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

DT Asia Pacific

BRISBANE, Australia: After five years of construction, one of Australia’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 a 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 Queens- land 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.”
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.

“Because of these perceptions, public perceptions are extremely important to 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 Wavelength 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 periodontal 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 significant improvements, there are still instances when patients are advised to lose one or more teeth 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.

Part of the key issue probably lies in the surface exposed to the susceptible patient’s oral environment, as most microbiologists will argue. 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 whom we are now accepting for implant provision. At King’s College Hospital, the criteria for state-sponsored implant provision largely involve patients with 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 iceberg. These problems become much more worrying when viewed from ethical, valid consent and medicolegal perspectives. This is particularly so when patients are sometimes made 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 many concerned clinicians 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 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 such implantology in which there were placed and restored, that means issues of machining, surface blasting, roughness, platform switching and the designs and attempts at bone augmentation by cow, coral or Californian substances. The list goes on and we need to continue to expand with what many might consider human experimentation without licence.

Over time, the components of implants have shown notable weaknesses. Screw loosening, fractured screws, loss of 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 peri-odontal 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 pre-sent, resulting in a net reduction in 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 medicolegal perspectives. This is particularly so when patients are sometimes made to undergo elective extractions of teeth that often seem reasonably intact or treatable with conventional proven treatment strategies.

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 to now 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 every one’s efforts on saving teeth and thereby look at 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...
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 bone-like 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 heat. In that case, dentine becomes much weaker. “We therefore believe 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. Consequently, 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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AD
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 research together with Arje Scheinin, professor’s future prospects. 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 endorse-ment 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? 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 measurable 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 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. Two pellets or one stick of gum but the gum must 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. How- ever, sorbitol, mannitol and com- posite mixtures can cause 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 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

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. Nirzam Bichacho and Dr Yovel 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 at 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 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 blot 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 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.

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 Composite 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-ænial product family, in order to achieve a highly aesthetic appearance and strong wear resistance.
“We need to congratulate Singapore”

An interview with Dr Iain Pretty, Professor of Public Health Dentistry at the University of Manchester in the UK and co-director of Colgate-Palmolive’s Dental Health Unit

Caries prevalence remains high in most parts of Asia despite international and national efforts to address the disease. At the recent Asia Pacific Dental Conference in Singapore, Dental Tribune South Asia had the opportunity to talk to Dr Iain Pretty from the University of Manchester about caries on the continent, the pitfalls of water fluoridation and what he considers the right measures for dealing with the condition.

Dental Tribune South Asia: According to the recently published Global Burden of Disease report by your colleagues in London, 95% of the world’s population currently suffers from untreated caries lesions in their permanent dentition. Is this a matter of concern?

Dr Iain Pretty: While we still have a significant problem with caries, we have seen a massive reduction in the overall caries burden since the late 1960s and early 1970s. For the most part, this has been due to the introduction of fluoride toothpaste.

What we see now is that the burden of the disease is concentrated in groups that are difficult to reach. We have eradicated the disease in many individuals and they are now caries-free. But those who do have caries are a much smaller population and carrying a greater burden of the disease.

It is now up to organised dentistry, as well as government and policymakers, to see how we can reach those individuals. It is often not only a question of finance or income levels. For example, in the UK we have free dentistry for the vast majority of people, yet we still find access to be difficult. Similar issues can be seen in the US.

It is about encouraging people to visit the dentist when available, to use evidence-based products, such as fluoridated toothpaste, to brush regularly and to seek care whenever they can. As with all public health problems, it is going to require joint thinking between many stakeholder groups.

A high-income country such as Singapore appears to have different caries experience from most countries in Asia. What do you consider the main differences when it comes to the management of caries here?

Versus the rest of Asia, Singapore is a relatively high-income country and has the benefits of water fluoridation. Access to dental care is also good and programmes that help support dental education and oral health are introduced as early as primary school. These things combined probably account for it.

Could the Singaporean model be transferred to the rest of Asia?

I would agree that the assessment of water fluoridation has an important role to play, although I think that it is not water fluoridation only. As I have mentioned, the evidence supports that it was also the introduction of fluoride toothpaste that helped with caries reduction. It has been probably both things working in tandem.

It also depends on water consumption. Asia covers a large area and one would not want to fluoridate water in Thailand, where the water is naturally highly fluoridated. Generally, it remains difficult to fluoridate the water supplies of small individual villages, where people will often have water supplies, but use different supply for drinking, cooking, laundry and that sort of thing. Ensuring that those water supplies are perfectly fluoridated is complex and depends on the logistics.

On an individual basis, government and policymakers need to assess whether it is possible to fluoridate the water, whether it is already naturally fluoridated or to what level it needs to be fluoridated. Much, of course, depends on temperature or the amount of water that is consumed. In some cases, water fluoridation might not even be possible and that has nothing to do with the Asian region. For example, in North West England, it is not easy to bring fluoridated water into certain areas, as where the water-flow is just not great because there are mountains in the way.

There are also political arguments, a state and the logistics, the natural condition of the water and the cultural use of water. All of these things need to be considered. I think we need to congratulate Singapore for its initial fluoridation efforts and the fact that it has continued with that. Areas that can look towards Singapore as an example.

Community-based interventions implemented in many Asian countries have achieved mixed results. What are the main obstacles there?

Generally, what one would hope for is that community-based interventions are locally driven, locally informed and evidence-based. If we need to be very careful with taking a programme that appears successful in one region and simply applying it to another region. One really has to look at the particular countries. It may not be appropriate for them. For example, water fluoridation may be the best choice for some countries, whereas community programmes, such as supervised toothbrushing, may work best for others.

More broadly, income and resource levels, as well as the availability of the dental workforce, are inadequate. However, there is a great deal of evidence that well-planned community interventions can make a difference, particularly in children and older adults. We need a good level of resourcing for dental public health activities.

What other measures do you consider useful to halt or reverse decay levels in Asia?

I think that education is a really important factor, so that parents, children and older adults are aware that there are evidence-based interventions that they can do at home. Other measures are ensuring that self-care is done effectively and that access to dental professional care is made as widely available as possible. Clearly, in some countries where the dentist per capita ratio is still very low further work needs to be done.

We should also be using community to deliver messages and simple treatments, in terms of distributing toothbrushes and toothpaste and having community-based champions. Something like that can be very helpful and not necessarily restricted to developing countries. Scotland, for example, used the Child Smart programme to embed local community leaders in developing and enhancing oral health.

Thank you very much for the interview.
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Peri-implantitis: Is it a crisis?

By Dr Michael R. Norton, UK

In the US over 500,000 implants are placed each year, whilst in the UK that figure was around 40,000 for 2010. The prevalence of peri-implantitis has been reported to be up to 29% microbiologically, 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,1,2 and cross infection from 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 review4 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 and topically applied antimicrobials in treating peri-implantitis.5 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.6 Interestingly in this particular study no correlation was demonstrated with smoking, poor oral hygiene, and prosthetic 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 (ROP). By definition it is not associated with pusulence or bone loss. However once peri-implant mucositis has taken hold it is unfortunatly 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 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 periodontopathic and infection resists. This then is peri-implantitis.

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

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 and the placement of implants with inadequate bone volume resulting in facial deficiencies, 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 Allovery et al7 has recorded widespread attention with concern for the evidence that suggests some modern micro-textured surfaces may not be completely resistant to decontamination.8

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 to the implant for surface decontamination. The author’s preference until now has been to use chlorhexidine and tetracycline solution for this purpose while others have reported the use of citric acid and hydrogen peroxide amongst others. “The use of lasers has also been extensively reported.”9,10 However in a recent systematic review a meta-analysis could only be done for Er:YAG laser as the literature on this particular factor is limited to 6-month data. It is typically

The author has recently completed the acquisition and treatment of 20 patients in an efficacy study using Er:YAG water laser (Morita, AdvErl Evo) and it is hoped that publication of the results will be forthcoming. Indeed promising data has already been published to date using this same machine.11,12 Nonetheless this methodology remains outside the reach of most general practitioners and has yet to be licensed in the UK.

As such most attention therefore remains focused on physical debridement via surgical intervention and topical antimicrobial therapies.
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Open flap debridement, defect decontamination, and repair as well as pocket elimination have all become the mainstay of those treating this condition.

So is there a crisis? The problem is that there is no clear consensus on the prevalence of the disease since this will vary according to the cut off values for the clinical parameters measured:24 and to date there appears to have been little consensus of these cut off values. As such estimates of incidence of the disease appear to vary from 28 to 56 per cent of subjects and 12 to 45 percent of implant sites.25

Furthermore there is an ongoing controversy about the initiating process of peri-implant disease since it is potentially considered a primary infection of periodontopathic origin by some26 while others hold that it is a secondary opportunistic infection subsequent to bone loss caused by other etiological factors27 such as a provoked foreign body reaction or iatrogenic dehiscence of the bone, exogenous irritants such as dental cement, bone loss through occlusal overload etc. If the latter is true then controlling the disease is theoretically made more simple by controlling the conditions for the implant, such as ensuring adequate buccal bone thickness, avoiding or controlling more carefully the use of dental cement, and paying closer attention to the occlusion.

In an effort to gauge the rate of mucositis and peri-implantitis requiring surgical intervention, the author audited his patient pool in the year 2014. Out of a total of 795 implants only 15 patients (7.9 per cent) required triple therapy at 20 implants (2.5 per cent) for mucositis while 10 patients (5.2 per cent) required surgical decontamination at 10 implants (1.3 per cent).

As can be seen this is well below the figures proposed in the article by Zitzmann & Berglundh (2005).25 This may of course reflect a more liberal approach to cut off values for parameters such as pocket depth and bleeding on probing as proposed Klinge in 2012.

Nonetheless after over 20 years running a practice dedicated to implant dentistry the author’s own audited failure rates indicate that less than 1 per cent of implants present as late failures, owing to peri-implantitis or fixture fracture as a result of bone loss. This would corroborate the findings by Jemt et al in which a cohort of patients already diagnosed with peri-implant bone loss showed a slow rate of additional progressive bone loss over a 9-year follow-up with an implant failure rate of 3 per cent.28

In all likelihood it is the author’s view that peri-implantitis is only a crisis if we allow bad implant dentistry to persist where there is a lack of control of the initiating factors as described above, and that it is more rather than less likely that it is the result of a secondary opportunistic infection rather than a direct susceptibility to primary infection of periodontopathic origin. However, there will clearly be some patients with a high genetic susceptibility with other predisposing factors such as the presence of untreated periodontal disease, smoking and diabetes who may well succumb as a result of primary infection.

Furthermore there remains a clear need to better define the different types of peri-implant disease and to establish a consensus as to the cut off values for the different parameters used to evaluate the disease so that future figures for incidence and prevalence are comparable.

Editorial note: A complete list of reference is available from the publisher.
All-ceramic restorations with IPS e.max

Minimally invasive methods to achieve harmony between pink and white aesthetics

By Dr Masayuki Okawa & Shigeo Kataoka, Japan

Minimally invasive restorations have long become a reality owing to the improvements in bonding materials and the enhanced strength of ceramic restoratives. However, a solid understanding of the materials’ properties and clinical steps is essential to be able to benefit from these advances. We believe that ineffective all-ceramic restorations can largely be attributed to human error caused by a lack of familiarity with the materials, as well as incorrect tooth preparation or bonding procedures. Five case studies will be presented in this article to demonstrate the flow of treatment from initial examination and diagnosis to final cementation.

In the first case, the patient’s teeth were badly stained (Fig. 1). Even after repeated whitening, the appearance was still not satisfactory. The patient finally presented to the practice with the wish to have his teeth restored with veneers.

A few years ago, all-ceramic crowns on metal or zirconia frameworks would have been the method of choice to treat such severely discoloured teeth. Now, we favour a minimally invasive approach with lithium disilicate (LS, IPS e.max Press, Ivoclar Vivadent). Given its high strength (400 MPa), this material is even suitable for veneers with a layer thickness of as little as 0.5 mm (Fig. 2). From a wide range of shades and different levels of translucency and opacity, users can select the ideal ingot for every patient situation. Other convincing features include high accuracy of fit and excellent aesthetics.

Harmony and beauty are inherent in natural teeth. As dentists, we must reproduce this effect with artificial materials. IPS e.max Press has enabled us to emulate the nuanced colour effects of natural teeth. The patient’s state of oral health is first assessed and the information gathered in the process forms the basis for the subsequent treatment planning. The key to success is to involve the dental laboratory at this stage already and to share the information gathered in the assessment process with the technician.

In addition to taking the usual oral and facial images, radiographs and impressions, we perform cephalometric analyses and jaw function tests, depending on the indication. In addition, we evaluate the aesthetic characteristics. By consulting the treatment partners, we seek to gather as much information as possible with the aim of using this data to prepare a treatment plan in which we consider not only the tooth to be restored, but also the overall balance between the facial configuration and oral cavity.

Staining technique vs cut-back technique

Although the staining technique has a favourable effect on strength, it places limits on the aesthetic design of the restoration. Whenever treating patients who require restorations in the anterior region, we prefer to use the refractory die method (IPS e.max Ceram, Ivoclar Vivadent) or the cut-back technique (IPS e.max Press). In the posterior region, however, we often opt for the staining technique. The result of a study conducted at New York University demonstrates the high strength of monolithic LS restorations manufactured in conjunction with the staining technique. Against such a background, we only occasionally use the layering or cut-back technique for full-crown restorations on anterior teeth. For this, communicating the refractory die method, we may opt for the staining technique.

Preparation

Minimising invasiveness is one of the goals of aesthetic dentistry. While the work of the dental technician may be supported by removing large amounts of tooth structure, this cannot be an acceptable reason for an unnecessarily high level of invasiveness. However, if a tooth has been prepared insufficiently, the technician may find it difficult to achieve an aesthetically satisfactory restoration in the correct shade.

Veneer restorations are incorporated by bonding the restoration material to the tooth structure using an adhesive technique. Although the materials for adhesive bonding have been improved to enhance the bond strength to dentine, the preparation borders should nonetheless be limited to the enamel to attain reliable adhesion. Generally, the shape of the preparation is designed in such a way that it takes both aesthetic and biomechanical aspects into account. For this purpose, a silicone key may be created on the basis of the diagnostic wax-up.

Indexing the tooth horizontally into three areas (cervical, coronal and incisal) allows the amount of tooth structure being removed during preparation to be checked. Additionally, a guide in the shape of the final tooth preparation may be used as a reference in complex micro-veneer preparations.

The preparation is performed under a microscope, resulting in clearly defined margins, thereby facilitating the work of the technician and enhancing the accuracy of fit.

Shade selection

Aesthetic restorations of discoloured teeth usually require the removal of larger amounts of tooth structure than usual. With the introduction of LS, however, we have been able to achieve shade adjustments with minimal reduction of tooth structure. For this, communicating the colour of the tooth preparation to the technician is essential. Photographs, shade tabs and digital shade-measuring devices are examples of instruments that can be used for shade communication. While shade-measuring devices are suitable for objective shade evaluations, they only provide information on a limited gamut of colours. They cannot convey subtle nuances. Photographs of the teeth with the shade tabs placed next to them are better suited to this purpose. Using tooth-coloured IPS Natural Die Material (Ivoclar Vivadent) is particularly useful for the fabrication of veneers on discoloured teeth.

Transparency— the key to aesthetic restorations

When restoring discoloured teeth, we tend to select an ingot with high opacity. However, using an opaque ingot entails the risk of obtaining...
In this way, shade interpretation can be required to control the base shade. Several tooth preparations showing inconsistent shades. A minute ingot even when working with excellent light-scattering properties, paste all restorations simultaneously shade of the veneers). Given its excellent light-scattering properties, IPS e.max Press allows users to fabricate all restorations simultaneously (Figs. 6–7c).

Accuracy of fit is one of the success factors for an aesthetic restoration. Since we started using IPS e.max Press, we have been able to try in the frameworks. This is not possible with veneers fabricated using the refractory die method. At the try-in, the shape, shade and marginal fit are checked. White wax is used to contour the planned tooth shape on the framework and then the restoration is inserted in the patient’s mouth for a try-in. Adjustments, such as modification of the crown length and shape, can now be applied.

Veneers may be tried in with try-in pastes. However, we use water for this purpose because it has a better fluidity. After a drop of water has been applied to the inside surface of the veneer, the veneer is placed on the tooth preparation (Fig. 5). This requires a meticulous working method under the microscope. At first, a white line appears between the preparation margin and the framework. If the marginal fit is accurate, the water penetrates and the line disappears.

Shade adjustment by layering

If several adjacent teeth had to be restored for different indications in the past, the restoration, allowing for little variation in shade, had to be fabricated first (e.g., veneers first and then crowns fabricated to match the shade of the veneers). Given its excellent light-scattering properties, IPS e.max Press allows users to fabricate all restorations simultaneously (Figs. 6–7).

We try not to change the shade of the ingot even when working with several tooth preparations showing inconsistent shades. A minute change in thickness is all that is required to control the base shade. In this way, shade interpretation can be simplified for shade adaptation by layering. One of the characteristics of the IPS e.max LS ceramic is that it maintains its translucency.

If all of the teeth were reduced by the same amount of tooth structure, it would remain challenging to match the shade of the restorations that require varying build-up layer thicknesses. If the thickness of the frameworks has been maintained to match the shade by means of the framework, the amount of layering ceramic must be reduced accordingly. In this case, the luster of the dentine may be increased by using bleaching shades, and saturation may be intensified by internal staining. This method is often applied in adjacent teeth where one is vital and the other is non-vital.

Often, preparations with varying amounts of removed tooth structure also show inconsistent layering thicknesses. As a result, shade matching becomes more difficult. Since IPS e.max Press is available in several levels of brightness, translucency and intensity, a satisfactory result can be achieved in such challenging situations by selecting an appropriate ingot and combining it with IPS e.max Ceram.

Cementation

Adhesive bonding is essential to minimally invasive dentistry. In veneers in particular, adhesion by bonding plays a more important role than does mechanical retention. If a veneer fails, it is often because a faulty bonding procedure has been applied.

Placing the temporary

A temporary restoration is not simply a short-term tooth replacement. It is a therapeutic step that requires full attention. We use a transparent luting composite (Telio CS Link, Ivoclar Vivadent), which exhibits a high degree of shade stability. The sequence of steps is as follows: placement of retraction cord, cleaning of the inner restoration surface with Ivoclean (Ivoclar Vivadent), air-drying the lingual side of the restoration, application of a thin layer of luting composite (Telio CS Link, Ivoclar Vivadent), and cementation of the temporary. The restorations can now be seated (Fig. 12).

Completed veneer restoration.

The tooth is cleaned thoroughly to create a clean environment. Fluoride-free and peroxide-free cleaning procedures using a soft brush are suitable for this step (Fig. 11).

Cementing the final restorations

For the cementation of the veneers, we use the light-curing Vario-link Veneer composite (Ivoclar Vivadent), which exhibits a high degree of shade stability. The sequence of steps is as follows: placement of retraction cord, cleaning of the inner restoration surface with Ivoclean (Ivoclar Vivadent), air-drying the lingual side of the restoration, application of a thin layer of luting composite (Telio CS Link, Ivoclar Vivadent), and cementation of the temporary. The restorations can now be seated (Fig. 12).

It is important to use Liquid Strip (Ivoclar Vivadent) to prevent the formation of an oxygen-inhibited layer.

Discussion

IPS e.max Press LS, glass-ceramic is compatible with minimally invasive procedures. Until recently, aesthetic dentistry was associated with the reduction of healthy tooth structure. However, we would like to reverse this unfavourable image by pointing out that IPS e.max is a material that allows for minimally invasive methods to achieve aesthetic restorations.

Reference

S. Gues et al. 2010

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Radicular cysts are the most common (52–68 per cent) cystic lesions affecting the jaw. They are commonly found at the apices of involved teeth and sometimes lateral to accessory root canals. They are a direct sequel of chronic periapical infection. Most of them are asymptomatic and are discovered when periapical radiographs are taken of teeth with non-vital pulps. Patients often complain of slowly enlarging swellings. Radiographically, most radicular cysts appear as round or pear-shaped unilocular radiolucent lesions in the periapical region. The cyst may displace adjacent teeth or cause mild root resorption.

The following case report presents the successful treatment of radicular cysts using autologous periosteum and platelet-rich fibrin (PRF) with demineralised freeze-dried bone allograft (DFDBA).

Case Report

A 17-year-old female patient reported to the Department of Periodontics, HKE’S S. Nijalingappa Institute of Dental Sciences and Research, Gulbarga, India, with a chief complaint of pain, swelling ongoing and pus discharge in the lower anterior region since two months. Past history revealed trauma in the lower anterior region five years ago with recurrent swelling and pus discharge.

On intraoral examination, inflamed and swollen gingiva was seen in relation to 41, 42, and 43 (FDI notation). A draining fistula was seen on the labial aspect in relation to 41 (Fig. 1). 42 had grade I mobility, whereas no mobility was noticed with 31, 41, and 43. A pulp vitality test was negative with 41, 42, and 43. While adjacent teeth showed normal response. Periodontal probing depth was ≤ 3 mm for concerned teeth, and no clinical attachment loss was seen. They were also painless on vertical percussion. On radiographic examination, two radiolucent areas of size approximately 2 x 2 mm were seen in relation to 41, 42, and 43 (Fig. 2). No root resorption was seen.

The treatment plan comprised of endodontic treatment of non-vital teeth followed by surgical enucleation of cystic lesions if necessary. The treatment plan was explained to the patient, and a written informed consent was obtained. In the same visit, root canal treatment was started under rubber dam application followed by working length determination. After complete biomechanical preparation, two per cent chlorhexidine gluconate was used as an irrigant and intracanal medicament. In the subsequent visits, root canal treatment was completed. Persistent pus discharge was observed at three months after endodontic treatment, and surgical enucleation was planned.

The procedure was as follows: local anaesthesia was administered, curettages incisions were given, and a full thickness mucoperiosteal flap from 41 to 43 and a split thickness flap in regio 31 and 32 were reflected. The area was degranulated revealing two small perforations of the buccal cortical plate in the regions of 41 to 43 and 1 x 1 x 1 mm. The remaining buccal cortical covering was carefully removed with rotary and hand instruments to expose the rest of the lesions of size 3 x 2 x 2 mm. Fragmented pieces of the lesion were freed from the bone, and a complete curettage of the cystic lesions was done (Fig. 3). The cystic cavities were thoroughly irrigated, and a root biomodification of involved teeth was done using tetacycline. DFDBA was mixed with sterile saline solution and grafted in an attempt to close the defect via osteoconduction. (Fig. 4) Autologous healthy periosteum was harvested from regio 31–33 (Fig. 5), and PRF was prepared from the patient’s blood, as described by Choukroun et al. The lesion was covered with periosteum, over which PRF was placed as a second layer of barrier membrane covering the graft (Figs. 6 & 7).

The flap was coronally advanced and closed with interrupted sutures using 3-0 black braided silk (Fig. 8). A periodontal dressing was applied at the surgical site. The patient was prescribed amoxicillin 500 mg TID and diclofenac sodium 50 mg TID both for 5 days with 0.12 per cent chlorhexidine gluconate rinse BD for seven days. The patient was asked to report after a week for suture removal, and the curedt tissue was submitted for histopathological examination. The patient returned for the post-operative visit, and the healing was uneventful.

Histopathology revealed the presence of a varying thickness of epithelium with fibrocellular connective stroma. The epithelium was disrupted with infiltration of chronic inflammatory cells along with vacuolations within the epithelium. The connective tissue showed dense infiltration of lymphocytes and plasma cells with few macrophages (Fig. 9). A diagnosis of radicular cyst was given. The patient was followed up for nine months. A radiograph at six months shows a healing lesion (Fig. 10). A subsequent radiograph nine months after operation (Fig. 11) reveals increased radiopacity where the bone graft was placed, and no evidence of recurrence of the lesion was seen (Fig. 12).

Discussion

A radicular cyst is an odontogenic cyst of inflammatory origin preceded by a chronic perapical granuloma and stimulation of cell rests of Malassez found in the periodontal membrane. The pathogenesis of radicular cysts comprises of three distinct phases: the phase of initiation, the phase of cyst formation, and the phase of enlargement. The initial swellings of these radicular cysts are usually bony hard, but as they increase in
“...in large or non-healing lesions, the endodontic treatment alone is not efficient...”

dentinal tubules. As an irrigant, it is especially in endodontic retreatment. As a medicament, it is more effective and is known to contain fibroblasts, osteoblasts, and stem cells. Skoog subsequently introduced the use of peristomal flaps for closure of maxillary cleft defects in humans, he reported the presence of new bone in cleft defects within 3–6 months following surgery. Furthermore, animal studies have reported heterotopic ossification in different or- "...in large or non-healing lesions, the endodontic treatment alone is not efficient..." 10.1155/2013/893791

**Conclusion**

To conclude, a radicular cyst is a common condition found in the oral cavity. It usually goes unnoticed and rarely exceeds the palpable dimension. This case report illustrates the successful management of a radicular cyst with enucleation and endodontic treatment.

The use of autologous periosteum and PRF has a promising future in periodontal regeneration.

**Editorial notes:** A list of references is available at the publishers. The authors declare that they have no conflict of interest. This article was first published in Case Reports in Dentistry, vol. 2013, Article ID 893791, 5 pages, 2013. doi: 10.1155/2013/893791.
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