issn 1868-3207 • Vol. 19 • Issue 4/2018

4/18

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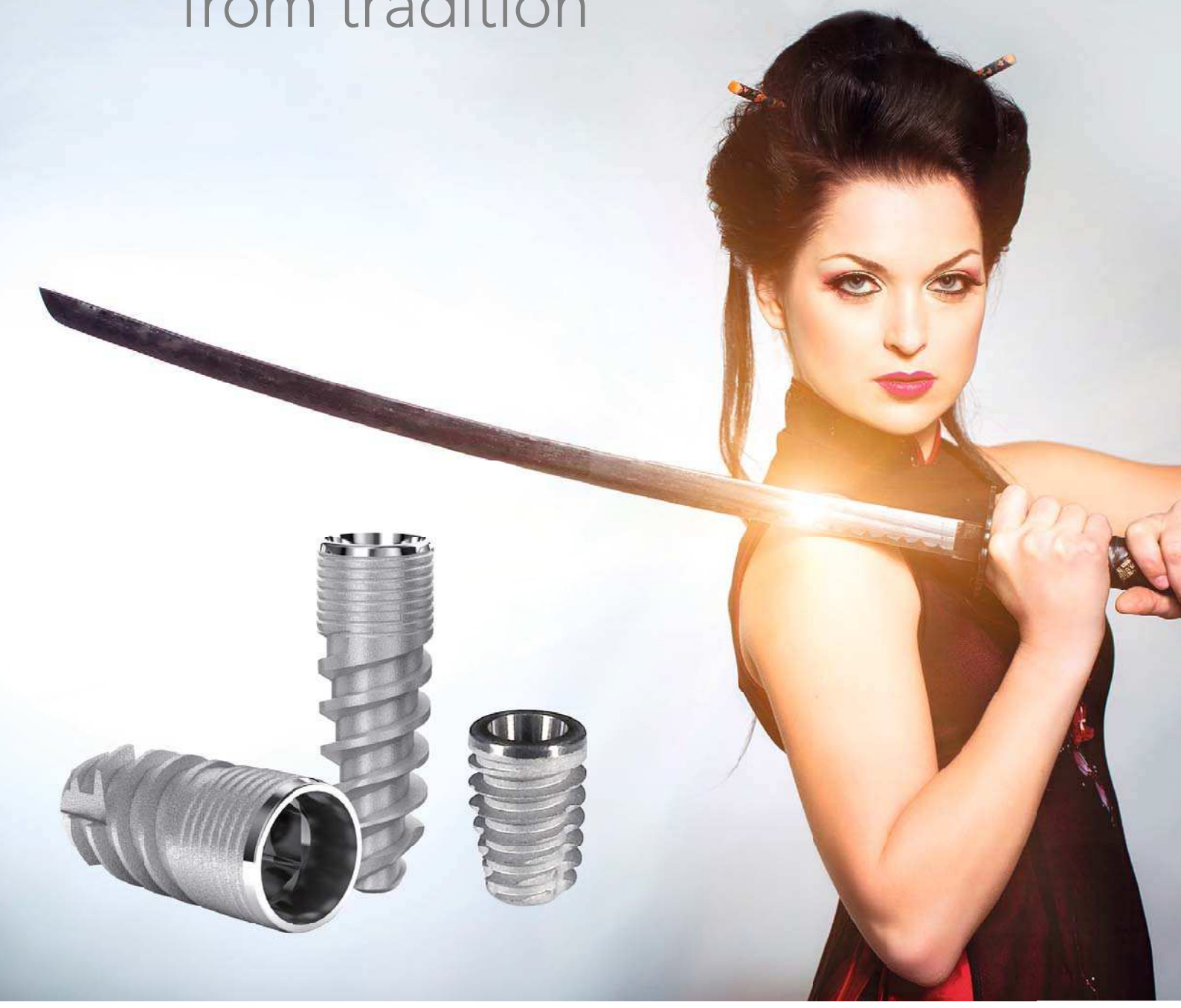

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Dr Rolf Vollmer

First Vice President and Treasurer of DGZI

We are ready for the future

Dear colleagues,

Our last Annual Congress, which took place under the motto “Visions in Implantology”, has shown that there is an ongoing development and significant progress in the field of dental implantology, in particular when it comes to digitalisation. For instance, the accuracy of bone-supported drill templates is constantly improving, whereas the amount of planning deviations is decreasing. Yet, we would be well advised to maintain a critical stance towards our own ambitions. In addition, we should always reassess the large amount of available information, obtained through modern radiology for example, in a critical and realistic fashion. The number of medical mistreatment cases does not decrease as a mere consequence of having a large amount of information and scientific data at our disposal and it would be unwise to believe that. Specialists working in the field of dental implantology, as well as courts are currently dealing with an increasing number of malpractice cases and bad treatment results, which is obviously a global issue. A couple of years ago, Dr Dennis Tarnow complained about the fact that sixty per cent of his new patients, already having implants, were attending his clinic to receive follow-up treatments. It is not without reason that we are facing an increasing number of patients suffering from peri-implantitis today.

So-called peri-implantitis classifications are being introduced at the moment and respective new treatment methods are being proposed by the various scientific associations. Our colleagues who are working in this field deserve the highest praise and our utmost respect. Let’s have a closer look at various cases that are being published.

I personally believe that many cases of peri-implantitis are home-grown or lie within the responsibility of the implantologists. To show all of these different cases in their entirety would go far beyond the scope of this editorial, so let’s just name some of the main causes of peri-implantitis: risky implantations in regions with low bone volume, disregard of both the periodontal conditions and underlying general illnesses, disregard of the therapeutic indication or inaccurate positioning, disregard of already established principles and guidelines, inadequate prosthetic care, remaining excess cement, and insufficient education of the implantologist, only to name a few. With regard to aetiology, there are no statistically significant studies yet, and thus further research is urgently needed.

Please consider that there is no technology capable of replacing the human brain and of considering all the vital factors that are necessary to achieve the best possible treatment results for our patients. The fact remains that medical mistreatment has to be avoided by all possible means. In addition, I would argue that a good medical education is the key to preventing mistakes and thus the key to success.

There is a new DGZI educational programme for the entire practice team, which is about to be launched. It features a modern training for dental technicians and can be requested at our office in Düsseldorf, Germany. We will be happy to provide you with personal advice and to forward special requests to the respective heads of department.

With this in mind, I remain with best regards and wish you a Merry Christmas and a peaceful new year.

Yours,

Dr Rolf Vollmer


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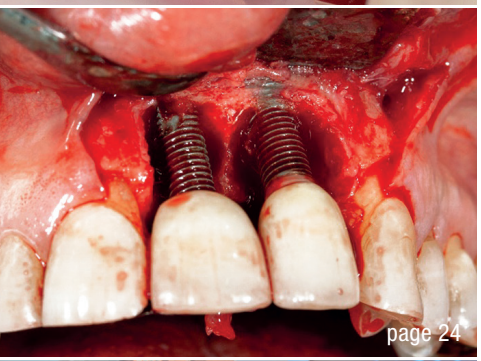
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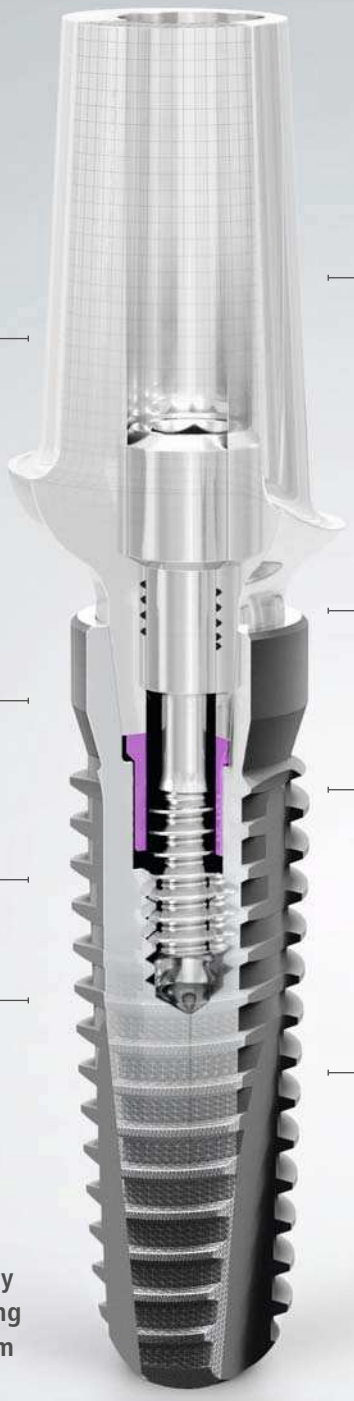

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Dental extraction: What else?

Prof. Mauro Labanca, Dr Ernesto Amosso, Dr Giuseppe Galvagna & Prof. Luigi F. Rodella, Italy

The decision-making process leading to a dental extraction has changed a great deal in the history of dentistry. We have moved from the concept of elimination of the infective source to one of bone preservation and regeneration of the alveolus. With the advent of modern drugs and the collaboration between different medical specialties, today we can consider extraction to be a totally safe procedure for the patient,[1] even though it should be deferred as much as possible in favour of the increasingly advanced techniques of restoration, recovery or regeneration.

When, unfortunately for the patient, extraction is indicated, how is this situation managed? And what is the decision tree to which we can refer today? This type of therapy, which is often under-estimated but of relevance to every single dental specialty, and especially important for general practitioners, is too little considered but is of great importance for the patient in the present and the future (Fig. 1).

Anaesthesia

Anaesthesia is the initial phase of any dental treatment. Often poorly evaluated by the operator, it plays a key role—for more than only clinical reasons—in ensuring greater compliance on the part of the patient. The patient will, in fact, judge the work of his or her dentist almost exclusively on the basis of the pain suffered: first in the

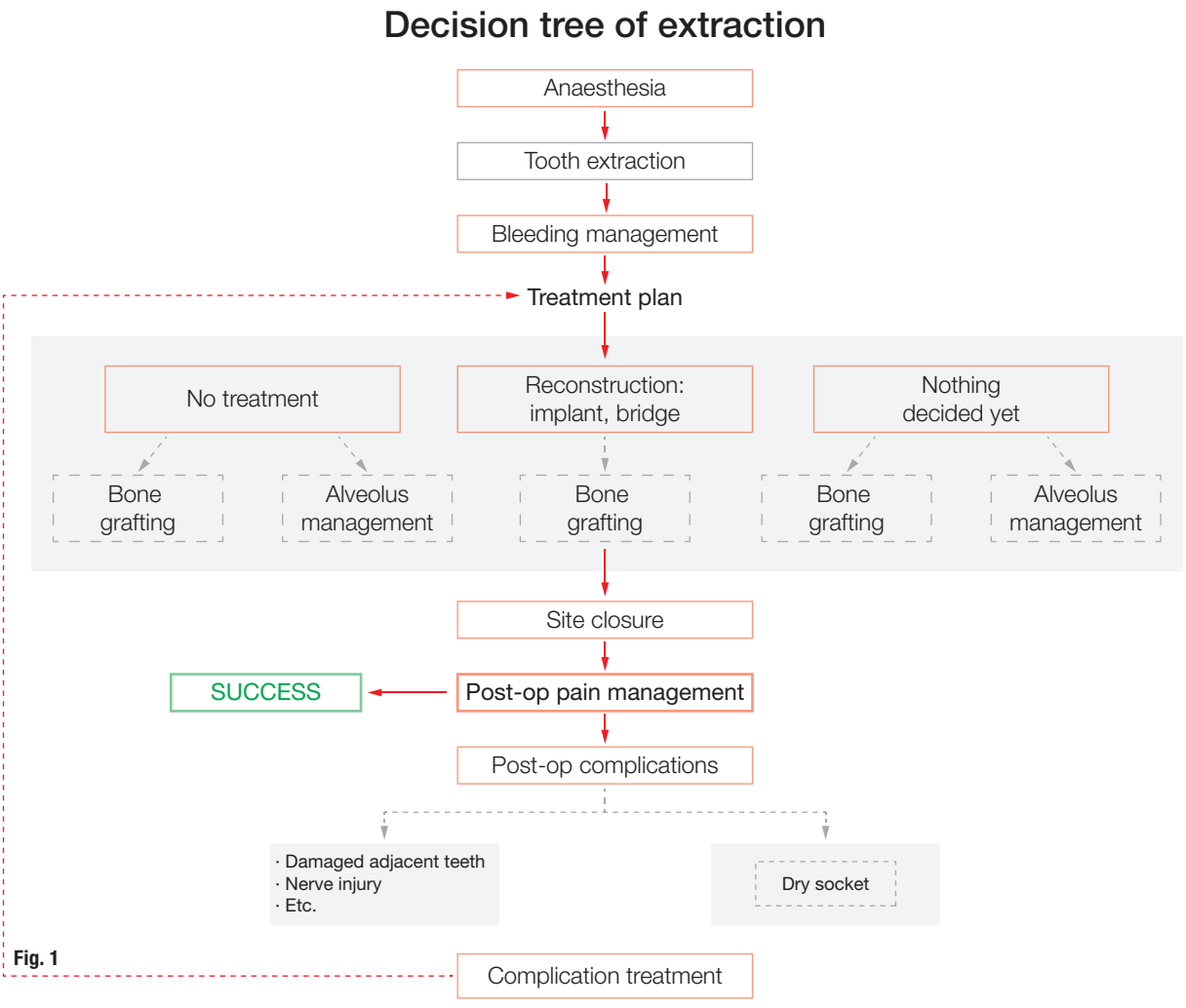

Fig. 1

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injection phase, then with regard to the pain felt during the operation and perceived after any type of treatment.

It is, therefore, essential that a topical anaesthetic is used to make the injection phase as least unpleasant as possible and that the injection is performed by applying the right pressure, so as not to overstretch the tissue (a cause of pain in itself) and in the right anatomical site (Figs. 2 & 3). Moreover, the recommended injection time is 1 ml/minute. Nevertheless, 84 per cent of dentists inject 1.8 ml in 20 seconds or less.[2] A compound suitable for the planned intervention must be used in terms of duration of its action and, therefore, of effectiveness, paying attention also to the quantity of vasoconstrictor present and the overall patient condition.

As far as the compound to be used is concerned, the absorption time and the duration time must, of course, always be carefully considered, and this must not be arbitrary, but linked to the type of extraction planned, in order to always have the most adequate pain coverage not only during the operation but also in the immediate postoperative period.

Articaine is one of the most recently developed local anaesthetic drugs available to dentists worldwide and the most widely used local anaesthetic in Europe. Articaine is closer to physiological pH and therefore its onset is quicker. Owing to its higher lipo-solubility, articaine is a potent dental anaesthesia molecule, and it has a longer duration than lidocaine owing to its higher protein binding. Being both an amide and an ester, its degradation starts as soon as it reaches the bloodstream, its metabolism is quicker and, therefore, it is safer to use. It has the lowest systemic toxicity, which is why it can also be used during pregnancy.

Lidocaine is one of the most widely used anaesthetics even though there are several other compounds of comparable efficacy; these drugs differ in terms of pharmacokinetic parameters.

For long procedures, bupivacaine is the most logical choice for its long anaesthetic duration in soft tissue, although, according to some studies, it is also the most painful during injection.[3–6]

It should be remembered that the presence of a vasoconstrictor is often fundamental not only for good control of haemostasis, but also and above all to antagonise the vasodilatory effect induced by any local anaesthetic. Inadequate use of the vasoconstrictor can make a simple extraction complex if the haemostatic effect is not induced. Indeed, the administration of a high concentration of vasoconstrictor (with the local anaesthetic) if used in an inappropriate manner (for example with an intraligamentous procedure) can create severe complications. For instance, that might contribute to the onset of dry socket, which could possibly result from an excessive vasoconstriction induced in the area of the intervention along with other possible factors.

Extraction and management of the alveolus

After having carried out adequate anaesthesia, the tooth or root can be extracted as planned. And obviously, as indicated, the dentist's choice regarding the treatment of the post-extraction alveolus will reflect what needs to be done in the site involved in the extraction.

After extraction, dimensional and aesthetic changes to the oral tissue occur. For this reason, it is important to contextualise the procedure (if it is not urgent) within a broader treatment plan.

The reasons for an extraction can be numerous. According to the directives of the Società Italiana di Chirurgia Orale ed Implantare (Italian Society for oral and implant surgery), the indications that lead to the decision to extract a tooth are as follows:

- the presence of ongoing dental caries that has led to a widespread destruction of the dental crown, affecting the gingival margin and making it impossible to recover the element;
- irreversible apical lesions;
- serious periodontal disease with non-reversible alveolar bone loss;
- fractured roots;
- orthodontic treatment;
- dysodontiasis of the third molars;
- management of infectious loci in patients having to undergo radiation therapy;
- immunodepressed patients;
- patients having to undergo treatment with bisphosphonates or anti-coagulants of the latest generation; and
- impacted teeth or continued presence of primary teeth in the mouth.

Once the extraction has been carried out, it will then be possible to opt for:

1. an immediate regenerative treatment;
2. a delayed regenerative treatment; or
3. no treatment.

The preservation of the alveolar process after a dental extraction is recommended to preserve the bone's volume and the soft tissue over it and to simplify the subsequent rehabilitation. It has been widely illustrated in the literature that, every time a dental extraction is carried out, a restructuring of the bone takes place in the site of extraction, leading to a decrease in volume, accompanied by qualitative and quantitative changes that affect the result of a prosthetic rehabilitation, especially if it is the anterior zone that is affected, which is further impacted

by the significant aesthetic changes.[7,8] It should be remembered that, with the extraction of a tooth, the periodontium is eliminated and with it the rich vascular network that characterises it. The supply of blood and lymph is essential for the turnover of the gingival cells and of the periodontal ligament itself, and even if to a lesser extent, it also contributes to the nourishment of that portion of bone close to it. Another determining factor for bone resorption is the surgical technique that is adopted during extraction; indeed, if a full-thickness flap is raised, the blood supply in the external cortex is interrupted, inducing a remodelling of the affected area.

We should stress that the alveolar bone is a structure that is closely linked to dental survival, and it undergoes important changes where the latter is absent. There are numerous studies that show that the greatest reduction in bone volume occurs mainly in the first three months, continuing in lower percentages in the first year after surgery.

In the first six months, the volumetric variation is quantifiable as 3.80 mm in width and 1.24 mm in height, with displacement of the crestal profile by two-thirds with respect to the original position.[7–13]

Based on an analysis of correlation, the vestibular thickness of the bone wall of less than 1 mm has been identified as a critical factor associated with the extent of bone resorption. The thin-walled bone phenotype shows significant bone resorption with mean bone loss of 7.5 mm compared with the thick-walled bone phenotypes, with a predicted loss of 1.0 mm.

Benefits of a bone grafting material

Studies conducted on samples of patients who had to undergo dental extraction have confirmed that the placement of biomaterials in the alveolar site immediately after extraction, compared with the samples where nothing was inserted, showed a significant reduction in the reshaping process, with preservation of the bone volume after healing, validating the concept of ridge preservation.[7–14]

It has been demonstrated in numerous histological studies carried out on different samples of bone taken from sites treated with different types of biomaterials,[15, 16] that beta-tricalcium phosphate is one of the few synthetic materials to be completely resorbable, with no trace remaining one year later in any of the samples examined. Moreover, an improvement of between 6 and 23 per cent was observed in the receiving site compared with the sites treated only with the presence of the coagulum (Figs. 4–12).[13]

Recently, in a systematic review, Ten Heggeler et al. demonstrated that the use of biomaterials in the post-extraction site resulted in alveolar volume preservation

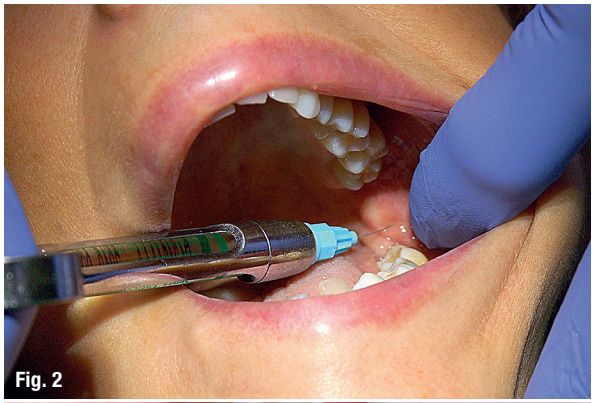
Fig. 2

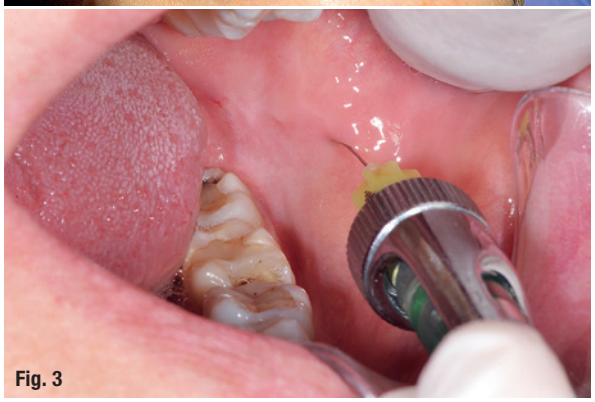
Fig. 3

Fig. 2: Anaesthesia administered to the alveolar inferior nerve. **Fig. 3:** Anaesthesia administered to the buccal nerve.

during healing.[17] It should also be noted that alveolar sites filled only with fibrin sponges do not register any significant improvement.

The technique of preserving the extraction site thus has proved to be effective both in minimising the resorption of the bone tissue and in expanding the bone volume for subsequent treatment with implants.[18, 19]

In some situations, when there is no implant or regenerative intervention planned directly after the extraction, it may be necessary and appropriate to control the haemostasis and the flap closure in an appropriate manner, in order to make the postoperative phase easier and thereby reduce the risk of infection of the site or the onset of dry socket. The control of haemostasis will be important, but at the same time, it will be essential for the dentist to verify at the end of the extraction that there is bleeding in the post-extraction alveolus. In case of a lack of bleeding, the site must be freshened in order to ensure the fundamental blood supply necessary for full healing of the site. A lack of spontaneous bleeding could instead be prodromal to a dry socket.

Bleeding management and collagen sponges

Several risk factors associated with post-extraction dental complications, including age, gender, drugs, ex-

traction site, smoking, poor oral hygiene and dentist experience, are reported in the literature. Some studies have suggested that the use of local antimicrobial, anti-fibrinolytic and anti-inflammatory substances at the post-extraction site minimises postoperative complications.

Excessive and uncontrollable bleeding of the alveolus is one of the most common complications and if not properly treated can lead to severe consequences. In the decision-making process leading to a dental extraction, it is therefore important to evaluate the patient's intake of anti-coagulant and anti-platelet drugs. The procedures to be implemented in these patients are well known, although the risks associated with bleeding are never completely absent.[20]

Beyond the obvious need for appropriate suturing of the flap, it is well known that the insertion of Type I collagen sponges minimises the risk of complications by controlling bleeding, protecting the wound and stabilising the coagulum. Its resorption normally takes place in 10 to 14 days through the action of collagenase and peptidase.[21] Sponges or any other material must be placed carefully in order to prevent excessive compression, which could cause ischemia and trigger a problem in the revascularisation (Figs. 13 & 14).

Post-extraction complications

Even though in most cases extraction is considered a non-major surgical operation, the possibility of more or less significant intra- and postoperative complications, which may be caused by incorrect procedures on the part of the dentist or systemic disease of the patient and which can interfere with the regular healing of the extraction site, should never be under-estimated.

Among the less serious but certainly more annoying complications that can arise after a dental extraction is dry socket. This occurs in very low percentages (one to five per cent of the cases) and is localised mainly in the molar region. The aetio-pathogenesis is caused by an in-

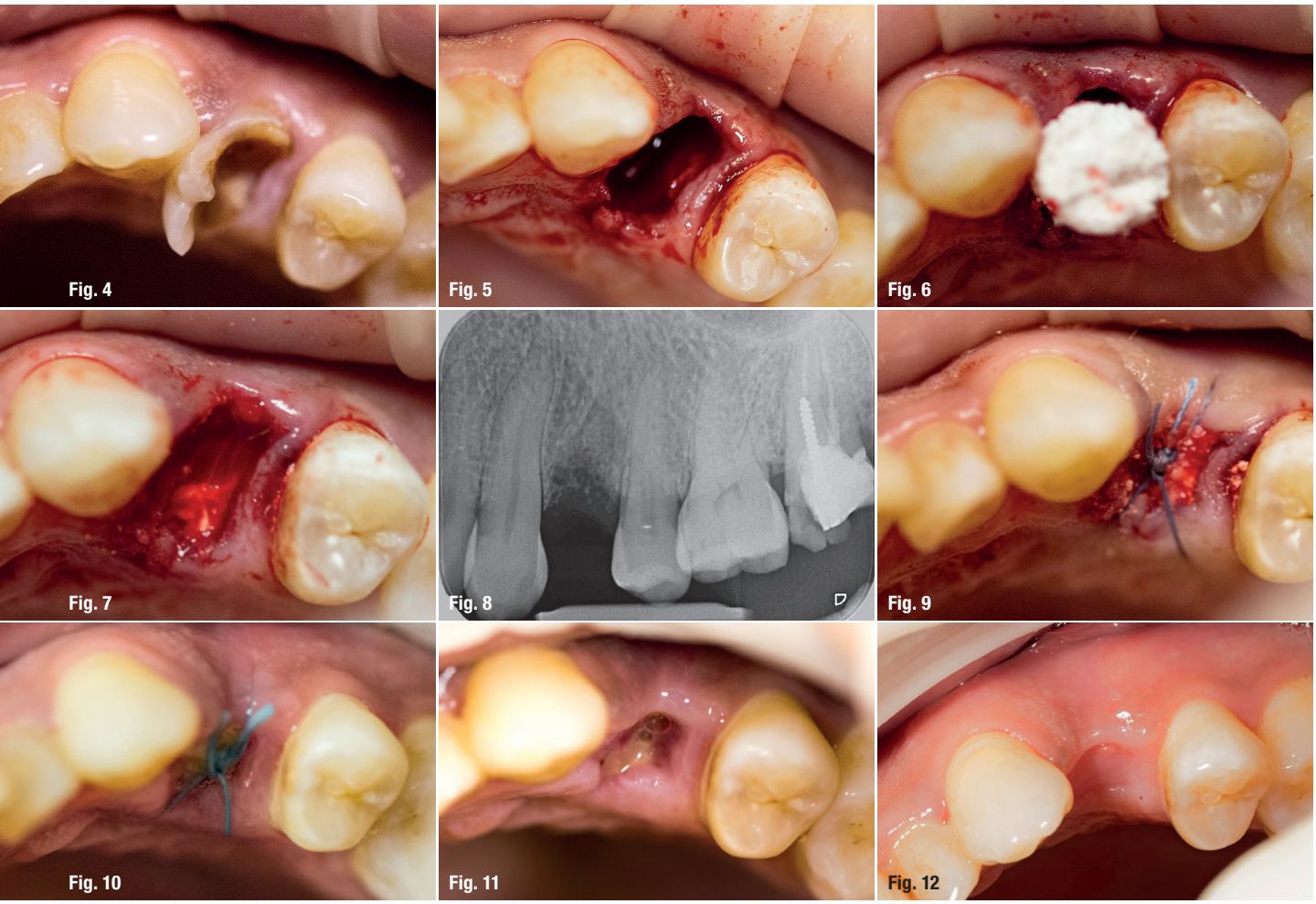

Fig. 4: First case example: fractured tooth #12. **Fig. 5:** Extraction of tooth #12. **Fig. 6:** Placement of biomaterial (R.T.R. Cone, Septodont) into the alveolus. **Fig. 7:** Biomaterial *in situ*. **Fig. 8:** Post-op radiograph showing the biomaterial *in situ*. **Fig. 9:** Post-op suture. **Fig. 10:** Situation after six days. **Fig. 11:** Suture removal after six days. **Fig. 12:** Situation two weeks later: good healing with no interference by the biomaterial.

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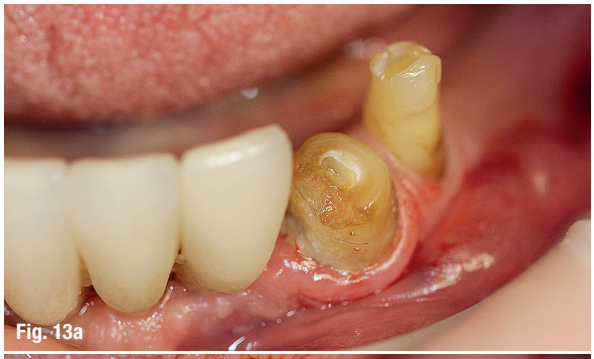
Fig. 13a

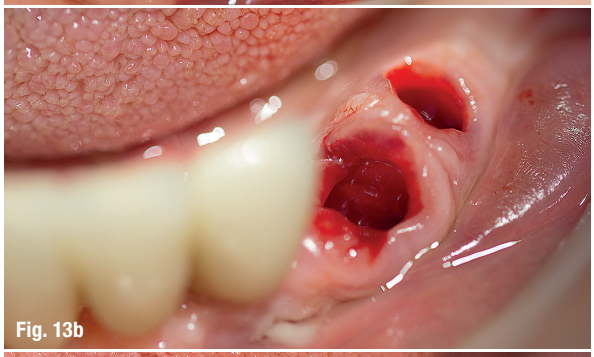
Fig. 13b

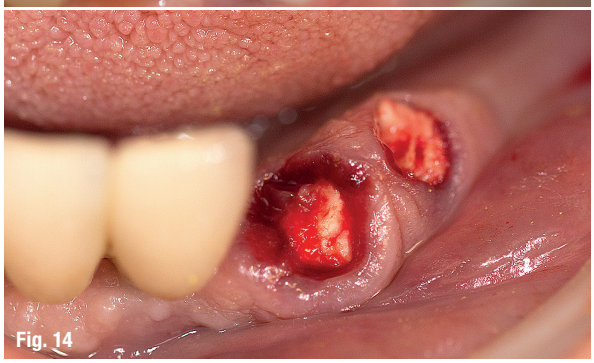
Fig. 14

Figs. 13a & b: Second case example: teeth #33 and 34 were successfully extracted. **Fig. 14:** Haemostatic sponges (Hemocollagene, Septodont) were inserted into the extraction sites.

flammation of the alveolar bone due to a fibrinolysis process triggered by bacterial contamination, itself caused by several factors, such as poor oral hygiene, use of anaesthetics with vasoconstrictors often injected by the intraligamentous technique or the daily use by women of oral contraceptives.

The patient suffering from dry socket often reports excruciating and persistent pain, unresponsive to analgesics and with a peak in symptomatology after three to four days.

A local swelling is always associated with swelling of the local-regional lymph nodes and cutaneous hyperaesthesia, and above all, there is always the presence of halitosis due to the occurrence of malodorous pus.

The gingiva around the alveolus is relatively swollen with a smooth and shiny appearance. In severe cases, the presence of a white or greyish pus secretion can be observed within the alveolus.

A study conducted by Poveda-Roda et al. showed that, in the case of dry socket, between 43 and 96 per cent of cases reveal the presence of viridans streptococci, which is very dangerous, especially for patients with bacterial or immunosuppressed endocarditis.[22]

A common practice to prevent the onset of dry socket, especially when treating patients with diseases that may interfere with the normal healing process, entails suturing the edges of the wound or inserting active ingredients into the post-extraction alveolus to reduce the risk of postoperative infections. It is widely documented in the literature, that before carrying out any surgical procedure, the asepsis of the operating area and the instruments used should be strictly respected, if necessary undertaking a preliminary decontamination of the oral cavity with 0.2 % chlorhexidine.[23]

In the case of dry socket, Syrjänen and Syrjänen describe the local use of a small dose of Alveogyl, which, owing to the presence of Penghawar fibres, produces a soothing effect on the tissue.[24] In the nineteenth century, these fibres, obtained from the fine soft down of certain ferns, were already being used for their haemostatic effect, producing a discreet result.[25] It is also advisable to use chlorhexidine gluconate sponges for a week, after careful alveolar curettage.[26]

Conclusion

Dental extraction has always been considered as a simple, carefree and minimal procedure. Nevertheless, this is an important procedure from the patient's point of view and from the clinical perspective. It is relevant to all categories of dentists independent of their specialties and always needs to be properly planned, in order to avoid risks and to obtain the expected results for a proper future rehabilitation. Today's patients expect this approach from dentists, and they deserve it.

Literature

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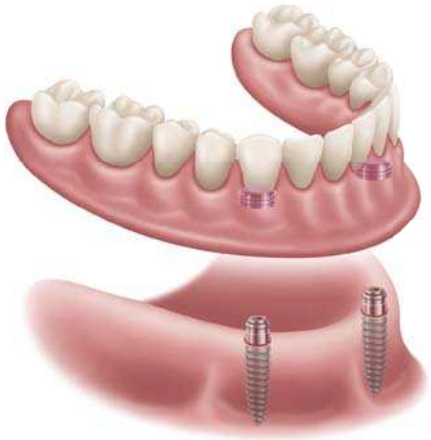

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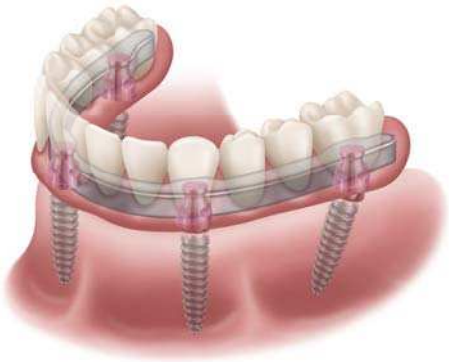

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Prevention 0: The best way to prevent peri-implant disease?

Prof Magda Mensi, Timothy Ives & Dr Gianluca Garzetti, Italy

The philosophy of prevention in all medical professions is increasing from a global perspective. In fact, prevention of chronic non-communicable diseases, the major burden of illness and disability in almost all countries in the world, has been strengthened in recent years.[1] The motivation is to ensure a better quality of life for people and to reduce public health expenditures.

In dentistry, periodontitis is one of the major chronic non-communicable diseases. World experts in periodontics and science have published several principles regarding the prevention of periodontal diseases.[2]

Peri-implantitis is a twenty-first-century version of periodontitis and increasing in occurrence as implant placement is increasing (Figs. 1–3). Like periodontitis, it is a biofilm-associated pathological condition, but instead of affecting periodontal ligaments and bone, it is characterised by inflammation in the peri-implant mucosa and subsequent progressive loss of supporting bone.[3] The main reasons for concerns in this area are an aetiology in which several risk factors can play a determining role[4] and a lack of a gold standard therapy. Primary and secondary preventative measures are really important to prevent mucositis and peri-implantitis and to avoid recurrences, but there are many details to consider before placing implants to mitigate iatrogenic problems. There are many different prosthetic solutions besides implants that dental professionals could propose to patients if consideration is given from the beginning to the entire situation. Implants may not always be in the best interest of the patient.

For these reasons, every clinician, before placing an implant, should consider not only patient- and site-specific aspects, but also surgeon, prosthodontist, dental hygienist and dental technician skills in order to minimise the possibility of peri-implantitis in the future.

The following should be considered before primary and secondary prevention, and it is the proposal of the authors that this approach be called “Prevention 0”.

Patient-specific considerations

When deciding to rehabilitate a patient with dental implants, before surgical planning, we have to carefully inform the patient about the characteristics of this procedure. It is important to underline that personal daily maintenance at home and appropriate compliance regarding follow-up controls and dental hygiene therapies are effective preventative measures.[5] Procedure awareness and compliance are the foundation for success, but the clinician must also inform the patient about the impact of systemic disorders (osteogenesis imperfecta, ectodermal dysplasia, diabetes), medications (bisphos-

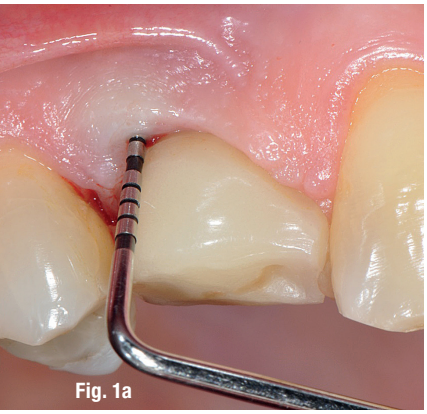
Fig. 1a

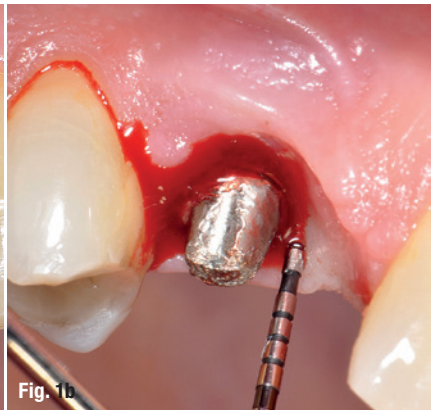
Fig. 1b

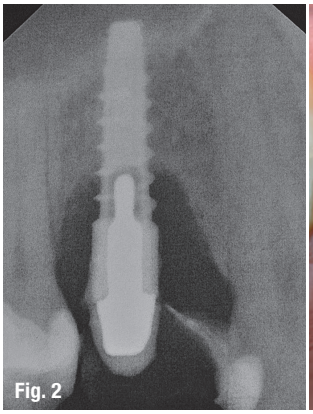
Fig. 2

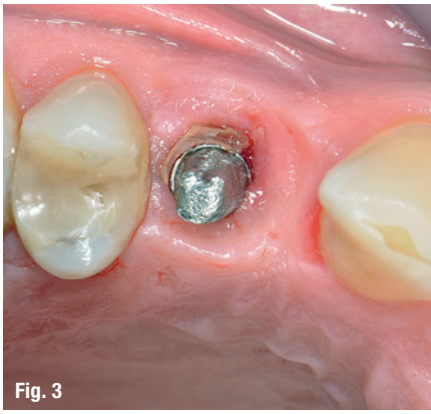
Fig. 3

Figs. 1a & b: Implant in position #14 affected by peri-implantitis: peri-implant probing **a)** with the prosthetic crown *in situ* and **b)** after prosthetic crown removal. **Fig. 2:** Radiographic examination of the implant. **Fig. 3:** Excess resin cement around the implant.


Fig. 4a

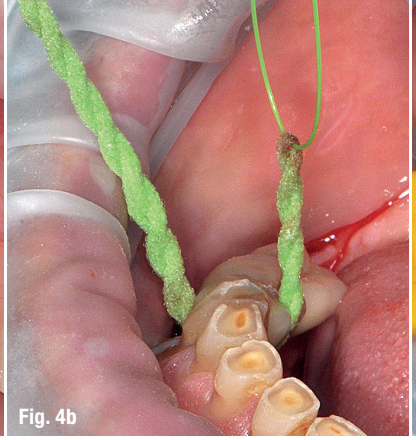
Fig. 4b

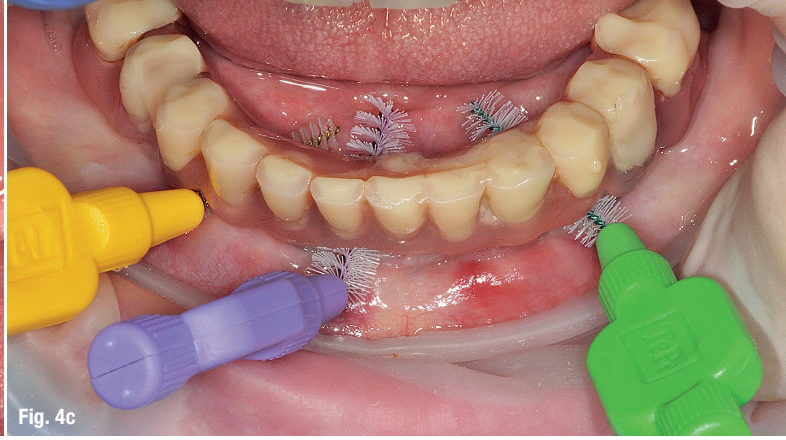
Fig. 4c

Figs. 4a–c: Peri-implant home care with **a)** AirFloss (Philips), **b)** X-Floss (ROEN) and **c)** interdental brush (TePe).

phonates), therapies (radiotherapy in the jawbone), habits (smoking, poor biofilm control) and a history of aggressive periodontitis[6] as being relevant risk factors for peri-implant disease.[7]

Site-specific considerations

The healing process after tooth loss leads to a variable reduction of the alveolar process, inducing hard- and soft-tissue deficiencies. The clinician must evaluate carefully all sites exposed to the following factors, because they have the potential for major healing deficiencies: loss of periodontal support, endodontic infections, longitudinal root fractures, thin buccal bone plates, buccal/lingual tooth position in relation to the arch, extraction with additional trauma to the tissue, injury, pneumatisation of the maxillary sinus, medications and systemic diseases reducing the amount of naturally formed bone, agenesis of teeth and pressure from soft tissue-supported removable prostheses.

Other site considerations relate to anatomical knowledge and in respect to the suitable anatomical structure of the area (maxillary sinus, inferior alveolar nerve), endodontic and periodontal health of adjacent teeth, and patient phenotype. According to Linkevicius et al. there is significant evidence that thin soft tissue leads to increased marginal bone loss compared with thick soft tissue around implants.[3,8] Lack of bone has led to the development of various alternative surgical techniques to avoid large bone regenerations or grafts, such as short implants, tilted implants, pterygoid implants and palatal implant mesh, with questionable results, but definitely decreasing the cleanability and maintainability of implants and prostheses.

Dental hygienist skills and devices

This professional figure plays a key role in disease prevention and oral health promotion.[9] Dental hygienists should not limit their activities to being an oral cleaner, but act as the patient's dental coach or personal oral trainer, motivating patients not only in dental habits but also in lifestyle, for example regarding smoking cessation and diet. This is a friendly expert who strengthens patient fidelity to the dental office, even in fearful patients, and maintains restorative work and rehabilitations undertaken by the dentist.[10]

To perform professional care in a minimally invasive way, wearing loupes and using plaque disclosing agents and appropriate devices are mandatory, especially if prosthetic rehabilitation is difficult for the patient to maintain. Correct and periodic biofilm removal should be considered the standard of care for prevention and management of peri-implant disease.[11] For this reason, patients should be motivated and instructed in daily implant maintenance, which should begin before implant placement and be continued after treatment within a regular, personalised recall regime (Figs. 4 & 5).

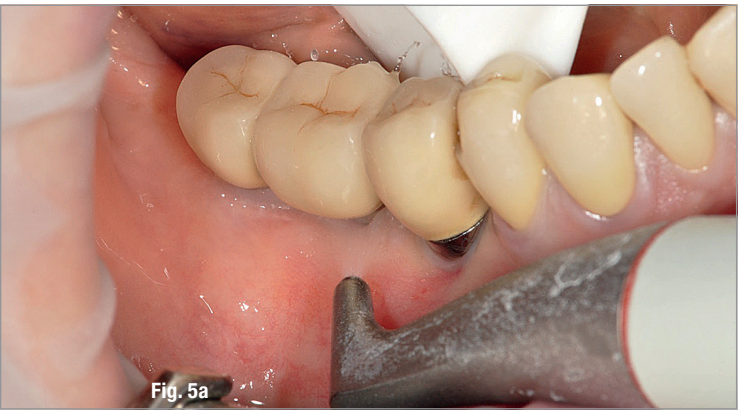
Fig. 5a

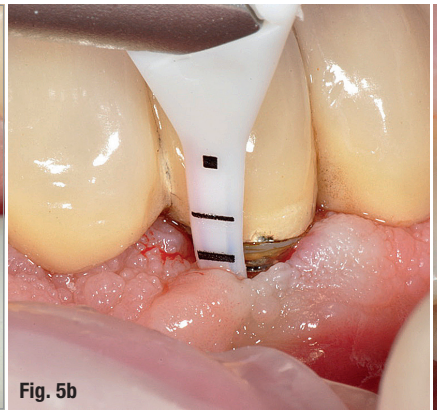
Fig. 5b

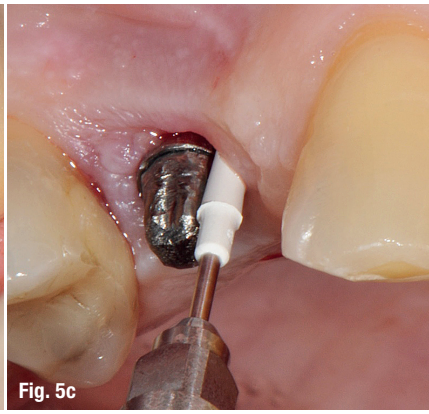
Fig. 5c

Figs. 5a–c: Professional peri-implant biofilm removal by **a)** AIRFLOW with erythritol powder (PLUS powder, EMS), **b)** PERIOFLOW with PLUS powder and **c)** with PEEK tip (PI, EMS).

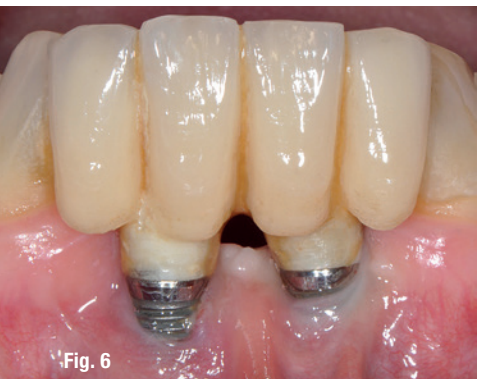
Fig. 6

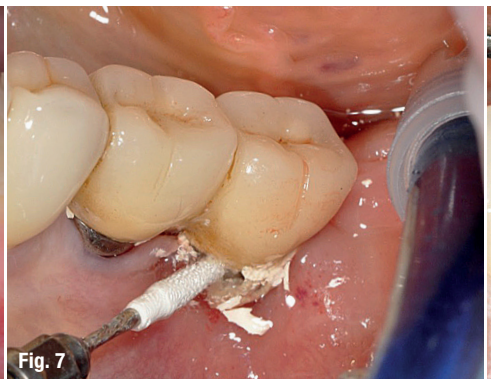
Fig. 7

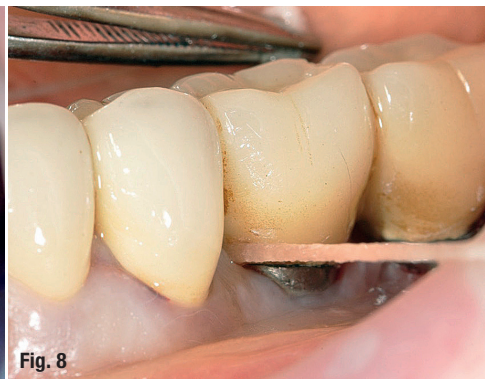
Fig. 8

Fig. 6: Improper planning led to poor performance. **Fig. 7:** Careful removal of excess cement after prosthesis cementation using a PEEK tip (PI). **Fig. 8:** Careful removal of excess cement with dental floss after prosthesis cementation.

Surgeon skills

Nowadays, especially in Italy, a new professional figure has appeared: the implantologist, who is a graduate dentist, generally a co-worker, and goes to different dental offices or clinics and mainly places implants, often without sufficient expertise in periodontal and prosthetic fields. That means, in some cases, implant mispositioning, resulting in reconstructive and maintenance problems. In order to avoid fabrication of specific prosthetic parts, unrestored implants and surgical interventions to remove or reposition them in favourable prosthetic positions, this surgical intervention should only be performed by an elite clinician.[7] This is an expert dentist with the necessary surgical skills to manage both soft and hard tissue (before and after implant placement) perfectly and with adequate expertise in the prosthetic field to allow a prothesis-guided implant surgery and, subsequently, a functioning, not overloaded, patient-tailored, cleanable and aesthetically pleasant rehabilitation.

Prosthodontist skills

Skilled clinicians know that there is no such thing as a gold standard prosthesis, but every patient needs a tailored rehabilitation, which takes into consideration his or her resources and requirements and which has to be planned before surgical intervention. After data collection and decision planning regarding the numbers of implants requested, Toronto versus overdenture, cemented versus screwed work, with a motivated and aware patient, the surgical and prosthetic work with careful load management can start.[12] Only careful and considerate planning can prevent poor outcomes (Fig. 6).

Prosthesis fabrication and cementation

Dental technicians should work in direct contact with prosthodontists in order to create aesthetically pleasant, patient-tailored and comfortable cleaning spaces. After dental hygienist instruction and training, patients should be able to clean their prostheses daily with minimal effort to maintain healthy mouths.[13] Another important factor associated with clinical signs of peri-implant disease is excess cement.[14–17] To avoid excess cement, restoration margins should be located at or above the peri-implant mucosal margin; otherwise, excess cement must to be removed.[18]

Despite world literature demonstrating an increased interest in excess cement as one of the key factors in aetio-pathogenesis of peri-implant disease, a standard protocol guiding clinicians in this delicate removal procedure is still needed. From the authors' point of view, the cementation procedure requires time, attention, loupes and meticulousness. For these reasons, an accurate protocol, dependent on cement composition, should be published (Figs. 7 & 8).

Conclusion

Implant rehabilitation provides a therapeutic alternative that is more similar to natural teeth than other alternatives. Nevertheless, while an implant-supported prosthesis can be a permanent successful solution, it lasts only if carefully planned with the patient, properly surgically performed, correctly loaded, and constantly maintained by the patient and the dental professionals. Successful results can be achieved only by an expert, patient-centred dental team.

Literature

contact

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Full-arch implant rehabilitation

Dr David García Baeza, Spain

Introduction

An implant-supported restoration is a good alternative to conventional complete prostheses for patients with edentulism. This treatment has been performed successfully in recent years and constitutes a high-value clinical reality.

Oral implantology has undergone great advances in recent years, as it allows lost teeth to be replaced with a high degree of satisfaction on the functional and aesthetic level. A partial or total loss of teeth affects not only facial aesthetics but also vital functions, like chewing and phonation. A prosthodontic rehabilitation with a high success rate can be obtained for this type of patient. The prosthetic options for rehabilitating an edentulous patient with dental implants are divided into two categories: fixed and removable restorations.[1]

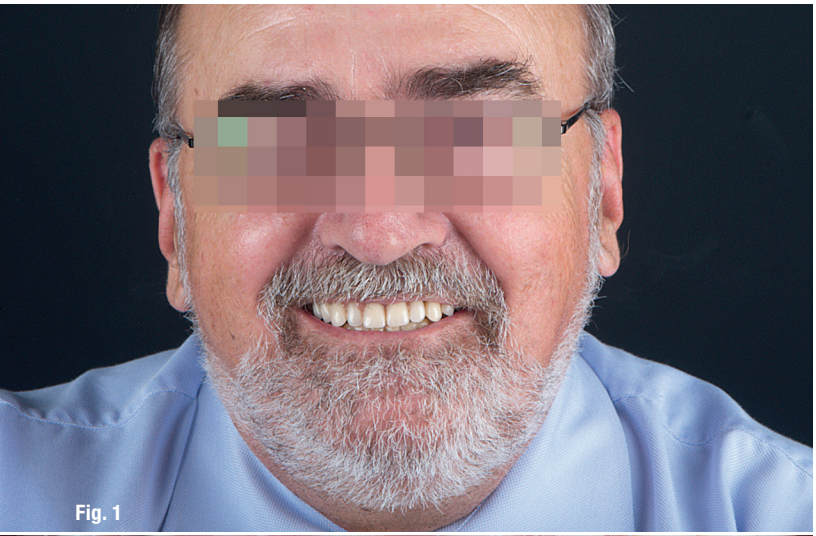


Fig. 1


Fig. 2

Fig. 1: Frontal view of the initial patient situation. **Fig. 2:** Intraoral view of the initial situation.

A hybrid prosthesis consists of a cast metal framework covered by acrylic, which supports artificial fixed teeth. The original design of the hybrid prosthesis (fixed-removable) was developed by Swedish researchers using the two-stage endosseous implant system developed by Per-Ingvar Brånemark. The prosthesis consisted of a gold alloy framework attached to the copings of the implants, and on this framework conventional acrylic resin denture teeth were secured with acrylic resin.[2]

The factors that determine the type of implant-supported restoration for a completely edentulous patient are the amount of space from the bone to the occlusal plane (prosthetic space) and the lip support. The prosthetic space needed for a hybrid prosthesis is a minimum of 11 mm and a maximum of 15 mm, with lip support given by the bone structures. When a space of 10 mm or less is available and there is lip support, a porcelain-to-metal restoration is suggested. When there is more than 15 mm of prosthetic space and absence of lip support, a type of implant-supported overdenture restoration is recommended, which will give the lip support not provided by the bony structures of the patient.[1] Cox and Zarb described the treatment of severely resorbed completely edentulous maxillae with a hybrid prosthesis using a metallic structure with acrylic and artificial teeth, with prosthetic spaces larger than 15 mm.[3]

An incorrect adaptation between metal structures and implants can cause bone loss and failure of osseointegration, which is clinically decisive. It is generally accepted in the literature that the passive fit of a prosthesis is required for maintenance and long-term success of an implant treatment. In addition, the literature has implied that incorrect adaptation of metal structures is a decisive and significant factor, causing mechanical and biological complications. The loosening of both the prosthesis and the abutment screws and even the fracture of various system components have been attributed to the lack of adjustment and adaptation of the prosthesis.

In this article, the clinical case of a patient with a completely edentulous maxilla and advanced periodontal dis-

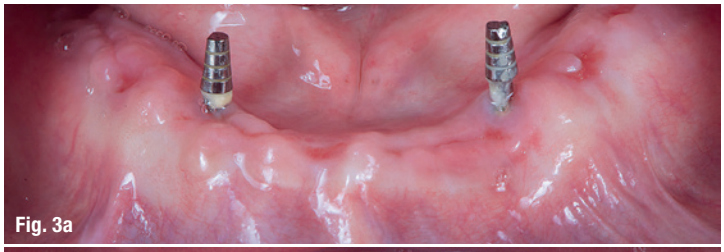


Fig. 3a

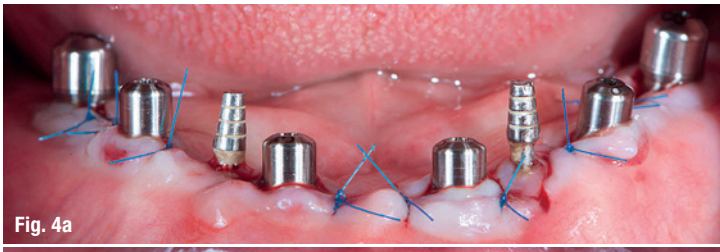


Fig. 4a

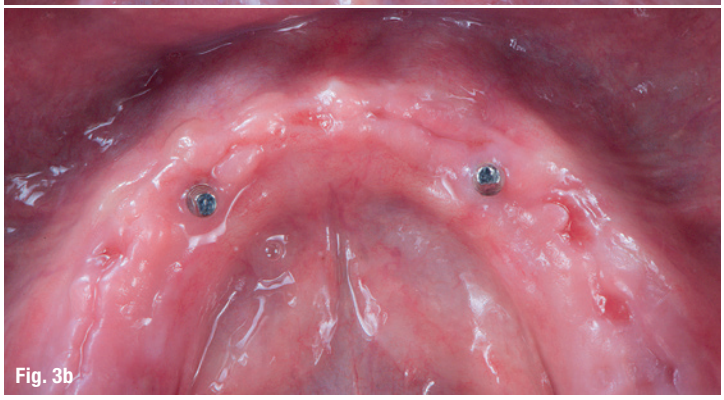


Fig. 3b

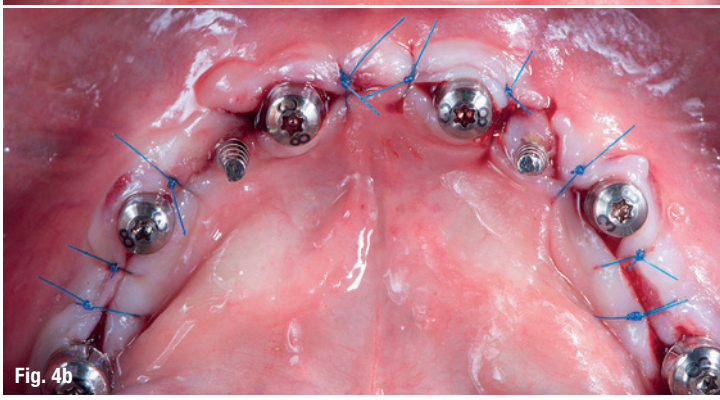


Fig. 4b

Figs. 3a & b: After extractions: **a)** Frontal and **b)** occlusal view. **Figs. 4a & b:** Healing abutments: **a)** Frontal and **b)** occlusal view.

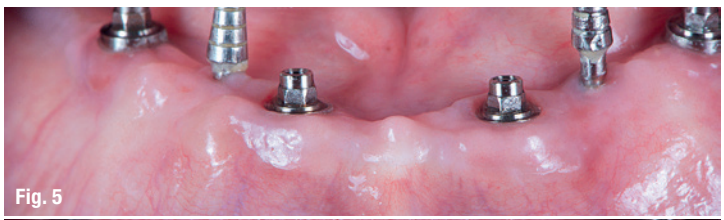
ease in the mandible is presented. The patient's mandible was rehabilitated with a hybrid prosthesis on six implants. The implant-supported prosthetic treatment that was performed to restore the patient's aesthetics and functionality, thereby improving his quality of life, is described step by step, as is the preparation process of the prosthesis.

Case presentation

A 68-year-old patient presented to our facility with a complete maxillary mucosa-supported denture, with which he was relatively comfortable. He had all of his original teeth on the lower arch, but with very advanced periodontal disease, which had caused him a loss of support of more than 80 per cent. These teeth presented with Class II and III mobility, which made it very difficult to chew (Figs. 1 & 2).

The proposed treatment plan for the patient was to extract the mandibular teeth and rehabilitate the lower arch using implants and a fixed prosthesis to maintain the same feeling as with his natural teeth. In addition, it was decided to replace the complete denture of the upper arch.

Normally, when teeth are extracted from a complete arch and an immediate restoration is placed, it creates a problem of adaptation for the patient, especially in the mandibular area. To help the patient during this period of healing and osseointegration of the implants, it is recommended to place two provisional implants.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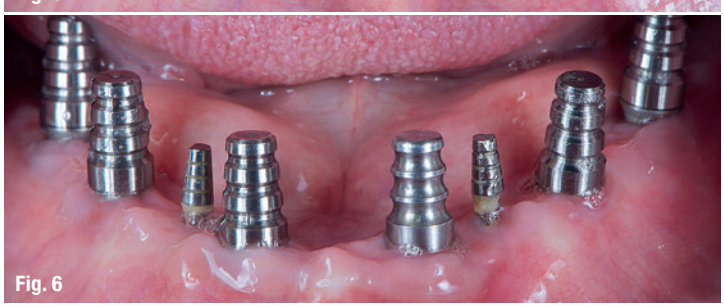


Fig. 6

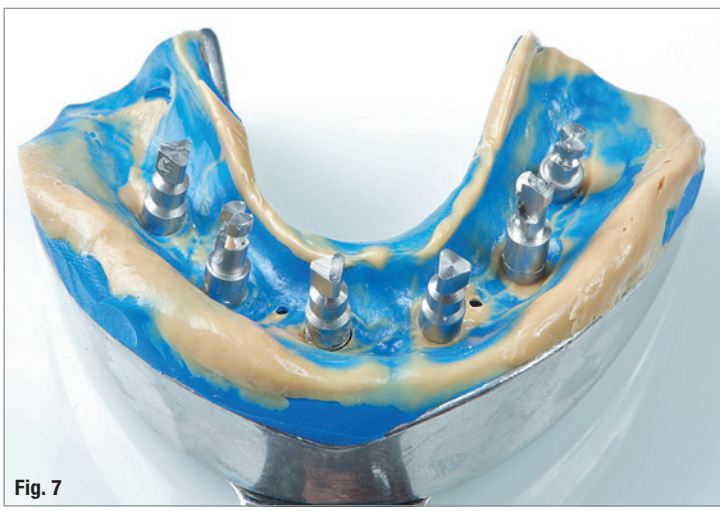


Fig. 7

Fig. 5: SR Abutments at gingival level. **Fig. 6:** Impression taking with closed-tray copings. **Fig. 7:** Preliminary impression.

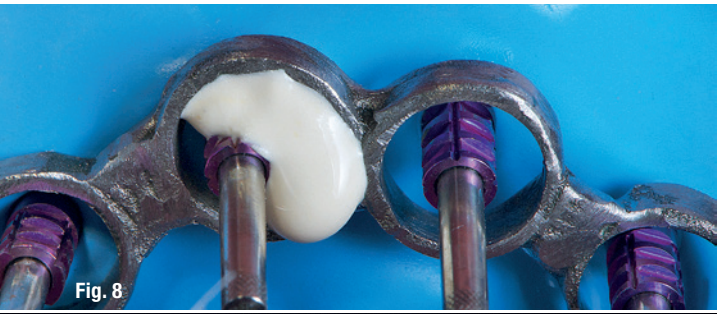


Fig. 8

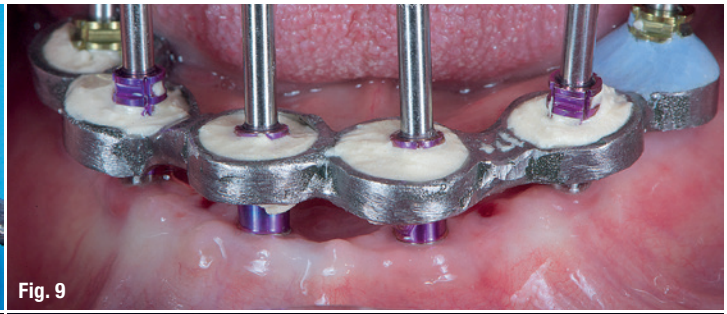


Fig. 9

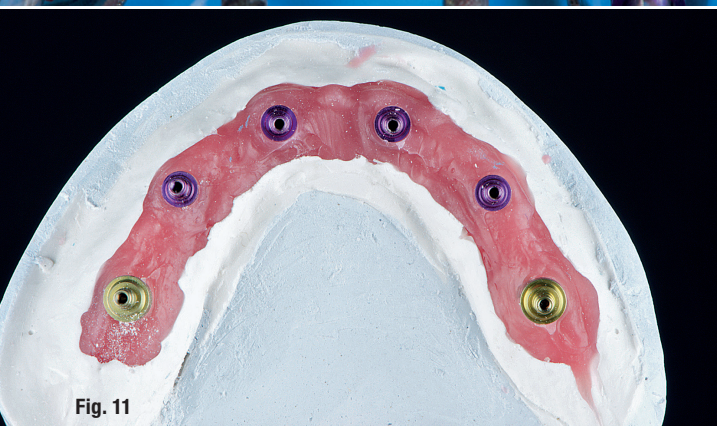


Fig. 11


Fig. 10

Fig. 8: Rigid metal tray impression taking: Fixing with plaster. **Fig. 9:** First step of final impression taking. **Fig. 10:** Final impression.

Once the extractions had healed, six Aadva tapered implants (GC Tech.Europe) of 4 mm in diameter and 10 mm in length were placed in the position of the molars, first premolars and central incisors (Figs. 3a & b). The bone quality and quantity were good, and once the expected osseointegration time had passed, transitional abutments were placed. In this case, two abutment diameters were used, narrower (SR Abutment of 3.8 × 2.0 mm, GC Tech.Europe) for the incisal and premolar areas, where there was less inserted gingival tissue, and wider (SR Abutment of 4.3 × 2.0 mm) in the posterior area (Figs. 4a & b, 5).

Before beginning with the prosthetic phase, there was a waiting period for the tissue to mature. For this, an impression was taken with closed-tray copings, which is very simple, but does not give a very exact model (Figs. 6 & 7). This was subsequently used to make a rigid impression tray that was made of metal and was secured with plaster to only one of the implants (Fig. 8).

Once the rigid impression tray was placed in the mouth, open-tray copings were then used and they were splinted to the structure with a special plaster mixture; once this had hardened, everything was registered with

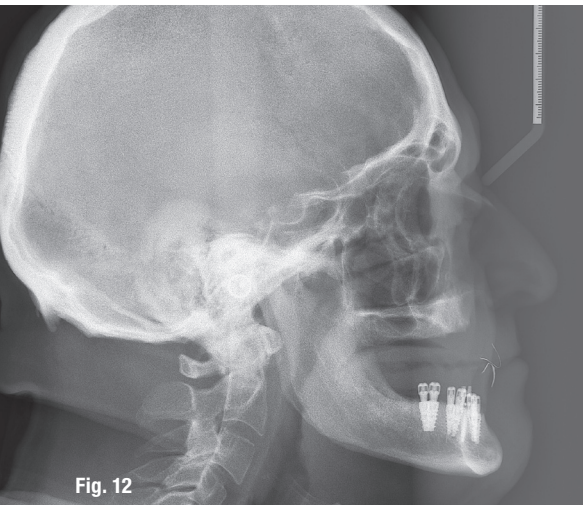


Fig. 12


Fig. 13

Fig. 12: Lateral radiograph taken with lead foil on the old denture for radiographic evaluation. **Fig. 13:** Fox plane test.

a polyvinylsiloxane impression (Figs. 9 & 10). This technique yields a very reliable master cast, ensuring a very good structure fit (Fig. 11).

Once the final model with the different analogues was ready, the planning started. First, the old complete maxillary denture was analysed. In this type of case, it is very useful to perform a lateral analysis, thus photographs and radiographs were taken. A step that differentiates our technique from other dentists' is that a narrow lead foil strip is placed on the maxillary and mandibular central incisors. This provides extra information to see the relationship between the position of the anterior teeth and the bone (Fig. 12).

With the lateral radiographs, the situation of the transitional abutments can be visualised, which is very important, as all the manipulation based on the different tests that need to be done will be carried out far from the head of the implant.

Once the fulcrum points and the inclination of the maxillary incisors for lip support had been analysed, the new upper arch was designed in order to give the patient a new occlusal plane and a new incisal position. The Fox plane helped us to obtain the correct plane and then we used the Kois Bow for the cranial-maxillary reference (Fig. 13).

Once the models had been placed in the articulator and the parameters taken from the patient, the laboratory technician began to make a set of test teeth from wax for both the upper and lower arches so that the correct fit could be assessed, including the patient's occlusion and aesthetics (Figs. 14 & 15).

As Figures 16 to 19 show, the upper arch was narrower than the lower one because those teeth were lost much earlier, which meant that, for correct functioning of the complete maxillary prosthesis while chewing, the posterior areas were to be placed at a crossbite. That way, the axis of force when chewing food would fall on the alveolar process and not displace the prosthesis.

Once confirmed that everything worked properly, the next step was constructing the metal structure that would be closely linked to the wax tooth design (Figs. 20 & 21). This was once again checked with the teeth in position to give a last confirmation before the final manufacturing. At that time, confirmation of the modifications made could be carried out again by using the lead foil strip, as well as confirmation of the occlusion, in case there was any variation (Fig. 22).

Subsequently, the final prostheses were made. The maxillary one was made as wide as possible in the posterior area so that it would be as stable as possible, and the mandibular one was placed on implants. Confirmation and small adjustments had to be performed in the mouth to counterbalance the small misalignments that normally occur in manufacturing (Figs. 23–25).

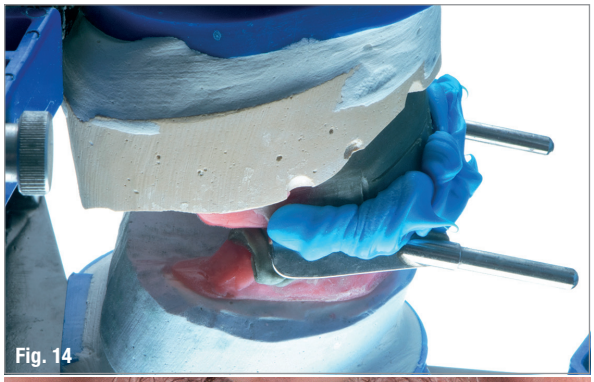


Fig. 14

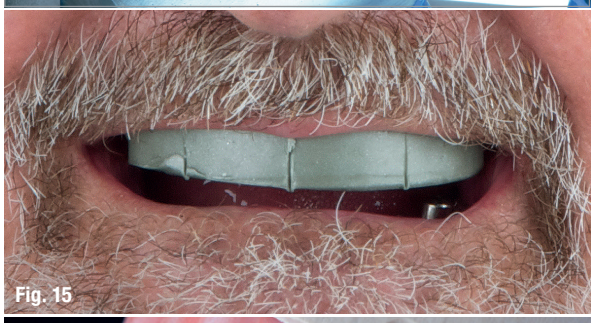


Fig. 15


Fig. 16a


Fig. 16b

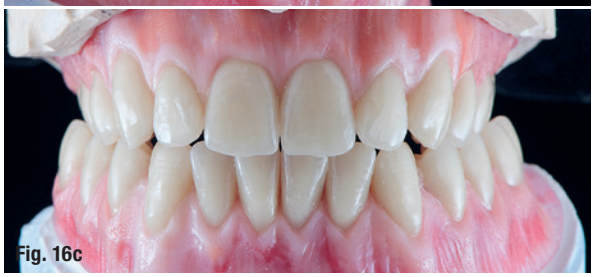
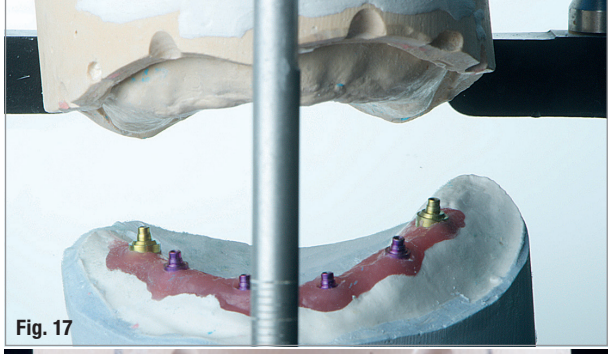


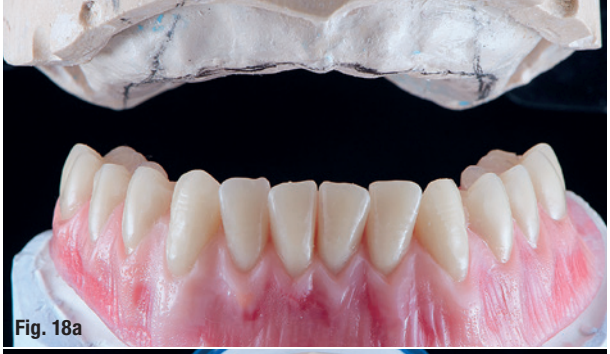
Fig. 16c

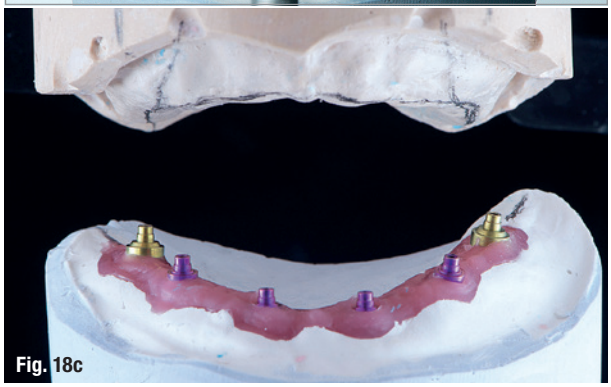
Fig. 14: Panadent articulator phase. **Fig. 15:** Wax test confirming smile parameters. **Figs. 16a–c:** Wax try-in: **a)** left, **b)** right and **c)** frontal view.

Discussion

The treatment of a completely edentulous patient with an oral restoration on implants begins by discussing treatment expectations, followed by an accurate clinical







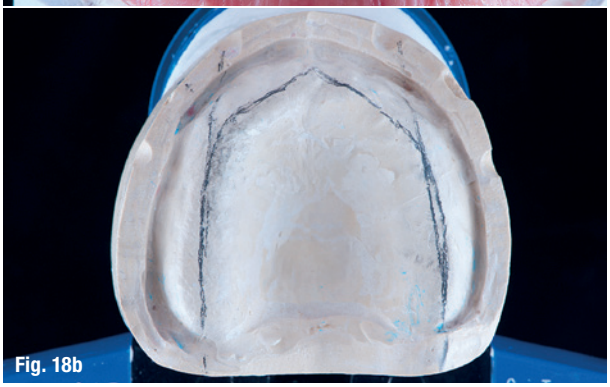


Fig. 17: Models in final position. **Figs. 18a–c:** Models in the articulator.

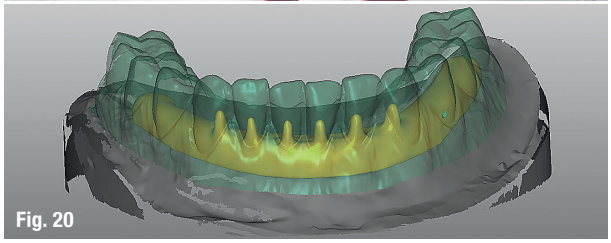
evaluation. Thus, a detailed intraoral and extraoral examination are performed following a work plan to help in the diagnosis. This includes studying patient photographs and radiographs, which have evolved remarkably in recent times, using models on a semi-adjustable articulator and following the protocol for the design of a proper prosthetic restoration on implants, choosing from overdentures, or hybrid or fixed prostheses. The choice will depend on what the dentist plans using a multifunctional guide—tomographic/surgical/prosthetic—for implant placement and a suitable type of oral restoration.

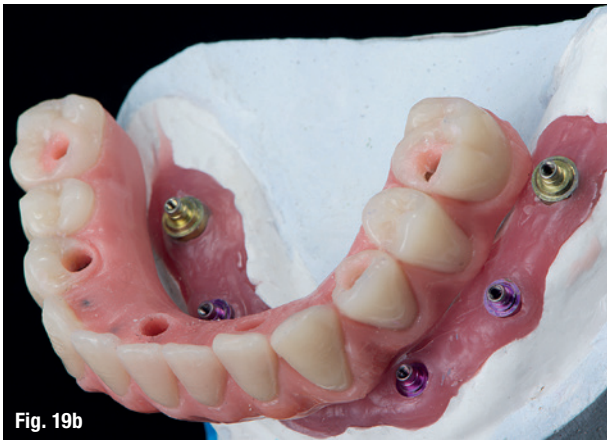
Rehabilitation with implant-supported hybrid prostheses is a fixed treatment in completely edentulous jaws where the prosthetic space is 11 mm or 15 mm,[3] but where the need for lip support for prosthetic restoration is not a determining factor.[4] An implant-supported hybrid prosthesis can be a questionable alternative treatment when a fixed restoration of porcelain and metal does not meet the patient's requirements for aesthetics, good phonetics, proper oral hygiene and oral comfort.[5,6]

Bidra and Agar proposed a classification system for edentulous patients for using implant-supported fixed prostheses, classifying them into four classes according to the following factors:

1. amount of tissue loss;
2. position of the anterior teeth in relation to the location of the residual ridge;
3. lip support;
4. smile line; and
5. need for prosthetic material for gingival colouring (pink acrylic).[4]

Class I includes patients who require gingiva-coloured prosthetic material such as pink acrylic to obtain aesthetic tooth proportions and optimal prosthetic contouring to attain adequate lip support. Class II patients require pink acrylic only to obtain aesthetic tooth proportions and for prosthetic contouring. Lip support is not a consideration, since the difference in lip projection with or without any prosthesis is generally insignificant. Class III contains patients who do not require gin-





Figs. 19a & b: Final wax test. **Fig. 20:** Aadva software: Structural design.

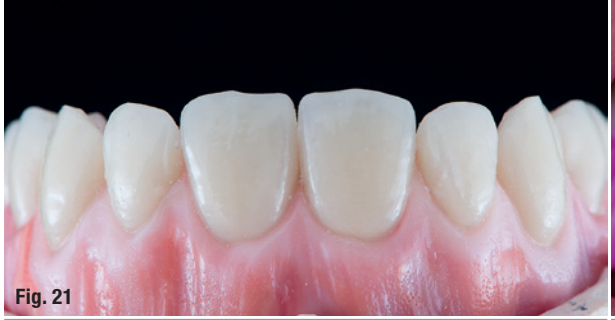


Fig. 21

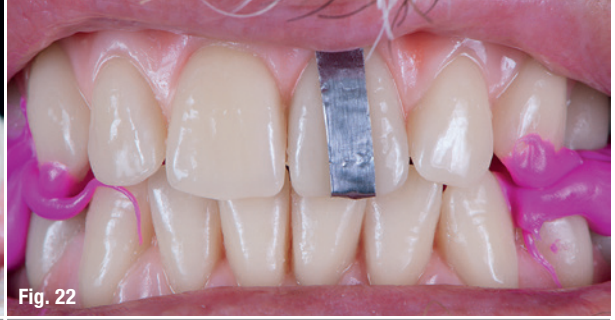


Fig. 22


Fig. 23a


Fig. 23b

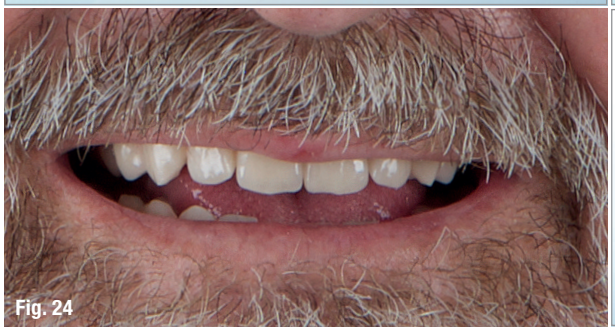


Fig. 24


Fig. 25

Fig. 21: Anterior view, final test. **Fig. 22:** Lead foil test for the new design. **Figs. 23a & b:** Final restorations: **a)** Lateral and **b)** frontal view. **Fig. 24:** Final smile. **Fig. 25:** Final restoration.

giva-coloured prosthetic material. Class IV is assigned to patients who may or may not require pink acrylic, depending on the result obtained after surgical intervention.[4] Following this classification, the patient in this report was determined as Class II.

The fabrication of hybrid dentures in patients with adequate interocclusal space provides the dentist with several advantages regarding the aesthetic appearance, including replacement and decrease of soft-tissue support owing to the bulkiness of the metal substructure and in the height of crowns compared with a metal-supported porcelain prosthesis. In addition to these aesthetic advantages, hybrid prostheses work as shock absorbers, reducing load forces on implants.[7]

The success rate of implant-supported hybrid prosthetic treatments is high, as demonstrated by a systematic review published in 2014, which included 18 studies for evaluation. In a period of five to ten years, high survival rates of 93.3–100 per cent for the prostheses and of 87.9–100 per cent for the implants were found.[8]

In a retrospective study evaluating the main complications after rehabilitation with an implant-supported hybrid prosthesis, it was observed that the main complication was mucositis, which affected 24 per cent of the cases, followed by problems with the prosthetic screws in 13.7 per cent of the cases, including thread wear or loss, and the same percentage was found for fracture of the prosthetic teeth or prosthesis detachment. These problems were related to an incorrect record of vertical dimension, inadequate occlusion or a lack of passive fit of the metallic structure. Another problem encountered concerned the access to the entrance holes of the prosthetic screws (7.8 per cent).[9]

Conclusion

A lower jaw hybrid restoration is a good option for the rehabilitation of an edentulous mandible, and it should be included in the treatment options when evaluating a patient, as it improves aesthetics, functionality and proprioception. It is furthermore easy to clean, requires less prosthetic maintenance, and can be removed at any time and repaired at a very low cost.

Literature

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Peri-implantitis therapy

Using resorbable bone replacement material

Dr Fernando Duarte, Portugal & Dr Gregor Thomas, Germany

Peri-implantitis is one of the medical challenges of the 21st century. Implantologists and periodontists around the world are consistently searching for reliable and implementable therapy solutions. The authors presented their preferred protocol of peri-implantitis treatment in this clinical case using a biomimetic bone replacement material and a resorbable collagen membrane.

Peri-implantitis is defined as a local lesion which is associated with bone loss around an osseointegrated implant, whereas peri-implant mucositis is a reversible inflammatory change in the mucosa surrounding the implant.

Peri-implant mucositis is diagnosed by probing, that is followed by bleeding. The mucositis is often not classified as severe and also not taken seriously by the patient.

Based on various examinations, prevalence for peri-implantitis varies significantly between 2 and 58 per cent of all implants (Koldsland et al.). According to a Cochrane report published in 2011, there is insufficient evidence for known peri-implantitis treatments. More research in this field thus needs to be conducted (Esposito et al.).

The authors experience regarding their preferred protocol for peri-implantitis treatment is presented step by step in the following clinical case. The Implacure® (MedTech Dental AG) peri-implantitis set and a regenerative, biomimetic bone replacement material (CERASORB® M, curasan AG) were used to replace the lost bone.

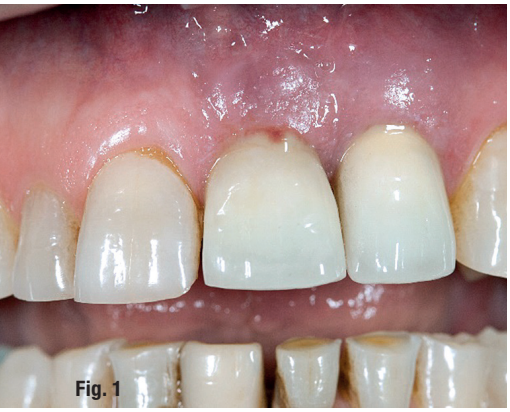


Fig. 1

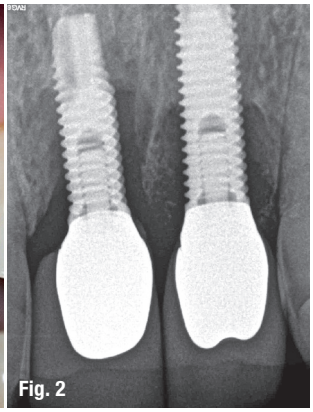
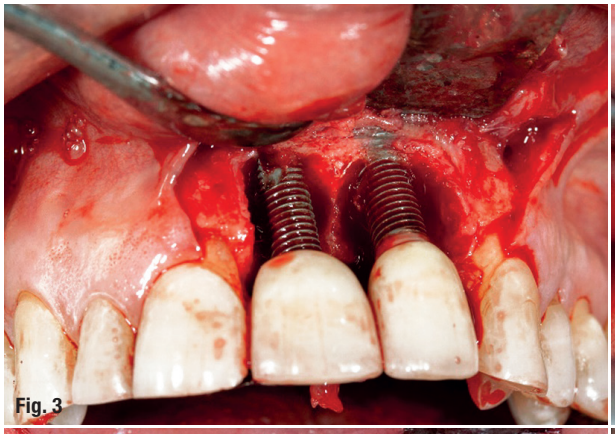


Fig. 2

Surgical protocol

1. Formation and mobilisation of a mucoperiosteal flap to achieve unconstrained access to the defect area. If possible, the superstructure should be removed.
2. Careful curettage of the infected area, thorough removal of all soft-tissue adhesions on the bone.
3. Decontamination of the implant surface using various burs: both the apical part, that later will come into contact with the bone replacement material, as well as the crestal part, that later will be in contact with mucosa have to be cleaned.
4. Dressing of the entire exposed bone surfaces with sterile gauze and moistening of the gauze with sterile saline solution in order to improve its adhesion to the bone.
5. Application of a gel comprised of 37 % phosphoric acid and 2 % chlorhexidine onto the entire exposed implant surface in order to eliminate all remaining biofilm.
6. After two minutes, the gel is thoroughly rinsed off with saline solution and the gauze is removed.
7. Dressing the entire implant surface in sterile gauze. The gauze is subsequently soaked with a sodium hyaluronate/piperacillin/tazobactam solution, letting it set for five minutes.
8. Removal of the gauze.
9. The bone replacement material is blended with a sodium hyaluronate/piperacillin/tazobactam solution and autologous blood taken from the defect area or PRP in a sterile container and inserted into the affected area without pressure. The defect area is subsequently covered with a resorbable collagen membrane which was previously soaked in antibiotic solution.
10. Re-adaption of the flap and suturing.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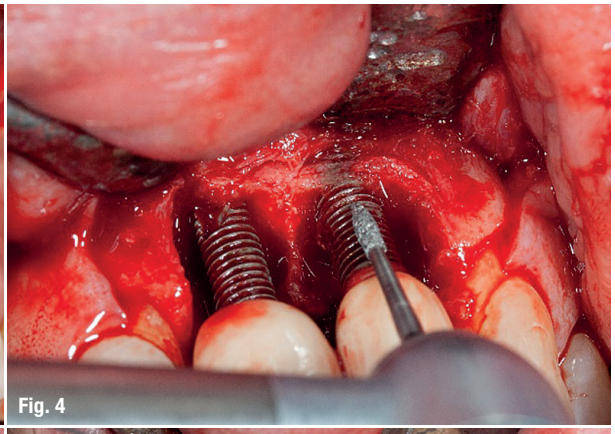
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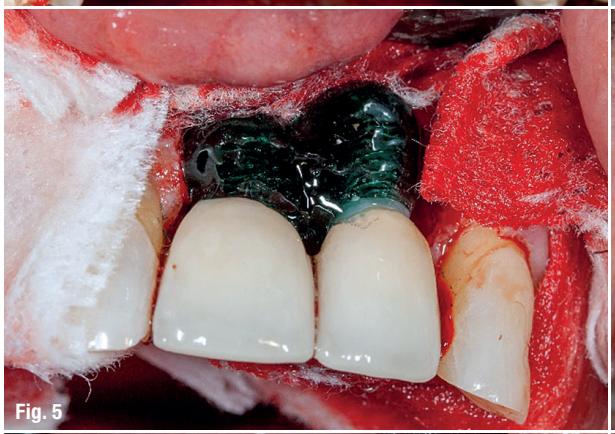
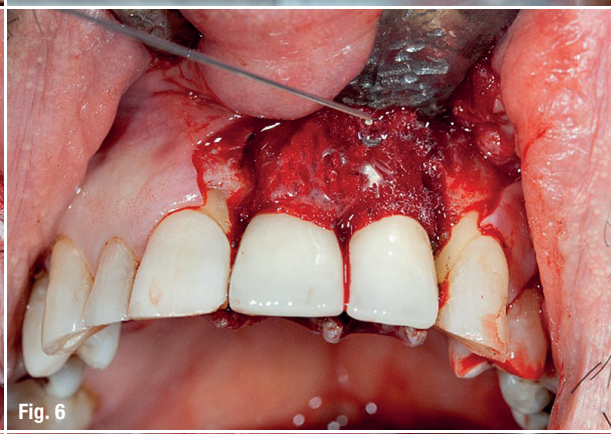


Fig. 5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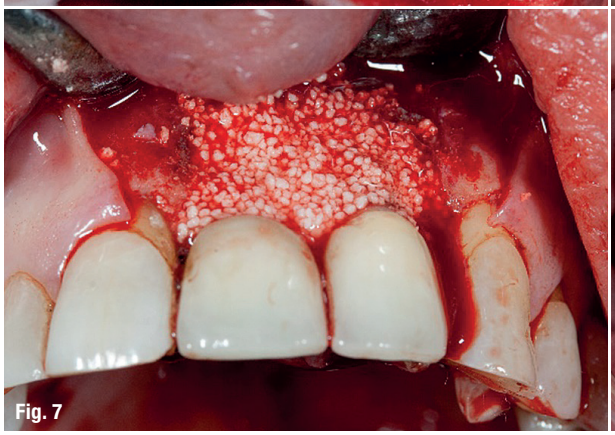
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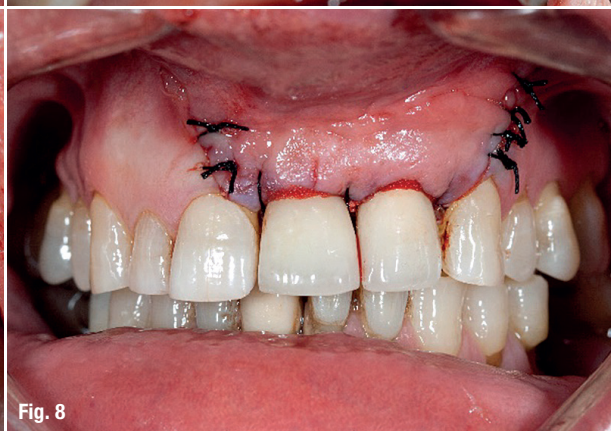
Fig. 8

Case presentation

A 59-year-old patient presented to the practice complaining about minor exudate at his dental implants in the anterior region (Fig. 1). Probing revealed a deep circular pocket around the implants during the initial examination. Mobility of the implants was, however, not detected. As suspected, the radiographic examination confirmed an advanced peri-implantitis at the recently placed implants (Fig. 2).

In accordance with the described protocol, a muco-periosteal flap was created in order to obtain full access to the severe four-wall defect (Fig. 3). The implant surface was mechanically cleaned with diamond-coated burs (Fig. 4). Chemical debridement of the surface with subsequent antibiotic impregnation was performed (Figs. 5 & 6).

After completion of the preparatory steps, the bone replacement material consisting of phase-free beta-tricalcium phosphate—which offers optimal conditions for osseous remodelling owing to its micro-, meso- and macropores—was inserted as previously described (Fig. 7).

Finally, the surgical area was covered with the bioresorbable membrane, and the flap was re-adapted with interrupted sutures in order to achieve a complete and impermeable wound closure (Fig. 8). The radiograph taken immediately after surgery showed the filled defect

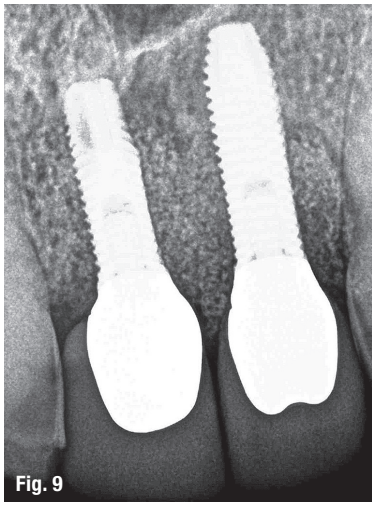
Fig. 9

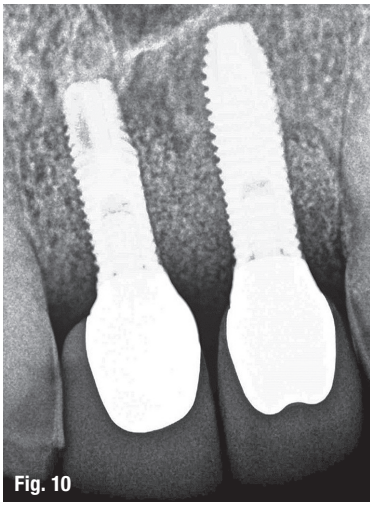
Fig. 10

(Fig. 9). Good osseous consolidation at the enamel-cement junction of the adjacent teeth could be seen on the follow-up radiograph taken 24 months later (Fig. 10).

Discussion

While improved oral hygiene and professional cleaning prove to be very effective in treating periodontitis, peri-implant lesions do not react correspondingly. This does not mean that good oral hygiene and professional tooth cleaning are redundant as peri-implantitis prevention. However, conservative therapy proves to be inefficient once peri-implantitis has developed. Non-surgical approaches by means of laser or powder jet show moderate results. Systemic chemotherapy and mechanical debridement have also largely been without success.[1–3] The use of photodynamic therapy has also proven to be unsuccessful. In summary, it can be said that non-surgical therapy approaches are not suitable for reliably treating peri-implantitis.[1,4]

Surgical treatment seems to be only the promising therapy approach. A surgical resection treatment is, however, only partially effective. In 2003, Leonhardt stated that surgical and antimicrobial treatments were successful in more than half of the cases for a period of five years. In 2008, Heitz-Mayfield et al. were able to demonstrate that using an antimicrobial protocol with surgical access via mobilisation of a flap stopped the progression of peri-implantitis in 90 per cent of the cases over a period of one year, while the bleeding on probing persisted in more than 50 per cent of these cases.[5]

Unfortunately, not all cases of peri-implantitis are suitable for regeneration. The crater shape with four walls does not typically occur in implants with thin fascial and lingual walls. In some of these cases the defect is associated with a complete loss of the surrounding bone crest, which turns regenerative measures into an unpredictable treatment alternative.

The decontamination of the implant surface proves to be the crucial step in all proposed treatment approaches. The complex topography of modern implants offers ideal conditions for bacterial growth. The decontamination of these surfaces sometimes seems impossible, particularly if non-surgical treatment is pursued. There are diverse options for surface decontamination. Anti-infective treatments with chlorhexidine, tetracycline, metronidazole, citric acid, laser and photodynamic application help in disinfecting the implant. Mechanical debridement with titanium, plastic or steel curettes, implantoplasty or powder jet should remove the biofilm. Most clinicians select a combination of these therapies assuming that as a result surface decontamination can successfully be obtained.

Implantoplasty ensures a complete decontamination of the implant surface, there are, however, four essential concerns: heat generation, accumulation of residue of milled material in the surrounding tissue, damage to the implant surface and impairment of the implant structure. Heat generation can be contained through careful and abundant irrigation, and an adapted bur selection. Some authors presume that milling residue has not been clinically verified in rejection reactions. Reducing the micro- and macro-roughness of the implant surface has mainly proven advantageous in preventing bacterial colonisation. The required abrasion thickness on the implant is ultimately not a decisive factor for reduced stability.[6,7]

Conclusion

The existing scientific findings and the clinical experiences obtained with the presented system, thus allow the conclusion that the protocol proves to be a successful and understandable method for the sanitation of peri-implant defects, when lost bone substance is simultaneously regeneratively replaced. The fully synthetically produced, biomimetic beta-tricalcium phosphate granulate has proven to be successful in this treatment. By means of a restitutio ad integrum it is possible to return the weakened implant site not only mechanically, but also biologically, to a functional condition, which is the prerequisite for a successful long-term sanitation.

Literature

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Quality seal for dental implants

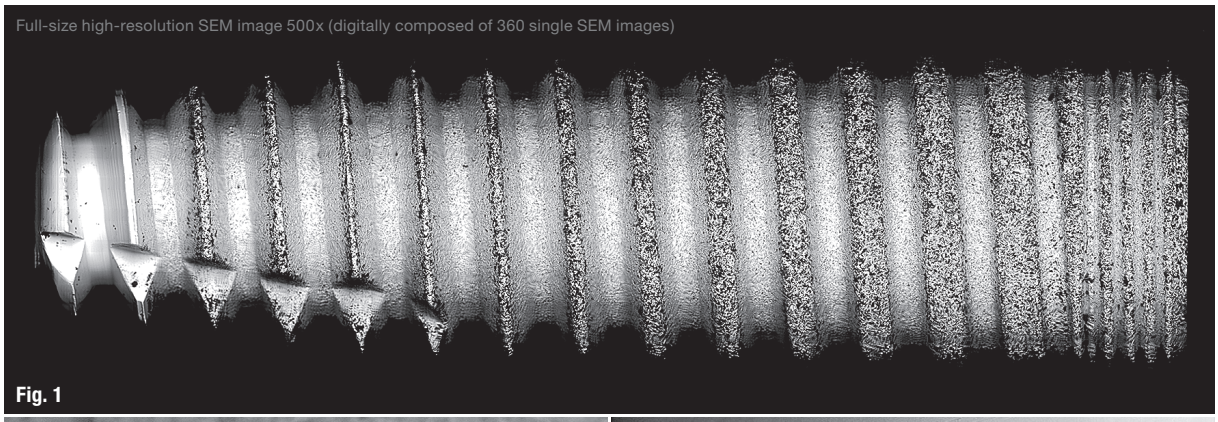
More safety for patients and practitioners

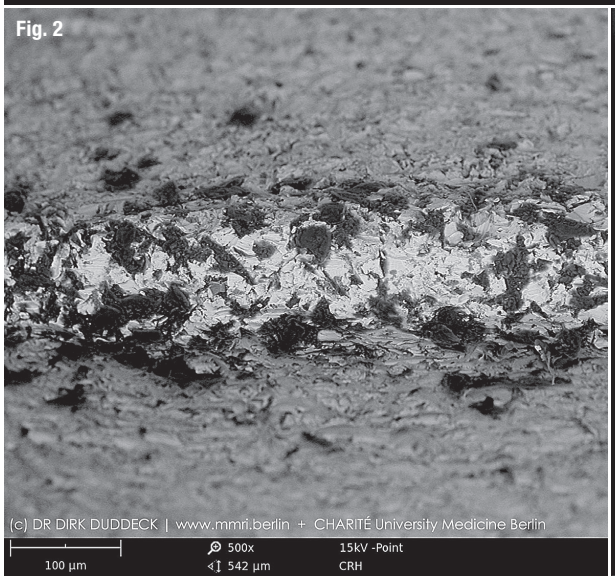
Dr Dirk U. Duddeck, Germany

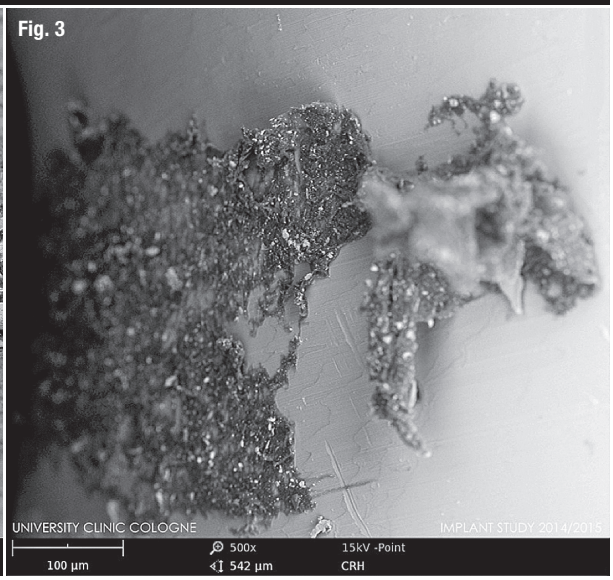
Dr Michael Norton, former president of the Academy of Osseointegration, summed up a problem of the implant market, stating “Dentists have to rely on the word of manufacturers and the FDA or CE marks to feel sure that the implants they are using are being manufactured to a standard one would expect of an implantable dental device. Sadly, this is often not the case.”

Impurities on sterile-packaged implants, in particular organic particles from the production or packaging process (Figs. 1–3), are highly suspected of being responsible for incomplete osseointegration of dental implants or even loss of bone in the early healing period.

Four consecutive studies over a period of more than ten years conducted in close cooperation with the University of Cologne and the Charité-University Medicine Berlin, both in Germany, have shown that neither CE (French: Conformité Européenne) marking nor U.S. Food and Drug Administration clearance can provide a reliable







Photos: © www.cleanimplant.com

Fig. 1: Massive organic pollution on sterile packaged implant (SEM mapping at 500x). **Fig. 2:** Organic particles on the implant thread (SEM image at 500x). **Fig. 3:** Organic particles with antimony on the implant shoulder (SEM image at 500x).

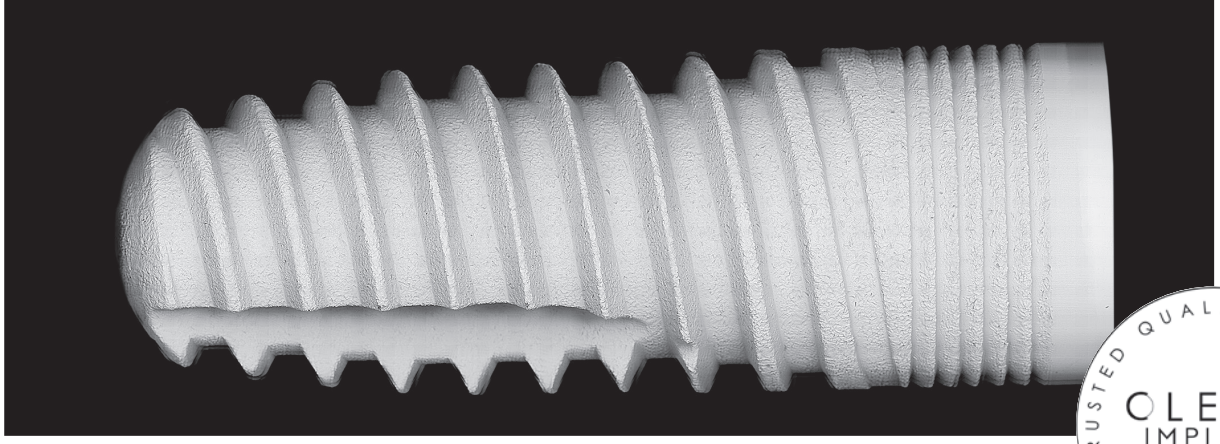


Fig. 4: blueSKY implant (bredent; SEM mapping at 500x).

indication of the cleanliness of dental implants. Scanning electron microscopy (SEM) imaging and elemental analysis (EDS) of more than 250 dental implants from over 200 brands were used to establish one of the largest, most comprehensive databases in implant dentistry. Recent analyses in 2018, revealed a continually growing number of implants with severe pollution, compared with previous reports. Areal pollution and particles containing iron, copper, chromium, nickel, tungsten and sulphur, and large quantities of stainless-steel particles, as well as remnants of polytetrafluoroethylene and other significant organic contaminations, give cause for concern.

The five-step approach

Step 1: Random sample collection

For the Trusted Quality Mark, five samples of each implant type will be collected for thorough analysis using a mixture of mystery shopping (two samples) and direct factory order (three samples) to ensure that samples are selected randomly.

Step 2: ISO Class 5 cleanroom environment

All implants have to be unpacked and analysed in the scanning electron microscope under cleanroom conditions according to ISO Class 5 (DIN EN ISO 14644-1).

Step 3: SEM analysis process accreditation

All collected samples are subjected to the same quality analysis protocol. Laboratories have to prove a quality management system according to DIN EN ISO/IEC 17025 and undergo regular audits and reassessments by external independent accreditation bodies.

Step 4: Full-size high-resolution SEM imaging

This technique produces approximately 400 single high-resolution SEM images of a single implant sample. Images are digitally composed to one large image with an extremely high resolution providing a perfect overview of the implant cleanliness.

Step 5: Peer review process

Two members of the scientific advisory board independently review the comprehensive report of analysis and correspondent clinical documentation.

How can the clinician know which implants are not affected by these impurities? With the variety of implant systems offered on the market it has become increasingly difficult for dentists to choose a safe system for their practice. The CleanImplant Foundation has set itself the goal of providing exactly this information worldwide. This independent non-profit organisation is supported and controlled by a scientific advisory board, which is chaired by renowned scientists and practitioners. In 2017 this board set the criteria for the CleanImplant Trusted Quality Mark. Implant companies and systems already carrying this seal are MIS V3, MegaGen AnyRidge, BTI UnicCa, bredent blueSKY (Fig. 4), NucleOSS T6 and NDI Replicate. Other implant systems are currently in the process of examination.

Objective analysis of dental implants

The CleanImplant Foundation established a thorough and accredited testing procedure that guarantees unbiased results for the new global quality seal (see information box “The five-step approach” on the left).

Practitioners interested in a personalised certificate for their practice and implant manufacturers who want to apply for the new quality mark will find more information and a corresponding newsletter at the project’s website www.cleanimplant.com.

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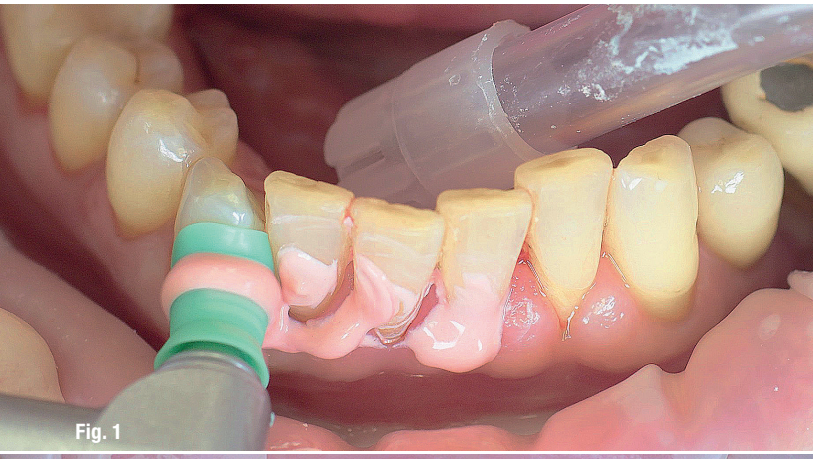
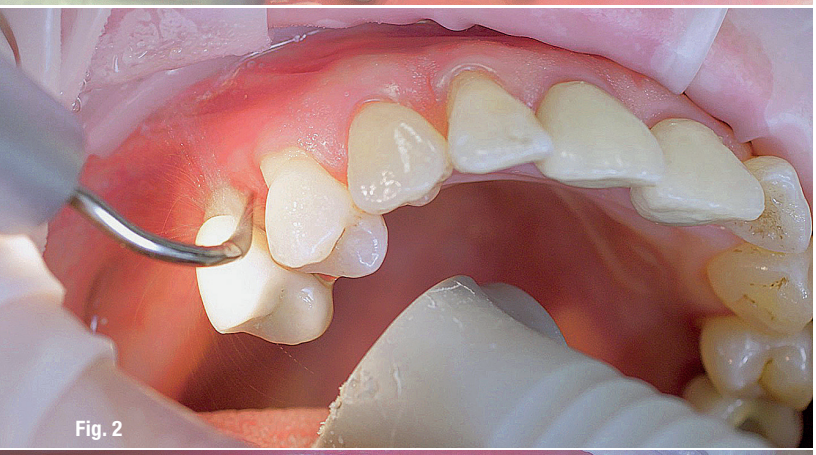
Connection between periodontal and peri-implant health emphasised





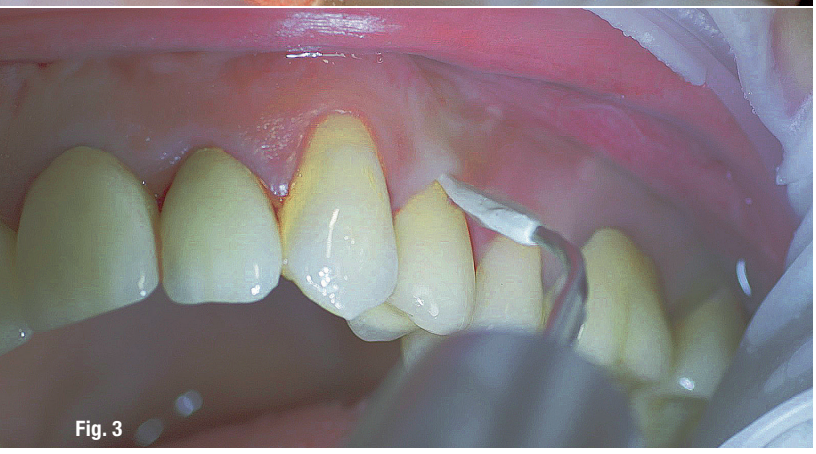


Fig. 1: Good individual oral hygiene and professional biofilm management, e.g. with cups and brushes, helps support periodontal and peri-implant health. **Fig. 2:** An air scaler efficiently performs the initial debridement, as part of initial periodontal therapy. **Fig. 3:** Implants and superstructures can be successfully cleaned with ultrasonic devices and special plastic instruments during postoperative care or non-surgical therapy. *(Source: © W&H)*

EuroPerio9 was held in Amsterdam from 20 to 23 June and was the largest congress to date with more than 10,000 attending. There was great interest in the causes and successful management of periodontitis and peri-implantitis. Two new classifications provided answers to the aetiology. Scientifically based and practice-oriented presentations demonstrated how to prevent and, if necessary, treat these inflammatory diseases.

Three out of four Swiss patients state that prevention is the main reason for them to visit the dentist.[1] They want to make sure that their teeth stay in good condition. They aim to keep previously restored teeth or implants for as long as possible. However, not all patients are aware of the fact that dental health also depends on intact periodontal or peri-implant tissue.

At EuroPerio9, renowned experts presented two new classifications as the basis for all preventive, as well as therapeutic measures. They were developed at a workshop conducted by the American Academy of Periodontology (AAP) and the European Federation of Periodontology (EFP) in November 2017: According to the classification, there is only one form of periodontitis, for which the treatment is classified into four stages, depending on its severity and complexity.[2] As explained in detail in Amsterdam, current research results indicate that what was formerly considered aggressive periodontitis cannot be distinguished from chronic periodontitis by microbiological or immunological criteria. According to the new diagnostic system, the disease is classified as chronic, which means that recall treatment is necessary for the remainder of the patient's life.

Periodontal therapy largely unchanged

Every dental examination is based on a detailed medical history combined with targeted diagnostics containing as much detail as possible: The dentist records systemic risk factors such as diabetes or smoking and identifies any potentially increased tendency to inflammation[3]. Hard and soft tissues are examined and periodontal pockets are probed in a screening test according to PSR (Periodontal Screening and Recording). In case of abnormal findings, the periodontal status is then recorded and therapy is initiated where necessary. This treatment begins with professional biofilm management, by using, for example, rotary cups and polishing com-

pounds (Fig. 1), and comprehensive instructions in oral hygiene. Sonic or ultrasonic systems remain an effective alternative or supplement to manual instruments for subgingival debridement and biofilm management (presentation by Prof. Dr Ulrich Schlagenhauf; Fig. 2). Supplementary use of photodynamic therapy, air polishing or local and systemic antibiotics is not adequately documented (Prof. Dr Sema Hakki).[4] According to Dr Sergio Bizzarro, improved biomarker diagnostics may lead to an increase in customised patient therapy in the future.

Primary prevention of inflammations

The key statement of the first classification for peri-implant inflammations is that periodontitis, mucositis and peri-implantitis are a result of biofilm.[5] One has to admit, however, that therapy is not always successful.[6] These inflammatory diseases need to be prevented before they occur by means of good oral hygiene and professional biofilm management.[7–9] A practice-based randomised study found that most patients maintain their peri-implant health by attending recall visits two to four times a year, regardless of the mechanical means of treatment that are used.[10] The risk of peri-implant inflammation is significantly higher in periodontitis patients.[11] The same goes for patients who have had initial treatment, but are not yet included in a recall programme (UPT).[12] Good biofilm management and preliminary periodontal treatment are particularly important preconditions for a planned implantation.

Proper implantation

Implantation and implant restoration are performed following standard surgical and prosthetic protocols. High-performance implantology motors combined with surgical contra-angle handpieces are available for the insertion of the implant. Large volumes of cooling fluids at low speeds are required to prevent the bone from overheating.[13] Once the implant has been screwed to its end position, its eventual stability can be measured safely and accurately by utilising resonance frequency analysis (RFA). A load protocol oriented to the ISQ value prevents the implant from developing micro-movement, thus improving the prognosis.[14] As stated in the consensus document presented at EuroPerio, the potential role of the above-mentioned biological and biomechanical factors in the development of peri-implantitis still requires clarification.[5]

First probe, then treat

Healthy peri-implant tissue does not show any signs of redness, swelling or bleeding, neither does it secrete pus when probed.[5] Based on the consensus document, Prof. Dr Giovanni Salvi explained the importance of regular probing—preferably with a flexible probe, as implant components often tend to obstruct the procedure.[5] In the case of mucositis or initial peri-implantitis already being present, the non-surgical removal of hard deposits and biofilm should be attempted first. For this purpose, ultrasonic power and special instruments designed to protect the implant should be employed (Fig. 3; piezo scaler Tigon+ with 1I, W&H). In case of no remission, the recall frequency needs to be increased. However, specific recommendations, applicable to individual cases, are not yet available in this context.[15]

According to an unpublished study presented by Prof. Salvi, the supportive use of photodynamic therapy or locally applied antibiotics does not significantly reduce bleeding on probing in patients presenting with mucositis or initial peri-implantitis. This finding is similar to the one with periodontitis and, according to a systemic overview, also applies to subgingival air polishing.[6] Professor Stefan Renvert states that whether an implant can remain in position with peri-implantitis depends on the possibility of retaining the implant-based prosthesis. Additional factors include the patient's general health, as well as their financial resources. Regenerative treatment may be indicated with 3- or 4-wall bone defects. Moreover, an implant can be removed rather atraumatically using piezo-surgical instruments.

No implantology without periodontology

In a small symposium presented by the Austrian dental company W&H, oral surgeon and periodontologist Dr Karl-Ludwig Ackermann explained that he does not insert implants in affected patients without prior periodontal treatment. This procedure is based on many years of experience and a clinical strategy, which is based on the so-called NIWOP-workflow, meaning "no implantology without periodontology". This workflow, developed on the basis of the 11th EFP workshop[8], was impressively confirmed at EuroPerio9. EFP President Prof. Anton Sculean, who chaired the symposium, stated: "A large number of implants are being placed these days and periodontitis has become a major problem. W&H has recognised this and is pursuing the right strategy, following the principle of *NIWOP*."

Literature

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Fig. 1

Innovate, educate, inspire

At the Dentsply Sirona World 2018 in Orlando, USA, Georg Isbaner, editorial manager of *implants*, had the chance to talk to Don Casey, CEO of Dentsply Sirona, about current challenges, future perspectives and newest product developments, like the newly launched Azento.

Mr Casey, you took over the leadership of Dentsply Sirona in February 2018. In the last couple of years Dentsply Sirona made huge acquisitions on the dental market and became one of the leading dental companies in the world. However, the competition is strong. What are the biggest challenges and how do you address these challenges?

Right now, our challenges are almost more internal than external. We are still in the process of bringing all the Dentsply and Sirona teams together. Going from still thinking as two organisations to getting it merged into one focused organisation, is mainly what we have been doing right now. I have been here seven months and when I came here initially, I said, the most important thing to do, is to grow and now seven months later I am still saying, the most important thing we should do, is to grow. I have a lot more clarity now in terms of how we grow. In my mind the two biggest areas of growth for us are new products, as well as getting our commercial organisation more focused on acting as one organisation.

There are significant competitors on the market. Ultimately our competitors are also helping to improve the practice of dentistry—thus the level rises. Having good competitors, makes you better.

You have a strong background in the healthcare industry. How does your experience and knowledge apply to your job at Dentsply Sirona?

I have been doing healthcare for 34 years. The interesting thing is, there is a couple of things that have always been consistent whether you are working in vision care, interventional cardiology or diabetes. Firstly, innovation is critical and how to focus on the customer needs and deliver innovation.

The second is globalisation. I have spent my whole life working at global companies, and we have more than 70 per cent of our employees, as well as of our revenues coming from outside of the US. Realising that the whole world does not look like, e. g. Florida (where we are right now), is very important. Thinking about a customer in a developing market like Thailand, is very different than about an established dentist in Germany. And even though Germany and France border each other, the French dentist's practice is extremely different to the German. So, understanding how you globalise things, is essential.

In all parts of healthcare, I have worked in, the KOLs are critical. The relationship with these thought leaders is absolutely essential, because they are the people that are going to challenge our thinking—whether it is somebody inventing something in cardiology or in molecular diagnostics, the KOLs are important. So how I look at

Fig. 2

Fig. 1: Dental professionals at the Dentsply Sirona World 2018 in Orlando, USA, could profit of up to 200 breakout sessions. **Fig. 2:** Don Casey, CEO of Dentsply Sirona and Georg Isbaner, editorial manager of *implants*, at the Dentsply Sirona World.

it, innovation, globalisation and KOL management—it is the same.

There are a lot of interesting things about dentistry, that are different than in general healthcare. If you look at the degree of specialisation in dentistry, it is not as high as it is in other industries. If you take eye care for example there are ophthalmologists, optometrists and opticians in every country in the world. Whereas in dentistry you will find oral surgeons but not every country has specialised endodontists, not every country has hygienists or people that do nothing but orthodontics. So, the degree of specialisation is a little different in dentistry globally than what you might see in other parts of healthcare.

Here in Orlando, Dentsply Sirona is welcoming more than 4,500 participants mainly from the US but also from many other countries including Germany. You even have a Dentsply Sirona Oktoberfest. How big is the "German identity"—if there is such a thing—in your company and what might it stand for?

I have said that multiple times publicly, I will say it again: I actually think we are a German company. A lot of our really big franchises come from Germany or the D-A-CH region—if you throw in endodontics for example, which is located in Ballaigues, Switzerland. There is a huge concentration of our big businesses coming out of this region. In Bensheim, Germany, I have now been able to do two big town hall events which we call "Under the roof" and I always refer to Bensheim as the capital of dentistry for the world, because if you think about digital dentistry, whether it is the imaging business or the CAD/CAM business it came from Germany.

We tend to think that one of the crown jewels of our entire enterprise is the fact, that we have a strong German heritage—whether it is the engineering, the intimacy with the customers or the fact that we just built a tremendous clinical training centre in Bensheim. The latter shows our commitment to that market: we would like to have 10,000 dental professionals per year do a training in Bensheim, so they think of Dentsply Sirona as their home town company.

> "Our recipe at Dentsply Sirona is going to be: talk to the KOLs, make sure we are developing great products and educate the dental professionals to use them."

What is the main focus of the Dentsply Sirona World 2018 event?

Dentsply Sirona has a couple of different important goals. The first is, the opportunity to launch new products. I am adamant about Dentsply Sirona being the innovation leader in all dentistry over the next decade. We are launching nine new products over the four days here. It is a great opportunity for us to launch something where there is a great number of dental professionals. So, innovation is the first big thing.

The second is clinical education. We have over 100 experts here doing 200 breakout sessions, so the level of clinical education of this event is unsurpassed, compared to any kind of trade event that we have seen. We are go-

ing to continue building on that as an important heritage, because our recipe at Dentsply Sirona is going to be: talk to the KOLs, make sure we are developing great products and educate the dental professionals to use them.

Another focus, to be honest, is having some fun with our customers. They work hard and they look at this event as an opportunity to improve their practice and the way they approach things clinically. They can learn about five to six new products and it is actually a great opportunity for them to purchase products—there is usually some good incentives to do that. If they leave this event reinvigorated to be great dentists, we think that is terrific.

Looking at your portfolio, it does provide such "single items" as scanners, dental chairs, CEREC systems, implants, etc. How do you turn products into solutions, as your claim "the dental solutions company" implies?

The biggest opportunity we have about innovation and delivering on solutions, is to put the customer in the centre. Sometimes you have a product line and the product has been thought out, but actually the customer has to be put in the middle first—like in backward planning. Instead of inventing a product and then checking who wants to buy it, the customers should first be asked the questions "How can we help you?" and "What procedures are you doing in your office?". A great example is our product Azento that we are launching today, which is a single tooth replacement. It is a classic example of thinking in procedures and not in single products. It is not about selling only an abutment, but also about providing the digital planning for the customer. Dentsply Sirona will literally take him or her through the five or six steps needed to actually have a perfect procedure. In my mind that is the way for successful future innovations.

> "If they leave this event reinvigorated to be great dentists, we think that is terrific."

Right now, Azento is only released for the US market, but it will be presented internationally at the IDS 2019. You can combine it with our imaging equipment, CAD/CAM equipment, implant systems and you can put together a digital treatment. The predictable clinical outcome is going to be better, the doctor's confidence is going to be significantly higher and that is how we deliver on solutions.

If we look out at the next couple of years, there is ten to twelve procedures that are critical across all dentistry. I am really grateful, that our R&D has realised that when thinking about a new tooth replacement, the innovation is not a new enamel but how to improve procedures. That is how we think about it.

So, instead of thinking about the investment, the dentists think of the solution that is offered for the challenges

Fig. 3

Figs. 3: Introduction of the newly launched Azento™ system.

they are facing in daily practice. Many single dentist practices do not really have the time to create a treatment plan to do an implant, so what we can do with Azento, is to give them an unbelievably sophisticated programming tool that will help plan the abutment, plan the implant—looking at every angle—and it is all delivered in one package. We think, that will deliver a significantly better patient outcome.

Implantology belongs to the driving forces behind dental innovations. Dentsply Sirona owns some of the most established implant systems in the world. How important is implantology for the future of dental care?

If you were to ask, what are the two biggest trends in dentistry, I would say cosmetic is one of them and if you think about clear aligners as an example of really delivering a new benefit into the adult market, it has been done very well.

And then I would actually argue, that the implant category should be a significant grower just based on demographics. We used to think that 60, 70 or 80 was very close to the end, now in the US alone we are going to have 25 million 80-year-olds in 2020—just think how many teeth they will need. In Japan, we are seeing a great initiative called 80/20, where they want to achieve 20 teeth among all the 80-year-olds by 2020—it is just a great way to help dentists think about that. A lot of that development will fall to the implantologists, they will really have a tremendous opportunity to engage with patients in a much more holistic way and further there is going to be more patients. So yes, it is all about implants.

We have a lot of runway in front of us, especially with the technology and equipment side—penetration to CAD/CAM is probably half as high today as it will be in the next five to seven years. If you look at the access people will have to simple tooth replacement because of the sophisticated imaging that is now available, it is going to be a very hot growth area. Also, general dentists will be able to do some of those procedures.

When talking about the future of oral health in general, what challenges, changes and chances lie ahead of us?

Governments have to decide, how much they want to invest in preventive oral health as a way of enhancing overall health, as well as basic dental hygiene. There has not been much uniformness in the countries around the world that are approaching this issue. The data that I have been seeing from longer term clinical studies absolutely show that if you improve the overall oral health of a population, you will see benefits five to seven years later, because oral health is a predictor of general health.

The reimbursement paradigms particularly in Europe about how we should approach prevention and really improve our overall oral health are going to be critical. I think it is a great investment for governments to make and if the governments are not investing as much, we have to start thinking about how we can collectively do so as an eco-system. Whether it's the manufacturers, the media or the practitioners, we really have to educate the public that prevention is a very inexpensive way of preventing much more expensive outcomes later.

I am really optimistic about the technologies we are bringing out and that we can help do an even better job of clinically educating dental professionals. I expect this to be the next big change in the amount of oral healthcare expenditures that will be seen globally. If the governments figure that out and step up—great. If they do not, we are going to have to do the job of educating the population.

Mr Casey, thank you very much for the interview.

contact

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Jan Kielhorn

"Mini implants can be used in cases where a conventional system would be problematic or the amount of preparation prior to fitting an implant would be too high."

Mini in size, high in standard

Jan Kielhorn from Öhringen, a town in the Southwest of Germany, is a dentist specialising in oral surgery. In this interview, he talks about how he has extended the spectrum of therapy he offers, by using mini implants. To him, there are several convincing arguments for mini implants offering an alternative to standard implants, especially when a minimally invasive solution is required. He has spent the past few months working with the implant system CITO mini® (Dentaurum Implants) and thus presents what advantages these mini implants have to offer and why he prefers to use this system rather than others.

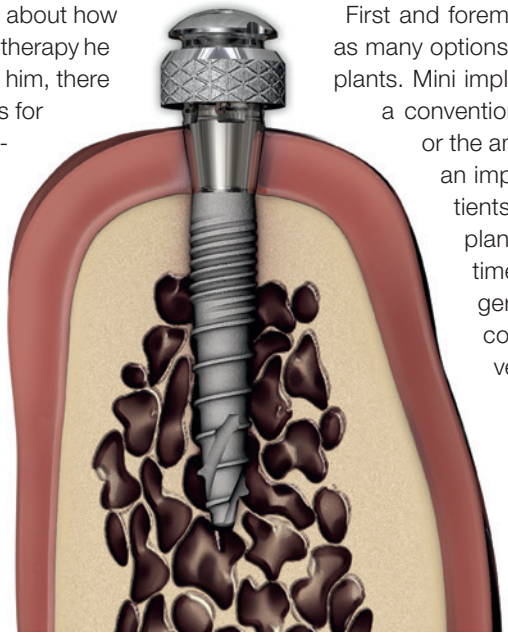

Fig. 1: Cross section of a jaw with CITO mini® implant and fitting matrix.

Mr Kielhorn, why have you chosen to establish mini implants as part of your treatment concept?

First and foremost, I wanted to offer my patients as many options as possible when it comes to implants. Mini implants can be used in cases where a conventional system would be problematic or the amount of preparation prior to fitting an implant would be too high. Many patients consult my practice wanting implant rehabilitation but, at the same time, wanting to avoid extensive surgery. In such cases, I can offer them comparatively minor surgical intervention by using mini implants.

Which indications warrant the use of mini implants?

The classic case is when a complete denture needs fixing, but there is a wide range of options. A modern implant system can cover many indi-

cations, for example when the number of abutments needs to be strategically increased in order to retain partial dentures. If teeth already display periodontal damage or have undergone endodontic treatment, it makes sense to insert mini implants, for example if the dorsal arch is shortened. Mini implants can help to avoid any lever action on the terminal abutment teeth. They can also be used in cases of reduced remaining dentition. Often, only a few implants are required to return stability to existing dentures. Moreover, mini implants are often used as an intermediate solution in the course of conventional implant therapy.

What did you find convincing about CITO mini® implants?

The fact that the system is very similar to modern standard implants, yet they are one-piece mini implants. Their characteristics are practically equivalent to standard implants, and they can be safely used for the above-mentioned indications.

What exactly are the advantages in comparison to other mini implants?

Work with a professional kit is important to me—this implant system offers just that. The implants are delivered in gamma-sterilised double packaging. They can be removed from the packaging contact-free using an insertion key (PentaGrip) and can then be inserted either with a manual or a power-assisted intermediate handpiece. The self-tapping thread ensures atraumatic implant insertion at a steady insertion torque, as well as high primary stability. The external geometry of the implant is cylindrical/conical, so we can assume a uniform, gentle loading of the bone avoiding local overloading and tension peaks that might damage the bone.

How are the prosthetic components connected?

By means of a ball abutment—a tried-and-tested technique. The abutment of this one-piece implant serves as a patrix. Configured O-ring matrices are offered to fit onto the patrix, thus ensuring a stable connection between implants and tooth-borne telescopic restorations. The force needed to remove the denture is similar to that of a telescopic crown. Another advantage is that depending on the indication and the amount of work that can be involved, a choice can be made between direct processing (without models or laboratory implant) and indirect processing (in a laboratory).

How important is the implant surface to you?

Very important, since it greatly determines successful osseointegration. In the case of CITO mini® the implant surface is inspired by two-piece implant systems. In the osseous region, the implant surface is blasted, etched and adapted to the cellular structure of the bone. In the shoulder region, the implant is polished favouring gingival apposition. Summarising, it can be said, that the mini implant I use, can in many ways be compared to a conventional system. As a user, I have a professional kit at my disposal which I can offer my patients as an adequate alternative to a standard implant—it is an ideal addition to the daily implantological practice.

Thanks for this interview, Mr Kielhorn.

contact

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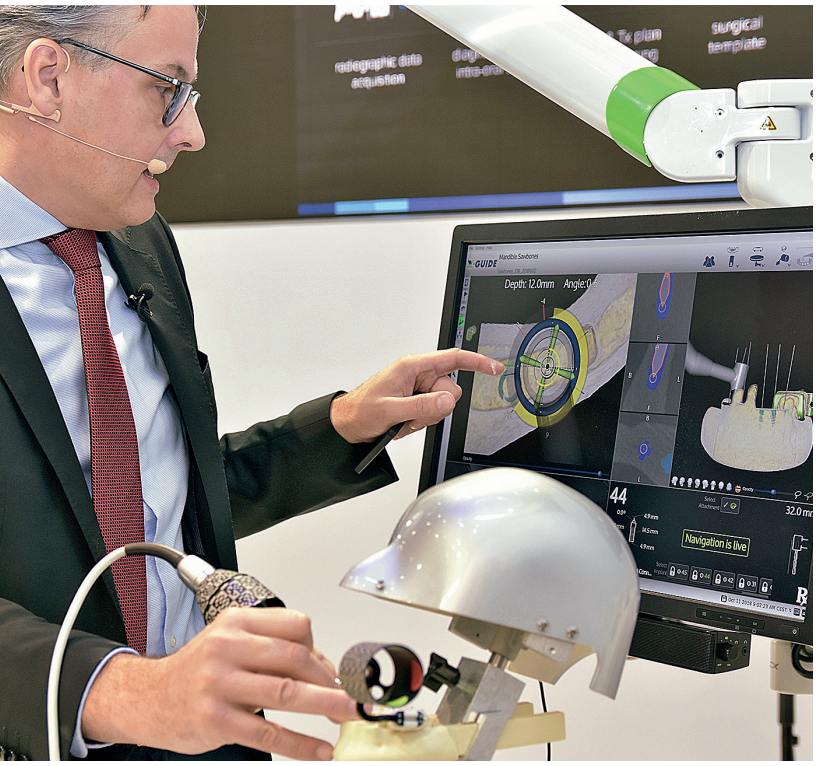
Nobel Biocare

Dynamic navigation added to digital workflow



At the 2018 annual scientific meeting of the European Association for Osseointegration (EAO) in Vienna, Nobel Biocare announced the next step in its digital workflow. Being officially launched there for the European market, X-Guide offers a new treatment option for same-day surgery, with DTX Studio Implant (formerly NobelClincian) empowering this system for dynamic 3D navigation. This way, treatment plans from DTX Studio Implant can be instantly delivered to the patient, facilitating a workflow for diagnostics, implant planning and dynamically navigated implant surgeries. X-Guide then provides lag-free 3D intraoral guidance of the drill in real time. “With DTX Studio Implant and X-Guide, clinicians can achieve high precision shorter time-to-teeth treatments, including screw-retained provisionalisation with full three-dimensional control of their implant site preparation and dynamically monitored implant insertion,” Dr. Pascal Kunz, Vice President Product Management Digital Dentistry at Nobel Biocare said during the presentation at the company’s EAO booth. X-Guide is manufactured by X-Nav, an exclusive partner of Nobel Biocare.

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Nothing is more winning than a light-hearted and happy smile. With the PURE Ceramic Implant System even very demanding patients can smile with confidence according to the principle “Discover natural PURE white. Love your smile.”
With this implant system, dentists can grant their patients the best aesthetic, natural and solid treatment. Patients will benefit from all the highly aesthetic advantages of a natural ceramic implant—ivory-coloured like a natural tooth root and even in cases of thin gingiva biotypes not shining through. No compromises on aesthetics, reliability or the most natural choice of material are necessary. Further they can rely on high-performance zirconia ceramic material being even stronger than the gold standard, grade 4 titanium implants.

The Straumann® PURE Ceramic Implant System is the result of more than 12 years of relentless research and development until the ceramic implants complied with the company’s premium quality standards. Swiss quality and precision, strength, clinical success and flexible treatment protocols are combined in an innovative solution that helps dentists meet the needs of their patients. Find out more at: pure.straumann.com.

Institut Straumann AG
Peter Merian-Weg 12
4052 Basel, Switzerland
www.straumann.com

Zest Dental Solutions

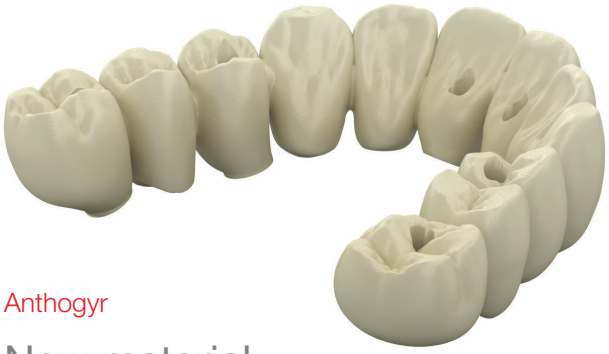
Newly improved attachment system

The LOCATOR R-Tx removable attachment system is the fourth generation of award-winning patient-removable attachment systems from Zest Dental Solutions. The new abutment coating is 30 per cent harder with over 25 per cent greater wear resistance, and nearly 65 per cent reduction in surface roughness. The narrower coronal geometry of the abutment and the dual engagement of the retention inserts on the outside of the abutment allow patients to easily align and properly seat their overdenture, decreasing potential deformation of inserts, which could lead to premature wear.

The system utilises the standard 0.050 in/1.25 mm hex drive mechanism and treats up to 30° of angle correction using a single set of redesigned retention inserts with straightforward retention values: zero, low, medium, high. In addition, all of the necessary components for each individual case are shipped in one convenient vial.

LOCATOR R-Tx is a better, simpler, stronger attachment system and comes with a 100 % Satisfaction Guarantee to prove it!

Zest Dental Solutions
2875 Loker Avenue East
92010 Carlsbad, CA, USA
www.zestdent.com



Anthogyr

New material for customised prostheses

Anthogyr is now adding a new ceramic to its line of CAD/CAM customised prostheses: Sina ML. Highly durable (> 1,150 MPa), it requires no ceramisation and reduces the risk of chipping. This multi-layer zirconia combines strength, beauty, and biocompatibility for single and multiple implant- and tooth-supported prosthetic restorations.

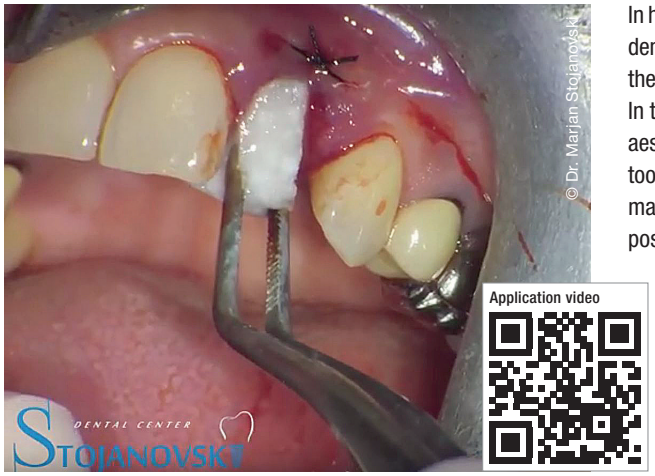
With the new Sina ML available in seven shades, Anthogyr expands the line of zirconia in its catalogue, which includes Sina Z (opaque) and Sina T (translucent), each available in 16 shades.

In addition, angulated access is available on Simeda® customised prostheses with an integrated inLink® connection in three different materials: medical grade V titanium, cobalt-chromium and zirconia. They are also available for Simeda® prostheses on multi-unit abutments for Axiom® BL, and for Connect+® prostheses with Nobel Biocare® multi-unit abutments.

Anthogyr Group
2237 Avenue André-Lasquin
74700 Sallanches, France
www.anthogyr.com

curasan

New application video: Alveolar management

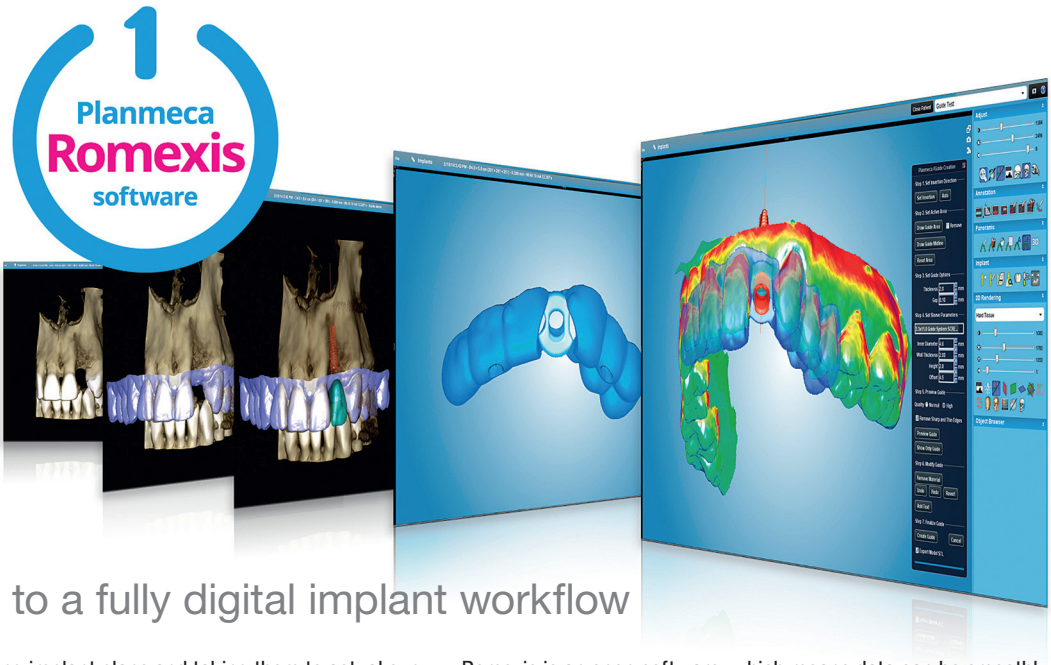


In his current video, Dr Marjan Stojanovski from Skopje, Macedonia, demonstrates how fast and easy an alveolar ridge preservation in the aesthetic zone can be achieved with CERASORB® Foam.

In the case shown in the video, not only the defect is filled, but for aesthetic and functional reasons, also the crown of the extracted tooth was used as a space holder. Thus, allowing the patient to maintain his daily routine. At the end of the video, the one-day postoperative situation is documented.

Its versatility and easiness of use make CERASORB® Foam a product of choice for intelligent alveolar management.

curasan AG
Lindigstraße 4
63801 Kleinostheim, Germany
www.curasan.de



Planmeca

Your key to a fully digital implant workflow

These days, creating implant plans and taking them to actual surgery is easier than ever before, as the Planmeca Romexis Implant Guide software supports all the required steps in a fully digital implant workflow. Everything is controlled and completed with the same software platform—from imaging and scanning to designing and implant guide manufacturing.
Users can capture all needed CBCT images and intraoral scans, perform prosthetic-driven implant planning using the software's comprehensive implant library, and design a surgical guide with a few simple clicks.
Romexis is an open software, which means data can be smoothly imported from other systems and completed guide designs exported in STL format without extra fees. The Romexis Implant Guide module allows designing 3D printable guides for both single and multiple implants—or even fully edentulous cases.

Planmeca Oy
Asentajankatu 6
00880 Helsinki, Finland
www.planmeca.com

MIS

Makeathon—An unforgettable experience for all

In June 2018, MIS held its first Makeathon—a two-day brainstorming event for young engineers, doctors, students and thinkers in general. After an introduction from MIS CEO Idan Kleifeld, familiarising the participants with the mission and vision of the company, the first day continued with several fascinating and eye-opening lectures by key speakers, from both the dental world and outside of it.

After a tour of the production facilities, the participants were divided into groups and started to formulate their ideas and work on their presentations. Throughout the entire process, the Makeathon mentors offered advice, vast personal experience and knowledge on what would work best according to the requirements and limitations.
On the second day, each group presented their ideas to the panel of judges. The high-level competition resulted in a third-place winner and two teams who tied for first place. Tali Jacoby, product manager and lead organiser of the event, was extremely pleased with the outcome, saying "MIS is proud that we can support young doctors, engineers and students in order to come up with new and fascinating ideas together. […] This is a fantastic platform for introducing new technologies which are still unknown to clinics."

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

Dentsply Sirona

Thousands of dental professionals at Dentsply Sirona World

Attendees experienced a one-of-a-kind conference from 13 to 15 September at the Dentsply Sirona World in Orlando, USA. The company presented many new products while hundreds of workshops showed dental professionals how to make their work even easier, faster and safer.

Topics ranged from introductory to expert at the 200 breakout sessions available within 12 educational tracks. Hands-on sessions provided attendees the chance to learn from industry experts in a collaborative space allowing them to apply and test their knowledge on the spot. A special highlight was the live surgery, held during the opening general session. A patient was fitted with a bridge produced with CEREC SW 4.6 for the already-placed implants, which had previously had a screw-retained temporary restoration.

The ultimate objective was for event attendees to leave with ideas on how to improve their daily work within their practice and to expand their network of peers.

Dentsply Sirona
Sirona Straße 1
5071 Wals/Salzburg, Austria
www.dentsplysirona.com

MEDENCY

State-of-the-art diode laser technology

The Italian company MEDENCY has been built upon profound global expertise in the dental market and dental lasers in particular. “Our flagship product PRIMO combines state-of-the-art diode laser technology with innovation and the experience of MEDENCY in the dental industry. PRIMO provides a variety of applications and is thus a viable alternative to conventional surgical methods like electrocautery and the scalpel. Owing to its intuitive interface, the device is easy to use,” stated the company’s general manager, Alessandro Boschi.

All products are designed, engineered and manufactured in Italy—with passion and commitment. “Our overall mission is to deliver a combination of cutting-edge products, services and interaction with customers drawing on a wide network of academic partners,” said Boschi.

The company supports its partners with tailor-made educational courses in different countries in order to gain practical experience in the use of the system in daily practice. Using dental laser technology has never been so easy.

MEDENCY Srl
Piazza della Libertà 49
36077 Altavilla – Vicenza, Italy
www.medency.com

Essential guide for clinical practice in implant dentistry

Sixty top scientists from around the world participated in the 2018 EAO Consensus Conference, which was held in Switzerland in February. The European Association for Osseointegration (EAO) has now published an essential guide for practitioners in the field of implant dentistry. It provides an accessible summary of the findings from the 2018 conference and shines a light on many challenges currently facing clinicians.

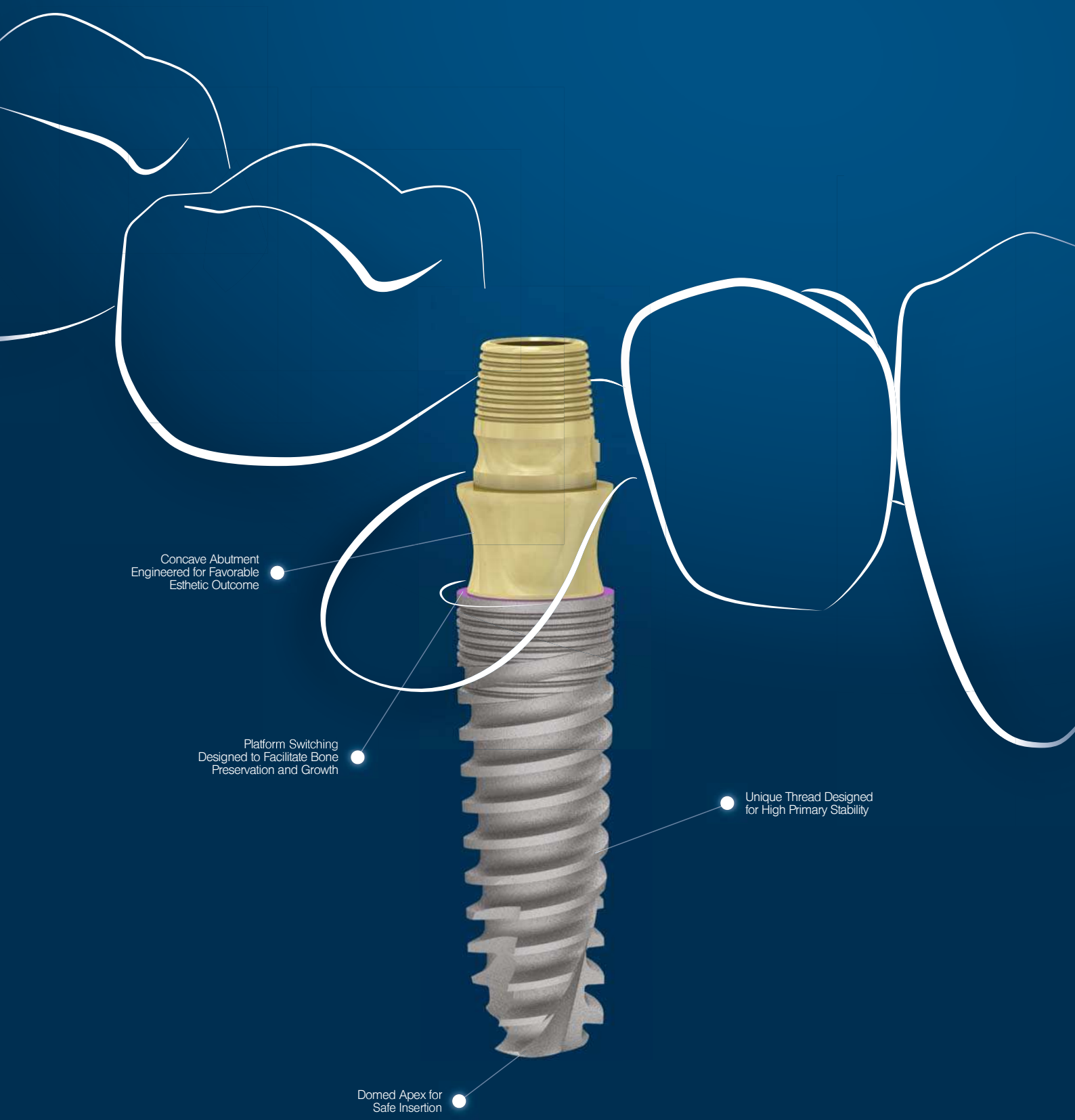
The EAO Consensus Conference takes place every three years. During the event, leading experts are invited to discuss emerging techniques and hot topics in the field and come up with their recommendations for best practice. Their findings are then published in *Clinical Oral Implants Research* as a comprehensive, open-access supplement. In order to disseminate the findings and make them more accessible, the EAO has published its *Key points for clinical practice*. The report was written by a group of dentists who were invited to attend the conference to observe the discussions. It provides a clear summary of the findings and gives readers key facts to include in their clinical practice. The topics selected for discussion during the 2018 EAO Consensus Conference were particularly relevant to clinical practice. Participants tackled the themes of drugs and diseases, biological parameters, reconstructions, and biomechanical aspects. These were broken down into several subtopics and debated at length. *Key points for clinical practice* follows the same structure and covers each topic in a helpful question-and-answer format.

The EAO has developed a dedicated microsite to allow users to explore the report. It has also been translated into ten languages (English, Spanish, French, Portuguese, German, Italian, Russian, Korean, Japanese and Chinese), and all editions will be available to download from the microsite (**www.eao.org/mpage/Keypoints**). In addition, a version translated into Swedish will be published in the Journal of the Swedish Dental Association.

contact

EAO Office
38 rue Croix des Petits Champs
75001 Paris, France
www.eao.org

Fig. 1: The drugs and diseases working group at the 2018 EAO Consensus Conference.



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1st Future Congress has set new standards

The DGZI is the most traditional European expert association of dental implantology. Right from the start, the association has provided decisive impulses without which modern implant dentistry as one of the absolute trend disciplines of modern dentistry would not be conceivable today. Today, the field of dental implantology undergoes a development in the interplay of practitioners, universities and industry, which was almost unimaginable. In this context, it is important for the DGZI to stay up to date and constantly face the new challenges of a rapidly developing training landscape. Thus, not only the competition has become stronger, but also the members of the DGZI, the participants in the DGZI congresses and curricula meanwhile set different premises. Efficiency, practical utility and a varied scientific programme are more and more in the spotlight today.

At a general meeting held prior to the congress, new DGZI board members were elected. By a large majority, the Cologne-based dentist Dr Arzu Tuna was elected as Second Vice President. Her focus is on promoting young researchers and integrating young colleagues into the DGZI. Prior to her election as a board member, Dr Tuna has worked as member of the jury at both the DGZI Implant Dentistry Award 2018 and the Poster Award, which were presented within the context of the Digital Poser Presentation at the 1st Future Congress. By electing dental technician Oliver Beckman as new assessor at the board and, thus, including a young and engaged in the work of the association, the DGZI was highlighting dental competence once again. In addition, the association aims to put an increasingly strong focus on the collaboration between dentists and dental technicians in the future.

From 28 to 29 September, the DGZI was hosting their 1st Future Congress in Duesseldorf, Germany. The event was held under the motto “Visions in Implantology” and its overriding aim was to offer new approaches with a clear eye on the future. Since there is a decrease in the number of participants at the congresses of the well-established implantology expert associations, the DGZI had to come up with something fresh and unique: 250 dental participants and 120 practice employees were experiencing a forward-looking congress that was both raising and answering new questions, and pointing to new ap-

Fig. 1

Fig. 1: The DGZI board renewing itself. From left: the recently elected assessor Oliver Beckman and the new Second Vice President Dr Arzu Tuna, Dr Rainer Valentin, Dr Georg Bach and Dr Rolf Vollmer. **Fig. 2:** The table clinics, which were occupied up to the last seat.

proaches in interaction with participants, speakers and industry representatives. The high demands on content were reflected in an entirely new organisational concept. To sharpen its profile as practical and application-oriented event, the congress was no longer split into separate speaking stages, workshops and side programs. Instead, it was divided into a so-called industry day on Friday, featuring strategy talks, live-surgery broadcasts and table clinics, and a science-oriented Saturday. This setup guaranteed that individual demands—especially from implantologists—were met and satisfied. Both a surgical treatment and a tutorial held in the Competence Centres of Leipzig and Bad Oeynhausen were broadcasted live using a fascinating multi-channel streaming technology, which showcased the direct implementation of a digital workflow into the

Fig.2

Fig. 3: The 1st Future Congress of the DGZI aimed to raise new questions.

daily practice. Thus, DGZI members abroad, who were not able to attend congress in Duesseldorf, had the unique opportunity to experience the work of their renowned colleagues. In doing that, the DGZI was breaking new ground once again. By performing a surgery on the topic of "The iSy way—one click, one scan, one shift. Minimisation as the key to success", for instance, the surgeon trio of Dr Thomas Barth, Christian Barth and Dr Stefan Ulrici were showing that a minimalist approach can be effective applied to various aspects of the dental practice—from surgical protocols to the digital workflow. Moreover, Dr Jochen Tunkel from Bad Oeynhausen contributed to the programme by presenting flawlessly documented patient cases and sharing his experiences regarding the peel technique on Friday morning. Dr Tunkel was excellently presenting explaining the medical procedure, with his main focus being on its safe and long-term stable application.

Instead of a parliamentary seating facing the stage, there were round tables resembling a banquet seating, which was an unusual sight. At these tables, each of the exhibiting companies gave demonstrations on a wide variety of different special topics and the accompanying

Fig. 4: The Japanese delegation visiting the congress, as every year, completing the expert examination.

Fig. 5: The operation performed by Dr Jochen Tunkel was streamed live, supported by Straumann.

discussions proved to be very insightful. This new format was accepted very well by both the participants as well as the dental exhibitors.

Both the table clinics and the exhibition concept, which were a spatially integral part of the programme, gave rise to the significance of the industry. By using modern tools such as the Future Podium, innovative presentation techniques or interactive solutions, the congress aimed to resemble a congress trade fair. In addition, digital poster presentations (DPP) were yet another highlight of the event: On both congress days, internet-based and interactive DPP were held in the DPP Lounge, right in front of the conference hall, with the posters also being available on mobile devices. The working group headed by Dr Ralf Smeets proved particularly diligent and successful: The Hamburg-based team was awarded first, second and third place.

Fig. 6: Dr Ralf Smeets delivering his poster presentation.

With a catering concept based on “flying-services” and without considerable breaks between lectures, live-surgeries and table clinics, participants, speakers and industry representatives were given significantly more time and space to communicate with each other.

The goals of this modification were future orientation, organisational modernity, content attractiveness and a new way of presenting perspectives in order to reach a new level of interaction from the different perspectives of science, practice and industry. The 1st Future Congress in Dental Implantology was in particular addressing the question of what implantology will look like in five or maybe ten years. Ultimately, apart from scientific and technological aspects, it was also about strategic questions with regard to the implantological practice of the future. In Duesseldorf, the DGZI once again proved its importance and attraction, also in view of the 50th anniversary of its foundation, which is due to happen in 2020. The 2nd Future Congress will be held under the motto “Perioimplantology: Implants, Bone and Tissue” from 4 to 5 October 2019 in Munich, Germany.

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Dental professionals from around the globe

To gather in Las Vegas next June

Nobel Biocare invites dental professionals from around the globe to join its upcoming Global Symposium, which will be held from 27 to 29 June 2019 at the Mandalay Bay Hotel and the Convention Center in Las Vegas. The event will offer a great number of lectures, master classes and hands-on sessions, as well as original solutions that range from smarter implant designs and site-preparation techniques to new digital solutions designed to further enhance the patient treatment. The upcoming event will feature a change of location and venue. Significantly expanding in size, it will welcome up to 3,000 dental professionals from around the globe. The scientific committee, led by Dr Peter Wöhrle from the US, comprises many renowned experts in implant dentistry and oral rehabilitation. The programme will, furthermore, feature a large number of expert speakers consisting of world-class researchers, clinicians and laboratory technicians. Moreover, participants will be given the opportunity to choose different streams to create an individualised programme tailored to their own interests and treatment goals. You can now register for the 2019 Nobel Biocare Global Symposium online.

Source: Nobel Biocare

Future “Simplantology”:

The convergence of evidence and digital innovation

From 18 to 19 October 2018, Alpha-Bio Tec hosted a two-day educational congress for European customers in Monte Carlo, Monaco. The congress, designed for global dental professionals, was an opportunity to share implant expertise. In addition, the latest trends in the implantology market were presented. Dental professionals from around the globe were exposed to various topics related to advanced 3D imaging and CAD/CAM technologies. Participants had the opportunity to learn from comprehensive clinical cases, as well as evidence-based advanced treatments and techniques. Alpha-Bio Tec also addressed the company’s core value of “simplantology”, based on the convergence of scientific evidence and digital innovation. Yuval Grimberg, General Manager at Alpha-Bio Tec, stated in his congress speech that the company’s focus is on providing dentists with simple solutions that aim for good aesthetic results. The company is continuously developing products and providing international training and educational programmes, thus delivering on the demand for patient-oriented solutions.

Source: Alpha-Bio Tec

Researchers trial new protocol for

Management of peri-implantitis

Peri-implantitis is one of the most frequently occurring pathological conditions that dentists and dental hygienists face. So far, however, there is no gold standard of treatment, nor randomised clinical trials in the literature comparing surgical and non-surgical treatment. Italian scientists have now found promising results with a new non-surgical protocol in their study, titled, "A new multiple anti-infective non-surgical therapy in the treatment of peri-implantitis: A case series".

The researchers, led by Dr Magda Mensi, Assistant Professor of Periodontology, Oral Surgery and Implantology at the University of Brescia in Italy, embarked on a pilot study in 2013 to determine whether a combination of low-abrasion powder, topical antibiotic and curettage could be more effective against severe peri-implantitis than conventional mechanical debridement. Mensi thus developed the multiple anti-infective non-surgical therapy (MAINST) protocol and utilised it on 15 patients with dental implants affected by peri-implantitis. The patients underwent quarterly maintenance sessions and were instructed to use personalised home care instruments, like sonic toothbrushes and floss. "The patients have to be educated in plaque and calculus removal, motivated to carry out this maintenance at home, and show up for their dental sessions. If they come back only when there is a problem, it will be too late," Mensi emphasised.

After 12 months of continued observation, a 4.0 mm reduction in probing pocket depths, an attachment level gain of more than 3.7 mm and a bleeding on probing rate of only 6.5 per cent were observed. The implant survival rate was 100 per cent. Mensi added that the results of the study so far indicate that the MAINST protocol could become the gold standard of treatment for peri-implantitis. A randomised control study shall validate this hypothesis.

Source: DTI

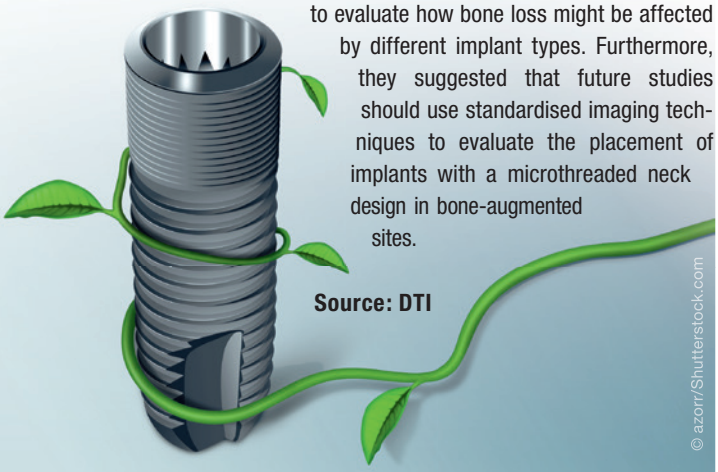
Microthreaded dental implants promote

Crestal bone preservation

Researchers from the University of Kentucky, USA, and the University of Dammam, Saudi Arabia, investigated the impact of a microthreaded neck design in implants on crestal bone preservation, which is essential for implant stability. For the study titled "Microthreaded implants and crestal bone loss: A systematic review" 23 articles published between January 1995 and June 2016 and obtained via relevant keyword search on three electronic databases were analysed.

As a result of the analysation the scientists concluded that the addition of deeper threads on the implant allowed for greater stabilisation between the implant and the bone, especially with weaker bone. Further it was found that less crestal bone was lost with dental implants that had a microthreaded neck design than with those with a machined surface or conventional rough surface. The findings demonstrate that geometry does affect the amount of stress and strain on the implant, shape may thus contribute to better primary implant stability.

The researchers recommended additional trials to evaluate how bone loss might be affected by different implant types. Furthermore, they suggested that future studies should use standardised imaging techniques to evaluate the placement of implants with a microthreaded neck design in bone-augmented sites.



Source: DTI

Dragonfly-inspired implant design shall

Prevent post-surgery infection

Cell biology researchers are partnering with nanotechnology experts to fight post-surgery infection by creating implants based on dragonfly wings. Working with leading surgeons and an Australian orthopaedic medical device company, researchers from the University of Adelaide and University of South Australia will use nano-modification technology to reduce the risk of infection after surgery.

The bacteria-destroying qualities of the dragonfly were first identified by Australian scientists who observed bacteria being killed on the insects' wings, characterised by tiny spikes—nanopillars—of about one thousandth of the thickness of a human hair. The researchers are thus carrying out diverse experiments to test whether mimicking the nano-patterns of the dragonfly wing on implants can kill harmful bacteria that cause infections.

The four-year project could achieve a critical breakthrough in the global fight against antibiotic resistant bacteria. The researchers from the Adelaide-based institutions will combine their expertise to create titanium implants with the dragonfly wing surface while confirming their safety and testing their bacteria-killing properties. The new technology could thus be of use in any field where surfaces are subject to high levels of bacteria.

Source: The Lead South Australia

Congresses, courses and symposia

AO Annual Meeting

13–16 March 2019
Venue: Washington DC, USA
www.osseo.org/annual-meetings

Giornate Veronesi

3–4 May 2019
Venue: Verona, Italy
www.giornate-veronesi.info

5th Annual Meeting of ISMI

10–11 May 2019
Venue: Constance, Germany
www.ismi-meeting.com

EAO
EUROPEAN ASSOCIATION FOR OSSEOINTEGRATION
CONGRESS

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

implants
international magazine of oral implantology

Imprint

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Printed by
Silber Druck oHG
Am Waldstrauch 1
34266 Niestetal, Germany

implants
international magazine of oral implantology is published in cooperation with the German Association of Dental Implantology (DGZI).

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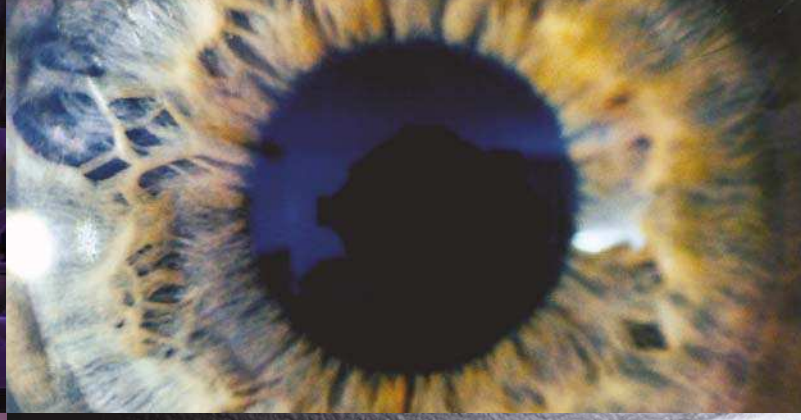

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