

STARGET

INTERNATIONAL MAGAZIN FOR CUSTOMERS AND PARTNERS OF STRAUMANN 2 / 2015

New standards for improved and more efficient treatment of your patients

Straumann® Bone Level Tapered Implant

More than primary stability. A new standard for conical implants.

Straumann® Pro Arch

An alternative solution for highly complex full-arch restorations. Quickly improve your patients' quality of life.

Biomaterials@Straumann®

A unique range of regenerative solutions. Because just one option isn't enough.



Imprint STARGET – INTERNATIONAL MAGAZINE FOR CUSTOMERS AND PARTNERS OF STRAUMANN | © Institut Straumann AG | Peter Merian-Weg 12 | CH-4002 Basel | Phone +41 (0)61 965 11 11 | Fax +41 (0)61 965 11 01 | **Editors** Roberto González, Mildred Loewen | **E-Mail** starget@straumann.com | **Web** starget.straumann.com | **Layout** bemerkt.gestaltung+kommunikation | www.bemerkt.de | **Printing** Hofmann Druck | www.hofmann-druck.de

iPad This publication is also available for the iPad (English, German, Spanish, French and Italian). Visit the official App Store and download “STARGET for iPad”.

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We're here to set new standards

FOR ANOTHER YEAR RUNNING STRAUMANN HAS LAUNCHED A RANGE OF GROUNDBREAKING PRODUCTS AND SOLUTIONS THAT ARE A FUNDAMENTAL LEAP FORWARD IN THE WAY YOU TREAT YOUR PATIENTS.

Launched in spring this year, the Straumann® Bone Level Tapered Implant is a major addition to the Straumann® Implant Dental System portfolio. This apical, tapered implant is based on clinically tested features and concepts from the tried-and-tested Straumann® Bone Level Implant line and has been given a very favorable response by the clinicians using it. It is also an important part of the Straumann® Pro Arch Treatment Concept, which is another treatment option for edentulous patients. Fixed full-arch restoration can be carried out in a short space of time, prosthetics are more flexible and efficient, and complexity is reduced.

Our cutting-edge SLActive® and Roxolid® technologies shape the interplay between implant and prosthetic treatment. Both increase the range of treatment options and therefore the number of potential patients, and their unique, powerful combination of design, materials and surface has a reassuring feel.

Our new biomaterial portfolio also offers you significantly more options and treatment flexibility. That's because an optimal solution must always be tailored to the patient, both in implantology and oral tissue regeneration. "Universal solutions" simply have no place in daily practice.

With this range, we want nothing other than to set new standards in implantology and oral tissue regeneration. So you can give your patients even better and more tailored treatment in the future.

More details can be found in this edition. I hope you find this a fascinating read.



George Raeber



GEORGE RAEBER
HEAD PRODUCT MANAGEMENT SDIS

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STARGET has gone digital. All content of the printed editions and additional, exclusive material can now be accessed online. With all the benefits this medium has to offer.

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Overview

STRAUMANN® BONE LEVEL TAPERED IMPLANT

04 Our new Bone Level Tapered Implant has all the clinically proven characteristics of the Straumann® Bone Level Implant and presents the powerful combination of Roxolid®, SLActive®, Bone Control Design™, and the CrossFit® connection with prosthetic versatility in a new conical form.



ENVIRONMENTAL DENTISTRY – WHAT IS THE ROLE OF CERAMIC IMPLANTS?

30 An interview with Dr. Sven-Olaf Börner, who is a specialist in oral surgery and especially in environmental dentistry. In this capacity, he tries to recognize the interplay between the mouth and the organs, and to correctly interpret the pathological influences of the oral cavity on the immune system. The aim is to find out what most commonly triggers immunosuppressed patients.

ACHIEVING SUCCESS TOGETHER

34 The success or failure of an implant-based treatment is very largely dependent on the quality of the dental technicians' work. That's why the skill and high quality standards of dental laboratories are among the factors determining the success of treatment. As a way of fostering awareness of this, Straumann is now introducing the Straumann® Original Seal of Quality.



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More than a tapered implant. Perfection with a plus.



Fig. 1



Fig. 2

The Straumann® Bone Level Tapered Implant offers excellent primary stability in soft bone and fresh extraction sockets. The tapered form adequately compresses the underprepared osteotomy (Fig. 1).

It also lets you effectively master your patient's limited anatomy such as facial undercut, converging root tips, concave jaw structure or narrow atrophied ridges (Fig. 2). Building on the clinically proven features of the Straumann® Bone Level Implant, our Bone Level Tapered Implant introduces the powerful combination of Roxolid®, SLActive®, Bone Control Design™, CrossFit® connection, prosthetic diversity, plus a tapered implant body.

Enjoy great peace of mind with all our established benefits – and the benefit of the new apically tapered design for excellent primary stability even in compromised bone situations.



Roxolid®

Roxolid® – reducing invasiveness with smaller implants

- More treatment options with smaller implants
- Preserves bone and reduces invasive grafting procedures^{1,2}
- Increased patient acceptance with less invasive procedures²



SLActive®

SLActive® – designed to maximize your treatment success and predictability

- Safer and faster treatment in 3–4 weeks for all indications^{3–11}
- Higher treatment predictability in challenging protocols^{1,13–17}
- Broader treatment possibilities with more confidence^{1–16}

Apically tapered – excellent primary stability even in compromised bone situations

- Full-depth thread to apex for early engagement
- Self-cutting in underprepared sites
- Protecting anatomical structure with round tip

Make your surgical procedure and product selection flexible with the Bone Level Tapered Implant (BLT).

Adaptable drilling sequence and new instruments

Drilling sequence adaptable to anatomic situation (according to bone density)
All new BLT instruments can be identified by 2 color rings and a tapered tip

Wide product portfolio¹⁷

Endosteal diameters: \varnothing 3.3, \varnothing 4.1 and \varnothing 4.8 mm

Length options: 8, 10, 12, 14 and 16 mm

Material and surface options: Roxolid® SLActive®, Roxolid® SLA® and titanium SLA®

LOXIM™ TRANSFER PIECE

Easy handling thanks to snap-in-mounting
Correct implant placement thanks to height markings
Protecting the inner implant configuration thanks to pre-determined breaking point



Prosthetic components of the Straumann® Bone Level System

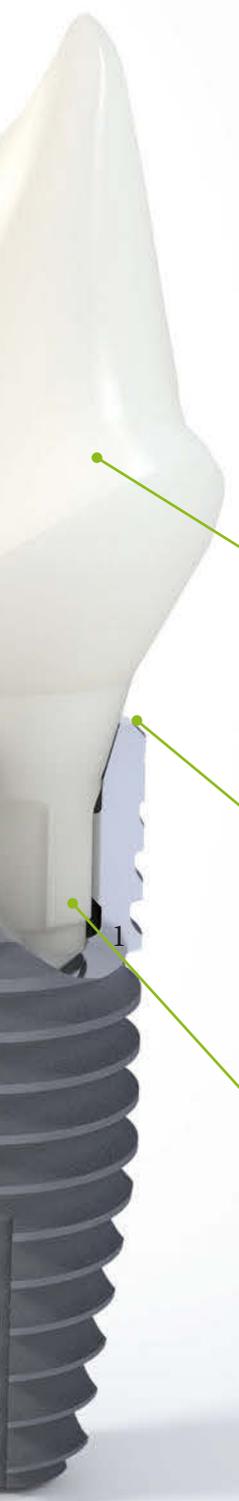
- Single- and multi-unit replacements: screw- or cemented-retained
- Edentulous treatment: fixed or removable options
- Cost-effective and premium: either with conventional or digital workflow

Bone Control Design™ – optimized crestal bone preservation

- Respects the biological distance and width
- Optimal position of smooth/rough surface interface
- Microgap control
- Biomechanical implant design

CrossFit® Connection – simplified handling, legacy of bone level system

- Easier handling and confidence in component positioning
- Ensured precision against rotation and long-term mechanical stability
- Restorative flexibility



Clinical review

HIGH PRIMARY STABILITY

Primary stability of dental implants, defined as the stability at the time of implant placement, is an important prerequisite for achieving successful osseointegration (Branemark et al., 1977; Meredith, 1998). High primary stability prevents micro-movements of the implant and therefore warrants its rigidity. This is important since the implant should not be subjected to micromotion of more than 50–150 µm during the healing phase in order to avoid fibrous tissue encapsulation (Cameron et al., 1973; Szmukler-Moncler et al., 1998). Straumann® Bone Level Tapered Implants have an apically tapered implant body and show excellent primary stability in soft bone and fresh ex-

traction sockets. A study demonstrated that for tapered implants the initial stability is secured over the bone remodeling stages (Rokn et al., 2011). One reason for this is that the tapered implant body design allows for preparing the site with tools one size smaller than the diameter of the implant, thus increasing the resistance to implant insertion. The lateral compression of the bone around the underprepared osteotomy walls leads to a continuous increase of insertion torque, an important observation especially for soft bone types as increasing peak torque values have been correlated to increased implant stability during the healing phase (Molly, 2006).



FAST OSSEOINTEGRATION

Surface modifications play an important role in the speed of osseointegration and thereby influence implant strength as well as aging resistance and success of immediate and early loading protocols (Buser et al., 1991; Coelho et al., 2011; Dos Santos et al., 2011; Elias et al., 2008; Shalabi et al., 2006). Straumann® SLActive® is a chemically modified hydrophilic surface which is clinically proven to accelerate the osseous healing (Buser et al., 2004; Lang et al., 2011; Oates et al., 2007; Schwarz et al., 2007). The hydrophilic and chemically active properties of SLActive® provide a larger accessible surface area for increased blood protein adsorption (Kopf et al., 2015), greater osteoblast differentiation and increased production of bone-building osteocalcin (Zhao et al., 2005) as well as stimulated blood vessel growth (Schwarz et al., 2008). Beyond that, studies with Roxolid® SLActive® implants indicate that the osseointegration properties are even superior to those of titanium SLActive® implants (Gottlow et al., 2012; Lang et al., 2011; Oates et al., 2007; Wen et al., 2013). Roxolid® is a unique metal alloy composed of ~15% zirconium and ~85% titanium, the only two metals commonly used in implantology that do not inhibit the growth of osteoblasts (Steinemann, 1998). Interestingly, titanium-zirconium alloys like Roxolid® have a better biocompatibility than titanium (Ikarashi Y et al., 2005) and an up to 40% higher fatigue strength than comparable titanium implants (Bernhard N. et al., 2009). Straumann® Bone Level Tapered Implants from Roxolid® and with the SLActive® surface speed up the process of new bone formation upon the implant and thereby shorten the critical transition phase between primary and secondary stability.



Fig. 1: Current global tapered design implants market trends (iData Research Inc., 2013; Millenium research group, 2015).

IMMEDIATE FUNCTION

Immediate function can offer many potential advantages such as reduced number of surgical procedures and an immediate esthetic and functional solution (Cordaro et al., 2012). Patients who have regained an important piece of their quality of life, may be more tempted to evaluate the treatment as success. It could be demonstrated that Straumann® Bone Level implants with SLActive® surface can successfully be used in early treatment

DID YOU KNOW?

The current global tapered design implants market is continuously growing (Fig. 1). More and more dental experts use tapered implants. The trend is driven by the growing patient demand for the immediate restoration of esthetics and function, but with simpler, more cost-effective and less time-consuming treatment procedures.

DID YOU KNOW?

A recent global survey among dental experts from 19 countries showed that there is a high level of satisfaction with the Straumann® Bone Level Tapered Implant (Average rating 8.5 out of 10). The reason for satisfaction is mainly due to the ease of use, the advantages of the Roxolid® material and the SLActive® surface.

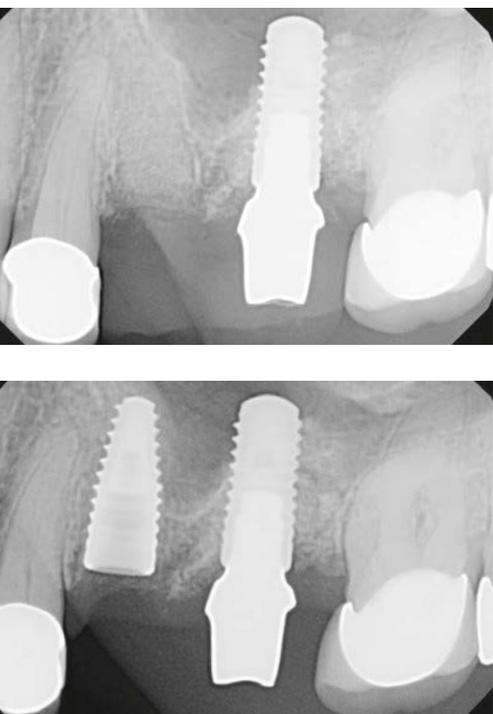


Fig. 2: Female patient presenting with a prior oral-antral fistula. The fistula with the prior implant was obturated and the Straumann® Bone Level Tapered Implant offered the opportunity to avoid sinus involvement. Courtesy of Dr. Robert L. Holt.

protocols (Bornstein et al., 2010; Buser et al., 2013b; Nicolau et al., 2011). The micro-gap of the Straumann® CrossFit® connection is extremely small and reduces inflammation, which helps to preserve bone (Cochran et al., 2013; Heitz-Mayfield et al., 2013; Jung et al., 2008). Even in poor-quality bone, survival rates are comparable with those from conventional or delayed loading. The mean bone-level change is not deemed to be clinically significant and compared well with the typical bone resorption observed in conventional implant loading. Thus, the Straumann® Bone Level Tapered Implant is suitable for placement into fresh extraction sockets or into bone of low quality (Akkocaoglu et al., 2005) and can be successfully used in conjunction with immediate and early loading protocols.

BROAD TREATMENT OPTIONS

Many patients have difficult health conditions which could compromise the treatment outcome of the implant therapy. Especially in challenging indications, the use of an implant system which is clinically proven and backed by scientific literature is mandatory to minimize the risk of treatment failure. The Straumann® Bone Level Tapered Implant mimics the shape of a natural tooth root which is advantageous with anatomic constraints (Fig. 2), including facial undercuts, converging root tips, concave jaw structure or narrow atrophied ridges. A high predictability of implant placement in augmented sites could be shown (Chiapasco et al., 2012a; Chiapasco et al., 2012b; Santing et al., 2013). Treatment of irradiated patients in the head and neck area showed 100% survival rate after 14 months (Heberer et al., 2011) and of patients with poorly controlled type II diabetes, 98% survival rate after 16 weeks were reported (Khandelwal et al., 2013). Immediate loading of overdentures supported by two implants reached 99% survival rate after up to 40 months (Stoker and Wismeijer, 2011). Additionally, the tapered design is of advantage for full-arch fixed restorations, as the temporary prosthesis is often placed at the day of surgery. For this indication, Straumann® Bone Level Tapered Implants provide the primary implant stability which is needed for reliable anchorage of the temporary prosthesis in the bone. From an esthetic point of view, Straumann® Bone Level Implants have demonstrated excellent esthetic results and high patient satisfaction in daily dental practice (Filippi et al., 2013; Furze et al., 2012). Pleasing esthetic outcomes after early loading with healthy and stable peri-implant soft tissues in the anterior maxilla even after 9 years have been reported (Buser et al., 2013a; Buser et al., 2013c; Buser et al., 2009; Buser et al., 2011). Therefore, Straumann® Bone Level Roxolid® SLActive® Implants have been tested in very challenging indications and successful treatment outcomes have been documented.

More than
primary stability.
The new tapered standard.



The perfect symbiosis of design, material and surface –
the Straumann® Bone Level Tapered Implant:

- Roxolid® material – Reducing invasiveness with smaller implants
- SLActive® surface – Designed to maximize your treatment success and predictability
- Apically tapered – Excellent primary stability even in compromised bone situations
- CrossFit® connection – Simplified handling, legacy of Bone Level System

In combination with:



Immediate implant placement and temporization



LEON PARIENTE

DDS

FRANCE

Private practice in Paris limited to Implantology and Periodontology. Graduate of the University of Paris Rene Descartes. Advanced Program in Implant Dentistry at the New York University College of Dentistry (2012). Several research projects at the Prosthetic and Implant Department of the University Paris Rene Descartes.

PATIENT HISTORY

A 35-year-old Asian woman, non-smoker, in good general health, was referred after horizontal root fracture of the left maxillary central incisor (Figs. 1, 2). She reported that she suffered from a trauma several years before and that the broken tooth was severely discolored and endodontically treated before fracturing. Clinical examination revealed a horizontal root fracture below the gingival level. The periodontium was healthy with no sign of infection. Radiographic examination showed that the fracture had extended to the bone level. The inter-maxillary relationships were normal. Analysis of the smile showed a high lip line.

TREATMENT PLANNING

Tooth #21 was diagnosed as hopeless. From a periodontal point of view, the clinical situation was considered as favorable: gingival margin at the same level as adjacent central incisor, mesial and distal papillae present and in proper position. The patient underwent computerized tomography to evaluate the available bone volume in the apex area of #21 as well as the integrity of the buccal plate of #21 (Fig. 3).

The examination of the CBCT showed that the buccal plate was intact 3 mm below the gingival level; correlated to the clinical examination, the future extraction socket was determined as Class I of Elian¹. The bone volume correlated to the axis of the tooth and was considered as favorable for immediate implant placement, Class I of Kan². Immediate implant placement after extraction of #21 was planned. Immediate temporization was intended, subject to suffi-





cient primary stability of the implant. The implant chosen for the procedure was a Straumann® Bone Level Tapered Implant 4,1×12 mm.

SURGICAL PROCEDURE

Tooth #21 was extracted atraumatically without raising a flap or osteotomy (Fig. 4). The extraction socket was meticulously cleaned and rinsed with Betadine (Purdue Products L.P., Stamford, CT). The drilling sequence included 2.2 mm, 2.8 mm and 3.5 mm drills (Fig. 5). The counter-sink drill or tap was not used in this case to safeguard sufficient primary stability.

The implant was placed with a final torque of 45 N-cm (Figs. 6, 7). In its final position, the implant platform lay 4 mm under the ideal gingival margin (compared to adjacent central incisor, Fig. 8) A titanium temporary abutment for the crown was placed and a laboratory-made shell was positioned without interference of the temporary abutment (Fig. 9). Before placing the provisional crown, the gap between the implant and the buccal plate was filled with a particulate bone augmentation material. The screw retained temporary crown was then torqued to 35 N-cm (Fig. 10).

Three months after placement, an implant level impression was taken for final restoration. Follow-up ten months after implant placement showed a preserved gingival contour (Figs. 11, 12).

CONCLUSION

Immediate implant placement and temporization, when properly indicated, has three main advantages: timing, biology and prosthetics. Treatment time and number of surgical procedures are reduced compared to a delayed approach. From a biological standpoint, using a slow-resorbing material to fill the gap between the implant and the buccal plate enables predictably preserved bone volume. The provisional crown supports the gingival architecture and helps maintain the pre-existing positions of the gingival margin and mesial and distal papillae.

From a prosthetics perspective, placing an implant retained provisional crown on the day of surgery simplifies the temporization in the anterior area, allowing the patient to leave the office on the same day with a fixed provisional. The success of this procedure relies on three basic principles: proper indication, atraumatic extraction and sufficient primary stability of the implant. The latter depends widely on the choice of the implant design and drilling protocol, which should be considered for greater primary stability.

This case was a collaboration between Dr. Leon Pariente, Dr. Karim Dada, Dr. Marwan Daas and Dr. Romain Cheron.

Acknowledgments: the authors would like to thank Asselin Bonichon for the laboratory work.

Scientific references: www.straumann.com/targetref

Straumann® Pro Arch

Discover even more prosthetic flexibility with the new Straumann® Variobase® and 3M™ ESPE™ Lava™ Plus zirconia



A recent study conducted in Germany showed that lifestyles of people over 65 years old are changing. Having been asked how old they feel, a majority stated that they feel up to 10 years younger than they actually are. Also interesting is the fact that elder people are socially very active and that quality of life is of major importance to them.

If this social group is faced with the option of full-arch reconstructions, removable restorations may not be the preferred solution, while fixed restorations are becoming increasingly attractive. With the Straumann® Pro Arch portfolio, Straumann offers a treatment option that meets these patients' quality of life related demands. Now, Straumann is extending its offering by adding prosthetic options for final restorations:

- New zirconia material for full-arch bars and bridges
- Full-arch restorations with the new Straumann® Variobase® for Bridge/Bar and Coping for Straumann® Screw-retained Abutments
- One shipment with Straumann® CARES® X-Stream®

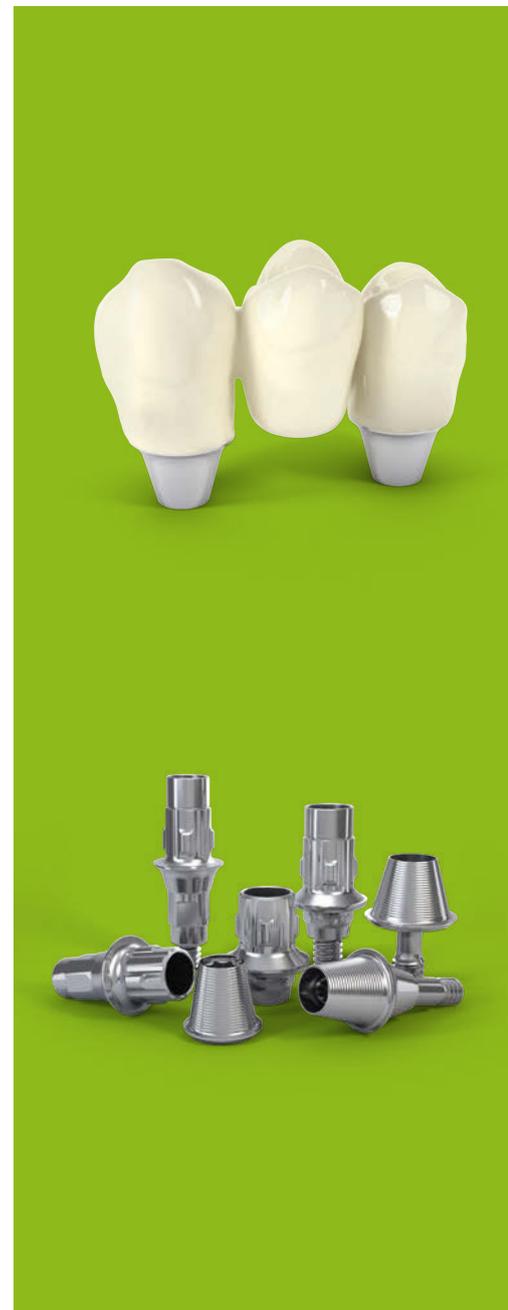
3M™ ESPE™ LAVA™ PLUS ZIRCONIA FOR FULL-ARCH RESTORATIONS

Market research data confirms that the demand for esthetic restorations is constantly growing. In order to meet this demand, Straumann is expanding its offering. In cooperation with our Partner 3M™, we now provide a high quality translucent zirconia material for full-arch restorations. In order to accommodate individual restorations, it is available in 16 different shades and 2 bleached shades. These colors correspond to the VITA shade guide, which is the standard in the dental industry. The material is available for bars and full contour bridges, as well as for single and partial tooth replacement.

STRAUMANN® VARIOBASE® ABUTMENT AND STRAUMANN® CARES® X-STREAM™

A further trend which can be observed on a global scale is the use of titanium bonding bases. Hybrid zirconia restorations (i.e. zirconia on top of bonding bases) in particular are expected to reach a significant share by 2021. The introduction of the Straumann® Variobase® for Bridge/Bar and Coping (titanium bonding base) for Straumann® Screw-retained Abutments for multi-unit restorations is fully in line with this market demand. For clinicians, this means that a broad choice of prosthetic options and materials for the final restoration is now available. In combination with our Straumann® CARES® X-Stream® solution, all parts are shipped in only one delivery*.

*May not be available in all countries.



<http://www.generalaltersstudie.de/online/portal/gdinternet/altersstudie/content/815252/831052>.

iData Research, European & U.S. Market for Dental Implants, Final Abutments and Computer Guided Surgery 2014, S. 45.

iData Research, European & U.S. Market for Dental Implants, Final Abutments and Computer Guided Surgery 2014, S. 131.

Scientific Review



Fig. 1: Edentulism (%) in elderly in selected countries (Dye et al., 2012; Emami et al., 2013; Peltzer et al., 2014; Polzer et al., 2010).

Hopeless dentition or edentulism is an irreversible condition and often the final marker of disease burden for oral health. There are considerable disparities in the prevalence of complete tooth loss in elderly between countries (Fig. 1). Sociodemographic factors (e.g. older age, lower education), chronic conditions (e.g. asthma), risk behavior such as smoking or an unhealthy diet and other health related variables have been associated with edentulism (Peltzer et al., 2014). Nowadays, improved oral prevention and treatment options are available, but the share of older people in the population is increasing due to higher life expectancy. According to the World Health Organization, about 2 billion people will be aged 60 and older by 2050 (World Health Organization, 2015). Therefore, it can be expected that the need for complete denture will increase as well (Douglass et al., 2002;

Polzer et al., 2010). Patient's awareness on the option of dental implant therapy is also increasing through growing access to multimedia. Additionally, a growing number of dental specialists will enter the field of implant dentistry (iData Research Inc., 2015). Straumann® Pro Arch is based on the treatment concept introduced by Paulo Malo (Malo et al., 2003b) and offers a safe, reliable and less complex treatment option for patients requiring full-arch treatments. Patients and clinicians benefit from the combination of the individualized prosthetics and the surgical advantages of the Straumann® SLActive® surface as well as the unique material properties of Roxolid®.

REDUCED TREATMENT COMPLEXITY

The concept of Straumann® Pro Arch is a fixed rehabilitation which encompasses the whole procedure from removal of hopeless teeth, immediate placement of four implants and immediate loading of the implants with a temporary bridge. It also includes the treatment planning steps before surgery and afterwards when converting the temporary bridge to the final full-arch prosthesis. A recent literature review concluded that two posterior and two anterior implants are appropriate if their placement does not necessitate major bone grafting procedures (Mericske-Stern and Worni, 2014). However, missing teeth lead within short time to significant bone resorption which is especially challenging in the posterior region of the maxillary

arch. In the past and with conventional implant treatment modalities, patients with bone loss had to undergo the lengthy procedure of bone augmentation. The full arch restoration with only four instead of 5–8 implants reduces the number of surgeries as bone grafting procedure is not performed and reduces therefore treatment complexity, which can result in cost savings of several thousand dollars per jaw for the patient (Babbush et al., 2014) and in saved chair time for the doctor. By tilting the distal implant, a more posterior position can be reached which reduces the distal cantilever of the prosthesis and avoids the need for bone grafting procedures (Malo et al., 2005). Another advantage is that longer implants can be placed

without interfering with the mental foramina in the mandible or the need for sinus floor augmentation in severely resorbed maxilla. A standard implant length of at least 10 mm has been indicated (Malo et al., 2003a). To today's knowledge, tilting of implants also provides a larger prosthetic base and reduces the force acting on the implants (Krekmanov et al., 2000). Therefore, the Straumann® Pro Arch treatment solution is less time-consuming and less costly in comparison with conventional implant treatment modalities of the edentulous and soon-to-be edentulous jaw.

IMMEDIATE FUNCTION AND ESTHETICS

Primary stability is a prerequisite for immediate implant loading and warrants the rigidity and successful osseointegration of a full-arch fixed restoration (Branemark et al., 1977; Meredith, 1998). The Straumann® Pro Arch concept uses Straumann® Bone Level Tapered Roxolid® SLActive® Implants. Roxolid® is a unique metal alloy with biocompatibility and fatigue strength superior to titanium (Ikarashi Y et al., 2005). The tapered implant body denturedesign allows preparing the site with tools one size smaller than the diameter of the implant, thus increasing primary stability. Protein and blood coagulation are influenced by implant surface properties, such as wettability and nanostructure. Straumann® SLActive® is a chemically modified hydrophilic surface which is proven by clinical evidence to accelerate the osseous healing (Buser et al., 2004; Lang et al., 2011; Oates et al., 2007; Schwarz et al., 2007). Straumann® Roxolid® Bone Level Tapered implants with the SLActive® surface speed up the process of new bone formation upon the implant and thus

DID YOU KNOW?

In a recent survey on oral health with more than 30 200 participants (Eurobarometer, 2010). 15% of people reported difficulties with eating food due to mouth and teeth problems. 4% avoided conversation or reduced participation in social activities because of problems with their denture

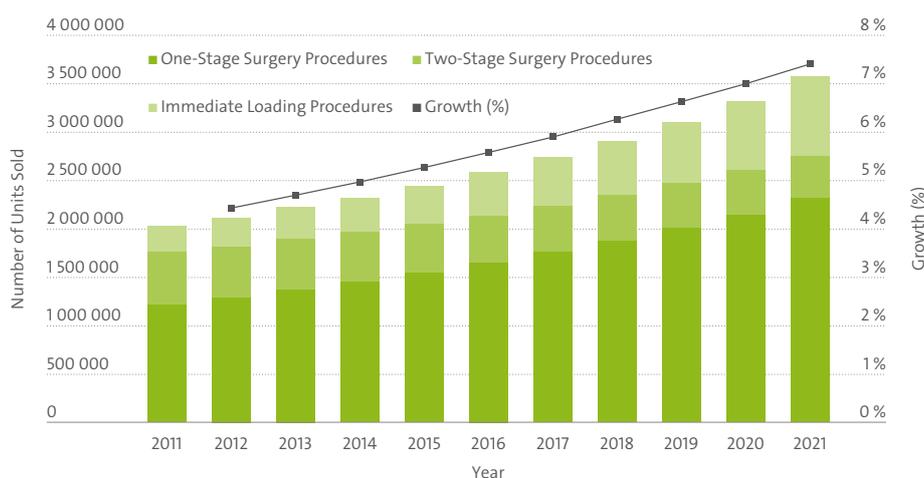


Fig. 2: Drivers of the dental implant market. Shorter procedures, utilizing only one stage or immediate loading, are becoming more popular because they reduce the period of time between implant and prosthetic installation. US data. Source: iData Research Inc.

shorten the critical transition phase between primary and secondary stability. Based on this an immediate installation of the functional prosthesis is possible without compromising on predictability. This leads to faster comfort and gain of time as well as immediate esthetics for professionally and socially active patients.



DID YOU KNOW?

According to a study by the American Association of Orthodontics, the first thing people notice when they meet you is your smile. Surprisingly, eyes came second followed by weight and hair. The majority of the respondents said that they would consider a dental treatment until a very old age.

CLINICAL LONG-TERM SUCCESS

A large cohort clinical study involving 245 patients and 980 implants installed in the edentulous mandible reported patient-related and implant-related success of 93.8% and 94.8%, respectively, after 10 years of follow-up (Malo et al., 2011). This resulted in a prosthesis survival rate of 99.2%. A retrospective study involving 242 patients and 968 implants in the completely edentulous maxilla reported a 5-year survival rate estimation of 93% and 98% at patient and implant level, respectively. The survival rate of the prosthesis was 100% (Malo et al., 2012). A recent clinical trial performed the technique also in diabetic patients and found no variation in success rate in comparison to non-diabetic patients. Thus, the reported survival and success rates compare favorably with other immediate/early loading protocols for the same indication and indicate that the immediate loading concept for the completely edentulous or soon-to-be edentulous patient using four implants is a viable long-term solution. Skepticism regarding higher stress in the bone from angled abutments or implants compared to straight counterparts could be disproved by stress studies. A study which analyzed stress patterns around distal angled implants found little difference in strain magnitude for implants placed at angles between 0–45° (Begg et al., 2009). Further analysis showed that two straight and two tilted implants with good anterior-posterior spread are at least equal to conventional concepts (Baggi et al., 2013; Bellini et al., 2009). Four to six implant fixed prosthesis yields an implant failure of 0.75%. Hence, it can be concluded that immediate loading performs at least equal as the conventional loading protocols of the past in edentulous mandibles (De et al., 2014).

HIGH PATIENT COMFORT

People with unrestored edentulism or cracked teeth often present with emotional and psychological problems such as behaving in a way that keeps the tooth loss secret, declining self-confidence and social isolation (Patil and Patil, 2009). The degree of suffering becomes clearer when looking at findings from a large German survey. People having fewer than 9 teeth reported more impact on health-related quality of life than people suffering from cancer (Mack et al., 2005). Osseointegrated dental implants allow for proper chewing and speaking, increases comfort, appearance and self-confidence, reduces bone resorption and usually improves patient's nutritional status. Also facial appearance is greatly improved with compared to conventional complete dentures as the patient's facial muscles are freed from the burden of having to stabilize dentures. Therefore, the Straumann® Pro Arch solution gives back quality of life to patients, already within a couple of hours of treatment.

Scientific references: www.straumann.com/stargetref



More than a
fixed rehabilitation.
A reason to smile.



With Straumann® Pro Arch patients are sure to receive a high-end solution that will instantly bring a new quality of life. And a perfect smile:

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Immediate implant-supported full arch reconstruction of both jaws



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INITIAL SITUATION

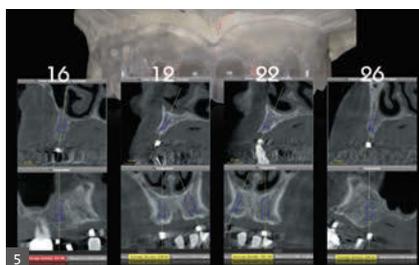
An 80-year male patient in good physical health, required fixed rehabilitation in both jaws to replace an existing unsuitable upper denture and to restore the hopeless dentition in his lower jaw (Fig. 1). When the patient smiled, his upper teeth were barely visible and the protrusion of his upper lip was deemed too full from an esthetic point of view.

Due to gingival recession and periodontal disease, his lower incisors were excessively visible. A removable prosthesis in the mandible had never been tolerated by the patient due to his gag-reflex. Therefore, the patient requested to receive treatment in both jaws at the same time, in order to avoid using any provisional removable prostheses and to shorten the overall treatment time. The aim was to perform both implant placement and loading with screw-retained provisional prostheses in both jaws on the same day.

TREATMENT PLAN

In such complex cases, accurate planning plays a fundamental role for successful treatment outcome. The ideal teeth set-up must first be checked in the patient's mouth to help in visualizing the final restoration. Once the feasibility of the treatment plan is confirmed, all the following steps can be developed accordingly. The approach used in this case was to place four implants in each jaw, which would be immediately loaded with provisional fixed prostheses.

After 3 months of healing, these provisional reconstructions would be replaced with the final prostheses. The first step of the treatment was to check the ideal teeth set-up in the patient's mouth. In order to reduce the excessively full upper lip, the flange was removed and the teeth were positioned in the correct alignment with the upper lip (Fig. 2). The incisal edges of the lower teeth were marked in black to show how their appropriate length





would appear in the final rehabilitation (Fig. 3). The comparison between the initial situation and the planned final restoration clearly showed the improved lip support with the new tooth positions (Fig. 4).

Once the try-ins were accepted from an esthetic and functional point of view, they were copied as diagnostic guides and used in the CBCT exam to help show the available bone volume. In the upper jaw, the CBCT exam revealed very poor bone quality in the sites chosen for the implant positioning (Fig. 5).

To address this problem, Straumann® Bone Level Tapered implants (BLT) were selected for better primary stability and to facilitate immediate loading. In the lower jaw, a guided surgery protocol was chosen as stabilization of the guide on the lower canines during implant placement helps to make this technique more reliable and precise. As the bone quality was good in the lower jaw, Straumann® Bone Level implants were selected.

SURGICAL PROCEDURE

After the planning stage, the diagnostic guide for the upper jaw was made into a surgical guide for conventional implant placement. In the lower jaw, a surgical guide was fabricated by 3D-printing. Provisional fixed full-arch bridge prostheses for immediate loading were constructed based on the original dental setup. During surgery, the lower jaw was first treated by placing implants with a guided-surgery procedure. A flap was raised in the anterior area (Fig. 6), while a flapless procedure was carried out in the posterior area. Once the implants were in position, the screw-retained abutments were placed on

the implants (Fig. 7). The titanium copings were secured on the screw-retained abutments, and isolated by rubber dam pieces, before resin was injected in the surrounding area. The lower provisional prosthesis was then placed over the implants, to connect them with the copings whilst setting in occlusion with the upper surgical guide (Fig. 8).

In the upper jaw, a flap was raised via a crestal incision. As directed by the surgical guide, the first implant site was prepared with dedicated drills for BLT implants (Fig. 9). Due to the low quality Type 1 bone this site was under-prepared and a BLT implant was placed to achieve high primary stability. The same procedure was repeated in the remaining sites (Fig. 10).

After all the implants were placed, the appropriate screw-retained abutments were chosen using the respective plan components from the Planning Kit (Fig. 11). These plastic plan components help the clinician to select the corresponding working abutments. Similar to the procedure already carried out in the lower jaw, the titanium copings were attached to the screw-retained abutments on the upper implants. The upper provisional prosthesis was used to pick up the titanium copings, while in occlusion with the lower provisional prosthesis. The upper and lower provisional bridges were removed from the mouth for final polishing by the dental technician in the office. The provisional bridges are screwed into the patient's mouth and checked when the patient is smiling (Fig. 12).

After a period of healing, healthy soft tissue is seen around the implants in the maxilla (Fig. 13), and the mandible also showed excellent soft tissue conditions (Fig. 14).

During the impression procedure for the final restoration, transfer copings are used in the maxilla, and titanium copings were used in the mandible (Fig. 15). A CAD/CAM framework was manufactured by Createch Medical and later veneered using a composite resin.

FINAL RESULT

The final restorations complete with composite veneering, provided an excellent esthetic result (Fig. 16). The final radiographs confirm correct implant placement and very precise prosthetic rehabilitation (Fig. 17). This upper and lower full-arch rehabilitation has satisfied both the esthetic and functional criteria as required by the patient (Fig. 18).

CONCLUSION

The treatment of this challenging case was greatly supported and simplified by using the appropriate implants and abutments. The new Straumann® Bone Level Tapered (BLT) implants allows the clinician to reach the insertion torque that is necessary for immediate loading even in cases of low bone density. An immediate tactile sensation of stability and firmness is provided during

the insertion of the BLT implant. In addition, the screw-retained abutments offer a wide range of prosthetic options, simplifying the re-alignment of the divergent implant axes where needed, thus allowing the clinician to select the ideal prosthetic solution. A well-executed treatment plan can be carried out with the availability of ideal surgical and prosthetic devices. This is the true foundation of success in such a demanding case.

Acknowledgement: This treatment has been made possible only with the valuable contributions of **Alessandro Giacometti**, Dental Technician in Genoa/Italy.





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- Increase patient acceptance with less invasive procedures



Mandible restoration with BLT implants and screw-retained abutments in a dental phobic patient with very poor dentition

THE STRAUMANN AID PROGRAMME

Straumann AID (Access to Implant Dentistry) is a global initiative. The necessary materials for an implant restoration are provided by Straumann free of charge to offer assistance in certain cases to patients who lack the financial means.

In the present case, the patient was in receipt of a disability pension, and therefore had very limited finances. Under these circumstances, an appropriately comprehensive and satisfactory restoration was impossible.

Thanks to Straumann AID and the fee waiver by Dr. Sleiter's practice (surgical and prosthetic treatment costs) and the dental lab (Jenni Dental Laboratory, Fulenbach, Switzerland), we were able to offer this patient a fixed mandibular restoration to re-establish his dental function. A new complete denture was also made for the maxilla.

The final result showed significant improvement, both in aesthetics and function.

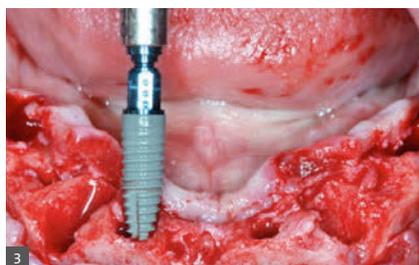
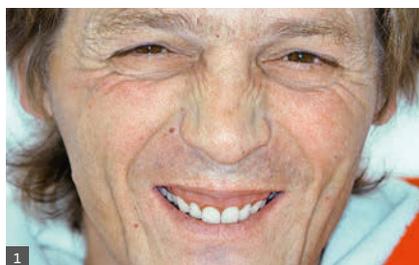
STARTING SITUATION

A 45-year-old dental phobic patient with very poor dentition, who had not visited a dentist for over 10 years, came to our practice (Fig. 1) requesting remedial work. The complete maxillary denture proved to have an inadequate hold and very poor aesthetic appearance. The patient's remaining mandibular dentition had multiple caries profunda or cervical caries and apical periodontitis. The patient was a disability pension recipient and therefore his finances were very limited.

TREATMENT PLANNING

Thanks to the materials provided by the "Straumann Access to Implant Dentistry" programme ("Straumann AID") and the fact that the authors and the laboratory waived their fees, we were able to offer our patient a complete maxillary denture and a fixed mandibular restoration. First, a new complete denture was made for the maxilla. The patient demonstrated a high level of acceptance during the course of the initial appointments, and therefore the decision was made to fit a fixed mandibular restoration in accordance with the Straumann® Pro Arch concept. This provides for a fixed prosthetic solution which is achieved by extracting the remaining teeth with immediate insertion and immediate loading of at least 4 implants.

Due to the above-mentioned very poor condition of the mandibular dentition which is clear in the OPT (Fig. 2) and the questionable prognosis for some teeth, it was decided that the teeth in the lower jaw should be extracted.



The treatment is divided into two phases, during each of which the patient receives a temporary restoration and a definitive restoration. The temporary restoration is directly screwed in immediately following implantation, allowing the immediate restoration of function and aesthetics. The definitive restoration involves optimising function and aesthetics after the implants are given time to heal (approximately 2 months).

SURGICAL PROCEDURE

All the remaining teeth in the lower jaw were removed, and bone smoothing was performed at the same time as the implantation (Fig. 3). 4 Straumann® Bone Level Tapered (BLT) implants made of Roxolid® (Ø4.1, SLActive®, 10mm and 12mm) were used. The 12mm implants were set in regions 32 and 42, and the 10mm implants in regions 35 and 45 (Fig. 3). Thanks to the favourable bone situation in the lower jaw, it was possible to set the implants in parallel (Fig. 4), all of which had adequate primary stability so the decision was made to carry out immediate loading.

PROSTHETIC PROCEDURE

A diagnostic splint was used to select the perfect screwed abutments (Fig. 5). In this case, the axes of the implants were so good that no angled abutments had to be used. Thus only 0° abutments were used, which were tightened with 35 Ncm (Fig. 6). In turn, the height of the screwed abutments (available in 1, 2.5 and 4 mm) was selected in accordance with the peri-implant mucosa and the bone level. It was necessary to ensure that the screwed abutments would end up lying epimucosally when the mucosa were adapted. These could be substituted for the final restoration, if the height or angle were not ideal. The protective RC caps (Fig. 7) were manually tightened to the screwed abutments with about 10-15Ncm, and the mucosa were adapted and sutured.

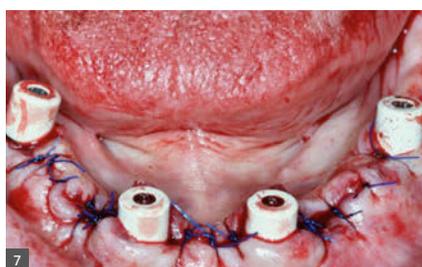


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« THANKS TO THE MATERIALS PROVIDED BY THE “STRAUMANN AID” PROGRAM AND THE FACT THAT THE AUTHORS AND THE LABORATORY WAIVED THEIR FEES, WE WERE ABLE TO OFFER OUR PATIENT A COMPLETE MAXILLARY DENTURE AND A FIXED MANDIBULAR RESTORATION. »

Roberto Sleiter



STRAUMANN® PRO ARCH

When it comes to treating edentulous patients or patients with residual dentition, Straumann® Pro Arch is one potential option.

The concept provides the possibility of immediate full-arch temporary restorations on a reduced number of implants despite limited bone availability. A new generation of surgical and prosthetic components provides full-arch fixed restorations on either straight or tilted implants with the additional advantages of Straumann's innovative surface and material technologies, SLActive® and Roxolid®.

According to the ITI Treatment Guide Vol. 4, these restorations require a significant level of know-how and experience by the surgeon, prosthodontist and the dental lab. Furthermore, careful patient selection and case planning is essential to achieve reliable results.

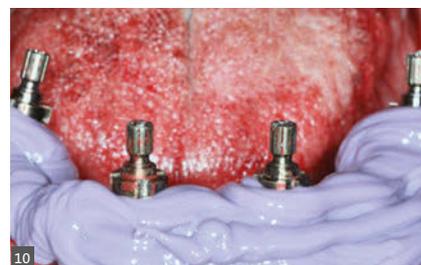
The temporary restoration was released amply at a basal level from 35 to 45, following which the complete maxillary denture was used together with a prefabricated silicone bite and the temporary prosthesis filled with silicone (3M ESPE Imprint 4 Bite) in order to determine the intermaxillary relations in the patient's mouth (Fig. 8).

In order to guarantee correct intermaxillary relations, it is important to ensure that the protective caps are not pushed through the silicone. A temporary prosthesis was made for the lower jaw to fit perfectly with the new complete maxillary denture, and also doubled as an operation splint for diagnosis. A bilateral balanced occlusion was selected for the occlusion design, ensuring the functional stability of the complete maxillary denture.

Subsequently, the protective caps were removed and an impression of the implants was taken using impression posts. These were screwed directly on to the screwed abutments (Fig. 9). The impression was performed using Impregum (3M ESPE) (Fig. 10). The temporary fixed restoration was incorporated in the lower jaw after just a few hours, following the principle of immediate loading (Fig. 11), with a follow-up appointment to remove the sutures one week later.

FINAL RESULT

After allowing a 3-month healing period for the implants, an impression of the lower jaw was taken for the definitive restoration. To this end, the impression posts were screwed directly onto the abutments. Bite registration was performed in the conventional manner with a wax rim and the tooth set-up was tried on in wax. Thereafter,



a CAD/CAM titanium framework was prepared to support the prosthetic teeth. The passive seat of the framework was assessed before the work was completed. The completed restoration (Fig. 12, 13) was tightened with 15 Ncm and the screw channels sealed with Teflon and composite in order to enable possible reintervention. The patient was given instructions on daily cleaning of the fixed restoration with Superfloss and Plack Out gel (Fig. 14). After insertion of the work, there were two follow-up checks, including OPT (Fig. 15). Since then, the patient has attended recall consultations (Fig. 16) twice a year.

CONCLUSION

Thanks to the Straumann® Pro Arch concept with the new Straumann® Bone Level Tapered implants (BLT), the SLActive® surface (which generates rapid healing of the implants), as well as the large choice of screwed abutments (height and angulation), it was possible to provide the patient with an ideal fixed solution within the shortest possible time.

Due to the experience of the practitioners and the ideal, close cooperative relationship with the dental laboratory, all the prerequisites for a smooth and successful process were in place, so the patient was able to leave the practice with a temporary fixed restoration within a few hours. Overall, from insertion of the implant to the second follow-up check on the final restoration, the patient only attended 8 appointments and within 5 months he was fitted with his final maxillary and mandibular restoration.



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« THE PATIENT WAS ABLE TO LEAVE THE PRACTICE WITH A TEMPORARY FIXED RESTORATION WITHIN A FEW HOURS. »

Nathalie Oppliger

Immediate screw-retained CAD/CAM provisionalization with an integrated digital approach



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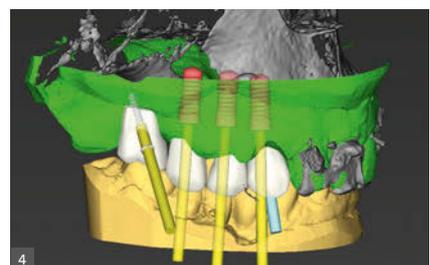
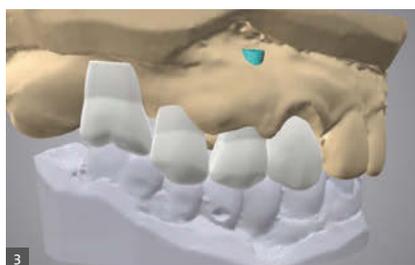
dr.zarrine@gmail.com

INTRODUCTION

Successful immediate implant placement associated with immediate loading remains one of the biggest clinical challenges. In addition to the placement of an implant into a tooth socket concurrently with extraction, the creation of a screw-retained CAD/CAM provisional prosthetic restoration is critical for the esthetic outcome. Currently, the procedure can be achieved using a conventional approach resulting in a high number of patient appointments with time-consuming steps for the dentist. For the patient, the day of the immediate loading treatment remains a long and tiring experience from the surgery to the provisional restoration. Instead of exposing the patient to a “marathon” day, the treatment could be shortened considerably by fully involving the patient, the surgeon and the dental technician and by having a predictable treatment protocol for the tooth extraction and the prosthetic restoration design (including the individual emergence profiles prior to the surgery). This would also lead to a better patient experience and improved satisfaction. The goal of this clinical report is therefore to introduce an innovative one-step surgical approach for immediate screw-retained CAD/CAM provisionalization by using the latest technological improvements in prosthetic and surgical planning software and seamlessly integrating the dental technician into the development of the fully digital treatment planning and new prosthetics options.

INITIAL SITUATION

The patient was 65 years old, female, non-smoking, with a fragile health condition, and willing to get back an adequate chewing capability. The patient suffered from cachexia following a stomach ablation resulting in an obvious compromised digestion which is



an aggravating factor in the dental condition (Fig. 1). The molars in sector 3 were missing, tooth 26 had to be restored and the occlusion curves adjusted. Teeth 13, 14 and 15 had a mobility classification of 3 according to Lindhe and Muehlmann. The roots were decayed and fractured, with the gum suffering from inflammation in 14 and 15 without abscess and sinusitis. Tooth 47 underwent an eruption, and bridge from 47 to 43 seems to follow this new curve of occlusion. This situation does not allow for sufficient inter-arch height in order to have number 16 as antagonist. To prevent an over-infection as well as for esthetic and comfort-related reasons, the urgency consisted in the treatment of sector 1. The overall health condition and drug treatment reinforced our decision to use a non-invasive surgical approach. The treatment plan was as follows:

#47 and #43: recreating sector 4 with two individual implant-borne restorations (Straumann® Soft Tissue Level Implant RN, Roxolid® material, SLActive® surface) respecting the occlusion curves.

#26: root treatment with a tooth-borne restoration in the occlusal plane.

#35# 36, placing of two individual implant-borne restorations (Straumann® Soft Tissue Level Implant WN, Roxolid® material, SLActive® surface)

From #13 to #16: implant-borne restoration after tooth extraction of 13, 14 and 15 (Straumann® Bone Level Implant RC, Roxolid® material, SLActive® surface)

The patient will have a reduced arcade. However, the occlusion will be balanced and provide a good masticatory coefficient. The current situation forced us to compromise (Fig. 2) and to place three implants in place of three teeth: canine, premolar and molar. The aim was to extract atraumatically the three decayed teeth and to perform an immediate implant placement after extraction with flapless surgery in conjunction with immediate loading enabling restoration of the other sectors. In order to maximize accuracy and to reduce the number of steps, a fully digital approach using guided surgery was selected, allowing us to preoperatively produce a screw-retained CAD/CAM provisional restoration.

PLANNING

After detailed three-dimensional diagnostics, teeth 13, 14 and 15 were virtually extracted in the implant planning software (coDiagnostiX™, Dentalwings). The prosthetic design was created with Straumann® CARES® Visual (Fig. 3). The prosthetic project was shared with the implant planning software using the integrated online platform Synergy (Dentalwings). The three-dimensional radiographic DICOM data and the prosthetic design project STL file were matched in coDiagnostiX™. The integrated platform allows for real-time collaboration between the dentist and dental technician for finalizing the treatment planning from both implant placement and restorative design (Fig. 4). The surgical guide was designed with coDiagnostiX™ (Fig. 5) and produced using three-dimensional printing technology (Objet Eden260VS Dental Advantage (Stratasys, Minnesota, Fig. 6). The surgical guide was teeth- and mucosa-supported



on the palate. To avoid lateral movement, fixation screws were added (Straumann® Bone Block Fixation). An individualized two-piece splinted three-unit bridge was virtually designed (Fig. 7) and CAD/CAM-fabricated from a PMMA-based restoration material cemented to a pre-fabricated bonding base (Straumann® Variobase® for bar and bridges + Polycon ae, Straumann® CARES® X-Stream™, Fig. 8–10). The bridge design and the occlusion were checked on a printed jaw model (Dreve Dentamid, Germany, Fig. 11) and finally sealed then sent to the dental practice with the jaw model and the surgical guides.

SURGERY

On the day of surgery (Fig. 12, 13), the surgical protocol provided by the implant planning software guides the clinician through the surgical procedure and supports him in the use of the appropriate instruments from the guided surgery surgical kit (drill heights, drill handles, etc., Fig. 14, 15).

To avoid deformation of soft tissues that could influence the stability of the surgical guide, we performed regional anesthesia:

- Vestibular: high tuberosity anesthesia for the alveolar nerve supra-posterior, and high canine anesthesia that reaches the supra-anterior alveolar branch of the maxillary nerve.
- Palatal: analgesia of the nasopalatal nerve in the retro-incisive area and the large palatal nerve in the area of the large palatal foramen.

The crowns were removed; the root of 13 was cut and removed in fragments. The avulsions were created delicately; the alveoli

were curetted and debrided under irrigation. Papillae were detached to allow for the regularization of the bone crest by removing bone that was too thin, anticipating the post-extraction resorption. The surgical guide was placed and the position was secured using 14mm fixation screws in the maxilla at sector 17 (Fig. 16). The drilling sequences were performed through the guide. To avoid bone overheating, high irrigation was performed using the up and down drilling technique. Tapping and profile drilling were essential despite the maxillary soft bone. This is critical in order to follow all the steps necessary for correct implant positioning according to the planning. In order to maximize the precision in the implant placement, we chose shorter implants than usual. This allowed us to achieve a quicker implant positioning through the surgical guide by using guiding transfer pieces that ensured the final positioning (depth and angle).

The implants were stabilized with a torque of 50 N/cm (Fig. 17). After removal of the surgical guide, the bone chips harvested during the drilling sequences were used to shape the crest and to fill the gaps. Interdental papillae were repositioned buccally by rotation.

A conjunctive tissue graft was partially dissected from the palate while remaining pedicle in order to recreate the interdental papillae. Sutures helped to stabilize the gingivoplasty (Fig. 18). The screw-retained two-piece CAD/CAM bridge was finalized before surgery and immediately placed and screwed onto the three implants (Fig. 19–20). Slight tension was detected during the screwing, but with no consequences for the implants since they were not



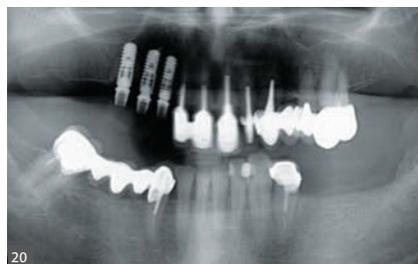
Protocole chirurgical		Dentelle Straumann® Guided Surgery	
Angle	Hauteur	Angle	Hauteur
11	14 mm	11	14 mm
12	14 mm	12	14 mm
13	14 mm	13	14 mm



yet osseointegrated and the mechanical stress was too low. The only change to the temporary bridge consisted in slightly adapting the under-occlusion. Additionally, the SLActive® surface stimulates the adsorption of blood proteins and enhances the fibrin network formation, which allows for the faster maturation of the bone. This is a major asset in immediate implant placement after tooth extraction and in immediate esthetics. Check-ups at 10 days post-op (Fig. 21) and at four weeks (Fig. 22) were used to verify correct gingival healing and implant integration. The postoperative courses were not painful and no edema or hematoma was observed.

RESULTS

Immediate implant placement associated with immediate loading is a predictable protocol with some variables. The digital tooth extraction was integrated with the production of a screw-retained CAD/CAM provisional restoration prior to the surgery and was successfully achieved and placed without any cementing steps in the dental practice. The entire treatment workflow was done fully digitally. Only a single surgical step was required to provide an entire individualized prosthetic rehabilitation.



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Environmental dentistry – what is the role of ceramic implants?



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An interview with Sven-Olaf Börner

Dr. Börner, how did you become involved in environmental dentistry?

Sven-Olaf Börner: I came to holistic environmental dentistry through caring for risk patients. I am a classically trained oral surgeon, and my work in our practice focuses on oral surgery and environmental dentistry.

Through daily treatment of risk patients, i.e. patients with chronic inflammatory diseases, multisystem disorders, allergies, diabetes, autoimmune diseases, cancer and cardiovascular diseases, as well as of periodontitis patients, I developed an awareness of general medical issues and immunological associations. And this, ultimately, is exactly what environmental dentistry is about: recognizing the interplay between the mouth and the organs, and correctly interpreting the pathological influences of the oral cavity on the immune system. The aim is to find out what most commonly triggers immunosuppressed patients, and this can only work if we study them in detail. An accurate medical history and extensive information are extremely important in this regard.

“Basically, every patient is an environmental dentistry patient! The next step, however, is to make a distinction and ask: to what extent is the patient predisposed to develop an immunologically relevant reaction?”

How do patients find about your practice?

Sven-Olaf Börner: Normally on referral by their GP or dentist. Also, of course, through recommendations by patients – classic word-of-mouth advertising. As a result, we also have many patients who come to us from other regions.

Do patients these days come to you already informed about implants?

Sven-Olaf Börner: Yes, but not necessarily in terms of the implant materials available. There are patients who would like a prosthetic but refuse to have any metal in their mouth. This is becoming increasingly common.

What is an “environmental dentistry patient”?

Sven-Olaf Börner: Basically, every patient is an environmental dentistry patient! The next step, however, is to make a distinction and ask: to what extent is the patient predisposed to develop an immunologically relevant reaction? This ability to distinguish – this is key in how we treat our patients.





ENVIRONMENTAL DENTISTRY

“Environmental dentistry is a new interdisciplinary field encompassing dentists, other medical specialists and dental technicians. The focus of environmental dentistry is on the holistic dental treatment of chronically ill patients, as well as the application of individual preventive treatment concepts with the aim of preventing or relieving chronic inflammatory diseases, including those not related to the oral cavity.” (German Society of Environmental Dentistry, www.deguz.de)

Can you explain more about this ability to differentiate?

Sven-Olaf Börner: We have lots of patients suffering from inflammatory diseases and in need of intensive periodontal and prophylactic care. In addition to this – and this is an extremely important part and ultimately also a reason for our ongoing development in practice – I also receive highly concrete patient referrals from general practitioners. These patients are suffering from cancer, multisystem disorders, chronic infectious diseases or severe allergies.

“The patient is first examined on the basis of conventional medicine. The next step, however, is to look for any hidden immunological triggers that may not seem obvious at first glance, for example.”

These are, therefore, patients with autoimmune diseases or immunosuppression who come to me from the beginning with the question of whether incompatible materials or confounding factors in the oral cavity could be the trigger for their chronic inflammatory diseases, or any treatment failures. In such patients with a long history of illness, I carry out a very different diagnostic procedure than in a healthy patient who comes to me for the purpose of prevention and check-up.

Sven-Olaf Börner: In some ways, for me environmental dentistry is a further development of oral surgery. The patient is first

examined on the basis of conventional medicine for inflammation in the mouth and jaw area in an oral surgical approach.

The next step, however, is to look for any hidden immunological triggers that may not seem obvious at first glance, for example. The materials used in the oral cavity are studied, any existing endodontic therapy is critically assessed and the results are viewed in the context of the patient's specific medical history. What could possibly be associated with this or that clinical picture? If an association is identified, a blood test is carried out. In addition, it is also determined whether the patient has craniomandibular dysfunction, which affects the jaw and the skeletal apparatus.

How does such a blood test work?

Sven-Olaf Börner: Blood is taken from the patient and analyzed on the basis of the question in hand, and conclusions are drawn as to whether a systemic disease or a disorder is associated with an allergy to or intolerance of a material. Allergy to titanium is extremely rare*, but allergies are not the only cause of immunology-related intolerances. Immunological reactions, i.e. release of the body's own pro-inflammatory antibodies known as cytokines, are becoming increasingly common.

What is measured in these tests?

Sven-Olaf Börner: The release of cytokines can be qualitatively

and quantitatively measured. This is not the only criterion, however – ultimately the key lies in genetic interleukin polymorphism, which we also identify in parodontology and in connection with peri-implantitis, and in the release of the proinflammatory cytokines IL1- β and TNF-a in order to establish a link with these through stimulation by titanium dioxide. The intensity with which the immune system reacts to titanium dioxide, for example, is individual and a temporary value.

“It can be taken for granted that ceramic implants are biocompatible. In future, higher flexibility in prosthetics and long-term data would be desirable.”

In addition to this, every one of us has a specific degree of personal, genetically determined inflammatory reaction. This inflammation level 0–4 is thus also jointly responsible for determining the future development of the material's tolerability and hence for its immunological relevance. If a patient is classified as level 3 or 4, then they are considered to be a “high responder”.

This means that in these patients the genotype constellation is accompanied by an increased production of proinflammatory cytokines with a simultaneous reduction in anti-inflammatory receptor antagonists. This group therefore reacts very strongly to a source of inflammation and is at increased risk of implant loss. A completely different approach must therefore be taken to high responders with level 3 or 4 than to level 0 or 1 responders.

Are these tests covered by health insurers?

Sven-Olaf Börner: The titanium stimulation test aimed at determining cytokine release and the determination of the genetic inflammation level in association with the implant are not subsidized by statutory health insurers. An allowance may be provided for a lymphocyte transformation (allergy) test on materials in the event of a patient with multiple allergies and the corresponding justification. Queries and reimbursement difficulties also tend to be common with private health insurers. For me, therefore, ceramic implants are increasingly becoming a

standard instrument. And they save the patient the cost of the test, which is around 180–200 euros.

How long have you been working with ceramic implants?

Sven-Olaf Börner: I have been gaining experience with one-piece ceramic implants in my practice for seven years now. It has long been known for longer, however, that ceramic implants are clinically effective. I completed my training in oral surgery in Baden-Württemberg, and at the beginning of the 1990s I gained retrospective experience with Tübingen immediate implants made of aluminum oxide ceramic. Surprisingly, these were often excellently osseointegrated, but unfortunately showed insufficient fracture strength.

What do you believe are the most important features of ceramic implants today?

Sven-Olaf Börner: Strength, naturally, combined with excellent osseointegrative properties. It can be taken for granted that ceramic implants are biocompatible. In future, higher flexibility in prosthetics and secure long-term data would be desirable.

“Then I show the patients the bright, metal-free, one-piece ceramic implant. This inspires positive emotions, creates trust and makes it easier to provide the patient with further information.”

What are the benefits of ceramic implants in your opinion?

Sven-Olaf Börner: In the event of thin gingiva, a ceramic implant helps to avoid a grey shimmer. This pleases both the patient and the practitioner (laughs). The result is a more attractive, cleaner look. Also, I have observed that patients who perhaps do not maintain optimal oral hygiene clearly experience more extensive plaque accumulation with titanium implants than with ceramic ones. In addition to this, irritation around the implants or secondary parts also appears to be considerably less common with ceramic implants.

What type of implant does a typical patient in your practice request?

Sven-Olaf Börner: The patients sitting opposite me are saying more and more often: “I do not want an implant, because I do not want any metal in my body”. Then I show the patients the bright, metal-free, one-piece ceramic implant. This inspires positive emotions, creates trust and makes it easier to provide the patient with further information.”

Just one more question: What has been your experience with the Straumann® PURE Ceramic Implant (monotype)?

Sven-Olaf Börner: I am completely satisfied with the clinical results.

Dr. Börner, many thanks for providing a fascinating insight into environmental dentistry and your day-to-day work.

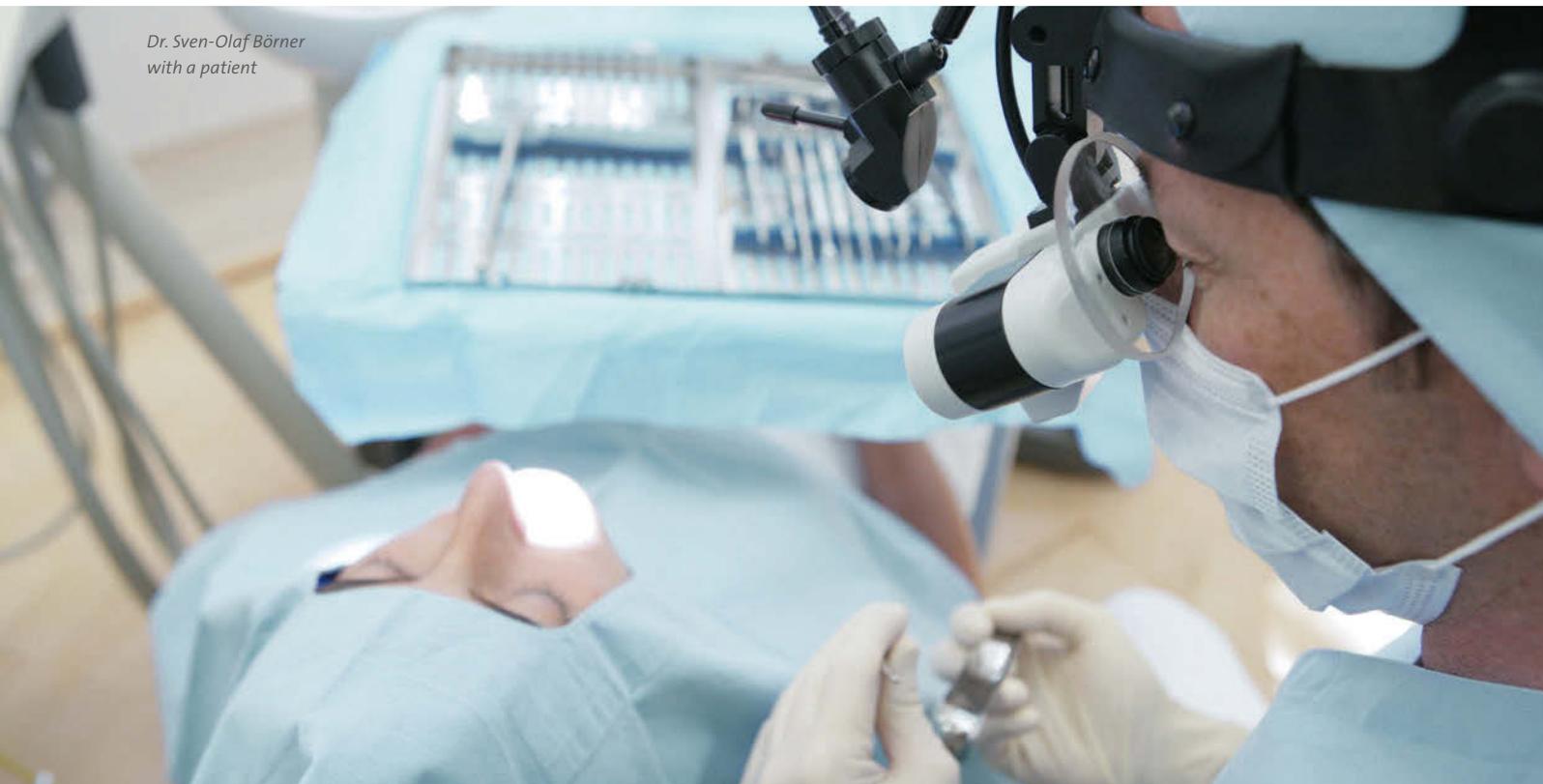
** Comment by Dr. Volker von Baehr from the Laboratory for Special Immunology at the Institute of Medical Diagnostics in Berlin-Potsdam, Germany: “Real titanium allergies are rare, however. Unlike other metals, titanium (oxide) cannot function as an ion and modify endogenous proteins. Metal allergies such as those we are familiar with in the context of nickel and cobalt are therefore not possible. The problem occurs when patients have an increased susceptibility to an inflammatory reaction caused by titanium particles. This is caused by polymorphism in the genes of our proinflammatory key cytokines, which affects approximately 15% of the population in Central Europe. This does not mean that all of these 15% will experience an increase inflammatory reaction to titanium, but it is a risk factor similar to diabetes and smoking. Naturally, these 15% are also more or less found via genetic tests. Added to this are the approximately 3–4% with abnormal results in the functional test (titanium stimulation test) who do not have a (known) genetic predisposition. This is most likely due to less common genetic constellations in inflammation modulation, which are not found in the standard test. It can therefore be concluded that in immunological terms, this risk constellation is present in almost 20%.”*



STRAUMANN® PURE CERAMIC IMPLANT

- A high-end esthetic solution made from ivory-colored material
- Opportunity to expand your patient pool with an alternative solution
- High predictability with revolutionary osseointegration features, equivalent to the established SLA® surface

Dr. Sven-Olaf Börner
with a patient





More than a lab partner. Lifelong commitment to uncompromising quality.

COMMITTED TO “SIMPLY DOING MORE”

When it comes to dental restorations, patients nowadays have very high expectations in regard of quality and aesthetic outcomes. This challenges dentists and lab technicians as well. Are you prepared to meet these increasing demands? Straumann is not only a manufacturer of premium implants. We are also committed to “Simply Doing More” for you as a technician and as a business lab owner who provides restorative solutions for implant-borne prosthetics. We aim to offer you the most efficient and most competitive solution for each patient indication regardless of the dental workflow selected.

WE SHARE THE SAME PASSION

High-quality implants are the state-of-the art of modern tooth replacement. But we know that the true differentiation comes also with outstanding prosthetic solutions. This knowledge and passion connects us with you. In partnership with Straumann, you can benefit from innovative products and tailored services that will make your daily work easier and more efficient, while further strengthening your position within the treatment team. Additionally, for all those dental professionals going digital, we are addressing your need to stay on the cutting-edge of the field by offering clinicians and technicians customized solutions that enable them to treat more patients better and more efficiently.

OUR MISSION IS CLEAR

Because your business is constantly evolving, Straumann is evolving with you. Our clear mission is to offer you continuous and strong support for making your dental lab business a success. Because, for every Straumann implant restored by your lab, you can rely on quality, outstanding precision and the protection of your margins.

REACHING OUR GOALS TOGETHER

– with your craftsmanship and our reliable technologies, services and products that ensure precise and high-quality restorations that meet the demands of today’s dentists and patients.



LEARN MORE ON THE
NEXT PAGES ABOUT HOW
YOU CAN MAKE YOUR
LAB STAND OUT WITH
OUR NEW STRAUMANN®
ORIGINAL QUALITY LABEL.

Straumann® Original

Show that your lab does not compromise on quality and precision

Dental technicians resemble artists in many respects. It's their love of detail, high-standard craftsmanship and in-depth know-how that form the basis for outstanding restorations, giving many people back a quality of life long forgotten.

But are these high standards of dental labs noticed by their target groups? Are dentists actually aware of the small nuances that can lead to either success or failure of an implant-borne restoration? The workmanship of labs is one of the pillars that ensure treatment success. Straumann wants to support labs in showing off their expertise to customers. As a leading supplier in the field of implant dentistry, Straumann itself has a reputation for its passion for precision. With the use of premium quality products from Straumann, labs can underline their value proposition.

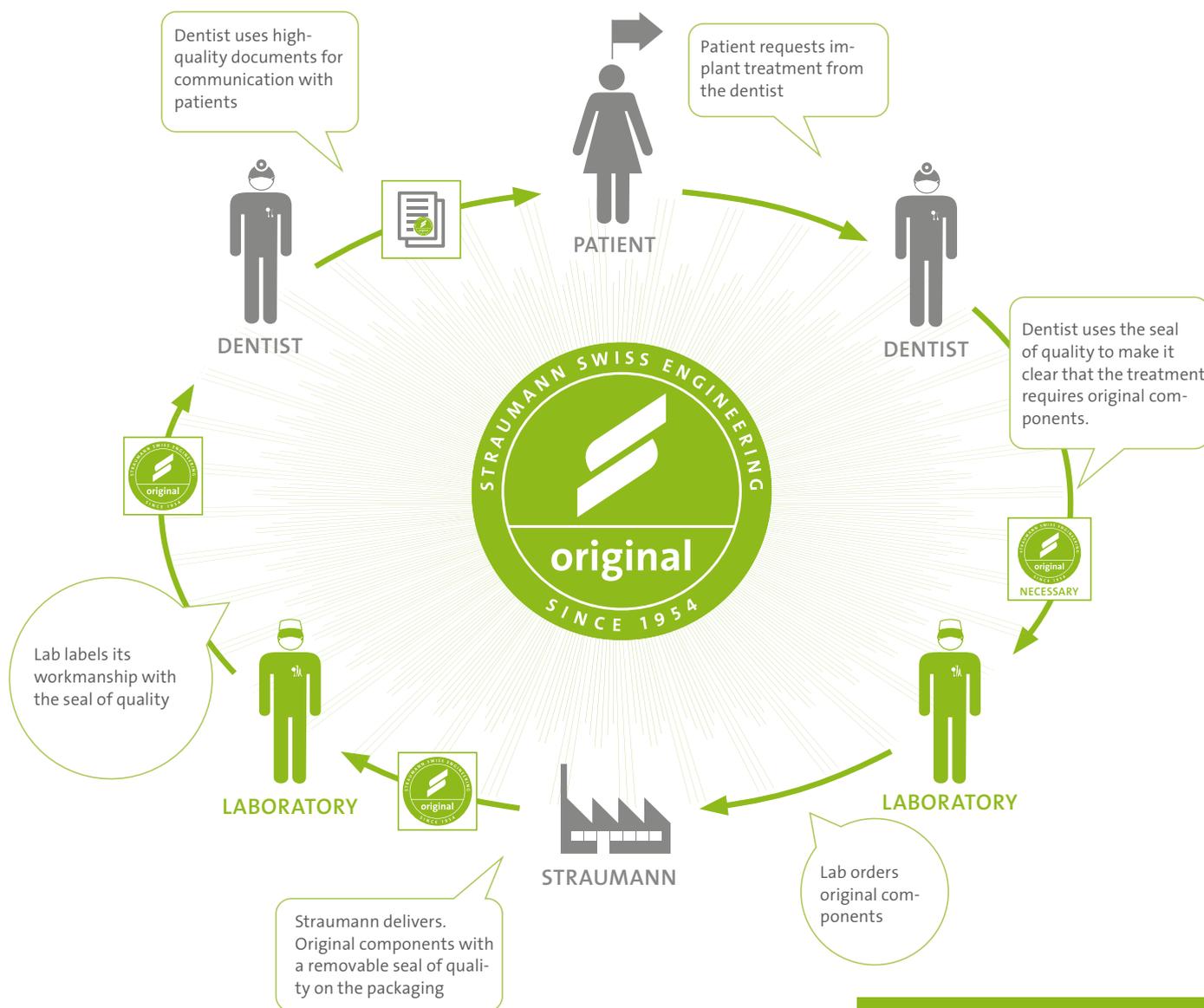
With a new marketing package, Straumann wants to support labs using original Straumann components in raising awareness of the high-quality services that are offered by them.

STRAUMANN® ORIGINAL QUALITY LABEL: STAND OUT FROM THE CROWD

From the very first purchase of an original Straumann abutment, labs not only benefit from Straumann's proven quality, but are also supported in promoting their expertise to current and potential customers.

The **Straumann® Original Quality label** plays a substantial role in this promotion flow.





EVEN MORE BENEFITS FOR “STRAUMANN® ORIGINAL AMBASSADORS”

Labs that are fully convinced by the exclusive use of original Straumann components can become “Straumann® Original Ambassadors” and use this unique selling proposition for their promotion.

Customized certificate: show that your lab does not compromise on quality and that it does not work with look-alike products but only uses original high-quality components

Quality label: use the Straumann® Original Quality label on your documents and in your communication channels (e.g. invoices, stationery, website, social media etc.)

Sample letter: a template letter to inform your customers or prospects about the high quality your lab is delivering

Lab finder: “Straumann® Original Ambassadors” are listed in our lab finder. This is an online platform where dentists can search for labs that meet the strict criteria for inclusion. This way, searching dentists are immediately drawn to the exclusive selection of Straumann® Original Ambassadors.

Would you like to take part?

If you like to learn more about this special initiative for your lab or if you would like to become an ambassador of original Straumann products, get in touch with your local Straumann sales rep for more information. Please note that this initiative may not be available in every country.

When one option is not enough

Decades of experience in dentistry and oral regeneration has propelled us to attempt to understand and meet all relevant needs, indications and preferences.

The right solution in implantology and periodontology is designed to fit the individual. Straumann offers an exceptional range of biomaterials that will meet your expectations and those of your patients.

Under the label “**Biomaterials@Straumann®**”, Straumann distributes its own regenerative products as well as those of **botiss biomaterials GmbH** in D-15806 Zossen in selected countries. Please contact your local Straumann subsidiary or distributor for further details.

MORE REGENERATIVE OPTIONS FOR THE RIGHT CHOICE

Treatment concepts in modern dentistry are getting more complex, leading to a holistic view of the clinical situation and desired outcomes. At Straumann, we believe that providing complete solutions for tooth replacement is the key for you to achieve the best possible results. So when it comes to biomaterials, “one size fits all” is not really an option. Your daily practice demands a complete range of integrated regenerative solutions with predictable positive outcomes for all biological situations and indications in implant dentistry and periodontology.

AN UNPARALLELED RANGE OF REGENERATIVE SOLUTIONS

Straumann and botiss biomaterials offer an unparalleled range of regenerative solutions to support implant and periodontal procedures – from bone augmentation to esthetic soft tissue results, and with a range of long-term proven biological materials (bovine, synthetic, allografts, collagen, granules, blocks, membranes, and soft tissue matrices). In addition, Straumann® Emdogain® is the unrivaled biological solution for periodontal issues. Engineered to predictably and reliably regenerate soft and hard tissue, this expanding range of flexible solutions is designed to provide patients with the functional and esthetic results they desire. It is the biomaterials portfolio that can potentially elevate the patient experience and your practice success.

A DIFFERENTIATED PORTFOLIO WITH MORE OPTIONS FOR HARD AND SOFT TISSUES

HARD TISSUE RECONSTRUCTION

Straumann® Bone Regeneration Biomaterials offer predictable remodeling and resorption. You can select the product that best meets your specific clinical needs (such as “size of defect” or “stability”):

- **botiss cerabone®**, derived from bovine bone, predictably integrates into the newly formed bone matrix, providing a strong and long lasting scaffold to support dental implants.
- **botiss maxgraft® allograft** is the matrix most similar to the patient’s own bone, with a high osteogenic potential. The maxgraft® product family comes with an impressive track record of safety and efficacy.
- **Straumann BoneCeramic®** and **botiss maxresorb®** (both synthetic) combine the demands of regenerated vital bone with volume preservation. They are the convenient alternative if materials from biological sources are not requested.





SOFT TISSUE MANAGEMENT

Predictable long-term results and perfect esthetic outcomes require adequate hard and soft tissue management – and the right product.

Straumann offers two natural collagen membranes with excellent handling properties and different resorption times: **botiss collprotect®**, a porcine dermis membrane with a barrier function of approx. two to three months and **botiss Jason® membrane**, produced from native porcine pericardium with a prolonged barrier function of approx. three to six months.

The soft tissue graft **botiss mucoderm®** is a three-dimensional collagen tissue matrix derived from porcine dermis that supports fast revascularization and soft tissue integration. This is a valid alternative to the patient's own soft or connective tissue, integrating into the patient's own tissue within six to nine months. Furthermore, two collagen products for oral wound management with an inherent hemostyptic effect are part of the portfolio: **botiss Jason®Fleece** and **botiss Collacone®**.

STRAUMANN® EMDOGAIN®

The unrivaled solution for periodontal issues

Although the benefits of implant dentistry are a blessing to patients that need a dental restoration, there is surely nothing that is able to compete with one's own teeth. This is why Straumann offers **Straumann® Emdogain®**, an unrivaled biological solution that induces the true regeneration of teeth supporting periodontal tissues lost due to trauma or disease.

In addition to improving the predictability of implant therapy, Straumann® Emdogain® is also used for better esthetics and to support early wound healing in oral surgical procedures.

Straumann Emdogain® can be used in combination with **botiss mucoderm®** when soft tissue thickening and avoidance of donor site morbidity caused by the harvesting of connective tissue grafts are prerequisites.

Read more about the impressive wound healing properties of Straumann Emdogain® on page 44.

Material recommendation overview

Materials mentioned in this table have regulatory clearance for different indications. Recommendations in this table are based on material characteristics and scientific data (where available). They indicate which of these products may be best suited to treat the specified defects prior to or after dental implant placement.

			Immediate implantation (after tooth extraction)	Socket preservation (atraumatic tooth extraction)		Ridge preservation (wall defect upon tooth extraction)	Fenestration/dehiscence defects	Horizontal augmentation		Extended defect	Sinus lift (lateral window)		Internal sinus lift (osteotome technique)	Vertical augmentation	Periodontal defects			Augmentation of keratinized gingiva	Soft tissue defects
				Early implantation	Late implantation			Smaller defect	Intermediate size defect		One-stage	Two-stage			Extended defect	Intraosseous defects	Furcation defects		
Bone substitutes	bovine	botiss cerabone®			●			●	●		●	●			●	●			
		Straumann® BoneCeramic™				●	●	●	●		●	●			●	●			
	synthetic	botiss maxresorb®				●	●	●	●		●	●			●	●			
		botiss maxresorb® inject	●								●		●						
	allogenic	botiss maxgraft® granules	●	●	●	●	●	●	●						●	●			
		botiss maxgraft® blocks/bonebuilder								●									
botiss maxgraft® bonering													●						
Membranes	porcine	botiss collprotect® membrane	●	●	●	●	●	●			●	●		●	●				
		botiss Jason® membrane				●	●		●	●	●		●		●				
Soft tissue	porcine	botiss mucoderm®		A**	**	●										●	●	●	
		botiss collacone®		P								●							
		botiss Jason® Fleece	●								●	●							
Biologics	porcine	Straumann® Emdogain®		****	****										***	●	●		

Under the label "Biomaterials@Straumann®", Straumann distributes its own regenerative products as well as those of botiss biomaterials GmbH in D-15806 Zossen in selected countries. Please contact your local Straumann subsidiary or distributor for further details.

- A anterior zone
- P posterior zone
- * to protect or repair the Schneiderian membrane
- ** for soft tissue management

- *** for three wall defects, Emdogain alone is our recommendation. For 1 and 2 wall defects, Emdogain mixed with bone graft material is our recommendation
- **** Straumann® Emdogain® PLUS

Material recommendation overview

For removal and reuse



Remove here



20 years of
Emdogain®.

It's just the
beginning.



- Over 2 million patients treated¹
- Stable results documented for over 10 years in 2 indications²
- Over 800 scientific publications
- Over 400 clinical publications
- Extremely well tolerated³

¹ Based on the number of syringes sold ² McGuire MK, Scheyer ET, Nunn M. Evaluation of human recession defects treated with coronally advanced flaps and either enamel matrix derivative or connective tissue: comparison of clinical parameters at 10 years. J Periodontol. 2012 Oct;83(11):1353-62/2. Sculean A, et al. Ten-year results following treatment of intra-bony defects with enamel matrix proteins and guided tissue regeneration. J Clin Periodontol. 2008 Sep;35(9):817-24 ³ Post surgery complication rate < 0.002%

New areas of application in soft tissue healing in oral surgery procedures



PROF. STAALE PETTER LYGSTADAAS

BE, DDS, PHD.

 NORWAY

Professor in Biomaterials and Dean of Research at the Faculty of Dentistry, University of Oslo/Norway. Ph.D. thesis “On the molecular biology of tooth formation” in 1995. Research director at Biora AB, Malmö, Sweden, between 1997 and 2001. Author of papers in international peer-reviewed journals.

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POTENTIAL FOR CLINICAL USE IN SEVERAL INDICATIONS OUTSIDE THE PERIODONTIUM

Emdogain® is a purified protein extract from enamel matrix (often called enamel matrix derivatives or EMDs) in a carrier gel of propylene glycol alginate (PGA) used to restore a functional periodontal ligament, cementum and alveolar bone in patients with severe tooth attachment loss. The application of Emdogain® has set a new standard for periodontal regeneration therapy. The first studies on clinical applications with Emdogain® were published in 1997. Since then, a large number of research groups has studied the mechanism of actions of EMDs and confirmed the clinical effect in periodontal healing and regeneration. The major component of Emdogain®, amelogenins, is evolutionarily well conserved and expressed, not only in teeth but also in other connective tissues, hinting at key roles in basic biological processes. Studies report that EMDs interact directly with several cell types, suggesting that Emdogain® has potential for clinical use in several indications outside the periodontium, most notably for promoting soft tissue healing.

EXCEPTIONALLY FAST WOUND HEALING AND MINIMAL POSTOPERATIVE SYMPTOMS

The activity of Emdogain® has been compared to that of growth factors. Studies also confirm that EMDs trigger a balanced and sequenced release of important growth factors and cytokines that orchestrate the clinical effects observed after application of Emdogain®. A common clinical observation when using Emdogain® is exceptionally fast wound healing and minimal postoperative symptoms such as pain or swelling.

A number of reasons for this observation have been suggested, including anti-inflammatory and antimicrobial effects. Inspired by clinical observations in oral surgery, several investigators have studied the effect of amelogenins on healing of both acute and chronic skin wounds. The first experimental study to demonstrate that amelogenins stimulate skin wound healing showed that the amount of granulation tissue in an EMD-treated wound was significantly increased, and that wound fill and re-epithelialization of full thickness wounds progressed almost twice as fast in the presence of EMDs.

The mechanisms involved in EMD-assisted skin healing have yet to be completely understood, but it has been shown that local application of amelogenins stimulates angiogenesis by inducing secretion of vascular endothelial growth factors (VEGFs) and platelet derived growth factors (PDGFs). Similar findings have also been reported in in vitro studies, which support the idea that amelogenins in general work by stimulating mesenchymal cells to express factors that are important for healing, growth and regeneration.

AMELOGENIN FORMULATION FOR SKIN WOUNDS, BASED ON THE ORIGINAL EMDOGAIN® PRODUCT

The surprisingly rapid healing observed with Emdogain® in periodontal surgery and in experimental animal wound models (Fig. 1) has led to the development of an amelogenin formulation for skin wounds, based on the original Emdogain® product. Several clinical studies have shown that the observation from oral surgery sites and animal models holds true. In the first phase III randomized, clinical multi-center trial on the application of amelogenins in hard-to-heal wounds Emdogain®-treated wounds showed a three-fold reduction in mean ulcer size compared with the control group, which was treated with the PGA vehicle alone over a 12-week period.

Statistically significant differences in favor of the Emdogain®-treated group were also found for reduction in ulcer-related pain and swelling. Results of the follow-up from the initial study also showed that the beneficial healing response to amelogenin was maintained six months after the initial treatment started. At the follow up, the overall number of patients with completely healed wounds was three times greater in the Emdogain®-treated group than in the control group.

FINDINGS

The effect of Emdogain® on wound healing is now widely recognized. There is no doubt that this effect has a great potential for a wide array of oral surgery procedures to promote soft tissue healing and avoid post-operative complications. In addition to healthy patients, patients that are locally or systemically challenged and show a risk of impaired healing might benefit from this unique product in the future. One example is the application of Emdogain® for treatment of dry sockets and other postoperative complications, even if the treatment is instigated after the onset of the complication. The scientific documentation for the use of Emdogain® for promoting soft tissue wound healing is now solid, providing a strong base to further extend its clinical evidence and use in oral surgical procedures in general. As researchers keep unraveling the modus operandi of amelogenins and EMDs, more applications and improved procedures will probably develop, but for now Emdogain® is staged for setting yet another standard in modern regenerative treatment, this time for soft tissue management.

THE POTENTIALS OF EMDOGAIN®

« In 2015, Straumann® Emdogain® is celebrating its 20th anniversary. Introduced in 1995, it was clear from the start that the product provides more benefits than just inducing periodontal regeneration. The stimulation of a wide variety of cell types and regenerative processes that was observed offers exciting new possibilities for exploiting the full potential of this versatile product in new indications outside periodontology. Its striking effect on wound healing of oral and dermal soft tissues is ready to be introduced to the medical and dental community for the benefit of both clinician and patient. »

Prof. Staale Petter Lyngstadaas

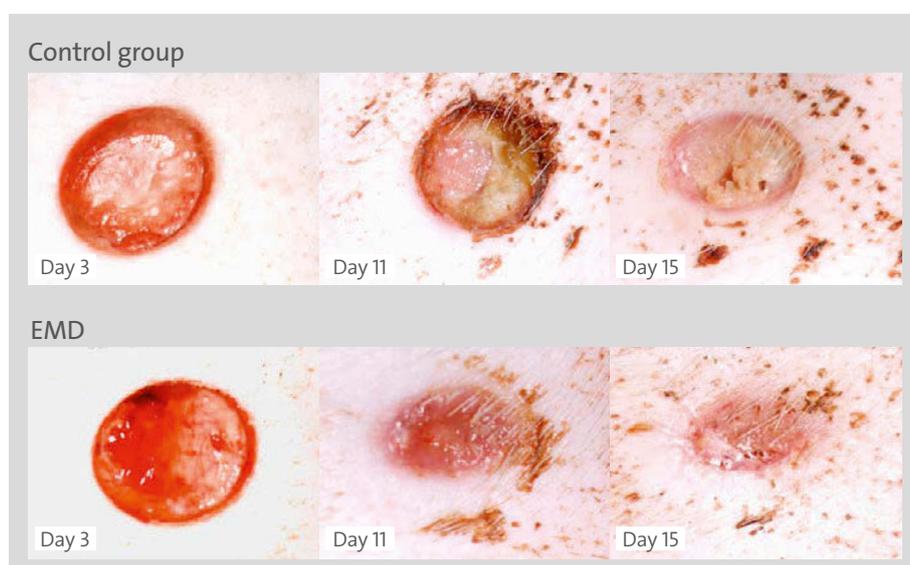


Fig. 1: Wound healing in full thickness wounds in pigs after one application with EMDs or control (PGA vehicle only).

After three days the EMD-treated wounds were significantly better vascularized than the controls as visualized here by the vivid red color and presence of blood vessels in the wound surface.

After 11 days the EMD-treated wounds were closed and epithelium covered most of the wound areas. At this stage the control wounds still only showed granulation tissue with little epithelialization.

After 15 days the EMD-treated wounds were covered by epithelium, while the control wounds still showed uncovered granulation tissue in central parts of the wounds.

botiss maxgraft® bonering technique

Vertical augmentation and simultaneous implantation of Straumann® Bone Level Implants

Dr. Bernhard Giesenhagen has developed an augmentation technique which allows bone transplantation and implantation to be performed on large three-dimensional bone defects in a single operation. Today, the bone ring technique can be used for nearly all indications. In the following article, the author describes the use of the botiss allogenic maxgraft® bonering (a further development with Dr. Orcan Yüksel). Use of the maxgraft® bonering technique is now established worldwide and offers an alternative to vertical augmentation with an autologous bone block.



INTRODUCTION

Implant treatment is often accompanied by bone augmentation procedures. In addition to guided bone regeneration (GBR), the most common techniques used to expand bone volume and height of the alveolar ridge are distraction osteogenesis, bone splitting as well as apposition and onlay osteoplasty. Harvesting autologous bone blocks for vertical augmentation is a very complex and invasive procedure. The author therefore developed the bone ring technique using autologous bone and unveiled his concept in 2003. The technique with allogenic bone (maxgraft® bonering by botiss biomaterials) was further developed in collaboration with Dr. Orcan Yüksel and presented in 2010. When using this allogenic bone ring technique, treatment for the patient is optimized as the extra surgical stage and risks involved with harvesting autologous bone at a second site, can be avoided. The author has now performed almost one thousand augmentations with autogenous bone harvested intraorally and over two hundred augmentations with maxgraft® allograft bonering.

THE MAXGRAFT® BONERING

The maxgraft® allograft bone ring offers a safe alternative to autologous bone. It is made entirely from donor bone from Germany, Austria and Switzerland, and is manufactured under pharmaceutical conditions by Cell+Tissuebank Austria (C+TBA). The maxgraft® bonering has a high biologic regeneration capability, as the natural collagen matrix is preserved during processing. This supports the rapid remodelling process during bone formation.

The clinical results in my practice to date show that there is no difference between autologous bone rings and the allogenic maxgraft® bonering.



BERNHARD GIESENHAGEN

DR. MED. DENT.

 GERMANY

Graduated from the University of Kiel, Germany Scientific researcher in the prosthetics department of the University of Kiel. Implantology practice in Kassel. Training activity as the founder of the Pro Implant Institute in Melsungen, Germany. Speaker at international conferences on the bone ring technique and other areas in implantology. Honorary professor at the Johann Wolfgang Goethe University Frankfurt am Main.

THE BOTISS MAXGRAFT® BONERING TECHNIQUE

The maxgraft® bonering technique is a one-stage procedure in which the maxgraft® bonering is pressed into a bone bed that has been prepared precisely with a trephine drill. The implant is then placed through the inner hole of the maxgraft® bonering.

Benefits

The bone ring technique has significant benefits over conventional procedures with autologous bone blocks:

- Reduction in treatment time of between 45 and 60 minutes
- Second procedure to harvest an autologous bone block and its associated risks can be avoided
- Treatment time until the start of prosthetic restoration is reduced by three to six months

Indications

Augmentation with bone rings is possible in the following cases, among others:

- Vertical augmentation (three-dimensional defects with low-volume horizontal defect)
- Single-tooth gaps
- Interdental spaces

Description of clinical case: Restoration of a 3D bony defect in region 46 with pre-fabricated allograft bone rings and simultaneous implantation.

INITIAL SITUATION

Male patient, 82 years old, non-smoker, with an unremarkable medical history. Previous clinical and radiographic diagnosis showed that teeth 44, 45, 46 and 47 were unrestorable and required extraction.

TREATMENT PLAN

The treatment plan included extractions, simultaneous bone augmentation using the maxgraft® bonering technique with pre-fabricated allografts, and immediate implantation with Straumann® Bone Level Implants at the tooth positions 44 and 46. A healing period of 6 months followed before final restoration with a 4-unit cantilever bridge.

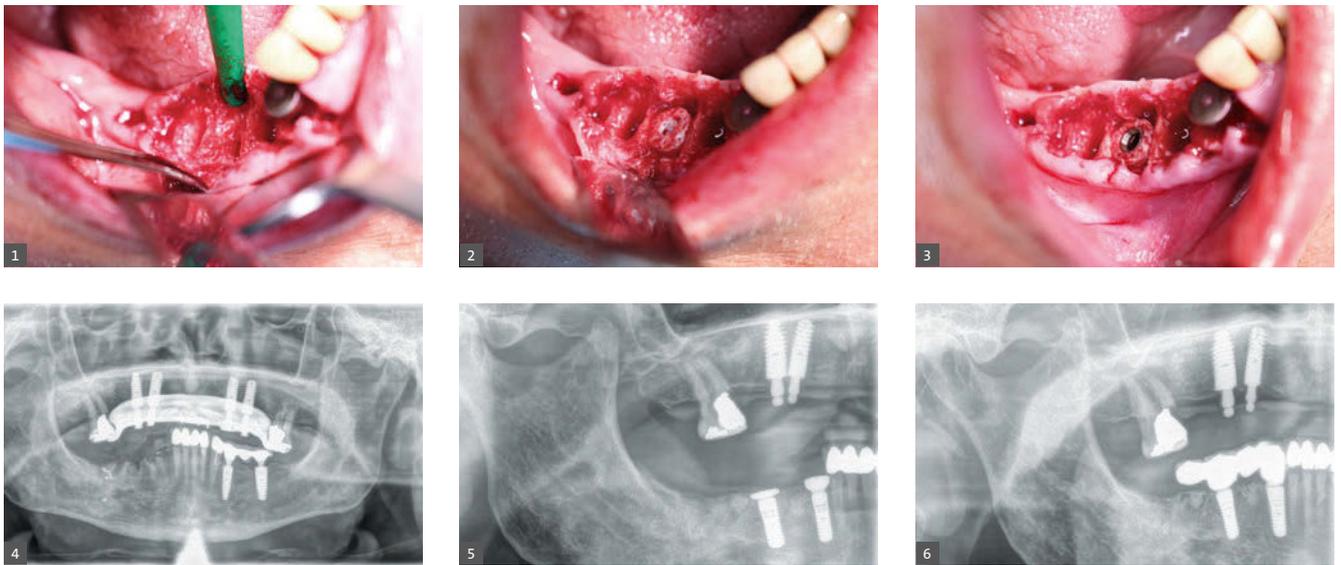
SURGICAL PROCEDURE

Once adequate local anaesthesia is achieved at the surgical site, teeth 44 to 47 are extracted (Fig. 1). The implant bed at tooth position 44 is then prepared and a Straumann® Bone Level Implant

is placed at this site. The 46 position is subsequently prepared for the insertion of the maxgraft® bonering using instrumentation specifically designed for this technique (maxgraft® bonering surgical set). The size of the defect can be measured by using the trephine drill to determine the corresponding diameter of the bone ring. A bone ring with a diameter of 7.0 mm is required in position 46.

The position and axis of the implant in the extraction site 46 is defined using a metal tulip drill and the Ø 2.0 mm pilot bur. The ring bed is then prepared with the Ø 7.0 mm trephine with pin. The pin has the same 2.0 mm diameter of the pilot bur so that the position of the trephine drill matches the planned implant position. The depth of the ring bed is determined by the vertical extent of the defect, with the corresponding markings on the trephine drill. Autogenous bone chips from the drilling procedure can be collected and used to fill any residual defect.

The ring bed is smoothed with the scalar to achieve a completely uniform surface for the maxgraft® bonering. At the same time, this step serves to remove any cortical bone from the



prepared site to provide a good nutritive blood supply to the bone ring. The bone level of the neighbouring teeth can be used as a reference for the vertical stop of the bone ring. If needed, the diamond disc from the surgical kit can be used to adjust the height of the maxgraft® bonering. The maxgraft® bonering should then be pressed into the bleeding prepared ring bed to ensure rapid vascularization. (Fig. 2).

Final implant bed preparation is carried out through the hole of the bone ring, and the implant is inserted through the maxgraft® bonering into the residual bone apically (Fig. 3). The primary stability of the maxgraft® bonering and the Straumann® Bone Level Implant is highly dependent on the maxgraft® bonering making full contact with the walls of the prepared ring bed, when pressed into the site. The implant should also be inserted approximately 3.0 mm deep into the residual natural bone apically. After placing the implant, the edges of the maxgraft® bonering must be smoothed using the diamond tulip bur to prevent perforation of the soft tissue.

If threads are still exposed buccally after implantation in three-dimensional defects or if gaps remain, they should be covered or filled with a particulate bone substitute material. We recommend a stable bone substitute material with low resorption properties (such as cerabone® with particle size 0.5–1.0 mm by botiss). This provides the bone ring with protection against rapid resorption. The augmentation is covered with a membrane which has a long barrier function (such as the Jason®

membrane by botiss) to ensure undisturbed and stable healing. The site is then closed in a tension-free manner, which is crucial for the success of the procedure. The sutures are removed approximately ten days postoperatively. Recommended post-operative medication: antibiotics (Clindamycin 600 mg per day for five days) and an analgesic (Sympal), if required.

OUTCOME

Post-op x-ray images (Fig. 4) and six-month post-op (Fig. 5) show good healing at the site with no complications. Re-entry to the implant site was done after 6 months of healing and the final prosthetic restoration was completed. One year after loading of the implants, a stable osseous condition is still present (Fig. 6), with no inflammation of the soft tissue.

CONCLUSION

Use of the maxgraft® bonering technique is now established worldwide and offers an alternative to vertical augmentation with an autologous bone block. The success of this technique depends largely on compliance with the treatment protocol and good soft tissue management. If both criteria are met, the bone ring technique can be considered as a safe bone augmentation method for vertical defects.

Single implant restoration in the esthetic zone with guided bone regeneration



MICHAEL ERBSHÄUSER

DR. MED. DENT.
GERMANY

Studied dentistry and graduated as Dr. med. dent. from Ludwig Maximilian University of Munich in 1998. Specialist training for oral surgery at the practice of Prof. Dr. Dr. Paulus, MKG Munich. Qualified specialist in implantology and parodontology by the consensus conference BDIZ, DGI, DGMKG, DGZI, BDO. 2003 to 2005 group practice for oral and maxillofacial surgery Dr. Dr. Zirn in Aalen. Since 2006, Director of Oral Surgery, Dental Clinic Mühldorf am Inn. Engaged in implantology since 1999. Speaker at national and international level. ITI Member.

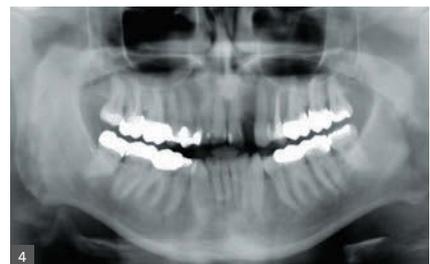
dr.erbshaeuser@zahnklinik-muehldorf.de

INITIAL SITUATION

A patient (male, 51 years old, non-smoker, good general state of health and good oral hygiene) was seen at our dental clinic with a gap in position 22 in the anterior region. A removable interim prosthesis was used to replace this missing single tooth (Fig. 1). According to the patient, the tooth was removed approximately two years ago. A previous attempt to preserve tooth 22 with endodontics and subsequent apicectomy had failed due to complications apically. The patient's goal was to have a fixed restoration at tooth position 22, without any need to prepare the neighbouring teeth to support a conventional tooth-borne bridge restoration. Hence it was agreed that an implant borne prosthetic restoration would be the preferred choice for this patient. Clinically, the neighbouring teeth in the anterior region were caries-free and not crowned. There was a secondary finding of aplasia of tooth 13 with complete space closure. The vestibular mucosal deficit in region 22 suggested that the presence of buccal bone atrophy. There was also low-grade vertical bone loss. Soft tissue conditions were unremarkable and wide keratinized gingiva was present. At the mucogingival junction, scar tissue from the previous apicectomy was seen (Fig. 2, 3).

PROCEDURE

Treatment planning: The preliminary radiographic examination with a two-dimensional OPG (orthopantomogram) provided information about the vertical bone loss in the



crestal area and the interradicular conditions in region 22 (Fig. 4). For further clarification of the extent of horizontal bone atrophy, a DVT (digital volume tomography) was prepared. Tomography in the horizontal plane showed that a single-stage procedure consisting of implant placement and alveolar ridge augmentation is possible (Fig. 5).

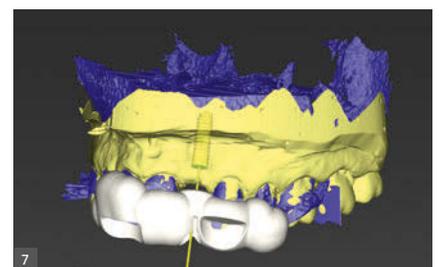
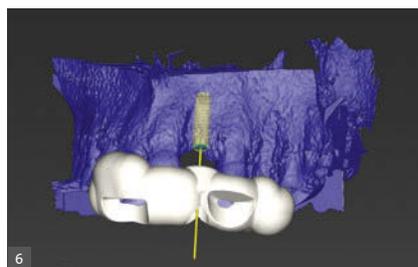
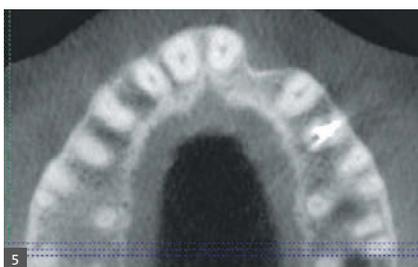
The study models and diagnostic wax-up were digitized and superimposed with the DVT. The coDiagnostiX™ planning software was used for 3D surgical planning for guided surgery (Fig. 6, 7). Starting from the position of the subsequent prosthetic restoration, a drill template was designed for safe and precise implant placement. The drill template was milled by CAD/CAM from a polyurethane blank in the on-site laboratory (Fig. 8).

Surgical procedure: Following local anaesthesia, an incision was made in the alveolar ridge combined with an intra-sulcular incision to region 11 and 23 with no relieving incision. A vestibular periosteal incision was made to mobilize the mucoperiosteal flap (Fig. 9, 10). The implant bed in region 22 was then prepared using the drill template (Fig. 11).

Following insertion of a Straumann® Bone Level implant made of Roxolid® (Ø 3.3 mm, L 12 mm, SLActive® surface), there was a bony dehiscence exposing the implant surface on the vestibular side (Fig. 12). Guided bone regeneration was used to augment this

« IMPLANTOLOGY PROVIDES AN INCREASINGLY IMPORTANT ROLE IN PROVIDING CONVENIENCE FOR THE PATIENT. WITH MODERN BIOMATERIALS, SUCH AS CERABONE® AND COLLPROTECT®, BONE AUGMENTATION IS POSSIBLE WITHOUT THE NEED FOR A SECOND SURGICAL SITE TO HARVEST AUTOLOGOUS BONE. »

Michael Erbshäuser



buccal bone deficit. A mixture of cerabone® (1.0 ml; particle size 0.5 to 1.0 mm) and autologous bone harvested locally at the surgical site was applied to augment the labial bone (Fig. 13, 14, 15).

The area was then covered using a collprotect® barrier membrane (15×20 mm) which was cut to fit the site (Fig. 16).

The surgical area was closed in a tension-free manner, using monofilament suture material (Fig. 17) and a post-operative radiograph was taken immediately (Fig. 18).

To avoid exerting pressure on the augmented area, the interim prosthesis was adjusted accordingly. The postoperative follow-up included an antibiotic (Clindamycin 600 mg, twice a day for five days), mouthwashes with a 0.2% CHX solution (twice a day) and 600 mg Ibuprofen as needed. The sutures were removed after 14 days postoperatively (Fig. 19).

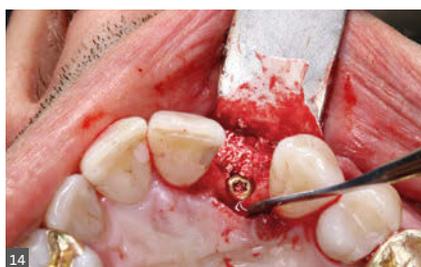
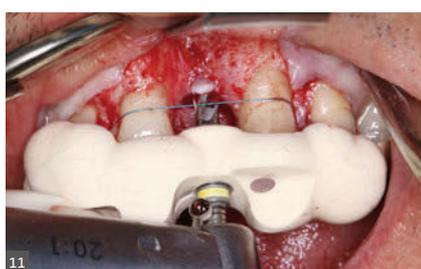
After 6 weeks of healing without complication (Fig. 20), surgery was performed to expose the implant. A roll-flap technique was used to thicken the buccal soft tissue (Fig. 21).

After developing an optimal emergence profile and achieving a stable mucosal condition, the final all-ceramic restoration was incorporated (Fig. 22).

CONCLUSION / DISCUSSION

The 3D surgical planning (DVT, digital model data, digital workflow) using CAD/CAM procedures and the coDiagnostiX™ planning software ensures increased precision and predictability of results when placing implants. As in this case, this is particularly relevant in the aesthetic zone. Implantology provides an increasingly important role in providing convenience for the patient.

With modern biomaterials, such as cerabone® and collprotect®, bone augmentation is possible without the need for a second surgical site to harvest autologous bone. This reduces patient morbidity and surgical time, as well as eliminates the additional risks of a second surgery, which is more acceptable to the patient. In this case, the materials used led to unremarkable



healing after the operation with no complications. Selecting the right implant for use in the aesthetic zone is particularly challenging. Thankfully, the Straumann® Bone Level Implant made of Roxolid® offers a suitable solution supported by good clinical data. Enhanced bone preservation, stability and aesthetic requirements are met, even with reduced diameter implants.

The Straumann® SLActive® implant surface provides safe, more predictable and faster healing to allow the prosthetic restoration of the implant. In this case, the prosthetic restoration phase was started only six weeks after augmentation of the maxillary ridge and implant placement.

This helps to reduce the time required by the patient to wear the removable temporary prosthesis. In many cases, we can manufacture a screw-retained monolithic crown by CAD/CAM at the chairside, on the day of treatment with an intraoral scanner. With such modern bone augmentation, implant and restorative techniques, we offer the patient exceptional convenience, short total treatment time and excellent results, which were unthinkable not too long ago.

« WITH SUCH MODERN BONE AUGMENTATION, IMPLANT AND RESTORATIVE TECHNIQUES, WE OFFER THE PATIENT EXCEPTIONAL CONVENIENCE, SHORT TOTAL TREATMENT TIME AND EXCELLENT RESULTS, WHICH WERE UNTHINKABLE NOT TOO LONG AGO. »

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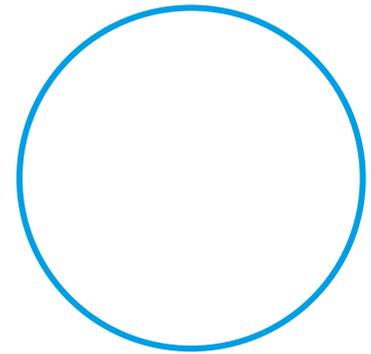
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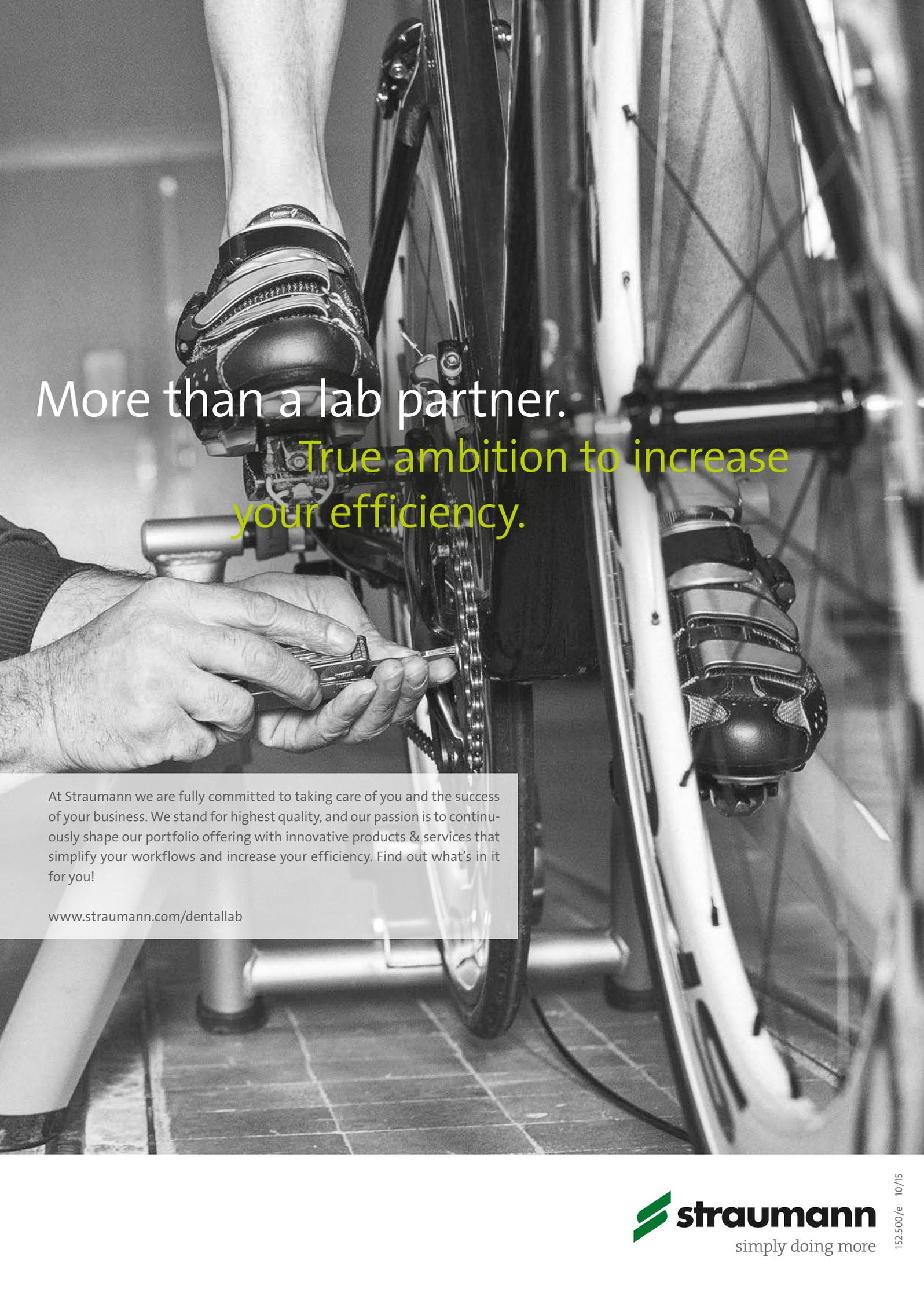
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