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GRANT RECIPIENTS

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KNOW YOUR PATIENTS

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Hidden periapical periodontitis

By DTI

HELSINKI, Finland: A new study at the University of Helsinki has found that hidden periapical periodontitis increased the risk of coronary artery disease (a cardiovascular disease). According to the researchers, infections of the root tip of a tooth are very common—about one in four Finns suffered from at least one in the study group—and are often unnoticed by patients, as they can be present without obvious symptoms.

Although there is a great deal of research on the connection between oral infections and many common chronic diseases, such as heart disease and diabetes, periapical periodontitis has been investigated relatively little in this context. In the recent study, 58 per cent of the patients, who presented with symptoms requiring examination via coronary



Periapical periodontitis is very common and often has no obvious symptoms. New findings from the University of Helsinki indicate that the condition could be a risk factor for acute coronary syndrome.

angiogram, had one or more such inflammatory lesions.

“Acute coronary syndrome is 2.7 times more common among

patients with untreated teeth in need of root canal treatment than among patients without this issue,” said lead author Dr John Liljestrand. Moreover, the

study found that periapical periodontitis was connected with a high level of serum antibodies

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Caffeine toothpaste

By DTI

NEW YORK, USA: Introducing the world's first caffeinated toothpaste, Power Toothpaste, two young US entrepreneurs want to ease people's start into the day. Unlike coffee, which takes up to an hour to be fully absorbed through the stomach, Power Toothpaste begins working immediately, being absorbed through the gingivae, according to the company's founders Dan Meropol and Ian Nappier.

After a year of research, development, formula refinement, a partnership with a Food and Drug Administration-compliant American manufacturer, and a drive of press coverage, the toothpaste can now be ordered online for the unit price of \$14.99 at the company's website: www.powertoothpaste.com.

Antibiotics in dentistry

By DTI

COPENHAGEN, Denmark: The Danish Health Authority has released new national guidelines addressing the use of antibiotics in dental care. “Antibiotic-resistant

bacteria are a growing problem that can cause even minor infections to become life-threatening. Therefore, we hope that the national clinical guidelines will help to reduce the use of antibiotics,” stated Dr Karen Geismar,

a dentist and chairperson of the working group that drafted the new guidelines.

“It is important to emphasise that in some cases treatment requires the use of antibiotics; however, it should not be a routine treatment in dentistry,” Geismar emphasised. “Our recommendations are based on the careful consideration of the expected effects of a treatment with antibiotics and the patient's risk of an oral infection in relation to the overall problem—the increase of antibiotic-resistant bacteria.”

According to the health authority, the new guidelines aim to ensure uniform quality treatment across the country and are primarily targeted at private practitioners who regularly prescribe antibiotics in their practice. In the past, various studies have indicated an alarming overuse of antibiotics in general dental practice.

More information can be found at www.sundhedsstyrelsen.dk.



The Danish Health Authority has recently issued national clinical guidelines aimed at curbing the use of antibiotics in dental practice.



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Eklund Foundation announces first grant recipients

By DTI

MALMÖ, Sweden: Established in 2015 by Swedish oral care company TePe, the Eklund Foundation for Odontological Research and Education has announced the first four projects to receive funding. Through a total of SEK1.56 million (€160,913) granted, the foundation will be supporting oral health research in Sweden, Italy and the Netherlands on topics such as the association between periodontitis and rheumatoid arthritis, complications in implant treatment and peri-implant disease.

For their study titled "Oral conditions in patients with rheumatoid arthritis: A population-based case-control study", Prof. Stefan Renvert and his research team from Kristianstad University will receive SEK708,426 (€73,913), the largest portion of the funding. "Today there are scien-

tific studies both supporting and not supporting a connection between periodontitis and rheumatoid arthritis, and this study may contribute towards shedding light on the possible connection between both these diseases," said the foundation's board on its decision to support the project.

A grant of SEK311,766 (€32,000) has been awarded to Dr Alexa Laheij from the Academic Centre for Dentistry Amsterdam in the Netherlands for her project titled "The oral cavity as a source of febrile neutropenia: An observational study in patients with solid tumors treated with myelosuppressive chemotherapy". Furthermore, Dr Paolo Ghensi from the University of Trento in Italy will receive SEK389,707 (€40,000) for his project titled "Metagenomic profiling of the microbiome associated with peri-implant diseases through high-resolution shotgun



sequencing". Fellow Italian researcher Dr Erierto Bressan from the University of Padova and his team have been granted the sum of SEK146,140 (€15,000) for their study titled "Primary prevention of complications in implant treatments: Protocol for maintenance of dental implants".

This is the first funding of research and education in oral health to be granted by the Eklund Foundation since its establishment in 2015. "We are happy to be able to contribute to the important odontological research of today," said Joel Eklund, CEO of TePe and Chairman of the foundation. Applications were open for international projects in all fields of dentistry from 1 to 31 May 2016.

The next round of applications for funding will run over the same period in 2017. According to the company, projects related to periodontology, implantology and cariology, as well as applications from postdoctoral researchers, will again be prioritised in the selection process.

More information about the application process can be found at www.eklundfoundation.org.

Sweden: New age assessment method for young refugees

By DTI

STOCKHOLM, Sweden: Starting in 2017, Sweden's National Board of Forensic Medicine will be using a new age assessment system for unaccompanied child refugees that is based on radiographs of third molars and knee joints. By examining both indicators, the

new method promises to resolve concerns regarding current age calculations that are mainly based on dental examinations and have been criticised as being unreliable and inaccurate.

According to Sweden's Migration Agency, 70 per cent of refugees who claimed to be between

15 and 17 years of age aroused suspicion in the past. With the new estimation system, officials hope to resolve uncertain cases, the agency announced at a press conference last week.

"Every X-ray will be assessed by two experts," said forensic examiner Dr Elias Palm, who is in charge of forensic age estimation at the National Board of Forensic Medicine. "For an assessment to be complete, the experts have to reach the same conclusion." According to Palm, both parts of the body to be assessed develop at different times, the knee joint later in life and the teeth at an earlier stage. For this reason, age determination with the new method will likely be more accurate.

The voluntary age tests, which will be implemented in the first quarter of 2017, will be conducted

separately at dental clinics and MRI departments. Overall, it is estimated that about 4,000 to 18,000 examinations will be carried out.

"There is no method to medically determine the exact age of an individual, but by studying which phase a person is in, you can draw approximate conclusions," Palm remarked.

Determining whether a person is over or under 18 is important for processing of the asylum application and the different entitlements that apply to child asylum seekers, such as free education and health care. In the recent refugee crisis, Sweden has accommodated more child asylum seekers than any other country in Europe has. In 2015, the country took in more than 35,000 unaccompanied minors, according to figures from the Migration Agency.



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related to common bacteria causing such infections.

The study was carried out at the Department of Oral and Maxillofacial Diseases of the university, in cooperation with the Heart and Lung Centre at Helsinki University Hospital. It examined the coronary arteries of 508 patients with a mean age of 62, of

whom 36 per cent had stable coronary artery disease, 33 per cent suffered from acute coronary syndrome, and 31 per cent had acute coronary syndrome-like results, but no significant coronary artery disease.

Periapical periodontitis is an immune response to microbial infection in the dental pulp, most commonly caused by caries. The often symptomless infections

are usually detected by chance in radiographs, the researchers said. In light of the findings, root canal treatment of an infected tooth may reduce the risk of heart disease; however, additional research is needed to confirm the relationship between the two conditions, they said.

According to figures from the World Health Organization, cardiovascular disease is the primary

cause of death globally. In 2012, an estimated 17.5 million people died from cardiovascular disease, representing 31 per cent of all global deaths. Of these, 7.4 million were due to coronary artery disease and 6.7 million were due to stroke.

The study, titled "Association of endodontic lesions with coronary artery disease", was published online ahead of print on 27 July in the *Journal of Dental Research*.

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Reducing dental anxiety with cartoons

By DTI

HUDDINGE, Sweden & RIYADH, Saudi Arabia: Sometimes a little distraction is all it takes to lessen children's fear of the dentist and consequently improve treatment outcomes. In a clinical trial jointly conducted by researchers in Sweden and Saudi Arabia, children who watched cartoons through video glasses during treatment exhibited significantly less anxiety and showed more cooperation than did children who had no audiovisual distraction.

Dental anxiety is very common in children. It is estimated that about one in five school-aged children are afraid to visit the dentist to some degree. Studies have shown that children with dental phobia experience more dental pain and are more disruptive during treatment. Investigating means to address these anxiety issues in a child-oriented manner, the present study evaluated the effectiveness of viewing videotaped cartoons with an eyeglass system, Merlin i-theatre (Merlin Digital General Trading), in a group of children receiving dental restorative treatment.

The study examined 56 children of 7 to 9 years of age in three separate treatment visits that involved an oral examination, injection with a local anaesthetic and tooth restoration. The treatment was undertaken at a dental clinic at King Saud University in Saudi Arabia. All of the children involved had exhibited some kind of dental anxiety in the past and were referred to the clinic for behaviour management. In the trial, one half was randomly chosen to watch their favourite cartoons through the eyeglasses, while the control group had no audiovisual distraction during treatment.

When measuring anxiety levels and cooperative behaviour in both groups, the researchers found that the children in the distraction group exhibited significantly less anxiety and showed more cooperation—particularly during the local anaesthetic injection—than the control group did. In determining indirect measures of anxiety, such as vital signs, including blood pressure and pulse, they further found that the average pulse rate of children without video distraction was significantly higher during the injection than in children in the distraction group. However, the children themselves, who rated their perceived treatment-related pain and anxiety during each procedure, did not echo this difference.

Although further studies are necessary in order to confirm the value of the method in general clinical settings, the results of the trial suggest that audiovisual distraction may be a useful technique to calm children with dental phobia

and ensure that they can be given the dental treatment they need, the researchers concluded.

The study, titled "Effects of audiovisual distraction on chil-

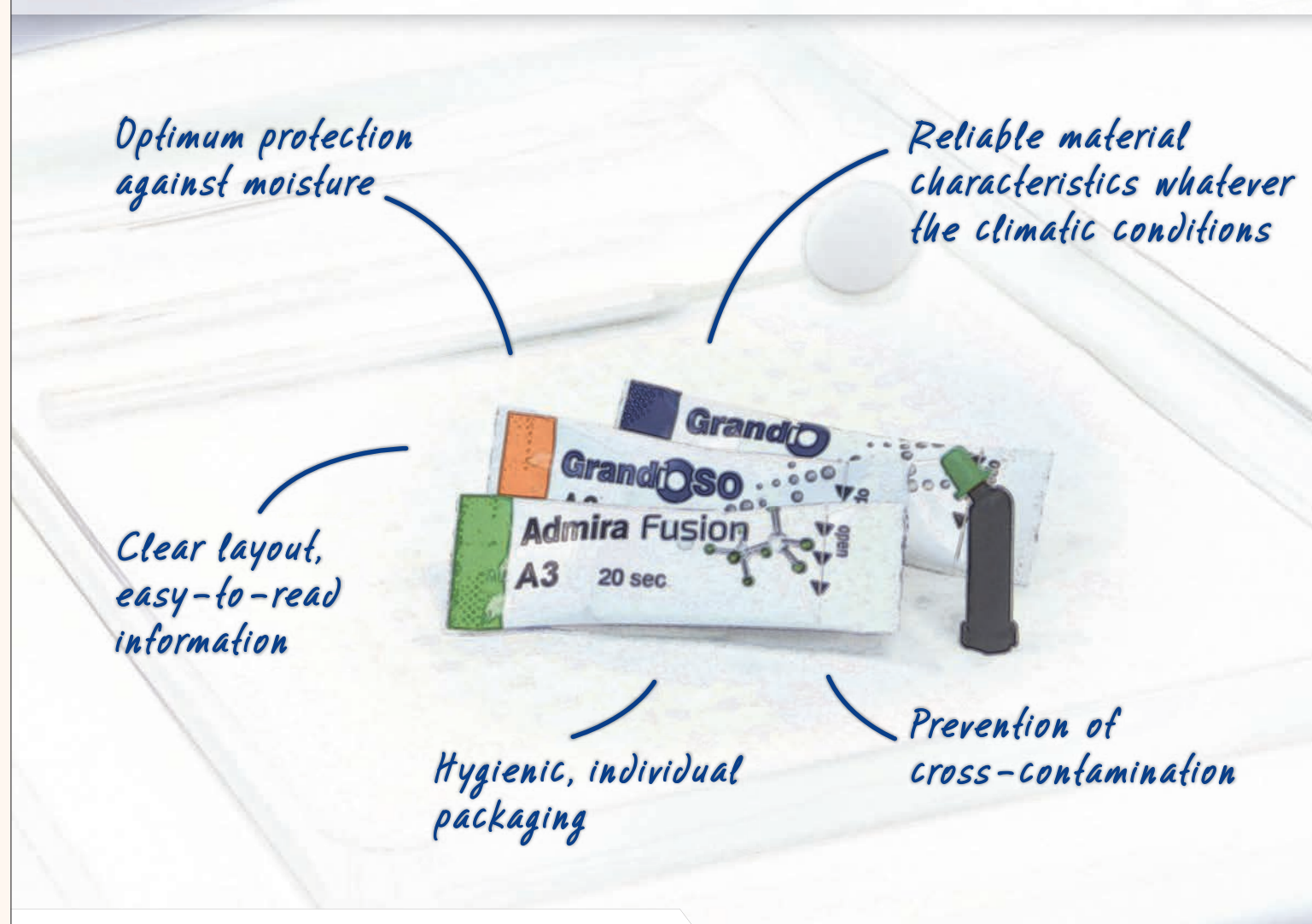
dren's behaviour during dental treatment: A randomized controlled clinical trial", was published online on 13 July in the *Acta Odontologica Scandinavica* journal.



Researchers from Karolinska Institutet in Sweden and King Saud University in Saudi Arabia have investigated whether audiovisual distraction during dental treatment may help children to overcome their fear of the dentist.

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Impact of an oral health-optimised diet

By DTI

FREIBURG, Germany: Based on the results of a pilot study in Germany, people suffering from gingivitis and periodontal disease should perhaps consider changing their eating patterns in order to improve their oral health. In the study, participants who followed a diet low in carbohydrates and rich in omega-3 fatty acids, vitamins C and D, antioxidants and fibre for four weeks showed significantly lower inflammation values than did participants in the group who did not change their diet.

Aiming to test the hypothesis that diet helps reduce inflammation—a connection that diet-based studies have already proved in part—lead author Dr Johan Wölber from the University of Freiburg and his colleagues investigated the impact of an oral health-optimised diet on periodontal health in a group of patients with a history of gingivitis.

Of the 15 participants who were otherwise accustomed to a diet rich in carbohydrates, ten were asked to follow a list of restricted and recommended foods and meals, while five continued with their typical eating patterns. People who smoked, were taking antibiotics, or had carbohydrate- or insulin-related



The findings of a small sample size study in Germany have shown that an oral health-optimised diet could significantly reduce gingival and periodontal inflammation in a clinically important range without any changes in oral hygiene performance.

diseases, such as diabetes, were excluded from the study. Apart from not using interdental cleaners, participants were advised not to change their oral health routines throughout the study period.

Dietary instructions in the experimental group included restricting the amount of fructose, disaccharides, sweetened beverages and meals, flour-containing foods, rice and potatoes as far as possible. Fruits and vegetables (polysaccharides) were excluded

from this as long as the total amount of carbohydrates was considered. The dietary protocol further included the daily intake of omega-3 fatty acids (such as fish oil capsules, a portion of sea-fish, two spoons of flaxseed oil), a restriction in the amount of trans-fatty acids as far as possible (such as fried meals, crisps, donuts, croissants, etc.) and a reduction in omega-6 fatty acids as far as possible (such as safflower oil, grape-seed oil, sunflower oil, margarine, sesame oil and maize oil).

In addition, each participant had to ensure the daily intake of antioxidants (a handful of berries, a cup of green tea or coffee, etc.), a source of vitamin C (such as two kiwis, one orange or one bell pepper) and a source of vitamin D (15 minutes of unprotected exposure to the sun, nutritional supplementation, 300 g of avocado, etc.). In order to ensure all participants followed these recommendations, they were asked to document their daily intake in a food diary.

After four weeks, participants in the low-carb group showed significantly reduced gingival and periodontal inflammation compared with the control group. According to the researchers, reducing carbohydrates in particular led to a significant improvement in the gingival index, bleeding on probing and the periodontal inflamed surface area. Although the study had its limitations—mainly the small study group, the loose dietary instructions and the difficulty in ensuring the participants' compliance with the nutritional protocol, among other factors—the presented dietary pattern significantly reduced periodontal inflammation in the study group, the researchers concluded.

In total, the results support the assumption that modern Western eating habits, including consumption of refined carbohydrates and a high omega-6 to omega-3 fatty acid ratio, promote inflammatory processes, they wrote.

The study, titled "An oral health optimized diet can reduce gingival and periodontal inflammation in humans—A randomized controlled pilot study", was published online on 26 July in the *BMC Oral Health* journal.

Malocclusion affects posture and balance

By DTI

BARCELONA, Spain/INNSBRUCK, Austria: In recent years, there has been increasing medical interest in correcting teeth that are not perfectly aligned in order to resolve diastemas and crowding and to prevent problems such as jaw pain. Two studies, carried out by Spanish and Austrian researchers, have now provided evidence that dental occlusion is associated with the control of posture and balance.

The studies, a collaboration between the Department of Cell Biology, Physiology and Immunology at the University of Barcelona and the Department of Sport Science at the University of Innsbruck, found a relationship between malocclusion and postural control. Both studies provide conclusive data that shows that postural control is improved—both in static and dynamic equilibrium—when various malocclusions are corrected by positioning the jaw in a neutral position.

The first study took into account the type of dental occlusion and whether there had been previous orthodontic treatment. The results showed that alterations in alignment of the teeth were related to poorer control of static balance.



The impact of oral health on general health is a topic of current prominence. The latest research has found a connection between malocclusion and posture and balance problems.

The second study assessed the type of dental occlusion, control of posture and physical fatigue in order to analyse a possible relationship between these factors. It demonstrated that balance improved when malocclusions were corrected, and that the latter had a greater impact on postural control when subjects were fatigued than when they were rested.

"When the subjects were tired, their balance was worse under

both stable and unstable conditions. Under static conditions, the factor that had the greatest impact on imbalance was fatigue. In contrast, a significant relationship between exhaustion and dental occlusion was observed under conditions of maximum instability," said lead author Dr Sonia Julià-Sánchez, a researcher at the Department of Cell Biology, Physiology and Immunology at the University of Barcelona's Faculty of Biology.

"When there is a malocclusion, it is classified according to scientifically established criteria. What is relevant in the study is that malocclusions have also been associated with different motor and physiological alterations," Julià-Sánchez explained. This relationship is not as obvious in everyday static conditions, although there may be conditions associated with pathologies, such as obesity, that worsen the body's instability, thus decreasing postural control and increasing the risk of falls.

In athletes, this relationship can play a crucial role in how well they ultimately perform, as well as in the prevention of injuries such as sprains, strains and fractures caused by unexpected instability as fatigue increases and motor control capacity decreases. "Therefore, it would be helpful for both the general population and athletes to consider correcting dental occlusions to improve postural control and thus prevent possible falls and instability due to a lack of motor system response," added Julià-Sánchez.

"Postural control is the result of a complex system that includes different sensory and motor elements arising from visual, somatosensory and vestibular information," explained the expert.

In recent years, there has been increasing scientific interest in the relationship between the stomatognathic system—the set of organs and tissues that allow us to eat, talk, chew, swallow and smile—and postural control. The link may have a neurophysiological explanation. There is a reciprocal influence between the trigeminal nerve and the vestibular nucleus, which are responsible for masticatory function and balance control, respectively, as well as between the muscles of mastication and of the neck. This influence would explain why dental malocclusions negatively affect postural control. Up until now, however, there was no conclusive research. "The main problem stems from the fact that the majority of these studies had statically assessed balance under conditions of total stability, which in practice has little actual application in the control of posture while in action," Julià-Sánchez pointed out.

The first study, titled "Dental occlusion influences the standing balance on an unstable platform", was published in the October 2015 issue of the *Motor Control* journal. The second study, titled "The influence of dental occlusion on the body balance in unstable platform increases after high intensity exercise", was published in Volume 617 of *Neuroscience Letters*.

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World Summit Tour 2017: A novel experience in implant dentistry

By DTI

MÖLNDAL, Sweden: Next year, Dentsply Sirona Implants will be welcoming dental professionals from all over the world to the World Summit Tour, a scientific congress on implant dentistry. According to the company, which is the world's largest manufacturer of professional dental products and equipment, the combination of distinguished international speakers and a multifaceted programme render this state-of-the-art congress unique in the dental industry.

Held on the premise that inspiration and confidence matter, the interactive scientific congress will visit Tokyo in Japan on 18 and 19 February, San Diego in the US on 12 and 13 May, Nice in France on 23 and 24 June, and Shanghai in China on 25 and 26 November.

The objective of the World Summit Tour is to inspire clini-



Spanning the globe, the Dentsply Sirona World Summit Tour will travel to Tokyo, San Diego, Nice and Shanghai in 2017.

cians and researchers to share their scientific knowledge and clinical experience and discover the latest developments in implant dentistry. Owing to the mix

of international and local speakers, each two-day tour stop will be exclusive to the participating audience. This will give dental professionals the opportunity to

attend a congress that is both geographically nearby and tailored to the needs of the regional market. In addition to general sessions, the programme will include

hands-on workshops and various parallel sessions. Overall, around 150 speakers and moderators will be participating in the four tour stops to discuss the latest ideas, innovations and scientific data in their area of expertise. Moreover, each tour stop will feature a poster competition in two categories: clinical application and research.

The scientific programme is being compiled by the international scientific committee, which consists of acclaimed scientists Prof. Jan Lindhe (Sweden), Prof. Clark Stanford (US), Prof. Christoph Hämmerle (Switzerland), Prof. Tomas Albrektsson (Sweden), Prof. Ye Lin (China), Prof. Meike Stiesch-Scholz (Germany) and Prof. Tetsu Takahashi (Japan).

More information about the World Summit Tour, registration dates, venues and scientific programme can be found at www.worldsummittour.com.

TePe receives prize for export achievements

By DTI

STOCKHOLM, Sweden: Swedish oral hygiene company TePe was awarded the Export Hermes prize at the Stockholm Chamber of

Commerce recognises the company's exceptional export strategy and success in international markets.

"We are very honored to be recognised for our export achieve-

A collaboration between the Foundation for Export Development and the Swedish Chambers of Commerce, the award honours Swedish companies that have expanded internationally in an innovative way, for example by establishing a presence in new markets, by gaining market share or by placing Sweden on the map in new industries.

"Through its complete range of quality dental products, TePe has developed into a world-leading export company that contributes to a world with more smiles," said the jury on its decision.

TePe has subsidiaries in Germany, Italy, the Netherlands and the UK and distributors in over 60 countries. The privately held company was founded in 1965 and is headquartered in Malmö in Sweden.



TePe CEO Joel Eklund with Helen Richenzhagen, Global Sales Director at TePe, at the award ceremony in August. The Export Hermes prize is awarded annually and aims to encourage companies to continue to strengthen Sweden globally.

Commerce World Trade Day on 30 August. The prize, which was handed over to TePe CEO Joel Eklund by Swedish Minister for EU Affairs and Trade Ann Linde,

ments," Eklund said on the occasion. "We have doubled our turnover over the last five years and see good opportunities for continued growth."

the UK and distributors in over 60 countries. The privately held company was founded in 1965 and is headquartered in Malmö in Sweden.

Planmeca's new PlanMill 40 S

By DTI

HELSINKI, Finland: In September, Finnish dental manufacturer Planmeca introduced its latest milling unit for dental clinics, Planmeca PlanMill 40 S. Designed for the chairside fabrication of metal-free dental restorations and appliances, the device will replace its predecessor, Planmeca PlanMill 40, in the company's product line. PlanMill 40 S can be ordered as of now, with deliveries starting during the fourth quarter of 2016.

"The S in the product's name stands for *Smart*—which is exactly what the unit brings to the table," explained Jukka Kanerva, Vice President of Dental Care Units and CAD/CAM Solutions at Planmeca. According to Kanerva, the milling unit will introduce a level of quality, precision and performance that has not yet been seen in the dental industry. "From usability to performance, the new unit has been built to achieve the smartest and most efficient milling experience in the field," Kanerva said.

The new milling unit stands out with its intelligent maintenance features, smart tool paths, expanded range of applications and automated tool changer for ten tools. It can be combined with the Planmeca PlanScan intra-oral scanner and the Planmeca PlanCAD Easy design software as part of the Planmeca FIT chairside CAD/CAM system.



According to the company, Planmeca PlanMill 40 S is immediately available for orders everywhere except in North America.

Headquartered in Helsinki, Planmeca distributes its products in over 120 countries worldwide. In 2015, the Planmeca Group generated a turnover of approximately €734 million.

“Going green is our business, not somebody else’s, but everybody’s responsibility”

An interview with Dr Claudio Pinheiro Fernandes, Brazil

By Kristin Hübner, DTI

Measures to reduce waste and pollution and to conserve natural resources such as water and energy already play a major role in many aspects of daily life. Likewise, acting in an environmentally friendly manner is becoming increasingly important in dentistry as well. *Dental Tribune* spoke with Dr Claudio Pinheiro Fernandes, head of the Sustainable Dentistry Center at Fluminense Federal University in Nova Friburgo in Brazil and consultant to the FDI World Dental Federation’s Science Committee, about sustainability principles in dentistry, the preservation of natural resources and the economic dynamics of going green.

Dental Tribune: Being environmentally friendly is becoming increasingly important in everyday life. When did this topic first gain momentum in dentistry?

Dr Claudio Pinheiro Fernandes: Sustainability is relevant to everyone and we face this challenge every day. Every single newspaper that one opens includes something about climate change or sustainable development. It is the responsibility of dentistry too to become involved as a profession to pursue sustainability in the field of oral health for the good of society.

The dental profession is being challenged by the increasing demand for better oral health care for more people in more countries than ever. At the same time, we have the challenge of needing to do so using less resources. In this context, the question of how exactly we are to do that arises.

What can dentists do and what defines a sustainable practice?

As dentists, we have to realise that there are certain aspects and areas of our work that can be organised better. From a procedural point of view and concerning the equipment used, there are certain sustainability principles to consider. Take a simple example: when one buys a refrigerator or an air conditioner today, one looks for energy efficiency labels that indicate the most efficient device in terms of its energy use. This means that it is good both for one’s pocket, being cheaper to run, and for the environment, since it needs less energy. Why do we not have this kind of labelling on dental equipment? We could introduce energy-efficient dental equipment, with labels indicating the device’s energy use. That would be one way of going green.

Another thing to keep in mind is how much water we use. That is an extremely important issue in dentistry. A dentist uses eight

times more water than the average person does—a large volume! Usually the equipment used in daily practice causes this high consumption. For example, some brands of suction equipment use clean water to drive the suction mechanism. On average, they use 200 litres per hour and this water goes from the pumps directly to the drain. Of course, suction is important, but could we not apply different technologies to achieve the same results? Do we have to waste clean water for this?

In many respects, dentists cannot implement a shift themselves alone; awareness of the importance of sustainability is important on the company side as well.

That is why the FDI is taking a stand on the sustainability issue right now. The whole thing started back in 2012 during the Rio+20 meeting, the United Nations Conference on Sustainable Development, in which the FDI had decided to participate. Back then, we had already begun collecting information and thinking about what we could do in dentistry. I represented the FDI in those meetings and I was able to see how much we could do even without going to a great deal of trouble. For example, the most sustainable thing to do is to focus on prevention. If we act on prevention of oral disease, this would reduce the need for extensive treatment and the related use of products and, in particular, the associated generation of a large volume of waste, as well as the substantial amount of water and energy required, and the large carbon footprint that all of this creates.

Speaking of waste management, what should dentists consider?

A great deal of waste is generated in dentistry and some of it very toxic. Another issue that the FDI has pursued is the Minamata Convention on Mercury, which includes the phase-down of dental amalgam. We have to face our responsibility of dealing with amalgam waste, for example. Nordic countries are a good example in this regard, having implemented well-established amalgam management practices for many years.

One area in which we could do a great deal more is the management of recyclable materials. All the disposable materials that we use in dentistry generate hundreds of kilograms of waste every day. What can we do to address recycling of those materials? A considerable amount of waste is generated with disposable barriers, gloves and masks. Much of this could be safely recycled with current technologies.

How open is the dental community regarding this? When it comes to change, such as going digital, there are early adopters and some that find it difficult to adjust to something new.

That is a good point. Digital dentistry represents a different mindset on production. The primary objective is to have more control and to be more efficient in production; however, a third point is that digital technology generates less emissions, since there is less transportation and less product waste. This is just one example that serves to demonstrate that there are many more efficient means of manufacture. Certainly, digital dentistry is one of those areas of increasing technology use that results in greater sustainability. Science, technology and innovation play a key role in most areas of business. Improvements in efficiency, accessibility and cost-effectiveness of products and processes may allow fulfilment of global need in a more sustainable way. Furthermore, dental research needs to be directed towards improving sustainability in dentistry.

Dentistry may be considered a very conservative profession. How difficult is it to change the predominant mindset?

We are doing that already. One way or another, people are coming to realise that going green is our business, not somebody else’s, but everybody’s responsibility. We as dentists have to play our part as well. In addition to efficient equipment and waste management, we should consider the topic of recycling, particularly in light of all the products that we use in daily practice.

I think that the most important thing is education. We need to include education on sustainable development in undergraduate programmes and in continuing education programmes. That way, new and experienced dentists alike will learn how to actually practise environmentally friendly dentistry. The national dental associations too can do a great deal to increase awareness and promote sustainable development. A good example is the Norwegian Dental Association, which has decided to include sustainability aspects of dentistry in its agenda.

What is the situation right now? Is the topic covered in the curriculum at all?

There is a great deal going on right now. I would say that we are in the moment of great activity. For example, the International Organization for Standardization has developed very good materials



Dr Claudio Pinheiro Fernandes

for action. There is also a United Nations Educational, Scientific and Cultural Organization platform for integrating education on sustainable development. It is called Education for Sustainable Development. In addition, it should be noted that many universities are already going green today. So, there is progress.

Behind it all, there is one driving force, the United Nations’ 2030 Agenda for Sustainable Development. This agenda has defined 17 sustainable development goals that were adopted by all member states in September 2015. This is very recent, but we are on a schedule of looking into the reduction of poverty, the reduction of hunger, better health for more people and more educational opportunities—a number of issues that will improve the environment on the one hand, as well as social and economic development on the other. By utilising the environment in an intelligent, sustainable manner, we allow society to develop in a healthy way. We need to have jobs, we need to produce, but we can all do that in a responsible manner and at the same time sustain a good economy.

When it comes to food and clothing, an eco-friendly lifestyle is often more expensive than the alternative. For dentists, is there an economic barrier to going green as well?

Yes, there are challenges regarding entry, and investment is required because everything must be reoriented to the future. As with everything, it is very difficult to start all over again, but when attitudes change, when dentists actively decide to pursue sustainability, then they will start

reviewing their own procedures and little by little implement change. The good news is that, once one actually starts to implement a sustainable approach, it becomes evident that energy and resources were wasted before—which is not a good business strategy. There will be a return on investment. One’s patients, one’s clients and the public will recognise one as an active member of a responsible society. It will take time and effort, but the dental profession will achieve this.

So in the future it could be a selling point for companies to identify themselves as “green”.

Yes, this is already happening in many business areas, because the public is driving sustainability awareness by seeking more sustainable alternatives. As always, there may be some companies that already say that about themselves even if they have not achieved that yet. However, standards have already been established to determine whether certain things have been applied. Based on these indicators of sustainability, auditors and reviewers are able to evaluate objectively whether sustainability is being achieved by the company.

Of course, investment is required in the beginning. However, some business reports indicate that going green can save as much as 40 per cent of costs on water, energy and unnecessary product waste, which is a great deal of money. Many companies, big and small, are already considering it their corporate responsibility to act for the social and environmental good.

Thank you very much for the interview.

Improving patient experience in daily dental practice

Five considerations to boost treatment acceptance

By Peter Bering, Denmark

According to a Wolters Kluwer Health survey, 86 per cent of patients believe they have to take a more active role in their own health care experience in order to ensure a better quality of care. Almost a third of patients expect this experience to be the same as any other customer experience, that is complete with choices and control.

However, 16 per cent of the adult Danish population have completely avoided going to the dentist for the past five years. Moreover, a Danish study has shown that 64 per cent of patients



distrust, especially when it comes to financial issues, regardless of the dentist's personal integrity. This often causes patients to opt out of the proposed treatment.

3. *Treatment concerns:* Almost 50 per cent of patients indicate some level of treatment barrier or anxiety. An estimated 19 per cent of patients are so anxious that it directly influences treatment, and almost 30 per cent have specific stressors that are often unknown to the staff treating them.

4. *Black box communication:* Not sharing your reasoning, diagnostics or process with the patient may be discomforting to him or her. In addition, many patients are not very explicit or precise in their communication and rather passive, giving the dentist very little to work with.

5. *Feelings:* Dentistry is personal and intimate. Patients may forget what you say and forget what you did, but they will never forget how you made them feel.

refused a highly necessary, but more extensive, treatment. This article discusses five aspects to consider in order to improve patient experience and, thus, treatment uptake in dental practice.

You have invested a great deal of money in attracting new patients and they are starting to tickle in. You thoroughly examine patients and base your treatment recommendations on evidence-based methods and years of experience. You always produce a solid treatment plan and are ready to deliver technical perfection. However, there is one problem: the patient does not opt for the treatment.

Why is that so? You need to ask yourself the following questions: Are you aligned with the patient's desires? (e.g. I'd like to be able to chew apples when I'm 80 years old) Is the outcome of the treatment understood by the patient? Is the outcome important to the patient?

Do you know the answers to all of these questions? Really know? Or do you just think you know? Before you invest time and money in attracting patients to your practice, consider these five points:

1. *Not knowing the patient's preferences and desires:* A concentrated focus on the professional evaluation of dental health needs and less on the patient's perception of his or her own dental health, aesthetics and outcomes may result in misalignment with the patient.

2. *Lack of trust:* The dental experience is based on trust, which is influenced by factors such as credibility, dependability and level of self-interest. Certain patient groups exhibit extreme

Patient insight and effective communication

Converting treatment is a matter of patient insight and effective communication. Access to research-based patient insights can both positively influence quality of care and lead to improved dentist-patient communication and relationships.

The dental experience is personal, memorable, and adds value to patients' lives. Thus, by creating a better patient experience, you can significantly improve treatment uptake. In short: know the patient; determine the treatment.

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Peter Bering is an experienced digital business developer and trend researcher working with dental clinics around the world to help them grow their business. He regularly gives insight into his work at copeit.com/blog-uk and can be contacted at peter@copeit.com.

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Evaluating the cariogenicity of food ingredients

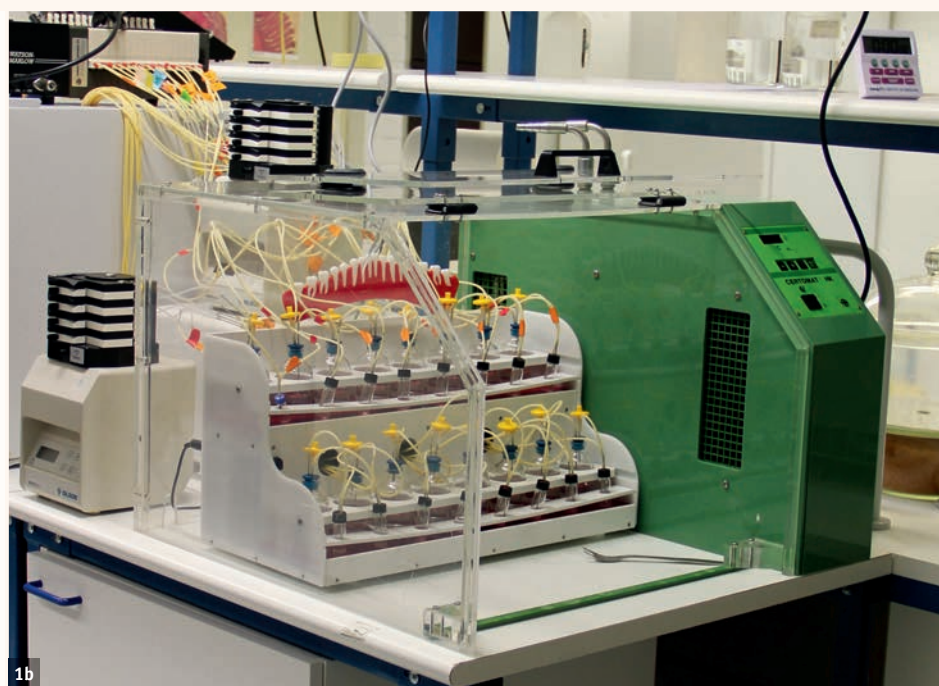
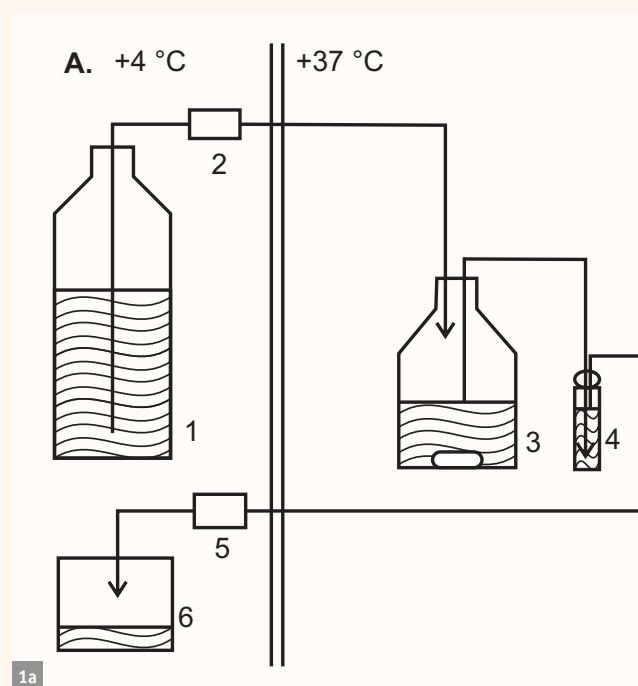
By Krista Salli, Finland

Worldwide, 60 to 90 per cent of schoolchildren and nearly 100 per cent of adults have dental caries, making untreated tooth decay the most common oral condition.^{1, 2} Caries and periodontal disease share many risk factors with non-communicable diseases, including tobacco use, high sugar intake and lack of exercise.³ Therefore, behavioural changes are needed to decrease the risk of developing these diseases. For caries specifically, the frequency and amount of sucrose consumption should be reduced.⁴ This improvement in dietary habits would be beneficial to general health as well.

In some cases, such as studies on food intake, body weight maintenance, glycaemic response, serum lipid profiles, blood pressure and the effects of sucrose-containing medication, sucrose or sucrose-containing products are still used as a comparator in clinical studies.^{5, 6} In dental caries-related randomised clinical trials, the use of sucrose as a comparator can be considered unethical, as the correlation between sucrose consumption and caries incidence is well established. Consequently, many of the studies investigating the association between sucrose consumption and caries are cross-sectional or population studies. To date, there are few non-randomised interventions and cohort studies that have evaluated this. A recent meta-analysis on studies from as early as the 1950s found that collectively these studies showed that oral health outcomes improved as sucrose consumption was reduced.⁴ Diet and nutrition can affect tooth de- and remineralisation in both protective and destructive ways. Frequent consumption of fermentable carbohydrates increases acid production and favours aciduric bacteria and thus caries development, but a healthy diet, low in added sucrose and high in calcium, fluoride and phosphate, can benefit mineralisation.⁷

Therefore, in addition to clinical trials evaluating the cariogenicity of foods using comparators other than sucrose, different ways of estimating the cariogenicity of foods or food ingredients are needed. These include animal trials, enamel slab experiments, plaque pH evaluation and laboratory methods.⁸ Animal, mostly rat, caries experiments provide the means to control diet or single food ingredients carefully.⁹

Animal studies have been used to evaluate frequency and amount of sucrose consumption, starch and milk cariogenicity, and frequency of fruit consumption



Figs. 1a & b: (a) Schematic diagram of the dental simulator.²⁸ 1. Reservoir for artificial saliva/artificial saliva with test substances. 2. Inlet pump. 3. Simulation vessel with constant stirring and added bacteria. 4. Sample collection during simulation. 5. Outlet pump. 6. Waste. (b) Photograph of the dental simulator.

in relation to caries.¹⁰ If possible, it is suggested that animal trials should be combined with plaque

Periodically, the appliances are placed in experimental solutions, and then caries development re-

like cheese, starch and cookies has been evaluated using enamel slab methods.⁸ The plaque pH method,

genicity, as foods or food ingredients may also have possible protective factors.¹⁰

“Diet and nutrition can affect tooth de- and remineralisation in both protective and destructive ways.”

pH or intra-oral methods to gain more information.⁸ Intra-oral or enamel slab models utilise appliances with real or modelled enamel or dentine that are kept in the oral cavity by volunteers.

lated factors are measured.⁹ The benefits of enamel slab experiments include the presence of saliva, oral microbiota and mastication, in addition to test products. The cariogenicity of foods

which is a means of following the pH of the plaque during and after eating, is another useful tool for evaluating acidogenicity of food items.⁹ It should be noted that acidogenicity is not equal to cario-

In addition to all the above-mentioned methods, laboratory models of varying degrees of complexity exist. In these models, depending on the research question, there may be no bacteria present or they may be pure culture studies or multispecies models or use salivary microbes in the model. These models cannot evaluate caries development per se, but factors that increase the risk of caries, including demineralisation, acid production, oral pathogen growth and microbial dysbiosis.

Studies on determining the cariogenicity of foods and food ingredients are limited. Most research has focused on sucrose, various sucrose-containing products, starch and alternative sweeteners, such as polyols. Evaluations of dairy products and fruits have been performed too.¹⁰ Among the polyols, xylitol has received interest since the 1970s when the Turku sugar studies were performed.¹¹ Xylitol is used widely as a sugar substitute. It is not metabolised by mutans streptococci, thus substituting sucrose with xylitol reduces the substrate for acid-producing



Fig. 2: The author presenting her latest research at the FDI Annual World Dental Congress in Poznań in Poland.