Dental Tribune

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PATIENT PROFILING

Esben Toftdahl Nielsen on how the PI Dental solution uses data intelligence to improve patients' dental experiences.

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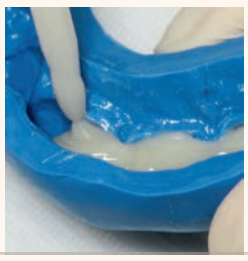

THE MOCK-UP

Easily performed in daily practice, the dental mock-up is a reversible technique with benefits for both patients and practitioners.

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***today* SWEDENTAL**

Read all about Scandinavia's largest dental show in our *today* specialty section included in this issue.

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Bruxism and implant failure

By DTI

MALMÖ, Sweden: Affecting up to a billion people worldwide, bruxism is a common disorder that can cause severe damage to the dentition and dental restorations. In addition, the findings of a new study from Malmö University suggest that excessive tooth grinding or jaw clenching may be linked to a higher implant failure risk. In the study, implant failure rates were three times higher in bruxers than in patients without the parafunctional habit.

Aiming to investigate the association between bruxism and the risk of dental implant failure, the researchers analysed data on 3,549 implants that were placed in 994 patients. Of these, 56 patients (with 185 implants in total) suffered from bruxism. Overall, 179 implants were reported as failures among both groups.

A study from Malmö University has found that implant failure was more common in patients with bruxism.

Comparing implant failure in patients with bruxism to patients without the condition, the Swedish researchers found that the failure rates were 13 per cent and 4.6 per cent, respectively. Thus, the risk of losing an implant was almost three times higher in the bruxer group in the current study.

The analysis further showed that bruxism was more common in men and failure rates were higher for short and wide im-

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Dental fear heritable

By DTI

MORGANTOWN, USA: Psychologists in the US have found that, in addition to environmental factors, genetic influences play an important role in the development of dental fear and anxiety. The study, which included 1,370 participants (aged 11–74), of whom 827 were female, demonstrated that fear of pain, a problem related to, but separate from dental fear, is heritable.

The researchers found that some of the genes that influence fear of pain likely influence dental fear too. They believe that the new findings could have important implications for improving future dental treatment, as a better understanding of dental anxiety could lead to the development of interventions aimed at reducing distress that is a barrier to seeking dental care.

Oral cancer therapy

By DTI

COPENHAGEN, Denmark/LUGANO, Switzerland: Compliance is a major issue in medical therapy in general. Non-adherence may impact the efficacy of treatment and survival, with high costs for the patient and health care system.

In a new study, conducted by the European Society for Medical Oncology (ESMO), 111 patients (median age of 70) underwent a neuropsychological test and completed a questionnaire one month after they had started their first exclusive oral therapy. Global cognitive impairment was observed in 50 per cent of the participants. According to the researchers, the overall adherence rate was 90 per cent. However, working memory disorders and depression were significantly associated with and appeared as predictors of non-adherence.

The findings indicate that oncologists need to take cognitive functions before initiation of oral anti-cancer therapy into account too, in order to identify patients who are more likely to fail in self-management of oral anti-cancer therapy. "I believe the current concept of adherence is too narrow i.e. physicians expect patients to take their medication as prescribed and non-adherence is considered a form of disobedience," said Dr Bettina Ryll, Chair of the ESMO Patient Advocates Working Group.

The findings of the study were first presented at the ESMO 2016 Congress, which took place from 7 to 11 October in Copenhagen.

AD

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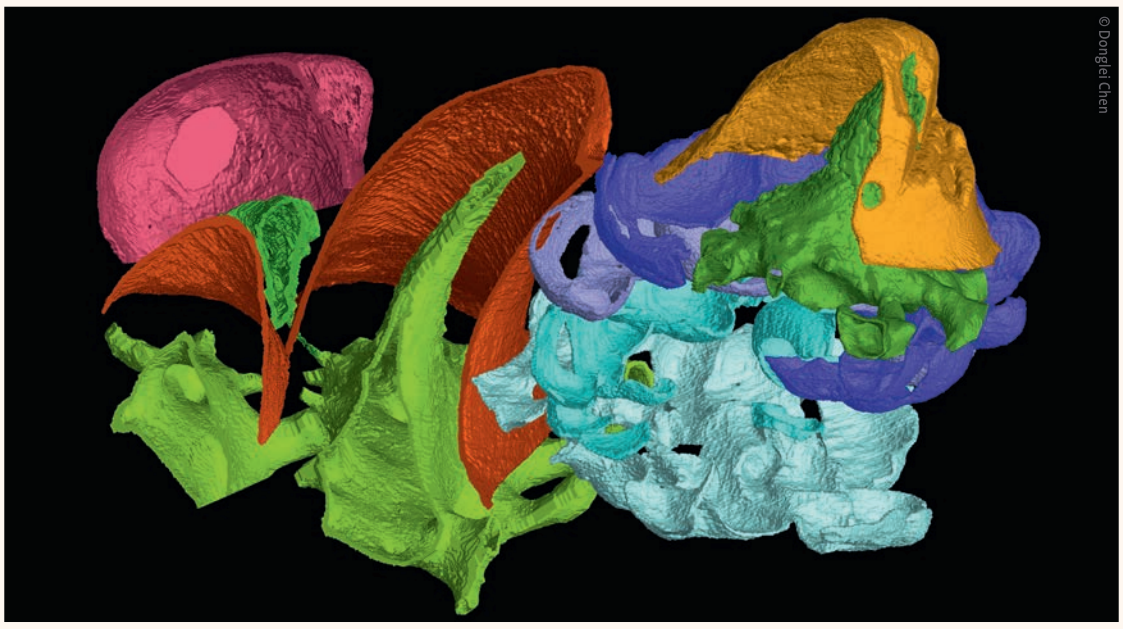
Study investigates process of tooth loss and replacement

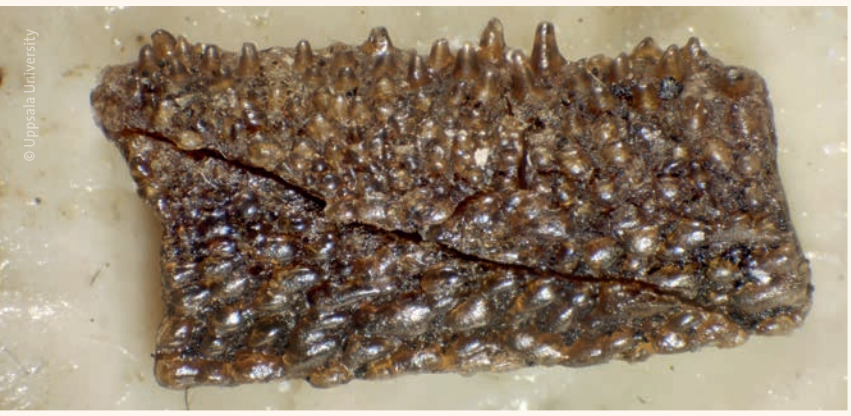
By DTI

UPPSALA, Sweden: By investigating the jawbone of a 424 million-year-old fossil fish, researchers from Uppsala University in Sweden and the European Synchrotron Radiation Facility (ESRF) in Grenoble in France have aimed to gain insights into the process of tooth replacement. Their findings will help scientists better understand the underlying cellular mechanisms of tooth growth and resorption.



A 3-D image of the jaw's tooth replacement sequence. Replacement teeth (in gold) sitting on a stack of resorption surfaces, evidencing that this tooth site was replaced four times. In contrast, the tooth-like odontodes (in red) and the gap-filling odontodes (in pink) never experienced basal resorption.

The jaw investigated in the study originated from a fossil of the *Andreolepis* fish, which was found in Gotland in Sweden. Less than a centimetre in length, the microstructure of the bone is perfectly preserved and contains a record of its growth history. According to the researchers, the fish represents the earliest known example of tooth shedding by basal resorption.



The jaw investigated in the study originated from a fossil of the Andreolepis *fish.*

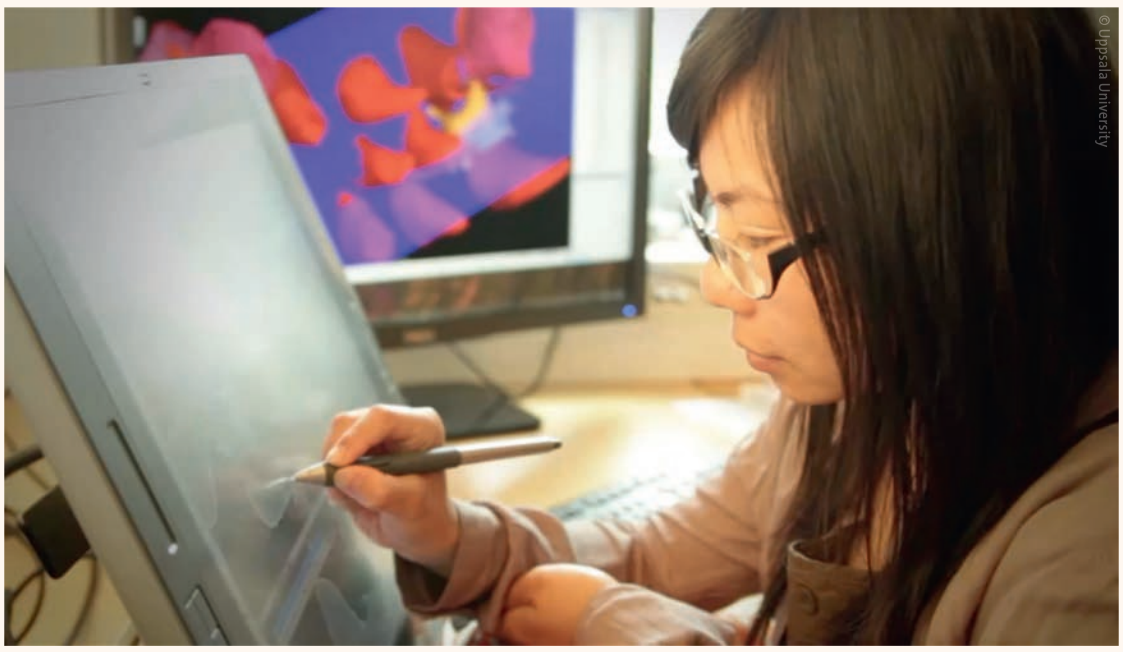
While until recently it was only possible to see internal structures by physically cutting thin sections from the fossil and viewing them under the microscope, the researchers applied a different technique, synchrotron microtomography, in the current study. At the ESRF, they produced tomographic scans that captured the same level of microscopic detail, but in 3-D and without damaging the specimen. Virtually dissecting the scan data on the computer screen, lead author Donglei Chen spent several years producing a 3-D map of the jaw's entire sequence of tooth addition and loss.

"Every time a tooth was shed, the resorption process created a hollow where it had been attached. When the succeeding replacement tooth was cemented in place by bone of attachment, the old resorption surface remained as a faint buried scar within the bone tissue," Chen explained. "I found up to four of these buried resorption surfaces under each tooth, stacked on top of each other like plates in a cupboard. This shows that the teeth were replaced again and again during the life of the fish."

This is the first time that an early fossil dentition has been analysed in such detail, the research team stated. The results suggest that new replacement teeth developed alongside the old ones, rather than underneath them like in humans. Moreover, the mechanism seems to be most similar to the process of tooth replacement seen today in primitive bony fish such as gar (*Lepisosteus*) and bichir (*Polypterus*).

"The amount of biological information we get from the scans is simply astonishing. We can follow the process of growth and resorption right down to cellular level, almost like in a living animal," stated Prof. Per Ahlberg, one of the leaders of the project. "As we apply this technique to more early vertebrates, we will come to understand their life processes much better—and no doubt we will be in for some major surprises."

The study, titled "The stem osteichthyan *Andreolepis* and the origin of tooth replacement", was published online on 17 October in the *Nature* journal.



Donglei Chen spent several years producing a 3-D map of the jaw's entire sequence of tooth addition and loss.

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plants. Other risk factors associated with higher implant failure rates were smoking, Type 1 diabetes, medication for high cholesterol and hypothyroidism, antidepressant drugs and proton-pump inhibitors.

The researchers concluded that bruxism could be associated with an increased risk of dental implant failure. However, in investigating the underlying causes, other risk factors, including implant length, implant diameter, implant surface, habits such as smoking, and intake of certain medication, have to be taken into consideration as well, the researchers emphasised.

The study, titled "Bruxism and dental implant failures: A multilevel mixed effects parametric survival analysis approach", was published in the November issue of the *Journal of Oral Rehabilitation*.

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Improved oral care for special needs patients

By DTI

COPENHAGEN, Denmark: In a new report, titled *Modernisering af omsorgstandplejen*, the Danish Health Authority has called for significant changes in municipal oral care for disabled and elderly citizens. The working group responsible for the report recommended that dental care for people living in sheltered housing units and care homes be improved. Moreover, it urged municipalities to find ways to better inform eligible patients and their relatives about existing services.

In Denmark, statutory municipal dental care services are offered to people whose self-care is so limited that they need help performing basic daily functions or any self-care. Services for patients who are have trouble accessing general adult dental care include financial and practical help for transport to and from specialty clinics, among others.

It is estimated that the target group for municipal dental care is up to 63,000 Danes. However, according to figures in the report, only 25,000 of the eligible persons received this service in 2015. Therefore, the report recommends that means of informing citizens of existing offers, as well as referral mechanisms, be expanded in the future.

As the target groups for municipal dental care and specialty dentistry often overlap, the report further suggests that both care programmes be amalgamated into one common dental service. According to the authors, this would likely make better use of resources, strengthen dental care staff competencies and simplify administration for municipalities.

"We are very pleased with the new and concrete recommendations regarding how the special oral care programme may work better. The Danish Dental Association has been looking forward to this for years," remarked Danish Dental Association President Dr Freddie Sloth-Lisbjerg concerning the release of the report earlier this month.

The working group that drafted the report was multidisciplinary and included representatives from Kommunernes Landsforening (the local government association), the Danish Association of Dental Hygienists, the Danish Dental Association and Landsforeningen af Kliniske Tandteknikere (the national association of clinical dental technicians).

"The experiences in the report demonstrate just what a good result one can achieve when one involves professionals from the fields of nursing and dental care," Sloth-Lisbjerg said. The full report can be accessed at the Kommunernes Landsforening website, *www.kl.dk*.

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The Danish Health Authority recently released a new report targeting oral care for people with special needs. The report's recommendations mainly focus on strengthening prevention, treatment, referral and organisation of municipal oral care.

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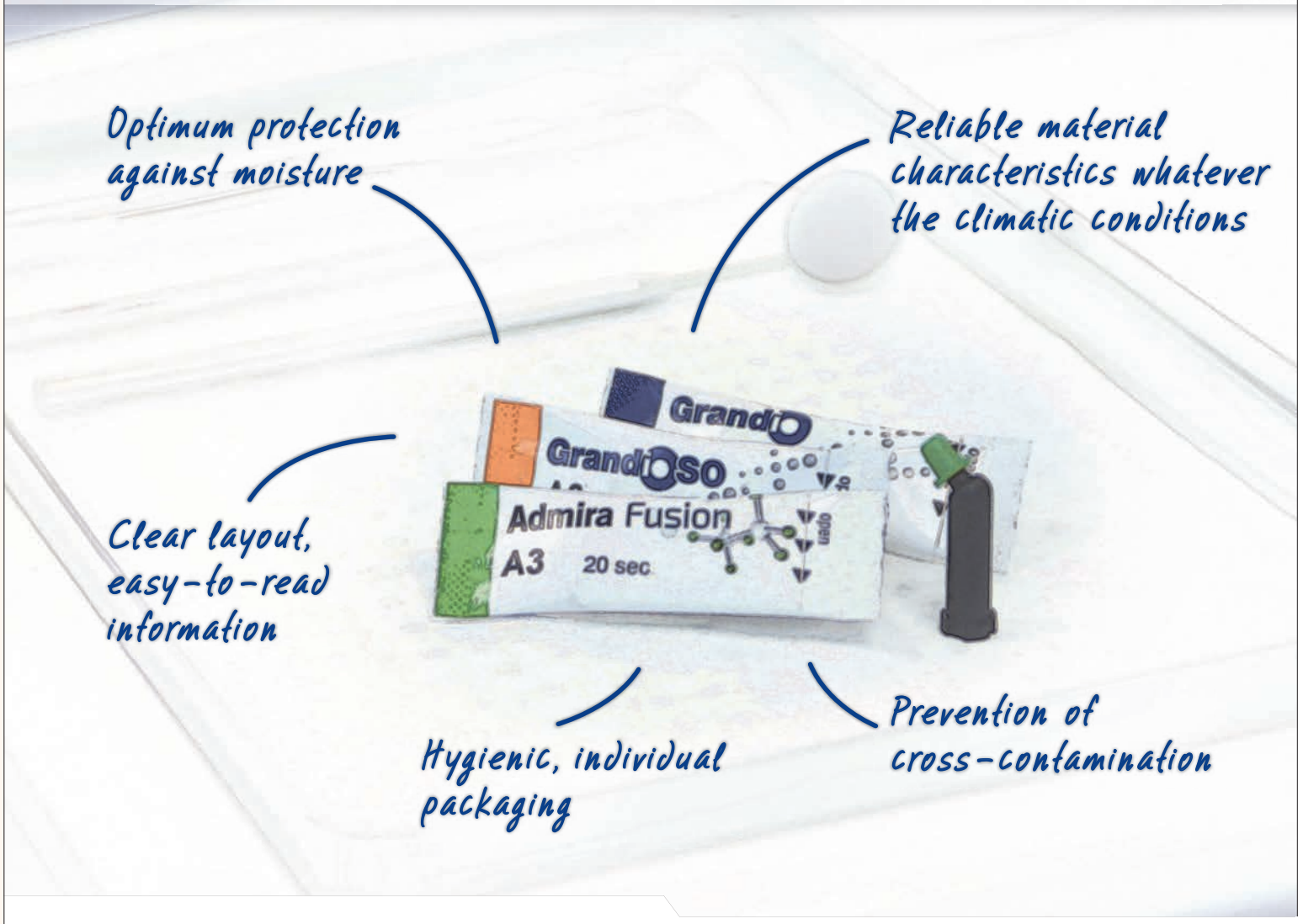

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VOCO THE DENTALISTS

Plaque-identifying toothpaste could reduce risk of heart disease and stroke

By DTI

BOCA RATON, Fla., USA: Health experts worldwide agree that oral health and inflammatory diseases, such as cardiovascular disease and stroke, are correlated. A recently published study has shown that users of a toothpaste that identifies plaque buildup on teeth also exhibited lower levels of a heart disease marker, suggesting that the toothpaste resulted in statistically significant reductions in dental plaque and inflammation throughout the body.

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Brushing one's teeth with a special plaque-identifying toothpaste could help prevent cardiovascular disease.

In the study, 61 healthy individuals (aged 19–44) were randomly divided into two groups. While one group (31) used the plaque-identifying toothpaste for 60 days, the second group (30) used a placebo toothpaste for the same duration. To assess dental plaque, all participants utilized a fluorescein mouthrinse and intraoral photographs were taken under black light imaging.

An analysis showed that the plaque-identifying toothpaste reduced the mean plaque score by 49 per cent compared with a 24 per cent reduction in the placebo group. In addition, laboratory tests in a pre-specified subgroup of 38 participants found that the plaque-identifying toothpaste reduced levels of high-sensitivity C-reactive protein (hs-CRP), a sensitive marker for future heart attacks and strokes, by 29 per cent, while hs-CRP levels increased by 25 per cent in individuals using the placebo toothpaste.

Plaque HD, the toothpaste used in this study, was introduced at the beginning of 2016. It incorporates Targetol Technology, which contains all-natural, plant-based disclosing agents, and colors any plaque and thus helps users remove up to four times more plaque than standard toothpastes do.

The researchers concluded that the observed reduction supports the hypothesis that Plaque HD could reduce the risk of cardiovascular disease. However, a large-scale randomised trial of sufficient size and duration is needed to verify the results, they stated.

The study, titled "Randomized trial of plaque identifying toothpaste: Dental plaque and inflammation," was published online on 19 October in the *American Journal of Medicine* ahead of print. It was conducted at Florida Atlantic University in the US.

New review: Oral health education by itself is ineffective in preventing caries

By DTI

MELBOURNE, Australia: Evaluating the effectiveness of oral health promotion strategies for preventing dental caries and periodontal disease among children, researchers from the Cochrane Public Health Group have found that oral health education alone, such as classroom lessons, videos, comics and brochures, was ineffective.

From analysis of the results of 38 international studies, the Cochrane researchers found that oral health education as a standalone measure, had no significant impact on caries in permanent or primary teeth and surfaces. Nonetheless, some of the studies reported improvements in gingival health, oral hygiene behaviours and oral cleanliness, the review showed.

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International researchers from the Cochrane Public Health Group have aimed to determine which promotion strategies are most effective and equitable in preventing poor oral health.

"There is a general perception that oral health education will change oral health risk behaviours and promote good oral health practices," commented Dr Shalika Hegde, a research fellow at Dental Health Services Victoria in Melbourne and part of the Cochrane Public Health Group, on the findings in an article on *DrBicuspid.com*. "However, this thinking is fundamentally flawed, as knowledge gained alone will not lead to sustained changes in oral health," Hegde emphasised.

When coupled with other measures, such as supervised toothbrushing with fluoridated toothpaste, oral health promotion interventions were generally found to be effective in reducing caries in children's primary teeth. Moreover, oral health education provided in an educational setting, combined with professional preventative oral care in a dental clinic, was effective in reducing caries in children's permanent teeth, the researchers found.

Another most promising intervention approach for reducing caries in children—although additional research is needed—appears to be improving access to fluoride in its various forms and reducing sugar consumption, Hegde told *Dental Tribune*.

Generally, the findings of this review will have global implications in the area of models of oral health care delivery and oral health promotion, research, policy and practice, Hegde concluded.

The review, which was the first of its kind at an international level, included data on 119,789 children in 21 countries from studies conducted between January 1996 and April 2014. All of the studies reviewed focused on community-based oral health promotion interventions for preventing caries and periodontal disease among children from birth to 18 years of age.

The review, titled "Community-based population-level interventions for promoting child oral health", was published online on 15 September in the Cochrane Database of Systematic Reviews.

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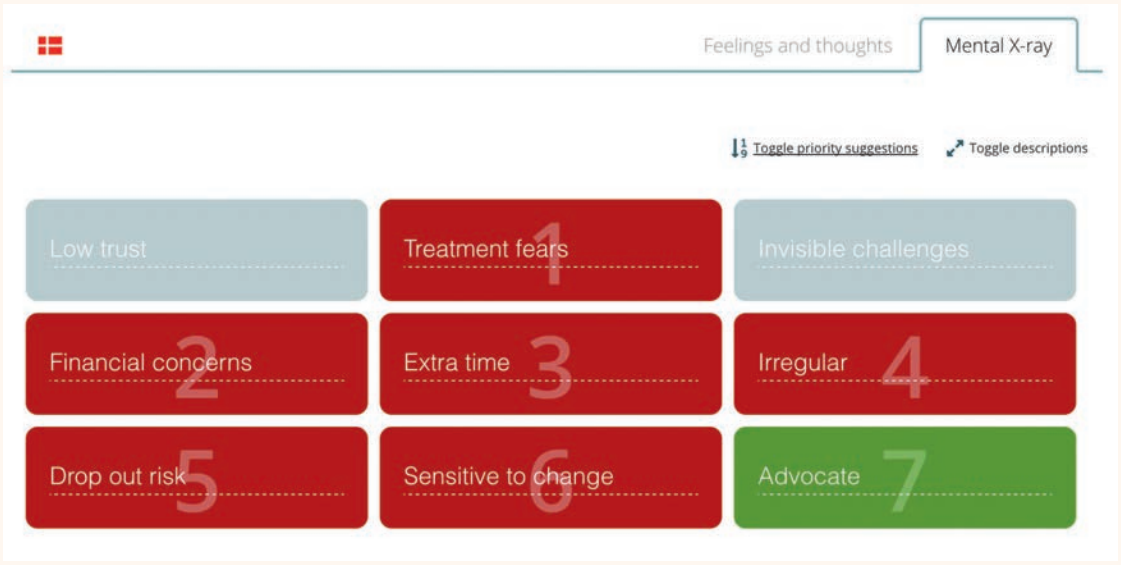
"Dentists can have much better conversations with patients"

An Interview with Cope it CEO Esben Toftdahl Nielsen, Denmark

Cope it CEO Esben Toftdahl Nielsen



The PI Dental mental X-ray screen—the key patient profile screen.

"The patient profile covers two dimensions: needs and desires, and treatment barriers."

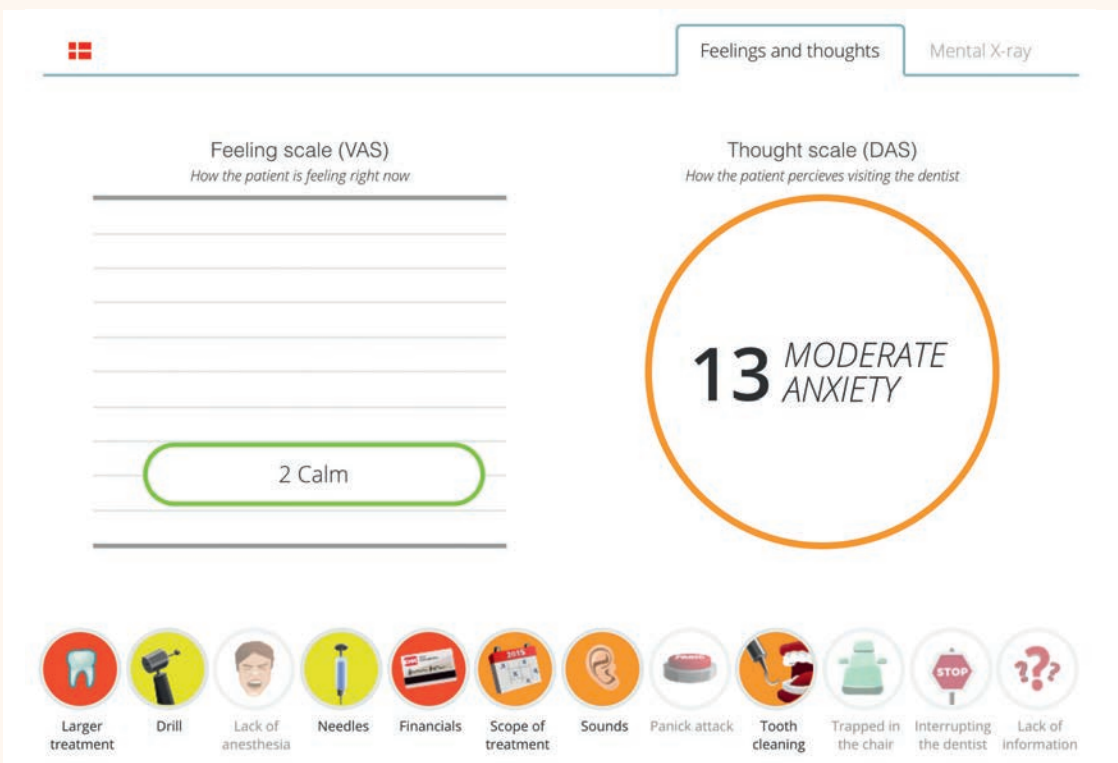
By Kristin Hübner, DTI

Aiming to help patients suffering from dental anxiety, Danish start-up Cope it introduced a digital anxiety treatment tool in June 2014. The solution consists of clinic software and an accompanying mobile app. Practices using the system ask their patients to answer a dental anxiety scale test on a tablet device prior to the visit. Through the test, they determine what situations trigger the patient's anxiety most. The information collected is then used by the dentist to evaluate the patient's current level of dental fear. This, according to the developers, enables clinicians to respond more effectively to the special needs of these patients.

In the last two years, much has happened, Cope it CEO Esben Toftdahl Nielsen told *Dental Tribune* in an interview. In 2015, the digital tool was named Product of the Year by the organisers of Danish dental exhibition SCANDEFA in Copenhagen. This year, the company redirected its focus from giving practitioners insights into patients with dental anxiety towards a broader approach of using data intelligence for generally improving patients' dental experiences too.

Dental Tribune: The Cope it clinic software is aimed at helping patients with dental anxiety. What has the feedback from patients and practitioners been?

Esben Toftdahl Nielsen: It has been well received by both dentists and patients. The information acquired through the solution has proved invaluable for dentists, as before the patient even sets foot in the surgery room, the practitioner has a very good idea of his or her core needs and how his or her treatment can be personalised. Furthermore, we have seen that patients who are just slightly anxious have felt that their dentist better understands them because of the advanced mental profile of the patient obtained via the software. This results in better care for patients, as well as increased treatment uptake.



Feelings and thoughts are assessed in order to gain in-depth insight into the patient.

How did the company develop, and what has your experience as young entrepreneurs been?

We launched the solution in Denmark in 2014. Since then, we have expanded to the UK, Hungary and Australia in collaboration with great partners. In the rest of the world, we provide the solution along with an online training course.

Our key challenge as a start-up company has been to gain access to prospective customers. Dentists have full schedules and focus their attention on their patients—as they should. Our job has been to make our offering appealing to dentists. We do so in collaboration with our partners in the industry, as well as via our blog—which has a growing audience.

Furthermore, we changed the name of the software to "PI Dental" just a few months ago. It stands for "Patient insight—for dental clinics". Our purpose was to create a stronger link to the dental community with a solution with a dentistry-related name.

You also expanded the use of the tool to gain more general patient insight.

The adjustment to our offering was driven by customer demand. Quite quickly, our customers asked us whether we could make patient profiles that did not only focus on identifying patients with dental anxiety, that is they desired a more comprehensive dental assessment of the patient, thereby making the solution even more useful. This is now a core part of PI Dental as well. The patient profile covers two dimensions: needs and desires, and treatment barriers. With this information, dentists can have much better conversations with patients.

Your company actively uses social media to keep customers and clients up to date. Why do you think that is important today?

As mentioned earlier, dentists have a tight treatment schedule and spend the majority of their time with patients. For that reason, we communicate our message to dentists via several channels and, among those, online channels are a great means of communication today. We focus mainly on our blog, *www.copeit.com/blog-uk*, which provides the latest insights into our work.

Thank you very much for the interview.

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Going green: The bottom-line benefits of green dental office design

By James Kuester, US

There is much talk these days about climate change and how we need to go green. Besides being better for the environment, a building designed according to green principles has several benefits: it is healthier for you, your patients and your staff. Moreover, a green building lowers one's utility and operating costs and boosts the sales value of the building. Lastly, adopting green practices provides an enhanced marketing opportunity for the dental office to attract and retain patients. Keeping these advantages in mind, let us look at some of the things one needs to consider when making the decision to build an eco-friendly practice.

There are five aspects that we will examine as we explore designing a green dental office: site selection, alternatives to building new, ways to design to reduce both energy and water usage, eco-friendly materials, and Leadership in Energy and Environmental Design certification.

Site selection

What are some of the things one needs to consider when selecting a site for a new dental office? First, one should look for a site where the building can have an east–west orientation. One should also look for a brownfield site, a site that has already had development on it, versus a greenfield, which is one where there has never been any development or building on the site. One should look for a site that is in a higher density area and close to existing utilities and access. Lastly, one should look for a site that is transportation friendly.

An east–west orientation has been found to be the best situation on a site for a building to take maximum advantage of natural wind flow in order to provide good natural ventilation in the space. Siting a building as such places its longest axis parallel with the movement of the sun to make maximum use of sunlight for natural lighting, as well as energy production, as photovoltaics are utilised in energy production **(Fig. 1)**.

A brownfield site limits the destruction of the existing, undisturbed vegetation and ecosystem compared with that of a greenfield or virgin site that has never seen development. Also, even if building on a brownfield site, if there are existing trees, one should try to limit the number of trees removed during construction, as mature trees help provide natural cooling for the building.

1

Locating the new dental office in a higher density area helps increase the likelihood that it will be pedestrian friendly and thus encourage patients and staff to walk to the office. Look at whether there are sidewalks to the building site and whether they are tied into municipal sidewalks. Having a sidewalk in front of the building that does not connect to a larger network of walkways does nothing to encourage walking, especially if patients have to cross multiple lanes of busy traffic or a large expanse of a busy parking lot.

Additionally, one should look to locate the dental office near existing public transportation stops. Within 0.4 km is considered ideal for encouraging patients and staff to make use of public transportation. A location near a commuter parking lot can help encourage patients to cluster their appointments at the beginning or end of their workday, before or after heading off on public transit to get to and from work. Locating the office near existing bicycle lanes and providing safe, secure parking for patients' bicycles can help promote cycling to appointments **(Fig. 2)**. Lastly, locating the office near other businesses that patients and staff frequently visit, such as supermarkets, pharmacies and dry-cleaners, helps reduce carbon emissions by reducing car usage.

2

Alternatives to building new

Rather than building a new dental office, one could consider renovating an existing structure. Renovating can significantly reduce the carbon footprint of the new dental office by making use of the existing shell of the building. This prevents the loss of all of the embodied energy contained within that building shell and prevents the consumption of all of the additional energy needed to build a new one. Renovating avoids the destruction of the existing ecosystem, as the site has already been developed. Typically, few, if any, trees need to be removed during renovation of an existing building and the natural rainwater run-off of the site has already been altered.

When renovating an existing building, however, it is important that one have the indoor air quality checked. Existing buildings can often contain carcinogens such as asbestos in old pipe coverings, flooring and adhesives. While the removal or remediation of these items may add to the cost of renovation, the cost of doing so rarely exceeds the cost of new construction.

Reducing both energy and water usage

Having decided to design a new dental office, what are ways one can design to reduce energy and water usage in the new space? One of the best things to do right at the start is to design an office that is as small and efficient as possible. A smaller space contains less embodied energy, since less materials are used to construct it. A smaller space requires less energy to heat, cool and illuminate, thus reducing utility costs. Additionally, a smaller, more efficiently designed space increases the productivity of the dental staff and this helps reduce labour costs.

One should make as much use of natural light in the design of the office as possible. Going back to the discussion on site selection, finding a site that offers plenty of natural light that can be incorporated into the design of the office helps to reduce energy costs by reducing the need for artificial lighting and electricity. Research by the Interdepartmental Neuroscience program at Northwestern University in Chicago has found that humans respond better to natural lighting, experiencing it to be more soothing.[1] In a dental office, where patient anxiety is typically already high, anything that can be done to help make the space more calming and reduce stress is good **(Fig. 3)**.

One should make as much use of natural ventilation in the design of the office. In this regard, the east–west orientation becomes important, as it will help maximise the amount of natural airflow through the building. Install operable windows so that they can be opened to take advantage of natural breezes and airflow. Again, research has shown people prefer natural ventilation over air-conditioned air. One should design the building to make maximum use of shade.[2] Large overhangs on the roof and awnings and other building features can be used to create shade. These factors help to reduce cooling costs.

Window tinting can help reduce energy costs. It can reduce solar heat gain by as much as 54 per cent and can block up to 99.9 per cent of ultraviolet radiation.[3] Ultraviolet light is damaging to finishes and fixtures, and protecting them from the ultraviolet light will help extend their life and increase their return on investment.

One should design to make use of LED (light-emitting diode) or compact fluorescent lighting throughout the new office. The former use only about 20 per cent of the electricity of an incandescent bulb and the latter use about 30 per cent of the energy. An incandescent or compact fluorescent lamp shines indiscriminately, wasting a significant amount of its light inside the fixture.[4] An LED lamp is monodirectional and shines light only on the

location where one wants it. Thus, there is no wasted light.

Installing motion sensors in rooms so lights are only on when someone is present also helps reduce energy usage. While these may not be practical in areas such as waiting rooms or operatories, in other less trafficked areas, such as restrooms, storage rooms or staff lounges, they can work well. Also, installing a programmable thermostat so the building is not being overly heated or cooled during off-hours helps reduce energy consumption and costs.

Whether building new or renovating, the building must be insulated properly for the climate zone of its location. Having adequate insulation can save up to 20 per cent on heating and cooling costs, especially when combined with proper seals on windows and doors.[5]

Every new building and even some renovated ones need new roof systems. Designing the roof to be light or white in colour is more energy-efficient than a dark one, as these colours reflect the solar energy away from the building rather than absorbing it, which would cause the building to become a heat island. If possible, one should consider installing a living roof system. These systems help reduce rainwater run-off, reduce cooling costs for the building, and when visible from the ground, attract and retain patients, as people find them appealing. One could also consider installing photovoltaics. Today's solar panels are much more efficient and affordable than the panels of the 1970s and 1980s, with integrated photovoltaics possible **(Fig. 4)**.

Rather than installing a hot-water tank in the new office, one should design for in-line hot-water systems. These systems provide hot water on demand, thus eliminating the need to heat and keep hot a large tank of water. Today's systems are small and compact enough to fit under counters and inside cabinets.

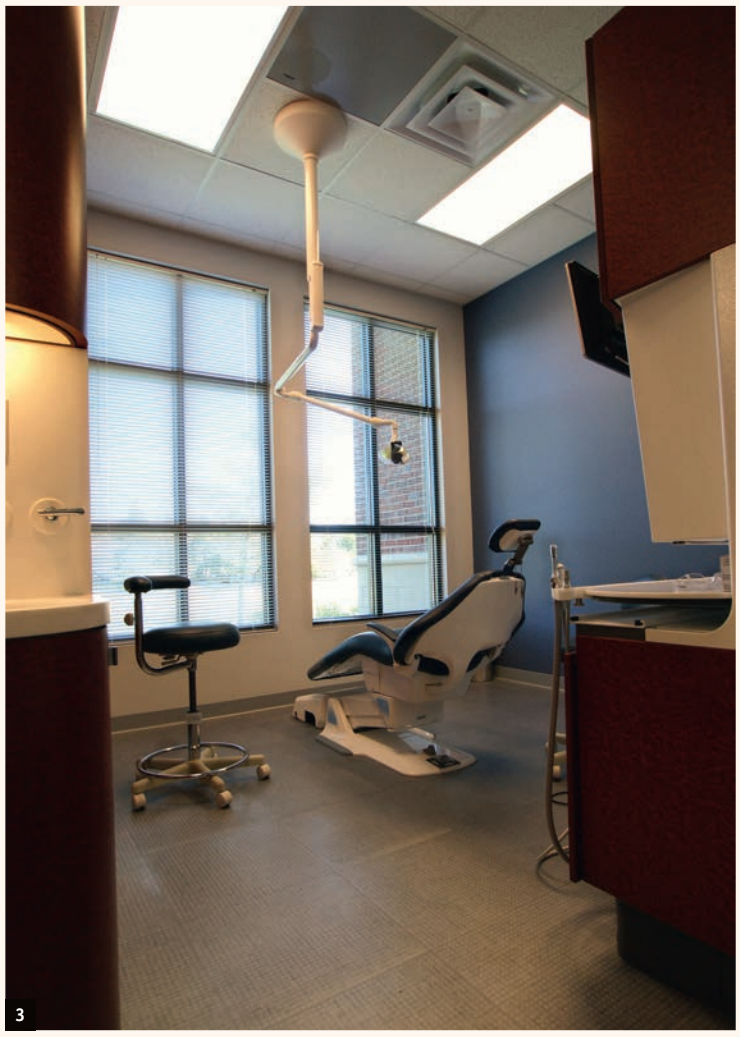
One way to design to reduce water usage is by installing motion-sensing faucets and dual-flush toilets. Both deliver the right amount of water to do the job and eliminate or at least reduce water waste.

Eco-friendly materials

Making environmentally sound material and finish choices during the design of the office can help reduce the new office's carbon footprint. Dental practices contain a high number of cabinets and counter-tops and these need to be able to provide a high level of sanitation and infection control, especially in operatories, laboratories and sterilisation areas. In these areas, quartz provides an eco-friendly option. Quartz is non-absorbing and the most sanitary material choice next to stainless steel. Quartz will not promote the growth of bacteria or mould. One should look for a source that is within 800 km of one's location to avoid or reduce high transportation costs.

Away from areas of high sanitation needs, one can consider other materials, such as reclaimed wood, concrete or terrazzo, as a counter-top material. Reclaimed barn wood is very popular right now in counters, counter-tops and floors. These materials offer a wide range of design options, are attractive and can readily be recycled at the end of their useful life.

On the floor, one can look to eliminate unnecessary material by leaving the floor as stained or polished concrete, if possible. This gives a great aesthetic, but is probably not a good choice in operatories and other areas of high sanitation control, as concrete tends to be porous. Furthermore, it can promote lower back and leg pain if one stands on it for long periods. In these areas consider a sheet vinyl that has a high degree of recycled content, can be recycled at the end of its life and is installed using welded seams. The reason for the welded seams is to eliminate cracks that are difficult to keep clean and where bacteria can hide.



3

On the walls, one can consider using only a zero volatile organic compound paint. While vinyl wallcoverings have been popular in health care for many years, it is one more material that requires energy to produce and adds to the carbon footprint of the office. When choosing a vinyl wallcovering, one should select one that has a high recycled content and is recyclable at the end of its useful life and with zero emissions of volatile organic compounds in the case of both it and its adhesion method.

Lastly, the upholstery throughout the office should be designed to be green. While in a dental office the upholstery needs to aid in infection control, there are plenty of fabric options available that have a high degree of recycled content, are recyclable at the end of their useful life, have a high wear factor for use in commercial settings, and are bleach cleanable to reduce the spread of infection.

Whenever and wherever possible, one should reuse materials such as doors, door frames, cabinets, cabinet and door hardware, and lighting. This reduces the amount of material going into landfills and reduces the total carbon footprint of the new office. Especially when remodelling, one can breathe new life into existing fixtures to give the office a clean, fresh appearance without having to buy everything new.

When looking to build or remodel, one should search for a contractor who is on board with the project's energy-reducing goals, one who is willing to commit the time to segregating waste materials and diverting them to the proper recycling centres. Many carpet, wallcovering and restroom fixture companies are willing to take old materials back and recycle them into their new ones. While this takes extra effort on the part of the contractor, doing so helps reduce the project's total carbon footprint.

4

Leadership in Energy and Environmental Design

Now that you have decided to build a green dental office, consider having the project LEED certified. Leadership in Energy and Environmental Design (LEED) is a program by the US Green Building Council (USGBC) that has become a global standard for certifying that buildings are designed and built to reduce energy and water usage, as well as their carbon footprint. A 2008 study by the CoStar Group found that LEED buildings command rent premiums of US$11.33 per square foot over their non-LEED peers and have 4.1 per cent higher occupancy. Additionally, LEED certified buildings command a US$171 per square foot premium over non-certified ones at the time of sale.[6]

Designing and building a green or environmentally friendly dental office is not more difficult than designing and building a conventional one, but it requires a bit more planning and thought up front to ensure the choices made during the design process and contractor selection promote the goal of reducing the building's environmental impact. The selection of the office's location, its orientation on the building site and the design of all of its various component parts all contribute to how much energy and water will be saved during the building's useful life. These choices affect the day-to-day operating costs of the practice too. Slowing down up front and taking care in the choices made can help promote both a healthier bottom line for the practice and a healthier environment to work and live in.

One does not necessarily have to wait to build or renovate to attain operating cost improvements and help the environment. There are things that can be done immediately, such as installing a programmable thermostat so the building temperature is always the right temperature for the occupancy at the time. There are a wide variety of LED lamps available now that can be used in almost any existing fixture, so replacing all of the bulbs in the office with LEDs will have an immediate impact on energy use. One can have the existing heating, ventilation and air conditioning system inspected to make certain it is operating at its peak efficiency and make sure all windows and doors are properly sealed. These few steps can have a dramatic impact on reducing energy usage and on the dental practice's bottom line.

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

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*In 2002, **James Kuester** founded Küster Design, which specialises in a full range of interior design services for dental offices. As a LEED Green Associate, Kuester is experienced in applying design principles that reduce energy costs and carbon footprints. He can be contacted at james@kusterdesign.com.*