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implants

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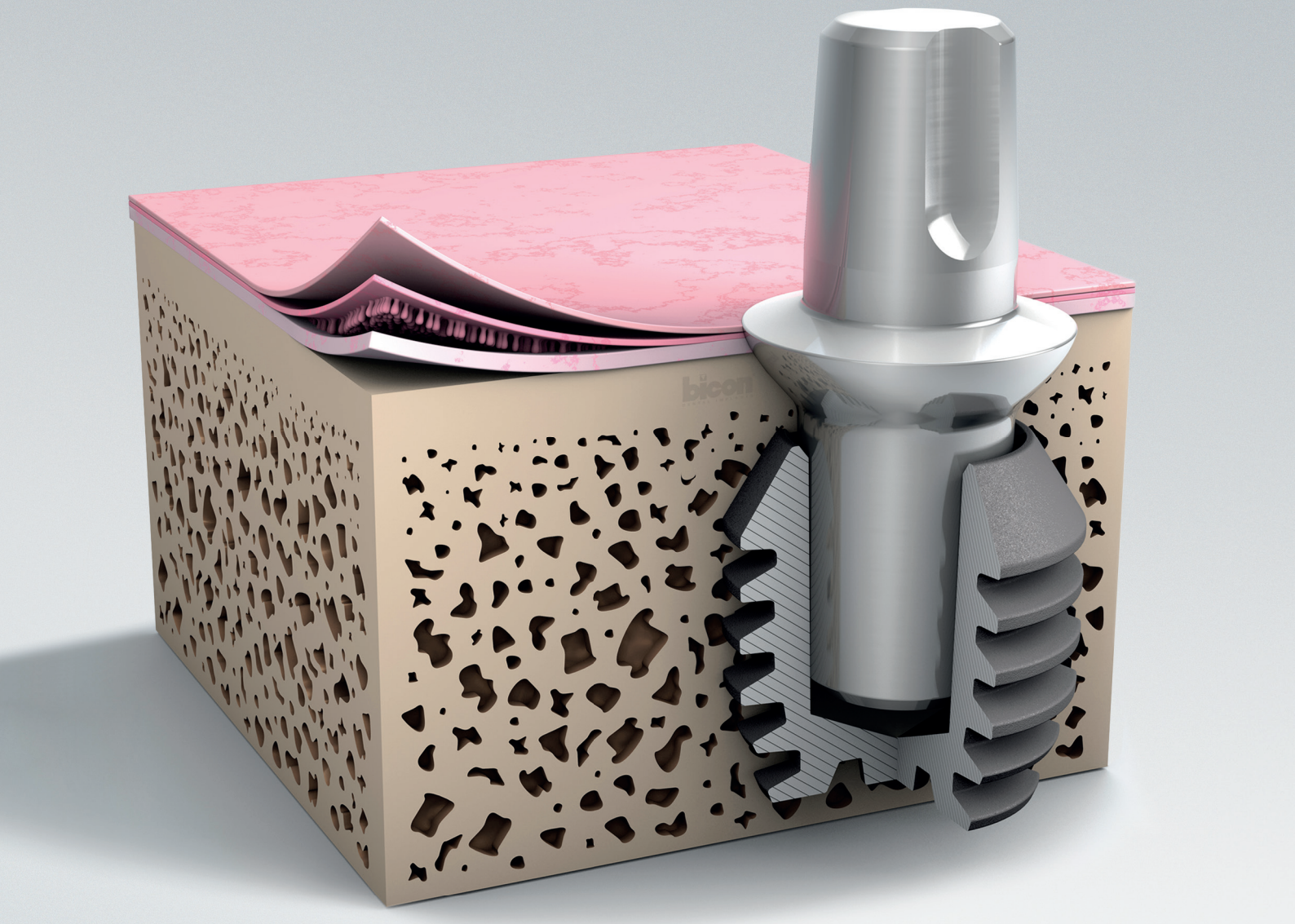

research
L-PRF in different intraoral applications

case report
Horizontal ridge augmentation and implantation

interview
A pipeline filled with groundbreaking innovations

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Dr Georg Bach

Scientific Director

A glimpse into the future of implantology

Dear colleagues,

The German Association of Dental Implantology (DGZI) would like to cordially invite you to the second Future Congress for Dental Implantology, to be held on 4 and 5 October 2019 in Munich in Germany.

Granted, we were a little nervous when we first presented our new congress format to the public in Düsseldorf in Germany last year. By completely realigning our annual congress, we set ambitious goals for the grand challenges and were successful in meeting them. Here, we have succeeded particularly well in combining innovation with tradition.

We have demonstrated that we, as Europe's oldest expert association on dental implantology, stand for values, yet still have the courage to get new ideas off the ground and at times choose unconventional paths to do so. The implantology sector is being transformed and our field of work is evolving rapidly. The DGZI also faces up to this development.

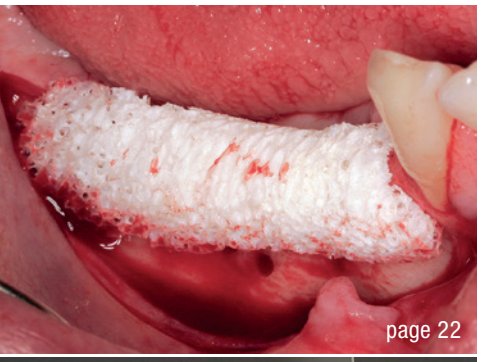
Courage and visions are now more important than ever, because implantology, our own dental specialisation area, faces enormous challenges.

Perio-Implantology: Implants, Bone & Tissue— Where are we today and where are we headed?
That is the guiding theme of our second Future Congress for Dental Implantology. Or in other words, the implant in the context of bone and tissue. A top-class team of university lecturers, as well as numerous practitioners, will present the latest developments and discuss them with the participants in lectures, live broadcasts and within the framework of table clinics.

Our goal is clear: If you as an attendee of our second Future Congress for Dental Implantology leave the congress hall of the Munich Westin Grand Hotel after two top-level training days, you will not only know what works in implantology and why, no, you will also know what the future of implantology will be like.

I look forward to an exciting Future Congress with you!

Yours, Dr Georg Bach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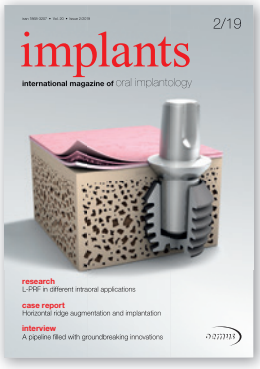

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Fig. 1a

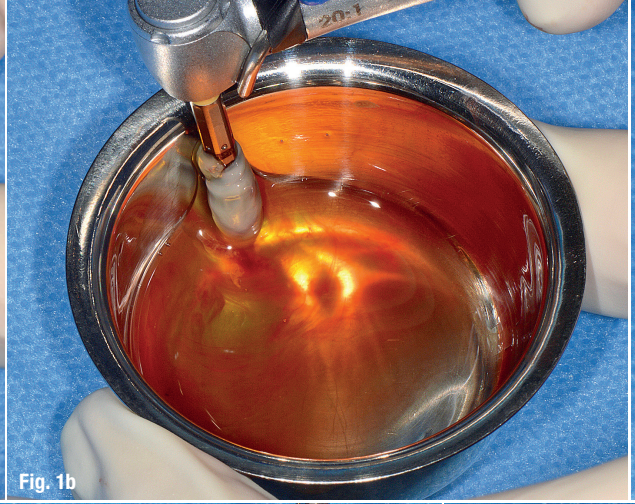
Fig. 1b

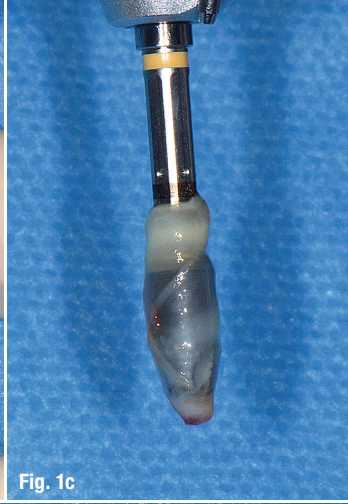
Fig. 1c

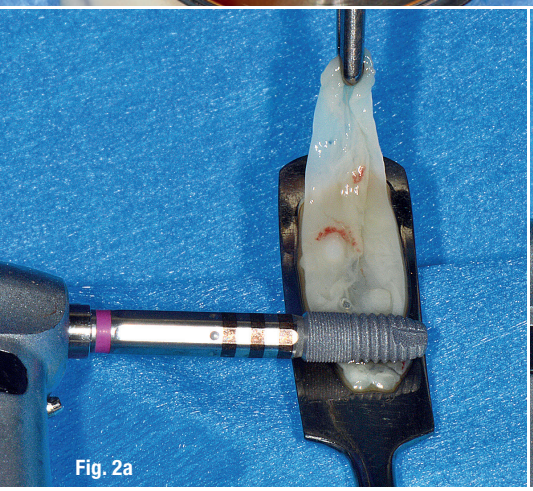
Fig. 2a

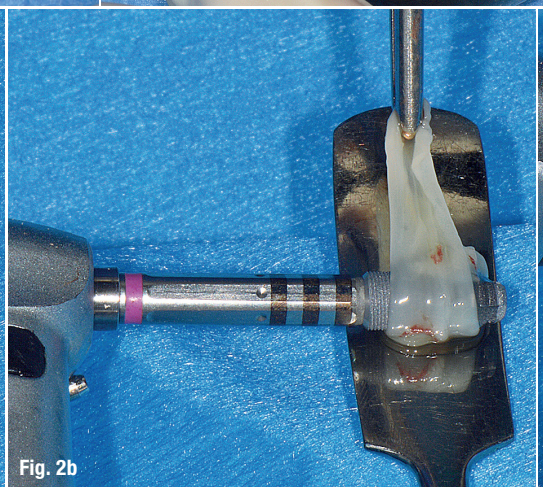
Fig. 2b


Fig. 2c

Techniques for implant coating with L-PRF: Fig. 1a: Placement of the implant against an L-PRF clot in a titanium dish. **Figs. 1b & c: b)** Slow rotation of the implant in contact with the clot while exerting pressure against the wall of the dish. **c)** The implant is wrapped in L-PRF. **Fig. 2a:** Placement of L-PRF membrane (carried on a titanium spatula) in contact with the implant. **Figs. 2b & c:** Membrane wrapped around the implant (via rotation) with the membrane face at the outside.

L-PRF in different intraoral applications

Part IV: Three preparation protocols

Prof. Nelson R. Pinto[1], Dr Andy Temmerman[2], Ana B. Castro[2], Simone Cortellini[2], Prof. Dr Wim Teughels[2] & Prof. Dr Marc Quirynen[2]

[1] Department of Periodontology and Oral Implantology, Faculty of Dentistry, Universidad de Los Andes, Santiago, Chile
[2] Department of Oral Health Sciences, Section of Periodontology, KU Leuven & Dentistry, University Hospitals, KU Leuven, Leuven, Belgium

Favourable wound healing has always been a major quest in dental surgery. It is a concern in both healthy and compromised patients. In an effort to improve and accelerate healing of both hard- and soft-tissue, substitutes, including growth factors and biomaterials, have traditionally been employed. Membranes were also introduced to separate tissue. Recent research clearly indicates that leukocyte- and platelet-rich fibrin (L-PRF; a second generation of platelet concentrates) significantly enhances wound healing in both soft- and hard-tissue. Evidence now supports the assertion that this has the potential to replace the above-mentioned substitutes in many situations. Clinical procedures benefit from recent advancements in platelet concentrate protocols, including soft-tissue healing, plastic periodontal surgery, gingiva enlargement, medication-related osteonecrosis of the jaw, regeneration of infra-bony defects, ridge preservation, sinus augmentation, immediate implant placement and implant osseointegration itself. An added benefit is that these platelet concentrate protocols offer signifi-

cantly lower-cost treatment solutions to our patients, owing to their ease of use and inexpensive preparation.

Major indications for the use of L-PRF and the step-by-step preparation of L-PRF clots, membranes and plugs, as well as application approaches to open-flap debridement and ridge preservation, were introduced in the first two parts of this article series. In the third part, two treatment approaches to sinus floor elevation, in which L-PRF is used as grafting material, were presented. In this fourth and last part of the series, implant coating techniques with L-PRF, as well as a coronal advanced flap procedure with use of L-PRF as grafting material, will be described. In addition, a protocol for the preparation of a PRF-Block (Intra-Lock) will be presented.

Step-by-step approach to implant coating with L-PRF

- Prepare implant osteotomy according to the required implant protocol.
- Use L-PRF exudate, obtained after compression of L-PRF clots, to irrigate and clean the osteotomy.
- Position the implant on the implant driver.

Option 1

- Place an L-PRF clot in a small titanium dish.
- Rotate the implant slowly in the clot while exerting a little pressure against the wall of the dish until the L-PRF is fully wrapped around the implant (Figs. 1a–c).
- Insert the implant into the osteotomy.

Option 2

- Place the implant in contact with the L-PRF membrane (Fig. 2a).
- Rotate the implant slowly and wrap the L-PRF membrane around it with the face side (the red side) of the membrane at the outside (Figs. 2b & c).
- Insert the implant into the osteotomy.

Option 3

- Place the L-PRF membrane in contact with the implant (Fig. 3a).
- Rotate the implant slowly until the entire implant surface has been in contact with the membrane; remnants of the L-PRF membrane become visible on the implant surface (Figs. 3b & c).
- Place the face side of the membrane into the osteotomy.
- Insert the implant into the osteotomy.

Option 4

- Collect the L-PRF exudate with a sterile syringe after compression of the clots (Fig. 4a).
- Rinse the implant surface with the L-PRF exudate before insertion (Figs. 4b & c).
- Place the face side of the membrane into the osteotomy.
- Insert the implant into the osteotomy.

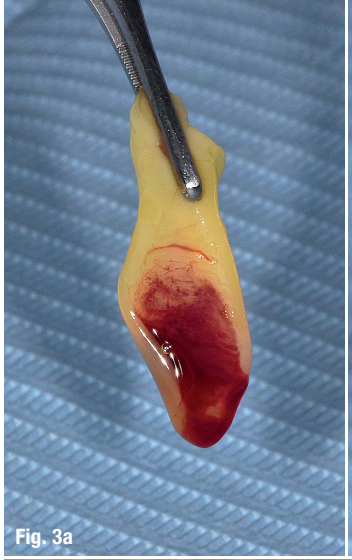
Fig. 3a

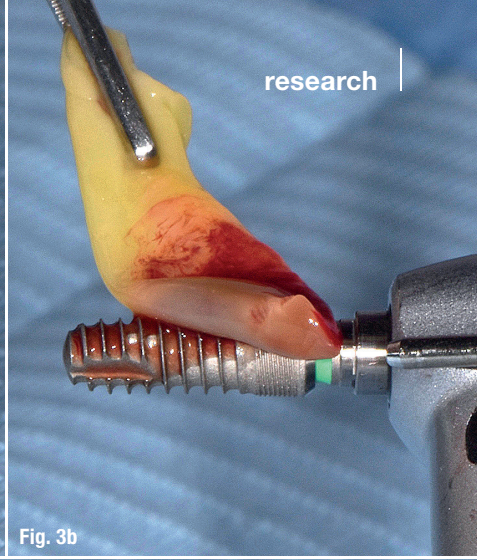
Fig. 3b

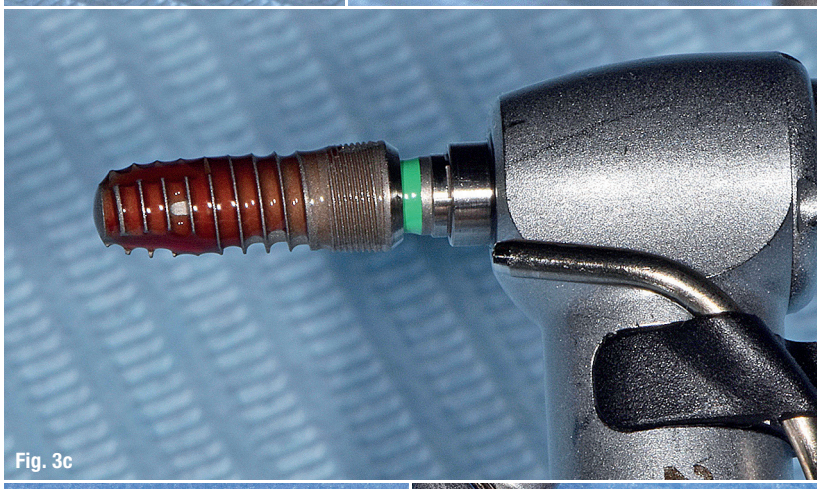
Fig. 3c

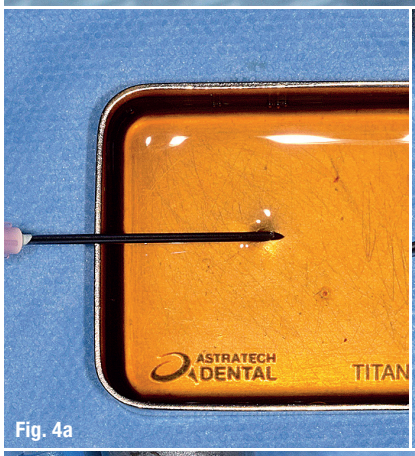

Fig. 4a

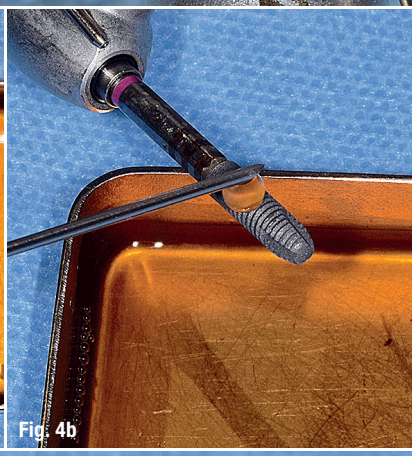
Fig. 4b

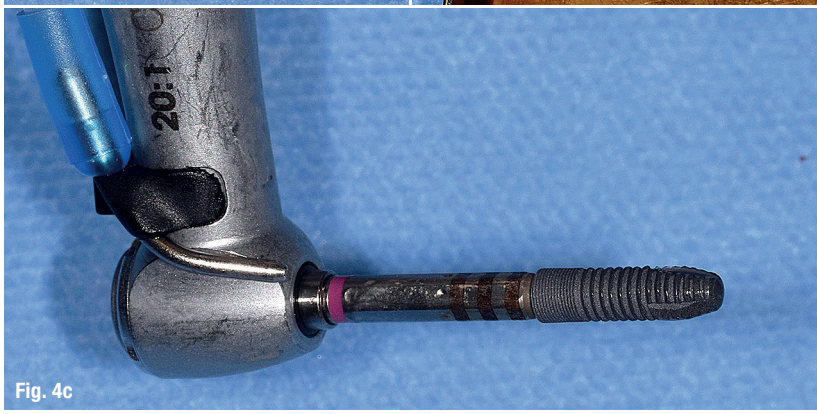

Fig. 4c

Techniques for implant coating with L-PRF: Fig. 3a: The L-PRF membrane needs to be placed in contact with the implant. **Figs. 3b & c:** Slow rotation of the implant in contact with the membrane. **Fig. 4a:** Collection of L-PRF exudate. **Figs. 4b & c:** The implant surface with the L-PRF exudate just before insertion.

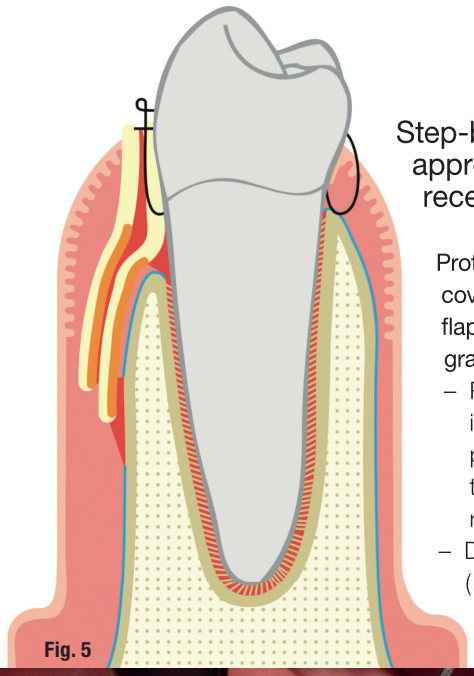

Fig. 5

Step-by-step approach for gingival recession coverage

Protocol for gingival recession coverage with a coronal advanced flap procedure with L-PRF as grafting material (Fig. 5)

- Perform an incision following the coronal advanced flap protocol and full-split, full-thickness preparation of the receptor bed (Fig. 6).
- De-epithelialise the papillae (Figs. 7a & b).
- Suture a minimum of two or three L-PRF membranes (of the correct dimensions) together with resorbable 6/0 sutures (Fig. 8).
- Place the L-PRF graft on the exposed connective tissue (receptor bed) and over the recession and suture it to the periosteum (Figs. 9a–c).
- Suture with coronal advancement of the flap for coverage of the graft (Figs. 10a & b).

Postoperative care

- No pressure or force must be exerted on the graft site for at least six months.
- Only soft food can be consumed and the patient must not bite of chew in the treated area. There must be no mechanical cleaning of the treated area. The patient

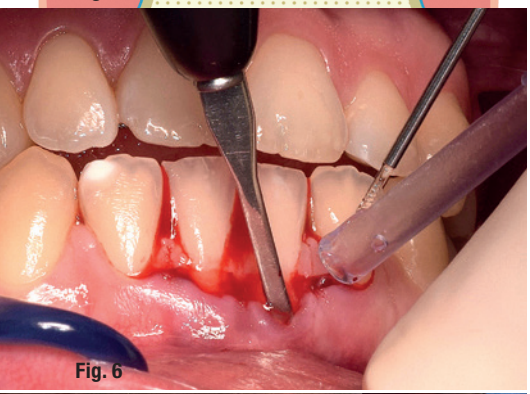

Fig. 6

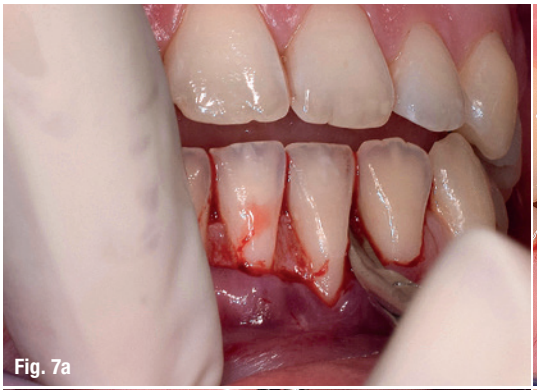

Fig. 7a

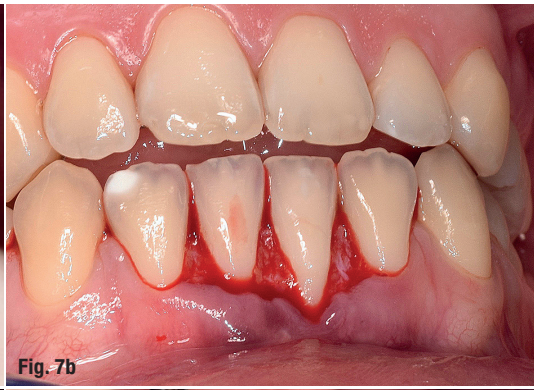

Fig. 7b

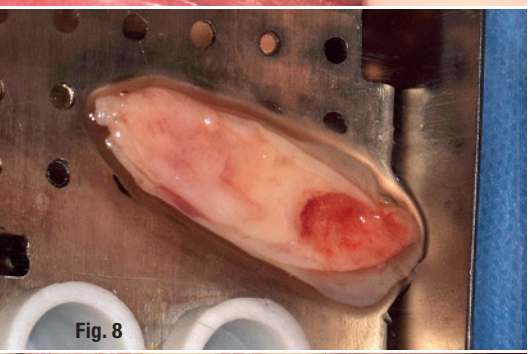

Fig. 8

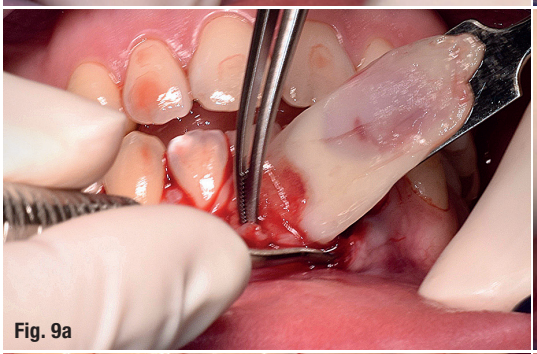

Fig. 9a

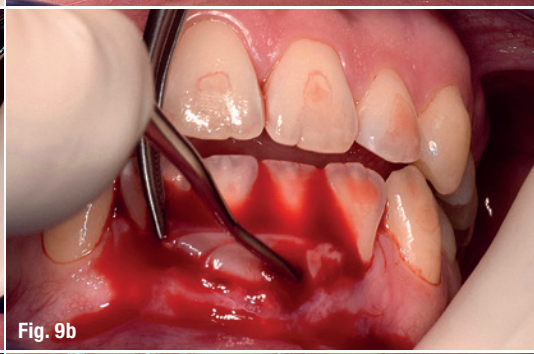

Fig. 9b

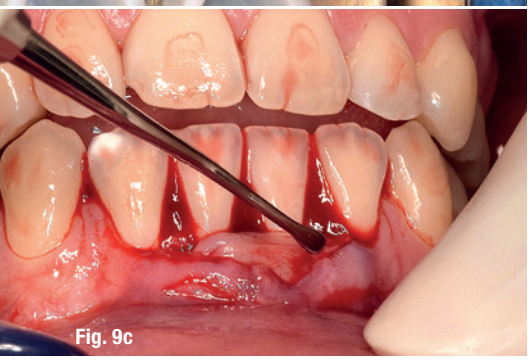

Fig. 9c

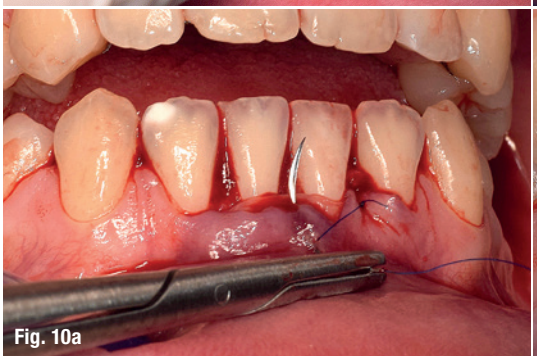

Fig. 10a

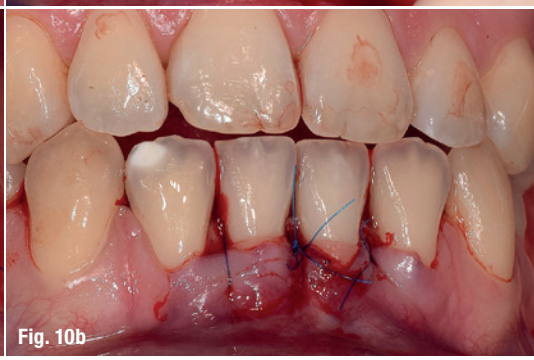

Fig. 10b

Gingival recession coverage: Fig. 5: Graphic representation of the final situation after gingival recession coverage with a coronal advanced flap and L-PRF membranes. Several L-PRF membranes (at least three) are placed on the receptor bed and over the recession. Suturing to coronally advance the flap over the recession is performed. (The periosteum, blue line, is cut in order to enable coronal advancement of the flap.) **Fig. 6:** Split-thickness preparation of the receptor site. **Figs. 7a & b:** De-epithelialisation of papillae. **Fig. 8:** Three L-PRF membranes (with the dimensions of the receptor bed) sutured together. **Figs. 9a–c:** Placement of L-PRF graft on exposed connective tissue (receptor bed) and over the recession. **Figs. 10a & b:** Suturing with coronal advancement of the flap for coverage of the graft.

should be careful to use his or her mouth only moderately. The patient must rinse with 0.12 % chlorhexidine (from the third day post-operatively) three times per day for one minute for at least three weeks.
– Prescribe sufficient painkillers.

Step-by-step approach for the preparation of a L-PRF Bone Block

Protocol for preparation of a L-PRF Bone Block using 0.5 g of a biomaterial of your choice (allogeneic or xenogeneic or synthetic biomaterial; Fig. 11)
– Venepuncture: collect six tubes of blood in 9 ml red-capped tubes following the L-PRF standard protocol and then two tubes in 9 ml white-capped tubes (Fig. 12). The blood for the latter is drawn last and the tubes placed last in the centrifuge (2,700 rpm/408 RCF).
– Interrupt centrifugation after three minutes to remove both white-capped tubes.
– Immediately restart the centrifuge with the red-capped tubes remaining for another nine minutes.
– Immediately aspirate the yellow fluid (liquid fibrinogen) in the white-capped tubes with a sterile syringe (Fig. 13). Get as close as possi-

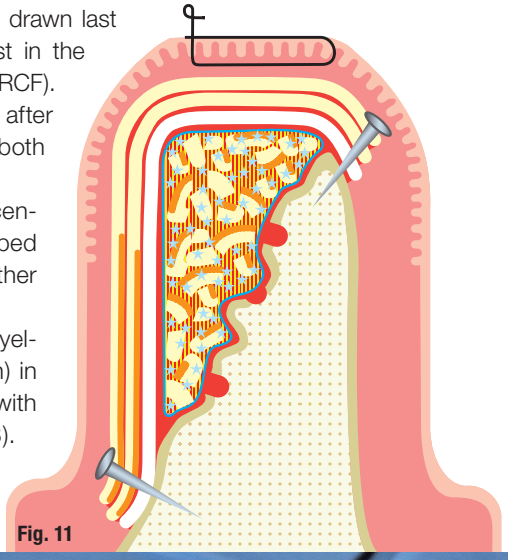
Fig. 11

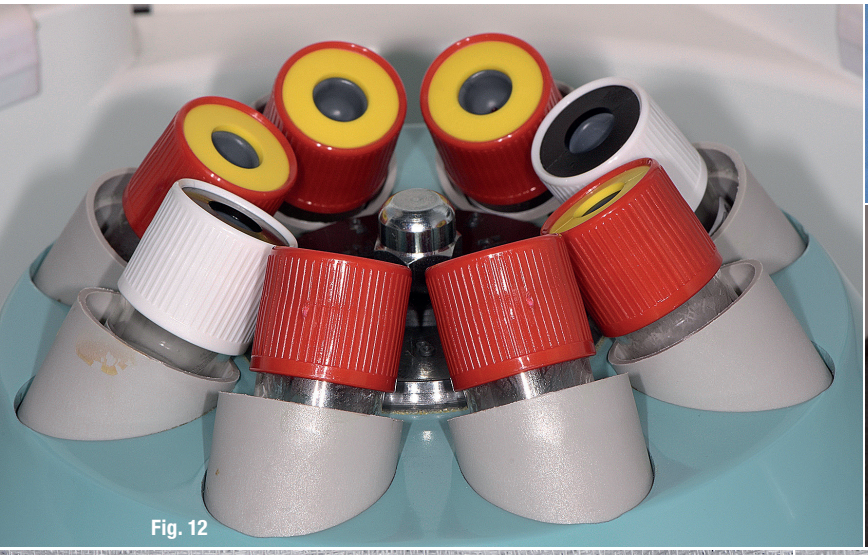
Fig. 12

Fig. 13

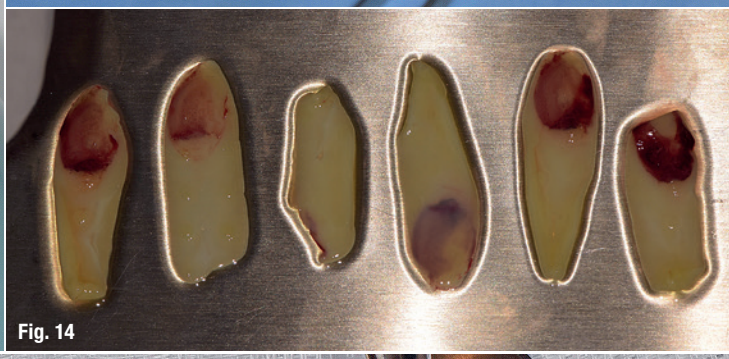
Fig. 14


Fig. 15a


Fig. 15b

Clinical preparation of PRF-Block: Fig. 11: Graphic representation of a L-PRF Bone Block for horizontal bone augmentation. The small holes in the cortical bone guarantee an optimal blood supply. The L-PRF Bone Block is quite well adapted to the bony defect, and the liquid fibrinogen is slowly transformed into fibrin. At least two membranes (face towards bony defect) are used to cover the block; they are fixed via membrane tacks. Primary closure by suturing is preferred. **Fig. 12:** Collection of six tubes (red cap, glass coating) of blood following the standard protocol and two tubes (white cap, plastic coating) collected last for liquid fibrinogen. **Fig. 13:** Collected liquid fibrinogen in a sterile syringe. **Fig. 14:** Clots gently compressed into membranes in the Xpression Box. **Figs. 15a & b: a)** Chopped membranes and bone substitute in a titanium dish; **b)** mixed.

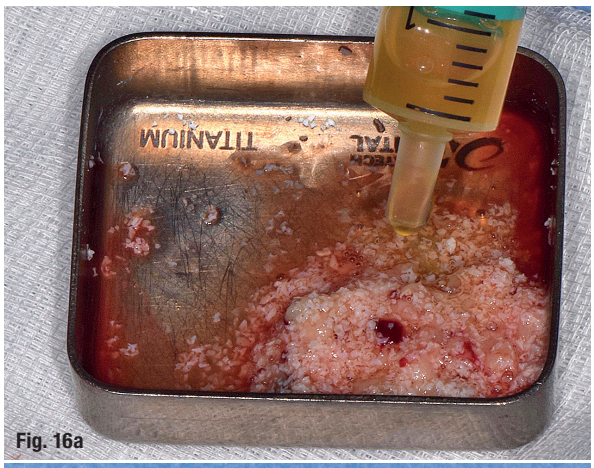
Fig. 16a


Fig. 16b

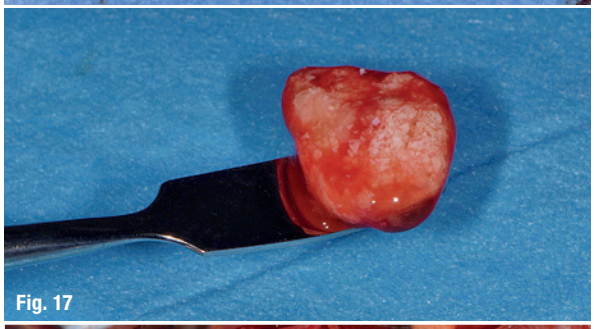
Fig. 17

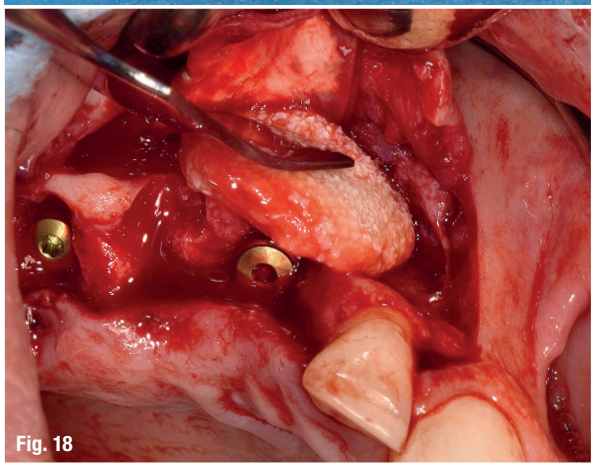
Fig. 18

Figs. 16a & b: Liquid fibrinogen added to the homogeneous mix and stirred gently while shaping it to the desired form. **Fig. 17:** PRF-Block ready to use (± 5 minutes). **Fig. 18:** Placement of the PRF-Block against an implant with buccal dehiscence.

ble to the red cells, but do not aspirate them. Use a plastic 5 cc sterile syringe with a 21-gauge needle and keep the liquid in that syringe with the covering lid on.
– After full centrifugation of the remaining tubes, remove the L-PRF clots and compress them gently into membranes (Fig. 14).

Preparation of a block
– Chop two membranes into very small pieces with curved surgical scissors.
– Mix chopped membranes and bone substitute in a titanium dish (ratio: approximately two membranes per 0.5 g of biomaterial; Figs. 15a & b). If the mix is too dry, one can add some L-PRF exudate from the Xpression Box (Intra-Lock). Ensure you obtain a uniform mix.
– Add 1 cc of liquid fibrinogen to the homogeneous mix and stir gently for five to ten seconds while shaping it to the desired form (Figs. 16a & b). The fibrinogen will clot into fibrin within a few minutes and trap the biomaterial to form a PRF-Block (Fig. 17). A variation would consist of moulding the mixed biomaterial and L-PRF membranes into the surgical defect and squirting the fibrinogen-rich liquid on to it. It would form the block *in situ*, but the liquid can only penetrate ± 5 mm deep into the mix.

about the author

Prof. Marc Quirynen received both his dental degree (in 1980) and his PhD (in 1986) from KU Leuven in Belgium. In 1990, he was appointed professor in the Faculty of Medicine at KU Leuven, where he teaches periodontics and anatomy. He is specialised in oral microbiology.

contact

Prof. Dr Marc Quirynen
University Hospitals Leuven
Periodontology & Oral Microbiology
Kapucijnenvoer 7 blok a – box 7001
3000 Leuven, Belgium
Phone: +32 163 32483
marc.quirynen@kuleuven.be

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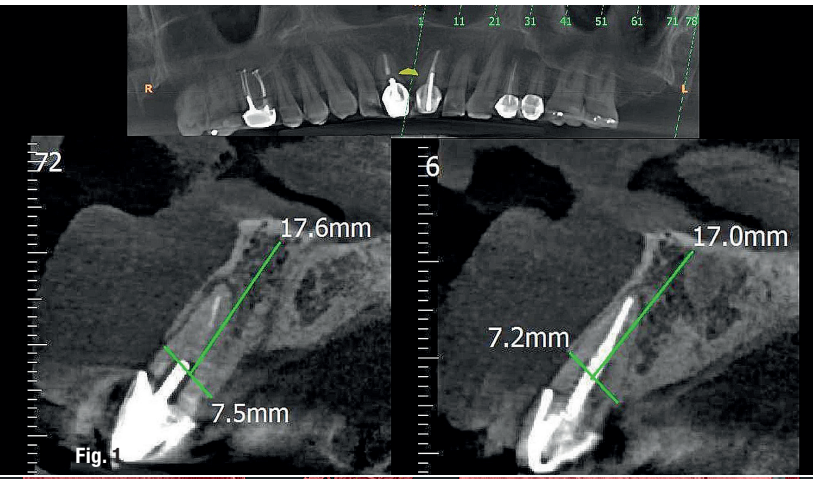
Guided implant placement in the anterior zone

A clinically novel technique

Drs Burzin Khan & Purvi Bhargava (co-author), India

Introduction

Precision in implant placement is of utmost importance for achieving predictable aesthetics and successful restorations, especially in the anterior zone. The quest for accuracy has recently been aided by digital workflows and stereolithographic stents, which not only support planning the implant positioning by flapless procedures accurately but also make possible the prefabrication of a provisional restoration before the procedure. CAD/CAM technology helps reducing inadvertent time loss and manual errors of impression making, pouring casts and fabrication of prostheses.



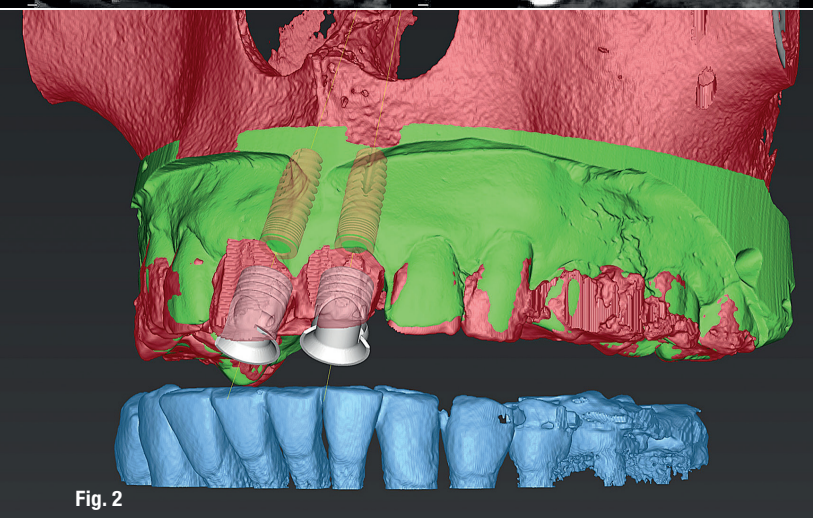


Fig. 1: Pre-op CBCT showing periapical lesion at teeth #11 and 21.
Fig. 2: Virtual extraction and superimposition on scanned diagnostic cast.

The success rate of now routinely practised immediate implant placement and immediate loading exceeds 95 %, and this protocol has the added advantage of reducing the treatment duration and helping restore the aesthetics during the healing phase.[1] During this period of osseointegration, it is imperative to assure soft loading and restrict micromotion on the implants. This is done successfully with softer materials like BioHPP (bredent medical), which is a ceramic-reinforced high-performance polymer. The modulus of elasticity is similar to that of human bone, thereby attenuating masticatory forces, unlike conventional materials, which could cause a direct load transfer to the underlying bone and sometimes with occlusal interferences even ceramic fractures and temporomandibular joint problems.[2] Biocompatibility is the ability of a material to perform with an appropriate host response in a specific situation. It can also be defined as the ability of a restorative material to induce an appropriate and an advantageous host response during its intended clinical usage.[3] BioHPP, owing to its virtue of biocompatibility, has a favourable soft-tissue response and, by virtue of its colour, is a material of choice for anterior restorations, as demonstrated by a recent animal study by Maté Sánchez de Val et al.[4]

In the transitional phase of soft- and hard-tissue healing with immediate implantation in the anterior zone, the provisional crown should be aesthetic, as well as have superior strength. This is marvellously achieved with long-term provisional crowns fabricated with breCAM.multiCOM (bredent medical). It is manufactured from polymethyl methacrylate (PMMA) and has been offset with > 20 % ceramic fillers in order to increase strength. The multi-chromatic-layered CAD/CAM block of breCAM.multiCOM gives the dental prosthesis a natural colour gradient.

The success of the immediate implant placement protocol has been made predictable by the use of photodynamic therapy (soft laser disinfection) using HELBO

(bredent medical). This ensures focused antibacterial action before immediate placement of implants, thereby improving the implant osseointegration prognosis. HELBO therapy entails use of a blue photosensitiser, which diffuses in the bacterial biofilm. The dye molecules are activated using the TheraLite laser (660 nm), resulting in release of aggressive singlet oxygen molecules and thereby causing destruction of bacteria in the biofilm. This anti-infective therapy increases the certainty of immediate implant procedures in infected sockets. The following case report describes rehabilitation of ailing maxillary central incisors following a completely digital workflow.

Case presentation

A 45-year-old male patient presented reporting pain and discomfort of his maxillary central incisors. Clinically, the teeth (with metal–ceramic crowns) were mobile from the post build-up, and radiographic examination with a CBCT scan showed a periapical lesion associated with his maxillary central incisors (Fig. 1). The long-term prognosis of the ailing teeth was ascertained as poor.

Presurgical phase

A thorough 3D treatment planning was done using the preoperative CBCT scan and coDiagnostiX software (Dental Wings). Owing to the presence of sound, adequate apical and palatal bone, an immediate extraction and implant placement procedure was planned. Fabrication of a stereolithographic stent for fully guided placement of implants was completed. This entailed virtual extraction of the central incisors and superimposition on the scanned diagnostic cast (Fig. 2). Using the coDiagnostiX software, the implant position and size were planned. This information was shared with the laboratory to prefabricate the one-time final custom abutments using BioHPP SKY elegance prefabricated abutments (bredent medical). The designing of these was done in exocad, based on the cut-back of the digitally designed provisional crowns to be fabricated from breCAM.multiCOM (Figs. 3a–c). The subgingival collars of the abutments were customised to support the soft-tissue profile of the scored casts. Using the surgical stent, the implant analogues were inserted into the planned positions on the cast (Fig. 4) and the fit of the one-time final abut-

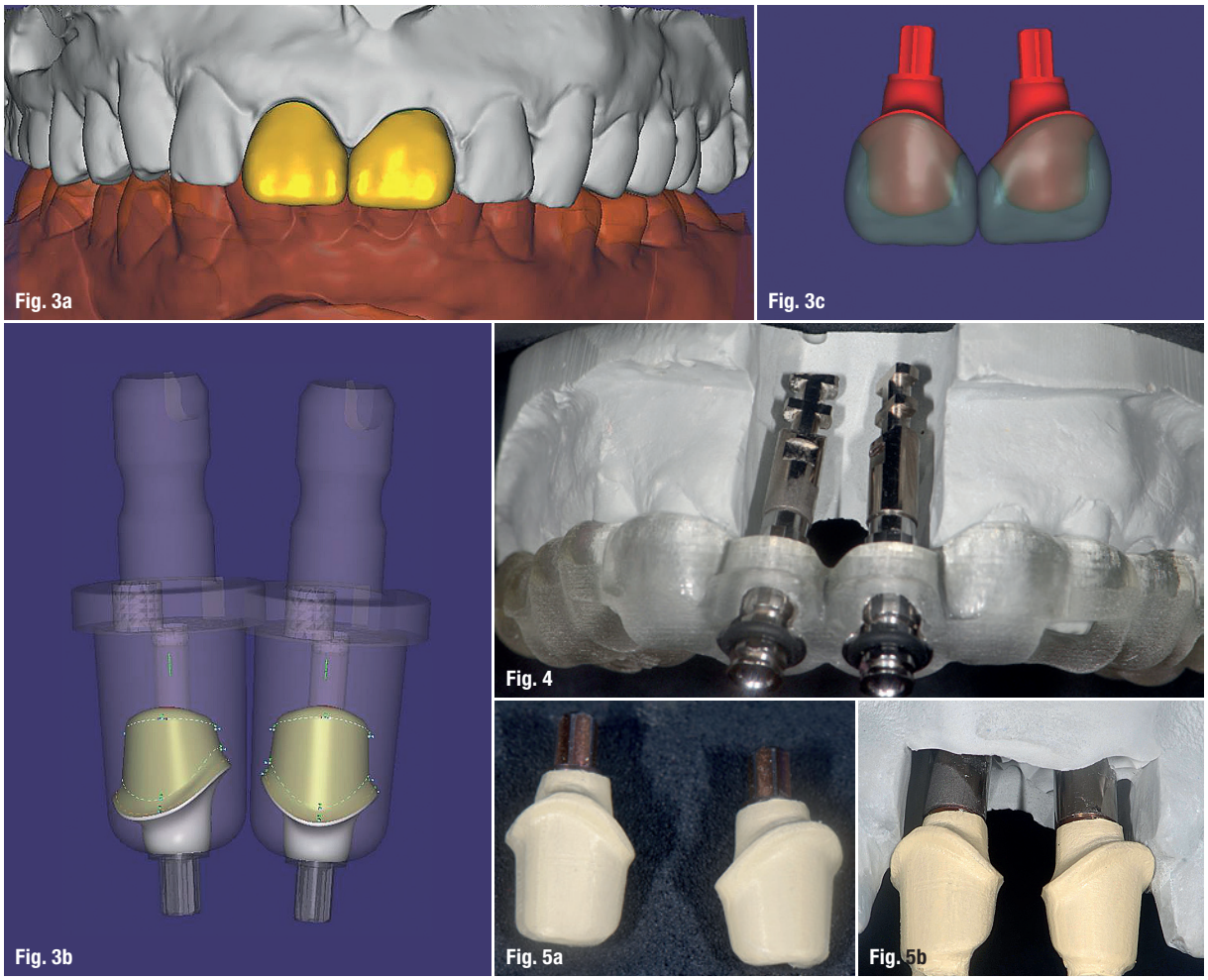


Fig. 3a: Digitally designed provisional crowns. **Fig. 3b:** Abutments customised digitally. **Fig. 3c:** Crowns designed after abutment preparation digitally. **Fig. 4:** Laboratory analogues on the model. **Fig. 5a:** Customised BioHPP SKY elegance prefabricated abutments. **Fig. 5b:** Trying of the customised abutments on the cast.

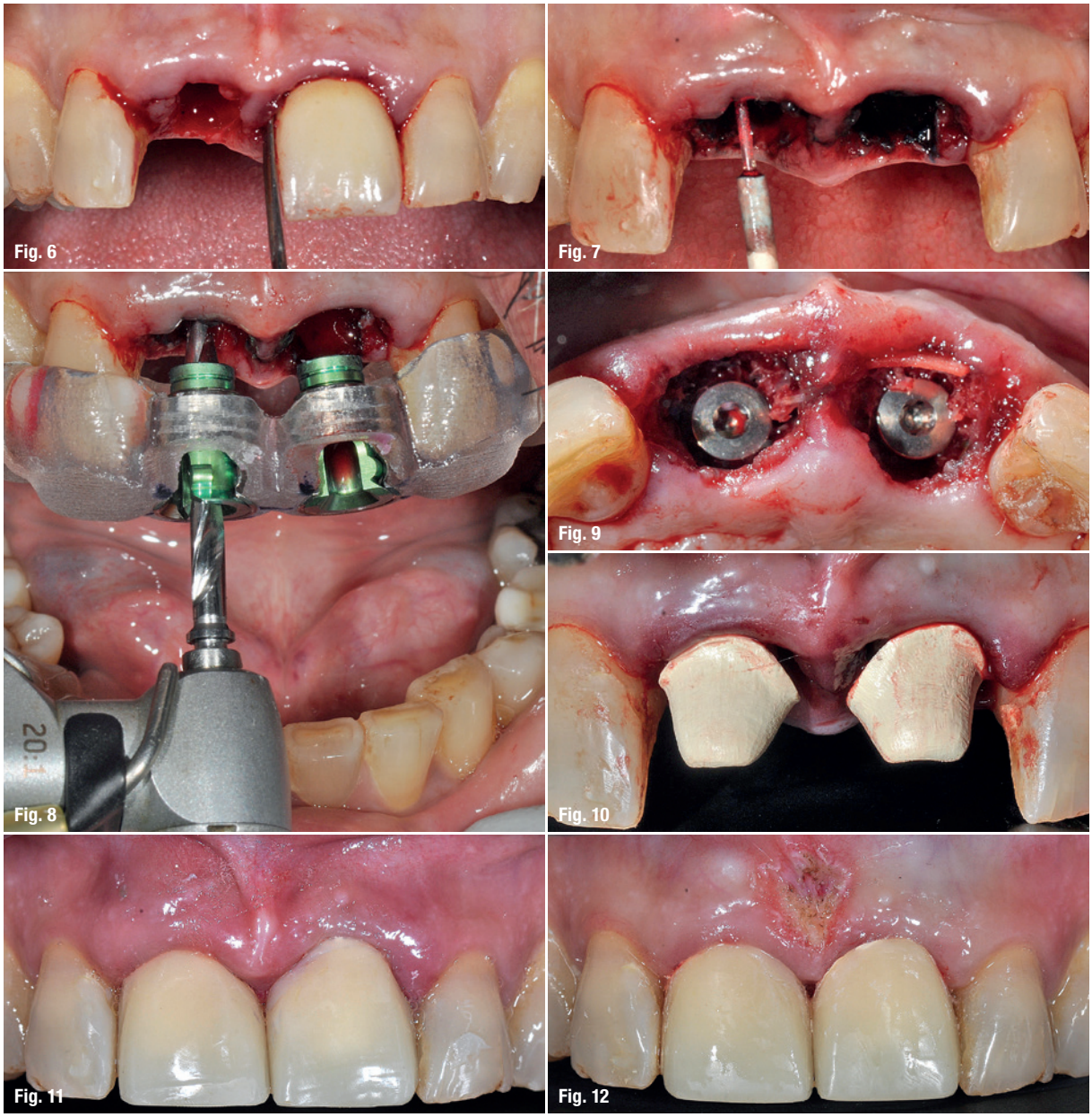


Fig. 6: Atraumatic extraction using luxatomes. **Fig. 7:** HELBO asepsis. **Fig. 8:** Flapless guided surgery—primary sleeve. **Fig. 9:** Guided bone regeneration using a membrane and cancellous bone grafting material. **Fig. 10:** Customised one-time abutments inserted after implant placement. **Fig. 11:** Customised breCAM.multiCOM provisional crowns cemented. **Fig. 12:** Laser frenectomy done.

ment and provisional crown was checked in the laboratory prior to surgery (Figs. 5a & b).

Surgical phase

The procedure was performed under local anaesthesia using the infiltration technique. Atraumatic extraction was done of the maxillary central incisors using periotomes and luxatomes (Fig. 6). Proceeding a thorough curettage, HELBO disinfection was performed intra-socket for reduction in the bacterial load (Fig. 7). The surgical guide was inserted in place, and with the predetermined sleeve sequence, the osteotomy site was gradually primed flapless (Fig. 8). The SKY implants (bredent medical) were inserted and a torque of > 35 Ncm was achieved. There was a dehiscence on the labial bone plate of the right central incisor alveolar socket, for which tunnelling was done beyond the defect and guided bone regeneration was performed by inserting a collagen membrane (angiopore, bredent medical) to prevent soft-tissue ingrowth during the period of osseointegration (Fig. 9). Since the jumping distance was more than 2 mm, the socket was grafted with a particulate cancellous bone augmentation material (0.25 cc; Rocky Mountain Tissue Bank).

The final customised BioHPP SKY elegance prefabricated abutments were torqued to 25 Ncm in the predetermined

positions (Fig. 10) and the screw access plugged with Teflon. The digitally prefabricated breCAM.multiCOM crowns were relined for an accurate marginal fit and soft-tissue support, and cemented on to the abutments using Premier Implant Cement (Premier Dental; Fig. 11).

After eight weeks, the high labial frenulum attachment, which was causing a pull on the inter-implant papilla, was eliminated by laser frenectomy (Fig. 12). Soft-tissue remodelling of the papilla was done by adjusting the contact point of the temporary crowns to within a 4 mm distance from the inter-crestal bone, to induce regeneration according to Tarnow's principle (Fig. 13).[5] Also, a lateral build-up of the crown contours helped squeeze the papilla downwards, closing the black triangular space between the crowns.

Prosthetic phase

At 12 weeks, the temporary crowns were detached from the abutments, the collar margins adjusted to an equi-gingival level and intraoral abutment level, a digital scan (CS 3600, Carestream Dental) was performed and the STL file digitally transferred to the dental laboratory (Fig. 14). Using the DentalCAD software (exocad), the final crowns were designed and milled from IPS e.max (Ivoclar Vivadent) in the laboratory. As these were layered crowns, 3D models were printed for the laboratory procedure (Fig. 15). After a crown trial, the BioHPP SKY elegance abutments were coated with visio.link primer (bredent medical; cured for 90 seconds) and the crowns treated with hydrofluoric acid, washed and dried, and a universal bond applied. The crowns were cemented with dual-curing resin cement. Optimal aesthetics with a good emergence profile was achieved owing to the preservation of both the hard- and soft-tissue, and the patient was satisfied with the clinical outcome (Fig. 16).

Discussion

The digital workflow in implant dentistry has made optimal implant positioning possible with pre-planning and use of a surgical guide. Prefabricating final abutments and provisional crowns helps maintain the tissue profile, assuring an immediate restoration, as well as the aesthetic appearance, to the patient during the entire treatment period.

In the current case report, a stereolithographic stent was fabricated based on the CBCT scan for accurate implant placement. A systematic review concluded that guided placement has at least as good an implant survival rate as conventional protocols do.[6] However, several unexpected procedure-linked adverse events during guided implant placement indicate that the clinical demands on the surgeon were no less than those during conventional placement. A flapless approach was possible because of the stent. A flapless approach prevents stripping of the periosteum, improving blood supply at the surgical site. Flapless implant placement appears to be a useful procedure, based on accurate and reliable CBCT image data and dedicated implant planning software.[7]

An immediate implant placement and loading protocol was followed in the current case. Anitua et al. concluded that immediate loading of implants inserted into fresh and infected extraction sockets is not a risk factor for implant survival.[8] A current study of Prof. Arturo Novães, presented at EuroPerio in Amsterdam in the Netherlands, showed that, with the disinfection of the extraction alveolus with HELBO, better bone quantity and quality in the healing time could be achieved.[9]

Gallucci et al., whose study results were presented at the fifth ITI Consensus Conference, stated that for the anterior region, immediate and early loading of single-implant crowns are predictable procedures in terms of implant survival and stability of the marginal bone.[10] However, data regarding soft-tissue aspects is not conclusive enough to recommend immediate or early loading of single-implant crowns in aesthetically demanding sites as a routine procedure. Immediate loading in such sites should be approached with caution and by experienced clinicians.[10]

The one abutment at one time concept is very beneficial for maintaining crestal bone levels in post-extractive sockets.[11]

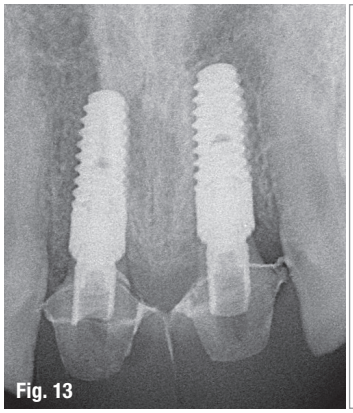


Fig. 13

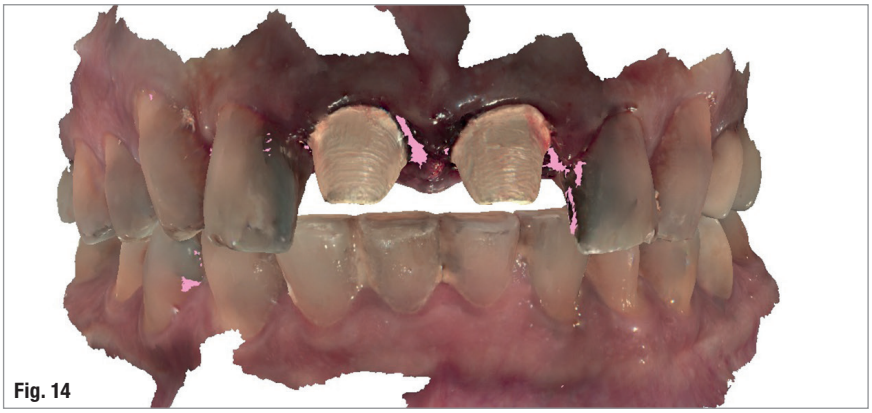
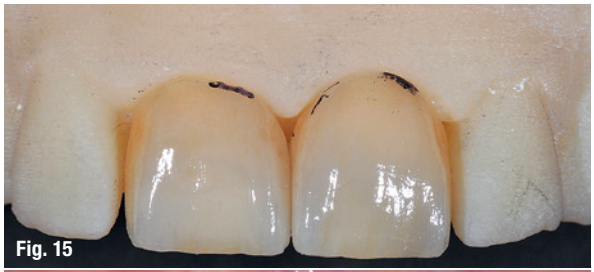


Fig. 14

Fig. 13: Digital radiograph showing the distance between the contact point of the crowns and interdental bone to be less than 5 mm. **Fig. 14:** Digital intraoral scan after three months for final crowns.

A recent meta-analysis found less bone loss for one abutment at one time over a longer follow-up period.[12] BioHPP was the material of choice for the one-time abutment, as it ensures soft loading during the healing period by virtue of its biomechanical properties and has a superior gingival response. It also offers improved aesthetics in the anterior zone owing to its non-metallic, light, dentine-like colour.[2] The provisional crowns were fabricated with breCAM.multiCOM owing to its strength and aesthetics. It is a PMMA integrated with > 20 % ceramic fillers, and therefore, this restoration can last for up to two years. The multi-chromatic layering of breCAM.multiCOM gives the dental prosthesis a natural colour gradient.[2]

A digital intraoral scan was taken of the one-time abutments for fabrication of the final crowns. A study revealed that crowns based on intraoral scans had a significantly better marginal fit and better interproximal contacts than crowns based on physical silicone impressions.[13]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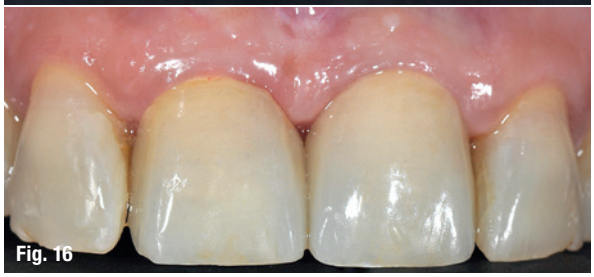
Fig. 16

Fig. 15: Final IPS e.max crowns on printed models. **Fig. 16:** Final IPS e.max crowns cemented.

Conclusion

The digital workflow in implant dentistry constitutes a paradigm shift from traditional protocols, enabling accurate treatment planning and predictability. However, long-term controlled studies are required to obtain conclusive evidence for clinical superiority of digital workflows for immediate implant restorations compared with conventional techniques. The use of new-age biomaterials with greater biocompatibility helps to improve tissue response and provides better aesthetic predictability.

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Literature

about the author

Dr Burzin Khan is a Mumbai-based dentist and published author. In 1990, he completed his MDS in Prosthodontics at the Government Dental College in Mumbai in India. He maintains his multi-speciality clinic Opus Dental Specialities. He is a mentor for the Mastership series programme on Implant Prosthodontics at Eduhub Mumbai. In addition, he is past President and one of the Founders of the Indian Academy of Osseointegration.

contact

Dr Burzin Khan, MDS
Opus Dental Specialities
17, Murzban Rd, Azad Maidan, Fort
Mumbai, Maharashtra, 400001, India
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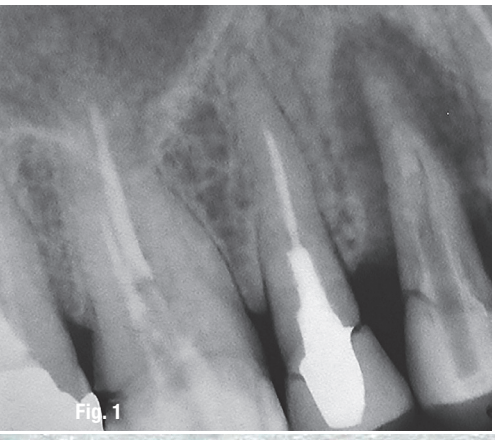
Extraction, tissue management and implant surgery over the long term

Dr Philippe Jourdan, France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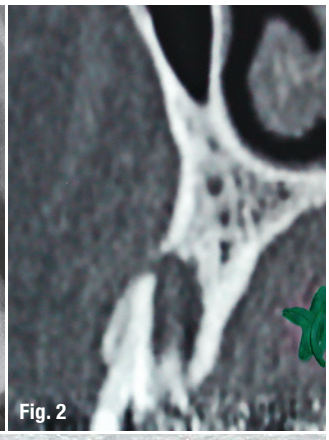
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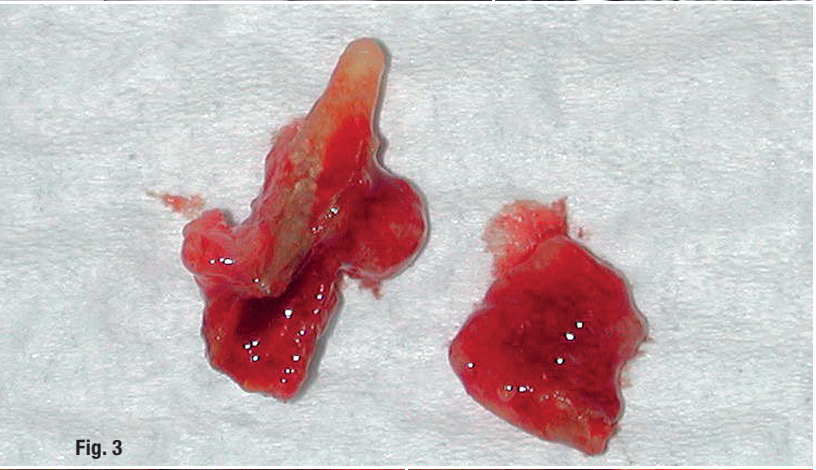
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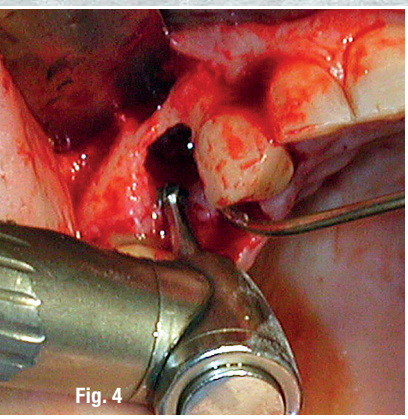
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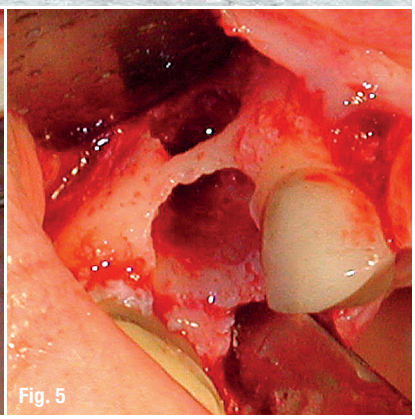


Fig. 5

Fig. 1: Pre-op radiograph showing a fractured root. **Fig. 2:** A cyst had developed around the fractured tooth. **Fig. 3:** The extracted tooth in two pieces. **Fig. 4:** Preparation of the surgical site. **Fig. 5:** The cavity after extraction of the tooth.

In this case report, I discuss a successful extraction and implant surgery in a female patient, with no complications after ten years of follow-up.

Assessment

The patient, aged around 60 years, presented with a fractured root of her maxillary right premolar (Fig. 1). A long-time patient of the practice, she was otherwise in a good state of oral health. After an initial assessment, it was discovered that a cyst had developed around the fractured tooth and the serious infection necessitated surgical extraction (Fig. 2). The patient was advised of the options open to her—either a bridge or an implant—and the benefits and potential drawbacks of both. After consideration, she chose the latter and the treatment could proceed.

Extraction

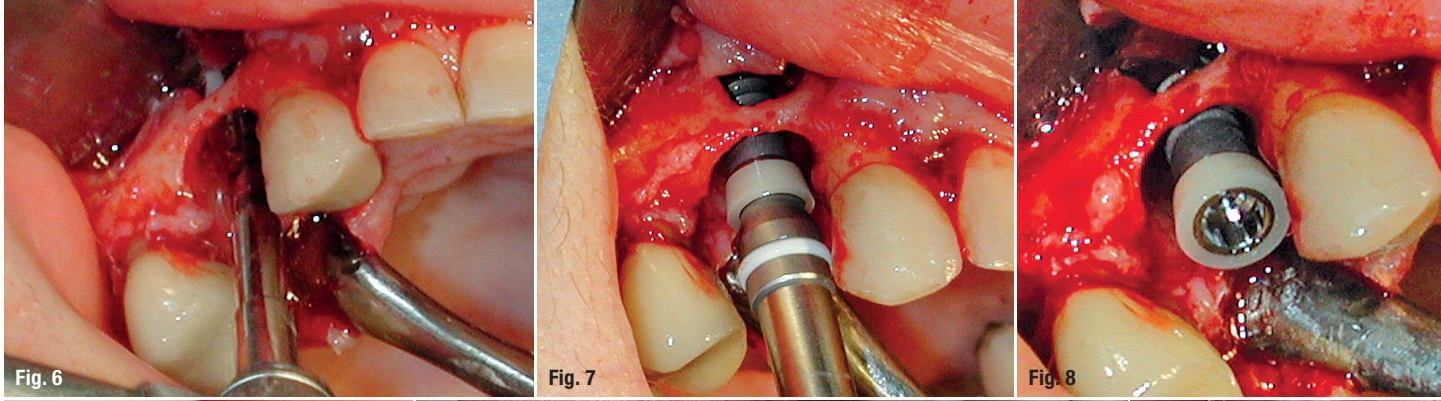
The extraction was a smooth, unhindered process. Owing to its fractured state, the tooth came out in two pieces (Fig. 3). Care was taken to maintain the small bridge of bone on the buccal side (Fig. 4); this would serve as a vital scaffold for the implant, for the bone substitute and for microvascularisation at the site (Fig. 5). Surgery was performed with a flap because of the need for greater visibility owing to the presence of advanced granulation.

Preparation

After the extraction, a bur was used to thoroughly clean the cavity except for the crucial remaining bone fragment (Fig. 6). The bur was used to prepare the fenestration site, with the cavity on the buccal side of the bone. The bur was used for drilling purposes for the preparation of the implant site because piezoelectric technology was not available at the time.

Implant placement

The Z1 implant (TBR Dental) was chosen because of its excellent periodontal integration and suitability for immediate implantation (Figs. 7 & 8). It is specifically designed



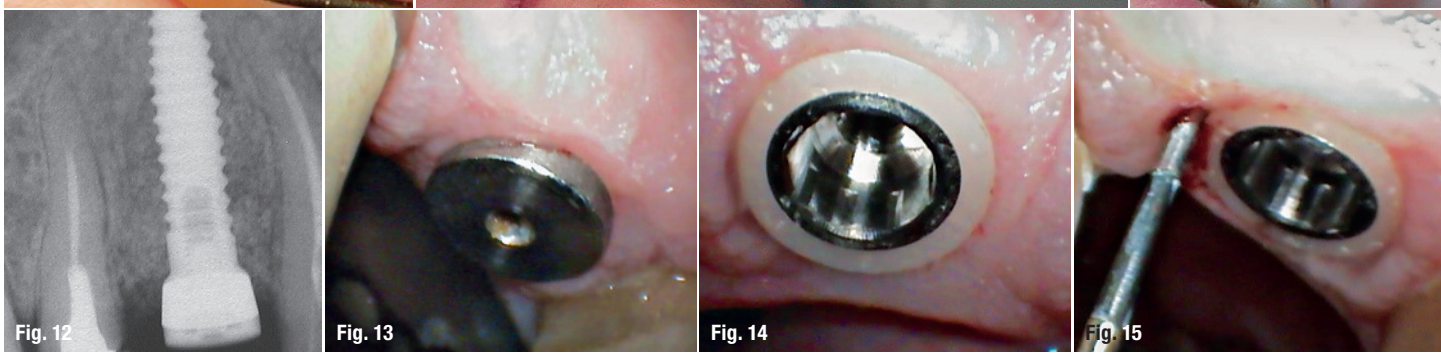


Fig. 6: The cavity was cleaned using a bur. **Figs. 7 & 8:** Placement of the Z1 implant. **Fig. 9:** Platelet-rich fibrin and bone substitute were used as bone grafting material. **Fig. 10:** Cryotherapy was used to prevent inflammation. **Fig. 11:** Occlusal view eight days after surgery. **Fig. 12:** Radiograph eight days after surgery. **Fig. 13:** Situation five months after surgery. **Fig. 14:** The cover screw was removed. **Fig. 15:** Epithelial healing had been successful.

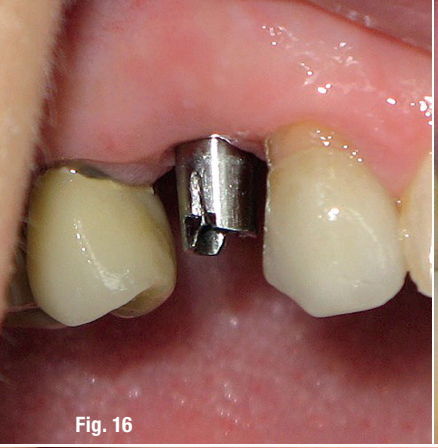
to suit the anatomy of every patient. It is the only tissue level implant which adapts selected materials—zirconia and titanium—to the surrounding tissue. The socket required a graft of platelet-rich fibrin and bone substitute (Fig. 9), to ensure efficient and safe healing of the tissue around the implant. Despite the trauma around the placement site, there was sufficient primary stability to ensure later osseointegration. One-third of the implant had good apical stability, which, in this case, was acceptable. Cryotherapy was then used to prevent inflammation and oedema (Fig. 10). The operation, with no unexpected developments or complications, lasted an hour. Antibiotics were prescribed post-operatively owing to the pre-existing severe infection at the implant site.

Healing period

The healing process was non-problematic, and healing was evident eight days after surgery despite the inflamed appearance (Figs. 11 & 12). Five months later, the osseointegration and gingival integration process had also been successful (Fig. 13), a highly pleasing result considering the severe trauma to the bone. The cover screw was removed (Fig. 14), and the space between the zirconia collar and the tissue was probed to determine the status of the periodontal attachment. Owing to the biocompatibility of the Z1 implant's zirconia collar, effective epithelial healing had taken place (Fig. 15).

Implant restoration

The abutment and the crown were placed (Figs. 16 & 17), and temporary cement applied to the crown for retention. Once again, there were no complications. The appearance of the gingival tissue around the crown showed the desired stippled consistency, displaying a rough texture but without the presence of bleeding or inflammation (Fig. 18). Owing to the employment of an in-practice technician, all post-operative procedures could be performed conveniently and efficiently on-site.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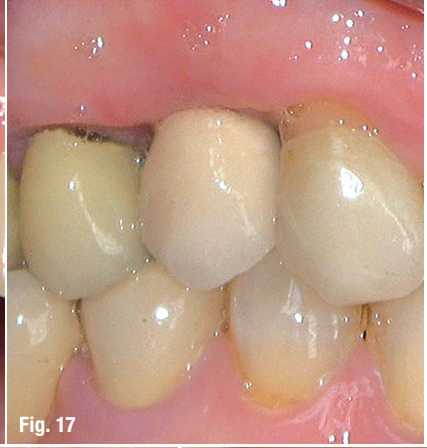
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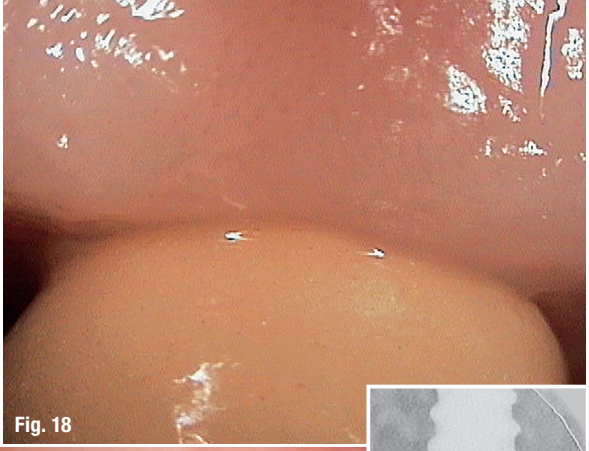
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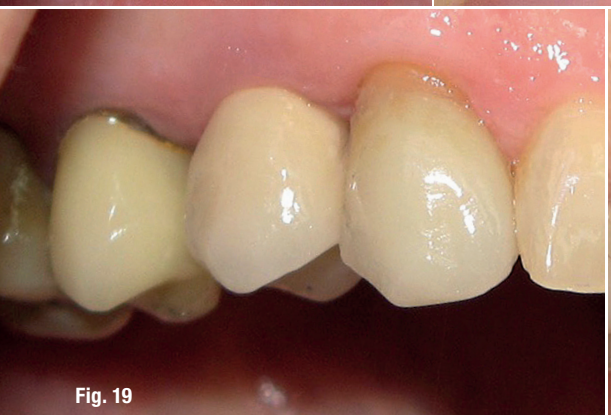
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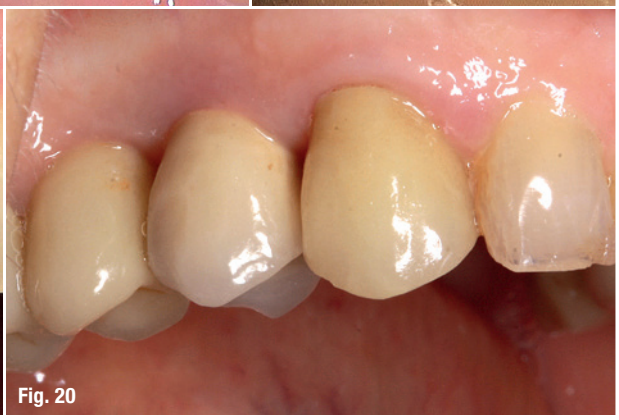
Fig. 20

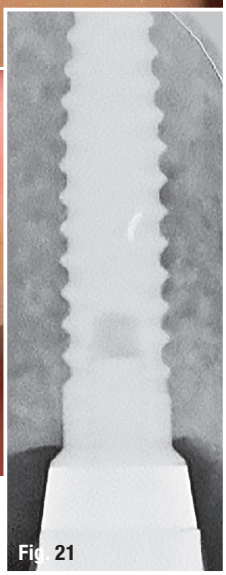
Fig. 21

Fig. 16: After placement of the abutment. **Fig. 17:** After placement of the crown. **Fig. 18:** The gingival tissue around the crown. **Fig. 19:** Clinical situation two years after surgery. **Fig. 20:** Clinical situation ten years after surgery. **Fig. 21:** Radiograph ten years after surgery.

Final results

The pleasing results of the implant surgery continued to be seen two years after the operation. Natural papillae had developed around the crown, compared with the flat appearance of the tissue initially (Fig. 19). Dental implants must integrate with the three surrounding tissues: the bone, connective tissue and epithelial tissue. The main challenge involved with the implant's periodontal integration is the long-term stability of the implant–tissue interface. This challenge is met by this tissue level implant with a zirconia collar.

The comparison between a tissue level surgical technique and a bone level surgical technique shows a considerable advantage. In this case, the crown was supported directly on the implant platform. However, if we had opted for a bone level surgical technique, this same crown would have been cemented on to the shoulder of the abutment. The tissue level surgical technique is, therefore, much less invasive for soft tissue. On the one hand, it does not constrain or mobilise the gingival tissue once the implant has been placed, and on the other hand, zirconia has aesthetic and antibacterial properties superior to those of titanium. In this technique, the combination of using a zirconia collar at soft-tissue level and a ceramic crown ensures a ceramoceramic continuity, significantly improving the aesthetics of the restoration.

A full ten years after surgery, there had been no complications and the tissue surrounding the implant remained strong and healthy (Fig. 20). The papillae had continued to grow healthily around the zirconia collar and the crown. Most importantly, there was no bone cratering (Fig. 21). The patient, aged 70 at the ten-year follow-up, repeated her satisfaction with the surgical procedures and her crown a decade after her initial treatment.

about the author

Dr Philippe Jourdan is a dentist from France specialised in dental surgery. Between 1983 and 1988, he completed several postgraduate training programmes both in Toulouse and Marseille in France. Since 1986, he has been in private practice in Balma in France.

contact

Dr Philippe Jourdan
Balma Dentaire
1 Place France
31130 Balma, France
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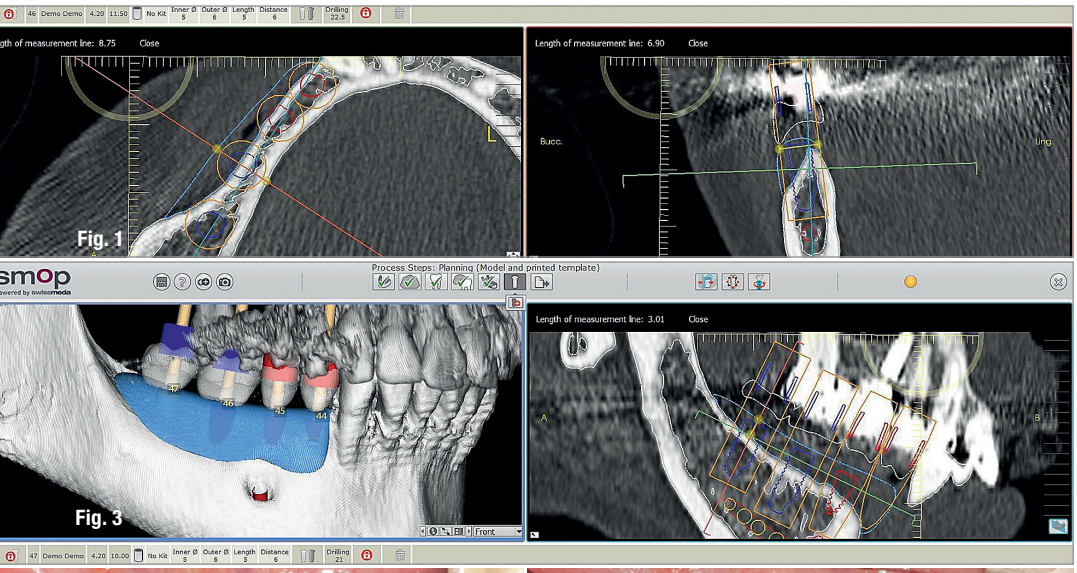
Horizontal ridge augmentation and implantation

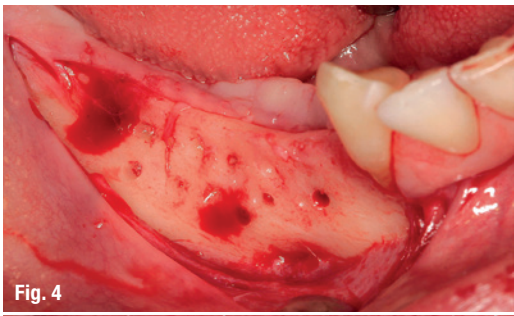
A two-stage GBR procedure

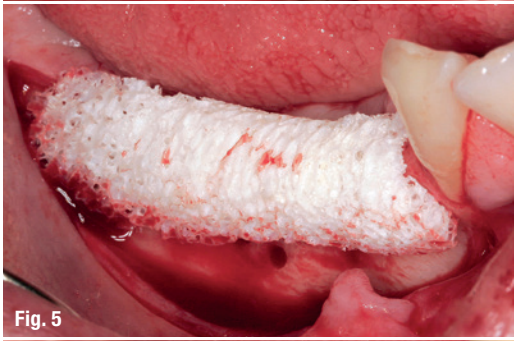
Dr Orcan Yüksel, Germany

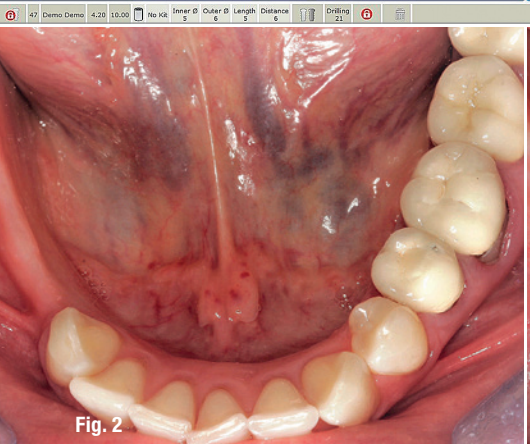
Introduction

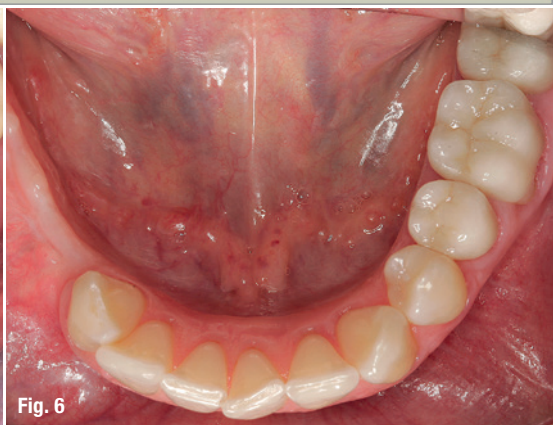
Atrophy of the mandibular bone caused by premature tooth loss due to periodontal or endodontic problems can often be found in posterior areas. Problems associated with implantation in these cases often arise owing to limited bone height or width of the mandible, and several treatment options have been suggested to gain enough bone for a stable implantation and achieve an aesthetically good result.[1] In clinical practice, freeze-dried bone allograft (FDBA) blocks have been used for alveolar ridge augmentation with promising results, offering patients a less-invasive treatment alternative to autogenous bone blocks, with no donor site morbidity and no second

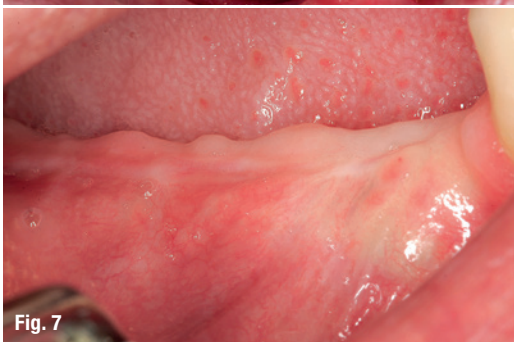












Figs. 1 & 2: Radiographic and clinical examination revealed limited bone availability. **Fig. 3:** Pre-op digital planning of the surgery. **Fig. 4:** Perforation of the cortical layer of the recipient site. **Fig. 5:** The customised allogeneic block fitted on to the recipient site. **Figs. 6 & 7:** Clinical situation six months after the first procedure.

surgical site.[2–4] Nowadays, customised allogeneic bone blocks can be produced using computer-aided design/computer-aided manufacturing (CAD/CAM) technology, enabling a shorter surgery time, as manual block adjustment during surgery becomes unnecessary, and thus, enhancing patient comfort.[5,6] This case report describes a two-stage guided bone regeneration (GBR) procedure using a customised allogeneic bone block as a first step to increase the horizontal mandibular bone width. In a second step, special newly designed implants (Straumann BLX with Roxolid material and the SLActive surface) were inserted to achieve good primary stability.

Initial situation

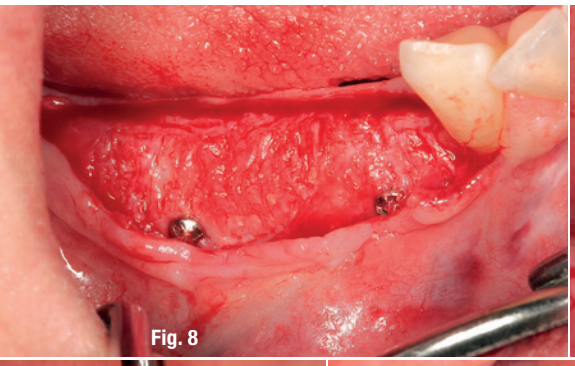
A 42-year-old woman presented with the wish for a fixed prosthetic restoration in the lower jaw. The initial clinical and radiographic examination showed an atrophic jaw with limited bone availability for implantation (Figs. 1 & 2). Several treatment options for a two-stage GBR procedure to regain an optimal horizontal width for further implantation were discussed with the patient. In the end, because the patient refused autologous bone augmentation, treatment with a customised CAD/CAM FDBA (maxgraft bonebuilder, botiss biomaterials), followed by placement of Straumann BLX implants, was determined.

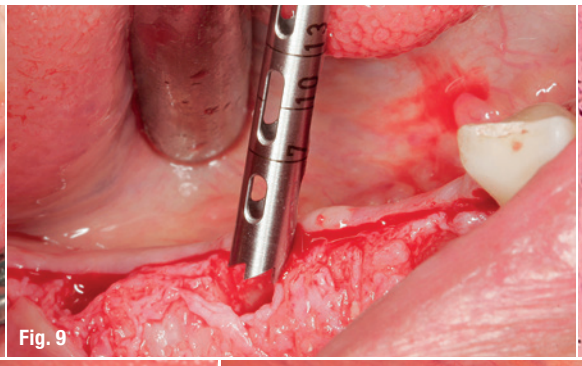
Planning

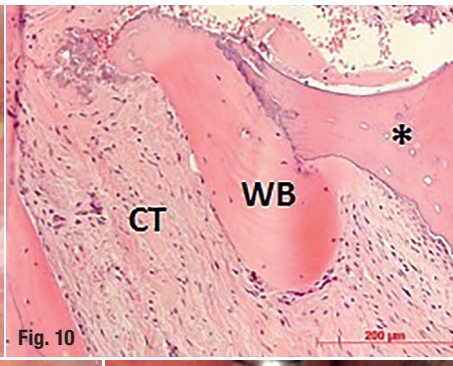
A CBCT scan was taken and forwarded, in the DICOM format, to botiss biomaterials to design the customised allogeneic bone block. Botiss virtually designed the allogeneic bone block on a 3D reconstruction of the patient's defect (Fig. 3). After review of the block design and approval by the surgeon, the maxgraft bonebuilder block was milled from processed (Allotec process, Cells+Tissuebank Austria) cancellous bone from femoral heads of living donors.

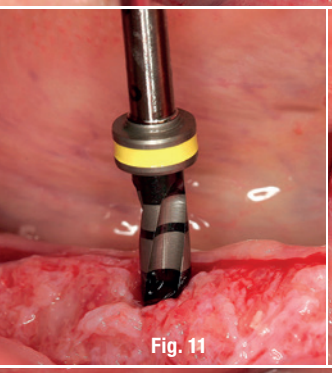
Surgical procedure

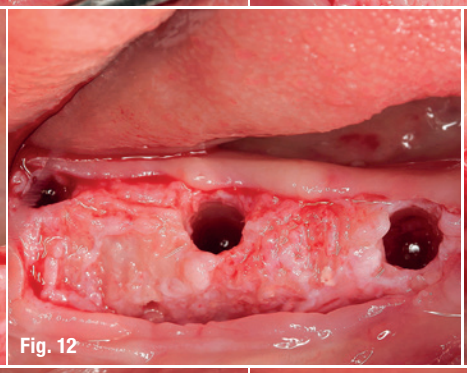
The GBR procedure was performed under local anaesthesia. A full-thickness vestibular flap with mesial

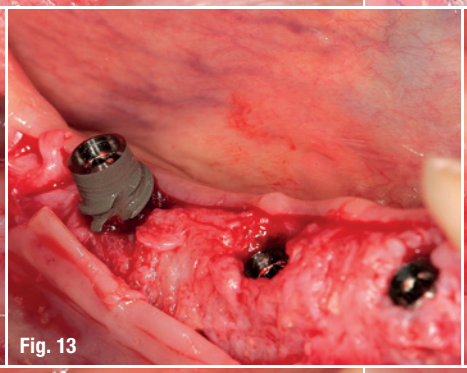


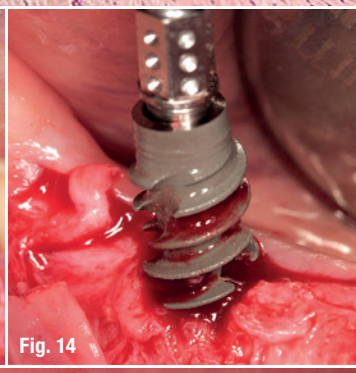


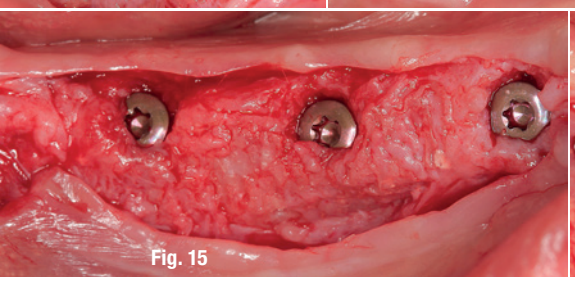












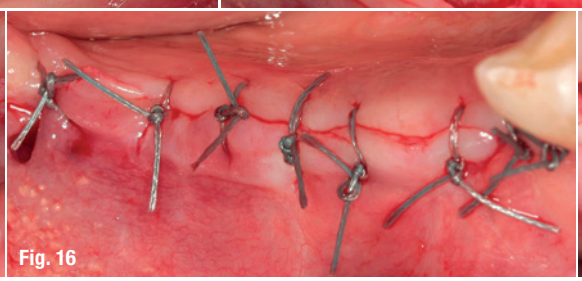


Fig. 8: The fixation screws were removed. **Fig. 9:** A bone core biopsy was taken. **Fig. 10:** The histology of the biopsy. WB = woven bone; * = allograft material; CT = connective tissue. **Figs. 11–14:** Placement of the Straumann implants at bone level. **Fig. 15:** The implants were covered with closure caps. **Fig. 16:** The surgical site was closed with sutures. **Fig. 17:** Uncovering of the implants after three months.

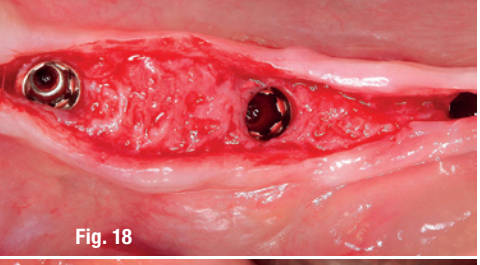


Fig. 18

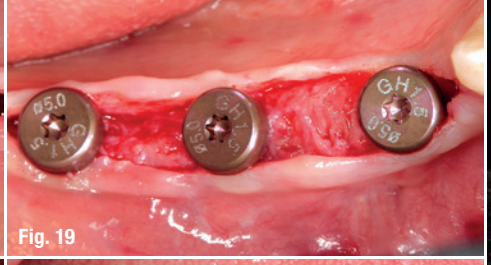

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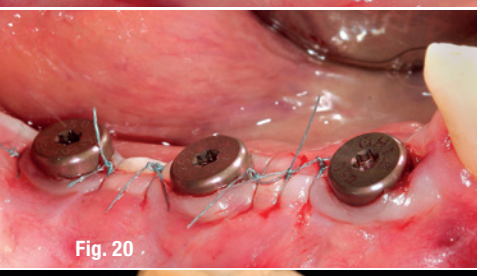
Fig. 22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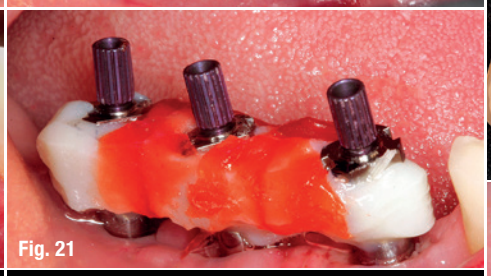
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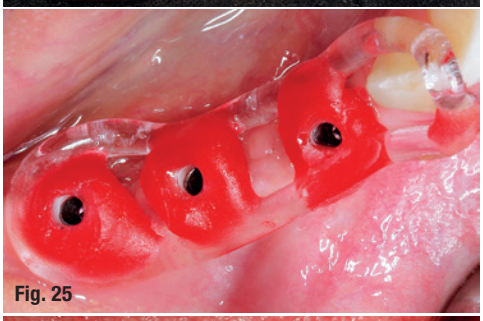
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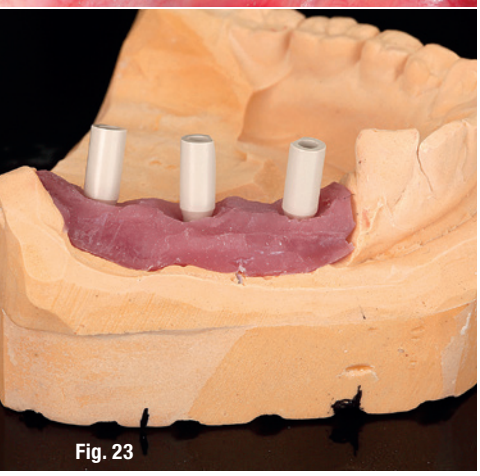
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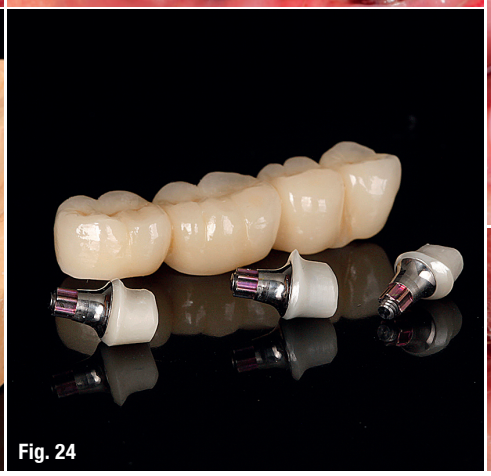
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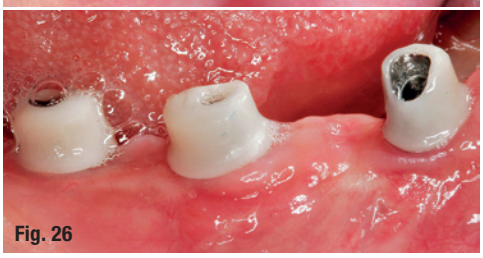
Fig. 26

Figs. 18 & 19: Healing abutments were placed. **Fig. 20:** The surgical site was closed with sutures. **Fig. 21:** Impressions were taken. **Figs. 22 & 23:** Individual abutments were manufactured. **Fig. 24:** Straumann Variobase abutments. **Figs. 25 & 26:** Acrylic with a pattern resin-modified key was used.

relieving incisions was raised. The lingual tissue was carefully dissected from the residual bone down to the mylohyoid muscle while protecting the neurovascular tissue by avoiding any sharp incision. Thus, the lingual tissue was mobilised in the buccal direction for proper soft-tissue management. The cortical layer of the recipient site was perforated using a small round bur to promote bleeding and accelerate revascularisation of the graft (Fig. 4). The customised allogeneic block fitted exactly on to the recipient site and was rigidly fixed to the mandible with 1.25 mm wide and 8.00 mm long screws (Fig. 5). Mesial and distal areas were contoured using xenogeneic bone substitute material (cerabone, botiss biomaterials). The surgical area was covered with a pericardium collagen membrane (Jason membrane, botiss biomaterials), which was fixed to the local bone using titanium pins. The flap was adapted and sutured using a 4/0 non-resorbable suture material. An apically positioned lateral mattress suture secured the muscle tension of the flap to achieve a tension-free wound closure. Sutures were removed at 14 days post-operatively.

After six months of uneventful recovery and healing, the patient presented for the implantation procedure (Figs. 6 & 7). At re-entry, the fixation screws were removed and a bone core biopsy was taken for histological analysis (Figs. 8 & 9). Biopsy slides were stained with haematoxylin and eosin stain, and the histological examination of the material obtained at re-entry showed the ongoing remodelling process of the FDBA block. Newly formed bone (woven bone) was found to be in close contact with the allograft material, surrounded by connective tissue, demonstrating the material-mediated bone regeneration (Fig. 10). Three Straumann BLX implants of 4.5 mm in diameter and 10.0 mm in length were inserted at bone level after measurements at locations #47, 46 and 44 (Figs. 11–14). The implants were covered with regular base (RB) closure caps, and the surgical site was closed with a 4/0 suture material (Figs. 15 & 16).

After three months, the implants were uncovered by a crestal incision. The closure caps were covered in places by new bone (Fig. 17). This shows the vital potential of the newly generated bone in this area. RB and wide base healing abutments were inserted (diameter of 5.0 mm, gingival height of 1.5 mm), and the soft tissue was approximated with a 5/0 non-resorbable suture material (Figs. 18–20).

Prosthetic procedure

After three weeks of healing, the impression was taken with splinted RB impression posts. An open-tray technique was performed in order to avoid dimensional changes during the transfer to the master model. An individualised open tray for the impression was used with polyether impression material (Impregum Penta, 3M

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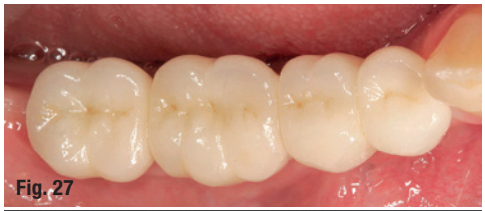
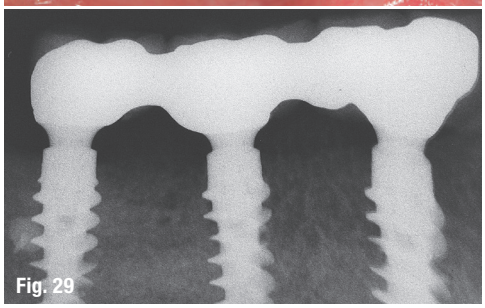


Fig. 27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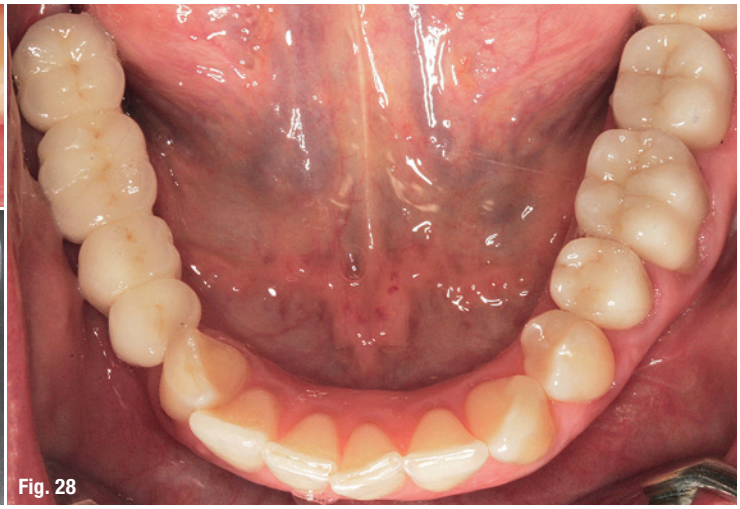
Fig. 28

Figs. 27 & 28: Clinical situation ten months after implant placement. **Fig. 29:** The post-op radiograph.

ESPE; Fig. 21). The individual abutments were created using a Straumann Variobase abutment with zirconia (Figs. 22 & 23). This abutment provides dental laboratories with the flexibility to create customised abutments (Fig. 24). The preferred workflow was in-laboratory milling. The abutment combines the benefits of the original Straumann connection and the unique Straumann engaging mechanism. An acrylic with a pattern resin-modified key was used to determine the correct position of the abutments in the patient's mouth (Figs. 25 & 26). Follow-up ten months after implant placement showed well-preserved gingival contours (Figs. 27 & 28).

Results

After successful integration of the prosthetic work, a zirconia and ceramic layered bridge was fixed with glass ionomer cement. A check radiograph revealed a perfect fit of the prosthetic work (Fig. 29).

Conclusion

The BLX implants achieved an optimal primary stability. BLX drills allow for adaptation of the implants' primary stability by making intermittent movements during the bed preparation. From this perspective, this implant is very easy to use in different segments of bone length and bone density characteristics, as in this case.

The two-stage GBR procedure using a customised FDBA block was able to fulfil the patient's wish for a fixed dental restoration without harvesting autologous bone, avoiding additional surgical sites for bone harvesting. CAD/CAM technology produced an optimally fitting allogeneic bone block, reducing the surgery time, as no manual adjustment of the block was necessary, and thus, also reducing patient discomfort. The augmentation procedure gained significant horizontal bone width for successful implantation. With its special thread design, the BLX implant chosen here showed excellent cutting and fixation properties in such different bone situations over the length of the implant, where more dense residual bone meets newly generated bone tissue. During uncovering, the newly formed bone tissue was even growing on top of the closure caps in places, showing the excellent remodelling properties of the allograft material.

Overall, this case demonstrates that, while being far less invasive, allogeneic block augmentation, especially the customised allogeneic bone blocks, facilitates bone augmentation procedures for the surgeon and the patient. At the same time, these long-lasting implant solutions offer maximum comfort for the patient.

Literature

about the author

Germany-based **Dr Orcan Yüksel** graduated from Goethe University in Frankfurt on the Main in Germany and Istanbul University in Turkey in 1987. Since 1993, he has owned a dental clinic and education centre specialised in dental aesthetics and oral implantology. Today, he works as a private practitioner in a joint practice in Frankfurt on the Main.

contact

Dr Orcan Yüksel
Bockenheimer Landstraße 92
60323 Frankfurt on the Main, Germany
Phone: +49 69 7432426
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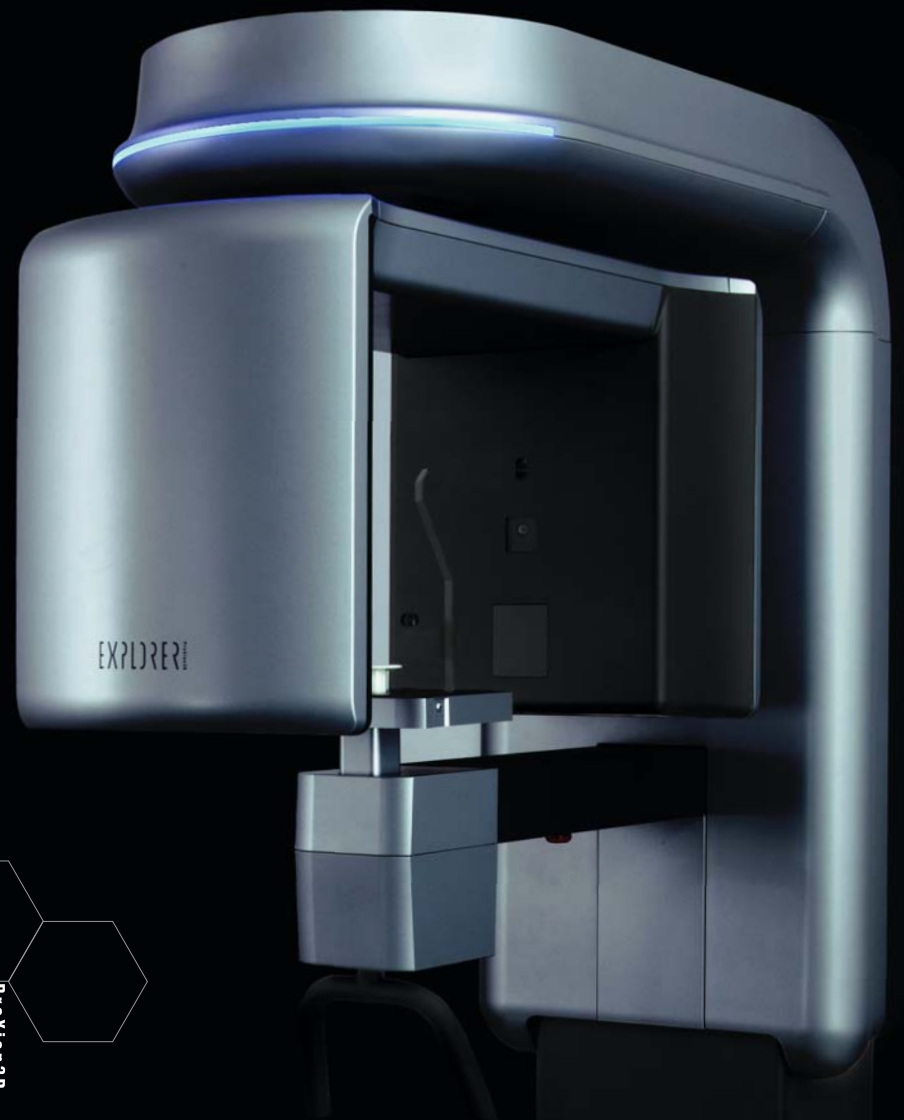

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Fig. 1

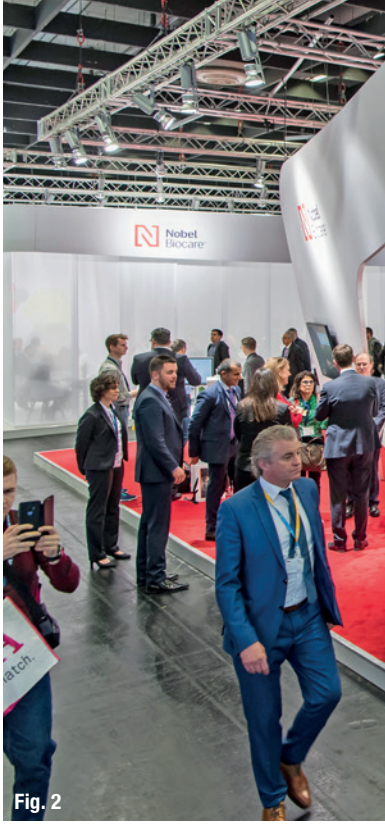

Fig. 2

Fig. 1: Georg Isbaner, Editorial Manager of *implants* (left), and Hans Geiselhöringer, President of Nobel Biocare Systems, at IDS 2019. **Fig. 2:** Visitors to IDS could gather information on the new Mucointegration™ concept at the booth of the dental implant company.

A pipeline filled with groundbreaking innovations

At the 2019 International Dental Show (IDS), Georg Isbaner, Editorial Manager of *implants*, spoke with Nobel Biocare Systems President Hans Geiselhöringer about the novel Mucointegration™ concept, the role that the ceramic implant system NobelPearl plays in the portfolio of the company and what participants can expect from the Global Symposium in Madrid this summer. In addition, he shared a few details about the new implant system Nobel Biocare N1, which is coming to markets soon.

Mr Geiselhöringer, judging by your presence here at IDS, there seems to be a lot of movement at Nobel Biocare right now.
You're right about that. Innovation is the bedrock of our strategy. For several years now, we've been working intensively to bring a number of groundbreaking products to the market that will change implant dentistry as we know it. We have introduced some quite significant innovations in the past and we are constantly aiming to advance the development of our products even further. That's why we have put our heads together and invested a great deal in the development of a new and advanced surface technology comprising the implant, the abutment and the soft-tissue interface in particular. Here at IDS 2019, we are proud to present this brand-new concept under the name Mucointegration™.

What exactly does this term mean?
Up to this point, implantology has been primarily focused on the integration of the implant with the bone. In recent years, however, the focus has shifted more and more to the soft tissue, as it is a very important factor for long-term aesthetics. In my opinion, there have not been enough solutions available so far to pursue this approach reliably and sustainably. With our new surfaces, we are now able to meet patients' demand for solutions that provide not only immediate function and shorter treatment times but better long-term results and aesthetics too. Necessary studies to back this claim also exist now. There has always been a strong focus on roughness when it comes to developing implant surface technologies. Yet, this is not the only factor responsible for successful osseointegration. Another important factor is surface chemistry. An effective implant surface has to be made by means of a special form of anodisation. With this in mind, we have developed our Xeal surface for the abutment and the soft-tissue interface on the upper implant head.

Mucointegration™ is a concept that requires entirely new investments in research, development and production. It was clear to us, however, that there are so many unresolved issues which today's implant dentistry has yet to address. This goes contrary to the belief of some that there are no real innovations left to be made in this field. We have devoted ourselves to these issues and have made enormous improvements in almost every vital step in implant therapy. We have combined these advances into one implant system, Nobel Biocare N1, which will be introduced at our Global Symposium in Madrid in Spain at the end of June 2019. It features easy handling, good predictability of treatment outcomes and an extremely short osseointegration period. I am convinced that it will set new industry standards and I look forward to presenting it to our customers in Madrid this summer.

With NobelPearl, the Nobel Biocare portfolio features a ceramic implant that plays in the top league. How does this fit into your overall strategy?
NobelPearl is an important part of our portfolio, although I think that ceramic implantology will most likely continue to be a niche area in the future. However, I can't really predict how this area will develop over the next ten to 15 years. NobelPearl is important to us because there are patients who quite simply demand an all-ceramic solution. I'm not going to go into the advantages or disadvantages ceramics might have compared with other materials. As far as I'm concerned, the only things that count are that an implant is clinically well applicable and scientifically proven. This is definitely the case with NobelPearl.

Moreover, I think it's crucial that a ceramic implant is actually metal-free. With the exception of NobelPearl, there is no such implant at the moment. Most ceramic systems usually have a metal screw built in. As a patient, I would be upset if I requested a metal-free construction and ended up having a metal screw implanted. I also think that two-piece ceramic implant systems have significant advantages, especially when it comes to the healing phase. Ceramic implants in general are not well suited to immediate loading during this time. However, there are always loading forces, be it through chewing or pressure from the tongue. One-piece ceramic implants do not cope very well with these loading forces and sometimes tend to break during the healing phase. Hence, I would always prefer a two-piece system. I also find two-piece ceramic implants simply more aesthetic. This is just my personal opinion, but I believe many of my colleagues and dentists would agree with me.

Only recently, you announced a new Nobel Biocare Global Symposia series. What can dentists look forward to at the first of these training events in Madrid this summer?
For many years, we have organised a global symposium every three years and held national symposia in the years between. However, based on the excellent feedback from our clinical partners on our new products prior to launch, we have decided to organise three global symposia over the next three years instead of only one. One will take place in Europe, one in North America and one in Asia. We really need three global symposia for our numerous advances and innovations to be addressed adequately on a global scale. In Madrid, our new surfaces and the new Nobel Biocare N1 implant system will be presented. At the symposium in the US, the surface will be presented again and Nobel Biocare N1 will be launched. In Asia, we will launch the surface and Nobel Biocare N1 simultaneously.

> "Our new Nobel Biocare solutions can be described as the next generation in implant dentistry…"

We want to reach as many customers with our symposia as possible because we consider our innovations to be real breakthroughs in implant dentistry. They are yet another step forward in making implant placement procedures even faster, safer and more predictable. Nobel Biocare N1, especially, is so different to what we have been used to and what we considered to be good in the past. It could be described as almost revolutionary, as it brings improvements to every step of the implant treatment. I am already looking forward to the reaction from the audience when we first present Nobel Biocare N1 and reveal the designs and the biology behind it. From

the unique preparation possibilities of the implant bed to the new implant body, Nobel Biocare N1 is amazing in every way. Our R&D teams and the more than 20 universities we have worked with to develop and test the system have done an incredibly good job.

Another factor that is very important when we launch new products is training. At our symposia, we will offer various hands-on courses led by experienced experts who, at that point, will have already been working with our new product for over a year. Based on their feedback and through a peer-to-peer exchange, we will be able to provide dentists with the best possible training and information on our products. Yet, we act as mere organisers of these training courses and the real training can only flourish when experts are training experts. Mentoring and coaching are both topics that are important to us and on which we want to focus even more in the future. In addition, we have established a support network for clinicians who are only starting to use our new products. There, they will be able to contact experts who will be able to provide feedback in the unlikely case that something doesn't work as planned.

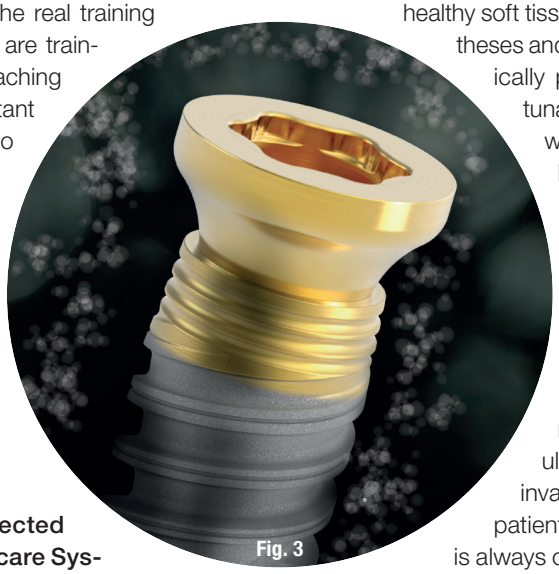

Fig. 3

What challenges are connected to establishing the Nobel Biocare Systems umbrella brand? How do you communicate this to dental professionals?
The innovations that we bring to the market with Xeal, TiUltra and Nobel Biocare N1 are clearly separated from those of our value brands, such as Alpha-Bio Tec, Implant Direct or Logon. Our new Nobel Biocare products can be described as the next generation in implant dentistry and, of course, we are creating the necessary incentives for dentists to invest in them. The surface technology and the protocols used when inserting Nobel Biocare N1 will help many patients to be less afraid before the procedure, and less traumatised and stressed afterwards. In addition to treatment costs, the patient's biggest concern is the pain that is associated with surgery. In order to address this fear, we have to do more research and continue to advance technologies even further.

I am convinced, however, that Nobel Biocare N1 and our new surface technology are giant steps in the right direction. There is still a lot that needs to be improved in implantology: when it comes to digital integration options and 3D pre-planning possibilities, for instance. However, if we look at our All-on-4 treatment concept, it didn't take long for it to become the standard protocol for treating edentulous jaws. I am confident that there are concepts in other areas, as well that we can embrace and improve on in order to do justice to our leadership role in innovation.

Moreover, I am confident that we will bring even more groundbreaking innovations to the market in the next five to seven years. Our surface technology and Nobel Biocare N1 are only the beginning. We will also focus even more on the long-term preservation of soft tissue. This is a crucial area which has not been addressed in implant dentistry at all so far—or only to a limited extent. In order to guarantee healthy soft tissue around the implant, the prostheses and the interface, we need scientifically proven protocols, which unfortunately do not exist yet. However, we are already tackling this issue by developing a new product which will be launched within the next two years.

I am pleased about the fact that we have a pipeline that is filled with groundbreaking innovations, all aimed at optimising the clinical workflow and ultimately making therapy less invasive and time-consuming for patients. At Nobel Biocare, our focus is always on the patient. Our products will also significantly increase the reliability of restorations, so that patients can hopefully live with our implants and prostheses throughout their lives.

There is still a great need for information regarding the approval of medical products. How do you feel about this?
It's becoming increasingly difficult to obtain approval for a product. However, I am glad about that. If I were a patient in need of treatment, I would want the product that is used to be safe, medically tested and scientifically proven. This lies within the responsibility of every manufacturer of medical devices. I welcome clear rules on when is a product approved and when is it not.

Mr Geiselhöringer, thank you for your time.

Fig. 3: The new surfaces Xeal and TiUltra are aimed at optimising tissue integration of implants.

contact

Nobel Biocare Services AG
P.O. Box
8058 Zurich Airport, Switzerland
Phone: +41 43 2114200
www.nobelbiocare.com

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Finding the missing pieces of the puzzle in peri-implantitis

In 2018, Dr Luigi Canullo was awarded the William R. Laney Award for the second time. The prestigious prize is awarded annually by the Academy of Osseointegration and is considered to be its highest scientific recognition. Dr Canullo received the award for his latest research study, titled "Association between clinical and microbiologic cluster profiles and peri-implantitis". In this study, he investigates the association between clinical and microbiological profiles and peri-implantitis in order to categorise the condition into different groups.

Dr Canullo is an international speaker on the surgical and prosthetic aspects of implant dentistry and is a specialist in aesthetic implantology, bone reconstruction and platform switching. He has given guest lectures at the universities of Valencia in Spain and Pisa in Italy, and to this day, continues to collaborate with these institutions. Moreover, Dr Canullo is a research leader working with some of the most important universities around the world. He is currently researching soft-tissue interaction and abutments with Prof. Anton Sculean from Bern in Switzerland.

"Despite the incredibly high number of cases, the treatment success rate is still extremely low."

He graduated *cum laude* in dentistry and dental prosthetics from the Sapienza University of Rome in Italy and received his PhD from the University of Bonn in Germany. He also has postgraduate courses from the State University of New York and the University of California, Los Angeles in the US.

Apart from his academic work, Dr Canullo is an active member of the Italian Academy of Osseointegration and the European Association for Osseointegration. Today, he runs a private practice in Rome that focuses on oral implantology, surgery and implant-supported prosthetic rehabilitation. *implants* had the opportunity to ask Dr Canullo about the main findings of his award-winning study and what they mean for implant dentistry in the future.

Dr Canullo, you were presented with the William R. Laney Award again in 2018. Could you please elaborate on the awarded study and tell us the key reasons behind it having been conducted?
As you stated, I have had the good fortune to be awarded the William R. Laney Award twice within the last five years. This time around, I received the award for a study on peri-implantitis. Throughout the past decade, I had worked a lot on platform switching, which was the topic of the work for which I earned the first award. After that, how-

ever, I felt the urge to change my focus. At the moment, peri-implant diseases represent a hot subject within our field. Based on the claims of current research and systematic reviews, the prevalence of this pathology is very relevant today, since between 15 and 42 % of treated patients show symptoms of it. Despite the incredibly high number of cases, however, the treatment success rate is still extremely low and recent systematic reviews suggest there will continue to be a low success rate in the short or medium term when using a non-surgical and regenerative approach. In my opinion, this shows that there are still some missing links in the aetiology and treatment chain. This is the reason the group led by Prof. Miguel Peñarrocha Diago at the University of Valencia, of which I am proud to be a part, started to work on this topic.

How did you set up the study, and what were its main findings?
The objective of this work was to investigate the association between clinical and microbiological profiles and peri-implantitis in order to eventually categorise the disease into different groups. For this purpose, subjects with at least one implant presenting signs of peri-implantitis and one healthy implant were selected. The clinical, radiographic, occlusal and microbiological profiles of these infected implants were collected. Cases were then classified into five peri-implantitis groups according to potential disease-triggering factors: surgically associated, prosthetically associated, biomechanically associated, purely plaque-associated and a combination of these. Generalised estimating equation models were used to study the differences among potential risk factors. Cluster analyses were applied to investigate the correlation between clinical and microbiological profiles and diseased implant samples.

In total, 55 patients with 110 diseased and 121 healthy implants were included in the study. The findings of the cluster analyses demonstrated that the associated factor of peri-implantitis can be predicted: the biomechanically associated group showed higher levels of microbiological contamination inside the connection, but the plaque-associated group had a higher level of microbial variety in the peri-implant sulcus. In conclusion, the outcomes of the study proved that it seems fair to say that, while peri-implantitis represents a plaque-induced inflammatory condition, certain local factors might be associated with this biological complication, as they involve plaque retention. Therefore, I would argue that, if further implemented with the associated surgical, prosthetic and biomechanical factors, the disease classifications can help to better target the aetiology.

With new technologies in dental implantology steadily evolving, what significance do you think peri-implantitis will hold for your field of expertise in the future?
I believe that new technologies such as computer-assisted surgery or intraoral scanners and the evolution of abutment and implant surfaces will potentially make our job as clinicians a lot safer. And for patients, being able to plan an entire procedure extraorally without any pressure will result in safer surgical procedures and reduced chair times. At the same time, faster osseointegration periods through newly developed activated surfaces and stronger soft tissue–abutment integration through new rough surfaces for abutments will likely result in implant-supported restorations that are very resistant to bacterial infections, thus, reducing the prevalence of peri-implantitis in the long run.

contact

Dr Luigi Canullo
Via Nizza 46
00198 Rome RM, Italy
Phone: +39 347 6201976
luigicanullo@yahoo.com

Dr Vincent J. Morgan (President of Bicon, left) and Georg Isbaner (Editorial Manager of *implants*).

The logic behind the Bicon SHORT implant

When the Bicon system was first introduced in 1985, its freestanding 8 mm length implants were considered quite short. Since then, the natural progression of Bicon's design philosophy has resulted in 5 mm SHORT implants, all with proven clinical success. Impressively, the design of the Bicon implant system has remained essentially unchanged since it was first conceived in the late 1960s. At the first Giornate Veronesi congress, which celebrated its debut in the Italian village of Valpolicella in April, *implants* spoke with Dr Vincent J. Morgan, Founder and President of the company, about Bicon's early days, its eventual copycats, and what makes its SHORT implant so special.

Dr Morgan, how did you initially become involved with implants?
I never intended to become a medical device entrepreneur. I have only had two intentions throughout my entire professional career: to treat my patients and to support my family. We were very fortunate that we were involved with implants long before most people were. I placed my first implants in 1970, which were Miter blade implants. I placed them in a colleague, who had lost his posterior maxillary teeth. If he were not a colleague, we would have advised the extraction of his anterior maxillary teeth and restoration with a denture. However, being a dentist who had worked with dentures all his life, he knew their disadvantages and resisted the idea of having one himself. We saw a little ad for the Miter dental implant in a throwaway dental magazine. We ordered six of them. We opened the package and, without any instructions, knowledge, or experience—just with common sense—I gave him local anaesthesia and reflected bilateral flaps. I had never cut bone before. I used a fissure bur, made grooves big enough for the implants, put them in and they worked. Beginner's luck, I guess. That was my introduction to implants in 1970.

Could you please elaborate on the history of Bicon?
Between 1970 and the early 1980s, we did not place many implants. However, with the introduction of a

Swiss implant to North America in 1985, there became an increased awareness, and implants became more acceptable. The oral surgeon with whom I worked, Dr Norman J. Shepherd, was a Professor of Oral Surgery at Tufts University in Boston. In those days, Tufts University used a German implant, which was Axel Kirsch's IMZ implant. Thus, we began using it, and before long, we were the largest user of the IMZ implant in the United States. As a result, we placed some 2,500 implants in our little practice between the late 1980s and 1992. In 1992, I started to question the efficacy of screws,

> "I have only had two intentions throughout my entire professional career: to treat my patients and to support my family."

IME abutments, and all of their intra-mobile elements. Dealing with loose and broken screws and IMEs was madness. If you have one or two patients with a broken screw, you simply change the screw. That's not a big deal. When you have 2,500 of these cases, however, you realise that screws are inefficient and foolish. Screws were always a frustrating problem. It became such an issue that a patient once said to Dr Shepherd, "Hey, Shep, I got this figured out: you come in here and drop a few holes in the bone and then you leave Morgan with a broom for the next six months cleaning up after you." That was not far from the truth. The problems with screws just didn't go away. Dr Shepherd went back to Tufts and told Dr Robert Chapman, who was Professor and Chair of the Department of Prosthodontics and Operative Dentistry, that I wanted to quit doing implants. He was concerned since he was personally doing very well placing our implants.

Fortunately, Dr Chapman introduced us to the then Stryker implant, which had been developed by Thomas Driskell. Initially, I did not understand how an implant could function without a screw, but after only a couple of cases, I was amazed by its simplicity and ease of use. However, it took a few years before I truly realised and appreciated the many financial benefits and unmatched clinical capabilities it provided for me and, more importantly, for my patients.

The history of this implant design is quite interesting: Stryker had seen the sales of its drill units increasing and wondered why. When they learned that implants were becoming popular, they charged their engineers to identify the best-engineered implant. Curiously, the engineers from both Stryker and another orthopaedic company, Zimmer, both identified Driskell's implant as having the best design. Although Driskell initially resisted the sale of his implant to Stryker, his financial backers prevailed, and Stryker purchased the Driskell implant. Unfortunately, Stryker did not realise that, unlike the products they sold to purchasing agents at hospitals, implants entailed selling to thousands of individual dentists, who run small businesses. They initially thought it would be like their other products: the company would approach a surgeon, who would choose the device and then the company would discuss the terms with the hospital's purchasing agent. Since dental implants did not fit into Stryker's marketing model of going to purchasing agents, they decided to sell their best-engineered implant.

One night prior to any public announcement that Stryker had decided to sell their implant, we had dinner with Stryker's product manager in Cambridge, Massachusetts. Afterwards, I said to Dr Shepherd that something has to be wrong, because the product manager was not forthright, as we thought he should have been. The next morning, I told a patient, who was the CEO of a large public company, about our meeting the night before and he advised me to call Stryker's Chairman. I called Stryker and asked for John Brown. He didn't call back, but Ronald A. Elenbaas, who was President of six of Stryker's companies at that time, did. He said, "I don't know how you knew that we had issues with our implant business, since there are only three people in the company that knew of our concerns and, for some reason, you figured it out." At a subsequent meeting, he suggested that we buy their implant. And that's exactly what we did. Fools rush in where wise men don't. At the time, their implant was only sold in the US. Today, Bicon is sold in 92 countries. Our largest market outside the

US is China, where sales are phenomenal. China is our fastest-growing market at the moment. It has had significant double-digit growth for twelve or thirteen years. Today, there are Bicon implants in almost every Chinese dental hospital or school.

What distinguishes the Bicon system from other implant systems?
Bicon is totally different from other systems. You have to take your hat off to Driskell because he got it right at the outset. There is logic behind the Bicon design. I was taught by Dominican Friars and I remember one friar telling me, "If it's logical, follow it. If it's not logical, avoid it." There is no logic with threaded implants or screw-retained abutments. Nor is there logic in doing high-speed drilling and generating heat, for example. If you know anything about bone, you know that heat and pressure cause bone necrosis. They destroy bone. Moreover, what are you doing when you do high-speed drilling with irrigation? You are washing away the healing mechanism of the body, which is blood. Driskell was aware of this fact as early as 1968, which is when he started using slow drilling. There are numerous advantages to slow drilling. You can harvest the bone, you have wonderful visibility, you're not running the risk of bone necrosis, your assistant is free from suctioning, and your patient is more comfortable. And yet, for some reason, clinicians today are still using high-speed drilling with an irrigant. There is no logic in it—absolutely none. In fact, to replace internally-irrigated burs which can be sterilised (but never cleaned) is significantly more expensive than Bicon's titanium reamers, which can be used for hundreds of osteotomies.

Moreover, there is no logic in using screws either. Most dental implant screws mathematically cannot work for the tasks they are charged to perform. Manufacturers are asking more of the screw than it can deliver. The IMZ implant, for example, had some 45 threads. In contrast, the screw for the fixed-detachable abutment of the Bicon system has only three. For, when you are attaching metal to metal, you only need three threads. Have a look at your eyeglasses, for example. They probably only have three threads. Holger Zipprich from the dental school of Goethe University in Frankfurt, Germany, has an excellent YouTube presentation in which he states that threaded fasteners have micromovement under function. Where there is micromovement of the threads, then there is also peri-implantitis. Every dentist knows the cause of peri-implantitis, because every dentist knows that if you have a three-unit bridge and it becomes uncemented, it will have micromovement. As a result, the papillae get inflamed and swollen. All you have to do to resolve this issue is to recement the bridge and the gingival tissue will shrink back. Further, is it not hypocrisy for the profession to admonish patients about the deleterious effects of bacteria, not only to their alveoli, but also to their coronary arteries, while placing implants which act as a septic reservoir in their alveoli?

Implant designs have improved significantly over the years, but Bicon's plateau implant design is the same one that was used in 1981. Driskell's Titanodont implant had the same plateaus, with the only difference being that he had the male side of the connection on the implant, and the female side on the abutment. In 1985, he reversed it and put the female on the implant and the male on the abutment for aesthetic reasons. Yet, the implant has remained essentially unchanged since 1981. Shorter is just better. It is far easier to put a thumbtack in the wall than a nail and it is clearly less risky. Why drill 8, 10, 12, or even 20 mm, when a 5 mm implant works? In our clinic in Boston, we only use 5 and 6 mm short implants. Initially, Bicon offered 14 and 11 mm implants, but the 14 mm was discontinued many years ago and the 11 mm is sold minimally. Again, the accepted dogma that longer is better and one should not exceed an implant-to-crown ratio of more than one-to-one has no basis in either nature or mechanical engineering. Nor does it have any basis in dentistry. Every dentist knows that an ankylosed tooth with a minimal length root can support a molar tooth for decades. Longer implants are not logical. If clinicians could avoid drilling close to anatomical structures, such as the inferior alveolar nerve, they would be more relaxed at the end of their workday, and they could enjoy their family more easily.

What are the differences when it comes to healing?
The Bicon SHORT implant works well, because the bone around it is cortical-like, Haversian bone with greater me-

chanical properties than the appositional bone around threaded implants. This scientific fact has been published multiple times over the past fifteen years by Dr Paulo Coelho of New York University College of Dentistry, but, sadly, many academics are still unaware of his work, which emphasizes that the macro-geometry of an implant is the key to its capabilities. Bicon's osteotomy is prepared with slow drilling of 50 RPM, or even slower with hand reamers. The implant is placed into the osteotomy, and without osteoclastic activity, blood forms in its plateaus and turns into cortical-like Haversian bone right from the outset. Whereas, when you screw a threaded implant into bone, you put pressure on the bone. From orthodontics, every dentist knows that if you put pressure on bone, the bone resorbs. Today, everybody talks about primary stability, and yet, when you screw an implant into bone the first thing you get is osteoclastic activity. The bone dies back, away from the threaded implant, and subsequently grows back towards the implant as appositional bone, which is bone without blood vessels. Such appositional bone has totally different mechanical properties than the Haversian bone around Bicon implants, which may be why Bicon SHORT implants work and other short implants do not.

> "…when you are attaching metal to metal, you only need three threads."

What role does marketing play in your overall strategy?
I know that marketing is an extremely important factor for successfully selling an implant. However, our marketing strategy has always been very simple: we tell the truth as we know it. We don't even have sales representatives in the United States. Speaking of marketing, I would argue that marketing has contributed to a great deal of misinformation in dentistry. The entire profession has been hoodwinked by the marketing of large dental implant companies. For example, most people believe that Per-Ingvar Brånemark was the first person to publish a paper on the compatibility of titanium and bone. His 1983 article "Osseointegration and its experimental background" was published in the *Journal of Prosthetic Dentistry*. However, in 1951, Gottlieb S. Leventhal had already published an article titled "Titanium, a metal for surgery" in the *Journal of Bone and Joint Surgery*, a very prestigious orthopaedic journal, where he discussed the same anecdotal story about titanium and bone that was attributed to Brånemark 32 years later. And even before that, in 1940, R.T. Bothe and others had published an article titled "Reaction of bone to multiple metallic implants" in the journal *Surgery, Gynecology and Obstetrics*, in which they reported on a tendency of bone to fuse with titanium. "To fuse" means "to become one", which is the equivalent of the modern term "osseointegration". And yet, the marketing strategy of the implant companies focused solely on Brånemark. It's not that he didn't do great things, but he was clearly not the first. In fact, Driskell marketed his Titanodont implant in 1981.

Apparently, some companies discovered that there's a clever idea behind the Bicon system. As a result, there are copies on the market. What's your take on that?
To be honest, I compliment everyone who has copied the Bicon system, because it means that they have realised that it was well designed and that it has worked for decades. However, Zipprich showed that the clones have a micro-gap under function, which will cause failures. Unfortunately, when the clones or copies fail they may give Bicon a bad name. It's not easy to make a consistently precise and quality-controlled connection. It's not easy to have a male component manufactured in 1985 and the female component manufactured in 2019, and still achieve a locking taper when they are put together. It can look like a Bicon, but is it truly bacterially-sealed like a real Bicon? It's sad to think that a dentist, who is supposed to be providing quality healthcare would take a chance with a clone because of price. That's the truth! Again, it may look like an original, but it clearly is not. The quality of the clones' manufacturing is just unproven and untested. The bacterial seal of Bicon implants has been proven at Boston University; it has also been proven at the Universita di Roma Sapienza. The simple reality that Bicon implants can have bone gain over their interface of the implant to abutment is proof enough of its bacterial seal. The list goes on and on. But, I suppose, it's logical in the end. They want to emulate Bicon's success and capabilities. Small companies try to directly copy and clone our design, while we see the large implant companies slowly adopt features of it over the years—the deep fins and plateaus, the sloping shoulder, and the shorter implants. I guess it's the ultimate compliment. Fortunately for us, they cannot copy the dedication and integrity of Bicon's experienced and gifted individuals throughout our organisation. Our people are responsible for novel research and many innovations, but more importantly for the quality manufacturing and support of many discerning clinicians and their patients throughout the world. There is only one Bicon!

Thank you for the interview.

contact

Bicon
501 Arborway
Boston, MA 02130, USA
Phone: +1 800 8824266
www.bicon.com

Alpha-Bio Tec

NeO—simple, reliable and state-of-the-art

The NeO dental implant system from Alpha-Bio Tec, a leading developer and manufacturer of innovative implants, prosthetics and related products, continues to enjoy global success. NeO quickly gained popularity amongst leading dental professionals for its state-of-the-art technology, reliability and simplicity. The NeO presents a range of advanced design features, including a unique coronal cutting flute, innovative shape of variable threads combined with two microthreads and a patented centering feature of the apical part. The state-of-the-art design enhances the implant's distinct clinical benefits: high and firm primary engagement, reduced pressure on the cortical plate, easy penetration and long-term aesthetic results. With primary stability enhancers matched with bone stress reduction elements, NeO is powerful and, yet, remarkably gentle to the bone. Three connections are available: a standard conical connection for implant diameters of 3.75, 4.2 and 5.0 mm, a narrow conical hex connection for diameters of 3.2 and 3.5 mm and a standard internal hex connection for diameters of 3.75, 4.2 and 5.0 mm. The complete NeO system is compatible with standard prosthetic solutions for screw-retained, cement-retained and digital restorations.

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www.alpha-bio.net

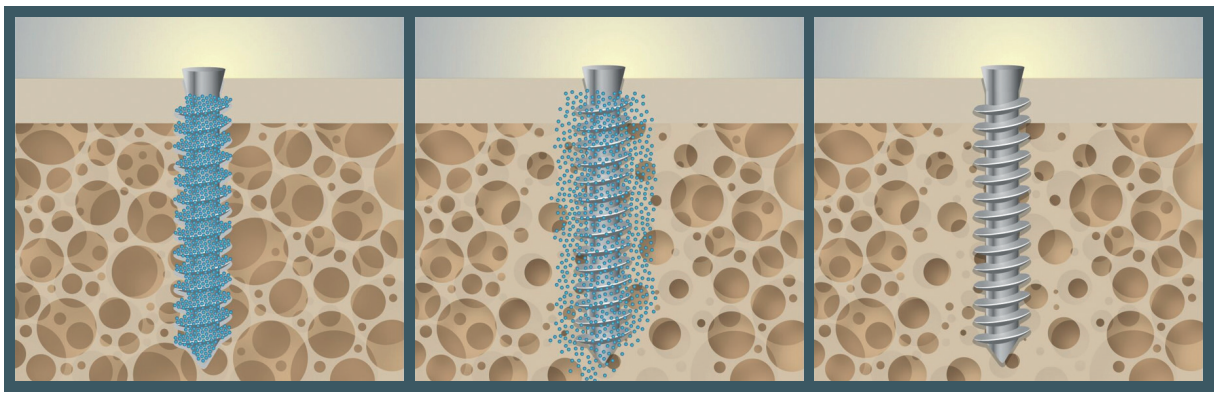
Straumann

BLX implant system now available in Europe

Straumann is now offering its new BLX implant system across Europe. The new implant system fills the gap in the company's premium portfolio and addresses the fully-tapered implant segment, which is the fastest-growing sector, now accounting for one in every four implants placed globally. BLX has been designed for immediacy protocols. It is also an appropriate solution for all other treatment protocols—from immediate to conventional placement and loading. The intelligent implant concept allows for Straumann Dynamic Bone Management and is designed to achieve predictable results in all bone types. "Short and reliable protocols are a common wish of a growing number of patients and dentists. Consequently, Straumann wanted to create a tailor-made answer to these needs that is well above the known standard," said Frank Hemm, Executive Vice President of Marketing and Education at the Straumann Group. BLX combines the high-performance Roxolid metal alloy and a SLActive surface for optimised primary stability. The result is an implant system that offers new levels of confidence—for immediacy and beyond.

Institut Straumann AG
Peter Merian-Weg 12
4002 Basel, Switzerland
www.straumann.com

From left: Marcel Obrecht (Senior Global Product Manager at Straumann) and Frank Hemm (Executive Vice President of Marketing and Education) present the new implant system BLX at IDS 2019.



AddBIO

Zolidd®—a protein multi-layer coating for implants

The Zolidd coating is applied to the implant after its conventional machining and cleaning processes have been completed. The implant is then packaged, labelled, and sterilised, reaching the surgeon in ready-to-use condition. The use of a protein coating ensures that bisphosphonate is available in the local bone environment immediately after implantation. Having a high affinity for bone, the bisphosphonate remains localised to the bone around the implant, strengthening it, and thus, improving implant stability. Better implant stability, in turn, results in better implant function and fewer complication risks. Consisting of nanometre-thin multi-layers, the coating does not interfere with the function of the implant. Every dental implant available on the market can be coated and implantation techniques do not need to be changed when working with Zolidd. Ulf Sewerin, CEO of AddBIO, commented, “Our Zolidd coating facilitates the long-term success of implant restorations by strengthening the bone.”

AddBIO AB
Teknikringen 10
58330 Linköping, Sweden
www.addbio.se

CAMLOG

Reliable high initial stability with new PROGRESSIVE-LINE

For modern implant concepts such as immediate restoration or loading, a reliable high initial stability is mandatory. The current concepts in market for immediacy are mainly niche implants, suitable for specific situations or bone types only. The geometry of the new PROGRESSIVE-LINE implants, however, was developed to be an implant suitable for all indications with predictable results and increased primary stability. Available as CONELOG® implant—a real bone level implant with conical connection and integrated platform switch—or as a CAMLOG® implant for prosthetic ease using the renowned tube-in-tube connection, both options allow to reach high initial stability especially in soft bone. A highly efficient drill protocol offers maximum flexibility to safely place the implant according to the needs of the treatment plan—without requiring additional tools or tap. Well thought-out features make the practitioner feel at ease with all clinical standard treatments but specially assists him in critical clinical situations, for example in the case of limited bone height. The PROGRESSIVE-LINE features down to the apex, making it ideal for immediate implantation. In addition, a coronal anchorage thread allows for improved stability in reduced bone height. Additional features encompass a broadened thread height, and a parallel-walled section for flexibility of the vertical position.

CAMLOG
Biotechnologies GmbH
Margarethenstr. 38
4053 Basel, Switzerland
www.camlog.com

MIS

CONNECT abutment system for a screw-retained solution

MIS has released the versatile CONNECT abutment system, which is suited for multi- or single-unit restorations in both digital and conventional procedures. It can also be used for provisional or final prosthetic restorations. The new abutment system is convenient, easy to use, and has advantages over other screw-retained systems that are currently available. Tali Jacoby, Implants Product Manager at MIS, says about the new CONNECT system: "It is a One Time Abutment, which enables a prosthetic procedure above the connective tissue level, distancing the micromovements from the bone." CONNECT allows for a broader range of screw-retained prosthetics in the aesthetic zone and is suited for one- and two-stage procedures. It supports long-term biological stability by increasing the distance from the bone and providing an ultimate seal. Dr David Norre, who has been using CONNECT since its release, says: "I think the most important reason I use the CONNECT is because I can avoid repeated disruption of the soft tissue, which reduces the risk of bacteria entering the site." This provides his patients with a safe and predictable solution and an aesthetic result.

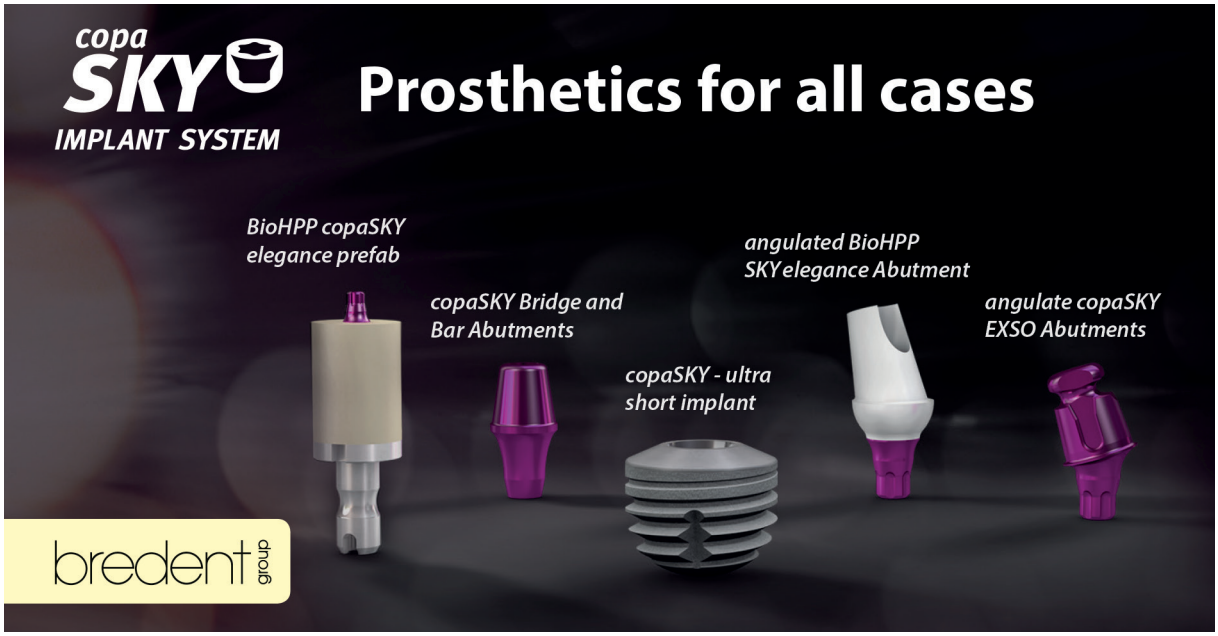
MIS Implants Technologies GmbH
Simeonscarré 2
32423 Minden, Germany
www.mis-implants.com

bredent medical

Ultra-short implant for numerous prosthetic solutions

With new prosthetic components for the ultra-short copaSKY titanium implant, bredent medical offers additional treatment options to patients with reduced bone quantity. The specialist for high-quality prosthetic solutions again relies on the high-performance polymer BioHPP. The ceramic-reinforced material absorbs masticatory forces which would otherwise act directly on the implant. Suited for the digital workflow, prefabricated BioHPP abutments are available in a straight and a 17.5° angled design. The exso ("extended solution") abutment line, in which the impression abutment is also the definitive abutment, allows dentists to work efficiently and cost-effectively. exso allows precise closed impression taking of straight and angled implants with an impression cap. Technicians use exso abutments as definitive abutments after creating the model. In addition to the popular uni.cone line, bredent medical now also offers bridge and bar abutments for the ultra-short copaSKY. These allow to screw bonded bridges directly into the implant—even with divergence compensation of 20°.

bredent medical GmbH & Co. KG
Weißenhorner Straße 2
89250 Senden, Germany
wwww.bredent-medical.com



Nobel Biocare

NobelPearl now available in the USA

Nobel Biocare has received FDA approval to market NobelPearl in the USA. A unique alternative to titanium, the two-piece ceramic implant solution has been designed to support a natural soft-tissue appearance. It is especially beneficial in patients with a thin mucosal biotype. NobelPearl is metal-free and comes with a cement-free internal connection made possible by the innovative VICARBO® screw made of carbon-fibre reinforced polymer. The thread design and tapered implant shape combined with the tapered drill protocol, have been engineered to achieve high primary stability. The hydrophilic sand-blasted and acid-etched ZERAFIL™ surface, combined with a partially machined collar, is further proven to osseointegrate. NobelPearl follows a range of well-established workflows for two-piece implants and is integrated into Nobel Biocare's digital workflow. Clinicians seeking a successful start in ceramic implantology can gain peace-of-mind with this new solution.

Nobel Biocare Services AG
P.O. Box
8058 Zurich, Switzerland
www.nobelbiocare.com

TBR Dental

Graftek® Neo: the new partner of bone regeneration

Graftek Neo is a synthetic two-phase bone substitute composed of 60 per cent hydroxyapatite (HA) and 40 per cent beta-tricalcium phosphate (β-TCP), with a unique micro- and macroporous structure that closely resembles the architecture of natural human bone. Soluble and resorbable, it gradually dissolves in the body, promoting new bone formation through the release of calcium and phosphate ions. In time, the porous structure is completely infiltrated and replaced with healthy, viable bone. Depending on the case to be treated, Graftek Neo is available in granule and putty versions. Developed to facilitate handling of the product during surgery, Graftek Neo Putty adapts to all forms of grafting sites. It consists of a mixture of biphasic calcium phosphate granules and a hydrogel in a syringe. Graftek Neo Putty preserves the initial shape and volume of the site. It is gradually absorbed to be replaced by vital bone.

TBR Dental Group
24 Impasse René Couzinet
31500 Toulouse, France
www.tbr.dental

Bicon

Implants driven by simplicity

The SHORT Implants line of the US-American company Bicon perfectly embraces their core philosophy of simplicity. When the Bicon system was first introduced in 1985, its implants with lengths of 8 mm were considered quite short in comparison to most other implants, which had lengths of at least 12 to 14 mm or 18 to 20 mm. Since then, the natural progression of Bicon's design philosophy has resulted in 5 and 6.0 mm SHORT Implants, all with proven clinical success.

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Dentsply Sirona Implants

Azento and Acuris—innovations in single tooth solutions

Azento and Acuris help implant dentistry professionals with one of their most common indications—single tooth replacement. These new products are developed around the implant systems Astra Tech Implant System, Ankylos and Xive, which are clinically proven and provide long-term functional and aesthetic solutions for patients worldwide. Azento streamlines the implant planning, purchasing and delivery for single tooth replacement. For clinicians, this custom implant solution increases convenience, seamlessly and efficiently connects with qualified laboratories, and enables excellent results for patients. Acuris redefines fixed retention and represents the best of two worlds: a retention that is removable for the dentist but is fixed for the patient. Acuris is based on a conometric concept that uses friction instead of a screw or cement to secure the crown and the cap to the abutment in the final prosthetic part of the implant treatment. This new solution saves time, improves predictability and ensures high-quality results in the clinic, while improving the workflow in the lab.

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PreXion

High 3D image quality with low radiation exposure

In many of today's 3D-imaging systems high picture quality is usually accompanied by high radiation exposure. Developed specifically for the European and US-American market, the new CBCT system PreXion3D EXPLORER offers the highest possible imaging quality at the lowest possible radiation levels. With a specifically controllable pulse generator, X-ray radiation is only generated when necessary for achieving high imaging quality. The small focal spot of 0.3 mm, as well as a voxel size of only 75 µm allow for an incredibly detailed visualisation of even the finest hard- and soft-tissue structures in Ultra HD. With the 3D analysis function, field of view (FOV) sizes of 50 x 50 mm, 150 x 80 mm and 150 x 160 mm can be generated, offering numerous flexible diagnostic options for oral surgery, implantology, periodontology, endodontics, orthodontics, and general dentistry. The PreXion3D EXPLORER convinces with easy handling and extensive planning programmes, covering the entire range of indications.

PreXion (Europe) GmbH
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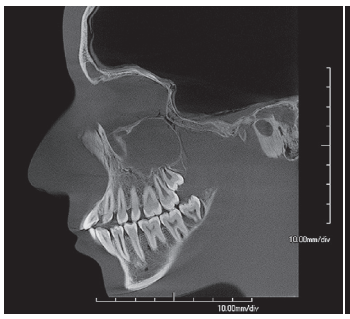
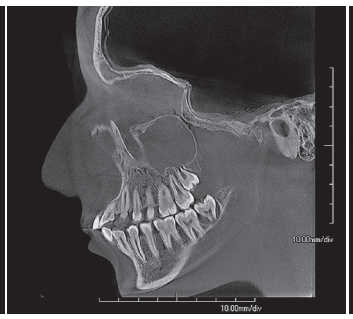
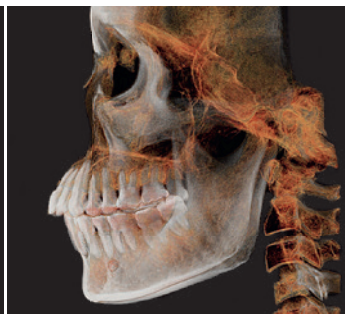
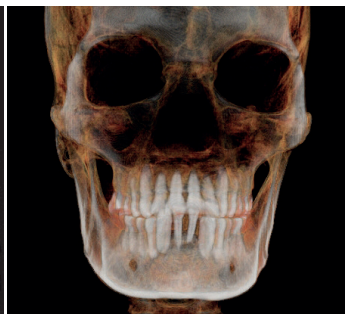
65428 Rüsselsheim, Germany
www.prexion.eu


100 µm voxel size.


75 µm voxel size (PreXion3D EXPLORER).


3D image with a 150 x 160 mm field of view.



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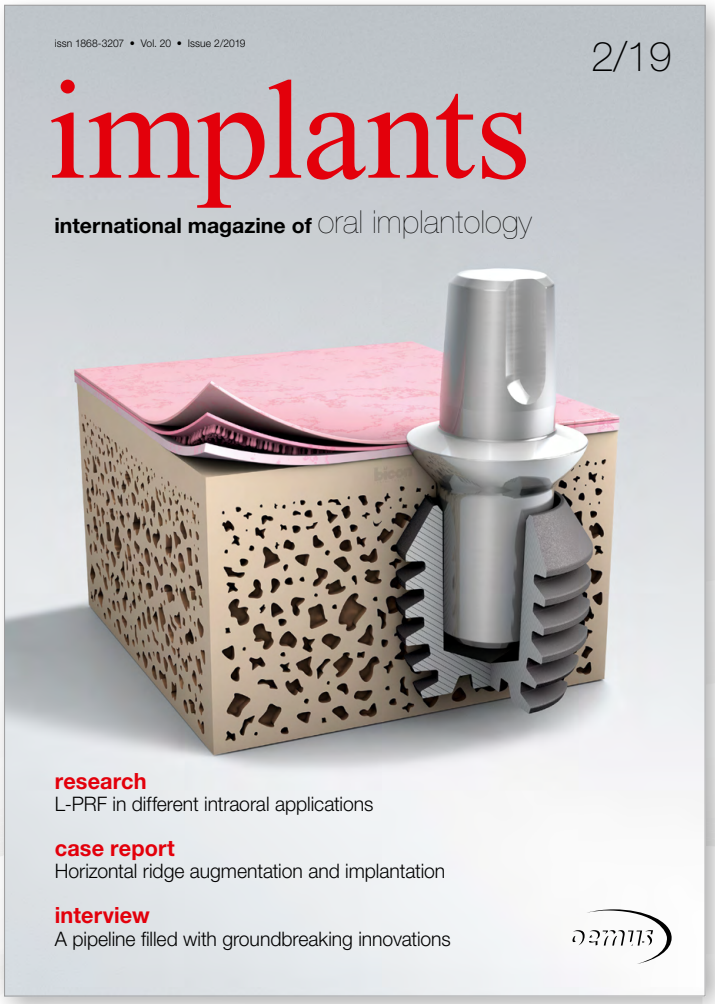

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Fig. 1

Fig. 2

Fig. 1: Prof. Pier Francesco Nocini giving his opening lecture at the University of Verona on Friday morning. **Fig. 2:** At the table clinics, participants had the chance to gain insight into 15 different dental topics.

The city of love as backdrop for a successful German–Italian congress

On Friday, 3 May 2019, the first edition of Giornate Veronesi was held in Verona in Italy. The city of love, where the story of Romeo and Juliet is set, served as a backdrop for the German–Italian congress on implantology and general dentistry. With over 200 participants, the two-day congress turned out to be a huge success. Prof. Pier Francesco Nocini, Professor of Maxillofacial Surgery at the University of Verona, opened the congress programme on Friday morning, comprising five lectures given at the University of Verona. In his opening lecture, Prof. Nocini discussed the possibilities of modern oral rehabilitation of the edentulous, atrophied maxilla using Zygoma implants. With the aid of impressive case studies, Nocini demonstrated how long-lasting implant-retained prosthetic reconstructions can be achieved in this borderline area of maxillofacial surgery. Dr Harald Hüskens then spoke about safe and predictable protocols for immediate implant treatment and osseous deficits. Prof. Mauro Labanca pointed out the importance of different suturing techniques in soft-tissue surgery. Dr Vincent J. Morgan presented a novel, metal-free and flexible CAD/CAM material for superstructures, which is also suitable for full prosthetics with short implants.

On Friday afternoon, the two-day training event, organised by the University of Verona and the German specialist publisher OEMUS MEDIA, resumed its programme in the congress resort VILLA QUARANTA in Valpolicella, just a few minutes outside of Verona. The live broadcast of a surgery from Switzerland on the topic “External sinus lift with a sinus implant without secondary materials” and the subsequent three-stage table clinics on 15 different dental topics on Friday were considered by many definite highlights. On Saturday, participants again experienced a scientific programme filled with high-grade lectures. Prof. Giorgio Lombardo from the Department of Periodontal Surgery at the University of Verona played a key role in organising and setting up the conference. As part of his programme for his German colleagues, he gave a lecture on the possibilities of minimally-invasive implantology using short implants. By means of numerous case studies, Lombardo discussed how short implants can also be used for the long-term treatment of extreme atrophic situations. Prof. Mauro Marincola from Rome in Italy and Prof. Mauro Labanca from Milan in Italy each showcased in their presentations that a relevant discussion about meaningful concepts in modern implantology and oral surgery mustn’t be led without Italian participation.

Their colleagues from Germany, Austria and Switzerland also contributed to the high level of further training at the congress. The presentations by Dr Karl Ulrich Volz on “Bone growing implants—bone augmentation with ceramic implants without secondary materials” and by Dr Dominik Nischwitz on “Vitamin D3 and other important micronutrients as a prerequisite of success for the osseointegration of ceramic implants” were followed by the audience with great interest. Dr Caroline Stolzer from UKE Hamburg in Germany compared the immune response of titanium implants and ceramic implants in her presentation. She emphasised the fact that there are indicators calling for the use of metal-free implant resto-

Fig. 3: On Friday afternoon, the congress continued its programme at VILLA QUARANTA in Valpolicella. **Fig. 4:** From left: Jürgen Isbaner (Board member of the OEMUS MEDIA AG), Prof. Giorgio Lombardo (Verona, Italy), Prof. Mauro Marincola (Rome, Italy).

rations. Apart from that, the lectures of Profs. Georg-H. Nentwig and Frank Palm on "Smart Repair—recontouring vestibular deficits after implantation with in situ curable biomaterial" and "New aspects in bone regeneration—is autologous transplantation still in fashion?", respectively, highlighted different clinical approaches to the topic of active bone and soft-tissue management. Furthermore, Dr Armin Nedjat discussed direct internal sinus lifts in his lecture. In addition to the podiums concerned with oral surgery, there were numerous presentations on general dentistry. In addition, entire practice teams from Germany and Italy travelled to the congress to be able to attend the hygiene course for the dental staff. As scientific director of the congress programme on general dentistry, Prof. Nicole B. Arweiler of the University of Marburg in Germany gave two dedicated lectures. In her first lecture, she spoke about modern mechanical biofilm management, which should be thorough but also gentle. Her second lecture was then concerned with the topic "Antibacterial oral hygiene products—what, when and how".

Profs. Ralf Smeets and Christian Gernhardt also delivered highly scientific and entertaining lectures from their respective disciplines. Prof. Smeets gave a comprehensive update on the topics "What do we know about soft tissue management? What works and what doesn't?" and "After dental extraction—what do we do? Socket Preservation, Socket Seal Surgery, Socket Shield Technique? When do we implant?" In numerous indications, immediate implant placement is considered the method of choice in order to preserve the alveolus and the surrounding soft tissue after dental extraction. In his lecture "Endodontics versus implantology—chances of tooth preservation", Prof. Christian Gernhardt argued that it should always be thoroughly assessed, how long endodontically striking teeth can be preserved—even if only for a few more years. A dentist should always keep an eye on the entire life of a patient and is thus advised to delay implantological measures as long as possible. Last but not least, Prof. Angelo Trödhan discussed the current state of diagnostics and digital planning possibilities and argued that modern imaging technologies, such as CBCT systems, can help avoiding pre-surgical complications.

At the congress venue VILLA QUARANTA, congress participants could enjoy special Italian delicacies in a pleasant atmosphere not only during the breaks of the scientific programme, but at the two evening events on the grounds of Tomasi family vineyard as well. The second edition of Giornate Veronesi will be held, once again, in VILLA QUARANTA on 1 and 2 May 2020.

contact

OEMUS MEDIA AG
Holbeinstraße 29
04229 Leipzig, Germany
Phone: +49 341 48474-308
event@oemus-media.de
www.giornate-veronesi.info

VISIONS IN IMPLANTOLOGY

2ND FUTURE CONGRESS FOR DENTAL IMPLANTOLOGY

Perio-Implantology: Implants, Bone & Tissue— Where are we today and where are we headed?

According the motto "Visions in Implantology", the German Association of Dental Implantology (DGZI) hosted their 48th International Annual Congress in 2018. The Düsseldorf event, which was held as "Future Congress in Dental Implantology" for the first time, turned out to be a great success.

The 250 dentists and the 120 practice employees attending the event experienced a congress that provided answers to topical issues and that pointed out new ways regarding the interaction between participants, speakers and the industry. This inherent high and new standard of content was also reflected in a completely fresh organisational concept, which will also serve as the bedrock of the 2nd DGZI Future Congress in Dental Implantology, to be held **in Munich from 4 to 5 October 2019**.

The overriding aim of the congress will be to provide top-notch practical education on the highest level and to bridge the gap between the latest scientific findings and industry innovations, with a view to the integration into the daily clinical practice of the latter. To sharpen its profile as practical and application-oriented event, the congress will no longer be split into separate speaking stages, workshops and side programmes. Instead, it will be divided into a so-called industry day on Friday featuring strategy talks, transmissions of live operations and table clinics, as well as a science-oriented Saturday. This setup guarantees that individual demands—especially from implantologists—will be met and satisfied. By using modern tools such as the Future Podium, innovative presentation techniques, an internet-based digital poster presentation, interactive solutions or a catering concept based on "flying services", the event will resemble a congress trade fair. Without there being considerable breaks between lectures, live surgeries and table clinics anymore, participants, speakers and industry representatives will be given significantly more time and space for communication.

DGZI
Deutsche Gesellschaft für Zahnärztliche Implantologie e.V.

ONLINE REGISTRATION/
CONGRESS PROGRAMME

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Charlotte Stilwell voted ITI President-elect

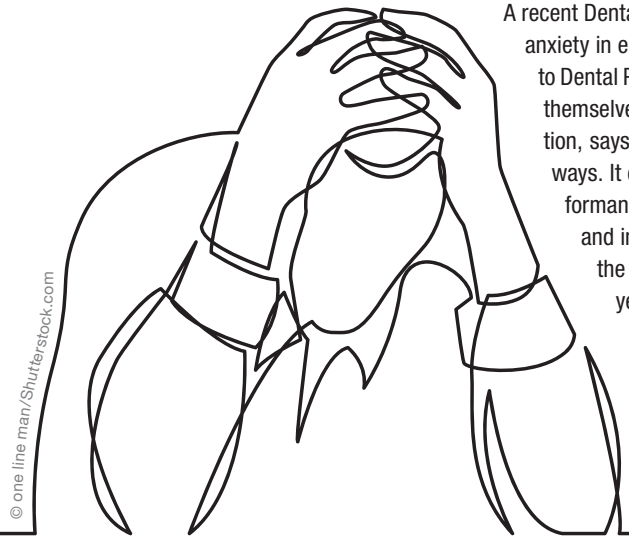
At 2019 Annual General Meeting

On 13 April 2019, Charlotte Stilwell was announced new President-elect of the International Team for Implantology (ITI) at their 2019 Annual General Meeting in Berlin. Taking over the position from Stephen T. Chen, she will start holding the Chair in 2021. Charlotte Stilwell is specialised in prosthetics and works in her London-based referral practice. She is one of the founding members of the Women's Implantology Network (WIN). Over the last decade, she has contributed significantly to the success of the ITI on an international level by playing a key role in setting up the ITI Online Academy, as well as the ITI curriculum. An online version of the latter was launched in February under the name ITI Online Curriculum Foundation level. The course provides for proficiency in the basic principles and science of implant dentistry. At this year's Annual General Meeting, the association also announced the establishment of sections in India and Russia. With these new additions, the ITI now has 30 sections worldwide.

Source: ZWP online

Fear of being sued to cause

Stress and anxiety among dentists



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A recent Dental Protection survey found that the fear of being sued causes stress and anxiety in eight out of ten dental professionals, dentistry.co.uk reported. According to Dental Protection, healthcare professionals often don't seek help when they find themselves in such circumstances. Raj Rattan, dental director at Dental Protection, says: "Stress can impact on a dentist's health and practice in a number of ways. It can affect confidence, clinical judgement, morale and even lead to performance issues. Research confirms that high stress levels affect performance and increase the potential for adverse outcomes of error." The publication of the findings coincides with Stress Awareness Month, which is held every year in April to increase awareness about the causes and cures for stress. The Mental Health Foundation claims 74 per cent of adults felt stressed at some point over the last year to such an extent that they felt unable to cope. Dental Protection offers a counselling service for members experiencing stress due to receiving complaints from patients.

Source: dentistry.co.uk

Applications still open for

DGZI Implant Dentistry Award 2019

Once again, DGZI presents its Implant Dentistry Award (IDA). At the 2nd Future Congress for Dental Implantology, which will be held on 4 and 5 October 2019 in Munich, Germany, academic works will be presented as part of the digital poster presentation programme. The Implant Dentistry Award is the highest sign of recognition for scientific achievement by the DGZI and is endowed with 5,000 Euro. This October, the both nationally and internationally advertised prizes will be awarded by a jury of experts appointed by the DGZI Board after all posters have been reviewed. Accepted formats are original papers published in an international journal, as well as habilitation theses, dissertations and other scientific papers on the subject of dental implantology. The works can either be written by a single author or by a group of authors. The last date for submitting applications is 30 June 2019. Further information on the participating conditions can be obtained via e-mail at sekretariat@dgzi-info.de.

DGZI
Deutsche Gesellschaft für Zahnärztliche Implantologie e.V.

Source: DGZI

Brexit reason for imminent

Shortage of dentists in the UK

According to a recently published report from the General Dental Council (GDC), it is possible that there will be a shortage of dentists in the UK in the near future. The report states that almost a third of dentists from Europe are considering leaving the UK in the next few years. More than eight in ten of those intending to leave blame uncertainty over Brexit arrangements as a significant factor. "Exploring the intentions of people who are currently able to work in UK healthcare because their qualifications are recognised under EU legislation is essential," head of regulatory intelligence at the GDC, David Teeman, said. "This research was undertaken before important issues have been resolved, such as recognition of qualifications, residency rights and access to the UK for existing and prospective dental professionals. Once these issues are settled, we are planning a further round of research." The survey also found that 84 per cent of respondents believe Brexit is leading to a shortage of healthcare workers and 75 per cent of people believe it is leading to a shortage of dental professionals.

Source: dentistry.co.uk

Tooth Enamel of panda bears

Inspiration for dental prostheses

Pandas spend more than 12 hours a day eating, approximately eating 30 kilograms of bamboo. The bears have developed an intelligent protective mechanism to counter the threat of tooth wear. Researchers at the Institute of Metal Research Institute of the Chinese Academy of Science, Lanzhou University of Technology and the University of California, Berkeley found that the panda's tooth enamel recover its structure and geometry at nano- to micro-scale dimensions autonomously after deformation to counteract the early stage of damage. "[This] property results from the unique architecture of tooth enamel, specifically the vertical alignment of nano-scale mineral fibres and micro-scale prisms within a water-responsive organic-rich matrix," explains first author Zengqian Liu. Owing to the viscoelasticity of this matrix, water absorption is promoted, which contributes significantly to regeneration. The team is hoping to develop tooth enamel-inspired self-recoverable durable materials by introducing shape-memory polymers at the interfaces of ceramics.

Source: materialstoday

Congresses, courses and symposia

Nobel Biocare Global Symposium

27–29 June 2019
Venue: Madrid, Spain
www.nobelbiocare.com

EAO Congress 2019

26–28 September 2019
Venue: Lisbon, Portugal
www.eao.org

49th DGZI International Annual Congress— Visions in Implantology

4–5 October 2019
Venue: Munich, Germany
www.dgzi-jahreskongress.de

Giornate Veronesi

1–2 May 2020
Venue: Verona, Italy
www.giornate-veronesi.info

6th Annual Meeting of ISMI

8–9 May 2020
Venue: Berlin, Germany
www.ismi-meeting.com

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

CEO
Ingolf Döbbecke
doebbecke@oemus-media.de

Members of the Board
Jürgen Isbaner
isbaner@oemus-media.de

Lutz V. Hiller
hiller@oemus-media.de

Chief Editorial Manager
Dr Torsten Hartmann
(V. i. S. d. P.)
hartmann@dentalnet.de

Editorial Council
Dr Rolf Vollmer
info.vollmer@t-online.de

Dr Georg Bach
doc.bach@t-online.de

Dr Suheil Boutros
SMBoutros@aol.com

Editorial Office
Georg Isbaner
g.isbaner@oemus-media.de

Johannes Liebsch
j.liebsch@oemus-media.de

Executive Producer
Gernot Meyer
meyer@oemus-media.de

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

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

Designer
Sandra Ehnert
s.ehnert@oemus-media.de

Theresa Weise
t.weise@oemus-media.de

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

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Holbeinstraße 29
04229 Leipzig, Germany
Tel.: +49 341 48474-0
Fax: +49 341 48474-290
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DGZI
DGZI Central Office
Paulusstraße 1
40237 Düsseldorf, Germany
Tel.: +49 211 16970-77
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