

# today

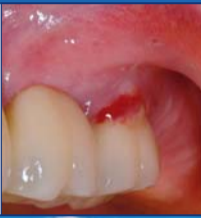
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### A Swedish perspective

Some 20 years ago, more implants were placed in Sweden per capita than in any other country. Recent calculations point to an annual use of some 75,000. An overview by EAO presenter Tomas Albrektsson, professor at Gothenburg and Malmö.

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### Is it a crisis?

The prevalence of peri-implantitis has been reported to be up to 29% most notably in patients whose implants are placed within a partial dentition. This yields a potentially vast number of implants that might succumb to some form of peri-implant disease.

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### What's on in Stockholm

Apart from its rich cultural and culinary scenes, the city of thousand islands offers something for everyone. Here are some tips how to spend your time off in the capital.

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## Välkommen till Sverige, Welcome to Sweden

European Association for Osseointegration celebrates premier meeting in Stockholm

■ For the first time in the history of the European Association for Osseointegration (EAO), thousands of dental professionals will gather this week in the Swedish capital to attend the organisation's 24<sup>th</sup> Annual Scientific Congress and update their knowledge on everything related to implant dentistry.

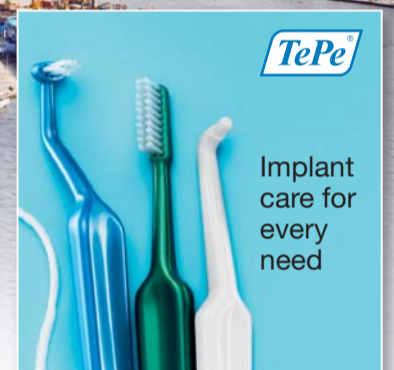
This year's edition will be largely influenced by the work of Prof. Per-Ingvar Brånemark. The Swedish clinician and researcher

changed dentistry in the 1960s significantly with his breakthrough discovery of the possibility of integrating bone tissue with an artificial material like titanium, thereby making modern implant therapy possible. Unfortunately, he passed away after a period of illness in December last year. The meeting will honour his achievements with a special symposium on Sunday at the Aula Medica at Karolinska Institutet, where Brånemark was awarded an honorary doctorate.

For the congress programme, which will start this afternoon with a special session on 50 years of clinical osseointegration, the organisation has invited over 50 local and foreign experts from around the world to present and discuss the latest scientific information and clinical concepts in implant dentistry. In addition, new methods and techniques will be presented during a number of satellite industry symposia, which are supported by several major companies

in the market. The latest products, including new implants and solutions for improved implant treatment planning, will be on display at an industry exhibition. ◀◀

More information about the meeting, the scientific sessions and the latest products is available on the EAO congress website at [www.eao-congress.com](http://www.eao-congress.com). The association also has on offer an application for mobile devices and tablet computers that is aimed at giving visitors quick



access to congress-related information. Daily news updates, interviews and product reviews from the show floor are available on the Dental Tribune website at [www.dentaltribune.com](http://www.dentaltribune.com).

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# Malmö University receives funding for research on tooth and implant infections

■ A research project on chronic oral infections, led by Prof. Gunnel Svensäter from Malmö University, has been recently awarded a grant of SEK12 million (€1.3 million) by the Swedish Knowledge Foundation. The researchers aim to develop new clinical tools to diagnose and treat such infections.

In a statement, the foundation acknowledged that research on chronic oral infections offers immense potential and could be of considerable benefit for patients, the dental care system, industry and society in general. To date,

there are no reliable methods in dental care for identifying individuals with an increased risk of serious tooth and implant infections. Therefore, the Malmö researchers are targeting the development of new clinical tools in order to enhance diagnosis and treatment of such conditions.

“We are searching for proteins that exist in biofilms around teeth and implants. The proteins can originate either from bacteria or from human cells. If these proteins could be found it would be possible to identify the site as a potential source of infection and treatment

could be initiated at an early stage,” Svensäter, Professor of Oral Biology at the university’s Faculty of Odontology, said.

The lead researcher furthermore foresees potential financial benefits from developing diagnosis tools that could be used worldwide, for both the health care system and companies.

“The problem we are endeavouring to solve is significant and exists on a global scale. Some 10 per cent of the Swedish population could experience serious problems involving chronic infections

that could result in them losing their teeth. The scenario is much the same throughout the rest of the world,” she said. The four-year project, which brings together microbiologists, cellular biologists, chemists and clinical experts, among others, will focus on first finding protein markers in laboratory experiments and later proceed to clinical studies with patients.

According to Svensäter, the research project has been in the planning for a number of years. “We now have the right research group and the right companies in

place and we are extremely pleased.”

Adding to donations of about SEK12 million by companies, as well as the university’s contribution of SEK6 million (€0.6 million), the grant by the foundation brings the project’s total budget to SEK30 million (€3.2 million).

The Knowledge Foundation is a funding body for universities and serves to strengthen Sweden’s competitiveness. Since its formation in 1994, the foundation has invested about SEK8.7 billion (€942 million) in more than 2,500 projects. ◀

**today** About the Publisher

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**dti** Dental Tribune International

# New study suggests many dental implants may be prone to fracture

■ An examination of biologically failed dental implants conducted by researchers in Israel has found that more than 60 per cent of these implants showed signs of mechanical flaws, such as crack-like defects and full cracks. In publicising these results, they aim to encourage dental implant manufacturers and dentists to find ways to reduce the structural damage that occurs when a metal is subject to repeated applied loads.

In the study, the researchers from the Technion–Israel Institute of Technology in Haifa examined 100 discarded dental implants, which had been extracted owing to peri-implantitis, made of a titanium alloy and commercially pure titanium using energy disper-

sive X-ray analysis and scanning electron microscopy. They found mechanical defects in 62 per cent of the specimens. In addition, the inspection showed that the pure titanium implants had more cracks than did the titanium alloy implants.

“Embedded particles appear to be linked to the generation of surface defects that evolve into full cracks,” explained Dr Keren Shemtov-Yona, who conducted the study as part of her Master of Science degree. Furthermore,



the wear and tear of daily use also seem to contribute towards the potential of manufacturing flaws to develop into cracks and subsequently lead to failure of the material, she said.

It was also found that the width and length of the different implants in this study were not correlated with the observed defects. Shemtov-Yona is now aiming to conduct further studies to investigate the reasons for the development of cracks to determine whether the causes lie in manufacturing, use or both. ◀

■ Dr Keren Shemtov-Yona (© Technion–Israel Institute of Technology)

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# “There is a general sense of frustration throughout the world”

An interview with CoDent founders Profs. Dov Sydney, USA, and Mauro Labanca, Italy



\*Dental Tribune editors in talks with Prof. Dov Sydney and Prof. Mauro Labanca (from left to right, © DTI).

With the first World Congress on Controversies in Dentistry (CoDent), Prof. Dov Sydney from USA/Israel and Prof. Mauro Labanca from Italy are aiming to make news by reaching current conclusions to ongoing debates in the field through evidence-based dentistry, as well as expert opinion and speaker-audience discussions. Dental Tribune Interna-

tional had the opportunity to speak with them about their concept, general information overload in dentistry and the upcoming launch of CoDent in Barcelona in Spain in 2016.

**Dental Tribune International:** Could you briefly introduce your project?

**Prof. Dov Sydney:** It is called CoDent and it is part of a company called CongressMed, which has developed a model for congresses based on the concept of “Controversies in...”.

CongressMed’s education is devoted to addressing controversial medical issues in a debate format.

Our role is to bring the concept to the dental field, and this involves defining the first topic, finding the moderators and generally advancing the project. We thought it good to start with implants because it is one of the most difficult issues we are faced with as dentists. In this regard, the first congress will address the topic of controversies in dental implantology and will be held in Barcelona from 3 to 5 November 2016.

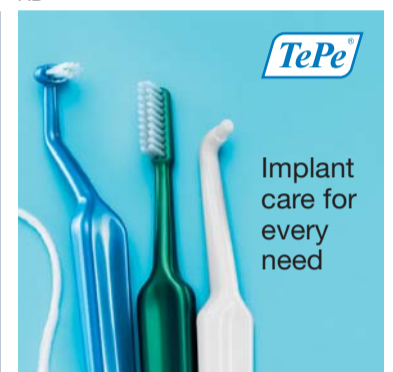
**What distinguishes this congress concept from other meetings?**

**Prof. Mauro Labanca:** We hope to promote real discussions and interaction between practising physicians and researchers on unresolved pressing clinical issues. We do not want to be a substitute for any other existing meeting. For the first congress, we will be discussing implants, but future topics do not have to be surgical ones. Congresses could address adhesive and restorative dentistry or different kinds of treatments in orthodontics. We are not an academy or a scientific society; we already have so many and we do not want to compete with them. We are doing something totally different.

**What will the programme cover?**

**Prof. Labanca:** Right now, we have eight topic modules that we feel are very interesting and will foster debate, as well as greater knowledge at the end of the meeting, hopefully. The programmes are designed to provide an effective forum for debate by allowing ample time for speaker-audience discussion. There are not going to be long presentations by one single speaker. Instead, we will have very short addresses of about 10 to 15 minutes during which the speakers will seek to answer a specific question. The result will be that, after approximately 1.5 hours, the audience will have had a summary by some of the most important speakers on that topic.

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**Prof. Sydney:** It will be the first time that dental companies will be on the podium together, presenting their best speakers but without the restrictions of having to identify that they work for the company etc. Afterwards, the companies will be able to debate with each other on a number of points. We also aim to initiate an interactive exchange between speakers and the audience with questions via microphone and social networks, in order to cover all the questions that may arise. At the end of each small section, the aim is to have achieved a fair and balanced coverage of the respective subject.

**What impact do you hope to have with this idea?**

**Prof. Sydney:** We expect to make news. Up to now, dental companies have mostly marketed their products in a way they think is most appealing to their target customers, but the individual dentist who is going to buy the products, quite frankly, does not have all the information to make a decision. And even if he or she does have a sense of direction regarding which implant system to choose, he or she is often not totally sure of the optimum selection. Our concept provides an opportunity to cut through the indecision and doubt. All the companies sitting up on the podium will have the opportunity to explain why their implant is great and the other companies will be able to join in and explain to the audience about their product's features. The dentist in the audience will then be able to participate as well to obtain the answers that they are really interested in, bottom line—what's best for me?

**Prof. Labanca:** In the long term, we hope to initiate an annual meeting that will cover different topics in dentistry. There are many issues that are not so clear and dentists wish to become more informed about these.

**So this is an opportunity for dentists to obtain a market-independent view of a certain product or topic in general?**

**Prof. Sydney:** Right. Moderators will monitor the scientific level of speakers and the information they provide. Among the criteria for selecting moderators are that they be well respected in their fields and well known in the academic world. In particular, they should not be connected in any significant manner with a particular company. That is the way we qualify them and that is also what draws the companies in. We represent a programme of a uniquely remarkably high level, and this means that when speakers present and say something that might not be evidence based or may leave some questions, the moderators, in a polite and non-offensive manner, will be step in. I believe this will make the audience extremely receptive to the results.

**Prof. Labanca:** We would define ourselves as a sort of supervisor in this project. In many countries, dentistry is generally a private practice industry. How can a busy and especially non-academic practitioner properly compare all the information that is available? What we will offer is the scientifically accurate information in order to help them interpret the efficacy and applicability of the message they receive from companies.

**You are both dentists. Have you experienced this problem yourselves?**

**Prof. Labanca:** Exactly. When I started with implants many years ago, I had this idea to bring the most important companies together to initiate open and honest debate between them. At that time I probably didn't have enough cards to play, but now it is the time! The reality dentists are facing today is that companies are approaching them and claiming to have something special and something new. This could be true, but you

do not have the means to compare or to confirm whether it is. You could try the products on your patients, but that would not be the right thing to do.

**Prof. Sydney:** Both of us travel quite a bit. Mauro and I have a global understanding of dentists' concerns in many parts of the world. There is universally a common sense of frustration regarding the different implant systems. I regard our role as providing a safe, scientifically enabled and controlled environment

for implant companies to proactively present the advantages of their systems directly to the end users.

**Will there be follow-up documentation after the meeting?**

**Prof. Sydney:** The existing congress model involves a journal issue that is published afterwards and compiled in such a way that it is relevant not only to the event, but also to anybody interested in reading about what was discussed and summarised by creating a per-

manent and easily-referenced resource.

**Prof. Labanca:** We are not just trying to look for something different; we have seen that there is a need for this congress. We want to achieve a high level of academic acceptability, as well as accessibility for the general dentist population. That is the balance that we hope will lead to success.

**Thank you very much for this interview. «**

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# A Swedish perspective on osseointegration

Remembering the work of Per-Ingvar Brånemark. By EAO presenter Prof. Tomas Albrektsson, Gothenburg/Malmö, Sweden

■ This year's European Association for Osseointegration (EAO) meeting in Stockholm in Sweden will be heavily influenced by the recent passing of Prof. Per-Ingvar Brånemark in December 2014. Although a physician by training, Brånemark was the first person to introduce oral implants in Sweden, as well as overseas. His efforts were initially received with great scepticism. Dentists did not at first believe in oral implants because devices used prior to the advent of Brånemark's discovery of osseointegration had been touted as having great success, but critical analyses had found imminent failure.

Brånemark treated his first patient in 1965 and his continued implant activities led to perhaps the greatest academic struggle we have had in Sweden in modern times. Finally, in 1977, the Swedish

National Board of Health and Welfare nominated three independent professors from Umeå University to investigate the matter. They submitted a report with positive findings on osseointegrated implants that was presumably the first independent piece of academic writing ever published that supported the use of these devices.

From 1977 onwards, we then started training dental specialists from Scandinavia in placing dental implants. Over time, an increasing number of private practitioners in Sweden began working with them too. Some 20 years ago, Sweden placed more implants per capita than did any other country, partly owing to government support for implant treatment, peaking at about 125,000 implants placed annually in a population of approximately nine million inhabitants.



Nowadays, far fewer implants are placed in Sweden. Recent calculations point to an annual use of some 75,000, probably because many of our totally edentulous pa-

tients have already been treated. The predominant scenario in Sweden today is replacement of single teeth or treatment of partially edentulous cases, which means that the number of patients treated has not decreased to the same extent as the number of implants placed annually.

I remember the first patient with dental implants I personally met, in 1968. He was an opera singer in his forties who was unable to perform professionally owing to poor retention of his dentures. Aged 95, he recently returned for treatment to a nearby clinic, where radiographs revealed that only one of his implants had failed, but the rest have remained in good function after 47 years.

Sweden has four dental schools, at the universities of Gothenburg, Stockholm, Umeå and Malmö. Undergraduate training in implants is provided at all four schools and students are encouraged to place implants under supervision. The majority, at least at my alma mater, still has a rather critical attitude towards implants, which can be attributed to some scholars here reporting the development of peri-implantitis in 50 per cent of patients. Students then take this knowledge with them when they join an implant clinic, where most practitioners only see five per cent or so of patients with peri-implantitis.

Graduates leave university with a balanced view on the threats and promises of dental implants. For many years, postgraduate training in basic implantology in Sweden has concentrated on private practitioners who had not been allowed to work with implants earlier in their career. In addition, we have ongoing specialty education in subjects such as dental surgery, prosthodontics and periodontics. However, implant dentistry is not a recognised specialty in Sweden. Training courses in the field are provided by several commercial companies, which represent all of the major dental segments today.

From a research perspective, Swedish scientists continue to pub-



Prof. Tomas Albrektsson is currently working as a professor at the universities in Gothenburg and Malmö in Sweden. This afternoon, he will be talking about the Per-Ingvar Brånemark concept as part of the 50 years of clinical osseointegration session at EAO 2015.

lish numerous papers on oral implants in international journals. At least one of our dental schools is regarded as being in the very top league internationally owing to pioneering implant papers originating from the school over the years. We also pride ourselves on maintaining a strong international presence. Many of our new PhDs conducting research on implant dentistry are from elsewhere in Europe and several are from overseas. Basic science reports, as well as clinical application papers, are published annually. In addition, Swedish researchers have been partners in many innovations in the areas of implants, membranes and measuring devices.

Few people know how the term "osseointegration" was initially introduced. Certainly, we believed from early on that implants were directly bone anchored, but did not have a word for this phenomenon. In 1976, Brånemark consulted a linguist of the University of Gothenburg in this regard. The linguist suggested the term "osseointegration" to describe how implant treatment works and later received an honorarium of £200.

Based on histopathological research, we now regard osseointegration as a foreign body response. Jokingly, we may consider renaming the EAO the "European Association of Foreign Bodies". Even if the EAO board proves negative to this suggestion, we expect many guests from abroad to visit Stockholm in September. Although the EAO has had two annual gatherings in nearby Copenhagen in Denmark, its 2015 conference is the first meeting ever to be held in Sweden. As a representative of the Swedish members, I welcome all of the visitors to Stockholm in what we hope to be rainy weather, so that the lecture rooms will be filled every day. ◀

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# Peri-implantitis: Is it a crisis?

By Dr Michael R. Norton, UK



Dr Michael Norton runs a practice dedicated to implant & reconstructive dentistry in London in the UK. This afternoon, he will moderate a satellite industry symposium on current strategies for limited bone situations sponsored by DENTSPLY Implants.

In the US over 500,000 implants are placed each year, whilst in the UK that figure was around 140,000 for 2010. The prevalence of peri-implantitis has been reported to be up to 29 per cent<sup>1</sup> most notably in patients whose implants are placed within a partial dentition. This yields a potentially vast number of implants, possibly as many as 185,000 in the US and UK alone that might succumb to some form of peri-implant disease on an annual basis.

The bacteria found within peri-implant lesions are similar to those found in deeper periodontal pockets,<sup>2,3</sup> and cross infection by periodontopathogens as a primary aetiology has been implicated as a possible pathway. However the wide variety of implant designs, surfaces etc. make the treatment of peri-implantitis much less predictable and subject to much greater variability than periodontal disease, where natural teeth present a known anatomy and well defined surface structure.

In 2008 a systematic review<sup>4</sup> of the literature regarding peri-implantitis using PubMed and the Cochrane library revealed little consensus on the treatment of this troublesome condition. One study reported on the efficacy of sub-mucosal debridement using ultrasonics or carbon fibre curettes<sup>5</sup>, while two others compared the effect of an Er:YAG laser against that of mechanical debridement and 2% chlorhexidine as a combined therapy.<sup>6,7</sup>

The first found similar results between laser and combined therapies, while the second concluded that the laser effect was limited to a six month period. A further study compared combinations of oral hygiene instruction, mechanical debridement and topical minocycline with a similar regime which substituted 0.1% chlorhexidine as the antimicrobial.<sup>8</sup> The former seemed to confer some benefit while the latter showed limited or no clinical improvements. Finally, a study comparing two bone regeneration procedures reported clinically

significant improvements mediated by both.<sup>9</sup>

Nonetheless a multitude of other studies have also been published reporting on the efficacy of tetracycline<sup>10</sup>, CO<sub>2</sub> laser<sup>11</sup>, and photocatalytic decontamination amongst others in the treatment of peri-implantitis.<sup>12</sup> Such a plethora of therapies makes it difficult for the clinician to choose a regimen that is both within the reach of the average clinician and has some documented reliability.

## Risk factors

There have been a number of risk factors cited for peri-implantitis. Recently, in a study published in the *Journal of Clinical Periodontology*, a clear association was demonstrated through multi-level statistical analysis between risk of peri-implantitis and location, specifically the maxilla, while overt peri-implantitis was shown to be highly correlated to patients with a predisposing history of periodontitis, and being male.<sup>13</sup> Surprisingly in this particular study no correlation was demonstrated with smoking, yet this has been a consistently cited risk factor in many other studies. Indeed in a study published in the *Swedish Dental Journal* in 2010, the percentage of implants with peri-implantitis was significantly increased for smokers compared to non-smokers ( $p=0.04$ ).<sup>14</sup>

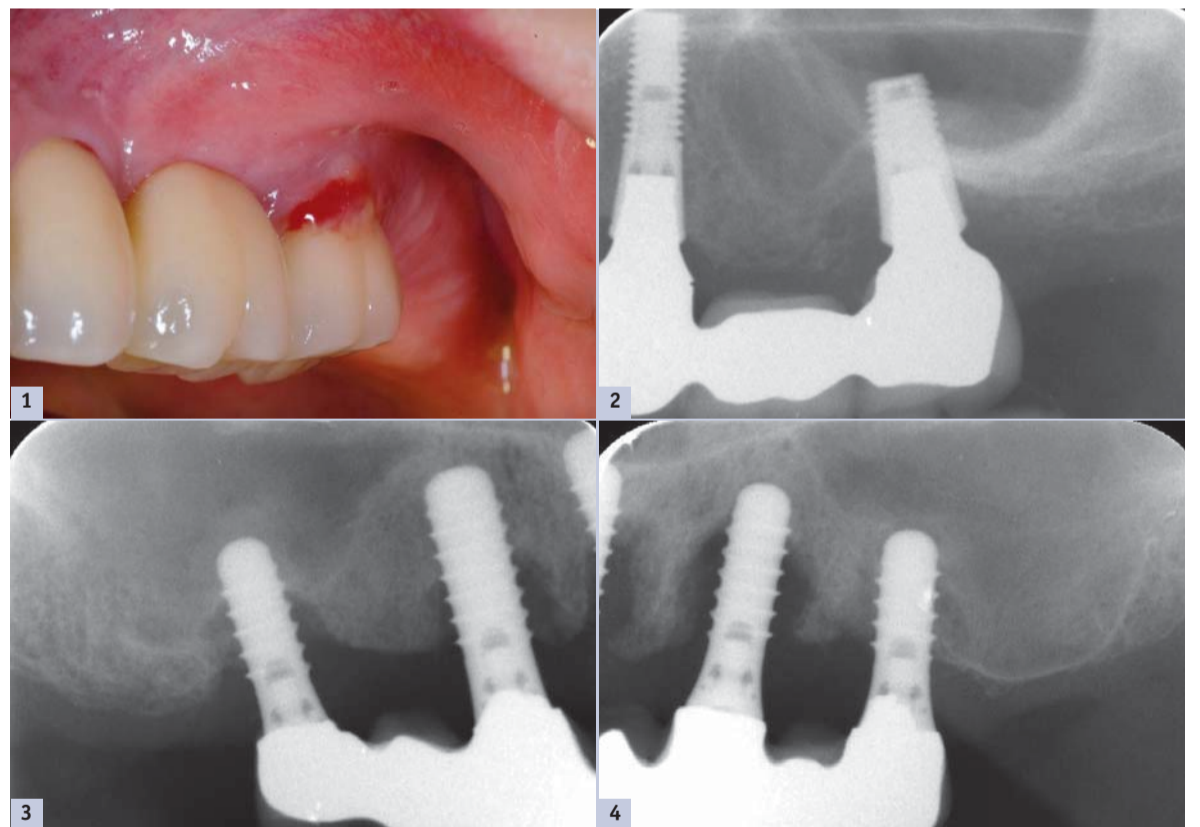
Other factors that have been implicated include excess cement, poor oral hygiene, and prosthesis design which are of course inter-related with some prostheses making effective oral hygiene untenable, while others present deep margins that make removal of excess cement almost impossible.

## Warning signals

Peri-implantitis rarely presents unannounced unless of course the patient fails to be placed on a regular recall programme or fails to attend for regular review. Early signs are often apparent in the form of peri-implant mucositis. This condition is characterised by mucosal oedema, rubor and bleeding on probing (BOP). By definition it is not

associated with purulence or bone loss. However this condition is often asymptomatic to the patient and as such is typically only diagnosed at routine recall. Hence there is a need to recognise that when implant treatment is completed the patient should remain on annual reviews for at least the first five years, and thereafter once every two years.

However once peri-implant mucositis has taken hold it is unfortunate that it is often exacerbated by the design of implants today. The presence of a rough surface, taken to the top of an implant, and the application of microthreads or grooves have been proposed as potential confounding factors for the advance of the lesion due to biofilm



On presentation with mucositis a combination of mechanical debridement and sub-mucosal decontamination and antimicrobial therapy are indicated. The treatment should be repeated three times within a two week period, so-called Triple Therapy (Norton M).

The protocol is as follows:

1. Mechanical scaling of implant surface with titanium or carbon fibre curettes.
2. Sub-mucosal irrigation with 5-10 ml chlorhexidine (0.2%) per site, at the deepest level of the pocket on all sides of the implant.
3. Application of Minocycline Gel 2% (Dentomycin, Henry Schein Ltd) at the deepest level of the pocket on all sides of the implant.

formation and bacterial contamination of the surface which leads to bone loss and further surface exposure. With advancing bone loss it often results in colonisation of the deeper pockets with well known periodontopathogens and infection ensues. This then is peri-implantitis.

Peri-implantitis is characterised by the presence of vertical or crater-like bone defects and spontaneous purulence and bleeding on palpation (Figs. 1 & 2). It is typically associated with deep peri-implant pocketing > 5 mm.

This condition is undoubtedly of increasing concern due to some principle factors, such as the almost exclusive use of roughened implant surfaces, the treatment of

partially dentate patients with a history of periodontal disease, the placement of implants with inadequate bone volume resulting in facial dehiscences, as well as the use of cement retained prostheses.

Implants with a micro-roughened surface texture have presented excellent long-term data and until recently there has been very little published in the literature demonstrating a susceptibility of these surfaces to this condition. However recent work by Albouy et al<sup>15,16</sup> has received widespread attention with concern for the evidence that suggests some modern micro-textured surfaces may be completely resistant to decontamination.<sup>16</sup>

Ultimately, if left unchecked and untreated, it may become impossible to arrest the condition, leading to wholesale failure of the case (Figs. 3 & 4). Such failures impose a tremendous strain and burden on the clinician (let alone the patient), destroying the confidence of a patient who has endured significant expense and trauma and occasionally results in a breakdown of communication between both parties that all too often sadly results in a legal claim of negligence. Such claims can be hard to defend for patients where no warnings and/or supportive periodontal/peri-implant therapy have been undertaken.

Treatment typically requires surgical access to excise any fibrous capsule and for direct access



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