge, with its consequent lingual repositioning, can reach 40–60%[3–5] and that this phenomenon occurs on a maximum scale during the first three to six months after tooth extraction,[1,5,6] but it also continues gradually throughout the whole life of the individual (about 0.5–1.0% every year).[7] Specifically, during the first eight weeks, bone resorption occurs especially in the mid-buccal area, that is, the area anatomically further from the periodontal ligament of the adjacent teeth







Figs. 3a–d: Radiographic evaluation by means of CBCT.

(if any), which help maintain the interproximal bone.[8]

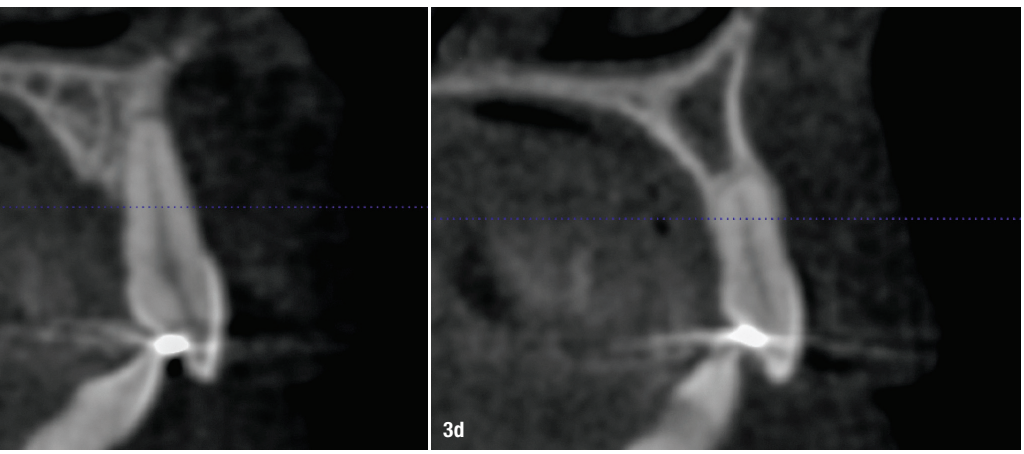
Furthermore, in a thin biotype, the defect generated will be a two-walled defect, owing to the more or less consistent loss of the vestibular cortical bone; whereas, it will be three-walled in a thick biotype, thanks to the greater thickness of the external cortical bone.[8] Soft-tissue changes, however, mainly take place in the first two weeks after extraction; nevertheless, in the presence of a thin biotype, a significant thickening of the gingival volume is observed in the early stages, mainly due to the resorption of the vestibular bone and the formation of granulation tissue in the crestal portion of the alveolus.[8] Knowledge and consideration of these changes and the clinical repercussions of a similar process of physiological atrophy are fundamental in order to simplify any future therapeutic procedure aimed at the replacement of missing teeth, as well as to optimise the functional and aesthetic result.

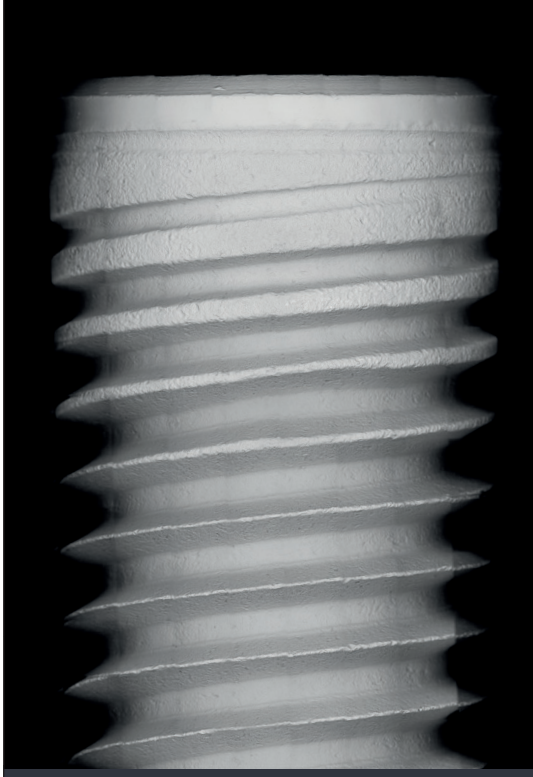
One of the current options for counteracting the post-extraction tissue remodelling phenomenon is alveolar preservation. There are several regenerative procedures, each with different therapeutic indications: preservation of soft tissue, of soft and hard tissue, and of hard tissue.[7] Contemporary scientific literature highlights the fact that alveolar preservation, regardless of the technique and type of biomaterial used, allows more favourable results than those of spontaneous alveolar healing, considerably reducing the volumetric atrophy of the bone crest.[6,9] Nevertheless, its efficacy has been found to depend strictly on a large number of local and general factors, such as the inclination of the socket, the condition of the adjacent teeth, the periodontal biotype, the vestibular cortical bone, systemic factors and the habits of the patient; for example, an essential precondition for an alveolar preservation protocol is the integrity of at least three of the four alveolar walls and at least 80% of the non-intact wall.[10]

Another therapeutic option is immediate implant placement, which has the advantage of significantly reducing treatment time and achieving better tissue maintenance and, therefore, a better aesthetic result.[11] The psychological benefit and the high comfort that such a protocol can offer the patient should also be emphasised, especially if it is also associated with immediate occlusal loading. However, this technique is defined as straightforward, advanced and complex, since it requires adequate surgical experience and excellent evaluation by the surgeon in each of the different clinical situations where it can be applied.

Clinical case

We received in our private clinic a 33-year-old female patient who reported mobility regarding the maxillary incisors and some concern about their possible sudden loss (Figs. 1 & 2). A careful clinical analysis, a dental panoramic tomogram





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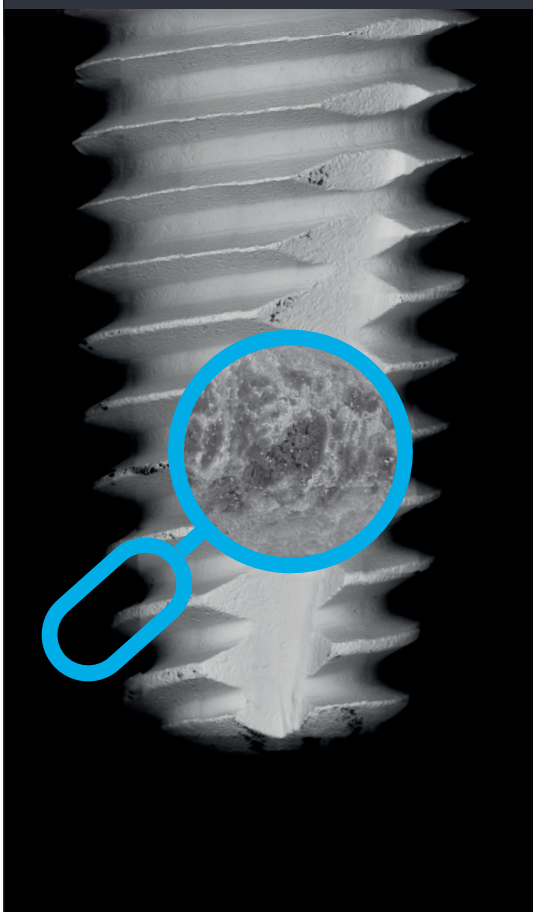
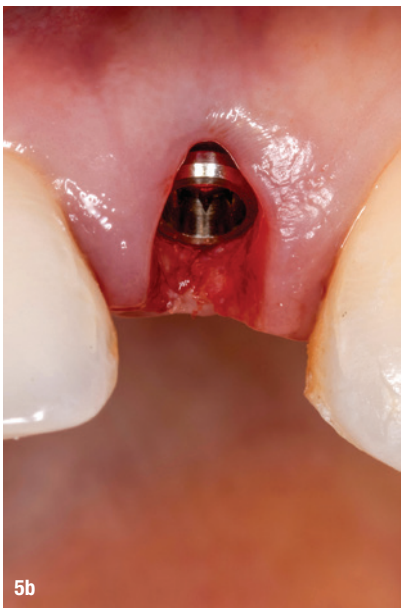
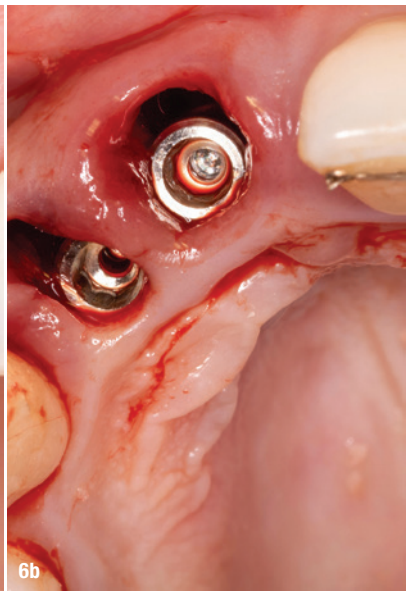


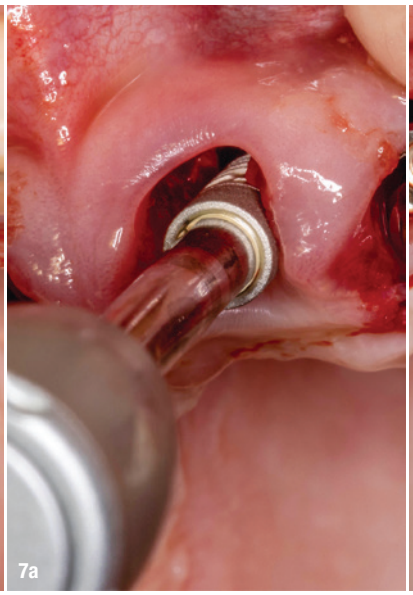


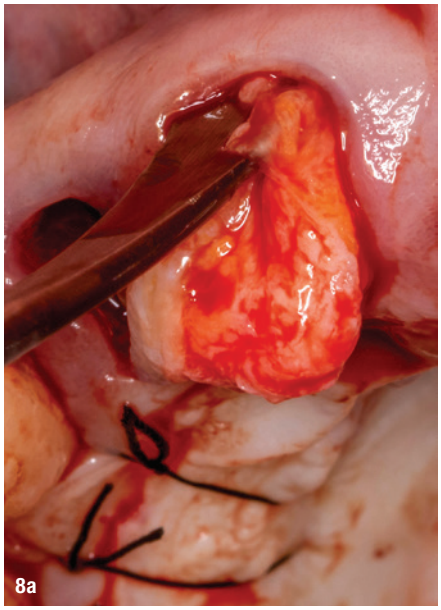
Figs. 4a–7b: Immediate implant placement.

and a cone beam computed tomography (CBCT) scan allowed us to observe the following clinical signs (Figs. 3a–d): Grade II mobility of teeth #12, 11, 21 and 22; marked gingival recession, the absence of papillae and a compromised periodontal situation in the same anterior maxillary area; and a periodontal lesion in the area of teeth #12 and 11 with destruction of the interproximal bony papilla. The treatment plan proposed to the patient was to extract the four teeth and replace them with four implants immediately placed and occlusally loaded and to simultaneously graft the hard and soft tissue.

The surgery began with the minimally invasive extraction of one of the teeth, followed by placement of the corresponding implant with a flapless technique in order to retain the anatomical reference of the adjacent teeth. The same method was applied until the fourth implant had been inserted. All the implants placed were GTB TZERO implants of 3.6 m × 9.0 mm (Advan; Figs. 4a–7b). The GFA abutment for single crowns (Advan) was chosen as the prosthetic abutment (the reasons will be highlighted later). The height of the abutment was 5.5 mm for the implants in the first quadrant and 6.5 mm for the implants in the second quadrant. Posteriorly, subepithelial connective tissue was harvested from both sides of the palate, and multiple connective tissue grafts were placed using an envelope technique, placing only one suture for each graft. To finalise the surgery, we proceeded with socket filling with a particulate bone biomaterial (Geistlich Bio-Oss, Geistlich Biomaterials; Figs. 8a–10b). Impressions were



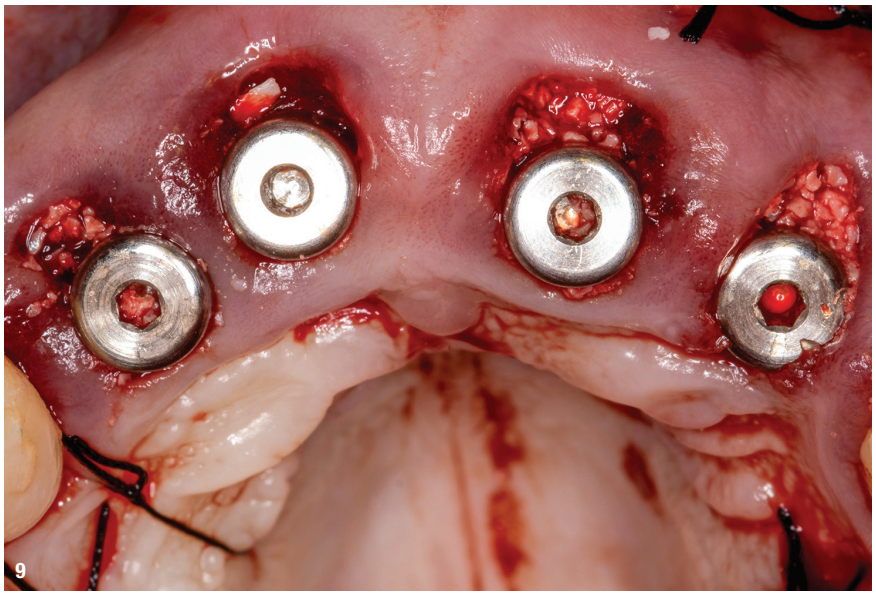




Figs. 8a–9: Bone augmentation around the implants.

taken immediately after the surgery in order to fabricate four provisional single crowns in resin and to place them on the same day of the surgery.

The patient was examined after one week for a check-up and for the removal of the sutures in the area of the connective tissue grafts. At one month and three months after the operation, a follow-up CBCT check was performed in order to check the conditions of the buccal bone. This was not a routine examination, but was carried out in this case given the delicacy of the patient's bone conditions and the importance of maintaining the external cortical bone as support to the soft tissue and, therefore, as fundamental for a satisfactory aesthetic result. The tightening torque of the abutments and the effective osseointegration of the four implants were confirmed at this appointment too. The definitive impressions were taken with four customised impression copings using the open-tray technique in order to retain the gingival emergence profile. Subsequently, four new provisional crowns in polymethylmethacrylate were designed using CAD/CAM to redefine in detail the



Figs. 10a & b: Situation after implant surgery.

emergence profiles and the dental anatomy before copying the latter in zirconia, the material in which the definitive crowns were to be made (with the vestibular addition of layered ceramic). Both the bone and the emergence profile were acceptable and made it possible to obtain, in association with careful and personalised prosthetic work, a functional and aesthetic result that was satisfactory for the patient.

> "Immediate implant placement is a technique that has undergone great evolution in recent years..."

Discussion

Immediate implant placement is a technique that has undergone great evolution in recent years; in fact, many of the conditions once considered contra-indications (such as active infection and lack of integrity of the external cortical bone, especially if associated with a thin periodontal biotype) today constitute a clinical situation in which this technique is predictable if used with some complementary protocols. As demonstrated by the most recent scientific literature, the survival rate of immediately placed and occlusally loaded implants is now comparable to that of immediately placed implants restored according to the conventional loading protocol, but some key fundamental factors for the aesthetic and functional therapeutic success of immediately placed and occlusally loaded implants do exist.

Firstly, the 3D palatal positioning of the implant is a key element for the preservation of the buccal bone and for the reduction of the risk of bone dehiscence and gingival recession.[4] Indeed, vestibular placement is associated with a greater resorption of the external cortical bone.[12] Secondly, the gap generated between the implant surface and the buccal bone should ideally be at least 2 mm, in order to be able to leave adequate 3D space for socket filling and the formation of a good blood clot; in fact, recent studies show a negative correlation between a greater gap and the amount of vertical bone resorption.[13] Thirdly, it is well established that the use of immediately loaded provisional crowns is crucial for the stability of the buccal gingival margin,[11,14,15] for the protection of the surgical wound, clot and bone graft,[12] for soft-tissue support and for the creation or maintenance of aesthetic papillae.[11] Furthermore, the same result in terms of soft-tissue stability would be achieved regardless of the biotype.[11] Finally, it has been observed that non-immediate provisionalisation is associated with greater bone remodelling.[16]

Fourthly, the flapless technique, associated with minimally invasive extraction, is another key factor for the success of immediately placed and occlusally loaded implants, mainly because it avoids any interruption of vascularisation, something crucial for the tissue regeneration potential. In fact, recent studies recommend the use of a flapless protocol whenever possible to minimise marginal remodelling;[16] nevertheless, there are clinical situations in which raising a surgical flap is indispensable and prudent, especially in the presence of major bone defects or very unfavourable alveolar conditions. Fifthly, it has been suggested that, in association with the correct 3D placement of the implant, the connective tissue graft is an important factor for volumetric augmentation and soft-tissue maintenance, thus avoiding gingival recession and important aesthetic problems.[17] Moreover, it would also be able to provide adequate support to the underlying bone, thus contributing to its stability.[18] Sixthly, the choice of prosthetic components is a key element for tissue maintenance. Both the one abutment, one time protocol and the use of platform shifting favourably affect the stability of the tissue, as the use of abutments with narrower diameters than those of the implant platforms is essential to reduce marginal bone loss[11,19–21] and, in the presence of a thin biotype, to ensure sufficient biological width.[11]

In the case described, the therapeutic strategy regarding the number of implants and the type of prosthetic connection and restoration proved to be essential for obtaining the final result. Specifically, the placement of four implants

(for four crowns) was motivated by the need to minimise tissue atrophy and optimise the volume throughout the anterior maxillary area. The GTB TZERO implant, thanks to the morphology of the threads in the apical portion, is particularly suitable for immediate loading protocols and was, in this case, combined with the GFA abutment, with a conical connection and internal anti-rotational octagonal index, which is normally used for a single restoration on a single implant. The use of this prosthetic element, instead of a conventional multi-unit abutment, has a dual purpose. On the one hand, though maintaining sufficient platform shifting, it has a diameter 0.8 mm narrower than the diameter of the multi-unit abutment, thus allowing 3.2 mm greater biological space overall. On the other hand, the anti-rotational connection was employed for the abutments of all four single crowns, producing a better aesthetic result owing to a more individualised prosthetic restoration.

Conclusion

The rehabilitation of four maxillary incisors with four immediately placed implants, simultaneous regeneration with bone and connective tissue grafts, and an immediate loading protocol allowed us to obtain a satisfactory result thanks to the combination of key factors taken into account both in the surgical technique and the prosthetic strategy (in terms of components and type of restoration). The use of four implants placed in correct 3D position and combined with socket filling, the GFA abutments with platform shifting associated with the connective graft to generate a biotype change and the four single crowns placed into immediate function achieved adequate maintenance of hard and soft tissue and a natural and satisfactory appearance of the definitive restorations, despite the unfavourable bone conditions and the thin periodontal biotype observed in the preoperative phase.

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Dr Perla Della Nave is a Spain-based dentist who specialises in dental implantology. She studied dentistry at the European University of Valencia in Spain and obtained her degree in 2016. In addition, she holds master's degrees in oral surgery and implantology. She is currently in private practice in Valencia.

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Literature

A new approach for patients on direct oral anti-coagulant medication

Dr Stefan Grümer & Melissa Yüce, Germany

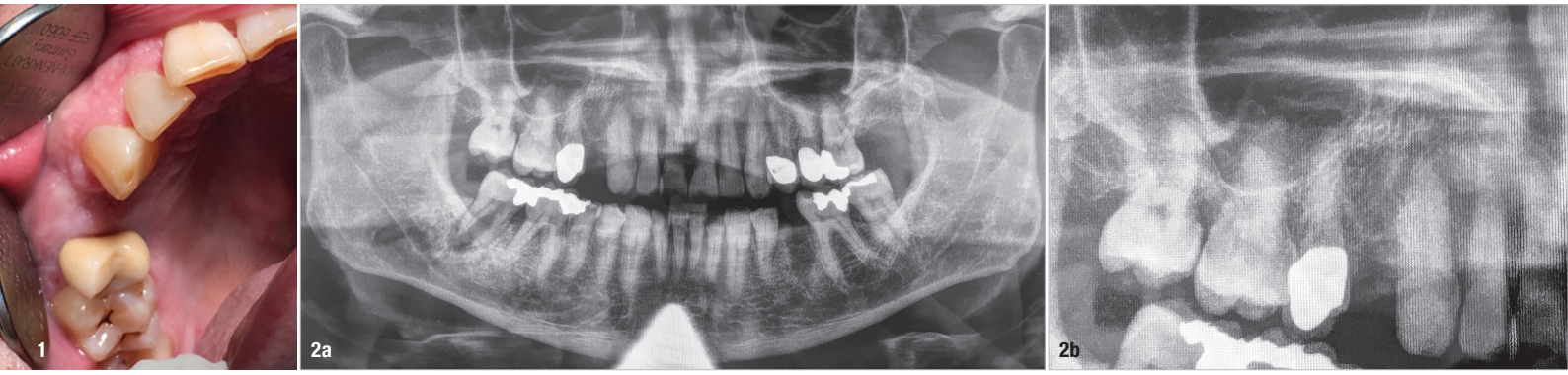


Fig. 1: The reduced size of position #14. **Figs. 2a & b:** Dental panoramic tomogram **(a)** and periapical radiograph **(b)** prior to implant placement.

Implant placement is a surgical procedure employed in accordance with the individual wishes of patients. It can often be avoided by choosing conventional, non-surgical alternatives. In particular, in cases of patients with haemorrhagic diathesis or patients undergoing anti-coagulant therapy with direct oral anti-coagulants (DOACs), the risk of undesired side effects, with even life-endangering consequences, necessarily led to a strict selection of patients who are suitable for dental implants. A new laser-supported approach in implantology for patients undergoing anti-coagulant therapy has been developed by the Aachen Institute for Continuous Medical and Dental Education in cooperation with the Clinic for Cardiology, Pneumology, Angiology and Internal Intensive Medicine of the RWTH Aachen University hospital in Germany.

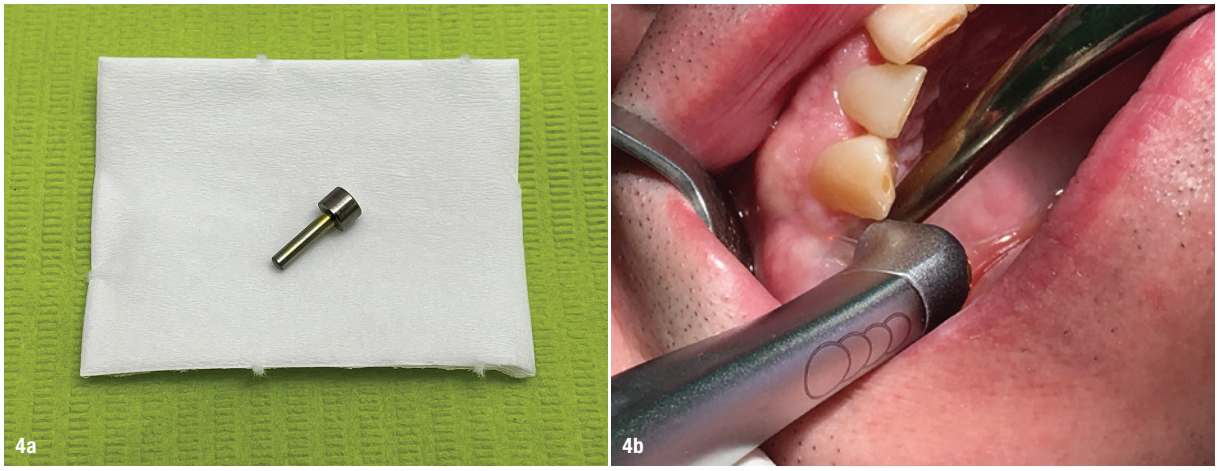
Fig. 3: The initial osteotomy for the implant being performed with the pilot drill.

Case presentation

Nowadays, the number of implants placed in patients with a higher average age and in medically compromised cases is rising. Particularly cases of patients undergoing DOAC therapy, with the advantage of no need to permanently control the coagulation parameters, are rising significantly. Despite the advice of cardiologists not to stop or interrupt the medication, these patients often request implants. In addition, for only two DOACs does an antagonist drug exist. For three other DOACs, there is no antagonist drug yet, leading to an increase in possible postoperative complications. Nevertheless, among this group of patients, the demand for implants is rising as well. To fulfil these wishes while following the advice of the cardiologist, a new transgingival, nearly blood-free surgical protocol has been developed. The following case describes this procedure in general and points out differences in relation to conventional treatment.

Clinical and radiographic situation

A 62-year-old male patient with moderate general health attended the prosthetic consultation. His medical history revealed that he had had three bypasses between 2014 and 2016 and signs of anginal attacks. Also, there



Figs. 4a & b: The guide for a conventional rotating soft-tissue punch with a central guide pin matching the pilot drill hole **(a)**. The laser handpiece used **(b)**.

were periodically recurring events of sinus arrhythmias. For a duration of three years, he had been on dabigatran etexilate (Pradaxa), which is a direct thrombin inhibitor. He was slightly overweight and a non-smoker. Upon intra-oral examination, restoratively and prosthetically rehabilitated dentition and missing teeth #14, 27 and 35 were noted, and it was observed that position #14 had reduced in size (Fig. 1). The patient maintained good oral hygiene. The panoramic radiograph revealed an apically compromised tooth #47 with furcation involvement and good bone structure in positions #14 and 35 (Figs. 2 & b). The patient was thoroughly informed regarding the treatment options. He asked for an implant replacement for tooth #14 and possibly, at a later stage, for tooth #35. After an explanation about the medical compromises regarding a surgical intervention and after consulting the cardiologist regarding the DOAC therapy, it was mutually decided not to interrupt medication with Pradaxa and to opt for transgingival, laser-supported implant surgery in position #14. The initial bone contours showed a sufficient amount of bone in all three dimensions. If the bone width appears critical, a 3D radiograph is highly recommended to evaluate the amount of bone in the third dimension.

Laser treatment and implant insertion

After local anaesthesia, the initial osteotomy for the implant was performed with a pilot drill (locator drill; Fig. 3). A guide for a conventional rotating soft-tissue punch with a central guide pin that matched the pilot drill hole was placed *in situ* as an outline guide for the blood-free laser punch procedure (Figs. 4a & b). The laser unit used was an Er,Cr:YSGG laser operating at a wavelength of 2,780 nm (Waterlase iPlus, BIOLASE). The laser was set to the parameters shown in Figure 5. After the laser incision, the punched tissue was removed with a curette (Figs. 6a & b). Thereafter, following the drill protocol of the implant system placed, a ProActive Tapered implant of 4 mm in diameter and 13 mm in length (Neoss) was inserted to a 32 Ncm torque (Figs. 7 & 8). The healing abutment was inserted to 15 Ncm. Slight pressure on the surrounding tissue is important, for which the diameter of the healing abutment should be at least 1 mm larger than the punch diameter. In this case, the tissue punch diameter was 4.3 mm and the healing abutment was 5.5 mm in diameter (Fig. 9). The definitive restoration is shown in Figure 10.

Discussion

After three months of healing, the implant can be loaded and the superstructure can be installed. Following the protocol described, 143 implants have been inserted during the last three years. The retrospective analysis of this method showed postoperative haemorrhage with the need for additional intervention for ten of these. Seven

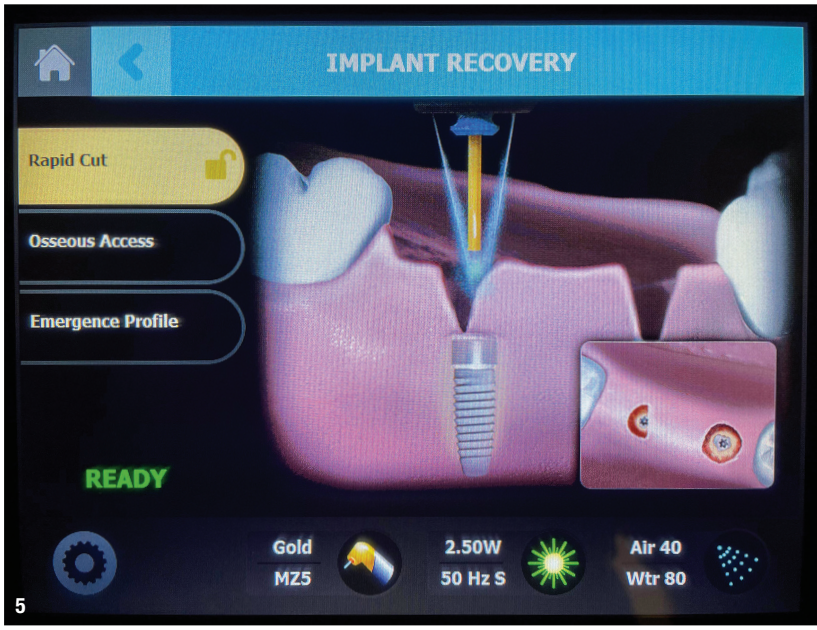


Fig. 5: The laser settings.

Figs. 6a & b: Removal of the punched tissue with a curette **(a)**. The tissue removed with the punch **(b)**. **Fig. 7:** The implant placed. **Fig. 8:** Periapical radiograph immediately after implant insertion. **Fig. 9:** Slight anaemia was visible around the healing abutment, demonstrating the pressure on the surrounding tissue required to prevent post-op haemorrhage. **Fig. 10:** The definitive restoration.

of the ten appeared during the first 30 implantations. After finding the right relation between size of the tissue punch and size of the healing abutment (diameter and height), only three cases of postoperative haemorrhage were encountered. The main precondition for this kind of treatment is a sufficient amount of bone in the implant site. Any augmentative procedures more demanding than a punch technique to gain 1–2 mm in the neck area of the implant are not compatible with the protocol described. In cases of reduced horizontal bone volume, case suitability for the laser-supported protocol should be evaluated by 3D radiography. The postoperative evaluation by the Clinic for Cardiology, Pneumology, Angiology and Internal Intensive Medicine showed no negative effects on the general health of the patients treated. This protocol is officially recommended by the clinic.

Conclusion

The use of laser in this delicate zone of soft tissue and bone of the implant site is very beneficial and does not harm the bone (or soft tissue) through high temperatures or carbonisation. In addition, the positive effect of biostimulation leads to quicker and better healing by accelerating the fibroblast activity around the implant. Of course, the primary benefit for patients is the reduction of the general risk of blood clotting and thrombosis, which can possibly cause seizures or strokes during the interruption of anticoagulant therapy, and such interruption is no longer essential with this laser-supported protocol.

about the author

Dr Stefan Grümer, MSc, is a specialist in implantology and laser dentistry. In 2013, he was appointed clinical director of the first academic teaching clinic in dentistry in Germany accredited by RWTH Aachen University. He is the head of clinical education in the MSc in lasers in dentistry programme at RWTH Aachen University. In addition, he is a member of the board of directors of the German Society for Laser Dentistry and the International Society for Laser Dentistry.

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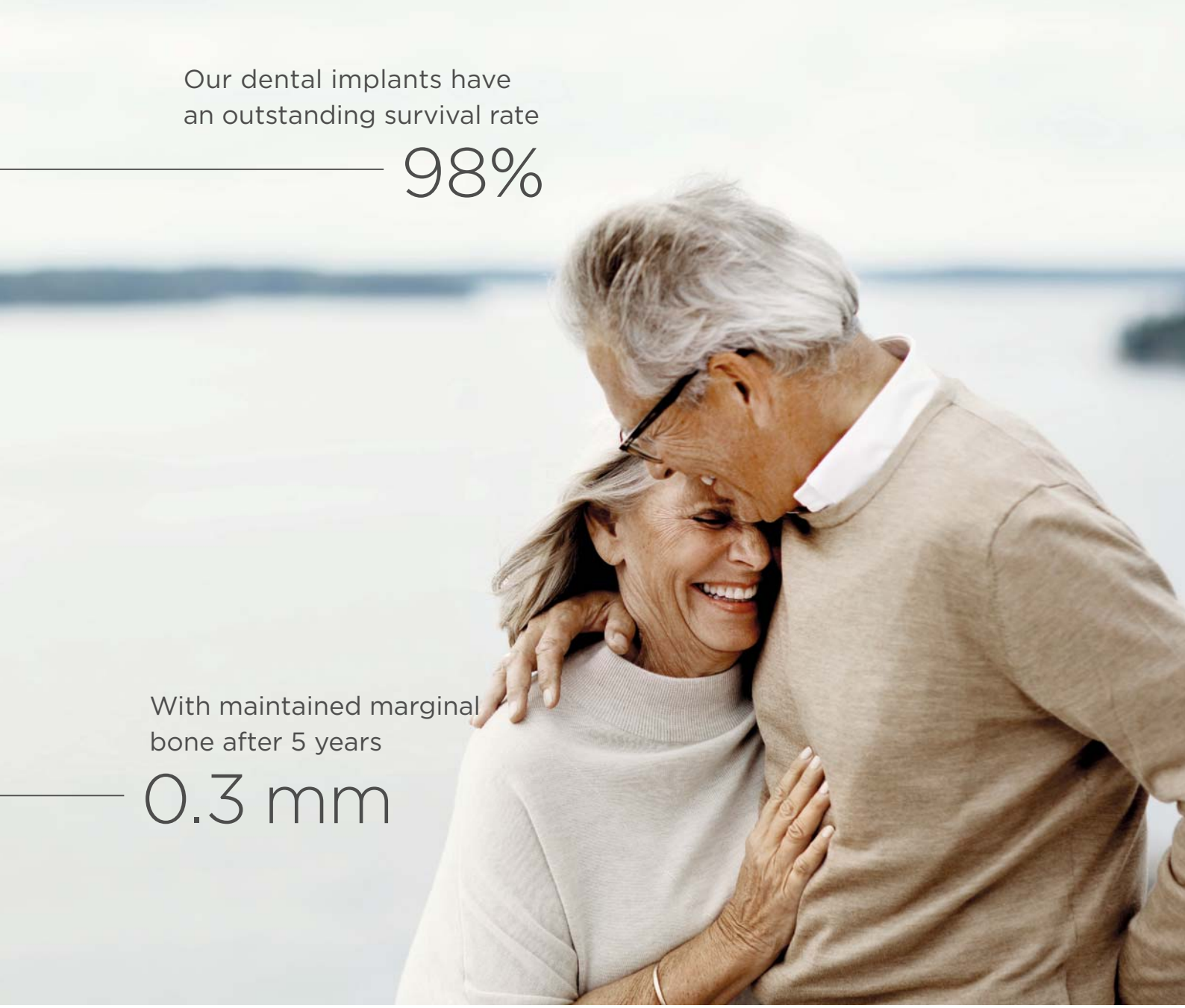

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Combining orthodontics with a zirconia collar implant

Dr Kunal Shah, UK

Fig. 1: Front view in occlusion. **Fig. 2:** Lower occlusal view. **Fig. 3:** Pre-operative intra-oral view of LL4.

A male patient in his thirties presented with a submerged LL4 that was very mobile and had a poor prognosis. The patient was fit and well with no medical issues. He came to the practice on a recommendation and his main concern was the position of his teeth—he had an increased overjet and wanted straighter teeth. The patient's dentition was healthy and his periodontal condition was good. Treatment options were discussed with the patient. These initially included no treatment or orthodontics—through either myself or a specialist orthodontist—to correct the position of the teeth, in addition to extraction and replacement of the LL4. Replacement options for the LL4 were also offered, including no treatment, dentures, a dental bridge or a dental implant. The patient did not want a fixed orthodontic appliance. Instead, he preferred a discreet removable solution, as he was conscious of being in a client-facing job role. As such, he decided on extraction of the LL4, orthodontics with transparent aligners system and replacement of the LL4 with an implant. Following extraction of the LL4, we knew from the outset how much space needed to be maintained ready for implant placement (Figs. 1–3). Aligners procedure was performed over 18 months to level out and align the lower arch, as well as to correct the patient's increased overjet to the point where he was happy. Orthodontic treatment effectively maintained the space left behind in the LL4 for the implant to be placed.

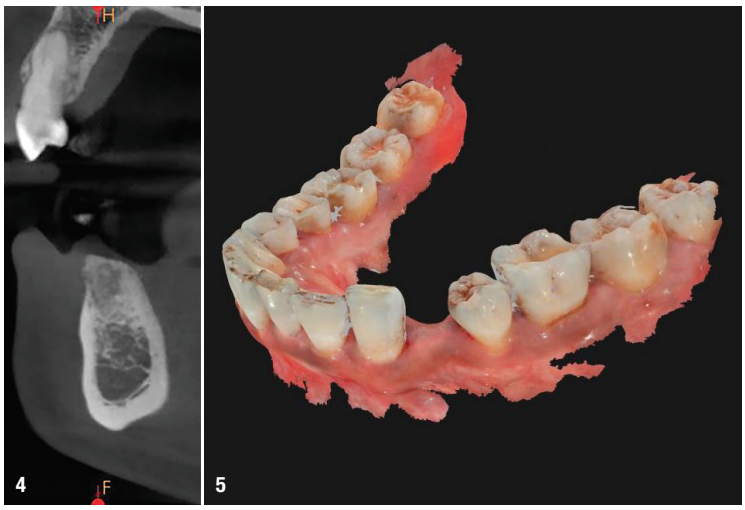

Fig. 4: CBCT scan close up of LL4. **Fig. 5:** Prosthetic-driven implant planning model.

Implant consultation

When the patient returned to the practice to discuss implant treatment, different implant systems were presented. The patient chose the Z1 implant (TBR Dental) as he had a thin gingival biotype, so the zirconia collar design of this implant would enable better aesthetics to be achieved. The patient had the bone structure to support either a bone- or tissue-level implant, so we were fortunate enough to be able to choose a solution that met the clinical needs of the patient best.

Treatment planning

Treatment planning began with taking CBCT scans (Figs. 4 & 5) to determine the position of the inferior alveolar nerve (IAN) and the mental nerve. This was essential to plan optimal placement of the implant. Injury to the IAN as a result of

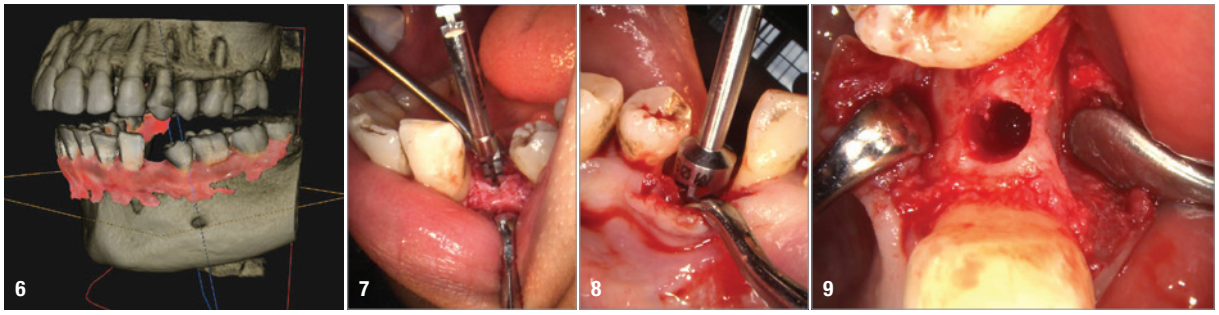

Fig. 6: 3D render with prosthetic-driven implant planning model. **Fig. 7:** Buccal view of TBR drill. **Fig. 8:** Lingual view of countersink. **Fig. 9:** Prepared site for implant placement following countersink.

implant surgery can cause severe pain and altered sensation in the face, which can affect everyday activities such as speaking and eating.[1] The CBCT scans also facilitated visualisation and assessment of the patient's bone density, so that treatment could be planned from a 3D perspective (Fig. 6). An implant (3.5 mm in diameter, 10.5 mm in length; TBR Dental) with a zirconia collar height of 1.5 mm was chosen. Each stage of the procedure was discussed with the patient, before he consented to treatment and surgery could begin.

Implant placement

The surgical aspect of treatment was straight-forward, as it had been planned meticulously in advance. A delayed implant placement protocol was followed that included raising a flap. This technique involved making an incision in the gingiva and lifting a flap to provide access to the bone. The patient's bone density ensured that a bone graft procedure was not necessary for implant placement, which enabled countersinking of the implant (Figs. 7–9), meaning the bone was prepared for the zirconia collar of the implant to be placed slightly below the crestal bone (Figs. 10 & 11). This is a protocol the author typically follows to achieve better integration of the implant with the bone and, consequently, improved gingival attachment to the zirconia collar for enhanced aesthetics. The zirconia collar of the implant acts like a healing abutment to encourage gingival flaring and soft tissue healing for a good gingival profile to develop. This procedure allows the hard and soft tissue to heal at the same time as the gingiva is not handled several times—as it would be with a bone level implant. In this case, a cover screw could be fitted to the implant and left for 3 months to achieve excellent osseointegration. The surgical site had been sutured. A radiograph was taken to confirm that the implant was positioned correctly. The patient was sent away with appropriate post-surgery care instructions, which involved wearing his retainers as normal to maintain the space in the LL4 during healing.

Restoration

The implant was reviewed after three months and found to be stable. The soft tissue was pink, healthy and firm, and the LL4 space had been effectively maintained as a result of the patient wearing his retainers. The implant was restored through a digital workflow. A CS 3600 intra-oral scanner was used to scan the lower and upper arches with the implant cover screw in place, which was then removed and the focus area scanned again to capture the emergence profile (Fig. 12). A TBR scan body was then placed (Fig. 13) and a final scan taken (Figs. 14 & 15). This was checked and sent to the laboratory to produce a screw-retained e.max crown on a pre-manufactured, titanium-base abutment from TBR. The patient was invited back to the practice to have the final restoration fitted. The e.max crown was seated correctly onto the implant (Figs. 16 & 17) and the access hole was sealed with PTFE tape (Fig. 18), before being filled with

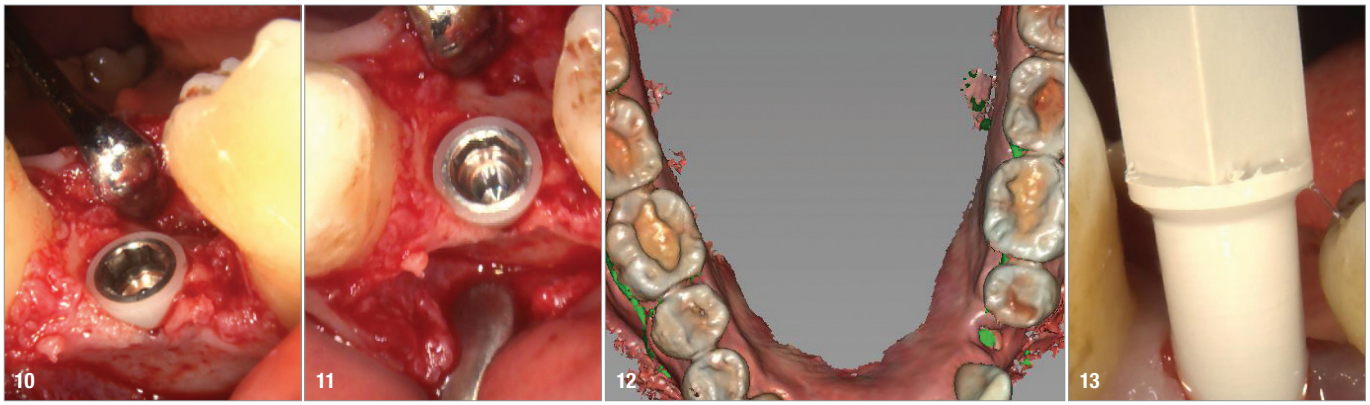

Fig. 10: Buccal view of implant placement. **Fig. 11:** Occlusal view of TBR 3.5 x 10 mm implant placement. **Fig. 12:** Intra-oral scan of lower arch with cover screw present on implant. **Fig. 13:** Buccal view of scan body seated in LL4.

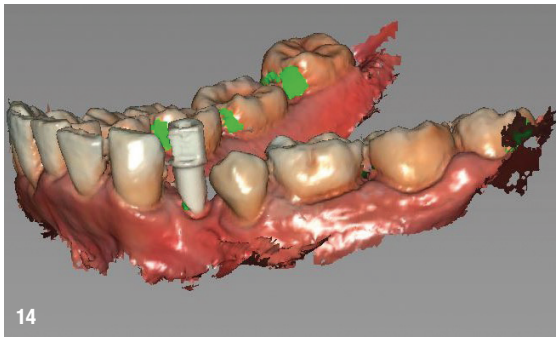
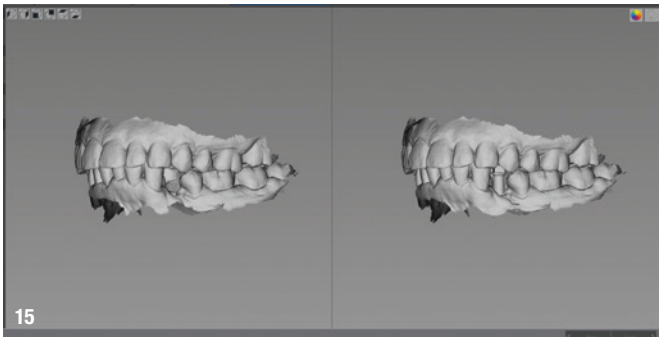

Fig. 14: Buccal view of lower arch IO scan with scan body. **Fig. 15:** Comparison model of LL4 region with and without scan body.

a temporary dressing. This was removed after a week and the crown tightened to 25 Ncm (Fig. 19). PTFE tape and composite were used to seal the screw-access hole. The patient was delighted with the overall outcome (Figs. 20 & 21).

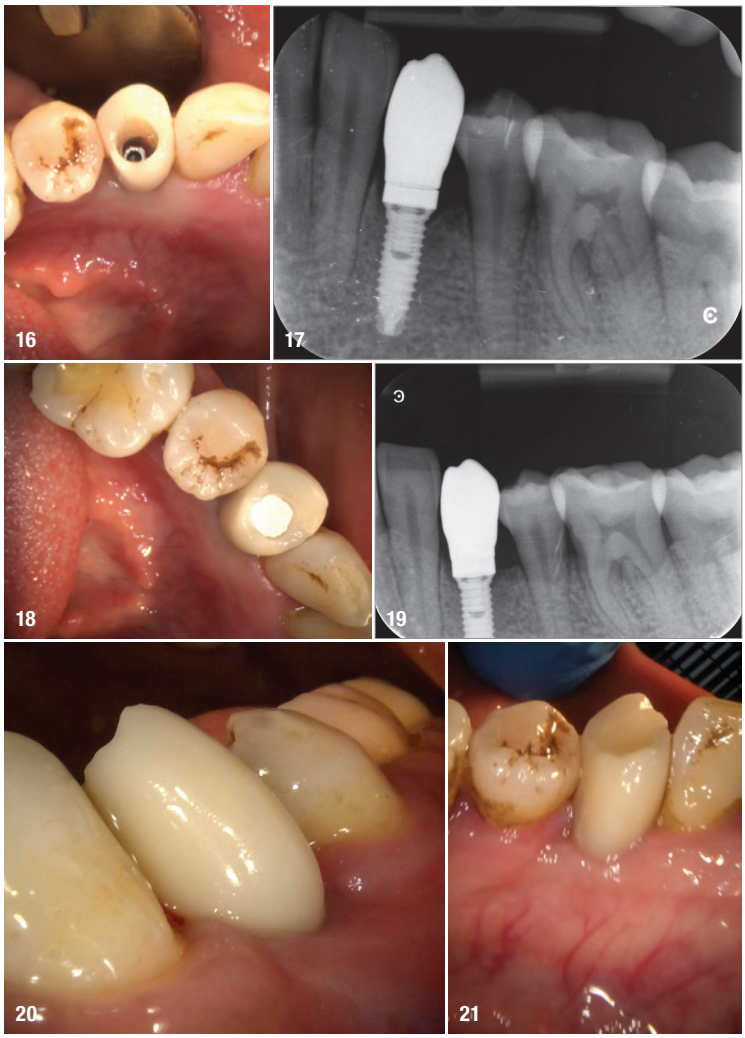

Fig. 16: Occlusal view of screw-retained e.max crown seated in LL4. **Fig. 17:** Post-op palatal aspect of LL4 showing initial seating of final crown. **Fig. 18:** Screw-retained e.max crown with PTFE tape in access hole. **Fig. 19:** Post-op PA LL4—showing final seating of screw-retained e.max crown. **Fig. 20:** Buccal view of final screw-retained e.max crown. **Fig. 21:** Lingual view of final screw-retained e.max crown.

Discussion

In this case, a combination of orthodontics and implant treatment ensured that a predictable and highly satisfactory result could be achieved. The unique design of the Z1 implant makes it a highly versatile system that can be adapted according to the clinical situation. The zirconia collar also limits the adhesion and proliferation of bacteria to help avoid infection and promote a longer life-span of the dental implant. Moreover, its zirconia collar facilitates treatment by protecting the crestal bone and soft tissue from infection and promoting natural gingival growth.[2,3]

Conclusion

This case emphasises the importance of careful treatment planning and choosing a top-quality implant that allows to achieve excellent aesthetics and function.

about the author

Dr Kunal Shah is the principal of LeoDental in London. He graduated from the University of Birmingham in the UK, was selected as a finalist for Young Dentist of the Year—South in the Dental Awards 2018 and has the accolade for the best implant and imaging clinic in London in 2018. He has a keen interest in the topics of digital dentistry, implantology and restorative dentistry specific to direct resin composites and impression materials, and has published several articles in the professional press and lectured internationally. Dr Shah is also a clinical mentor for students on the year-long postgraduate implant course at LeoDental in conjunction with SmileTube.tv.

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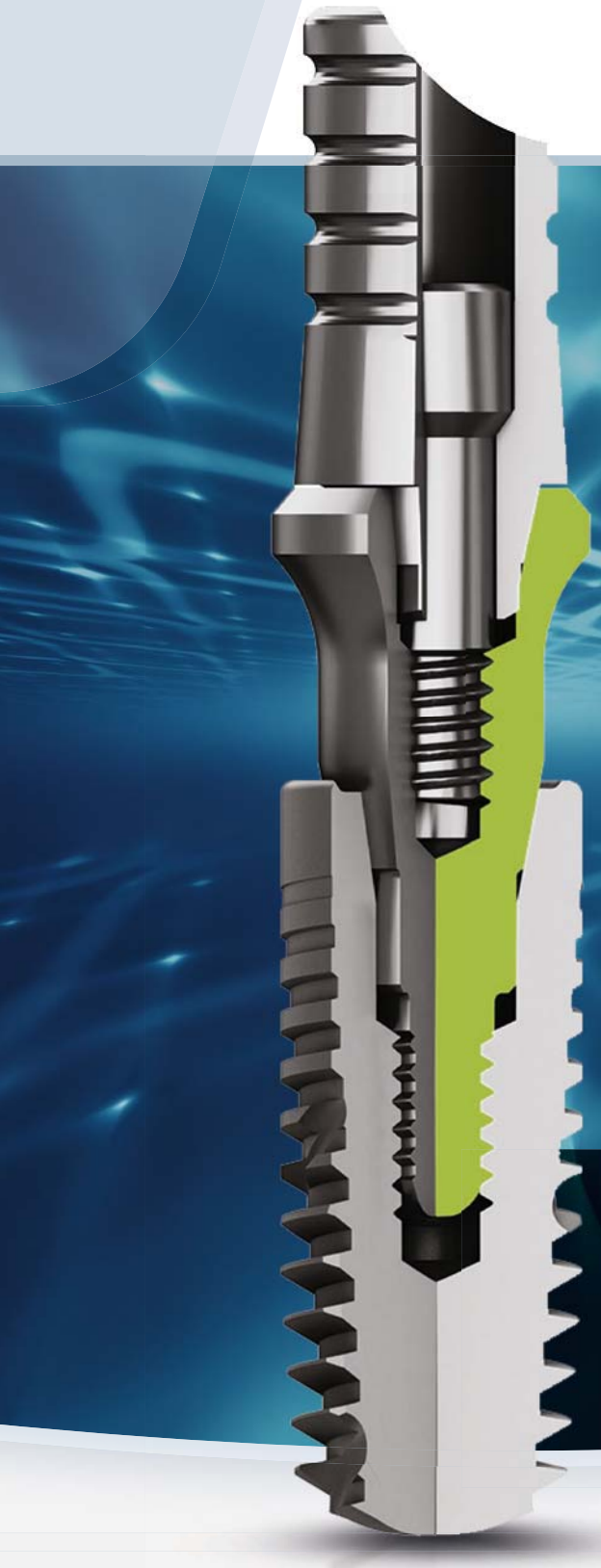

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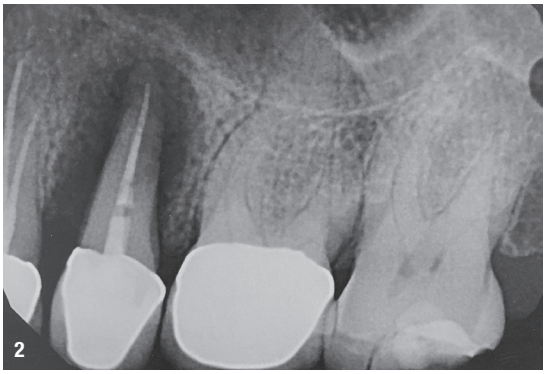

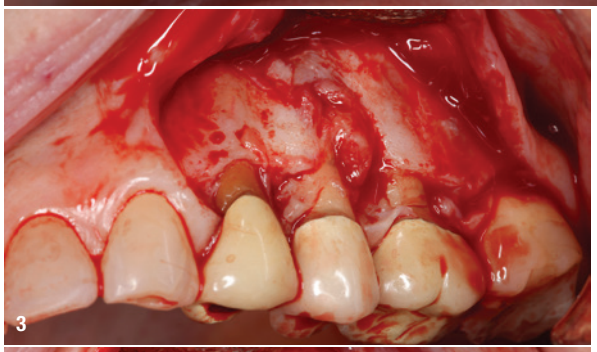

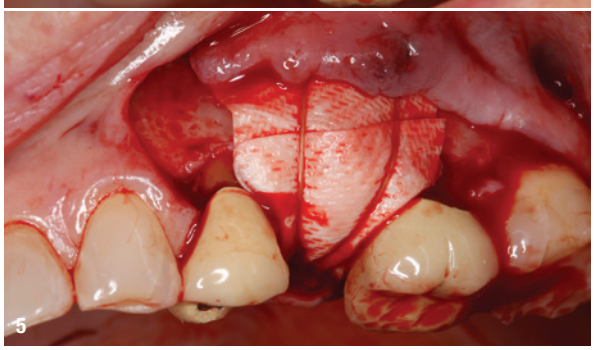

Fig. 1: Pre-op buccal view. **Fig. 2:** Pre-op radiograph. **Fig. 3:** Full-thickness flap reflection. **Fig. 4:** Extraction and degranulation. **Fig. 5:** Membrane stabilised with resorbable sutures over the allograft particulate bone graft.

A 46-year-old female patient with a non-contributory medical history presented for evaluation and treatment of swelling in her maxillary left quadrant. The intra-oral examination revealed moderate swelling and a buccal fistula 3 mm from the gingival margin of tooth #25 (Fig. 1). The radiograph revealed severe bone loss as a result of fracture and subsequent infection of tooth #25 (Fig. 2). Treatment planning included tooth extraction and subsequent tissue debridement. Tooth replacement with a dental implant was planned to be carried out once the site had regenerated.

Extraction and bone grafting

In a first surgical step, a full-thickness flap was reflected (Fig. 3). Once the infected tooth had been extracted, all granulomatous tissue was meticulously debrided from the defect (Fig. 4). The defect was then grafted with a freeze-dried bone allograft, and an OSSIX Plus membrane (Dentsply Sirona) was adapted to the buccal–occlusal–palatal line angle and secured with a resorbable suture (Fig. 5). At the follow-up two weeks after surgery, slight soft-tissue dehiscence at the incision line was noted (Fig. 6). There were no longer any signs of an infection. At four weeks postoperatively, the tissue over the graft–membrane complex had healed almost completely (Fig. 7). After four months, the patient had fully recovered (Fig. 8). At that point, a significant increase in the contours of the ridge in the area of the previous infection was notable.

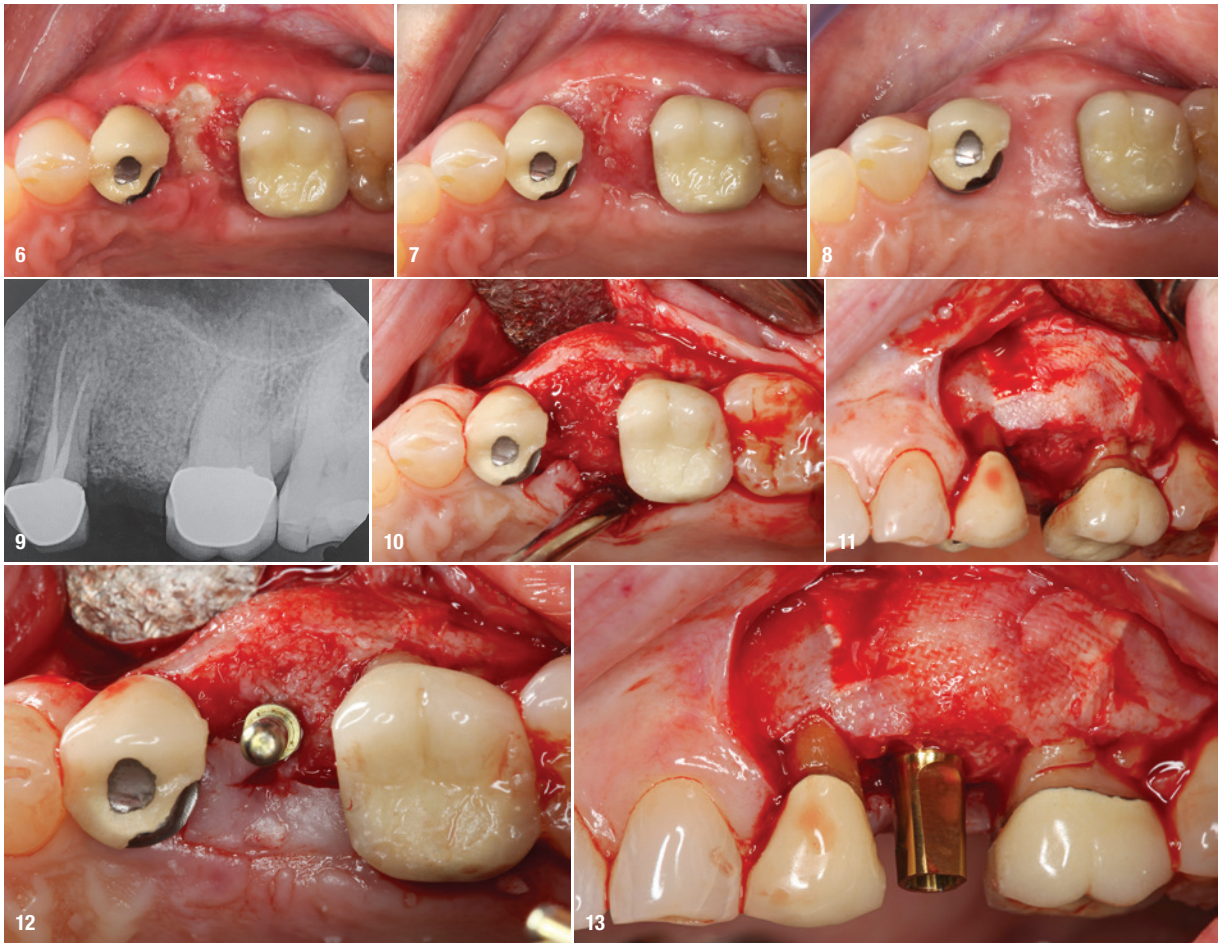

Fig. 6: Occlusal view of healing at two weeks post-op. **Fig. 7:** Occlusal view at four weeks post-op: almost complete healing over the graft–membrane complex. **Fig. 8:** Full recovery after four months. **Fig. 9:** Radiograph at four months post-op revealing complete defect filling and incorporation of the bone graft. **Fig. 10:** Occlusal view of the regenerated ridge at the time of implant placement. **Fig. 11:** Buccal view of the regenerated ridge at the time of implant placement. **Fig. 12:** Occlusal view after initial osteotomy preparation and placement of a guide pin. **Fig. 13:** Buccal view after implant placement.

A radiograph was taken which revealed complete defect filling and incorporation of the bone graft (Fig. 9). The vertical height of the alveolar ridge could be maintained despite the severity of the defect at the time of extraction.

Implant placement

Ahead of implant placement, six months after extraction, a flap was reflected (Fig. 10). At that point, the ridge had fully regenerated. Remnants of the OSSIX Plus membrane can be seen in Figure 11, protecting the healed ridge. The initial osteotomy was prepared and a guide pin was placed. At that point, a significant increase in ridge width beyond the confines of the alveolar housing was noted (Fig. 12). After implant insertion, imprinting of the herring bone pattern on the regenerated bone and re-establishment of the buccal–occlusal line angle could be seen (Fig. 13).

about the author

Dr Matthew J. Fien graduated from the Columbia University College of Dental Medicine in New York in the US in 2006. He received his specialty training in periodontics from Nova Southeastern University in Florida in the US and his diplomate status from the American Board of Periodontology in 2009. He has published articles in various dental journals and lectures throughout the US on bone grafting techniques and all aspects of implant dentistry. He is an active member of the American Academy of Periodontology and the Academy of Osseointegration and maintains a private practice in Fort Lauderdale in Florida.

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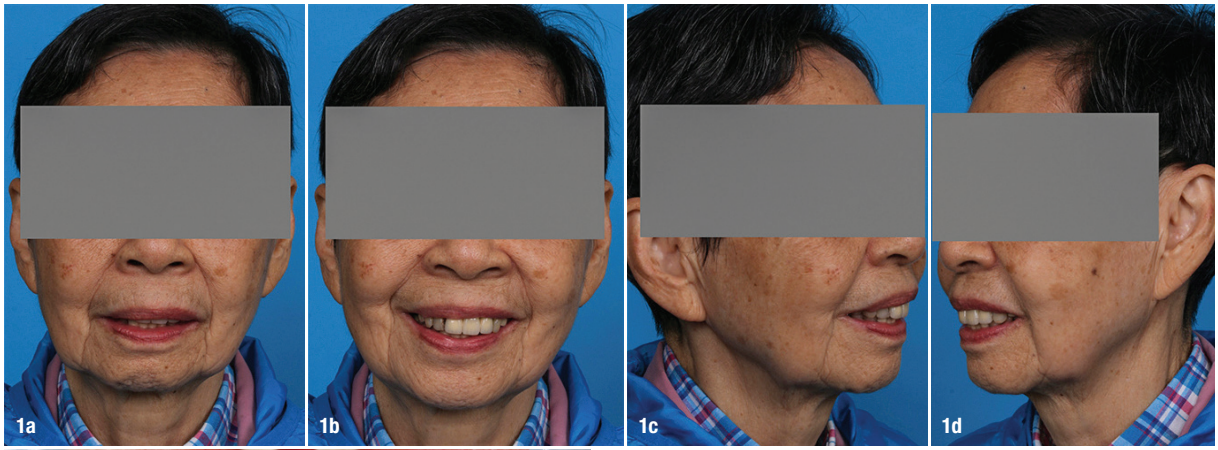
Full-mouth implant reconstruction using zygomatic and standard implants

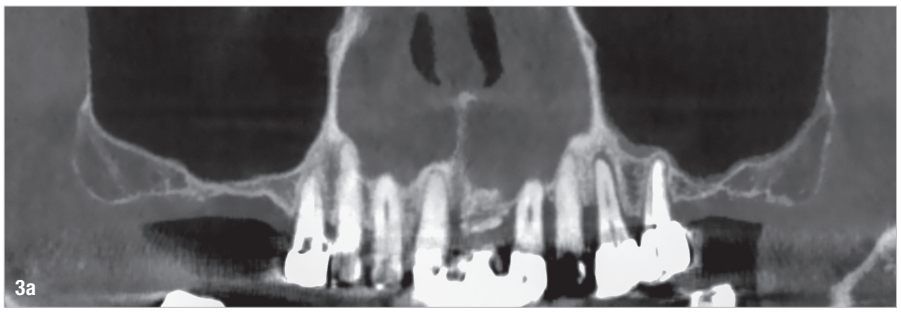
Dr James Kwok Fai Chow, China



Immediate implant insertion is indicated when treating patients with terminal dentition. In the case of full-arch implant reconstruction, clinicians usually couple immediate implant placement with immediate loading if the primary stability of these implants is adequate. If the residual bone volume is limited in the posterior maxilla, a zygomatic implant is often employed by experienced surgeons to minimise the extent of grafting and to support immediate loading. This article describes the dental implant treatment of an elderly lady who was suffering from terminal dentition. This patient had undergone full mouth clearance followed by double-arch immediate implant reconstruction using zygomatic and conventional implants.

Initial situation

A 76-year-old lady who complained of gum swelling and tooth mobility was a known case of hypertension and hyperlipidemia (Figs. 1a–d). She was taking antihypertensives regularly (amlodipine 5 mg at night; losartan 50 mg QD). In addition, this patient had undergone a left hemithyroidectomy in 2018, as well as a spinal fusion many years ago. The patient was fit and ambulatory without any acute distress. Preoperative blood tests showed that she had mild vitamin D deficiency. Clinically, this patient suffered from multiple missing posterior teeth in her upper and lower jaws. The remaining teeth were diagnosed with secondary caries, chronic periodontal disease with clinical attachment loss, defective fillings and failing crown and bridgework (Figs. 2a–c). Radiological examination further revealed


3a

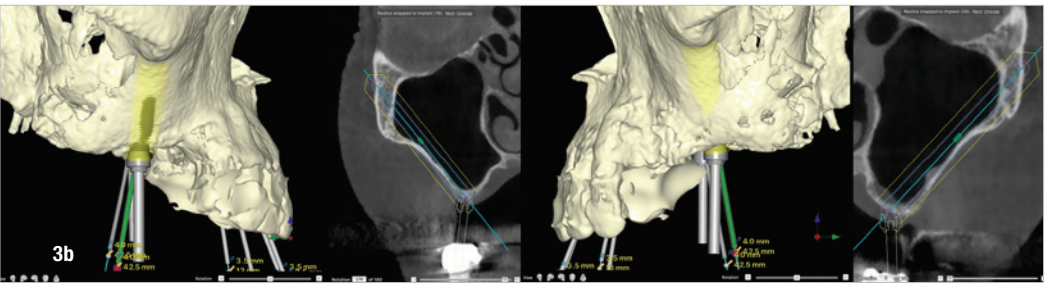
that the three anterior mandibular implants had extensive peri-implant bone loss, which was consistent with a clinical diagnosis of severe peri-implantitis.

Treatment planning

After undergoing a CBCT scan, the patient's DICOM files were exported for computer-aided implant planning (Figs. 3a & b). Third-party software was used for segmentation and simulation. To respect the biology and biomechanics for optimal functional and aesthetic outcomes, the treatment plan was formulated according to the principles of prosthetically driven implant planning (Figs. 4a & b). Important planning considerations included the distribution of the dental implants in a wider arc, the placement of dental implants according to the future tooth position, and the elimination of a distal cantilever on the prosthesis. Based on the clinical and radiological findings, this patient was found to have the following problems: 1) Terminal condition of the remaining upper and lower teeth; 2) Low-lying maxillary sinus floor bilaterally with limited residual bone volume; 3) Peri-implantitis of the anterior mandibular implants.

To solve these problems, the following treatment plan was explained and recommended to the patient and her family to consider: 1) Clearance of all remaining teeth; 2) Removal of the anterior mandibular implants; 3) Six conventional dental implants in the mandible for full-arch reconstruction; 4) Six dental implants in the maxilla for full-arch reconstruction including four conventional dental implants in the anterior maxilla and single zygomatic implants bilaterally; 5) Immediate loading using abutment-level screw-retained provisional prostheses; 6) Surgery under general anaesthesia. Once the patient had agreed with the proposed treatment plan, the CBCT DICOM files were segmented, and 3D printed jaw models were produced. These real-size jaw models were used for visualisation of anatomical structures and the mental rehearsal of the surgical steps (Fig. 5). In addition to CBCT diagnostic imaging and computer-aided planning, 3D printing is an invaluable technology in the digital workflow of implant dentistry.

BLX and ZAGA™ zygomatic implants (Straumann) were selected for this patient. The BLX Implant System is designed for immediacy. Straumann® Zygomatic Implants ZAGA™ flat and round were recently introduced to the market to provide implant surgeons with an extra tool to manage patients with severely atrophic maxilla. In this case report, a ZAGA™ round implant was selected based on the current ZAGA™ concept. According to the ZAGA™ classification,[1] a zygomatic implant may take an intra-sinus or extra-sinus path depending on the lateral maxillary sinus wall configuration. When an intra-sinus path is antici-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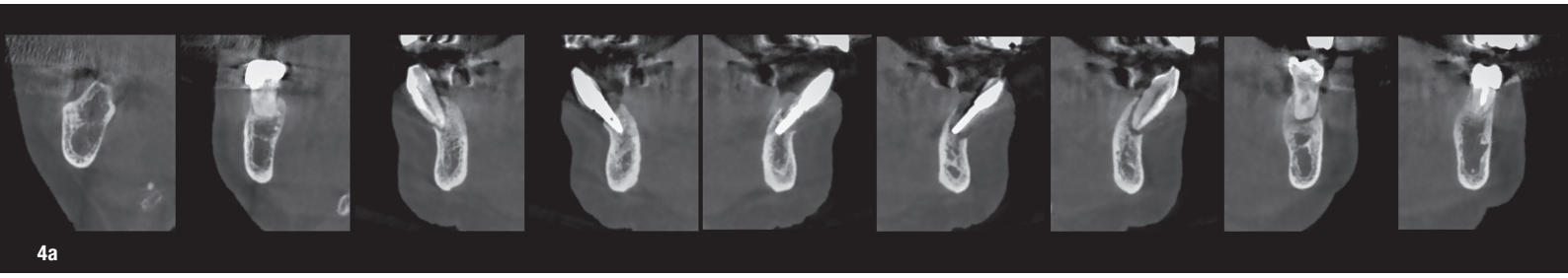


4a

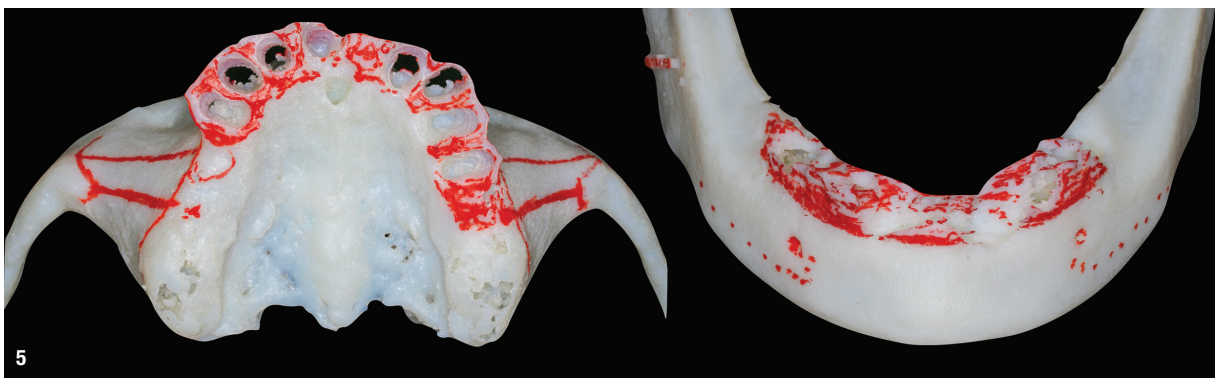
pated, a ZAGA™ round implant with threaded coronal portion is considered favourable. The BLX and the ZAGA™ zygomatic implant both share the same prosthetic platform. The SRA abutments are available for both implant systems, and these abutments are selected and connected immediately after implant placement to facilitate immediacy.

4b

Surgical procedure

Surgery was performed under general anaesthesia with naso-endotracheal intubation. After disinfection and draping, the patient underwent the following procedures: 1) Clearance of all the remaining teeth, excision and curettage of any granulation tissue; 2) Removal of the three implants in the anterior mandible; 3) Osseous reduction was conducted using piezoelectric surgery in the upper and lower jaws to provide adequate restorative space and to create a bone platform with sufficient width to support the chosen implants (Figs. 6a & b); 4) Implant placement in the mandible was completed by free-hand surgery (Figs. 7a & b); 5) Implant placement in the anterior maxilla was performed by free-hand surgery (Figs. 8a & b); 6) Prior to a zygomatic implant osteotomy, an extended lateral window was cut on both sides for an open sinus lift procedure (Figs. 9a & b); 7) Elevation of the maxillary sinus membrane was carried out by leaving the bone window attached to the Schneiderian membrane (Figs. 10a & b); 8) By locating the starting point and end point for the zygomatic implant placement, a zygomatic implant osteotomy was completed by sequential drilling (Figs. 11a & b); 9) Grafting of the sinus floor with xenografts (Bio-Oss collagen, Geistlich; Fig. 12); 10) Placement of zygomatic implants bilaterally (Figs. 13a & b); 11) Grafting of the coronal portion of the zygomatic implants with xenografts (Bio-Oss collagen, Geistlich; Fig. 14); 12) Covering the grafted site with collagen membrane (Bio-Gide, Geistlich); 13) Connection and tightening of SRA abutments; 14) Wound closure around the abutments and impression copings (Fig. 15); 15) Silicone impressions were made, and bite registration was taken for immediate prostheses.

An extended sinus lift is a technique introduced by Chow et al.[2] to eliminate the risk of maxillary sinusitis in zygomatic implant patients. In ZAGA™ type 0 and type 1 patients, the extended sinus lift technique keeps the zygomatic implant external to the maxillary sinus despite the fact that the implant has an intra-sinus trajectory. When an extended sinus lift is performed, it is recommended to graft the sinus for the following reasons: 1) To provide bone support around the coronal region of the zygomatic implant; 2) To increase the bone thickness to minimise the risk of development of an oral–antral communication. Implants with sufficient insertion torques were used for immediate loading (Table 1). In this case, except for the BLX implant



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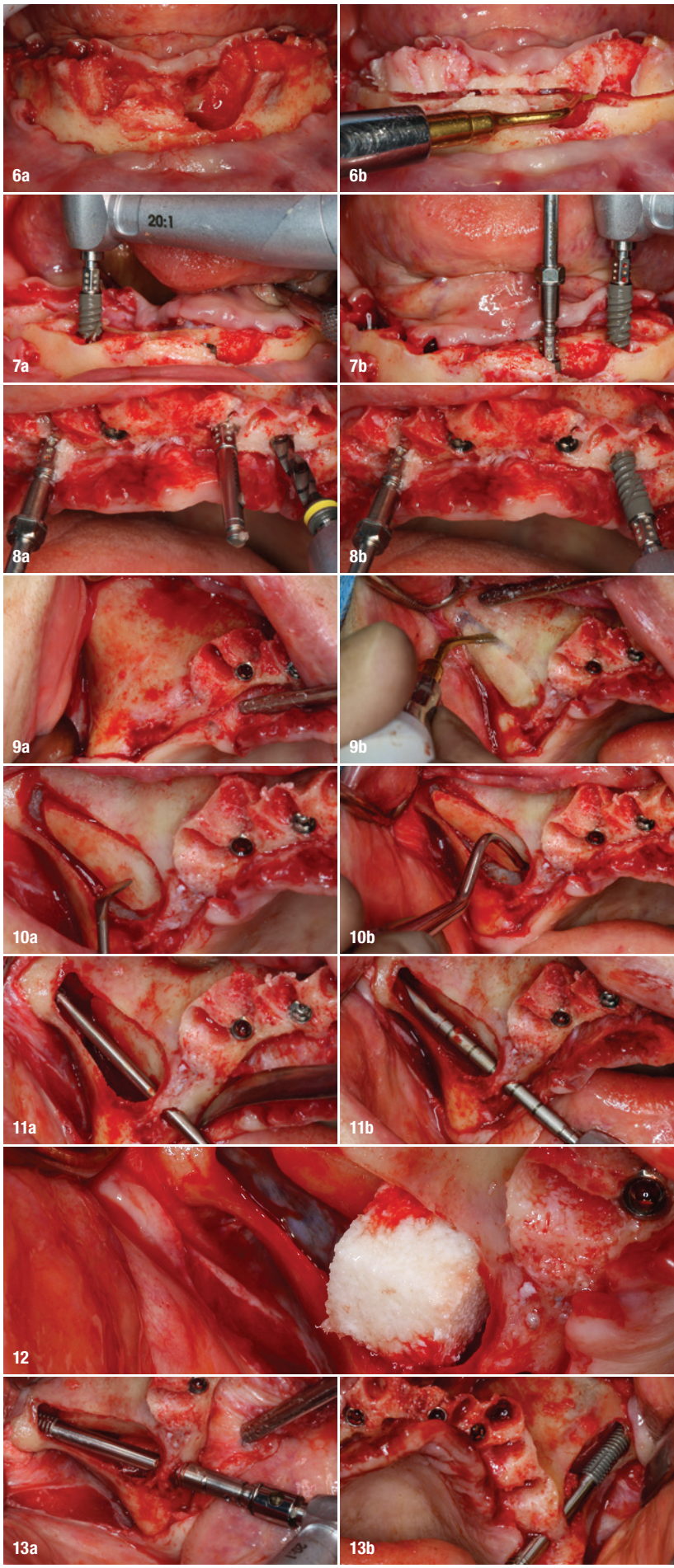
at the lower right first premolar location, all implants, including the zygomatic implants, were seated with insertion torques not less than 30 Ncm. Since the BLX implant at the lower right first premolar location had a low insertion torque, it was submerged for healing. The upper and lower working impressions and the bite registration were sent to the laboratory for fabrication of the screw-retained upper and lower acrylic prostheses. After the surgery, the patient was monitored in the recovery room. When the patient was fully awake and her vital signs were stable, she was discharged home. The patient was prescribed an oral analgesic (etoricoxib 120 mg QD), oral antibiotic (amoxicillin 250 mg TDS) and chlorhexidine mouthwash for 5 days.

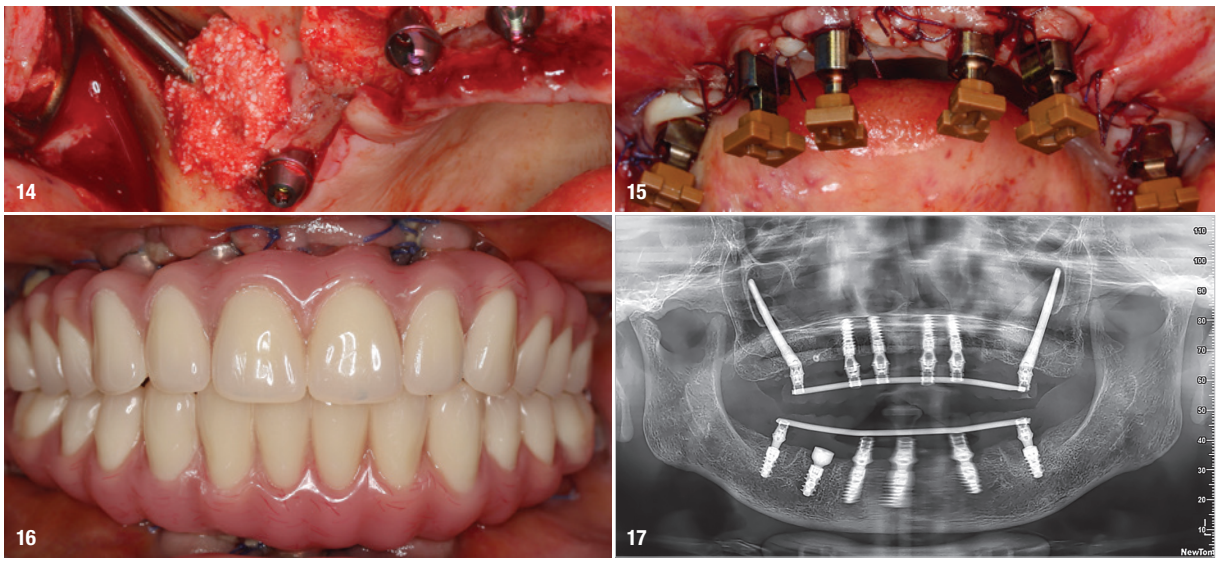
Immediate loading and prosthetic procedure

The patient returned for a follow-up visit 5 days after surgery. She presented with moderate facial swelling and bruising without complaining of pain. Clinically, the oral wounds were clean, and there was no bleeding or any signs of infection. Provisional acrylic, metal-reinforced prostheses were delivered for immediacy (Fig. 16). All the prosthetic screws were tightened manually, and screw access holes were sealed with a light-curing temporary composite resin (Fermit, Ivoclar Vivadent). An OPG was taken after the delivery of the immediate prostheses (Fig. 17). In this case, the following occlusal scheme for full-mouth implant reconstruction was adopted: 1) Prosthetically driven implant planning; 2) Dental implants with a moderately rough and hydrophilic surface; 3) No cantilever in the prostheses; 4) Even contacts in centric relation; 5) Shallow anterior guidance; 6) Group function on excursion; 7) Use of soft night guard. The patient was scheduled for regular review for wound healing and occlusal adjustment. The definitive prostheses were scheduled to be fabricated three to four months later.

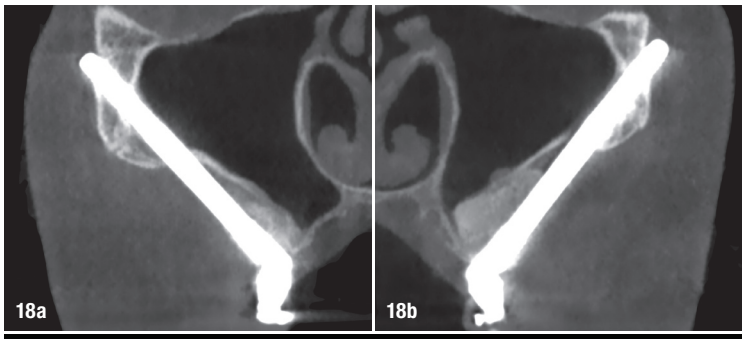
Treatment outcomes

A significant proportion of patients scheduled for full-arch reconstruction suffers from terminal dentition. Immediate implant placement and an immediate loading protocol help these patients cope with the implant treatment by minimising the stress and inconvenience associated with the edentulous phase. Meta-analyses have shown that immediate implant placement is just as successful as delayed implant placement in full-arch reconstruction. Moreover, immediate loading is predictable, with high implant survival rates compared to conventional loading. Of course, certain criteria exist for immediate loading, and good primary stability is considered essential. The BLX implant is designed for immediacy, and this implant system is indicated for all types of bone quality. In addition, in this case of a ZAGA™ type 0 classification, a ZAGA™ round implant was chosen. In order to achieve a more distal location to eliminate a cantilever effect, the starting point of the zygomatic implant is usually located





around the zygomatic alveolar crest region. Before performing the zygomatic implant osteotomy, a lateral sinus lift procedure was performed, and an extended window was opened from the sinus floor to the base of the zygoma bone. The Schneiderian membrane was elevated with the bone wall of the lateral window attached. It was important to preserve the integrity of the Schneiderian membrane. The purpose was to keep the zygomatic implant external to the maxillary sinus to reduce the risk of maxillary sinusitis. Grafting of the sinus floor and around the coronal portion of the zygomatic implant was performed. In principle, grafting increases the crestal bone support for the zygomatic implant and helps by distributing the functional loading more favourably compared to a situation without bone. Moreover, the increased bone thickness surrounding the coronal portion of the zygomatic implant creates a more robust hard tissue barrier between the oral cavity and the sinus cavity. This may prevent the development of an oral–antral communication after zygomatic implant treatment. To investigate the sinus reaction after zygomatic implant treatment, CBCT examination is useful to evaluate the sinus membrane thickness and patency of the osteo-meatal complex. In this case, the CBCT taken 3 months after surgery showed that there was no sinus membrane thickening and no obstruction of the ostium (Figs. 18a & b).



Maxilla	RZ #16	UR2 #13	UR1 #12	UL1 #21	UL2 #23	LZ #26
Implant	ZAGA Round 42.5 mm	BLX 4 mm x 12 mm	BLX 3.5 mm x 12 mm	BLX 3.5 mm x 12 mm	BLX 3.5 mm x 12 mm	ZAGA Round 42.5 mm
Torque	30 Ncm	40 Ncm	40 Ncm	40 Ncm	50 Ncm	40 Ncm
Mandible	LR3 #46	LR2 #44	LR1 #42	LL1 #31	LL2 #33	LL3 #36
Implant	BLX 5 mm x 10 mm	BLX 5.5 mm x 10mm	BLX 3.75 mm x 12 mm	BLX 3.75 mm x 12 mm	BLX 4 mm x 10 mm	BLX 5 mm x 10 mm
Torque	40 Ncm	20 Ncm	50 Ncm	50 Ncm	40 Ncm	40 Ncm

Table 1

Table 1: Recommended insertion torques of the zygomatic and standard implants used.

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James Kwok Fai Chow BDS, MDS obtained his Bachelor of Dental Surgery and Master of Dental Surgery from the University of Hong Kong. In addition, he holds a Bachelor of Medicine and Bachelor of Surgery degree from the same University. He is a specialist in Oral and Maxillofacial Surgery. Dr Chow holds a Diploma in Implant Dentistry from the Royal College of Surgeons of England and is a Fellow of the International College of Dentists as well as an Honorary Clinical Associate Professor in Oral & Maxillofacial Surgery at the Faculty of Dentistry of the University of Hong Kong.

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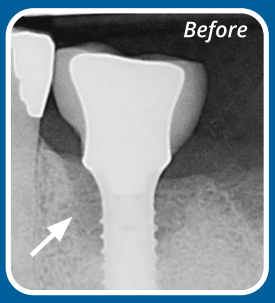

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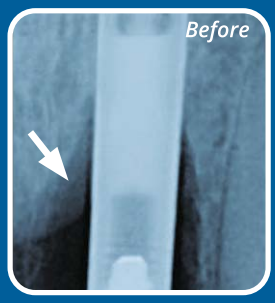

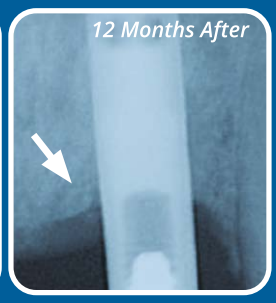

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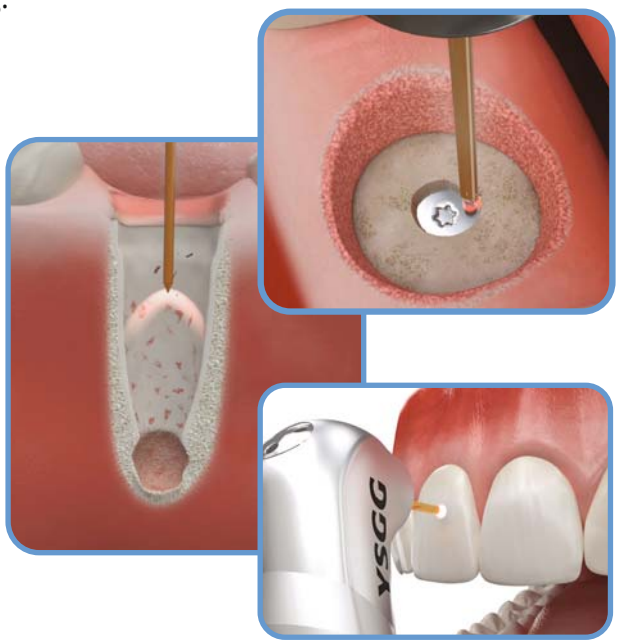

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In a randomised comparison study of bovine-derived (MinerOss X) and porcine-derived bone grafts (MinerOss XP) in molar or premolar extraction sockets covered with a collagen membrane (Mem-Lok® Pliable) in 18 patients, Guarnieri and colleagues detected no differences in terms of dimensional vertical and horizontal changes at the extraction sockets between the two groups.[1] In sockets that were grafted using the bovine-derived bone material, the mean ridge width and the average heights of the vestibular and the lingual crest were reduced by 1.25 ± 0.7 mm, 1.18 ± 0.8 mm and 1.12 ± 0.9 mm, respectively. For the group whose sockets were augmented using porcine-derived bone, the reductions were 1.19 ± 0.4 mm, 1.21 ± 0.8 mm, and 1.09 ± 0.6 mm respectively (Fig. 1).

In the assessment of the histo-morphometric parameters, statistically significant differences were detected between the two groups (Fig. 2). The percentage of newly formed bone was significantly higher in the group that was treated with porcine-derived bone material compared to the bovine xenotransplant group at four months post grafting (57.13 ± 2.8% vs. 49.08 ± 3.7% of new bone). Conversely, non-mineralised connective tissue (16.37 ± 4.9% in bovine vs 13.65 ± 3.6% in porcine), residual graft particles and

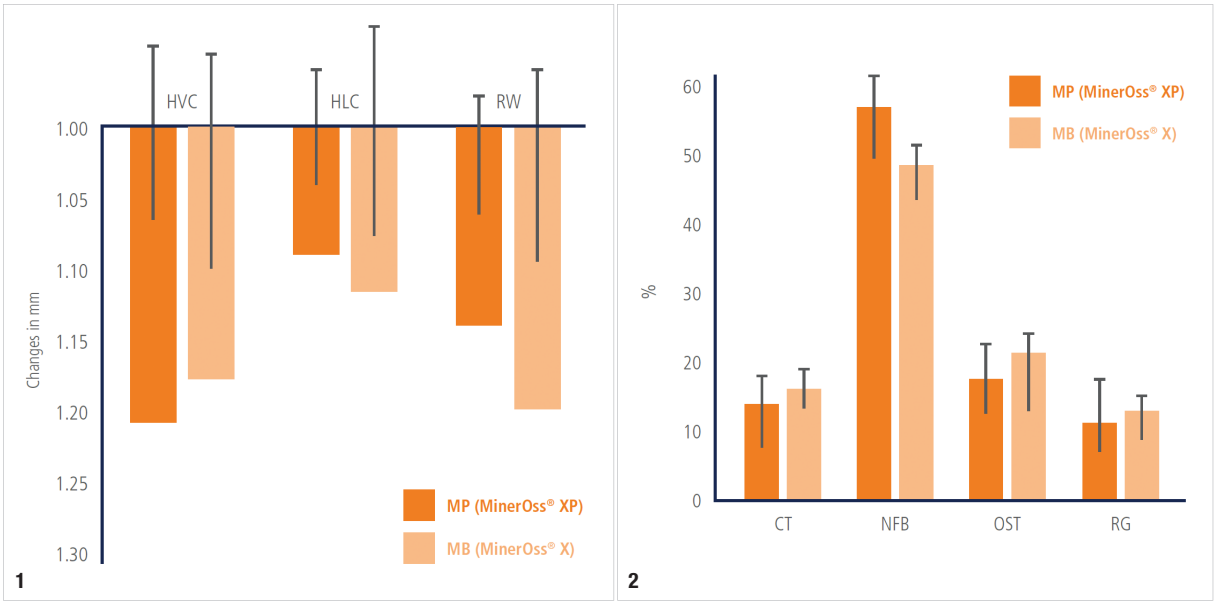

Fig. 1: Horizontal and vertical changes at re-entry surgery. HVC: height of the vestibular bone ridge; HLC: height of the lingual bone crest; RW: ridge width; MB: bovine-derived bone graft group; MP: porcine-derived bone graft group.[1] **Fig. 2:** Histo-morphometric mean values. CT: connective tissue, NFB: newly formed bone; OST: osteoid tissue; RG: residual graft; MB: bovine-derived bone graft group; MP: porcine-derived bone graft group.[1]

osteoid tissue were present at a higher extend in the sockets treated with bovine material (13.49 ± 2.8% and 21.06 ± 3.8% in bovine vs 11.74 ± 4.7% and 17.63 ± 3.8% in porcine).

The data also suggest that alveoli treated with a membrane and porcine bone grafts (MinerOss XP) leave less residual bone replacement material compared to alveoli treated with bovine bone grafts (MinerOss X). This might indicate a different impact of the bovine- and porcine-derived materials on the bone healing process. This hypothesis is also supported by the higher percentage of osteoid tissue (bone in maturation phase) found after four months in extraction sockets grafted with bovine-derived bone.

The different histological results between the two groups. Bone mineral matrices must be biocompatible and fulfil four key properties to promote bone formation and to allow efficient tissue regeneration. In summary, the properties of an "ideal" bone graft enable bone growth in the augmented site and lead to stable osseointegration with minimal host response. Osseointegration is defined as the formation of new bone at the direct interface between an endosteal implant or bone substitute material and the native bone without intervening soft tissue.[2] Compared to bone of bovine origin (MinerOss X), porcine bone (MinerOss XP) therefore appears to facilitate accelerated alveolar bone healing.[1]

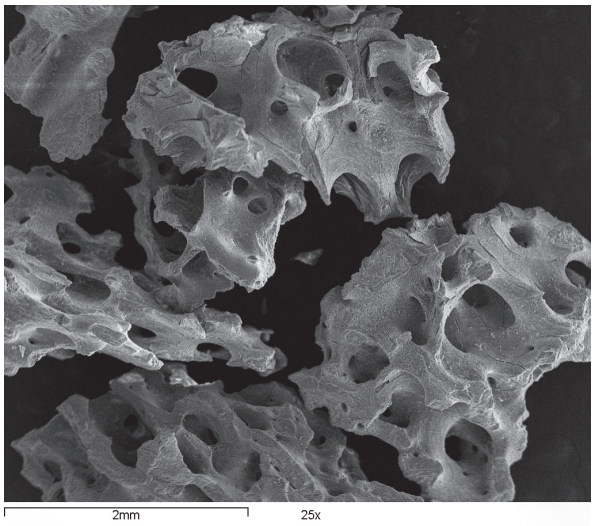

Fig. 3: REM: MinerOss XP macro and micro pores resemble human bone.

Author Details

Literature

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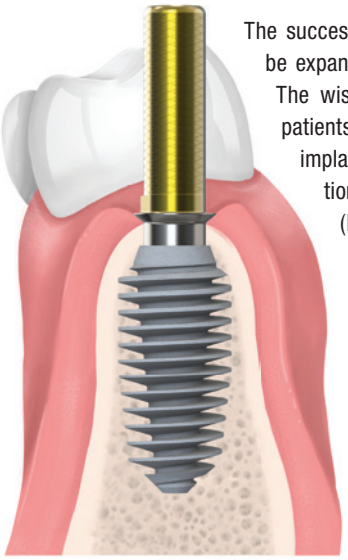

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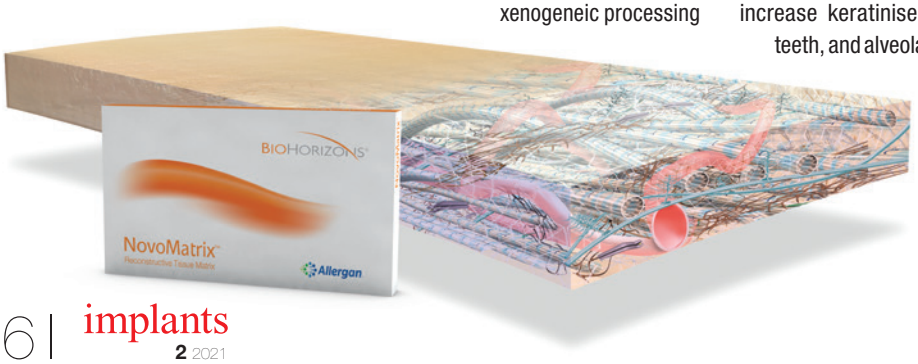
When choosing a biomaterial, there is a strong demand in clinical practice for predictable outcomes. For over 20 years, LifeCell, a leading global medical technology company, has developed innovative products for use in a wide range of applications. BioHorizons Camlog expands its soft-tissue portfolio to bring NovoMatrix, an innovative soft-tissue augmentation material. NovoMatrix is an acellular extracellular dermal matrix consisting of tissue-engineered porcine material. It is a breakthrough in xenogeneic processing ensuring a structurally intact, undamaged scaffold that supports cell and microvascular ingrowth. The proprietary tissue processing allows for rapid revascularisation, cell repopulation and minimal inflammation. NovoMatrix comes pre-hydrated and ready to use and offers a true alternative to autogenous soft-tissue grafts and current products on the market. The NovoMatrix indications include guided tissue regeneration procedures in recession defects for root coverage, localised gingival augmentation to increase keratinised tissue (KT) around implants and natural teeth, and alveolar ridge reconstruction for prosthetic treatment.



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Fotona's EmunDo® Photo Thermal & Photo Dynamic Therapy is an innovative 810 nm diode laser concept for precise, non-invasive and highly effective bacteria reduction in periodontitis and periimplantitis treatments. The therapy is based on the administration of a photosensitive activator that accumulates only in inflamed areas and on bacterial biofilm. The combination of photothermal and photochemical effects works in a synergetic way to eliminate all types of bacteria. The treatment does not stain the vital tissues and the activator can be washed out easily without any residue after the procedure, reducing the use of antibiotics as a result. To learn more, go to www.fotona.com.

Fotona d.o.o., Slovenia
+386 15009100
www.fotona.com

LASERVISION

F47—The sporty, lightweight 2-lens glasses for every use

The new, sporty, lightweight laser protection frame F47 is particularly characterised by its 2-lens design. It is designed for the absorbing plastic laser protection filters from the laservision product portfolio. The frameless filters with base curve 8 ensure excellent all-round visibility without restrictions and, thanks to the filter height, offer a large coverage area that also includes the eyebrows. Together with the laser protection filters the sporty designed F47 eyewear weighs only 25 g. It is equipped with 2-component soft temples and an adjustable nose pad, which all in all ensures a high level of comfort and an individual fit. At launch the F47 is available with the P1M03, P1L12 or P1P10 filters. Flexibility in use is achieved through the central adapter preparation, which currently allows two different expansion options. Together with the appropriate special adapter from laservision, the F47 can, for example, be equipped with an LED or a binocular magnifying glass from HEINE.

LASERVISION GmbH & Co. KG, Germany
+49 911 9736-8100
info@lvg.com
uvex-laservision.de

Dentsply Sirona

OSSIX regenerative solutions portfolio

The OSSIX® portfolio consists of OSSIX Plus, OSSIX Bone and OSSIX Volumax. OSSIX Plus is a porcine-derived, ossifying, resorbable collagen membrane. OSSIX Bone is a porcine-derived, sponge-like ossifying block for true bone formation, and OSSIX Volumax is a porcine-derived, volumising, thick collagen scaffold. Powered by the patented GLYMATRIX technology, OSSIX Plus, OSSIX Volumax, and OSSIX Bone are supported by over 100 scientific publications and extensive clinical experience. The OSSIX products use the proprietary GLYMATRIX core technology, a proven process that uses naturally occurring sugar to cross-link collagen biomaterial, for guided bone regeneration (GBR) and guided tissue regeneration (GTR). These products have enabled clinicians in hundreds of thousands of procedures to safely provide predictable, long-term results to their patients over the past 20 years. With innovative products driven by the GLYMATRIX core technology, OSSIX bio-durable design will ensure long-term predictable and superior results, while supporting and enhancing the future of implant dentistry and oral care. Making work flow in implant dentistry revolves around identifying the smoothest and most convenient workflow for each customer, and making sure to deliver whatever is needed to ensure that. With a vast, world-class assortment of products and solutions for implant treatment, Dentsply Sirona offers complete solutions that create the best possible workflow and make work flow better.

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VISIONS IN IMPLANTOLOGY

COLOGNE

SAVE THE DATE

1–2 October 2021
Cologne, Maritim Hotel

50th International Annual Congress of DGZI e.V.
3rd Future Congress for dental implantology

DGZI Deutsche Gesellschaft für Zahnärztliche Implantologie e.V.

OEMUS MEDIA AG · Holbeinstraße 29 · 04229 Leipzig · Germany · Phone: +49 341 48474-308 · Fax: +49 341 48474-290 · event@oemus-media.de · www.oemus.com

Registration

Fifty years of implantology...

...to be celebrated in Cologne

The 50-year anniversary of the German Association of Dental Implantology (DGZI) was initially planned to be celebrated last year in Bremen, Germany, the association's founding city. However, owing to the COVID-19 pandemic-related restrictions imposed by the federal government at that time, the congress had to be postponed. The new date has been set to 1 and 2 October 2021, and the new venue will be the Maritim Hotel in Cologne. For the third Future Congress for Dental Implantology, which is also the 50th International Annual Congress of DGZI, the association is gathering a high-profile group of renowned speakers in perfect keeping with the special occasion. Presidents, past presidents and board members of the German Association of Oral Implantology (DGI), the German Society of Oral Implantology (DGOI), the professional association of German oral surgeons (BDO), the German society for endodontology and dental traumatology (DGET) and DGZI will hold scientific lectures as part of the main programme, according to the event's theme "Visions in Implantology: 50 Years—From single Implant to digital Workflow". Attendees can look forward to a congress that reflects on the past 50 years of dental implantology, addresses topical questions, and envisions the future of this special discipline of dentistry. With an updated structure and content, the organisers have succeeded in eliminating the previous fragmentation of the congress into various separate lecture rooms, workshops and side programmes, sharpening the congress's profile as an event for practitioners as a result. All lectures, panel discussions, livestreamings and the table clinics will take place in the main hall, which will also serve as the industry exhibition area for the myriad of manufacturing companies which will be showcasing their product innovations at the event. For further information, visit www.dgzi.de or contact event@oemus-media.de. In addition, feel free to register for the event via the QR code.

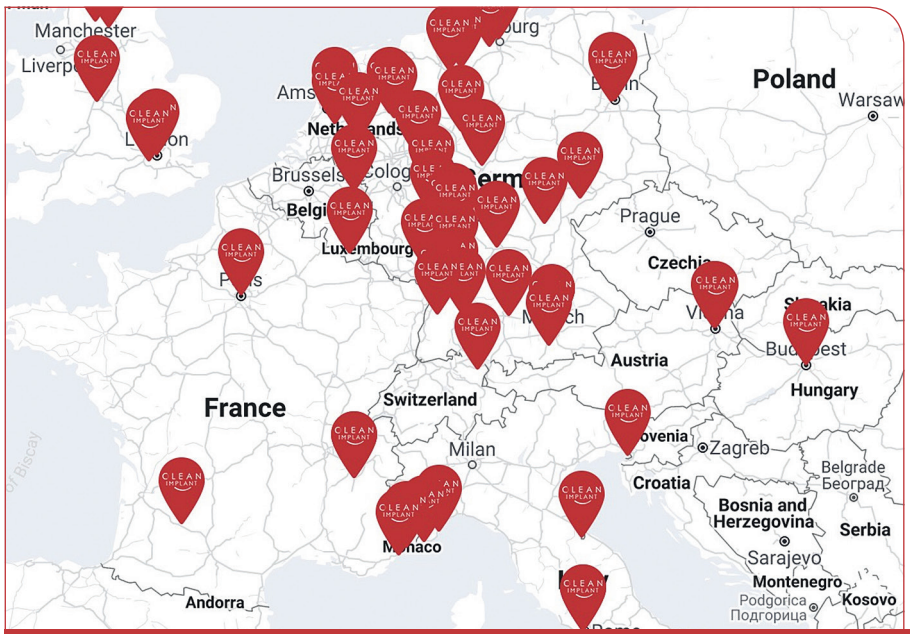
Source: German Association of Dental Implantology (DGZI)

"CleanImplant Certified Dentists" in 19 countries

Initiative creates safety for implantologists and patients

For many years, CleanImplant has been performing quality assessment studies on sterile packaged implants in accredited testing laboratories. The "Trusted Quality" seal for clean implants can only be awarded after an independent evaluation of test results that has successfully been completed in a strict peer-review process. "Alarming contamination on many other test samples should raise concerns for every practitioner," says Dirk Duddeck, dentist and founder of the non-profit CleanImplant Foundation. Study results show quite clearly that neither the exposed market position of manufacturers nor the country of production or the price alone can provide any certainty that the implants sold are actually clean. Significant residues of detergents, silicon compounds or polyacetal—even on ceramic implants—from the production and packaging process have been found on sterile packaged samples. "We've also seen metallic particles with nickel- or copper-containing compounds on dental implants. Implant quality seems to be getting out of hand—and we are no longer alone with this criticism. Three years ago, we launched an initiative for residue-free implants on the internet. We never dreamed that we would have more than 100,000 dental professionals following us on Facebook in such a short time." In the meantime, implantologists from 19 countries are registered as a "CleanImplant Certified Dentist". They can be sure that they only use implants that have been tested as clean. On the new website **www.cleanimplants4you.org**, launched as an information campaign directed at patients, a list of practices that have already joined the initiative can be found. For more information: **www.cleanimplant.org**.

Source: CleanImplant Foundation CIF GmbH



CleanImplant-Certified Practices.

A Straumann Virtual Symposium

"New opportunities in immediacy and beyond"

Based on 35 years of tissue-level heritage, Straumann is hosting a two-day online symposium on its upcoming TLX implant. Whether you are a keen user of the Straumann® Tissue Level Implant or an experienced clinician in immediate treatment protocols, the new Straumann® TLX Implant System will open up new opportunities for you. In this event, you will discover what happens when 35 years of heritage meet one of the major trends in dentistry, and how it can add value to your own practice. Renowned international experts and leading clinicians will present the development history and the clinical advantages of this new system in various indications: Abid Faqir (UK), André Chen (PT), Barbara Sobczak (PL), Daniel Buser (CH), Dean Morton (USA), Edgard El Chaar (USA), Eik Schiegnitz (DE), Faresh Desai (UK), German Gallucci (USA), Leonello Biscaro (I), Louwrens Swart (ZA), Matthieu Collin (F), Ophir Fromovich (IL), and Shakeel Shahdad (UK). The event takes place on 15 and 16 June 2021 (2.5 hours per day from 16:30 CET). Register now at https://tlx.virtualevents.straumann.com/?utm_source=website&utm_medium=&utm_campaign=tlx-symposium

Source: Straumann

MIS announces new dates

For its fifth Global Conference

Following the long-awaited announcement of the new dates for the fifth MIS Global Conference, the MIS team is hard at work getting ready for Marrakech, Morocco, where the company will be hosting the event from 19–22 May 2022. The conference will feature a three-day scientific programme filled with lectures by world-renowned experts, hands-on workshops, as well as exciting social celebrations. As in previous Global Conferences, the scientific committee is determined to address the most relevant and important topics and cases as part of the scientific programme. Speakers have been carefully selected to present new concepts and breakthroughs, and provide insight into their vast professional knowledge and clinical experience. With a location such as Marrakech, conference guests can look forward to a myriad of beautiful and colourful sights, as well as exotic tastes and fragrances, making for a truly unique and unforgettable experience. The meticulously planned and spectacular evening celebrations, which are part of every MIS Global Conference, are an integral part of this next, highly anticipated event as well.

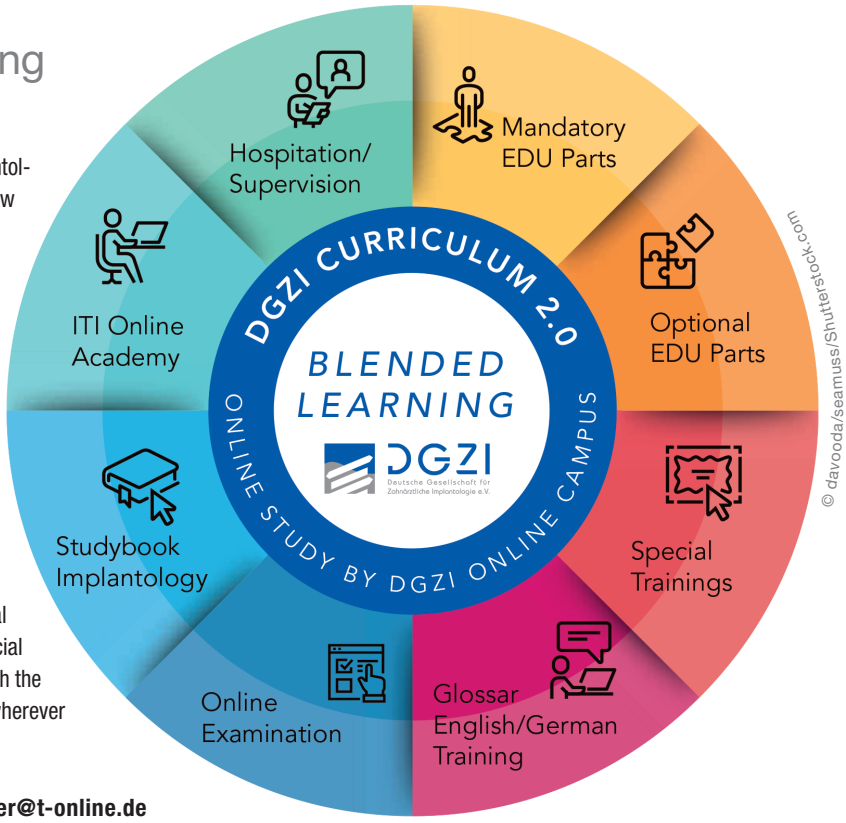
Source: MIS

DGZI Online Campus

International online training wherever you are

The structure and content of DGZI's successful implantology curriculum was revised in 2019. All participants now have access to the ITI Academy, where young dentists with little experience in implantology can learn the basics of implant dentistry. All participants in the curriculum will start their training in the new "DGZI Online Campus". This has been completely redesigned and enables e-learning from all devices and from anywhere you have online access. The theoretical basics of implant dentistry are well presented and taught in separate modules. Each module ends with a learning success check, which can be practised as often as required in advance in test examinations. After successful online training, three practice-related compulsory modules and two therapy-related optional modules follow. The curriculum is supported by special learning materials of the DGZI Online Campus. Start with the new concept of the DGZI online training at home or wherever you are—that is Blended Learning! Now at DGZI!

Contact: sekretariat@dgzi-info.de; info.vollmer@t-online.de



Congresses, courses and symposia

IDS Cologne

22–25 September 2021
Cologne, Germany
www.ids-cologne.de

50th DGZI International Annual Congress— Visions in Implantology

1–2 October 2021
Cologne, Germany
www.dgzi-jahreskongress.de

30th annual scientific meeting of EAO

14–16 October 2021
Milan, Italy
www.eao.org

AAID Annual Conference

10–13 November 2021
Chicago, IL, USA
www.aaid.com/annual_conference

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Hard tissue augmentation

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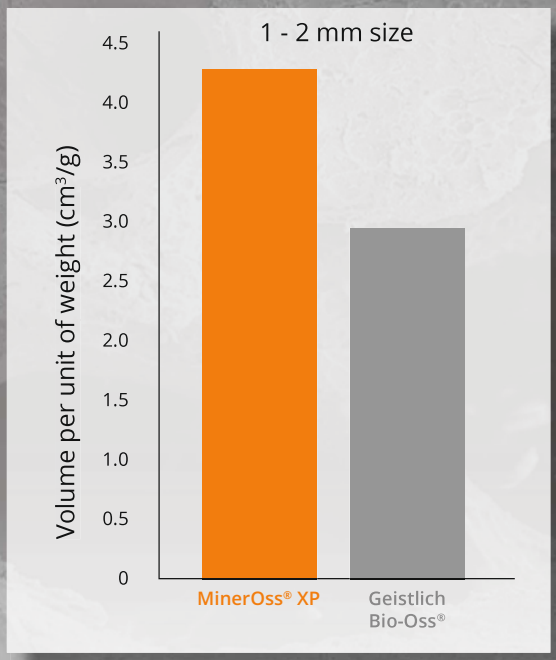

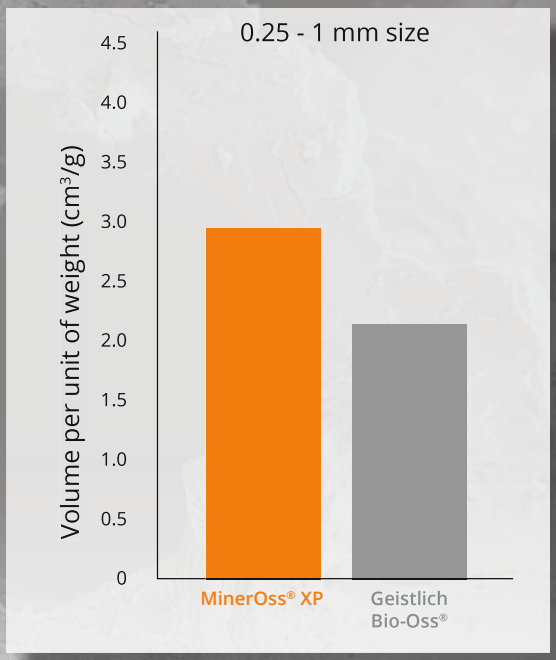

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References available at www.biohorizonscamlog.com/references_minerossxp

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