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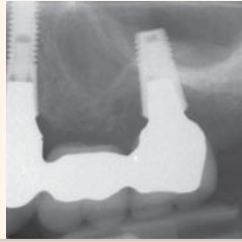
VOL. 13, No. 6



INTERVIEW

Dr Iain Pretty about the caries experience in Asia, the pitfalls of water fluoridation and what he considers to be the right measures to deal with the epidemic.

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IS IT A CRISIS?

Risk factors and warning signs of peri-implantitis and the reasons why there is no clear consensus on the prevalence of the troubling disease yet.

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ALL-CERAMIC RESTORATIONS

Japanese clinicians demonstrate a treatment flow with minimally invasive methods to achieve harmony between pink and white aesthetics.

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Study reveals unrealistic public expectations regarding implants

By DT Asia Pacific

HONG KONG: Dental implants are gaining increasing popularity in the treatment of partially dentate or edentulous patients, and both the industry and dental professionals offer detailed information about implant materials, functions and procedures.

Yet, many people are not well informed and tend to overestimate the functionality of implants, while underestimating the expertise needed for implant dentistry. These are the findings of a qualitative study conducted at the University of Hong Kong.

The researchers aimed to evaluate the public's acquisition of information and their perceptions regarding dental implants, as well as the effects of these perceptions on their care-seeking and decision-making behaviour.



Patients tend to overestimate the functionality of implants, new research has shown. (© Warren Goldswain)

The study examined a sample of 28 adults between 35 and 64 years old who had never been engaged

in a dentistry-related job. Moreover, for inclusion in the study, participants had to have at least

one missing tooth and to have heard about dental implants, but

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Halitosis association launched

In order to address the lack of scientific data on halitosis, the International Association for Halitosis Research (IAHR) was officially formed on 5 June at a meeting of leading halitosis researchers during EuroPerio8 in London. As new insights into the problem of bad breath are rapidly expanding, the IAHR aims to promote research on all aspects of halitosis and its related issues and to distribute and publicise the research. "Not only do we need to create awareness among the public, but we should also enhance the information and treatment advice for professionals," president Dr Edwin Winkel from the Netherlands said.

Despite affecting a vast number of people worldwide, sound epidemiologic data on halitosis is rare. While 9 in 10 cases of halitosis are attributable to tongue coating, gingivitis, periodontitis and other conditions in the oral cavity, a minority of cases are caused by systemic diseases or conditions.



Priyanka Chopra at a film premiere in 2012. The Bollywood actress and former Miss World was recently named brand ambassador by Colgate-Palmolive in India.

Malocclusion study

Research conducted at the University of Adelaide in Australia has found that children who were exclusively breastfed from three to six months, as well as up to six months had a 33 per cent and a 44 per cent lower prevalence of open bite, respectively, compared with children who were never breastfed by their mothers.

WOHD 2015

According to the FDI World Dental Organisation, this year's World Oral Health Day has continued to grow, with estimates of the total world audience rising to just under 27 million. Established in 2012, the event is celebrated annually on 20 March with numerous awareness-raising events and activities all over the world.

AB Dental expands to China & HK

Simultaneous to the launch of its customizable implant at the last Europerio conference in London, AB Dental has said to have entered into partnerships agreement with several dental institutions in Mainland China and Hong Kong.

The new partnerships with Bybo Dental Group, Dolphins International Dental Academy and Sino Integrity are intended to help the Israeli company to distribute their range of dental implants and related products such as prosthetics and imaging services and offer training courses to dental professionals in these regions and the Macao Special Administrative Region. The first of these seminars featuring international renowned clinical experts is scheduled to take place in August.



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A\$139 million new oral health centre opens in Brisbane



Fig. 1: (From left to right) Queensland Minister for Health and Ambulance Services Cameron Dick, UQ dean Prof. Lakshman Samaranayake and Federal Minister for Health & Sport Sussan Ley observing equipment at the new facility. (© Kaylene Biggs, Australia)—Fig. 2: Photo showing the new complex at Herston campus. (© University of Queensland, Australia)

DT Asia Pacific

BRISBANE, Australia: After five years of construction, one of Aus-

tralia's largest and most advanced oral health centres has opened this month at the University of Queensland's Herston

campus in Brisbane. The new facility is intended to improve access to dental care for people in Australia's second largest state

and northern New South Wales, as well as to facilitate dental training and research.

Originally set for completion in 2012, construction was expanded due to flooding, as well as commissions and certifications for the fit out taking longer than usual.

The university is reported to have spent a total of A\$134 million (US\$103 million) on the new complex, of which two-thirds were provided by the federal and local governments. It will replace the university's former dental school at Turbot Street, which was returned to the Queensland government last December, and offer general dentistry services, as well as a number of specialised treatments, including orthodontics and periodontics.

Equipment has been increased with twice as many chairs available for treatment and the acquisition of advanced diagnostic equipment, like microscopes and intra-oral cameras.

Furthermore, surgeons will be able to record and stream procedures with the help of two demonstration chairs boasting state-of-the-art recording equipment.

"It's a long way from the days when the smell of eugenol was ever present," President of the Australian Dental Association and former University of Queensland dental student Dr Rick Olive, who attended the opening on Thursday, said. "We were the last cohort to use the old pump-chairs and slow speed belt-driven handpieces."

Plans to update the university's dental facilities, which were established in the 1930s, were in the making for almost 20 years. Once the design had been awarded to Brisbane architects Cox Rayner, constructions for the new oral health centre began in 2011. The site finally became operational late last year. Among other things, it will connect the Royal Brisbane and Women's Hospital to the Mayne Medical School.

"The UQ Oral Health Centre has been a significant project over several years and is a fine facility of which we can be proud," Vice-Chancellor Prof. Peter Høj commented.

"UQ has been at the forefront of Australian dentistry for the best part of a century, and this ensures we continue to set the standard for coming generations."

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WCLI Asia Pacific Symposium

By DTI

TAIPEI, Taiwan/IRVINE, Calif., USA: The World Clinical Laser Institute (WCLI), the largest dental laser organisation in the world, will be hosting a symposium in Taipei on September 19 and 20. The event will feature educational content suited for every dental professional—with new presenters just announced in periodontology and paediatric dentistry.

◀ Page 1

never received one or had any dental consultation regarding dental implants.

The participants were divided into six focus groups and had to discuss dental implants and their individual knowledge about them. All of the group discussions were transcribed verbatim and subjected to thematic content analysis following a grounded theory approach.

The Chinese research team found that the participants acquired information on dental implants through various means, such as patient information boards, printed advertisements, social media, and personal connections.

According to the researchers, the participants expected dental implants to restore patients' appearance, function and quality of life to absolute normality. "They regarded dental implants as a panacea for all cases of missing teeth and overestimated their functions and longevity," the scientists stated.

The participants further underestimated the expertise needed to carry out the clinical procedures to place an implant. However, they were deterred from seeking dental implant treatment by the high costs, invasiveness of the procedure, risks and possible complications.

Overall, the study found that the public is exposed to information of varying quality and has some unrealistic expectations regarding dental implants. Such perceptions may shape their care-seeking behaviours and decision-making processes in one way or another, the researchers said.

"The views and experiences gathered in this qualitative study could assist clinicians to better understand the public's perspectives, facilitate constructive patient-dentist communication, and contribute to the creation of positive clinical experiences in implant dentistry," they concluded.

The study, titled "Public perceptions of dental implants: A qualitative study", was published online on 8 May in the *Journal of Dentistry*.

The WCLI Taipei Symposium will address topics on today's challenges in dentistry, including periodontitis and peri-implantitis. Dr Sam Low, past President of the American Academy of Periodontology, will present "The Role of Lasers in Perio and Introduction of a Dual Wave-length Approach for the Treatment

of Perio Disease". Renowned speakers joining him include Dr Ki-Tae Koo, who will discuss the "Latest Developments in Peri-Implantitis Treatment Solutions, Including Laser"; Dr Linda Murzyn-Dantzer, presenting on laser-assisted paediatric dentistry; and Dr Rana Al-Falaki, who will cover laser-assisted

periodontic and osseous surgical techniques.

The WCLI is more than an educational gathering of dentists seeking clinical knowledge and tips on the latest technologies in dentistry. The largest group of its kind, the WCLI is a close-knit network of thousands of

dental professionals who share a passion for improving the patient experience, elevating their clinical results to the highest level, and building the best possible practice they can.

The institute has been holding world-class educational events for over ten years. At this year's Taipei Symposium, dental professionals will be able to improve their knowledge and techniques in the areas of periodontology, endodontics, implantology, cosmetic dentistry and restorative dentistry.

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Dental implantology: Evolution or the road to ruin?



By Aws Alani,
UK

Teeth are highly evolved structures that have developed progressively over millions of years in attempts to protect themselves from caries and periodontal diseases. Over the years, many advances have been made that can treat these various diseases predictably. Various strategies have been developed to prevent or slow down these problems given adequate patient compliance and appropriate personal and professional maintenance. Despite these very significant improvements, there are still instances when patients are advised that one or other tooth has to be extracted. It is the obvious sadness, heartache or despair that patients are caused by this bad news that has driven, caring clinicians to find ways to replace teeth with various devices, including dentures, bridges and implant-retained prostheses.

P.-I. Brånemark, now sadly deceased, famously quipped: "No one should have to die with their teeth in a glass of water beside their bed". His original inspiration coupled with determination, intuition, passion and an ability to surround himself with a great team of individuals with differing skills made osseointegration much more predictable. Brånemark's landmark studies changed prosthetic dentistry dramatically, but a careful look at the design of these protocols and the implants themselves reveal that they were hugely different to the patient selection protocols and the types of implants being placed today.

Furthermore, the restorations supported on them were made of the established materials then and obeyed traditional mechanical laws. In terms of biological cleanliness, the metal, polished "high water" abutment design allowed for optimal interproximal cleaning, while the implant surface itself was also relatively smooth in comparison with the rougher surfaces we often see today. Market saturation, cost, profit and market share in many technology-driven markets often pursue innovation of some sort of change to help gain greater market share or profit. The over-commercialisation of dentistry generally creates a constant turnover of supposedly new and better products, where the common notion of "if it ain't broke don't try to fix it" is lost on many directors of marketing or increasingly profit-driven CEOs.

Why and where?

Where this technological change has taken implantology and what the real reasons are that this is and is happening need to be examined. Increasingly, the shadow of peri-implantitis looms like a spectre over the provision of implants. Unlike caries or periodontal disease, there is very little consensus or research that can provide a predictable cure for what now is now a new breed of disease. Peri-implantitis is relentless once established within fine threads of the implant, and the bone resorption and soft-tissue problems that follow can result in spectacular problems.

nano-level features make the implant surface a veritable inflammation super highway for the pathogenic organisms. Predictably enough, the micro-organisms found on the rough surface are usually the common pathogenic ones, but also some species are found that have previously never been discovered in the oral cavity.

Patient selection issues

We need to consider the types of patients whom we are now accepting for implant provision. At King's College Hospital, the criteria for state-sponsored implant provision largely involve patients with hy-

any real capacity for changing that. Patients who smoke, those with a history of periodontitis and those with poor oral hygiene are well known to be at a very significantly higher risk of peri-implantitis.

Biological versus mechanical problems

If we are being frank, the pathogenic bacteria-induced diseases are not the only long-term problem that we are now seeing. The reported frequency of mechanical complications has risen over the years, but the reported problems are probably only the tip of the ice-

physiological feedback and thereby creating an increased chance of failure of some type.

Ethical, moral and legal issues

These problems become much more worrying when viewed from ethical, valid consent and medico-legal perspectives. This is particularly so when patients are convinced to undergo elective extractions of teeth that often seem reasonably intact or treatable with conventional proven treatment strategies.

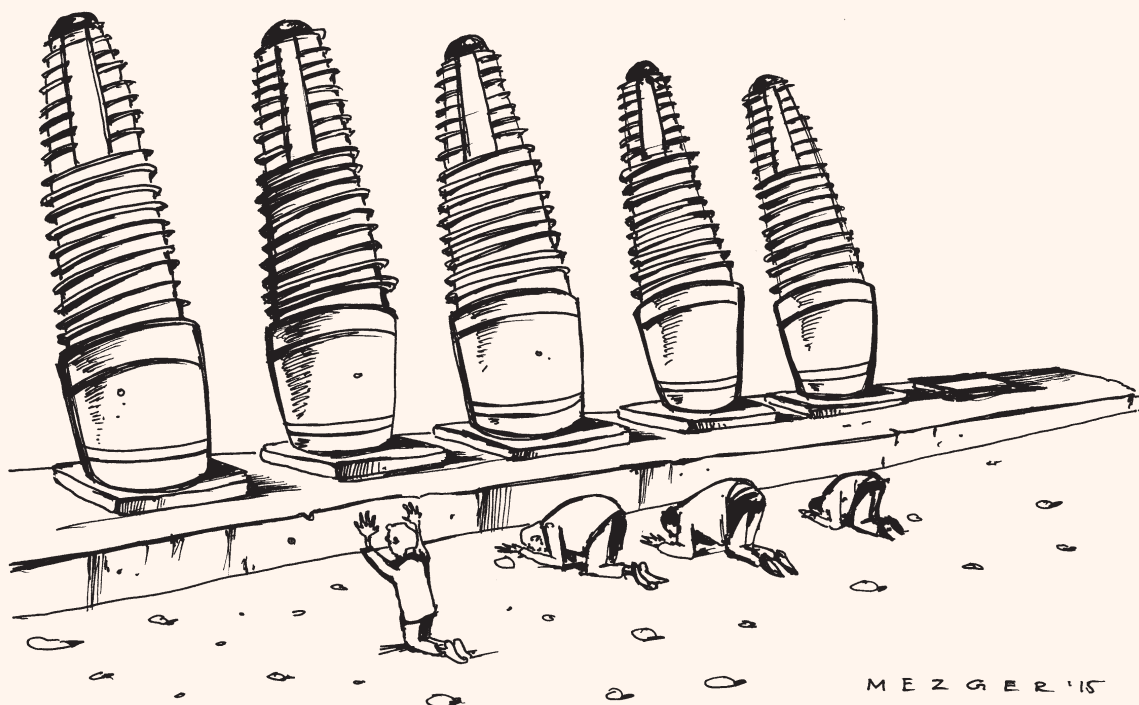
It appears that there is a worrying drift towards aggressive treatment with extractions in order to provide a supposed full-mouth rehabilitation with multiple implants. The increasingly dubious practice of sacrificing teeth for the sake of implants appears to be quite irrational. As ethical oral health practitioners, deliberately removing saveable teeth for prosthetic replacement using implants as support appears to be consciously flying in the face of increasingly apparent evidence of various complications with implants and many would consider that approach to be foolish. How many "implantologists" doing that to others would genuinely have it done to themselves or done to some close family member?

Planned obsolescence

A state-of-the-art implant today is likely to be obsolete tomorrow. Electively removing teeth is irreversible and replacing teeth with implant-retained devices means that patients are trapped in the era of the implantology in which these were placed and restored, that means issues of machining, surface blasting, roughness, platform switching, design and attempts at bone augmentation by cow, coral or Californian substances. The list goes on and on and will probably continue to expand with what many might consider human experimentation without licence.

Now comes the time for implant manufacturers to take stock of their many "market-driven" mistakes, including fast initial integration with the roughest possible surfaces. Instead they need now to produce proven (i.e. not speculative) designs to better prevent these well-known problems of infection and breakage.

A wiser, pragmatic approach appears to be to concentrate everyone's efforts on saving teeth and thereby eke out their usefulness for the patient's lifetime. Recently, the legendary Prof. Jan Lindhe, interviewed in the *British Dental Journal*, summarised the state of play as



Part of the key issue probably lies in the surface exposed to the susceptible patient's oral environment, as most microbiologists will allege. The bacterial content and make-up of the biofilm is a reflection of the surface on which it resides. Implant surfaces have become progressively rougher in order to hasten the early osseointegration processes and to try to provide patients with their restoration quicker in an ever more competitive financial environment.

However, speed is not always helpful. Experience shows that some things are better achieved gradually.

Once exposed to the environment of a susceptible patient, the macro-topography of the threads provides an ideal ecological niche for bacterial proliferation. Further

podontia and those who have suffered trauma. Usually both cohorts are likely to present with well-maintained, minimally restored dentition or with scope for oral health improvement prior to consideration for any restoration, let alone an implant. Unfortunately, we are unable to provide this treatment for smokers.

This is in stark contrast to the patients who may be provided with implants in general and specialist practice, such as patients who are likely to have lost teeth as a result of plaque-associated diseases. Indeed, it could be considered a paradox by many interested observers that some clinicians are providing patients with implant-retained restorations when they have shown that they are highly prone to plaque-associated disease via tooth loss and have not demonstrated

berg, as many complications have not and will not be reported for a variety of understandable reasons.

Over time, the components of implants have shown notable weaknesses. Screw loosening, fractured screws, loose abutments and the cracking of ceramic can be laborious and expensive to manage. One aspect, which may be lost on some, is that since they lack a periodontal ligament dental implants cannot and will never be able to acclimatise to changing occlusal and non-axial forces. These are very likely to create stresses within the masticatory system, thereby resulting in breakages. These forces are compounded greatly if patients exhibit parafunction on a daily basis and that is sometimes an unknown risk factor until it is too late. The more implants that are placed, usually the fewer teeth are present, resulting in a net reduction in

Aws Alani is a Consultant in Restorative Dentistry at Kings College Hospital in London, UK, and a lead clinician for the management of congenital abnormalities. He can be contacted at awsalani@hotmail.com.

Researchers reveal new insights into the internal structure of dentine

By DTI

BERLIN, Germany: Being subjected to massive forces, human teeth consist of one of the most durable organic materials. To date, the high crack resistance of dentine has not been fully understood. An interdisciplinary team of scientists has now analysed the complex structure of dentine, revealing that its mineral particles are pre-compressed and internal stress works against crack propagation to increase the resistance of the bio-structure.

Engineers already use internal stresses to strengthen materials for specific technical purposes. Now it seems that evolution has long known about this trick and has put it to use in our teeth. Unlike bones, which are composed partly of living cells, human teeth are not able to repair damage. Their bulk is made of dentine, a bonelike material consisting of mineral nanoparticles. These mineral nanoparticles are embedded in collagen protein fibres, with which they are tightly connected. These fibres are found in every tooth and lie in layers, making teeth tough and damage resistant.

Researchers from the Julius Wolff Institute at Charité – Universitätsmedizin Berlin, together with several national and international partners, have examined these bio-structures more closely. They performed microbeam *in situ* stress experiments at the BESSY II synchrotron radiation source at Helmholtz-Zentrum Berlin and analysed the local orientation of the mineral nanoparticles using the nano-imaging facility of the European Synchrotron Radiation Facility in Grenoble.

When the tiny collagen fibres shrink, the attached mineral particles become increasingly compressed, the research team learnt.

“Our group was able to use changes in humidity to demonstrate how stress appears in the mineral in the collagen fibres,” Dr Paul Zaslansky from the Julius Wolff Institute explained. “The compressed state helps to prevent cracks from developing and we found that compression takes place in such a way that cracks cannot easily reach the tooth inner parts, which could damage the sensitive pulp.”

In this manner, compression stress helps to prevent cracks from running through the tooth.

The scientists also examined what happens if the tight mineral-protein link is destroyed by heating. In that case, dentine becomes much weaker. “We therefore be-

lieve that the balance of stresses between the particles and the protein is important for the extended survival of teeth in the mouth,” Charité scientist Jean-Baptiste Forien stated.

Their results may explain why artificial tooth replacements usually do not work as well as healthy teeth do: they are simply too passive, lacking the mechanisms found in the natural tooth structures. Con-

sequently, fillings cannot sustain the stresses in the mouth as well as teeth do. “Our results might inspire the development of tougher ceramic structures for tooth repair or replacement,” Zaslansky hopes.

The study, titled “Compressive residual strains in mineral nanoparticles as a possible origin of enhanced crack resistance in human tooth dentin”, was published in the *Nano Letters* journal on 26 May.

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Professor Emeritus Kauko K. Mäkinen posing with a model of the xylitol molecule.

During the early 1970's, xylitol and other natural sweeteners were extensively tested in Finland as potential replacements for sugar. The series of over 20 research reports, published together in *Acta Odontologica Scandinavica* in 1975, became collectively known as the "Turku Sugar Studies". Approaching

the 40th anniversary of the publication, *Dental Tribune* had the opportunity to speak with Professor Emeritus Kauko K. Mäkinen, who led the original Turku research together with Arje Scheinin, about xylitol's impact on caries levels, its popularity in Finland and the sweetener's future prospects.

"Xylitol is here to stay"

An interview with Professor Emeritus Kauko K. Mäkinen, Finland

Dental Tribune: Prof. Mäkinen, you were involved in the first extensive studies of xylitol in the seventies—how far has the sweetener come since then?

Prof. Emeritus Kauko K. Mäkinen: The awareness of xylitol among consumers and healthcare professionals has increased significantly since the early 1970's. However, knowledge about xylitol is not equally distributed across the world. Although awareness may approach 100 percent in Finland, the situation is different in other countries and the level of awareness depends on the level of dental and medical education in each country.

As you mentioned, in Finland, xylitol seems to be a part of daily life?

Xylitol is indeed known by virtually all Finns and is also used by most people in Finland on a daily

basis. Parents and grandparents have adopted a habit of buying xylitol gum, pastilles or lozenges for their children and grandchildren. At many day-care centres, children learn to use xylitol after lunch.

In Germany, for example, you can buy xylitol as a sweetener and it is also added in gum, but it is not widely known to the public as a mainstream product. Why do you think there is such a difference in "popularity"?

You are right about the situation in Germany. I cannot help but wonder why this could be, since xylitol was discovered by German chemists and its medical use in infusion therapy is best known by German physicians. It is possible that German dentists do not value early caries prevention as much as the dentists and the authorities do in Scandinavia. One would need a strong and committed distributor and an official endorsement from the German Dental Association.

When you did your research for the Turku studies, did you expect to find xylitol to be so beneficial, especially for oral health?

daily amounts that are taken at least three to five times a day.

Do you have any data on how much xylitol is consumed in Finland or worldwide?

These figures are possessed by xylitol manufacturers and they do not provide any production-related information to us. However, the annual production worldwide must be tens of thousands of tons since xylitol is produced in China, Russia and in other countries. The first true xylitol plant in the world was in Finland and was sold to DuPont a few years ago. When production started in Finland in the 1970's, 3,000 to 50,000 tons were made during the first few years, but overall, production is by far much larger now.

How should the sweetener be used in daily life?

My current recommendation is about 7–10 g per day, evenly distributed throughout the day. The first dose in the morning, the last after oral hygiene at bedtime. Always after meals and sugary snacks. Use it about 5 times a day, not less. Use two pellets or one stick of gum but the gum must

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"Overall caries prevention takes place as a result of multi-faceted efforts and programs, xylitol being a part of the whole."

We did not anticipate the magnitude of this preventative effect. We considered it a welcome surprise. Later, of course, after learning how xylitol works and after we learned to understand the chemical mechanisms involved, we started to regard the findings as natural and expected.

Is there a measureable impact on caries levels and dental health that can be attributed to the sweetener?

We cannot give any figures of the effect of xylitol in caries incidence in the above instances. Overall caries prevention takes place as a result of multi-faceted efforts and programs, xylitol being a part of the whole. It is impossible to differentiate between the effect of each individual preventative measure since all of them are in action simultaneously, such as tooth brushing, the use of fluorides, the application of sealants, etc.

The caries preventative effects of xylitol that were reported in the literature are based on clinical trials. Xylitol does, however, significantly increase the efficacy of overall caries prevention, provided that the use of xylitol is habitual and is based on the consumption of sufficiently-large

be 100 % xylitol. One may "tolerate" some maltitol in it, but no sorbitol, unless the sorbitol amount is very small (<5 %). Some companies use only 5–10 % xylitol and call their product "a xylitol gum", which is false.

Are there any known side effects?

Regular consumers who use xylitol for dental purposes have no side effects. If somebody accidentally consumes larger single doses, for example, 20–30 g, some individuals may have transient diarrhoea. However, sorbitol, mannitol and common milk causes much more severe symptoms. Of course, small children must use xylitol gum under parental guidance.

Do you think xylitol could be playing a greater role in the future, maybe in developing countries?

Xylitol is here to stay. We are already using xylitol in developing countries. Vietnam is one example and, in thinking, it is still a developing country. Xylitol is currently being used in hundreds of dental, medical, cosmetic and other products all over the world. Its popularity is increasing steadily, but not abruptly.

Thank you very much for the interview.



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MIS launches new implant at special event in London

Manufacturer says new V-Concept delivers true innovation to implant dentistry

By DTI

LONDON, UK: MIS Implants Technologies launched a new implant at a special event in London that promises immediate biological benefits for better treatment outcomes. The new V3 is a multi-use implant suitable for a wide range of surgical scenarios, according to the Israeli implant solutions provider, and is ideal in anterior regions, as well as in regions where space and bone may be limited and good aesthetic outcomes are essential.

Designed in collaboration with leading clinicians, including Prof. Nitzan Bichacho and Dr Yuval Jacoby, both from Israel, as well as Dr Eric Van Dooren from Belgium, the development of V3 took two years to complete, MIS Product Manager Elad Ginat stated. He said that it will be available to visitors to EuroPerio8 from Thursday and to clinicians worldwide in the upcoming months.

"MIS is immensely proud of our innovative position in the global implants industry, which has led to the development of the unique V3 implant system. It's a widely



The launch event took place at the Science Museum in London.

anticipated evolutionary next step in dental implant performance, designed for the benefit of clinicians and their patients all over the world," Ginat stated.

The design of V3 aims to provide both specialists and general practitioners with optimum flexibility in implant planning and placement for a restorative-driven approach. In particular, the triangular shape of the coronal portion is intended to encourage bone regeneration and to gain greater volume of bone in

support of stable surrounding soft tissue for restorations with improved aesthetics. According to Ginat, the neck provides solid anchorage at

three points in the crestal zone while forming three compression-free gaps at the sides (between the implant and the osteotomy), thus favouring conditions for better osseointegration, such as high primary stability, bone compression and crestal bone resorption. The gaps encourage clot formation at the bone-implant interface to promote the initial scaffold-building process for bone growth and allow more space for blood pooling and the establishment of a stable blood clot. This way, V3 provides clinicians with advantages from the start, achieving a greater volume of bone and soft tissue at the onset of implant placement.

A high-performance conical connection implant with platform



MIS Product Manager Elad Ginat.

switching, V3 also features a variable thread and self-tapping capability, micro-rings, a concave inter-thread for maximum bone-implant contact, as well as a flat apex supporting immediate placement engagement. Ginat added that clinicians can enjoy all of these design benefits without having to learn new protocols. Furthermore, a dedicated surgical kit makes procedures especially simple, safe and accurate, resulting in ease of placement for the dentist and shorter recovery time for patients, he explained.

everX Posterior

GC enhances fracture toughness with new composite

By DTI

SINGAPORE: According to research, the most common reason for failing composite fillings is fracture of the composite, followed by secondary caries.



Posterior from GC Asia features a strong composite substructure made of short glass fibres that are said to provide a fracture toughness equal to collagen-containing dentine and almost double that of a conventional composite. According to the manufacturer, the fibres effectively prevent and arrest crack propagation that often starts from the surface of the

composite material and slowly propagates through the filling and the tooth structure, thus extending the limits of direct restorations.

GC recommends that everX Posterior always be covered with a light-curing universal composite, such as one from the GC G-aenial product family, in order to achieve a highly aesthetic appearance and strong wear resistance.

The overall failure rate of Class II restorations after seven years, according to a 2011 study by Van Dijken and Pallesen, was 14.9 per cent. Nearly half of those cases were caused by composite fractures.

Developed in response to the increasing demand by dental specialists for a low-cost treatment alternative for large restorations, everX

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