

# today 16 17 18



## Opinion

today international spoke with Dr Fotinos S. Panagakos, USA, about dentine hypersensitivity and its effect on patients and dental professionals who treat them.

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## Plan ahead

You will find the latest update of the exhibitors list and floor plan of this year's International Dental Meeting & Exhibition in Singapore (IDEM) in our business section.

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Photo: Warren Goldswain

## Travel

Singapore can be best described as a unique mixing pot of Asian cultures. Besides a vibrant multicultural experience, there's much more to discover about the city.

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## IDEM Singapore International Dental Exhibition and Meeting

### Date

15–18 April (Congress)  
16–18 April (Exhibition)

### Venue

Suntec Singapore,  
International Convention  
& Exhibition Centre,  
Halls 401–404

### Visitor profile

Dental Traders, Dentists,  
Dental Technicians,  
Dental Assistants,  
Dental Hygienists,  
Pharmacists, Academics,  
Associations,  
Press and Media

### Organiser

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### Congress Organiser

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## IDEM 2010 gives dentistry a warm welcome

Latest dental products and treatment concepts on display/Consumer forum to be held on Sunday



Fig 1: Singapore's Minister of Health Khaw Boon Wan (second from right) joins representatives of SDA, FDI and Koelnmesse at the ribbon cutting. (DTI/Photo courtesy of Koelnmesse) Fig 2: Crowded aisle in hall 401 (DTI/Photo Daniel Zimmermann)

With a traditional Welcome Ceremony, attended by high-ranking Koelnmesse officials, the Singapore Dental Association and the FDI World Dental Federation, IDEM 2010 opened its doors yesterday to dental professionals from Singapore and the South-East Asian region. The organiser is expecting 6,000 visitors to participate over the next couple of days, which would make it the largest regional dental meeting in Asia this year. The 2008 edition of IDEM saw a record atten-

dance of 6,370 trade visitors from 56 countries.

During his welcome speech, Executive Vice President of Koelnmesse, Oliver P. Kuhr, told participants that IDEM is owing its success to the growth of dentistry in Singapore and the increasing rate it contributes to the overall health care sector. He said that this year's IDEM will not only aim at the profession itself but also educate the public about the advantages and limitations

of complex treatment options, such as dental implants.

The global dental implant and bone graft market is expected to top US\$4.5 billion by 2012 as developments in dental science and technology bring more advanced dental procedures into the general practice, latest industry reports state. Due to high demand, IDEM will host a Consumer Education Forum on dental implantology on Sunday, 18 April 2010. The event is organised by the Singa-

pore Dental Health Foundation in conjunction with IDEM Singapore. It will be open to the public and share information about the basics of implantology, the risks factors that may affect results and other practical questions surrounding implant-supported treatments.

Dentists will find the latest equipment that local and international manufacturers have to offer on display in the exhibition hall on level 4. An increased display of dental surgical equip-

ment and bone grafting tools that aid dental implant procedures is offered. Digital dentistry specialists will also present 3-D imaging systems that help to streamline communication between dentists and laboratories and thus improve treatment outcomes.

According to the organiser, over 350 companies are exhibiting in this year's IDEM show. Amongst others, there are new participations from countries like Slovenia and the Republic of Colombia.

## Scientific programme

### Saturday, 17 April

**8:00–11:00**  
**A New Era in Implant Dentistry—**  
**With Innovative Material**  
**and Surface Technology**  
Prof. Dr Dr Bilal Al-Nawas, Germany  
Theatre, Level 3

**9:30–12:00**  
**Functional Aspects of Implant**  
**Supported Prosthesis**  
Dr Ulrich Wegmann, Germany  
Hall 404, Level 4



Photo: Koelnmesse

**13:30–16:00**  
**Tissue Stability and Predictability—**  
**Replacing Multiple and**  
**Single Teeth in the Aesthetic Zone**  
PD Dr Anton Friedmann, Germany  
Theatre, Level 3

**14:30–17:00**  
**Implant Treatment Planning**  
**and Considerations for the**  
**Complete Edentulous Mouth**  
Dr Suh, Bong-hyeun, Korea  
Hall 404, Level 4

**17:00–20:00**  
**Hands-on Workshop: The Quest**  
**for Optimal Restorative Aesthetics**  
Dr Ricardo Mitrani, Mexico  
Room 301, Level 3

**17:30–20:00**  
**Efficient and Low Risk Sinus**  
**Bone Graft Techniques**  
Dr Cho, Yong-seok, Korea  
Hall 404, Level 4

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# Small diameter implants—clinical results with an advanced material



By Prof. Bilal Al-Nawas

■ Orofacial rehabilitation with reduced morbidity for the patient is an imperative for future research. The topic of 'avoiding augmentations' is of particular interest. There is no doubt that bone grafting procedures in aesthetically critical areas are often required to stabilise the soft tissue and allow for an adequate restoration. On the other hand, the value of augmentation procedures has to be questioned when it comes to immunocom-

promised patients or aesthetically uncritical situations.

Only a few researchers have compared the complication rate of the whole augmentation process with the outcome of short or diameter reduced implants. While for short implants marginal bone stability in the long term period is important, the problem of diameter reduction lies in the higher possibility for implant fractures (tech-

nical complications). The use of grade IV commercially pure Titanium (cpTi) seems to limit the broad use of implants with < 3.5 mm of diameter. Most implant manufacturers have well described indications for smaller implants (e.g. lateral incisors). Alloys would allow manufacturing of more fracture resistant implants, but the classical Ti-Al-V alloys are lacking acceptable biocompatibility. In order to allow a wider use of narrow diameter implants, a new material—Roxolid—has been developed.

This implant material, which is a Ti-Zr alloy, increases the fracture resistance compared to cpTi. Data from animal models indicates at least a comparable osseointegration to cpTi. Fracture resistance due to ISO standard exceeds that of cpTi. The first randomised, double blind study compared 3,3 cpTi implants with 3,3 Roxolid implants in a split mouth study. The data showed promising results for the new alloy.

Small diameter implants can be beneficial in cases of narrow bone ridges. Due to their reduced

dimensions, bone grafting procedures should be avoided. However, long-term data on the rate of technical complications is needed. The first trials comparing small diameter implants with augmentation procedures are ongoing and will help to learn more about this exciting field.

*Prof. Bilal Al-Nawas' lecture on "A New Era in Implant Dentistry—With Innovative Material and Surface Technology" will be held today in the Theatre on Level 3. The session starts at 8:30.*

## "The main effect on individuals is the impact on quality of life"

An Interview with Dr Fotinos S. Panagakos, USA, on the management of dentine hypersensitivity

■ Since April 2009, Dr Fotinos S. Panagakos is the director of clinical research relations and strategy within the Research and Development division of Colgate-Palmolive Co. His responsibilities include oversight of clinical studies, scientific communication strategy, and liaison with dental professional organisations. today international spoke with him about dentine hypersensitivity and its effect on patients and dentists who treat them.

**today international:** Can you please explain what causes dentine hypersensitivity and, specifically, what is going on with a patient biologically?

**Dr Fotinos S. Panagakos:** Dentine is normally covered by enamel or cementum. Due to any number of factors, including abrasion, periodontal disease causing gingival recession or erosion removing the enamel, the underlying dentine and dentine tubules can become exposed. An external stimulus, such as a change in external temperature, air movement or a physical stimulus can cause discomfort for the patient. The external stimulus is usually transitory and the discomfort subsides shortly after the stimulus is removed.

The accepted theory of how dentine hypersensitivity pain is

transmitted suggests that pressure or ionic changes in the fluid that exists in the dentine tubules stimulates the pain experienced by the patient. This is often referred to as the 'hydrodynamic theory.' Inside the dentine tubule, a change in osmotic pressure causes fluid movement, which is transmitted as a stimulus to the odontoblastic process and fires the afferent nerve ending in the dentine tubule.

**How does this condition affect patients and the dentists who treat them?**

The main effect on individuals is the impact on quality of life. Patients have to avoid certain foods



Photo: Luba V Nel

and beverages that may trigger a painful response, thus reducing the type of foods and drinks they can enjoy. In the dental office, what is normally a routine visit may end up being a very uncomfortable appointment for a patient with dentine hypersensitivity. Simple procedures, such as scaling and a prophylaxis, may be painful. And, at times, the pain associated with dentine hypersensitivity may cause a patient to skip dental appointments all together.

The diagnosis of dentine hypersensitivity often poses a challenge for dental professionals because the cause and description of the pain reported by the patient can vary and is often not adequate to make a definitive diagnosis. Dental professionals often need to perform a thorough exam as well as additional tests to determine why the pain is occurring. The exam and test can help develop a definitive diagnosis that allows us to rule out other possible causes of the pain (periodontal disease, caries, etc) and then implement an appropriate treatment plan for addressing the problem.

Once the diagnosis is made, treating the problem can also be a challenge. Many products today do not work instantly or last following application or may take time, sometimes up to weeks, for an effect to be felt by the patient.

**What are some of the ways that dentists can diagnose and treat dentine hypersensitivity today?**

The treatment and prevention of dentine hypersensitivity, for many years, has focused on eliminating the ability of the causative agent to stimulate discomfort. This has resulted in the development of two major classes of products—agents that occlude dentinal tubules and desensitising agents that interfere with transmission of nerve impulses.

Occluding agents act by physically covering or 'plugging' the open, exposed dentinal tubules, thus preventing the effect of thermal changes or physical stimuli caused by the movement of dentinal fluid due to osmotic pressure changes. These agents can be applied professionally in the dental office or by the patient through the use of home care products.

The second approach recommended by dental professionals to help prevent and/or treat dentinal hypersensitivity is through the use of OTC desensitising agents. Desensitising agents work by altering the levels of charged molecules in the dentinal tubule fluid. The most commonly used agent is potassium nitrate, usually delivered in a dentifrice that is applied twice daily by the patient during regular tooth brushing. The

potassium ions enter the dentinal tubule fluid, reducing the excitation caused by the movement of fluid in the dentinal tubules, and blocking the transmission of the stimulus from the odontoblastic process to the nerve in the pulp chamber. Most products require continued use over a four- to eight-week period before relief may be realised by the patient. In addition, the procedure often needs to be continued in order to maintain the relief afforded by the potassium nitrate.

**What other treatment concepts are available if patients do not positively respond to either of these agents?**

In this case, dental professionals may turn to covering the exposed dentine using direct or indirect restorations. Finally, periodontal surgery, involving the grafting of gingival tissue to cover the exposed dentine may be performed.

**Thank you very much for the interview.**



*Dr Fotinos S. Panagakos' lecture on "Tooth Wear and New Technology to Manage Dentin Hypersensitivity" will be held today at the DT Study Club Symposia in the exhibition hall, booth J30-K29. A similar lecture will be held on Sunday as part of the IDEM 2010 Scientific Programme in the Theatre on Level 3.*

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today IDEM Singapore appears during the 6th International Dental Exhibition and Meeting, 16–18 April 2010.

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# Dental agreement commits to US export efforts in Singapore

Ortho Technology, Lien Nah sign distribution contract at IDEM



\* Alvin Chia, MD Ortho Technology, Daniel L. Shields III, Chargé d'Affaires of the US Embassy in Singapore, and Le Xuan Vinh, Director Lien Nah (from left to right). (DTI/Photo: Daniel Zimmermann)

■ The Singapore subsidiary of Ortho Technology has entered into a new distribution agreement with Lien Nah, a Vietnamese dealer based in Ho Chi Minh City. The contract, which was signed during a US exhibitor meeting yesterday morning, is limited to three years and will cover the company's entire range of orthodontic products, Managing Director Alvin Chia stated.

Ortho Technology offers a complete line of orthodontic supplies, including brackets, bands, buccal tubes, archwires, adhesives, lab supplies and patient accessories.

Chargé d'affaires of the US Embassy in Singapore, Daniel L. Shields III, said that the contract is another successful example of the embassy's efforts to convince US manufacturers to invest in the region. He said that despite its relatively high-cost operating environment, Singapore has become the 11<sup>th</sup> largest export market for US companies, leaving even countries like India behind.

Trade between the United States and Singapore has skyrocketed after the two countries signed a bilateral free trade agreement in 2003.

The United States currently leads in foreign investment, accounting for 63 per cent of new commitments to the manufacturing sector including dentistry in Singapore, according to figures of the US commercial service. As of 2008, the stock of investment by US companies in the manufacturing and services sectors in Singapore reached about US\$106.5 billion.

The president of the Singapore Dental Association, Dr Lewis Lee, acknowledged the ongoing commitment of the US dental industry to Singapore. He claimed that the city state has become a centre for high-tech dentistry in the Asia Pacific region. Singapore dentists are also continually updating their knowledge and make use of the latest dental equipment in order to achieve optimal treatment results, he added.

With over 20 companies representing all sectors in dentistry, the US dental industry hosts one of the largest joint participation booths at IDEM 2010. It is located in hall 401.

US companies who are interested in further information on the Singapore and regional markets can also visit the US commercial service at booth P17.

## Successful start of Dental Tribune Study Club Symposia

Hypersensitivity and indirect aesthetic restorations on today's schedule

■ The first Dental Tribune Study Club Symposia clearly claimed its share of the buzzing crowd that swarmed the exhibition floor yesterday morning. Hundreds of IDEM visitors took the opportunity to earn ADA CERP continuing education credits while learning more about the latest treatment concepts in dentistry.

It is the first time that such a forum is being held at a Singapore meeting.

Today's highlights include a session about managing dentine hypersensitivity (please also see our interview with Dr Panagakos on page 2) and exploring new frontiers in indirect aesthetic restorations by Dr Shriju Joshi. Among other things, this presentation will explore the novel application possibilities of a versatile aesthetic indirect composite system with a focus on its application in minimally invasive cosmetic dentistry.

Cosmetic dentistry has seen continuous growth in recent years, fuelled by an increased media hype and the desire to attain the *perfect smile*. Due to the recent change in treatment philosophy, a minimally



\* A filled Symposia on Thursday. (DTI/Photo Daniel Zimmermann)

invasive approach is currently being adopted in cosmetic dentistry, with an aim to preserve as much natural tooth structure as possible, while achieving the desired aesthetic result in the best interest of the patient.

According to Dr Joshi, advances in dental material technology and the development of novel aesthetic restorative materials have truly brought dentistry to the 21<sup>st</sup> century. Biocompatible aesthetic indi-

rect restorative systems such as Ceramage, a zirconium silicate filled indirect composite from the Japanese manufacturer SHOFU, have provided the clinician with a wide array of restorative options ranging from conventional crowns and bridges to minimally invasive onlays, inlays and veneers.

Visitors will find the Symposia in hall 402 at booth J30.

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# “Global thinking and local business are our core strategies”

An interview with Dr Luo Chuan Hao, VOCO, Germany



Dr Luo Chuan Hao (right), (DTI/Photo Daniel Zimmermann)

■ VOCO is a Germany-based company specialised in the production of modern aesthetic dental materials. Since 1995, the company is doing business in Singapore and the South-East Asian region. today international spoke with Export Area Manager D. Luo Chuan Hao about the market in Singapore and the company's offering for this year's IDEM.

**today international:** Most regional divisions of many dental manufacturers are operating from Singapore. What are the advantages of doing business from here compared to other places like Hong Kong?

**Dr Luo:** We do business in Singapore and Hong Kong. The economical and political conditions that Singapore provides are excellent and can even be compared to countries like Germany. In addition, dentists here are very well trained and in demand of products with a higher quality and price level. All in all, global thinking and local business are our core strategies.

**VOCO has been doing business in South-East Asia since 1995. What is your current reach and are there plans to extend distribution to more countries in the region?**

Currently, we sell our products in almost all countries in South-East Asia, including Malaysia, the Philippines and South Korea. Our next goal is to increase our market share.



GrandTEC. (DTI/Photo Daniel Zimmermann)

**With approximately 1,000 dentists, Singapore is clearly a small but highly specialised market. What products are currently in highest demand?**

Our current product range comprises filling and temporary C&B materials with high quality and aesthetic properties.

**More dentists in Singapore and South-East Asia are becoming aware of the aesthetic aspects in dentistry, mainly driven by patient demand and new developments in the industry. Will these trends determine where the market is heading?**

Yes, we also see this as an important trend. That is why we introduced the Amaris composite in 2007 and Amaris Gingiva last year in order to fulfil this demand. We are also increasing our sales for Grandio and Structur range.

**You say that you introduced Amaris Gingiva, another innovative restorative, in Singapore last year. What response has the material received from the dentists?**

The response has been very positive. Dentists in South-East Asia like this product very much. Amaris Gingiva is currently the only highly aesthetic light-curing restorative in gingival shades that can be used chairside.

**Can you tell us how the product improves the aesthetic outcome of dental restorations?**

For example, if there are V-shaped defects or exposed cervical areas, you need one product to repair the defects in the correct colour, namely gingival colour. With Amaris Gingiva, cervical areas exposed after gingival recession or cervical V-shaped defects can be restored both aesthetically and functionally.

**When it comes to new products and innovation, companies usually focus on big trade shows like IDS or the Midwinter Meeting in Chicago. What do you have in store for IDEM?**

You are correct. Generally, we present new products here in Singapore after we launched them at other meetings. However, this time we also showcase our new product GrandTEC alongside with several established products like Grandio, Grandio Flow, Amaris, Amaris Gingiva, Structur, Ionoseal, Futura-bond and GIC. GrandTEC is a glass fibre strand impregnated with light-curing, methacrylate resin in an uncured condition. It was developed for application in traumatology, periodontology, orthodontics, conservative dentistry and prosthodontics. The glass strands can be equally applied to natural teeth, models and impressions and adhere after light-curing.

GrandTEC is supposed to ensure the stability of the teeth after orthodontic and periodontic treatment. It can also be used as a base for replacing missing teeth as well as locking and splinting avulsed or loosened teeth. It thus provides fragment anchorage after fractures as well as reinforcement to provisional, composite-based crowns and bridges. The glass strands can also be used for the temporary or semi-permanent treatment of a tooth space using an extracted, natural tooth as well as temporary treatment during osseointegration of an implant.

**Although the significance of IDEM has been questioned, more exhibitors have chosen to participate this year. What do you think of the meeting and how do you foresee its development in the years to come?**

We use IDEM mainly as a platform to communicate with our regional sales staff and, of course, to introduce new innovative products to the market. In my opinion, Singapore is still one of the most important meetings for us though other shows in Malaysia or the Philippines are slowly catching up.

Its future role and development, however, will depend on the organisers. If their aim is to fulfil the requirements and demands of dentists in this region and if they consider the interests of dental manufacturers as well as the participating dental dealers, IDEM should have a good future.

Thank you for the interview.

AD

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### PIERRE ROLLAND UPDATES ITS EXPASYL SYSTEM

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At IDS 2009, Pierre Rolland introduced another updated version of Expasyl that was developed according to the needs of dentists and patients. Therefore,



the paste is now available with straw-

berry flavour. Pre-bended canulas are also included for an easier, quicker and more precise application. In addition, tips are now longer—40mm against 36mm—to provide more comfort to the dentist.

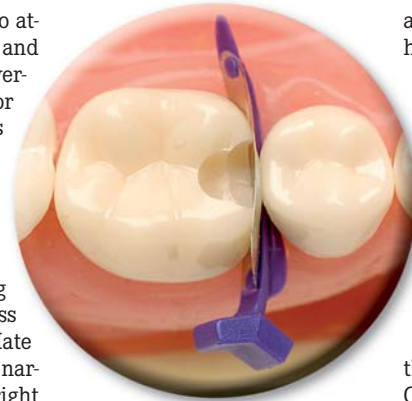
The Expasyl Premium Kits contain 10 capsules of paste with strawberry aroma, as well as 40 pre-bended canulas and a manual applicator.

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and holds its shape without having to use a retentive ring that inhibits access to a cavity. The contact point is created by the dual curvature of FenderMate so that further burnishing will not be necessary.

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Bisco Dental Products is presenting a new single-component priming agent at IDEM 2010. Z-PRIME Plus, which is versatile and durable with many different substrates, can be used to enhance adhesion between composite resin cements such as BISCO's Universal Resin Composite Luting Cement, DUO-LINK and indirect restorative materials including zirconia, alumina, metal, composite and endodontic posts. In addition, it can



be used for intra-oral repairs, the company said.

They added that Z-PRIME Plus' chemical stability is superior to other multi-functional primers available on the market and has been specifically formulated to provide high bond strengths in both self cure and light cure modes. Z-PRIME Plus is available in a single-bottle for ease of dispensing and application.

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### FOTONAS AT FIDELIS' ER:YAG LASER

A new study published in the 4/2009 issue of the *Journal of Oral Laser Applications* has found that less total absorbed laser energy in the form of heat remains in teeth when treated with the AT Fidelis' Er:YAG laser from Fotona, a Slovenian-based manufacturer of medical laser systems. The authors concluded that the results, at least partially, explain the observed higher ablation efficacy of Er:YAG (erbium: yttrium, aluminium, garnet) lasers compared to Er,Cr:YSGG (erbium, chromium:yttrium, scandium, gallium, garnet) lasers.

This report follows previous studies that examined the use of laser profilometry for the characterisation of craters produced in hard dental tissue by



Er:YAG and Er,Cr:YSGG lasers, which gave insights into accurately measuring laser drilling speeds. One study revealed that the AT Fidelis' Er:YAG laser's ablation rates, which determines drilling speed in volume per second, to be 3.7 times higher in dentine and 5 times higher enamel compared to the Er,Cr:YSGG laser.

Er:YAG lasers such as the AT Fidelis are solid-state lasers who typically emit infrared light. They are being used for wide range of medical and dental applications including the cutting of bone in dental surgery.

**Fotona d.d., Slovenia**  
www.fotona.com  
Booth K40/L39

### NEW TETRIC N-FAMILY FROM IVOCCLAR VIVADENT

At IDEM 2010, Ivoclar Vivadent is introducing a new comprehensive nano-optimised restoration system for high-quality standard restorations. The new line of products comprises the products Tetric N-Ceram, Tetric N-Flow, Tetric N-Bond and Tetric N-Bond Self-Etch.

According to the company, the universal composite Tetric N-Ceram is based on the popular Tetric Ceram and designed for the fabrication of high-quality standard restorations in the anterior and posterior region. Important properties like polishability, low shrinkage and wear could be enhanced with the help of nanotechnology. Tetric N-Ceram is complemented by the flowable composite Tetric N-Flow which also offers excellent handling properties as well as an exceptionally high level of radiopacity. Owing the material's outstanding wetting ability, it is particularly suitable for use as a cavity liner and offers the stability required for Class V restorations.

Tetric N-Bond is a light-curing single-component bonding agent for enamel and dentin bonding in conjunction with the total-etch technique. It uses

nanotechnology and is acetone-free which is supposed to help postoperative sensitivities occur less frequently. It also enables a durable bond to be established between the restorative material and the dental hard tissues. Tetric N-Bond is

the acetone-free Tetric N-Bond Self-Etch material is sufficient to establish a sound bond between the composite and the enamel or dentin reducing the time required for direct restorative treatment. According to Ivoclar, it is possible



suitable both for direct and indirect restorative procedures after prior light polymerization, the company said.

Tetric N-Bond Self-Etch is a single component, self-etching, light-curing adhesive for direct restorative treatment procedures (composites, comonomers). A single layer of

to store Tetric N-Bond Self-Etch at room temperature without compromising its quality because of the monomers which are resistant to hydrolysis.

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# ROXOLID™: The new “DNA” of implant materials—exclusively from Straumann

■ Straumann has developed a new and stronger metallic material with superior osseointegration properties: Roxolid™ an alloy of titanium and zirconium and the first material to be designed specifically for the needs of dental implantology. Roxolid™ is 50 per cent stronger than pure titanium<sup>1</sup>, the current material of choice for implants. Exciting preclinical study results presented at the EAO 2008 in Warsaw showed the better osseointegration of Roxolid™ in comparison with pure titanium. The combination of enhanced strength and osseointegration enables a new generation of small implants to be produced; these are advantageous, especially in situations where space is limited. Engineered and developed by Straumann, Roxolid™ is currently undergoing clinical trials in six countries. Preliminary observations (6–12 months) from the first clinical trial were also presented at the EAO and showed very promising survival rates.

Pure titanium (Grade 4) is known for its biological compatibility with the human body and its resistance to corrosion. The discovery that bone integrates with titanium (osseointegration) opened the way for its use in orthopaedic surgery and subsequently in implant dentistry,

where its physical properties were also important in order to withstand the very strong masticatory forces. As the mechanical properties are limited in the case of small diameter implants (e.g. to replace a lower incisor) the use of alternative materials, such as titanium alloys (e.g. Ti-6Al-4V, TAV), came into play. However, additional strength came at the expense of osseointegration due to inferior biocompatibility and surface characteristics.

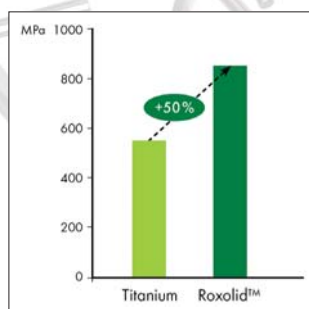


Fig. 1: Material properties based on the ASTM F67 norm and internal specifications show a significantly higher strength for Roxolid™ than for titanium.

In order to accept no compromise in either strength or osseointegration, Straumann developed the new material Roxolid™. It is composed of the two elements, titanium and zirconium. The combination of these two elements increases the strength of the material. According to published

research, titanium and zirconium are the only two metals used in implantology that do not inhibit the growth of osteoblasts, the bone-forming cells that are essential for osseointegration. In addition to this, Roxolid™ can be combined with Straumann's third generation SLActive®—the gold standard in surface technology—unlike other alloys such as TAV, which cannot accommodate the sophisticated microstructuring processes required. The unique combination of Roxolid™ and SLActive® enhances safety thanks to the properties of surface and material.

The composition of implant materials plays a key role in dental implantology as it defines the factors leading to implant success. Material has a direct influence on implant strength (mechanical properties) and osseointegration (biocompatibility and surface properties). These properties are fundamental to achieving successful treatment results.

Material strength is defined by the ultimate tensile strength. This value shows the force which can be exerted (on standardised probes) before a material breaks. In order to enhance the strength of titanium it is alloyed with other elements. The combination of

titanium and zirconium gives a superior strength to the material, resulting in the ultimate tensile strength of Roxolid™ of 50 per cent, which is higher than that of pure titanium (Fig. 1).

In vitro experiments by Steinemann regarding the reaction of tissue in combination with different elements show the high biocompatibility of Roxolid™ components. In the same publication, Steinemann also states that titanium and zirconium are the only elements which do not inhibit the growth of osteoblasts (based on in vitro testing). In combination with the SLActive surface, enhanced osseointegration was observed in a preclinical study. The histology from

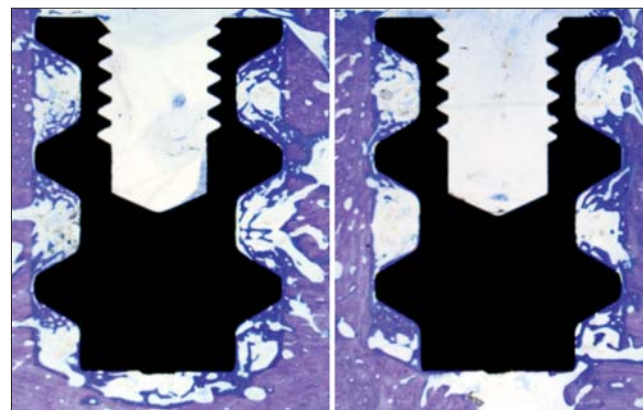


Fig. 2: Roxolid™/SLActive®

Fig. 3: Titanium/SLActive®

a pre-clinical study shows the difference between a titanium/SLActive® surface and

a Roxolid™/SLActive surface. Whereas the bone to implant contact is comparable, the newly created volume of bone is

significantly higher with the Roxolid™ implant (Figs. 2, 3). The torque required for removal also gave a higher value for the Roxolid™ material than for titanium. In this pre-clinical study, Roxolid™ implants with SLActive® surface performed better in 2 out

of 3 osseointegration parameters, i.e. removal torque and bone area, whereas the bone to implant contact was similar to that of the titanium implants.

Further preclinical studies are ongoing to investigate the osseointegration behaviour of Roxolid™ with the SLActive® surface. It can be said that the combination of Roxolid™ and SLActive® shows very promising results. It does not compromise either in strength or in osseointegration.

The laboratory tests and pre-clinical results show the excellent behaviour of Roxolid™. Studies with patients in order to amass clinical evidence are ongoing.

AD



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Reverse cone

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