STARGET

PROGRESS THROUGH QUALITY

COMMITTED TO SIMPLY DOING MORE FOR DENTAL PROFESSIONALS
We don’t take shortcuts

Dear readers

Do you too believe that your patients should only come into contact with safe, high-quality products, regardless of the complexity of the specific treatment? If so, it is probably no coincidence that as a Straumann customer, you are holding a copy of this magazine. If the defining guiding principle of Straumann’s product development had to be named, it would probably be “quality.”

Straumann has always developed and manufactured products based on innovation, precision, reliability and simplicity. One of our corporate principles was, and still is, never to take shortcuts — whether in development, production or research. Implants are not merely “screws.” We manufacture high-tech medical devices that will remain in your patients’ bodies for years, or even decades. Clinical success is based on many factors, and can only be expected where all key biological factors of implantology are taken into account from the outset. We have this know-how, gained from decades of serious, expensive research and development. Simply copying the design of a Straumann implant cannot replace this.

I believe we can say in all modesty that Straumann is a company that has advanced implantology as a scientific discipline, and will also continue to shape it in the future with groundbreaking innovations. Why? Because we think everything through, from start to finish, and spare no expense before a product is launched. Because we want only the highest quality — for you and your patients.

Sincerely

Michael Hotze

Head of Clinical Research
The combination of the Straumann® Soft Tissue Level implant with the SLA® surface is one of the very few implant systems where excellent 10-year clinical data are available from a system that is still on the market.

Mathieu Fillion and Dominique Aubazac state in their essay and interview that Roxolid®, Straumann’s TiZr implant material, “enables a new way of thinking about implantology”.

An excellent esthetic outcome and functional longevity are the result of a proper soft tissue management. An interview with Julia Wittneben about this topic from a prosthodontist’s perspective.
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The surface technology of the Straumann dental implant system has become the clinical ‘gold standard’

The advent of Straumann’s sandblasted, large-grit, acid-etched (SLA®) surface in 1997 led to a revolution in the timing of provisionalization, reducing it from 12 to 6 weeks, offering improved safety and predictability. The SLA surface became the ‘gold standard’ in terms of surface technology. The SLActive® surface was introduced in 2005 and further improved the gold standard with a shorter osseointegration time, offering even more predictability in the first few weeks.¹²³ The Straumann® SLA and SLActive® surface topography and effects have been extensively investigated in preclinical studies, and they have become among the most documented and clinically validated surfaces.

The Straumann® Soft Tissue level implant line – one of the most widely used and extensively documented implant designs

The basic design of the Straumann® Soft Tissue Level implant is so simple and effective that it has remained unchanged since its introduction in 1985; the design is now supported by clinical evidence in publications over the last 25 years. The combination of the Straumann® Soft Tissue Level implant with the SLA® surface is one of the very few implant systems where excellent 10-year clinical data are available from a system that is still on the market. Implant practitioners can therefore treat their patients in the knowledge that the implant system they are using is well documented, highly predictable and successfully proven over the long term. The implant has a machined, tulip-shaped neck portion designed to shape the soft tissue and minimize the need for healing abutments and soft tissue management procedures. The one-stage design of the implant also generally avoids the need for secondary surgical procedures. The versatility and flexibility of the implant design, making it suitable in a wide range of situations and indications, elegantly simplifies the surgical treatment and the prosthetic restoration, therefore making implant treatment easier and more efficient for both patient and clinician.

The following interviews were conducted with some of the most influential implant practitioners in the world to gather their thoughts on and professional experience with the Straumann® Soft Tissue Level implant and its influence on implant treatment. We also added some testimonials by Straumann employees who received implant therapy with a STL implant.
1985
Straumann® Soft Tissue Level Implant

1997
Straumann® SLA implant surface

2005
Straumann® SLActive next-gen surface

2009
Straumann® Roxolid implant material

2012
Straumann® NNC Implant
WHAT ARE YOUR PERSONAL REASONS FOR USING THE STRAUMANN® SOFT TISSUE LEVEL IMPLANT LINE (STL)?

Belser: I love this implant – it is easy to use, and is an excellent implant for the patients because of the convenient one-stage surgery. The important features for us are the accessible prosthodontic interface, outstanding implant-abutment connection, choice of cemented or screw-retained restorations, and optimum versatility.

ten Bruggenkate: One reason is historical. We have been using the Straumann system for a very long time – since 1984 – although we now also use bone level implants since their introduction and mix both types. Some clinicians prefer to use bone level implants, e.g. in the esthetic zone or for small gaps; however, we prefer soft tissue level implants for large gaps in the esthetic zone, making use of the wider emergence of the implant.

Buser: We began using this line in 1986, and have seen excellent clinical results. Long-term data have been documented, first with the 8-year study in 1997 and now more recently with the upcoming 10-year data with the SLActive® surface in partially edentulous patients. We rarely see problems, and that’s why we primarily use this implant, in about 70% of cases.

Cochran: In my opinion, it’s biologically clearly one of the most evidence-based dental implants on the market and is an excellent implant for the patient because the interface or microgap is not at the bone crest level. For me it’s all about the host...
response and the biology. We don’t want crown margins at the bone level, and we certainly don’t want interfaces at the bone level. The soft tissue level implant is a perfect implant as it mimics the tooth and the surrounding biology, so it makes sense biologically.

**Fischer:** I have placed more than 12,000 STL implants and I like the thread spreading, but mainly the smooth neck. I think this is very beneficial for the soft tissue, both from a short-term and long-term perspective.

**HOW WOULD YOU DESCRIBE YOUR EXPERIENCES WITH THE STL IMPLANT LINE OVER THE YEARS?**

**Belser:** The prosthetic line is very versatile and easy to use; restorations on standard implants in particular are easy to cement. Our university has been using STL implants since 1989, and will continue to do so, primarily in the posterior segments of the jaws.

**ten Bruggenkate:** Firstly, the trumpet shape of the implant is ideal for surgery because it engages the bone beautifully, even under poor bone conditions, and its design gives the implant great stability. The wedge is at the strongest point of the bone, at the cortical plate, in order to achieve a really rigidly placed implant. Secondly, the Straumann 4.1 mm diameter implants are so strong, and the wide body/wide neck implants are incredibly strong, which makes them suitable in cases where there are high chewing forces. The third reason is the transmucosal part of the implant – as a one-stage implant it is very attractive for patients as they only need one surgery.

**Buser:** We have seen that the solid screws performed better than the previous hollow screw and hollow cylinder implants and we published these data in 1997. The solid screw, soft tissue level implant is very predictable and helps us in most clinical situations, particularly posterior sites where there is high masticatory function. It’s also easy to handle and straightforward to restore, so clinicians and restorative dentists are familiar with the restorative procedures and are also very pleased with it.
Cochran: I’ve had outstanding experience with the STL implants since starting with them in the late 80’s. We’ve had tremendous success, first with TPS and then with SLA® and now with SLActive®; we have a very osseoconductive surface, no micragap at bone level and easier restoration because the restoring components meet the implant at or below the marginal tissues. My 24-year experience has shown this to be an extremely successful implant.

Fischer: My experience has been fantastic since placing my first one in 1997, so I am very satisfied with the STL implants.

WHAT IS YOUR IMPRESSION OF THE LONGEVITY DATA FOR STL IMPLANTS AND THE FACT THAT THE STL IMPLANTS ARE STILL ON THE MARKET?

Belser: There is so much great data for this implant line – over more than 20 years – with very high success and survival rates. This has been confirmed by data from our own university. When it comes to long-term success, the treatment outcomes of posterior three- and four-unit FPDs supported by STL implants are truly unrivaled with > 95% success at 10 years.4,5

ten Bruggenkate: The STL implants are those that we’ve been familiar with for the longest. The implant design was way ahead of its time because the actual shape has remained relatively unchanged since 1988, and it is still on the market – how many other implants can you say that about? It’s a great implant.

Buser: Right now it’s one of the best documented implants on the market, without question. Why would clinicians want to change implant systems when they see such a good performance with these implants? I think more and more people realize that the most important point is to offer our patients successful outcomes with high predictability.

Cochran: Being a dominant implant it should be on the market forever – the data over the last 25 years have shown that it really is a perfect dental implant. The data are
overwhelming, and I have never seen any evidence in the literature that would suggest anything but excellent results with these implants. We have patients that have been walking around with these implants for 20 to 30 years with absolutely no problems.

**Fischer:** I trust the STL implant line. Straumann has a good, serious strategy in following up on products. I almost always use SLActive® now instead of SLA®, unless the difference in cost plays a role for the patient. The long-term data on STL implants is an advantage that can be used in the discussion with patients regarding costs, as the implant is well-documented compared to cheaper look-alikes.

**Rita Brüderli, Customer Services Coordinator, Straumann Switzerland**

“I had to have an inflamed molar extracted. Bone augmentation was required initially which caused me considerable pain for a few days. On the other hand, the placement of the implant went off without complications and it was almost painless for me. I was able to load my tooth right from the start and have had no difficulties at all with the new artificial molar.”

**WHAT DO YOU CONSIDER TO BE THE MOST APPROPRIATE INDICATION FOR STL IMPLANTS?**

**Belser:** The posterior region the posterior region is best suited for the STL implants and it is great to have an implant for this region, that allows promoting the concept of “design simplicity and low maintenance”.

**ten Bruggenkate:** Generally, I would say the lateral maxilla and mandible are both favorable sites for STL implants, as the loading capacity is phenomenal. The 3.3 mm diameter implants were previously considered a little more vulnerable than the standard or wide implants, but with the new Roxolid material I think Straumann has dealt with that potential problem. Now, because the new 3.3 mm diameter Roxolid® implant is stronger, this actually makes it a great portfolio.
STRAUMANN® SOFT TISSUE LEVEL IMPLANT LINE

Buser: I would say particularly posterior sites in partially edentulous patients, replacement of premolars and molar replacement where there are various dimensions from the implant or implant shoulder diameter. These patients are my main indication. In our department, we place about 800 implants a year, 70% of which are soft tissue level implants and 30% bone level implants.

Cochran: Personally I consider the STL implant as my first choice; for every case I start out by asking ‘OK, can I use the tissue level implant?’ There are only a couple of indications where one might prefer bone level implants, the main one being simultaneous bone augmentation, which can be better stabilized if the bone graft and peri-implant tissue can be completely covered. Another possibility is where the interocclusal distance is a little bit compromised. Otherwise, the first choice for me is always a soft tissue level implant.

Fischer: Completely edentulous situations, both maxilla and mandible and in the molar region, especially WN.

HOW DOES THE STL IMPLANT LINE IMPACT DENTAL TREATMENT?

Belser: The STL implant line has many advantages. It is our proven workhorse, particularly for posterior jaw segments, and we will continue to use it in the future and train our students on it. The following features, inherent to the STL implant, are decisive for our choice: 1. An easily accessible prosthetic interface 2. Excellent mechanics of the connection between implant and abutment (morse taper configuration) 3. The possibility for both cemented or screw-retained restorations and 4. Great versatility assured by a complete (but nevertheless “overlookable”) range of abutments and auxiliary components.

Buser: With this implant, you have a much more preventive approach, because when patients lose teeth and can be treated with implant-supported restorations, you don’t have to prepare natural teeth for conventional prostheses. We therefore see two clear trends: Firstly, dentistry has become much more surgical today than
20 years ago because of implant surgeries, and secondly, dentistry has become much more preventive because we no longer have to cut down healthy teeth.

ten Bruggenkate: Implantology has given dentistry a real spectrum of treatment options, within which the Straumann implants offer reliability and precision. Straumann does not follow trends but provides products that have a long background of research, testing and safety. Some other companies might follow a new trend quickly as they are afraid of falling behind, but Straumann takes its time and thinks it over. The company is therefore focused on long-term success rather than ‘quick wins.’

Cochran: It impacts dental treatment by providing the practitioner with a biologically-sound, evidence-based implant. If you think about a natural tooth, it’s a one-piece structure with a root, crown and no gap that goes from inside to outside the body. Well that’s exactly what the tissue level implant is, a one-piece implant with no junction at the bone level that goes from inside to outside the body, exactly mimicking a natural tooth. It therefore provides the opportunity to replace a tooth with natural similarity.

Fischer: At the time when I worked as a general dentist I didn’t have access to implants, so I had to make removable partial dentures for cases of bilateral edentulous mandibles. This was never a perfect treatment. Now these patients get two implants in each side and a fixed prosthesis, which works very well! I wish that could have been possible in the late 70’s and early 80’s. What a difference for the patients!
WHERE DO YOU SEE THE STL IMPLANT LINE IN THE FUTURE?

Belser: In my opinion, colleagues who discontinue using the STL implant are throwing away a lot of advantages and I would urge them to consider the available data and the high survival and success rates associated with this specific implant design.

ten Bruggenkate: I think it will maintain its present position and will not be surpassed or pushed out of the market because it has its own indications. I’m very glad that Straumann hasn’t switched completely to bone level, but has instead extended the portfolio to cover the indications, because some clinicians may prefer bone level over tissue level implants or vice versa.

Buser: I anticipate that it will maintain its importance, and I also see a very good future for the NNC implant, which is a soft tissue level implant made of Roxolid, for sites with a limited, or borderline, crest width. I am very pleased with this implant, and it is a very nice addition to the line. The assumption that implant dentistry always has to develop new products is wrong; today we have very mature treatment concepts and biomaterials, so the challenge is on the educational side.

Cochran: For me, it’s the standard implant and I have been involved with it for a long time. When I first began lecturing about tissue level implants, some people were critical and said they would not work because they were not familiar with them – what’s interesting now is that other companies are copying them and have their own versions of them, so the whole field finally realized that biologically this makes sense. So, the future for me is that this will always be the standard implant and should be the standard implant used in patients.

Fischer: They must stay on the market – they are fantastic!

Thank you for this interview.

References: The complete list of references to this text can be viewed on the Straumann website: www.straumann.com/stargetref.pdf
SEM image of the SLA® (sand-blasted, large grit, acid-etched) surface with its macro and micro roughnesses.
INTERVIEW

“We want to make products better and safer in dental medical technology”
An interview with Dr. Sandro Matter, Executive Vice President of the Straumann Institute AG, on developments in implant dentistry and questions regarding the quality and reliability of implant systems and abutments.

At Dr. Matter, Straumann is one of the leading companies worldwide who have driven implant dentistry as a dental therapeutic method and have established this principle globally in science and dental practice. Osseointegration works, implants remain functional in human jaws even for prolonged periods of time. As a rule the implant survival rate is higher than that of prostheses despite careful fabrication and care. What are the challenges for users and what is Straumann’s reaction as a premium manufacturer?

If the prosthesis needs replacing – which is highly probable when worn over a longer time period – then one must first remove the old abutment from the implant and obtain the matching original components to fabricate the new prosthesis. And this could prove difficult for less common implant systems which are no longer being manufactured today. Problems also arise if the implant manufacturer no longer exists or the abutments are no longer being manufactured, or cannot be manufactured any more as the production documentation is missing.

At Straumann there have hardly been any changes over the past ten years in terms of implant abutment connections, the fundamental connections have virtually remained the same. We also have little change in the implant systems per se and the continuously monitored clinical results are excellent. There is only one abutment in our system which does not fit the universal screwdriver – and even this screwdriver has remained the same for over 30 years. In the past customers have asked us for abutment components for older implant connections which we no longer had in stock. We always manufactured these abutments individually in small numbers for these customers as all the design drawings were still in existence.

Today we offer this service to all dentists, for all Straumann implants since 1974. These abutments under the label ”Straumann Classic” are slightly more expensive than today’s conventional abutments, but then they are available for all systems since 1974. Whoever needs to restore a Straumann implant will get the matching parts from us. We call that customer and patient orientation and are convinced that such a system is truly cost-efficient in the long run.

Straumann implants have always been copied, some of these copies and their manufacturers have disappeared, others have existed for many years. ”Also works” is a frequent comment when turning to the usually less expensive imitations. Manufacturers such as Straumann always point out that the study data obtained with the original products cannot be transferred to the imitations. Even small modifications in design and materials, for example the abutment connections, can have a significant impact on the survival rates. Is there any data on this?

There is considerable marketing-driven information available from the respective manufacturers, however partly without scientific data or serious comparisons. From our own research and investigations on implant development and the loading capacity of implant-abutment connections we know that a precise fit and the relevant tolerances for work-pieces in production are the decisive key. This requires stringent quality control for the raw materials in production as well as for machines and processes – all things which are associated with considerable costs, especially when you have to guarantee these qualities for large quantities.
Implant is not equal to implant, even if they look similar. There are numerous individual components which are crucial for success, from the choice of raw materials – we use pure titanium grade 4 as a matter of principle and our own special alloy for the Roxolid implant – to consistent surface quality, and not the similar design alone. Only because something looks similar does not necessarily mean it works the same clinically. The claims of discounters are hardly ever proven clinically and it is not individual mechanical laboratory properties which count, it is the sum of the properties in combination, in their relation to each other. This is what makes clinical studies elaborate and expensive. But this is the only way to arrive at sustainable statements for dental professionals. I think it would be a good thing if clinicians asked suppliers for such studies, otherwise one always compares apples with oranges.
Another topic in this context are imitation products – less expensive secondary components and abutments from other manufacturers for the implant systems of brand suppliers. Straumann is counteracting this with its initiative “Pro Original”. What reasons and experiences are in favor of using original parts only?

Initially I already mentioned the precisely balanced fit between implant and abutments. Add to this that we always take a precise look at the overall system when we develop implant systems, for example, at mechanical loading and the ideal predetermined breaking point in case of possible overloading due to special events. Being a typically Swiss company, we always also include considerable safety margins. “Good enough” has never been an option for Straumann. Therefore broken screws have hardly been a topic worth mentioning over the past ten years. If imitation products are used, then this balance between implant and abutment components is not assured. Changes in manufacturing tolerances and deviations in materials can lead to problems, fractures etc., which can then also occur in unfortunate places. In the worst case the apparently less expensive imitation may then lead to unpleasant problems for the patient as well as expensive ones for the dentist and the laboratory. The first mechanical comparisons have been published recently in the scientific literature (Kim et al., JOMI 2012, Vol 27, issue 1, p42.), and have shown considerable differences even for relatively minor components. To avoid misunderstandings, this was a purely mechanical test where 2/3 of the tested imitations led to reproducible fracture of the implant – and this can be extremely expensive from a clinical point of view. In view of these aspects, our original components campaign is extremely well received by dental technicians and dentists. Implant dentistry is still regarded as an expensive form of therapy. Copy products, less expensive “spare parts”, “simpler” systems – has the price war also entered this market? What role does the price of the implant system really play for the costs of restoration with implants?

In Europe, the costs for simple restoration of a single tooth for a Straumann implant with accessories averages at 15 to 20 percent of the total costs for the patient. And if I save 50 percent on the implant this hardly reduces the end price for the patient. But as a dentist, I take on the risk of a higher failure rate. Take 100 implant restorations at EUR 3,000 each per annum – if I only had to redo two at my own expense I would need to charge an extra EUR 60 for each treatment, so as not to lose EUR 6,000 in the end.

“Being a typically Swiss company, we always also include considerable safety margins. “Good enough” has never been an option for Straumann.” Sandro Matter

And if we do our sums correctly the cost is even more because in the time it takes me to replace the implant I could have treated two new patients. Never mind the patient’s dissatisfaction. Our profession would be well advised to take total costs into consideration. It cannot be in the interests of our customers and especially their patients to keep implant dentistry expensive. Patients want patient-adequate, indication-adequate, efficient restorations with a reasonable balance between effort and costs over a treatment period of 10 years and more.
Straumann places great value on evidence-based product development and comprehensive documentation prior to launching new products on the market as well as later on in dental practices. Could you elucidate that using examples such as Roxolid® or the Straumann® Bone Level implant system? And what are the benefits for the user?

“Straumann places great value on evidence-based product development and comprehensive documentation prior to launching new products on the market as well as later on in dental practices.”

Sandro Matter

Implant development projects follow a standardized development process at Straumann. Preclinical and clinical studies are conducted during the individual development stages. This process starts very early on during the technical development of the implants. To start with, tests such as material tests, cell culture tests or finite element analyses are conducted. These studies are planned and conducted both by experts from the Straumann laboratories as well as through worldwide collaboration with academic partners at universities and research institutes. As soon as a new product has been developed to the stage where it is ready for use in humans, very extensive and expensive clinical studies are initiated. As a rule the clinical program starts with a smaller pilot study to document the safety and efficacy of the implant in principle and thus forms the basis for further studies. This is generally followed by a major international multi-center study which is conducted at renowned university clinics and specialist dental practices.

It is only through these elaborate studies that we can guarantee that products offer the safety and efficacy which our customers and their patients expect from us. After a new product has been launched documentation continues within a framework of clinical studies. One the one hand these are long-term studies which monitor the product over periods of up to 10 years, and on the other these are studies which are to provide answers to special situations or specific questions in implant dentistry. Furthermore we initiate studies with the aim of monitoring the new product in daily clinical practice. Both the development of the Straumann® Bone Level implant as well as Roxolid®, followed this comprehensive study program to mention some major examples.

“Only a fraction of the dental implants placed are recorded systematically and monitored today.”

Sandro Matter

We are convinced that only this science-based process will ensure further progress in implant dentistry, prosthetics as well as dental tissue regeneration. Of course there is always the risk that new developments could mean a step backwards rather than a step ahead. It is only through accurate documentation of the product performance that the user can be secure in recommending his patient a treatment which corresponds to state-of-the-art science and technology and which reduces possible risks to a minimum.

On the subject of clinical long-term studies one often hears science state that, as with many other products in dentistry,
the implant systems have not really been on the market long enough to obtain true long-term data on clinical efficacy. What is the data situation for the Straumann® Dental Implant System?

We are already compiling the ten-year data now for the Straumann® Soft Tissue Level implant line with SLA® surface (see p. 4–12). There is also comprehensive data on all the other Straumann implant lines prior to market launch, and after launch further clinical and independent studies are conducted over prolonged periods of time and the data published at international congresses. Our implant lines have furthermore been available virtually unchanged over many years. Only a fraction of the dental implants placed are recorded systematically and monitored today – mainly in the premium range. Therefore there is no reliable data on how the implants of the various manufacturers and brands perform clinically over the long term. For example, at the EAO 2010 in Glasgow the Swedish Society for Oral Implantology presented new data on an implant register where Straumann was involved in the implementation. This implant register is now in public hands with the aim of documenting the success of all implants used in the participating Swedish clinics. We certainly look forward to the publication of future data with interest.

**Straumann® Classic: guaranteed availability of prosthetic components**

When patients and dentists decide on a dental implant, they place their trust in the reliability of the product. Straumann has been providing dental implants and prosthetic components for more than 35 years Straumann – and we are well versed in these expectations. As a pioneer in implant dentistry, Straumann is committed to supporting the millions of patients worldwide who wear our dental implants with Original Straumann® prosthetics, as implant-supported prosthetics – like natural teeth too, are subject to wear. Straumann® Classic stands for Straumann’s commitment to supporting prosthetic products for all Straumann® Implants sold in the past, should the patient need them. If a patient has received a Straumann® Implant between 1974 and 1999, Straumann® Classic will today be able to provide the suitable prosthetic product. (Note: some products may require approval from the authorities and may not be available in all markets).
How do you view the development of fully ceramic implant systems? Straumann entered this field with dental developers some time ago, but as yet no product is available.

Yes, we have been conducting research in this field since 2004. The question here is: can the proven titanium for implants be substituted by ceramic and which materials have the appropriate potential? Ceramics are certainly a highly interesting material and there are applications in implant dentistry which make sense. It is therefore obvious for an innovation leader such as Straumann to be involved. Ceramic per se is nothing new as today’s titanium implants have a ceramic surface made of titanium oxide which offers good osseointegration but is unfortunately too thin to offer white light reflection.

“We are convinced that only a science-based process will ensure further progress in implant dentistry, prosthetics as well as dental tissue regeneration.” Sandro Matter

The current commercially available full ceramic implants are probably as good as titanium implants were 10 years ago, in our opinion they do not, as yet, constitute an equivalent alternative to state-of-the-art titanium implants. However, it is definitely an exciting material with future potential. In this context it was demonstrated recently that a ceramic Straumann test implant with a specially developed surface offered comparable osseointegration to titanium/SLA® – a major step forwards. Clinical studies are presently being conducted on this subject.

Straumann spends more than 5 percent of its net turnover on research and development which makes the company the leader in this sector. For several years now it is not only implants, but also regenerative materials and modern, digital-supported fabrication of dental restorations which make up the product portfolio. Where is the current focus in research and development and which innovations or synergies will drive implant dentistry and prosthetics most in the medium term?

We are active in all our business and research fields and follow a holistic approach. We are also concerned with treatment chains which we want to cover with our research and product portfolio. What counts is what customers want and what helps them. Which is why we are increasingly covering the segment which follows the implant, the prosthetics. In the end, the patient wants a fully functional and esthetic tooth, even if there is an implant underneath. As to the trends, these will focus on surgery becoming available to dental professionals in greater depth. The issue is reproducible results for all those who want to provide their patients with secure restorations every day. Procedures will therefore no doubt become easier overall, both from a situation and indication point of view, also on the prosthetic side, especially due to new materials and technologies. This will be more accommodating for patients who want their restorations with as few visits as possible. And finally, it is also all about complete solutions within a reasonable price structure. In my opinion the dental technician will play a new role as partner. Therefore we will approach the technicians more. Add to this new materials for CAM fabrication. Next to metals and ceramics, special synthetic materials are now extending the range of materials for long-term temporary dentures and permanent restorations.

References: The complete list of references to this text can be viewed on the Straumann website www.straumann.com/stargetref.pdf
As a result of recent problems with faulty medical devices, there is discussion at present about the quality of testing medical devices with stricter controls and supervision. What is your opinion about the present safety and quality of medical devices?

We want to make products better and safer in dental medical technology, and that includes stricter criteria for their marketing authorization. The playing field should be identical, also with regard to fair competition. Stricter criteria should certainly apply to analogies from the literature when reviewing new products, and the conclusions from the analogies need to be proven. And there is certainly a significant need for more direct clinical trials.

Dr. Matter, thank you for this interview.

Straumann original components were developed to give the best possible performance

Original Straumann components were developed to complement each other and ensure the balance of design (shapes and features), tolerances, surface qualities and materials used. Straumann® abutments on Straumann® implants therefore ensure the best possible performance of the implant-abutment connection and thus the entire restoration: (a) Optimal load distribution to reduce peak stresses, (b) minimization of the infiltration of bacteria and contamination in micro gaps, (c) matched design of abutment, screw and implant and thus optimal mechanical performance and long-term stability of a restoration, (d) good handling of abutments and screws during assembly, genuine Straumann® components give the user tactile feedback when an abutment has been placed correctly and a screw has been tightened firmly.

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* including screw-retained bars and bridges; excluding consumable products and retentive products such as ball anchors. ** including Straumann® CARES® copings, full contour crowns and bridges. EXCLUDING all other products offered by Straumann, particularly Straumann® CARES®, inlays, onlays, veneers, partial crowns and Straumann® CARES® Guided Surgery products.
CONFIDENCE IN LIMITED SPACE
STRAUMANN® NARROW NECK CrossFit®

The Straumann Soft Tissue Level solution to address space limitations
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- Wide range of treatment options
- Simplicity in daily use

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THE WINNER IS...

"reddot design award" for the Straumann® Standard Plus Narrow Neck Crossfit® Implant (NNC)
Straumann’s NNC implant has been distinguished with a prestigious “reddot design award”, in the product design category for medical devices. Consequently, this is the third “reddot design award” for Straumann in three years (2010: Annual Report, 2011: CADCAM Scanner CS2).

The NNC implant

Designed to increase patients’ acceptance of implant treatment, the NNC implant is a 3.3 mm diameter implant that includes a narrow prosthetic platform. Its internal connection can be used for a wide range of prosthetic options and treatment solutions in the upper and lower jaw where space is limited. For implant dentistry, the NNC provides these benefits: simplicity and efficiency, additional treatment options for all indications and confidence in the placement of small-diameter implants.

The prize

The reddot award is the most renowned international design prize existing since 1955. A high-level jury assessed the product in detail based on criteria such as design, functionality, degree of innovation, ergonomics and quality. They selected Straumann from 1800 companies and designers from 58 countries that registered for the “red dot product design award”, making this the third reddot award that Straumann has received in three consecutive years.
HERVÉ BUATOIS AND MARC ANDRÉ LERICHE
Clinical experience with the Straumann® NNC implant: replacing teeth 22 and 23

Initial situation
A young man aged 19 years without any medical history or contraindications presented to us for implant-based stabilization of tooth 22 and 23. Both showed significant root absorption due to the fact that tooth 23 was impacted. (Figs. 1–3).

Treatment plan
Taking into consideration the needs of the patient associated with his age (19 years), the treatment plan was geared towards avoiding removable restorations throughout the period of care. To achieve this we suggested extracting the impacted canine, while preserving tooth 22 and 23 as far as possible.

At 4 months, extraction of these two teeth and immediate placement of two narrow implants (given the mesio-distal space available) was performed, with immediate restoration. After 2 months, two ceramic crowns were fabricated on two anatomically-accurate ceramic cast cores (the option of using CADCAM technology was not available during treatment).

Surgical phase
The first phase comprised the extraction of the impacted canine. To begin with, a retainer was positioned from tooth 11 to 24 in order to hold tooth 22 and 23 securely during surgery and to ensure post-operative stabilization. A slow-absorption
xenograft and a resorbable membrane were used for filling in order to prepare the site for subsequent implantation (Fig. 4). The second phase of surgery took place 4 months after clinical and radiological follow-up. Teeth 22 and 23 were extracted without any particular difficulty. The width of the residual alveolar ridge was entirely satisfactory and the thickness of the buccal wall appropriate to ensuring alignment of the emergence profiles of the intended restorations as well as stability during periodontal support (Fig. 5). This can be considered a standard implant placement procedure. The mesiodistal space available led us to select two Straumann® NNC implants (14 mm). Bone density was good (type 3). The bone volume as well as the GBR procedure carried out following extraction allowed us to perform three-dimensional implant positioning consistent with the prosthetic objectives. The new NNC design allowed us to observe biological principles for positioning, particularly with regard to vertical positioning of the implant (Figs. 6–8). Two temporary abutments for screw-retained restorations were positioned on the two implants. First, the gap in the extraction site was filled with a xenograft and collagen membrane (Figs. 9, 10). The temporary teeth for immediate restoration were fabricated using the direct relining approach, with a silicone key and self-curing resin on the temporary abutments. The restorations were screw-retained.
following polishing and suturing via a muco-periostal flap using simple stitching, and subordinate occlusal function was established (Fig. 11).

**Prosthetic phase**

After two months, the final prosthetic phase could begin, confirmed in this regard by validation of the osseointegration and appropriateness of the gingival architecture (Fig. 12).

In addition to facilitating management of a fixed restoration while the wound was healing, immediate restoration also enabled the bed for the emergence profile of the restoration to be prepared at soft tissue level (Figs. 13, 14). The impression was taken using the open-tray technique with two transfer abutments. The internal connector of the restoration uses the CrossFit® design already implemented in Bone Level implants. Marc André Leriche, a dental technician, used a gold firing ring for casting and ceramization of the sub-gingival area in order to create a transitional anatomical structure for the emergence profile and a seat for the crown with a ceramic shoulder section so that the presence of metal could be eliminated completely in the esthetic region. Clinical appearance on the day of placement is shown in Figs. 15–17.

Radiological and clinical follow-up took place at 12 months so as to verify bone behavior and gingival integration in the
vicinity of the restorative implants. The situation showed excellent periodontal stability (note the radiological appearance after an interval of 12 months, (Fig. 18, 19) and esthetic integration that was entirely satisfactory, both in terms of pink and white esthetics as well with regard to recovery of shade and brightness (Figs. 20, 21). With the new NNC implant that replaced the NN in the range of soft tissue level implants we aim for:

» Extending the indications for narrow Tissue Level implants in areas subject to greater mechanical stress, thanks to the mechanical benefits of Roxolid®.

» Be able to manage prosthetic rehabilitation in a more esthetic manner while at the same time observing three-dimensional positioning criteria in accordance with biological principles (prevention of encroachment of the external hexagon).
MATHIEU FILLION AND DOMINIQUE AUBAZAC

Roxolid®: a material for new strategies in oral implantology
30 years of progress behind us
Can we still talk about dogma in oral implantology? In the last 30 years, implants have never stopped progressing. Many small revolutions have occurred that changed implant parameters, such as macro- and micro-roughness, implant diameters, implant lengths, or combination with bone volume augmentation techniques, etc. This progress has allowed for a good imitation of natural teeth, and patients now want to obtain the ideal treatment without undergoing a complex surgical procedure that may involve an autogenous bone graft, sinus lift, or soft tissue grafts.

The quest for the ideal material
Patient quality of life with regard to oral health during and after treatment was evaluated. The simplest treatments, i.e. without autogenous bone graft, sinus lift or soft tissue graft, produce higher patient acceptance scores. The surgical procedures have been simplified over the last 10 years. The osseointegration time reduction to 4 weeks and the reliability of immediate loading have overshadowed the necessity of wearing an uncomfortable temporary denture. Moreover, the optimization of implant design and the introduction of the platform switching concept combined with smaller diameter implants, has reduced the need for bone augmentation.

Many firms have focused their research toward the discovery of the ideal material, which is highly biocompatible and fracture resistant. Titanium alloys are commonly used in implantology. For instance Ti6Al4V alloy exhibits higher mechanical performance than Ti Grade 4, however surface treatments do not allow the same micro- and macro-roughness as Ti Grade 4 that is beneficial for osseointegration and bone metabolism. The need for a material that combines both high strength and excellent osseointegration led to the development of new alloys as in the case of Roxolid®.

Roxolid® – an innovation with promising results
Roxolid®, which has a metallic gray appearance, is a combination of zirconium and titanium (TiZr) and is reported to have excellent biocompatibility and higher mechanical strength than Ti Gr 4. Additionally, preclinical tests showing higher cellular adhesion than Ti alloys and a survival rate of 98.8% after two years clinical studies are promising. The Roxolid surface always consists of Straumann SLActive®, which is beneficial for osseointegration, as explained in the following section.

SLActive®: surface properties as a crucial factor
The quality of osseointegration seems to be related to the ability of osteoblast cells to couple rapidly with the implant surface. The effectiveness of implant surfaces is multifactorial and no longer simply depends on sandblasting and/or etching. Each step in the industrial process, such as the choice of blasting particles, type and titration of acids, frequency of quality controls and implant packaging, has to be mastered. Only this rigor and prior scientific investigations lead to an improved surface chemistry and reproducible clinical results.

The hydrophilic SLActive® surface with micro- and macro-roughness topography allows early adhesion of the cells necessary for new bone formation. Bone formation is initiated immediately, resulting in earlier secondary stability and consequently to a reduction of the risk of failure to just 2–4 weeks. A preclinical study reported that the SLActive® surface
achieves about 20% increase of bone to implant contact (BIC) formation two weeks after implantation when compared to SLA surface. These histological results correspond to an increased removal torque in the same timeframes, which underlines the good absorption of the implant in the bone.

Expanding the applications for small diameter implants
The use of a 3.3-mm implant helps in emergency needs in a strategic site. The opportunity to perform surgery that is less aggressive will expand the recommendations for smaller diameter implants. Table 1 lists some clinical cases and indications that have been positively treated by the authors (see table 1). Patients who consider themselves too old or whose anxiety paralyzes them at the thought of undergoing a “major procedure” may agree to the implant solution. This therapeutic choice of using small-diameter implants will no longer be a second choice after conventional treatments.

<table>
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<tr>
<th>IMPLANT USED</th>
<th>PROSTHETIC RECONSTRUCTION</th>
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<tr>
<td>![Implant Image]</td>
<td>Maxillary incisors and premolars</td>
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<td>FPD framework support</td>
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<td>Full arch or sectorial immediate loading</td>
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<td>Overdenture attachments</td>
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<td>![Implant Image]</td>
<td>Wide emergence profiles</td>
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<td>Zirconia or titanium anatomic abutment</td>
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<td>Immediate loading with 25° angulated abutments</td>
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Example of clinical cases successfully treated with small diameter implants Roxolid 3.3 mm by the authors

Roxolid enables a new way of thinking about implantology
It appears obvious that an implant is more stable in larger bone volume. The biology necessary for good implant integration depends on cortical and cancellous bone architecture. All too often, clinical bone conditions force borderline use of bone volume. This standard implant placement approach should change for smaller size implants that allow preservation of a larger bone volume around them and open up more treatment options with small diameter implants. This attractive effect needs to be validated by other prospective studies, to again change the dogmas of oral implantology. The following clinical case gives one detailed example of Roxolid’s potential.
CLINICAL CASE REPORT (FILLION/AUBAZAC)
The use of Roxolid® implants for tooth replacement in hypodontic patients

Anamnesis
A 27-year-old woman with 4 temporary teeth presenting no replacement teeth consulted a professional. She complained of functional difficulty with mastication and a cosmetic problem with regard to the shape and color of her temporary teeth. To compensate for the missing teeth 12, 13, 22 and 23, the patient asked for a cosmetic and permanent fixed rehabilitation. As far as possible, she wanted to avoid a partial removable denture during the osseointegration period and combination with orthodontic treatment.

The patient reported no diseases that could contraindicate oral implantology. The facial physical exam showed good facial symmetry. When she smiled, it was easy to see the gingival scalloping. On oral exam, no gingival inflammation was found, and her hygiene was excellent. Study of the neck line showed a curve disrupted by short teeth. The smile had become disharmonious, as the free edges had become abraded and the enamel stained. The curve of the smile needed to be adjusted (Figs. 1–3). Palpation of the alveolar processes showed good thickness at the neck of the teeth, but they appeared to become thinner rapidly when the apical region was tested. At each site, the available mesiodistal space from the distal sides of the central incisors to the mesial sides of the first premolars was 11.5 mm. A panoramic x-ray and a three-dimensional cone beam x-ray (3Ds Planmeca) were performed. Analysis of the sagittal slices confirmed low apical volume. Digital modeling of the positioning of a 4.1-mm diameter implant showed that it was incompatible with the prosthetic axis without invasion of the vestibular cortical bone. The use of a 3.3-mm diameter implant combined a prosthetic axis that retains the available bone volume. The
analysis of the panoramic reconstruction made from the 3D image allowed precise measurement of the available mesio-distal space. There was 11.5 mm available on each site to rehabilitate (Fig. 4).

Considerations and treatment plan

The reference publications on implant positioning propose a tooth-implant distance of 1.5 mm and an implant-implant distance of 3 mm. The use of two 3.3-mm implants requires a minimum space of 12.6 mm. The missing millimeter may be detrimental in preserving the inter-implant bone papilla. Because the bone biology could not be respected, the gingival papilla would not be stable over time. With two implants to replace two teeth, the cosmetics could not be guaranteed, bone loss would appear and a pocket could be created between two implants that are too close. Faced with this clinical picture, the only therapeutic solution seemed to be the use of an implant supporting a cantilever denture. The unfavorable mechanical component for a 3.3-mm implant pointed to the choice of the Roxolid alloy. The good mechanical properties and the biocompatible surface would allow for extraction and immediate implantation with a screw-retained temporary bridge fulfilling the cosmetic function. The neck diameter of a temporary canine was compatible with the use of an RN neck. The flare of the neck would facilitate a good emergence profile and inter-dental papilla support (Figs. 5, 6).

Clinical procedures

The patient was given local anesthesia using periapical injection and a palatine booster. Teeth 12, 13, 22, 23 were extracted after syndesmotomy then luxation with dental forceps. The alveoli were carefully repaired then two Roxolid
3.3/12 RN implants were positioned at sites 13 and 23. An impression was taken perioperatively, and high healing abutments were screwed on the connectors. One suture was made with polyglactin 5.0 suture to facilitate the stabilization of the blood clot in the alveolus and avoid significant bone resorption. In the denture laboratory, each sector of the rehabilitation underwent the same process. The armature was made from a titanium temporary abutment on which a titanium armature was laser welded. This element facilitates support of the tooth in extension. Two cantilever bridges were made within six hours. The patient was seen again in the practice the afternoon after the procedure. She was given local analgesia by soaking the area with an anesthetic gel. The two bridges were screwed on with a torque of 35 Ncm. Occlusion was carefully checked. Two months of osseointegration were observed before the final denture step. An impression was taken to record the new gingival environment. The color and the surface characterizations were recorded. Two cantilever bridges were made and then screwed on. The temporary bridges supported the papillae during the bone healing phase. Ceramic bridges were fitted to the gingival morphology and preserved the biology and the cosmetics (Figs. 7–17).

Conclusion
The remarkable biological affinity and mechanical properties of the Roxolid implant lead us to consider treatment plans differently. The priority is given to the periodontium while managing the inter-implant distances and the peri-implant bone volume as well as possible.

Acknowledgements: ARV Laboratory 11bis, rue Jean Baptiste Toury F-63000 Clermont-Ferrand
What are the benefits of small diameter implants – for patients and in the clinical procedure?
In the future, procedures in implantology will become simpler. Today, many patients decide against implant treatment out of fear of bone augmentation. If the good success rates enable us to insert small diameter implants in poor bone volume, we will increase the number of treatments while at the same time offering the patient a smooth postoperative recovery. Using an implant with a diameter of 3.3mm makes it possible to insert the implant in poor bone volume situations in combination with expansion osteotomy and guided bone regeneration.

What is your opinion with regard to the use of small diameter implants after the introduction of Roxolid®?
Reading the results of the mechanical studies with the new TiZr alloy strengthened our confidence in small diameter implants, and thanks to the arrival of Roxolid® we reintroduced 3.3 mm diameter implants to our treatment plans.

“In view of the excellent clinical results, we decided to enable all our patients and referrers to benefit by using SLActive® and Roxolid®.” Mathieu Fillion and Dominique Aubazac

Why did you decide to use SLActive® and Roxolid®? What convinced you to make this choice?
With osseointegration, it is not a clear-cut question of whether the implant is considered osseointegrated or not. Some implants that are considered osseointegrated are, in reality, not, because it is only a small percentage of their surface area that is integrated. This incomplete contact between the bone and the implant can cause subsequent implant failure. During the first minutes following the insertion of the implant, hydrophilia aids the homogeneous stabilization of red thrombus and fibrin thrombus. With optimal cellular bone to implant contact, it is realistic to hope for perfect osseointegration. Up until 2011, we frequently used SLActive® in cases of advanced and complex surgery: immediate load implants, management of poor bone volume, implantation in combination with guided bone regeneration. In view of the excellent clinical results, we decided to enable all our patients and referrers to benefit by using SLActive® and Roxolid®.

In a structure such as ours, in which implantology is our main activity, management of implant failure is extremely costly. What is more, every failure carries the risk of portraying a negative image of implant treatments; all bad experiences are talked about by patients, and complicate the process of acceptance of alternative treatments. Increasing success rates has, therefore, always been our priority. The choice of a high-performance surface enables us to follow the developments in implantology, without bringing down our success rate.

What are the benefits of SLActive® for your patients? What are the benefits of Roxolid® for your patients?
The question of the life span of the rehabilitations is a recurring one among patients. Thanks to SLActive®, we have great confidence in our implant treatments, and can give patients good short and long term prognosis. In the case of immediate load implants, we insist on using SLActive®. For implant candidates, Roxolid® is revolutionary, making it possible to increase success rates, and reduce advanced surgery with bone augmentation.
Have you explained the benefits of SLActive®/Roxolid® to your patients? If so, how? If not, why not?
Patients need to be reassured of the clinical track record and reliability of the products, which is why, in initial consultations, we highlight the clinical studies to which we have access.

Have you recommended use of SLActive® or Roxolid® to your colleagues? If so, how? If not, why not?
We run an implantology training center. As part of this training, practitioners have the opportunity to insert 6 SLActive® or Roxolid® implants with our support. This gives patients the possibility to benefit from the properties of SLActive®, while the practitioners see the advantages during the treatment process itself.

How do you believe Roxolid® can help to bring dental implantology forward?
The increase in the availability of implantology will be based on reduced post-operative recovery times. Patients whose treatment included bone grafting are generally satisfied with the results, but admit that they would not necessarily repeat the procedure if they had to undergo this stage again. Patients are the best channels of communication between each other, as each successful intervention can represent a further recommendation. The availability of less invasive treatments, i.e. with smaller implants, can help to bring implantology forward and increase the rate of acceptance of treatment plans. We hope that, by using Roxolid® and SLActive®, we will be able to avoid as much as possible the incidence of problems in our patients.

Doctor Aubazac, Doctor Fillion, many thanks for your time.

References: The complete list of references to this text can be viewed on the Straumann website: www.straumann.com/stargetref.pdf
NEW SURGICAL INSTRUMENT
Designed for optimal mechanical debridement of metal implant surfaces affected by peri-implantitis

Complications as a burden to clinicians
In the past years, dental implants have gained wide patient acceptance and play a crucial role in oral rehabilitation. It is speculated that today 20–25 million implants have been in place for more than 5 years. By 2015 this figure will have more than doubled to over 50 million. Despite the overall high success and survival rates of over 97%, the absolute number of mechanical and/or biological complications of dental implants in function presents a considerable burden to clinicians.

Risk factor: peri-implantitis
A prominent biological complication of dental implants is peri-implantitis, a multifactorial destructive inflammatory process affecting the soft and hard tissues surrounding dental implants. The primary etiological factor is bacterial biofilms which are similar to those found in association with various forms of periodontal disease. Every peri-implantitis case is associated with bone loss and in the worst cases the dental implant is lost. This may result in patient discomfort, potential damage to the clinician’s reputation and loss of time and money.

Treatment methods
There are several approaches for the treatment of peri-implantitis depending on the progression and severity of the infection. If detected early, non-surgical treatments like mechanical cleansing by a dental hygienist, antiseptic mouth rinses or antibiotic therapy are indicated. In severe cases the infected implant surface is cleaned during an open-flap surgical procedure. This approach often combines mechanical debridement with a chemical cleaning step. Current mechanical debridement methods range from manually scraping away the biofilm with curettes to complete removal of the infected implant surface with burrs (implantoplasty). Straumann has designed TiBrush™, a surgical instrument that is gentle on metal implant surfaces and makes mechanical debridement more effective and efficient.

Straumann® TiBrush™: 3 times more effective than a curette
The Straumann® TiBrush™ is made from titanium bristles with a medical grade stainless steel shaft. It is delivered sterile in a single unit package and is for single patient use only. For optimal debridement results it should be used with an oscillating handpiece. After proving its effectiveness and ease-of-use in the Clinical Input on Handling Evaluation and in case studies, TiBrush™ is now available for limited distribution in selected countries.

PRODUCT DESCRIPTION
The Straumann® TiBrush™ is a surgical instrument indicated for debridement of metal implant surfaces affected by peri-implantitis in an open-flap procedure. It is an alternative to current mechanical methods of debridement. TiBrush™ offers clinicians the following benefits compared to a metal curette:

» Gentle on metal implant surfaces
» More effective and efficient at debriding implant surfaces
» Significant reduction in treatment time
» Optimized access into implant threads with fine titanium bristles

The TiBrush™ has been shown to remove over 90% of biofilm within 3 minutes of use, which is over 3 times more effective than a curette.

References: The complete list of references to this text can be viewed on the Straumann website: www.straumann.com/stargetref.pdf
TiBrush™ is not available in all markets. Please contact your local distributor for more information.
Clinical Input on Handling Evaluation

During the first half of 2011 an evaluation was conducted in 6 European countries. The purpose of this evaluation was to study the handling of the TiBrush™ and also to check the perception of the product in relation to Straumann’s activities in the field of implant maintenance. The TiBrush™ was used to treat a range of different metal dental implants in a variety of indications. The clinicians were required to document the cases and provide Straumann feedback via a questionnaire. The evaluation was successful with valuable feedback given by the clinicians. 26 patients were treated with over 50 implants being debrided with the TiBrush™. The product was perceived very positively by the clinicians and credit was given to Straumann for proactively addressing peri-implantitis and providing products such as TiBrush™ to help fight the problem.

A key part of the evaluation was to check the clinical use and acceptance of the TiBrush™ with an oscillating handpiece. During the development of the TiBrush™ it was found that optimal debridement results were obtained when the brush was used in an oscillating mode at 900 rpm. The evaluation confirmed that use with an oscillating handpiece provided better tactile feedback while prolonging the life of the titanium bristles which in turn means better cleaning.

The eight clinicians that participated in the evaluation

Hadar Hallstorm – Halmstad, Sweden
Morten Klepp – Stavanger, Norway
Gaston King – Bath, UK
Jérôme Lasserre, Michael Brecx – Brussels, Belgium
Haakon Kuit – Arnhem, The Netherlands
Nicola Zitzmann – Basel, Switzerland
Thomas Sorg – Zurich, Switzerland
Testimonials
The resounding success of the evaluation is evident from the statements provided by some of the clinicians that participated.

**MORTEN KLEPP – STAVANGER, NORWAY**

“As peri-implantitis most often manifests many years after implant insertion, I find myself confronted with a clinical challenge, to manage the peri-implantitis lesions. In this context and with the scarcity of evidence-based treatment protocols available, I am grateful to Straumann for bringing the TiBrush™ to the market. The TiBrush™ application on the exposed implant surface is well controlled with an oscillating handpiece under copious irrigation. Through magnifying lenses the visual inspection reveals a clean surface following TiBrush™ application. I regard the Straumann TiBrush™ as a valuable, first-generation device for mechanically debriding the contaminated peri-implantitis implant surface.”

**JÉRÔME LASSEURRE & PROF. MICHEL BRECX – BRUSSELS, BELGIUM**

“The TiBrush™ was tested last year in the department of periodontology (Université catholique de Louvain-UCL) on six patients with a total of eight implants presenting severe peri-implantitis lesions. It seems preferable to use it after a wide surgical flap elevation and crown removal if possible. This keeps the brush parallel, close to the implant surface and controls the bristles all around the implant from its coronal to its apical part of the contaminated surface. The experience with this product was really interesting, because of the size of the TiBrush™ permits access quite easily, rapidly, deeply and efficiently along the contaminated implants without destroying or polluting the titanium surface.”
JULIA SCHMIDT AND NICOLA ZITZMANN
Cleaning and decontamination of implant surfaces under
direct vision with the Straumann® TiBrush™

Initial situation
A 56-year-old female patient presented in May 2010 in the
Department of Periodontology, Endodontology and Cariology, University of Basel, Switzerland. The medical history
was unremarkable. The patient had been a non-smoker for
three years at this time, but had smoked 20 cigarettes a day
between the ages of 20 and 53 (33 pack-years). In Janu-
ary 2008 the patient received implant reconstructions at a
private dentist in Turkey. The implants were inserted in the
maxilla regions 12 and 22, as well as regions 15 and 16. In
the mandible, the free-end situation in the third quadrant was
also treated with implants in regions 34, 36 and 37. About
three months after implant insertion, the implants were recon-
structed with fixed bridges in region 12 to 22 and region
34 to 37 and splinted crowns in regions 15 and 16 (Fig. 1).
In May 2010, the patient’s main concern was a check-up.
Her periodontal diagnosis showed localized highly increased probing depths of up to 12 mm at the implants in regions 15 and 16, as well as up to 11 mm at the implants in region 34 to 37, with bleeding on probe (BoP+) and edematous swelling (Fig. 2, 3). Furthermore, there were generalized moderately increased probing depths. The X-ray status revealed generalized moderate horizontal bone resorption around the patient’s own dentition, whereas in the implant regions 15 and 16, as well as region 34 to 37, there was advanced bone resorption through to the apical third of the implant (Fig. 4). The main diagnosis was severe peri-implantitis and localized severe chronic periodontitis. In addition, there was an insufficient filling on tooth 46.

Treatment planning
The initial periodontal treatment encompassed oral hygiene instruction and motivation, as well as filling therapy on tooth 46. Striking was the closed interdental space structure and
the close proximity between neighboring implants in regions 15–16 and 36–37 thus impairing the adequate use of interdental space brushes. Subgingival and submucosal instrumentation was performed on the periodontal tissue and implants under local anesthetic in two treatment sessions. The periodontal reevaluation after 3 and 6 months showed a reduction in the probing depths in the region of the periodontal tissue and the implants. In regions 15 and 16, as well as 34 to 37, the probing values were still 6–11 mm, however, so that a surgical procedure was planned.

Clinical procedure
The aim of surgical intervention was, besides degranulation and cleaning of the implant surface under direct vision, also pocket elimination with mucosa excision, so the patient could be in a position to achieve adequate postoperative oral health.

Dr. Julia Schmidt
Dental degree from the University of Bonn/Germany.
Assistant at the Department of Periodontology, Cariology and Endodontology at the University of Basel.
Currently participating in the postgraduate programme in Periodontology at the University of Basel.
hygiene. Firstly the prosthetic superstructures in regions 15 and 16, as well as 34 to 37, were removed (Fig. 5, 6). The incision was made intrasulcular in region 34 to 37 due to the narrow strip of keratinized mucosa and a crestal incision was made between the implants. In contrast, in the maxilla a paramarginal incision could be selected by way of a gingivectomy incision. The paramarginal incised mucosa and the inflammatory granulation tissue were excised with a curette and sharp spoon. Following formation of a mucoperiosteal flap, cleaning and decontamination of the implant surfaces was carried out with the Air-Flow® and low-abrasion glycine powder (EMS, Nyon), blunt curettes and with the use of the Straumann® TiBrush™ (Figs. 7–9). The TiBrush™ was used on an oscillating handpiece and was moved in a circular manner over the implant surface under moderate pressure. The alveolar bone was recontoured with a round bur. Intensive irrigation with sterile sodium chloride solution then followed. Due to an extended

Prof. Dr. med. dent. Nicola U. Zitzmann, PhD
Dental Degree from the University of Aachen/Germany. From 1997 Assistant Professor at the Department of Fixed and Removable Prosthodontics and TMJ Disorders at the University of Basel/Switzerland. Currently Professor at the Clinic for Periodontology, Endodontology and Cariology at the University of Basel. ITI fellow and Education Delegate for Switzerland. Member of the International College of Prosthodontics, the Swiss Society of Periodontology (SSP) and the Swiss Society of Reconstructive Dentistry (SSRD).
crater-shaped bone defect, the implant in region 37 was explanted and the bridge restoration separated distal of the implant crown 36. The interdental space between the implant crowns in regions 15–16 were recontoured to improve the ability to perform oral hygiene measures. Primary wound closure was achieved with single-button sutures in the area of the incision. The superstructures were recemented with a temporary cement; sutures were removed one week after surgery.

**Therapy outcome and conclusion**

At the subsequent periodontal check-ups, a reduction in the signs of inflammation and probing depths with a low tendency to bleed (BoP) was ascertained in the surgical areas (Figs. 11–13). The radiological examination 1 year post-op revealed both a corticalization and a remineralization of the bone in the maxilla and the mandible (Fig. 10). The periodontal and peri-implant situation will continue to be examined in
three-month recall intervals. The administration of antibiotics should be generally evaluated on account of the severity of the surgical procedure. In the case described, besides the individual risk factors, iatrogenic parameters are also to be considered as cofactors of peri-implantitis. Aside from cement residues around the implant shoulders that promote plaque accumulation, the low inter-implant distances and poorly accessible interdental spaces hamper personal oral hygiene. As a result of the resective procedure, as well as cleaning and decontamination of the implant surfaces, it was possible to achieve an inflammation-free situation for the patient, which, with continued good oral hygiene, can be maintained stable over the long term despite reduced implant-bone contact.
Patients today have high esthetic expectations. Therefore, it is important to provide evidence-based treatment approaches to patients who expect an excellent esthetic outcome and functional longevity. But how can these excellent esthetic results be achieved? One important step towards this goal is proper soft tissue management. We asked Dr. Julia-Gabriela Wittneben, Assistant Professor at the University of Berne, about soft tissue management from a prosthodontist’s perspective.

“Even after a successful surgical intervention, the prosthetic finalization remains challenging.” Julia-Gabriela Wittneben

Why is it so challenging to treat patients in the esthetic zone?
A top quality esthetic outcome is not left to chance. It is the product of careful treatment planning, a realistic assessment of all risk factors, the longevity of the biomaterials used, the selected evidence-based treatment method – and the patient himself. Here, the clinician is the key figure as he or she bears the responsibility and determines most of the above mentioned factors: implementing the treatment plan, diagnosis, determining treatment and selection of the biomaterials to be used. Patient demands for esthetic outcomes have increased considerably over the past years – especially for the region of maxillary anterior teeth which have a major effect on smiles and personal charisma. Healthy attractive teeth signal health, well-being and attractiveness to the community and usually affect the social competence of person. Add to this the permanent evolution of implant design, prosthetic components and dental materials which further highlight the possibilities and expectations of achieving a successful functional and esthetic outcome. Even after successful surgical intervention – especially in the anterior region – the prosthetic finalization remains challenging. The creation of an esthetically pleasing implant restoration in the esthetic region is based on detailed treatment planning and consideration of all possible risk factors. Therefore, it is of crucial importance to perform proper treatment planning and risk assessment prior to starting the treatment. SAC classification is a good tool for this. In addition, it is important to discuss the case with the patient and to lower the patient’s expectations if many risks factors are involved. The esthetic outcome depends on surgical and prosthetic aspects. Prosthetic aspects encompass the quality and visual appearance of the restoration per se as well as modifications to the surrounding peri-implant soft tissue which should harmonize with the adjacent teeth. Hence, the crown-implant-tissue complex should fully mimic the anatomic and esthetic characteristics of the tooth or teeth to be replaced – in harmony with the adjacent teeth. Implants featuring the abutment connection at the crestal bone level should preferably be used in the esthetic zone. With the bone level design, the clinician has more freedom to determine the location of the crown margin and mucosal contours, the emergence profile and the soft tissue architecture.

What are the main risk factors in the esthetic zone that need to be considered?
The esthetic region is particularly exposed to risk factors. Therefore, it is of crucial importance to perform detailed treatment planning prior to starting the treatment and to assess all the risk factors.
The first question is why the tooth was lost. Very often this is the result of a trauma, and in that case we may already see bone loss. Also, the amount of buccal bone available prior to treatment is of great importance. If this bone is too thin, it will impact the esthetic outcome considerably, and thus pose a risk factor. Furthermore, it is important to evaluate the pre-existing conditions in detail, such as the size of the tooth gap itself, the bone and soft tissue levels at the adjacent teeth, any existing or previous infections at the implant site and the soft-tissue anatomy.

In addition, the soft tissue biotype is a key factor for the final esthetic result. Very often, the anterior region has a very thin tissue biotype. Other risk factors include patient expectations, the position of the smile line (high, medium, low) and the shape of the former tooth. A high smile line presents with complete visibility of the anterior maxillary teeth and the gingiva/mucosa, and is therefore also referred to as a “Gummy Smile”. This presents a major challenge as each millimeter of soft tissue surrounding the final restoration will be visible. An absolute precondition for a top quality esthetic outcome are existing, healthy, inflammation-free and stable conditions of the soft tissue. Important when treating the esthetic region, is not to introduce an additional risk factor by the selected treatment method. That is why it is so important to proceed in an evidence-based manner.

How would you define prosthetic soft tissue management?
What is it about?
Basically, it is the first prosthodontic procedure after surgery. With its focus on the esthetic region, soft tissue management with fixed, implant-supported provisionals plays a crucial role. This includes the sculpturing of soft tissue, creating an accurate emergence profile, reconstructing the gingival zenith, achieving papillae height/width and establishing a matching tissue profile at the mucosa level. In summary, prosthetic soft tissue management is the non-surgical refinement of the soft tissue architecture, the creation of the emergence profile and the finalization of the soft tissue framework prior to final impression.

“Treatment planning and risk assessment are of vital importance. The SAC classification of the ITI, which is available online, brings clarity in the treatment planning. SAC classification is also a very good tool to illustrate the risk factors to the patients and to discuss treatment outcomes and expectations.” Julia-Gabriela Wittneben

Why and when should dentists think about soft tissue management?
Dental implants differ from natural teeth in size and shape at the crestal bone and soft tissue levels. Whenever using an implant at bone level, dentists should consider soft tissue management. After removing the healing cap, the geometry of the tissue profile is circular and does not match the profile around the teeth. With incisors in particular, teeth have a more triangular-shaped tissue profile created by the emergence profile and form of the teeth. Therefore, the peri-implant soft tissue profile has to be converted into a tissue profile that is in harmony with the adjacent dentition. This is performed firstly by using healing abutments, and secondly by using an implant-supported fixed provisional in order to perform soft tissue conditioning.
What are the main steps in soft tissue management?
The use of healing abutments is the first phase of soft tissue management in order to create an initial shape of the mucosa profile. Here, it is recommended to increase the diameter of the healing abutment at regular intervals. The second phase is to use a fixed provisional restoration in order to give the soft tissue surrounding the implant a natural-looking shape, to position the mucosa contours and form the papilla. Finally, it is important to apply an evidence-based treatment with clinically validated and peer-reviewed documented implant systems so that the patient receives a long-lasting, attractive crown and esthetically pleasing soft tissue. Therefore, treatment planning and risk assessment are of vital importance.

The SAC classification of the ITI, which is available online, brings clarity in the treatment planning. SAC classification is also a very good tool to illustrate the risk factors to the patients and to discuss treatment outcomes and expectations.

Do different soft tissue management techniques exist?
That is a very difficult question because nothing really exists in the official literature about soft tissue management with the use of healing abutments and provisionals in the prosthetic phase. Today, I think every clinician is doing what he or she feels is best. But it is not as if there is a clear rule about how to manage soft tissue, what should be done and when. There are different opinions expressed among clinicians, even country-specific.

What is your preferred technique of soft tissue management?
My preferred technique is the so-called “dynamic compression technique”. As the name suggests, it is a dynamic approach: pressure is first applied to squeeze the papilla in the right location, then the provisional is reduced at regular intervals to create space for the soft tissue to fill in. In specific, the “dynamic compression technique” consists of the following steps: first, a screw-retained implant provisional – slightly overcontoured in the mesial and distal region – is inserted and pressure applied to form the entire peri-implant mucosa. By customizing the shape and the contour, the peri-implant frame and the emergence profile are formed. The presence of an interproximal contact area to the adjacent tooth is important. The initial reaction to the applied pressure on the mucosa at insertion is of the ischemic type, causing so-called “blanching” of the peri-implant soft tissue, although this phenomenon is only moderate and disappears within 15 minutes.

“...it is important to follow evidence-based approaches in order to achieve a long-term result because it is important for the patient not only to have the implant inserted and the crown affixed on top of it, but also to have a long-term stability and esthetic situation.” Julia-Gabriela Wittneben

During the first 2 weeks, pressure is applied by adding volume using flowable composite material or light-cured acrylic resin on selected sites. After each additive modification, the provisional is polished. Finally, two weeks later, the shape is modified at regular intervals by removing volume in the interproximal and cervical area intraorally. This creates space for the soft tissue and allows the papillae to grow into the prepared space. As a consequence, the provisional crown outline has now become undercontoured in the mesial/distal
intertemporal site. Further details on this method can be found in an accepted publication which will be published shortly.¹

“Esthetic dental prostheses are not a luxury, they can improve the patient’s quality of life and well-being.” Julia-Gabriela Wittneben

What are the main criteria of successful soft tissue management?
First of all, it is important to know what the pre-existing anatomical site-specific conditions are (how much soft tissue and bone was lost). Secondly, as I said before, it is important to evaluate all risk factors. Of course, the surgical intervention must have been performed successfully and prosthetic management provided with a fixed implant-supported provisional. The modification of the fixed implant provisional is the crucial aspect. Thus, the purpose of soft tissue conditioning is to finalize the soft tissue architecture in order to maximize the esthetic result for a given pre-existing condition. But, generally speaking, I would say a successful outcome would be an esthetically pleasing implant restoration, in other words “white” esthetics, with successfully performed soft tissue management, the “pink” esthetics, that remains stable over the long term.

With implants at the bone level, the emergence profile has to be created by the clinician. This can be done by enhancing the diameter size with a healing abutment at regular intervals. The “Consistent Emergence Profile” has the advantage that the shape of the final healing abutment at the mucosa level can be matched with the exact same shape of the standard abutment. This concept is therefore a help for the clinician in simplifying the procedure.

What are, in your opinion, the main advantages of the Straumann® Bone Level Healing Abutment portfolio?
First of all, the different available heights of the healing abutments and the increase in the abutment’s diameter make the Straumann® Bone Level very user-friendly. The conical shape is another major advantage because sometimes you cannot insert the abutment when faced with straight cylindrical profiles. Also, it is a big advantage to have a special bottle shape healing abutment for thin mucosa biotypes. The bottle shape of the healing abutment helps to prevent the soft tissue from receding and helps to create an attractive tissue profile.

What are your personal practical tips in cases with high esthetic demands?
In my opinion, highly esthetic demanding cases are the most challenging part of dentistry in general. As the field is quite large, it really depends on the patient’s individual situation, which makes it difficult to provide standardized practical tips. It ultimately hinges on the clinician’s experience in esthetic cases, their training and also their artistic sensitivity. This might be the reason why it is so demanding. It is also important to follow evidence-based approaches in order to achieve a long-term result, because it is important for the patient not
only to have the implant and prosthetic reconstruction inserted, but also to have restored the function and chewing comfort, and to receive a long-term stable and esthetic situation. In case of young patients who have lost teeth due to trauma, they will have to live with the restoration for the next 25–30 years. This fact makes the esthetic restoration even more important. One crucial piece of advice is to discuss with your patient exactly what they want in advance, because esthetics are a very personal issue. Some patients prefer a more individualized esthetic result where the future crown will look exactly like the other teeth. Other patients, however, prefer to have an enhanced esthetic overall result – that is, a more perfect esthetic design. Overall, today we can offer our patients implant-supported dental prostheses for every phase of life which not only restore the functionality of chewing comfort but also provide an esthetic appearance. Social behavior is impaired by missing teeth. From this point of view, esthetic dental prostheses are not a luxury, they can improve the patient’s quality of life and well-being. Patients often become more positive and, following treatment, one often gains the impression of saying goodbye to a person totally different from the first visit. And that is a lovely feeling for all concerned.

Dr. Wittneben, thank you for this interview.

* Wittneben JG, Buser D, Belser U, Bragger U. Periimplant soft tissue conditioning with provisional restorations in the esthetic zone – the dynamic compression technique. The International Journal of Periodontics and Restorative Dentistry, accepted for publication.
STRAUMANN® CARES® GUIDED SURGERY

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*From single-tooth to edentulous*
In the context of the coDiagnostiX™ update 8.5, we asked users Dr. Pier Carlo Frabboni from Italy and Dr. Nick Fahey from the UK about the potential advantages of using a 3D diagnostic and planning software such as Straumann® coDiagnostiX™ 8.5.

“Guided Surgery makes me more confident before surgery by better understanding and mastering all the clinical parameters and helps me to perform stressless surgery.” Dr. Pier Carlo Frabboni

For me everything begins with the prosthetic project, so I use 3D diagnostic and planning for almost all the cases and, in selected cases, with a fully guided surgery protocol. The main advantage of using such kind of software is to better understand the cases, not only the surgical aspects. For me it is most important to better understand where and how the prosthetic project will be created, in order to place my implants according to the prosthetic requirements. Before using coDiagnostiX™, I planned my cases with the printed (CB)CT scans and with the X-ray templates. Having a planning software now is really useful for me since I have everything in one tool with which I can easily select the suitable implant type, diameter and length for each case, as well as the abutment. My daily practice has really changed since I have started to use Guided Surgery because it makes me more confident before surgery by better understanding and mastering all the clinical parameters and helps me to perform stressless surgery.
The main advantage as I see it is that we are dealing with a 3-dimensional situation and the planning therefore should be done in a 3-dimensional arrangement rather than in 2D, because 2D only gives you everything flattened into one plane. With guided surgery I can get so much more information on the anatomy and any potential pathology. I can avoid grafting in non-esthetic sites or define the volume of the grafting and where the implant should be placed in relation to the planned restoration.

“ I get so much more information that just would not be showing up with conventional planning.” Dr. Nick Fahey

Then, if I have got other issues related to various anatomies of the mouth – like buccal structures, nerves, the foramen, where the sinus is and to define if the quality and quantity of bone is sufficient – that would not be showing up with conventional planning, so the tool is a massive improvement for me. I know that changing is always difficult. When you get new software, it looks unfamiliar, even scary, and maybe it does not seem to work in the way that you feel it should. But the truth with the coDiagnostiX™ software, as I see it, is that it is a very intuitive software. I like the way to go through the steps and I like the fact that you can put the abutment on the digital wax-up and that you are able to import the iTero® scan and other STLs. So I can get information not only on the bone, but also on the soft tissue and surface of the teeth.
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A 39-year-old, non-smoking female with no systemic disease presented with a chief complaint of “I want to improve my smile”. Upon clinical examination, probing depths ranged from 2–3 mm with minimal bleeding found upon probing. 2–5 mm gingival recessions were found on most of her maxillary and mandibular teeth. The patient admitted past aggressive brushing and reported recessions having been present for over ten years. She was using desensitizing toothpaste and only minor cold sensitivity was reported. She learned to control her smile to hide gingival recessions and exposed roots.

Diagnosis was made as Miller type I-II gingival recessions with lack of keratinized tissue. Etiologies included thin peri-odontal biotype as well as trauma from aggressive brushing. Oral hygiene instructions were given and she was instructed to refrain from using hard bristle toothbrushes and avoid excessive brushing pressure.

The treatment plan included connective tissue graft with use of Straumann® Emdogain. Due to limitation of the donor tissue, surgery was planned separately for maxilla and mandible. The tunneling technique was used in the maxilla, whereas a
A combination of tunneling and flap was used for the mandible to minimize trauma to the thin tissue. The patient was instructed to use antibiotic mouthwash for the first two weeks and all sutures were removed at two weeks. Healing was uneventful. The patient was instructed to use extra soft toothbrush for next two weeks and then to resume normal oral hygiene.

Fig. 1: Initial presentation (frontal view). Fig. 2: Initial presentation (upper left). Fig. 3: Initial presentation (upper right). Fig. 4: Initial presentation (lower left). Fig. 5: Initial presentation (lower right). Fig. 6: Situation immediately after maxillary surgery, in which tunneling was used and part of graft was left exposed to increase keratinized tissue. Fig. 7: Situation immediately after maxillary surgery (upper left). Fig. 8: 

Ken Akimoto, DDS, MSD
Situation immediately after maxillary surgery (upper right). Fig. 9: Eight weeks after maxillary surgery. Fig. 10: Mandibular surgery. A combination of tunneling and flap approach was used due to thin periodontal tissue. Fig. 11: Six months post-op in maxilla, three months post-op in mandible. Fig. 12: Six months post-op in maxilla (upper left). Fig. 13: Six months post-op in maxilla (upper right). Fig. 14: Six months post-op in maxilla (anterior). Fig. 15: Six months post-op. Fig. 16: Final documentation. 18 months post-op in maxilla, 15 months post-op in mandible.
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IADR/Straumann Award in Regenerative Periodontal Medicine presented to Anton Sculean
At the General Session of the International Association for Dental Research, held at Iguazu Falls in Brazil, the 2012 IADR/Straumann Award in Regenerative Periodontal Medicine was presented to Prof. Anton Sculean from the University of Bern, Switzerland, in recognition of his outstanding work and achievements in periodontal medicine.

Anton Sculean
“Prof. Sculean has contributed significantly to our understanding of oral tissue regeneration throughout his career”, noted Prof. Alpdogan Kantarci. “As a preclinical and clinical investigator, he has evaluated all major approaches to periodontal regeneration. Furthermore, he has been an outstanding educator, a respected leader and a strong advocate of evidence-based regenerative medicine. In view of his continued active involvement and impressive output over the past 10 years the PRG board was unanimous in its decision to nominate him for this highly prestigious award”, he added.

The IADR Award
The objective of the Award is to recognize significant contributions in basic and/or clinical research in regenerative periodontal or peri-implant medicine. The 2012 Award was presented by Prof. Alpdogan Kantarci, President of the IADR Periodontal Research Group, and Prof. Michel Dard, Head of Preclinical Research at Straumann. Worth a total of USD 5000, the IADR/Straumann Award in Regenerative Periodontal Medicine is sponsored by Straumann and administered by the Periodontal Research Group of the IADR. Straumann is a leading contributor to R&D in implant and regenerative dentistry and this award is a further example of the Group’s commitment to fostering and recognizing excellence in dental research.
**LITERATURE ALERTS**

Selected literature of potential interest from recently published journals

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**STRAUMANN® SOFT TISSUE LEVEL IMPLANT LINE**

Fornell J, Johansson L-Å, Bolin A, Isaksson S, Sennerby L. Flapless, CBCT-guided osteotomy sinus floor elevation with simultaneous implant installation. I: radiographic examination and surgical technique. A prospective 1-year follow-up study. Clin Oral Implants Res 2012;23(1):28-34. Preoperative CBCT with a titanium screw post in the intended implant position was performed in 14 patients requiring sinus augmentation. A total of 21 Straumann implants (10 and 11 in residual bone of 2.6–4.9 mm and 5–8.9 mm, respectively) were placed and evaluated after 3, 6 and 12 months. Permanent prostheses were provided after 8–12 weeks. No marginal bone loss was noted during the follow-up period. Flapless transalveolar sinus lift guided by CBCT can therefore be a successful procedure.

Cochran DL, Jackson JM, Bernard J-P, ten Bruggenkate CM, Buser D, Taylor TD, Weingart D, Schoolfield JD, Jones AA, Oates TW Jr. A 5-year prospective multicenter study of early loaded titanium implants with a sandblasted and acid-etched surface. Int J Oral Maxillofac Implants 2011;26(6):1324-1332. A total of 439 Straumann implants with the SLA surface were placed in 135 partially and fully edentulous patients, with abutments connected after 6 weeks in type II and III bone and after 12 weeks in type IV bone. Evaluations were performed for up to 5 years, after which the cumulative implant survival and success rates were 99.1% and 98.8%, respectively; 11 implant failures were between surgery and 1 year. SLA-surfaced implants can therefore be loaded after 6 weeks in type II and III bone and maintain high survival and success over 5 years.

Rocuzzo M, Bonino F, Aglietta M, Dalmasso P. Ten-year results of a three arms prospective cohort study on implants in periodontally compromised patients. Part 2: clinical results. Clin Oral Implants Res 2012;23(4):389-395. Straumann implants with the TPS surface were placed after initial periodontal therapy in 112 partially edentulous patients who were periodontally healthy, periodontally compromised or severely periodontally compromised. Patients were also asked to follow a supportive periodontal therapy program. Clinical measurements were performed after 10 years in 101 patients. Eighteen implants were removed due to biological complications, and antibiotic and/or surgical therapy was performed in 10.7% of periodontally healthy, 27% of periodontally compromised and 47.2% of severely periodontally compromised cases; the differences were significant. The percentage of implants with probing depth ≥ 6 mm was 1.7%, 15.9% and 27.2% in periodontally healthy, periodont-
tally compromised and severely periodontally compromised cases, respectively; the differences were significant. Patients with a history of periodontitis therefore had a higher number of sites requiring additional treatment and should be informed that they are at a greater risk for peri-implant disease.


Patients received Straumann Standard or Standard Plus implants, with the polished surface placed crestally or subcrestally, and peri-implant crevicular fluid was evaluated. Crestal placement of Standard implants resulted in lower crevicular fluid volume, greater IL-1β levels and lower TNFα levels, indicating that a coronal placement of the microgap can help to maintain peri-implant tissue health.


Patients with single crowns or fixed dental prostheses (FDPs) supported by Straumann implants (mean observation periods of 78.2 months and 67.8 months, respectively) were retrospectively evaluated. No significant differences in bone loss were found between implants supporting single crowns, FDPs or FDPs with a cantilever extension, suggesting that the presence of a cantilever extension does not jeopardize the marginal bone level.


Patients who received Straumann implants immediately in extraction sockets were evaluated for up to 7 years. Buccal bone was evaluated and found to be covering the rough implant surface in nine cases, while in the remaining five cases almost no buccal bone was found; mucosal level was found to be 1 mm more apical in the latter. There was no correlation between initial bone defect and bone dimensions at follow-up.


Each of 12 patients received six Straumann Standard Plus implants to support a maxillary overdenture; the distal implant
in each quadrant was 6 mm long. No significant differences in mean bone loss were found between short and long implants during the first or second year after loading, and all prostheses were stable after 2 years. No significant differences were therefore found between short and long implants after 2 years.


Each of 22 patients received one 3.3 mm diameter Straumann Roxolid implant (test) and one 4.1 mm diameter Standard Plus implant (control); the test implants were splinted to the control implants. One test implant was lost due to infection and one patient was lost to follow-up; 20/22 patients therefore had a surviving implant after 2 years. The mean change in bone level was -0.33 ± 0.54 mm after 2 years and healthy peri-implant soft tissues were noted. The new implant material was found to be safe and reliable in partially edentulous patients after 2 years.

STRAUMANN® BONE LEVEL IMPLANT LINE


Placement of Straumann Bone Level implants with either submerged or transmucosal healing was performed in the anterior maxilla and/or mandible in 127 patients. Clinical and radiographic measurements were taken at implant placement and after 6 and 12 months. The mean change in crestal bone level from baseline to 6 months was -0.32 mm and -0.29 mm in the submerged and transmucosal groups, respectively, while the change from baseline to 12 months was -0.47 mm and -0.48 mm in the submerged and transmucosal groups, respectively; the differences between the groups were not significant. Good results for soft tissue parameters and patient satisfaction were obtained. The results indicated that submerged and transmucosal healing of implants were equally successful.


Straumann Bone Level implants with platform-switched abutments were placed in minipigs with inter-implant distances of either 2 or 3 mm and marginal bone level preservation and soft tissue quality were evaluated after 2 months of healing. No difference in interproximal bone loss was observed for the two inter-implant distances; the horizontal position of the bone relative to the microgap was 0.31 ± 0.3 mm and 0.57 ± 0.51 mm for the inter-implant distances of 2 and 3 mm, re-
spectively, after 2 months. Inter-implant bone levels can therefore be maintained for inter-implant distances of 2 and 3 mm.

**STRAUMANN® SLACTIVE®**


Straumann implants with the SLActive® surface were placed with simultaneous guided bone regeneration 6 to 8 weeks after extraction of 10 single failing teeth and provisionally loaded after 2-3 months. Definitive loading was performed after a further 6 months. Aesthetic outcomes were evaluated after 1 year using the pink and white esthetic scores. All implants survived, and good aesthetic outcomes were observed; the mean PES and WES scores were 7.9 ± 1.7 and 7.0 ± 1.5, respectively.

**STRAUMANN® REGENERATIVE SYSTEM**


Four saddle-type defects were prepared in six dogs and filled with autogenous bone in combination with either natural bone mineral or biphasic calcium phosphate, and covered with either a collagen or a PEG membrane. Straumann SLActive® implants were placed after 8 weeks and histomorphometric analysis was performed after a further 2 weeks. Treated area and BIC were higher in the PEG membrane groups compared to the collagen membrane groups, although bone regeneration and osseointegration was observed in all augmentation groups.


Defects were prepared in the mandibles of six dogs and treated using natural bone mineral or biphasic calcium phosphate (Straumann BoneCeramic) and covered with a PEG (MembraGel) or a collagen membrane. Straumann SLActive® implants were placed after 8 weeks, and histomorphometric analyses were carried out at 8 + 2 weeks. Mean mineralized tissue and BIC were higher in the PEG groups compared to the collagen membrane groups, but the differences were not significant. All augmentation procedures therefore supported bone regeneration and osseointegration of implants.


Mandibular premolars and first molars were extracted from 18 dogs and bone defects were prepared after 10 weeks.
Defects in four dogs were treated with PEG + DBBM, resorbable glycolide membrane (PGA-TMC) + DBBM, or DBBM alone for baseline measurements. Defects in the remaining 14 dogs were randomly assigned to these treatments or to empty defect and evaluated at baseline or 4 or 16 weeks. Tissue augmentation was equal in all groups at baseline, while PEG showed the greatest augmented areas after 4 and 16 weeks, with a significant difference between PEG and DBBM at 16 weeks, and between PEG and empty defects at 4 and 16 weeks. PEG + DBBM therefore maintained graft volume better than controls.


Buccal gingival recession defects in 10 patients were treated by coronally advanced flap with or without the addition of enamel matrix derivative (EMD). Clinical measurements were assessed at baseline and after 6 and 24 months. Significant root coverage was obtained by both procedures after 6 months, and there was a similar amount of relapse in both procedures by 24 months.


Miller Class I or II gingival recessions in 19 smoking patients were treated with acellular dermal matrix graft (ADMG) with (test) or without EMD (control). After 6 months, no significant differences from baseline were found for probing depth, clinical attachment level, gingival recession height, gingival recession width or keratinized tissue thickness, however, the mean gain in recession height and complete root coverage were significantly greater in the test group. The combination of ADMG and EMD is therefore beneficial for the root coverage of gingival recessions in smokers.


This review addresses the question whether enamel matrix derivative (EMD) is more effective than other regenerative procedures. The authors were looking at 27 randomized controlled trials [20 for intrabony defects, 1 for furcation and 6 for recession]. The treatment of intrabony defects with EMD showed a significant gain in clinical attachment level compared to open-flap debridement, EDTA or placebo, but no significant difference compared to resorbable membranes. In contrast, furcations were improved in horizontal defect depth when EMD was used compared to resorbable membranes. A coronally advanced flap will show significantly more root coverage when EMD is used. However, similar results can be obtained with a connective tissue graft. The authors conclude that for regenerative periodontal therapy, the use of EMD will
give superior results compared to alternative treatments or, depending on the indication will be as effective as resorbable membranes or connective tissue grafts.


Cylindrical critical-sized defects in pig calvariae were filled with Straumann BoneCeramic (SBC) covered by Membragen matrix (group 1), SBC with PEG matrix (group 2), SBC with BMP-2 transfected osteoblasts and PEG matrix (group 3), or BMP-2/4 gene transfer (group 4). Histomorphometric and immunohistochemical analysis were performed after 2, 4 and 12 weeks. New bone formation was significantly higher for group 3 versus groups 1 and 2 after 4 and 12 weeks, and BMP-2 expression was higher in group 3 compared to all other groups after 2 and 4 weeks. The PEG matrix can act as a scaffold for cell-mediated BMP-2 gene delivery, and local BMP-2 gene delivery can lead to increased bone formation.
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<td>ITI Congress Sweden</td>
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<td>Stockholm, Sweden</td>
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<td>July 6–7, 2013</td>
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