Study finds DNA vaccine to inhibit caries formation

Daniel Zimmermann
DTI

HONG KONG/LEIPZIG, Germany: A research group from the Chinese Academy of Sciences in Beijing has reported a vaccine containing genetically modified DNA to be effective in preventing tooth decay in animals. By injecting lab rats with a protein derived from the Salmonella bacterium, they found evidence that it promoted the formation of antibody molecules that have the potential to inhibit the colonization of Streptococcus mutans and the development of caries lesions.

Being a relatively new concept, nucleic acid vaccines have been under examination for their use in forming antibodies against a number of diseases and systemic conditions including cancer. It’s potential influence the formation of caries lesions was first examined by scientists almost 30 years ago. The new results build on previous research from the Beijing research group with the so-called pGJA/VAX vaccine and are the most convincing so far in having found an effective mucosal adjuvant candidate for intranasal immunization of an anti-caries vaccine, the authors said.

The admitted low immunogenicity which is the ability to provoke an immune response is still relatively low in the vaccine.

"Animal experimentation with this vaccine and route of administration have been reported over the past several years, "explains Dr Daniel Smith, an immunology specialist and member of the Forsyth Institute in the US, to DT Asia Pacific. "The new feature here is the use of flagellin as an adjuvant which seems to give a modest improvement in antibody levels."

Other substances currently in pre-clinical experimentation for use as a caries vaccine are other recombinant proteins and glucan-protein conjugates. According to Smith, human trials however cannot be expected to be realised anytime soon.

Better oral health for Vietnam

The Vietnamese government is doing well in its efforts to improve the oral health of schoolchildren, Minister of Health Nguyen Thi Kim Tien has said. Speaking at the Sixth Asian Conference on Oral Health Promotion for School Children last month in Hanoi, she revealed that 10 million school children are now receiving regular dental care through the country’s national oral health programme.

According to results of the last National Oral Health Survey conducted in 2001, more than 85 per cent of six-year-olds in the country suffer from tooth decay. Tien said that although the programme has achieved good results, still only 5 per cent of hospitals nationwide offer dental services.

India’s largest provider of health care clinics and services has agreed to pay more than half a billion US Dollar to buy Singapore-based Fortis Healthcare International PTE from RHC in Mauritius. The record deal is expected to be completed by mid-December depending on regulatory approval.

Human jaw shrinks with age

The size of the human jaw decreases with age, research conducted at the Malmö University Faculty of Dentistry in Sweden has found. According to study, which followed 50 participants over a timespan of 40 years, less room was available for teeth in the jaw of each individual with increasing age.

Fortis buys Singapore unit

India's largest provider of health care clinics and services has agreed to pay more than half a billion US Dollar to buy Singapore-based Fortis Healthcare International PTE from RHC in Mauritius. The record deal is expected to be completed by mid-December depending on regulatory approval.

Taiwan implants receive recognition

Dental implant maker Hung Chun Bio-S from Southern Taiwan has been given a product award for its Y-one 101 implants by the Institute for Biotechnology and Medicine Industry at the recent National Innovation Awards in Taipei.

Operating from Taiwan’s major port city Kaohsiung, Hung Chun Bio-S has been active in the national and international implant markets since early 2011. Director of Research and Development Lui Ching-Chin told reporters at the company, which invested US$10 million in its implant portfolio, has gained a five per cent market share within the last 11 months.

Taiwan’s US$50 million dental implant market is still dominated by companies from Europe, Korea and the US. In 2008, for example, Nobel Biocare entered the market with the acquisition of its Taipei-based distributor Implant Master. National industry sources estimate that the number of implants placed is growing by almost 20 per cent each year.

Besides Hung Chun Bio-S, local competition includes bio-ceramics manufacturer Coho Technology in Taoyuan.

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Ad
Disagreement brews over use of botox in Australian dentistry

From news reports

MELBOURNE, Australia: The use of botulinum toxin (botox) in dentistry is causing debate amongst the dental community in Australia. The discussion came to a head recently after the Australian Academy of Dento-Facial Aesthetics (AADFA) issued a letter to the Dental Board of Australia (DBA), the government agency that oversees standards, registration and training in dentistry, requesting the retraction of an interim policy that allows only dentists trained in the treatment of TMJ disorders to administer the toxic protein.

Put in place originally in November 2010, this policy also announced the review of the use of botox in dentistry but has not introduced any changes thus far. In a public letter, the DBA’s chairperson John Lockwood, however, said that the Board is currently working on establishing a panel of national experts who will review several policies, including those on the possession, administration, supply and prescription of restricted drugs such as dermal fillers or botox.

Dr Myles Holt, head of the AADFA, a private organisation of dentists that promotes facial injectable treatments throughout Australasia, said that the current guidelines are causing confusion amongst dentists and should therefore be retracted in order to make way for a better regulatory framework. He blamed the DBA for having set up its policy without the proper research or scientific consultation.

Based in Melbourne, the AADFA claims to have trained more than 150 dentists in Australia and New Zealand in facial aesthetic treatment since 2009. On its website, the Australian Dental Association confirmed that it has received some enquiries by dentists requesting clarity on the issue and advises its members to comply with the current DBA guidelines.

Cosmetic dentistry procedures like tooth whitening, veneers or invisible braces have become a thriving business in Australia, with clinics specialising in aesthetic procedures reporting an increase in patients of up to 60 per cent in recent years. According to the latest figures from the Cosmetic Physicians Society of Australasia, Australians are also currently spending more than AUS$500 million (US$282 million) on non-invasive cosmetic procedures, with botox being the most requested in 91 per cent of clinics.

The use of botox and dermal fillers by dentists is currently allowed in some countries in Asia, as well as the USA and Europe.
Dental students in New Zealand borrow most, pay back early

Although in the group with the highest loans, medical and dental graduates are usually the ones who are able to pay back their loans quickly, Joyce commented. He said that almost one million students have received money from the government since the implementation of the scheme in 1992. The total amount of debt currently exceeds NZ$600 million (US$488 million), almost 0.5 per cent of the country’s gross domestic product.

Joyce announced initiatives to amend the scheme in order to reduce the amount of debt of groups who owe the ministry the most, especially those living overseas. The loan amount of borrowers there has increased by 27 per cent within the last 12 months. Legal action will be also taken against some borrowers living in Australia and the UK who have not made any effort to pay back their dues, he said.

With NZ$80,000 (US$65,000), dentistry tops the list of occupations with the highest average starting salaries, according to latest figures from Careers New Zealand, a government agency based in Wellington. This amount can almost double within five years of practice to NZ$150,000 (US$121,900).

Singapore pushes dentistry

From news reports

SINGAPORE: Singapore’s new Minister for Health Gan Kim Yong has announced further investment into the city-state’s dental infrastructure. Speaking at this year’s Dentist’s Pledge Affirmation Ceremony of the Singapore Dental Council, he said that his ministry will look into the possibility of enhancing its capacity to better support dental research and training. As a first step, the annual intake of students at the National University of Singapore’s Faculty of Dentistry will be raised from 48 to 80 by the year 2020.

During his speech, Yong pointed to the Primary Care Partnership Scheme, which was recently expanded and now subsidizes tertiary dental procedures like crowns and root canal treatment in private practices for an estimated additional 700,000 Singaporeans. He said that a working group has also been established to strategise the development and implementation of a new specialty, including geriatric and special needs dentistry, a field of care that according to him needs development owing to the city-state’s rapidly ageing population.

Earlier this month, the ministry announced an initiative to encourage private practices to publish their average fees for several kinds of dental treatment, a practice the ministry has followed for fees charged by public institutions for years.

Yong, who is a member of the governing People’s Action Party, took over office after the general elections from long-term Minister for Health Khaw Boon Wan, who is currently serving as the country’s Minister for National Development. After he was sworn in, Yong launched a campaign for reviewing the physical capacities of the ministry, amongst other issues.
Dear reader,

Daniel Zimmermann
Group Editor
Dental Tribune International

Last year one of these pages I already talked much about Asia’s prospects in dentistry. Looking back at the last 12 months, nothing could be more relevant today. With debts soaring and markets plunging in almost all developed markets, established systems of social and health care are getting under increasing financial stress. This development will have an effect not only on many people but also on the industry, which is already looking at the Far East for profits.

With the majority being only at the beginning of their development cycle, however, Asian countries should carefully watch the crisis that is currently unfolding in the West in order to avoid repeating the same mistakes. There is no doubt that growth is important for the survival of every society but it also has become quite clear that uncontrolled distribution of resources and welfare only leads to turmoil. Asians should be aware that all our future will depend much on how seriously they are willing to take these principles.

With this in mind, the Asia Pacific editorial team wishes you a happy and successful year 2012.

Yours sincerely,
Daniel Zimmermann
Group Editor
Dental Tribune International

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Use of botox is a medical procedure

Prof Laurence J. Walsh

The use of botox to treating TMJ dysfunction and spasms in the muscles of mastication is a well-accepted part of clinical practice, particularly for oral and maxillo-facial surgeons, with a growing evidence base supporting safety and efficacy. Severe bruxism or jaw-closing dystonia unresponsive to other treatments can be treated by injecting Botox-A into the masseter muscles.

The Dental Board of Australia’s interim policy on the use of botox permits the use of botulinum toxin by registered dentists with the necessary education, training and competence for the treatment of TMJ disorder or dysfunction. A general dentist is not sufficiently conversant with the indications for using Botox-A to treat wrinkles as opposed to other skin treatments such as laser resurfacing, dermabrasion or Retin-A therapy.

The arguments against allowing use of botox for wrinkle reduction and other cosmetic treatments are threefold. Firstly, the principles of pharmacology that underpin the use of botox are covered in dentistry programmes at a very basic level, which is not a sufficient foundation for clinical use because of the lack of detailed pharmacology and therapeutics (doses, side-effects, etc.). Secondly, the detailed anatomy of the mid-face, orbit, upper face and neck is not covered in dental training at a level sufficient for the safe use of botox. The fact that we as dentists are experienced at administering injections of local anaesthetic solutions into the oral and peri-oral regions does not mean it is appropriate for dentists to inject botox across the neck and face. Finally, the use of botox for cosmetic purposes is part of cosmetic medicine (or beauty therapy) and does not form part of the practice of dentistry. Its use for cosmetic purposes should be confined to appropriately trained medical practitioners, and should be considered a medical procedure.

Contact Info
Prof. Laurence J. Walsh is head of the University of Queensland School of Dentistry in Brisbane, Australia. He can be contacted at l.walsh@uq.edu.au.

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Myth or reality?

Dental caries is one of the most common infectious and non-life-threatening diseases known to affect us. It also appears to be a major public health problem, which if left untreated can cause considerable pain and discomfort, as well as require huge amounts of money and time to treat. The WHO has estimated that more than five billion people have suffered from tooth decay.

There are various preventive measures for dental caries, of which immunisation is one. The vaccination can be given subcutaneously, orally, or intranasally by activating gut or nasal lymphoid tissues.

Over the last four decades, many successful animal experiments have been conducted on mice, rats and monkeys for effective immunisation against antigenic components of S. mutans or S. sobrinus in dental plaque. Despite the scientific evidence, no dental caries vaccine for humans exists today, primarily because paediatric vaccine approval boards are reluctant to add such a vaccine for a normally non-life-threatening disease to their catalogues. Another reason is strong economic interests that hinder the development of such a vaccine for release onto the market.

Contact Info
Dr KM Shivkumar is associate professor at the Department of Public Health Dentistry, Shard Pawar Dental College & Hospital, Datta Meghe Institute of Medical Sciences University, Sawanji, India. He can be contacted at kmshivkumar@rediffmail.com.
New study targets dental drills for hearing loss

Daniel Zimmermann

An audiology student who is investigating the effects of noise from dental drills on dentists has won a National Hearing Conservation Association 2011/2012 research award. In her study, Krisztina Busci Johnson from the East Tennessee State University in Johnson City seeks to determine whether rotating instruments used in dentistry take their toll on dentists’ hearing function.

Johnson is not the first scientist to look into a possible connection between dental drills and hearing loss in dental professionals. Research on this topic dates back to the early 1980s, when a study published by the “American Journal of Public Health” found a cause and effect relationship between hearing loss and the use of the high-speed dental handpieces.

Results, however, remain inconclusive, as a recent study conducted by the Institute for Evaluation in Cologne in Germany found that noise from rotating instruments did not go beyond 85 to 90 decibels, the limit commonly associated with permanent inner ear damage. This level of noise is typically created by subway trains driving at high speeds or heavy traffic.

Being a dental assistant for eight years herself, Johnson intends to measure and compare data on the hearing threshold of dentists drilling without hearing protection over a period of a working day. She is currently seeking participants in the Johnson City area, who will also receive a free clinical hearing evaluation during the process. If successful, she hopes to be able to persuade dentists to use better hearing protection and to widen the study to including dental assistants or hygienists.

“Another possibility is that the data could persuade dental drill manufacturers to produce drills that are safer for the human ear,” she said.

Manufacturers of modern dental drills usually do not recommend using ear protection during operations, saying that the technology has become quieter over the years and their running time has significantly decreased. According to the NHCA, a second research award went to a University of Florida research assistant who is investigating hearing threshold changes induced by digital audio players.

The annual trophy comes with prize money of $5,000.

2012 WDF to be held in Hong Kong

BELLEVUE, Wash., USA: Modern Dental Laboratories has announced that registration for its second World Dental Forum in Hong Kong in 2012 is now open to dentists in the United States. The event will be held in conjunction with the centennial anniversary of the University of Hong Kong and feature educational offerings in English ranging from subjects like dental restorations to endodontics, implant dentistry or sleep medicine.

With its Shenzhen dental lab north of Hong Kong, Modern Dental Laboratory says to be one of the largest global providers of ISO 13485:2003 certified dental work. It also maintains one of the largest dental technology schools worldwide with a staff of 3,000.

The company’s first congress was held in fall 2009 and saw more than 200 dentists from Europe, North America and Asia learning and discussing new trends in the global dental industry. Next year’s event has confirmed presentations from US dental researchers Drs John Burgess and Jack Ferracane and will be held at the Grand Hyatt hotel from 31 May to 3 June.

Participants will be also able to earn up to 16 AGD approved CE credit hours, the company said.
A durian a day keeps caries away, research from Asia suggests

From news reports

LAS VEGAS, Nev., USA: A sugary gel covering the thorn-covered husks of the durian fruit is currently being investigated by researchers for its potential as a mouth disinfectant. Students from the Faculty of Dentistry at the Chulalongkorn University in Bangkok, Thailand, recently presented their initial findings at the Annual Meeting of the American Dental Association in Las Vegas, the website drbiscus.com has reported.

They found that the substance made of polysaccharides was able to reduce the number of Streptococcus mutans bacteria in lab rats hours after use, which would make it as effective as 0.2 % chlorhexidine, a common formula used in mouth rinses. Studies on human subjects also showed a reduction of hydrogen sulphide, methyl mercaptan, and dimethyl sulphide, compounds responsible for halitosis or bad breath. No evidence of treatment-related gross toxicity or deaths caused by exposure to mouth rinsing with durian polysaccharide gel was observed, the researchers stated.

Durian is popular in many Southeast Asian countries, including Thailand and Malaysia, which are the world’s largest importers of the fruit. Its roots and leaves are often used in traditional medicine.

Earlier research conducted on durian polysaccharide gel confirmed the antibacterial properties of the gel.

Caries investigated by nanotech

From news reports

BASEL/VILLIGEN, Switzerland: Researchers at the University of Basel and the Paul Scherrer Institute, the largest research centre for natural and engineering sciences within Switzerland, have successfully demonstrated how caries affects human teeth at a nano-level. Their study offers new possibilities for the treatment of tooth damage.

Dentine consists mainly of inorganic elements but a fifth is composed of organic material. It was previously hypothesised that these organic components—especially certain endogenous structural proteins (collagen)—were unaffected by damage to the dentine and that their structure could offer a basis for remineralisation. To test this hypothesis, the research team, led by Prof. Bert Müller at the Biomaterials Science Center at the University of Basel, used X-ray scattering to compare the density of collagen in healthy and carious tooth spots.

The researchers cut both healthy and carious teeth into thin slices of 0.2 to 0.5 mm and examined them using small-angle X-ray scattering, a technique used for the structural characterisation of solid and fluid materials in the nanometre range.

They observed that carious bacteria initially destroy the ceramic components of the outer enamel and the subjacent dentine. In contrast, in the early to mid-caries state, a significant part of the dentinal collagen network remains practically unaffected.

Hence, the researchers suggest that in the future their method will allow the development of biometric dental fillings and cavity treatments that are based on an undamaged dentinal collagen network, and allow the remineralisation of damaged dentine, for example, with nanoparticles.

www.cavex.nl
Forsyth starts commercialization of blue light gum treatment technology

From news reports

BOSTON, Mass., USA: The Forsyth Institute in Boston has signed an exclusive licensing agreement with a US-based start-up for the commercialisation of a recently patented blue light based technology for use in dentistry. Under the terms of the contract, Lexington-based PhotOral will be allowed to support the development and marketing of an intraoral cleaning system working against bacteria that cause gingivitis.

The promising technology was developed and first documented by Forsyth researchers Nikos Soukos and Max Goodson. They found that light with a particular wavelength, typically used in teeth whitening procedures, did also eradicate so-called “black-pigmented bacteria” that are responsible for the inflammation of gum tissue. In addition, their study showed that the proportion of other healthy bacteria increased.

“This suggests that it might one day be feasible to use light to restore a healthy bacterial balance in the mouth,” Soukos told the university paper Harvard Gazette in 2005.

According to PhotOral CEO Stamatis Astra, a Boston University business graduate and radio talk show host, a prototype of the device is expected to be available within the next 12 to 18 months. He said that it will be targeted at the consumer market and be priced at US$90 dollars. His company would now be in the process of raising a sum of US$10 million for financing first clinical trials, production and marketing.

Astra told the New England technology journal Mass High Tech that the technology could also be used in the future to disinfecting wounds.

Birth after oral cancer treatment

Lisa Townshend
DT UK

LEAMINGTON SPA, UK: A British mother has made medical history after successfully giving birth having had chemotherapy cancer treatment during her pregnancy. Thirty-year-old mum-to-be Sarah Best from Leamington Spa was diagnosed with mouth cancer when she was four months pregnant and was told that if she did not opt to have radiotherapy the cancer was sure to spread.

As Best underwent radiotherapy and chemotherapy treatment to treat the mouth cancer, two five-cm thick lead shields were used to protect baby Jake from the radio waves. Best unexpectedly gave birth to a healthy baby boy just hours after receiving her last course of radiotherapy.

“I was devastated when I was told I had cancer,” Best, who had an operation to remove a tumour from her tongue, was quoted saying in The Telegraph. “The surgeons managed to remove most of it but they said they saw specks of cancer cells on my lymph nodes. I thought pregnancy was supposed to be the happiest time. You are supposed to feel wonderful. I was really worried about the effect the radiotherapy could have on the baby but the doctors said the lead shield would protect him.”

Best said she was expecting to have Jake at least a month after her treatment ended but suddenly went into labour on the last day of her treatment.

Meanwhile, she has been given the all clear from cancer. Consultant oncologist Lydia Fresco, who helped design and build the lead guard for Sarah, said in The Telegraph: “Sarah’s case was extremely rare. As far as published cases go she was the only woman with mouth cancer in the world to have this combination of chemotherapy and radiotherapy while pregnant.”

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The 2011 FDI Annual World Dental Congress in figures

With entry free-of-charge, just under 500 square metres of exhibition space, some 27,000 visitors, 200 exhibitors and nearly 1,000 exhibition staff, 2011 proved to be the largest FDI World Dental Exhibition in recent years. Jointly organized by FDI and the Mexican Dental Industry (AMID), it was held alongside the 2011 FDI Annual World Dental Congress at the Centro Banamex Convention Centre, Mexico City, from 14–17 September 2011.

Over 5,000 individuals, principally dental practitioners, but also hygienists and students, participated in the sessions and meetings scheduled in and around the event. The four-day Scientific Programme, held under the theme ‘New horizons in oral health care’, featured 112 scientific sessions facilitated by more than 128 speakers from 20 different countries.

Sessions covered a wide range of issues, from oral health and noncommunicable diseases to caries management, from patient safety to salivary diagnostics and from oral and maxillofacial surgery to orthodontics—in fact full coverage of the today’s key areas of interest and discussion in dental art, science and practice.

In addition, 121 scientific posters were on display and 59 free communications were presented. The three winners of the 2011 FDI Poster Award Competitions were announced during the VIP reception on 14 September. They are Assoc. Prof. Josimert Helling from Brazil, Assoc. Prof. Aziza Eldarief from the United Arab Emirates and Prof. Hyun-Duck Kim from South Korea.

In all, 98 nationalities were represented at the 2011 FDI Annual World Dental Congress.

FDI Hong Kong 2012 briefing

“We outlined our plans for new sessions and products envisaged for the 2012 Congress and feedback was very positive,’ said FDI Executive Director Jean-Luc Eisele. “I really picked up on an interest and willingness to invest in the event.”

“Success, as they say, is measured by attention to detail and understanding needs and expectations,” added Dr Eisele. “And that is exactly the approach FDI plans to adopt for the AWDC 2012.”

Meanwhile, the Congress website will soon be open, with a preliminary programme online by the end of November.

FDI President: high-level meetings on India visit

On his first official visit—at the invitation of one of FDI’s members and valued partner in ‘Leading the world to optimal oral health, the Indian Dental Association (IDA)—FDI President Orlando Monteiro da Silva addressed local events, consolidated links with regional branches of IDA and held high-level meetings with government officials.

The trip took in three of the country’s major cities. His first stop, 23 September, was in Chennai, where he addressed a vast audience of dentists and dental students at the opening ceremony of a ‘Dental-medical interaction Symposium’, organized by IDA’s Greater Chennai Branch and the Sri Ramachandra University.

IDA President Dr George Thomas was present as guest of honour. Other dignitaries present included Dr Gunaseelan Rajan and Dr S. Murukesan, respectively President and Hon. Secretary of the IDA-Greater Chennai Branch, and Dr R. Suresh, Dean of the Dental Faculty Sri Ramachandra University. The visit included a view of the University’s medical, pharmaceutical and nurse training facilities.

The following day, Dr da Silva was in Kolkata, where he briefed a highly receptive audience, among them Mr Subir Bandopadhay, Minister of State (Health), on FDI advocacy and activities in the field of noncommunicable diseases. As well as IDA representatives, the audience comprised government officials from all over India, members of the Indian Dental Council, notably IDC President Dr Dhyendu Marumber and Vice-president Dr Mahesh Verma, and faculty from a number of universities.

Mumbai, 25 September, was Dr da Silva’s last port of call. There he once again had the opportunity of carrying out a presentation of FDI and outlining its vision and activities to members of the local chapter of IDA, officials from the regional government, and deans from local universities.

During the course of Dr da Silva’s visit, IDA officials expressed their keen support for FDI to launch a Continuing Education Accreditation System and outlined their intention of presenting a specific proposal.

Commented Dr da Silva on his return, “I was genuinely moved by the warm reception I received everywhere I travelled and by the enthusiasm of IDA, local politicians and academicians on FDI’s work and what it is trying to achieve.”

“More specifically, I received very clear signals from a major FDI contributor: we really need to move forward on continuing education.”
Oral diseases are obstacles to development, says UNDP

The Administrator of the United Nations Development Programme, Helen Clark, has called oral diseases “obstacles to development.”

In her address, “Intersectoral Collaboration to Advance Social Economic Development and Achievement of the Millennium Development Goals,” she highlighted the development impact of oral diseases.

“Low and middle income countries face variably alarmingly high and/or rapidly increasing rates of oral diseases, including tooth decay, cancers, and Noma. These challenges can be exacerbated by weak health system capacity, and by a lack of focus on oral health—despite its importance for sustaining overall health.”

“The result,” said Ms Clark, “is unnecessary death and disability on a large scale from oral diseases.”

FDI omnipresent during United Nations Summit

FDI was omnipresent in New York during the two-day United Nations Summit on noncommunicable diseases both to attend the Summit and to promote and disseminate the newly-published World Health Partnership Alliance WHPA Action Toolkit.

FDI President Dr Orlando Monteiro da Silva and Executive Director Jean-Luc Eiselé attended the Summit to hear presentations from ministers of health and a number of international dignitaries, including WHO Director General Dr Margaret Chan.

She called the Summit “a wake up call for governments” and cautioned that NCDs “are the diseases that break the bank” which, left unchecked, “have the capacity to devour the benefits of economic gains” delivering “a two-punch blow to development.”

FDI + NDAs = success at UN Summit

FDI’s bid for oral diseases to be mentioned specifically in the Declaration from the United Nations Summit on noncommunicable Diseases has been crowned with success.

Thanks to its own lobbying and direct action by FDI member national dental associations (NDAs), as well as to the sustained efforts of a number of other governmental and non-governmental stakeholders, the Declaration’s Article 19 now recognizes that “renal, oral and eye diseases pose a major health burden for many countries and that these diseases share common risk factors and can benefit from common responses to noncommunicable diseases.”

This reflects a view that FDI has long expressed. Yet, in early July, FDI had to admit in a letter to its NDAs that “the feedback we have received indicates that, at this point, oral health still has little support and is unlikely to figure in the Final Declaration unless at the specific request of member governments.”

This was despite two interventions, the first at the World Health Assembly in Geneva on 21 May, the second, by Executive Director Jean-Luc Eiselé, at a UN Civil Society Hearing on NCDs held in New York on 16 June.

In the wake of this, FDI sent its landmark “Write to your Minister” email to its NDAs on 5 July, encouraging them, first, to make sure their head of government or state would be attending the Summit and, second, to make contact with their Health Minister, Chief Dental Officer and, possibly, public health authorities “to alert them to the fact that oral health is not included in the ‘Draft outcome document’.”

It attached a special advisory document on the main points to raise as well as a template letter, based on a model from the American Dental Association, to provide an opener for face-to-face dialogue.

FDI followed this up on 10 August with a direct appeal to UN General Assembly Chair, H.E. Joseph Deiss, with copy to Sir George Alleyne, former PAHO Director General and chairman of the drafting committee for the outcome document, indicating specific changes FDI was requesting.

Commenting FDI’s successful campaign, FDI President Orlando Monteiro da Silva said “We could never have achieved our goals without the timely action of some NDAs who took our advice and alerted their health authorities.”

This whole NCD campaign illustrates the very real strengths of FDI as an international Federation working directly through its member organizations to advocate health policy and getting the results it wants!”


FDI World Dental Federation
(Communication Manager)
Tour de Cointrin, Avenue Louis Casaï 84,
1205 Geneva – Switzerland
Phone: +41 22 300 84 50
Fax: +41 22 300 84 98
E-mail: media@fdiworldental.org
Web site: www.fdiworldental.org

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Implants for a neglected clinical situation

An interview with Dr Anders Holmén, Astra Tech

The Swedish implant manufacturer Astra Tech AB recently presented OsseoSpeed TX Profile, an implant for sloped ridge situations, at the annual congress of the European Association for Osseointegration in Athens, Greece. Dental Tribune Asia Pacific spoke with former dentist and Astra Tech Head of Product & Therapy Management, Dr Anders Holmén, about its indications, clinical benefits and why it is mainly targeted at experienced users.

DT Asia Pacific: After the Academy of Osseointegration congress in Washington, DC, in May, you presented the OsseoSpeed TX Profile implant at a major European implantology meeting for the first time. What has the feedback been from specialists so far?

Dr Anders Holmén: The EAO congress has always been a positive forum for Astra Tech AB to present new products with related concepts and the scientific background that is behind it. By exhibiting at congresses like the EAO you as a company also establish your presence and demonstrate your level of expertise. This year, we again have had an extremely good response from congress participants, including those who visited our EAO satellite symposium where they had the opportunity to discuss aspects of the new profile implant with various clinicians from the Europe and the US.

The new implant was designed for a specific clinical situation. How common is this problem in dental implantology?

I would say that sloped ridges are not so much a problematic but rather neglected clinical situation. We have noticed that implant cases where the alveolar ridge has a slope are quite frequent, and that regular implants with a flat profile do not offer good adaptation to this bone contour. When a flat implant is placed in line with the buccal aspect in such a case, then the lingual/palatal and proximal bone have no support and will eventually resorb and disappear. The risk for soft tissue dehiscence and compromised aesthetic results is a reality.

Another way to place a flat implant that supports all surrounding bone is to position it level with the lingual/palatal aspect of the bone. The disadvantage with this is the risk for discoloration of the buccal soft tissue owing to the implant sticking out of the buccal aspect of the bone. What we have done with the OsseoSpeed TX Profile implant is a very simple thing from a conceptual point of view. By giving the implant a sloped profile, in harmony with the bone profile, we are able to maintain the bone around the implant and provide support for long-term aesthetic results.

How many cases do you estimate could be treated with this kind of implant?

Initial calculations indicated that 5 to 10 per cent of clinical situations will be suitable for treatment with this implant. However, after the launch in March and looking at the experienced from our clinical research programme, we see the need becoming more frequent. Clinicians are also communicating that this is something they will use more often, so we foresee that in the future it will be used more commonly.
Acteon cancels seminar over floods

HONG KONG/LEIPZIG, Germany: Dental Tribune Asia Pacific has learned that Acteon has stopped organisation efforts for a seminar on bone management to be held in the capital of Thailand in early 2012. Owing to the floods that are still affecting Thailand's capital, a safe environment for holding such an event is compromised, the French dental manufacturer said in a statement.

The company has been doing business in Bangkok since 2004. Its current staff comprises 50 people. General Manager of Acteon Thailand and seminar project leader Junichi Wakabayashi said that participants who have completed the registration procedure for the seminar will receive a full refund of their registration fees. According to the latest figures from the Department of Disaster Prevention and Mitigation in Thailand, more than 500 people have died since the flooding began in July. The catastrophe could also have a severe impact on the country's already strained political and economic system, experts say.

Acteon had invited a number of international speakers, including renowned oral surgeon Dr. Fred Bergmann from Germany and Prof. Fumihiko Watanabe from the Nippon Dental University in Japan, to hold lectures and hands-on courses.

“As the Thai government is still very concerned about inhabitants' safety and of hygiene conditions, we do not want the attendees to take any risk,” International Marketing Director Robert P. Gregoire told Dental Tribune Asia Pacific. “Our priority is to support our Thai office and our personnel there to repair the damages and move on.”

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Do you have clinical results available to back up the new profile implant?

First results from studies were presented and discussed at the AO and the EAO meetings. We have one-year data available from implants placed in healed ridges and are about to start another trial looking at implants placed in extraction sockets. The scientific basis, however, for the Profile implant is the well documented Astra Tech BioManagement Complex which in total applies to this new evolution of our implant assortment.

The implant is mainly targeted at experienced users. What are the main challenges that come with this new profile?

There is definitely a learning curve attached to this implant and clinicians who want to use it have to have good diagnostic experience and be knowledgeable in implant surgical procedures. The problems here are that beginners might miss implant planning and performing correct dimension and direction of the drilling which does not necessarily result in severe complications but could mean negative feedback from the patient. It is easy to understand the concept but we have installed a process where our customers have to do some actual hands-on training to make sure that they understand the critical and important parts of the handling before doing the first clinical case.

The TX Profile has already gained market approval in the US and the EU. When will it be available in the rest of the world?

This is a global launch, so dentists in countries where we have distributors or own subsidiaries should be able to obtain this implant depending on the local regulatory processes.

The OsseoSpeed TX Profile will probably be a topic at your next World Congress in Gothenburg in May 2012. Apart from this, are there more products that you are currently working on?

With our implant system, we already have a scientifically supported solution that offers predictable long-term results. What we constantly do, nevertheless, is to try to identify those situations where we can improve on products and make it easier to work with for our customers. The new profile implant is a perfect example for existing scientific documentation to meet a clinical situation through a minor product modification. We certainly have more things in the pipeline and some of them will be discussed at our World Congress next year in May.

Thank you very much for this interview.

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Laser in endodontics (Part 1)

Prof. Giovanni Olivi et al.
Italy

One of the main goals of endodontic treatment is the effective cleaning of the root canal system. Traditional endodontic techniques use mechanical instruments, as well as ultrasonic and chemical irrigation to shape, clean and completely decontaminate the endodontic system.

The complexity of the root canal system is well known. Numerous lateral canals, of various dimensions and with multiple morphologies, branch off from the principal canals. A recent study found complex anatomical structures in 75% of the teeth analysed. The study also found residual infected pulp after the completion of chemo-mechanical preparation, both in the lateral canals and in the apical areas of vital and necrotic teeth associated with peri-radicular inflammation.

The effectiveness of the debridement, cleaning and decontamination of the intra-radicular space is limited, given the anatomical complexity and the inability of common irrigants to penetrate into the lateral canals and the apical ramifications. Therefore, it appears advisable to search for new materials, techniques and technologies that can improve the cleaning and decontamination of these anatomical areas.

The use of lasers in endodontics has been studied since the early 1970s, and lasers have been more widely used since the 1990s. In this article, Part I of this article will describe the evolution of laser techniques and technologies. The second part, which will be published in DT Asia Pacific 12/11, will present the state-of-the-art effectiveness of these instruments in the cleaning and decontamination of the endodontic system and take a look at the future, presenting recent preliminary studies on new methods of utilising laser energy.

Lasers in endodontics

Laser technology was introduced to endodontics with the goal radial and stripped tip in combination with EDTA irrigation results in effective debris and smear layer removal without any thermal damage to the organic dentinal structure. Electromagnetic spectrum of light and laser classification: Lasers are classified according to their location on the electromagnetic spectrum of light. They can be visible and invisible, near, medium and far infrared light. Owing to optical physics, the function of the various lasers in clinical use differs (Fig. 1). In the visible spectrum of light, the green light laser (KTP, a neodymium-duplex 532 nm) was introduced in dentistry in recent years. There have been few studies concerning this wave length. Its delivery through a flexible optical fibre of 200 µ allows its use in endodontics for canal decontamination and has shown positive results. Near infrared lasers (from 805 nm to 1,550 nm) were the first to be used for soft tissue decontamination. In particular, the Nd:YAG (1,064 nm), introduced at the beginning of the 1990s, delivers laser energy through an optical fibre. The medium infrared lasers, the erbium, chromium: YAG and Nd:YAG (810 nm and 1,064 nm), belong to the near infrared region of the electromagnetic spectrum of light. They interact primarily with soft tissue by diffusion (scattering). The Nd:YAG laser has a greater depth of penetration into soft tissues (up to 5 mm), while the diode laser is more superficial (up to 1 mm). The erbium:YAG and Nd:YAG lasers vapourise and affect these tissues thermally. The Erbium lasers (2,780 nm and 2,940 nm) belong to the medium infrared region and their beam is primarily absorbed superficially by soft tissue between 100 and 500 µ and up to 400 µ by the dentinal walls.

The chromophore target is water, which is why their use in dentistry extends from soft to hard tissue. Owing to the water content of the mucosa, gingiva, dentine and cavity tissue, Erbium lasers vapourise and affect these tissues thermally. The exploitation of the water molecules generates a photomechanical effect that contributes to the ablation and cleaning process (Fig. 2). Parameters that influence the end result of laser energy

Laser energy is emitted in different ways with various instruments depending on the power emitted in a continuous wave (CW mode). A mechanical interruption of the energy beam (properly called ‘gated’ or ‘chopped’ and improperly called ‘pulsed’), allows for better control of the thermal effect. The pulse duration and intervals are in milliseconds or microseconds (time on/off).

The Nd:YAG laser and the erbium fibres emit laser energy in a pulsed mode (also called ‘free-running pulse’), so that each pulse (or impulse) has a beginning time, increase and an end time, referred to as a Gaussian pulse. Between pulses, the laser remains off. The interaction of laser light and tissue occurs when there is optical affinity between them. This interaction is specific and selective based on absorption and diffusion. The less affinity, the more light will be reflected or transmitted (Fig. 2).

Reflection of light on tissue

The interaction of the laser beam on target tissue, via absorption or diffusion, creates biological effects responsible for therapeutic aspects that can be summarised as:

- photo-thermal effects;
- photochemical effects (this includes photoacoustic effects); and
- photomechanical effects.

The diode laser (from 800 nm to 1,064 nm) and the Nd:YAG (1,064 nm) belong to the near infrared region of the electromagnetic spectrum of light. They interact primarily with soft tissue by diffusion (scattering). The Nd:YAG laser has a greater depth of penetration into soft tissues (up to 5 mm), while the diode laser is more superficial (up to 1 mm). The erbium:YAG laser is statistically more effective and selective, with a greater affinity being absorbed by haemoglobin, oxyhaemoglobin and melanin, and has photo-thermal effects on tissue. Therefore, their use in dentistry is limited to the vapourisation and incision of soft tissue. They are also used for dental whitening with a laser beam, by thermal activation of the reagent. In endodontics, they currently represent the best system for decontamination, removing debris and infecting material from the dentinal walls (up to 750 µ with the 810 nm diode laser; up to 1 mm with the Nd:YAG) and for the affinity of these wavelengths with bacteria, destroying them through photo-thermal effects.
The Erbium lasers also work with an integrated water spray, which has the double function of both cleaning and cooling. In the pulse mode, a string of pulses is emitted with a different pulse repetition rate (improperly called the frequency) referred to as the Hertz rate (generally from 2 to 50 pulses) per second. The higher emission repetition rate acts in a similar way to the CW mode, while the lower repetition rate allows for a longer time for thermal relaxation. The emission frequency (pulse repetition rate) influences the average power emitted, according to the formula shown in Table I.

Another important parameter to consider is the shape of the pulse, which describes the efficiency and the dispersion of the ablative energy in the form of thermal energy. The length of the pulse, from microseconds to milliseconds, is responsible for the principal thermal effects. Shorter pulses, from a few microseconds to 100 nanoseconds, are responsible for photomechanical effects. The length of the pulse affects the peak power of each single pulse, according to the formula in Table I. Denta lasers available on the market today are free-running pulsed lasers, the Nd:YAG with pulses of 100 to 200 µs and the Erbium lasers with pulses of 50 to 1,000 µs. Furthermore, diode lasers emit energy in CW that can be mechanically interrupted to allow the emission of energy with pulse duration of milliseconds or microseconds depending on the laser model.

Effects of laser light on bacteria and dentinal walls

In endodontics, lasers use the photo-thermal and photomechanical effects resulting from the interaction of different wavelengths and different parameters on the target tissues. These are dentine, the smear layer, debris, residual pulp and bacteria in all their various aggregate forms.

Using various strengths, all the wavelengths destroy the cell wall owing to their photo-thermal effect. Owing to the structural characteristics of the different cell walls, gram-negative bacteria are more easily destroyed with less energy and radiation than gram-positive bacteria. The near infrared lasers are not absorbed by hard dental tissue, having only an ablation effect and not an ablative effect. They penetrate deeper, allowing for a decontaminating effect on deeper dentine layers. The medium infrared lasers have an ablative effect on dentine walls but are also well absorbed by the dentinal walls and thus have an equally effective, although more superficial, decontaminating effect in this regard. The thermal effect of the lasers, utilised for its bactericidal effect, must be controlled to avoid damage to the dentinal walls. Laser irradiation at the correct parameters vaporizes the smear layer and of the organic dentinal structure (collagen fibres) with characteristics of superficial fusion and melting. Only the Erbium lasers have a superficial ablative effect on the dentine, which appears more prevalent in the intertubular areas richer in water than in the more calcified peri-tubular areas. When incorrect parameters or modes of use are employed, thermal damage is evident in the extensive areas of melting, re-crystallisation of the mineral matrix (bubble), and superficial microfractures concomitant with internal and external radicular carbonisation.

| P | power (in W) |
| K | energy (in J) |
| R | pulse repetition rate (in Hz) |
| M | power density or density of power (in W/cm²) |
| F | fluence or density of energy (in J/cm²) |
| Pd | average power × E × K |
| PFW | peak power × E × length of single pulse (in seconds) |

Table I: Laser light emission parameters.

With a very short pulse length (less than 150 µs), the Erbium laser reaches peak power using very low energy (less than 50 mJ). The use of subablative energy minimises the undesirable thermal effects on dentinal walls while the peak power offers the advantage of the phenomenon of water molecule excitation (target chromophore) and the successive creation of the photomechanical and photoacoustic effects (shock waves) of the irrigant solutions introduced in the root canal on the dentinal walls. These effects are extremely efficient in cleaning the smear layer from the dentinal walls, in removing the bacterial biofilm and in the canal decontamination, and will be discussed in Part II.²⁹

Editorial note: A complete list of references is available from the publisher.

Dr Giovanni Olivi practices aesthetic, restorative and paediatric dentistry in Rome. He can be contacted at olivi.g@iol.it.
Restoring severely discoloured anterior teeth
How to achieve an impressive outcome with minimally invasive procedures

By following a clearly coordinated procedure, the treatment team may achieve satisfactory results with an internal bleaching method, an adhesive post build-up and a preparation technique that suits the requirements of the restorative material. The invasiveness of this approach is considerably reduced compared with conventional restorative techniques.

This article discusses the re-habilitation of two upper central incisors by placing fibre-reinforced composite posts, using build-up materials and subsequently restoring the teeth with 500 veneers made from lithium-disilicate ceramic. A 28-year-old male patient presented at the practice with the wish to have his endodontically treated and severely discoloured upper central incisors restored. He said that he had not had any problems since the reseption of the root was done years ago. However, he was dissatisfied with his impaired aesthetic appearance caused by the affected teeth (Figs. 1–3).

The pronounced discoloration and the inadequate tooth position of the upper incisors impaired the patient’s appearance. The asymmetrical tooth sizes of the incisors are clearly visible (Fig. 4). Lack of complete root fillings and secondary caries in the endodontically treated teeth (Figs. 6 and 11). The root canal fillings were checked prior to the internal bleaching procedure, and the cemento-enamel junction was sealed. The cusps were then ready for the application of the bleaching agent. (Fig. 5) Ten weeks later, the severe discoloration had almost entirely been removed by the internal bleaching treatment. (Fig. 7) The build-up and prepared incisors (Figs. 8 and 10) were to be fabricated in the cut-back technique. (Fig. 12) The patient was satisfied with the aesthetic outcome, the veneers excellently matched the adjacent teeth (Fig. 13).

Treatment planning

Before we proceeded with the planning for the permanent restoration, the inadequate fillings of the anterior teeth and the secondary caries were removed. This allowed us to assess the extent of damage to the teeth. In addition, a possible contamination of the two root canals with micro-organisms, resulting from the inadequate fillings—which had been in place for years—had to be ruled out.

Both root-canal fillings had been tightly sealed at the cemento–enamel junction with separate fillings and therefore the canals did not have to be reopened. Internal bleaching of the crown portions of both teeth using the walking bleach technique was planned. After an initial technical and clinical evaluation, the following treatment plan was determined. First, the tooth position and proportions were to be corrected by means of an analytic wax-up. The brightness of the affected teeth was then to be adjusted by internal bleaching to match the brightness of the neighbouring teeth during a preliminary treatment phase. Owing to the extensive lesion, we opted for a direct adhesive build-up following endodontic treatment with cemented fibre-reinforced composite posts. For the final restoration of the severely discoloured anterior teeth, we decided to use 500 veneers based on a lithium-disilicate material. In order to achieve an optimum aesthetic outcome, the veneers were to be fabricated in the cut-back technique (Figs. 14–16).

Preliminary treatment and preparation

After the coronal pulp chamber of the two incisors had been cleaned, another seal was placed at the cemento–enamel junction using a small amount of phosphate cement. This procedure ensured that the bleaching agent that would be applied later did not diffuse into these sensitive areas (Fig. 17). For the internal bleaching, a mixture of sodium-perborate powder and distilled water was applied using the walking bleach method. The palatal access to the coronal pulp chamber was sealed with cotton pellets soaked in holding agent (Helibond) and a low-viscosity composite (Tetric EvoFlow, Ivoclar Vivadent).

The next appointment was scheduled for one week later. The desired tooth shade had not yet been achieved, and therefore fresh bleaching agent was applied. After another week with the bleaching agent in place, a satisfactory brightness value was observed on both abutment teeth (Fig. 18). A 3-layer grinding preparation (CalciPure, Durr-tech) was inserted into the pulp chamber and left in place for a week in order to neutralise the bleaching agent.

After the neutralisation phase, we proceeded to the post-endodontic build-up of the abutment teeth. For this purpose, the coronal sealing of the root-canal fillings was removed and standardized.
ised holes for the fibre-reinforced composite posts were drilled. The posts were luted with Variolink II (dual-curing, low-viscosity, white-opaque shade) and a multistep adhesive (Syntac, both Ivoclar Vivadent). After the posts had been covered with a low-viscosity composite (Tetric EtoFlow), a bright, highly filled viscous composite (Tetric EvoCeram, Bleach XL) was applied to create the direct build-up. A high-power curing light (Bluephase G2, Ivoclar Vivadent, with > 1,000 mW/cm²) was used for the final polymerisation of the cementation and build-up materials. A diagnostic pattern, fabricated on the basis of the wax-up, was employed for the minimally invasive preparation, containing all information relating to the correction of the tooth position and the outer contour of the final restoration.

Temporisation and fabrication of the final veneers

The diagnostic template was also used for creating the direct veneer temporaries. The temporary restorations could thus be fabricated in a fairly straightforward manner using a Bis-GMA-based temporary material (Telio C&B, A2; Ivoclar Vivadent). He-obond was applied to the finished, non-etched preparation surfaces and to the inner side of the temporaries and light-cured after removal of excess material.

After a four-week evaluation phase of the tooth shape and position, which both were determined by the wax-up and transferred to the temporaries, a precision impression of the prepared teeth and an impression of the antagonist jaw were taken. This information was sent to the laboratory together with the face bow, the registration of the jaw relation and an image of the prepared abutment teeth. The image of the preparations helped the laboratory to assess the required degree of opacity for the framework structure. Given the different levels of translucency and the different build-ups of the abutment teeth and to ensure an improved masking capability in case of a relapse of the discolouration, the treatment team chose to use press ceramic ingots with a medium opacity level in shade 0 (MO 0). The IPS e.max Press frameworks were veneered with the IPS e.max Ceram veneering ceramic in shade A2 (both Ivoclar Vivadent; Fig. 7).

Try-in and seating

After removal of the temporary restorations, residue of the bonding agent was removed with cleaning brushes and a fluoride-free cleaning paste. In order to check the shape and shade of the veneers in the patient’s mouth, the restorations were tried in with a shaded glycerine gel (Try-in Paste, Variolink II, white-opaque). A perfect masking of the abutment teeth had already been achieved at this stage and the resulting situation showed a harmonious appearance regardless of the substrcture (Figs. 9 & 10).

The inner aspects of the glass-ceramic veneers were etched with a hydrofluoric acid gel (< 5% IPS Ceramic Etching Gel, Ivoclar Vivadent) for 20 seconds. Subsequently, a bonding agent (Monobond Plus, Ivoclar Vivadent) was applied. Only the multistep dentine adhesive system Syntac was applied to the tooth. The restorations were luted into place with the Variolink II system in white-opaque (Fig. 11).

Conclusion

A light transmission that corresponded to that of natural teeth was achieved by using translucent build-up materials in conjunction with glass-ceramic lithium-disilicate veneers (Fig. 12). The final outcome with regard to functional and aesthetic parameters was found to be very satisfactory at the final evaluation. The tooth shade was in perfect harmony with the surrounding dentition. In addition to removing the severe discolouration of the hard and soft tissues, we were able to correct the tooth position and adjust the tooth proportions (Fig. 13). The patient was fully satisfied with the outcome and did not have any phonetic problems resulting from the correction of the tooth position (Fig. 14).

Contact Info

Prof. Daniel Edelhoff is working as a tenured associate professor at the Department of Prosthodontics, Ludwig-Maximilians-University, Munich, Germany. He can be contacted at daniel.edelhoff@med.uni-muenchen.de.

Contact Info

Oliver Brix is working as a dental technician/vocational assistant, Germany. He can be contacted at Oliver.Brix@t-online.de.
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Successful implant therapy is not only a result of osseointegration but also implant–abutment connections in any effects on the bone and soft tissue. A large degree of success, especially in terms of quality, aesthetics, quality of life and patient satisfaction, depends on the success of the abutment–implant connections. In particular, the connection between the implant and the abutment may be of great importance when it comes to long-term stability and the successful outcome of a restoration.

The following article illustrates properties of an implant–abutment connection in terms of handling, stability, biological, clinical aspects and success of a restoration. The right balance of design, materials, used, precise state-of-the-art manufacturing, rigorous quality controls as well as many years of experience from Straumann provide prosthodontic parts with reliability and confidence to the patient and the restorative dentist.

1. The right materials and characteristics, a pre-requisite for optimal performance

The materials used in prosthodontics play a key role in handling, stability, strength, biological, clinical aspects and success of a restoration. The right balance of design, materials, used, precise state-of-the-art manufacturing, rigorous quality controls as well as many years of experience from Straumann provide prosthodontic parts with reliability and confidence to the patient and the restorative dentist.

2. Smart tolerances are essential for the engagement and functionality of parts

In addition to the design, the tolerances of the abutment, screw and implant also play a major role in an implant–abutment connection. Tolerance means the permissible limit or limits of variation in a physical dimension deviating from a nominal dimension. Dimensional tolerances, for instance, define the possible space between two connecting components (e.g. outer diameter of an abutment and inner diameter of an implant as shown in Fig. 1). Geometric tolerances define a feature to be within a certain tolerance.

Smart tolerances on the design as well as high-precision manufacture are essential for the engagement and functionality of the parts. The accurate fit of abutment, screw and implant is achieved by harmonized dimensions in terms of the restorative dentist (in terms of assembly of the prosthetic components on the implant) as well as for the dental technician (in terms of assembly of the restoration on the master model). Assembly: Good guidance and tactile feedback During the assembly process, good guidance and tactile feedback (so that the assembly process is complete) are important. The result is a hassle-free assembly procedure which helps to save time, compensates for low visibility and does not require X-rays to confirm the proper seating of the prosthodontic components. This is a key requirement for comfort and stability in a patient’s mouth can be limited. Geometry: Connecting surfaces The design of the screw plays an essential role in the stability and long-term reliability of a connection. A design with a conical section on the screw head and abutment increases the stability of the area to keep the screw from rotating and thereby minimizes the possibility of screw loosening. In addition, the cone on the screw and the cone on the abutment (only with titanium abutments) between implant and abutment are engineered to be paraxial to allow to ensure optimal clamping force between the engaging parts. The screw is also required to bear axial loads that occur through the tightening process, thus a balance between design features and dimensions is important to prevent screw loosening and breakage.

4. A high surface quality helps to minimise wear Smooth surfaces on components in contact seal the engaging surfaces and reduce wear. This results in a connection with minimal wear and thus good stability. A smooth surface can also reduce or minimize the occurrence of wear debris.

5. Smooth handling for both restorative dentists and dental technicians Handling characteristics are another important factor, both for the restorative dentist (in terms of assembly of the prosthodontic components on the implant) as well as for the dental technician (in terms of assembly of the restoration on the master model). Assembly: Good guidance and tactile feedback During the assembly process, good guidance and tactile feedback (so that the assembly process is complete) are important. The result is a hassle-free assembly procedure which helps to save time, compensates for low visibility and does not require X-rays to confirm the proper seating of the prosthodontic components. This is a key requirement for comfort and stability in a patient’s mouth can be limited. Geometry: Connecting surfaces The design of the screw plays an essential role in the stability and long-term reliability of a connection. A design with a conical section on the screw head and abutment increases the stability of the area to keep the screw from rotating and thereby minimizes the possibility of screw loosening. In addition, the cone on the screw and the cone on the abutment (only with titanium abutments) between implant and abutment are engineered to be paraxial to allow to ensure optimal clamping force between the engaging parts. The screw is also required to bear axial loads that occur through the tightening process, thus a balance between design features and dimensions is important to prevent screw loosening and breakage.

6. Biological aspects

Control of bone and soft tissue growth: The influence of the implant-abutment interface

Individual oral hygiene of the patient is a relevant biological aspect that can influence the successfull outcome of restorations. How the implant-abutment interface influences bone growth and surrounding soft tissue growth is an important success factor in restorations.

Tissue and implant in contact seal the engaging surfaces and reduce wear. This results in a connection with minimal wear and thus good stability. A smooth surface can also reduce or minimize the occurrence of wear debris.

Biological width: As big as possible

A smart design of the connection as described in an earlier section of this article reduces bacte- rial infiltration into microgaps, the origin of bacterial contamination. In this regard, consideration of the biological width – the distance from the bone crest to the micro-gap (point on surface at implant-abutment connection) – plays a crucial role when designing abutments and implants. The biological width should be as big as possible! Therefore, the connection should be moved as far away from the bone as possible. This can be achieved with an implant design emerging at the level of soft tissue (cortical offset) or with an implant design emerging at the level of the bone crest with so-called platform switching (horizontal, offset through internal connection). A design according to these requirements avoids the infiltration of bacteria, which is important as it avoids bacterial contamination and related inflammation and bone loss.

* Combining parts from different manufacturers may delay the delivery of the finished implant abutment.

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