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Interview

today international sat down with Michael Dreyer (Photo: Welcome Ceremony), Koelnmesse vice president for Asia Pacific, to discuss the outcome of this year's show and what is in store for the anniversary meeting in 2018.

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Aesthetics in focus

Current developments, concerns and future prospects in the field of tooth whitening—discussed by IDEM presenter Dr Linda Greenwall, UK.

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What's on in Singapore

Owing to its rich cultural and culinary scene, Singapore offers something for nearly everyone. Here are some tips how to spend your time off in the Lion City.

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More growth: IDEM looks ahead to anniversary meeting

2018 edition to mark 20 years of Koelnmesse–SDA collaboration



■ With today being the last opportunity for dental professionals from all around the Asia-Pacific region to learn about the latest trends and innovations in their fields at IDEM Singapore 2016, there is no doubt that the show can look forward to a bright future. According to figures from organiser Koelnmesse, this year's edition has been the largest in numbers of visitors and exhibitors since the first meeting was held in 2000.

With final figures to be announced shortly after the meeting, it has already been confirmed that more than 8,000 visitors from all over Asia will have participated in

the 2016 edition of the show. Boasting over 500 exhibitors from 38 countries and 12 national pavilions, the trade exhibition has again proven to be the most important platform for all that is dental trade in the region. When surveyed by *today international* on Saturday morning, the majority of exhibitors were clearly satisfied with the outcome of the show.

Before the doors of the Suntec Singapore Convention and Exhibition Centre close today, however, the programme has much to offer, including the Digital Dentistry Forum, which will advise participants on the use of CAD/CAM technology to restore teeth and plan dental implant procedures. A special lunch lecture, supported by prominent UK dentist Dr Linda Greenwall, will further inform participants of how to incorporate new technologies into clinic routines and provide strate-



• This year's edition has been the largest in numbers of visitors and exhibitors since the first meeting was held in 2000.

gies on overcoming resistance encountered by practice staff implementing them.

Planning is now beginning to turn to 2018, when the next IDEM Singapore is scheduled to be held from 13 to 15 April at the Suntec.

The show will mark 20 years of collaboration between Koelnmesse in Singapore and the Singapore Dental Association (SDA). It will also be the tenth time that IDEM will be held, so participants can look forward to a very special meeting, according to the organisers.

For more information on this year's meeting, please visit the official congress website at idem-singapore.com. The latest news from the show floor is available daily through the *today international* congress newspaper or online at the *Dental Tribune Asia Pacific* website (dental-tribune.asia). ◀

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Useful information

Exhibition opening hours

- Friday, 8 April: 10.00 am–6.00 pm
- Saturday, 9 April: 10.00 am–6.00 pm
- Sunday, 10 April: 10.00 am–4.00 pm

Registration

Dental professionals can still register for IDEM Singapore 2016 onsite at the registration counters on Level 3. There are discounts for members of the Singapore Dental Association, as well as for auxiliary staff and dental students.

Internet

Free wireless internet is available in all areas of the exhibition centre.

Money

ATM machines can be found throughout the Suntec City Mall. Banks in Singapore are open from 9.30 am to 3.00 pm on weekdays, and 9.30 am to 11.30 am on Saturdays.

Embassies

Foreign representation offices can provide help in emergency situations like lost passports or visas. They can also assist with travel arrangements or give legal advice. Contact information for foreign missions other than those provided in the list below can be found at the website of the Ministry of Foreign Affairs (www.mfa.gov.sg).

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“The reach of IDEM into the neighbouring countries and markets has increased”

An interview with Koelnmesse Vice President for Asia Pacific Michael Dreyer

■ This year's International Dental Exhibition and Meeting (IDEM) has been yet another success for organiser Koelnmesse. On Saturday, *today international* sat down with Michael Dreyer, vice president for Asia Pacific, to discuss the outcome of the show and what is in store for the anniversary meeting in 2018.

today international: Mr Dreyer, the first day of the show was buzzing. Is this an indication that IDEM has met your expectations?

Michael Dreyer: The general situation is that we have a 10 per cent growth in both trade visitors and congress delegates. Overall, we are talking about 2,200 delegates and approximately 8,000 visitors. Both numbers have gone up, which is the result of measures we took to correct the situation from two years ago when we used Level 6 for the first time and had difficulty attracting visitors to the floor. This year, we intentionally moved the trade show registration to Level 6, so everyone who wants to visit the exhibition has to go up, get his or her bag, and stroll through the hall. It has worked almost too well, as it took almost 45 minutes yesterday for attendees to come down to Level 4. We also have the lunch area for delegates, as well as the Singapore pavilion in Hall 6, where locals can buy consumables, whereas on Level 4, one can find the more sophisticated, high-

priced equipment. I received some comments yesterday that there could be more traffic on Level 4, however.

hibitors with lower-quality equipment from China, for example. We also have a Brazilian pavilion for the first time, which is show-

With regard to visitors, we have quite a substantial group from Turkey, with more than 100 visitors coming here on the initiative of a few

dentists have come to IDEM in larger numbers. This shows that the reach of the event into the neighbouring countries and markets has increased and this is what we would like to see. There are many dentists from Western Australia, for example, too.

The next show will be a special one because not only is it the tenth time the show will be held, but it also marks 20 years of the partnership between your company and the Singapore Dental Association. What is in store for IDEM 2018 and what can visitors look forward to?

I think we will continue to strive for having the strongest conference programme. We changed the organisation and content management side two years ago with Dr David Alexander from New York replacing Dr Choo Teck Chuan, who went into retirement, as conference director. While this year's programme was a bit of a hybrid, Dr Alexander was able to give it a slightly different direction. For next time, we are considering whether to keep the system of different presentations and forums or to bring everything together. There was a suggestion yesterday from the Singapore Dental Association to involve all the specialist groups in Singapore more. We will definitely look into this and evaluate it after the event with our partners.

Thank you very much for the interview and for a great event. ◀



• Michael Dreyer (second from right) with FDI president Patrick Hescot, Singapore Minister of Health Gan Kim Yong and SDA president Dr Kuan Chee Keong at the ribbon cutting on Friday (from left to right).

You said that there are 10 per cent more visitors at IDEM this year. Where do they come from mainly?

On the exhibitors' side, we have had a shift as a direct result of us reducing the number of ex-

casing some quite interesting products. There has also been a move towards digital equipment, reflecting the general trend of upgrading the technology level and therefore the quality of the event.

exhibitors. For the first time, we also have a large group from India, which is probably due to word of mouth regarding the scientific programme. There are larger contingents of visitors from countries like Indonesia, Brunei and Cambodia. Also, Thai

Trans-Pacific Partnership focus of IDEM presentation

Facts and opportunities explained at DT Study Club symposium

■ Signed two months ago, the Trans-Pacific Partnership (TPP) is expected to come into force later this year when it is voted on by the US Congress. IDEM visitors had the opportunity to learn about the most important aspects of this significant agreement and the opportunities it holds for the markets involved, during a session held on Friday by the US Commercial Service in Singapore at the Dental Tribune Study Club symposium.

Involving existing and new trade partners of the US, such as Brunei, Malaysia, New Zealand, Japan and Vietnam, the main goal

of the TPP is to remove barriers to trade in the form of 18,000 foreign taxes and tariffs and to bring foreign labour and environmental standards up to US levels. An expansion of the existing Trans-Pacific Strategic Economic Partnership, it was first negotiated at a summit in 2010. In February this year, the final draft was signed by the US and four other American nations (Canada, Chile, Mexico and Peru) and seven Asian states (Australia, Brunei, Japan, Malaysia, New Zealand, Singapore and Vietnam).

A cornerstone of President Barack Obama's strategy to make US exports more competitive and revive American business leadership in the Asia-Pacific region, the agreement has been met with controversy at home, particularly during the US primary elections, with some candidates (including Republican candidate Donald Trump and Democratic forerunner Bernie Sanders) speaking out against it.

According to figures from the US Commercial Service, TPP coun-

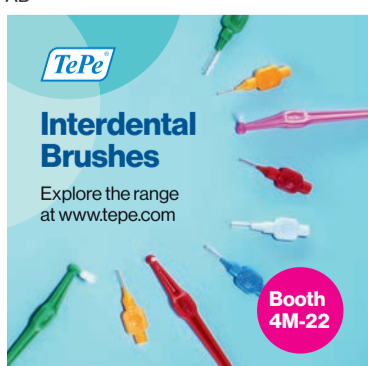
tries currently account for almost half of all US goods imports. Imports of health products to TPP

countries amounted to US\$8.9 billion (S\$12 billion) in 2014. With the agreement, current tariffs of up to

30 per cent paid by companies involved in the health care sector would be removed. ◀



• Stephen Jacques, Deputy Commercial Counselor of the US Commercial Service Singapore.



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Wipes products can be combined with proven disinfectants, such as Dentalrapid AF.

In addition, Müller-Omicron offers a new flat dispensing system for hygienic storage of DryWipes, as well as VarioFix, a practical variable wall mount made from brushed stainless steel for DryWipes boxes. With VarioFix, the working surface can be kept uncluttered.

DryWipes are available in three variants: the proven DryWipes classic in size 160 mm × 280 mm and a surface density of 40 g/m²;

the particularly soft DryWipes soft in size 280 mm × 300 mm and a surface density of 50 g/m²; and DryWipes velours, premium wipes with a very soft texture in size 270 mm × 270 mm and a surface density of 68 g/m². WetWipes can be bought in classic, velours and soft variants.

Müller-Omicron customers and visitors at IDEM Singapore can obtain more information about the entire product range of impression and bite registration materials, silicones and other laboratory products at the company's booth (Booth 4K-23). ◀

Hahn Tapered Implant combines proven features with contemporary design

■ With more than 45 years of history as a provider of high-quality restorations and implant solutions to dental practitioners worldwide, Glidewell Laboratories is today recognised primarily for its CAD/CAM processing capabilities which are among the most advanced in the industry. In cooperation with Cincinnati dentist and creator of the original tapered implant Dr Jack Hahn, the company has now announced the release of the Hahn Tapered Implant System, which adds to the extensive line of Glidewell dental implant products, including the Inclusive Tapered Implant. The company's complete assortment of Inclusive prosthetic components are compatible with most major implant systems and

support the full range of traditional and custom restorative protocols.

The goal behind the new system was to make implant therapy simpler, more predictable, and accessible to as many people as possible, Glidewell announced. Having placed and restored thousands of tapered implants during his extensive career, Hahn's clinical observations and experience have served as the basis of design for former implant systems that are still in widespread use. Determined to address some of the growing demands faced by today's clinicians, he sought an opportunity to improve upon his successful designs of the past with advanced features intended to support a new genera-

tion of patients and practitioners—all at a price that gives back to the industry and patient population upon which his career has been built. In order to realise this objective, Dr Hahn partnered with a highly experienced team of dental implant engineers, researchers and manufacturers at Glidewell and personally oversaw the design and creation of the new system.



According to Glidewell, the Hahn Tapered Implant's wide array of sizes, root-form shape, and unique thread pattern allow efficient placement with a high degree of primary stability in all regions

of the mouth, including fresh extraction sockets. With its blend of time-tested features and contemporary design, the system also aims to provide a comprehensive treatment solution for a variety of

clinical indications, enhancing the quality of treatment while reducing the cost of care.

Engineered and manufactured in the USA, the Hahn Tapered Implant System is compatible with popular surgical instrumentation already used in many implant practices. Its surgical protocol was simplified and includes implant-specific drills that precisely control both the diameter and depth of the osteotomy.

For more information, dental professionals are invited to visit the company's website at www.hahnimplant.com or the Pacific Dental Specialties' booth at IDEM (Booth 4N-20). ◀

DenMat launches revolutionary new Firefly Cordless Headlight System

■ DenMat, a leading manufacturer of innovative esthetic dentistry and advanced oral health solutions, is pleased to announce the newest addition to the PeriOptix line of magnification products. The Firefly is the first cordless headlight system that fits any pair of loupes, allowing users the freedom to focus on what matters most—their patients.

At only 28 grams, the Firefly's elegant design is a lightweight

and ergonomic alternative to conventional headlight systems. Although the Firefly is free of the cords, it still provides all of the features expected in a high-end headlight system. With extended run times, adjustable brightness settings, and an extra-large spot size, the Firefly is the future of dental headlight systems.

"We're excited to launch this truly revolutionary technology", said Robert Cartagena, Chief Operating Officer. "At DenMat, our customers' success is our mission, and the Firefly Cordless Headlight now makes it easier for them to focus on their patients."

The Firefly uses an innovative magnetic mount to securely connect the light to almost any pair of loupes. Eliminating the cord also eliminates a potential source of infection. The Firefly comes with an easy-to-use charger base and

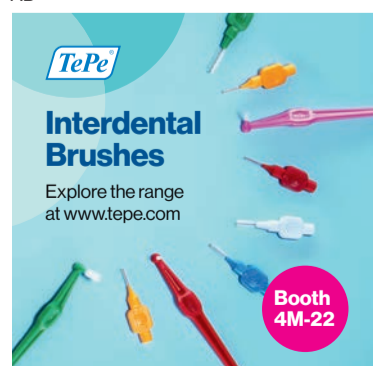


two rechargeable light pods for easy continuous use throughout the day.

Since 1974, DenMat has been a leader in high-quality products for dental professionals in more than 60 countries around the world. DenMat makes and assembles most products at its world headquarters on the Central Coast

of California. The company offers products in three main categories: Consumables, Small Equipment, and a full-service Dental Laboratory. DenMat's trusted brands include PeriOptix loupes and lights, LumiSmile White, and Lumineers, the number one patient requested thin veneer. For more information, visit Booth 4N-29 at IDEM or www.denmat.com. ◀

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A sparkling white smile

By IDEM presenter Dr Linda Greenwall, UK

Many people quest after a sparkling white smile, but what is the reason? Is it because a smile is an essential asset for to convey health and beauty and is essential for all forms of communication in our society? A beautiful white smile helps patients to feel confident to face the world and to feel good about themselves, which then improves their self-confidence, and self-esteem. While a sparkling white smile is desirable for some, it is even essential for others. It has been shown that people who have a good smile, white teeth and look presentable in an interview get offered jobs quicker as they make a better impression.

Tooth whitening is therefore one of the most requested services amongst patients, more than any other dental treatment service. It is thus essential that dentists are ready to receive many enquiries about the procedure and take extra efforts to train on tooth whitening techniques.

Aesthetic dentistry

The demand for aesthetic dentistry has increased exponentially over the last decade. There is a wide range of treatments available which can be undertaken from a

- Icon resin Infiltration to remove the appearance of white marks and white patches on teeth.
- Direct bonding onto teeth with no preparation.
- Advances in Straightening teeth includes many new options for

tray to place the whitening gel into the mouth for better retention. This method provided longer lasting and more predictable results. It has now been 26 years since that this paper was published. Millions of people around the world have benefitted

the mouth. In the second appointment the dentist explains the procedure as well as the risks and if the patient gives consent, impressions are taken for bleaching trays. The third appointment is for delivering the bleaching trays and to check the fit. Normally only the upper teeth are whitened first. The fourth appointment is to review the upper whitening and to rule out any side effects. If the whitening was sufficient, the dentist can commence the lower whitening which is assessed

Vital single dark teeth

When the patient receives mild trauma to an anterior tooth (bleeding into the pulp chamber and canal), the tooth tries to repair and heal itself by laying down extra secondary and tertiary dentine in the pulp chamber which causes discolouration. This can be seen when the tooth is a different colour compared to its neighbouring teeth by about one or two shades only. In the past it was assumed that these teeth need to have root canal treatments

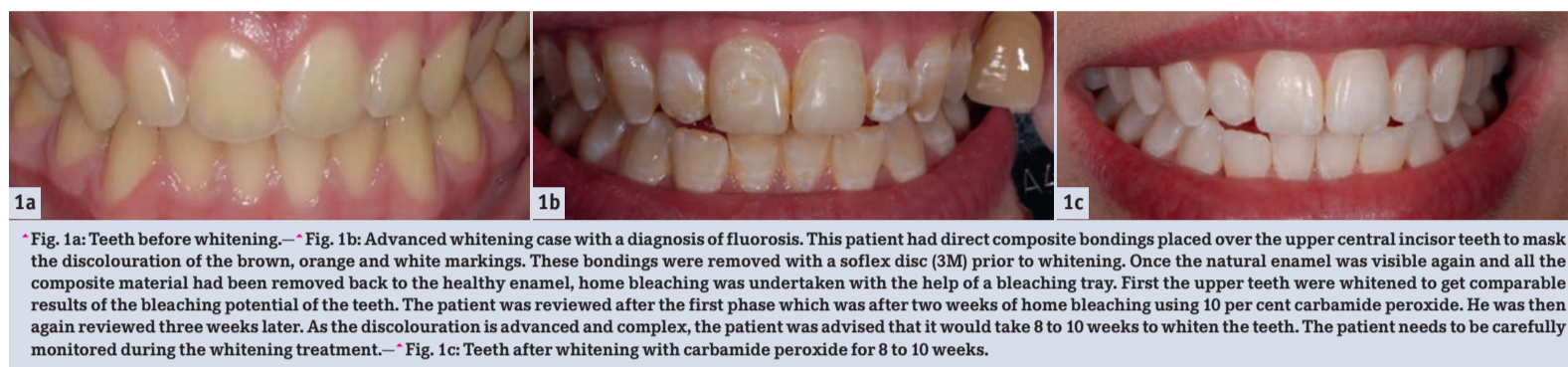


Fig. 1a: Teeth before whitening.— Fig. 1b: Advanced whitening case with a diagnosis of fluorosis. This patient had direct composite bondings placed over the upper central incisor teeth to mask the discolouration of the brown, orange and white markings. These bondings were removed with a sofex disc (3M) prior to whitening. Once the natural enamel was visible again and all the composite material had been removed back to the healthy enamel, home bleaching was undertaken with the help of a bleaching tray. First the upper teeth were whitened to get comparable results of the bleaching potential of the teeth. The patient was reviewed after the first phase which was after two weeks of home bleaching using 10 per cent carbamide peroxide. He was then again reviewed three weeks later. As the discolouration is advanced and complex, the patient was advised that it would take 8 to 10 weeks to whiten the teeth. The patient needs to be carefully monitored during the whitening treatment.— Fig. 1c: Teeth after whitening with carbamide peroxide for 8 to 10 weeks.

Orthodontic treatment. The introduction of aligner treatment without the use of metal braces. In addition, there are now porcelain brackets, white wires and the use of lingual orthodontics. Clear aligner treatment is hardly noticeable on teeth and whitening can be undertaken in the aligner trays while the teeth are being straightened.

- Closing of spaces, midline diastemas through orthodontics, composite bonding,

from tooth whitening materials and techniques and its popularity still continues to grow (Greenwall 2001).

Methods of tooth whitening

Home bleaching

There are two basic techniques for home bleaching using a carbamide peroxide material (night time use), or a hydrogen peroxide only material (day time use). The number of visits varies according to the severity of the discolouration. The general rule is that the darker the teeth is the longer it will take to whiten it. This will determine the number of appointments for the patient.

Power bleaching

It is very rare that only one power whitening will provide sufficient long lasting results. If the teeth are power bleached this should normally be followed by home bleaching in order to achieve a deeper penetration of the whitening gel over a longer period of time. Maybe multiple visits of power whitening at certain intervals are required.

Power bleaching is not a one off procedure. Patients should be informed about this, so they have realistic expectations of what can be achieved during one single session. Often power bleaching is undertaken as maintenance treatment after a hygienist visit depending on the white shade that the patient wishes to maintain.

Home bleaching visits

For patients who only require a basic whitening of their teeth, it may take approximately two weeks of home whitening of the upper and lower teeth. Most home bleaching programmes require six appointments. The first appointment is usually to undertake a thorough evaluation and to exclude pathology from

in a fifth appointment. The sixth appointment is for the final assessment of the shade after the upper and lower whitening is completed. Before and after photos are taken for comparison.

Studies have demonstrated that using the original protocol of Van Haywood (Haywood 1991 a, b, c) whereby for a basic whitening case the total treatment time is about 4 to 6 weeks. Normally, the upper teeth are whitened first for a period of at least two weeks, then re-assessed. Then upper and lower whitening may take place together for one week and after that the lower teeth are whitened for another two weeks.

The upper teeth may take two to three weeks to whiten. The upper teeth are whitened first as they whiten quicker and normally show less side effects like sensitivity. The patient has a comparison of the colour when only the upper teeth are whitening first. The lower teeth may take at least three weeks to whiten. They usually experience more sensitivity owing to the tray to be in contact with the lower premolar teeth as well as the cervical recession present on some teeth. There is believe that the agents are washed out on the lower teeth with the salivary duct so the whitening takes longer on the lower teeth.

Bleaching single dark teeth

With the introduction of whitening techniques, the treatment options for both vital and non-vital teeth have changed over the last 25 years. Nowadays, a sectional whitening tray can be used to whiten the single dark tooth whether they are vital or non-vital. It is essential to whiten the dark tooth first. Otherwise the contrast to the rest of the teeth will be higher as normal teeth whiten quicker.

(Haywood 2010). This however turned out to be false and they need only to be whitened.

Non-vital teeth

The techniques for non-vital bleaching have also evolved after sodium perborate was banned in response to concerns about its feototoxic and cytotoxic effects. The standard technique called the Walking Bleach technique used sodium perborate mixed with 35 per cent hydrogen peroxide. The two products acted synergistically and created the equivalent of 50 per cent hydrogen peroxide which is too caustic for a root canal considering that it may be affected by previous trauma. The use of high concentrations of hydrogen peroxide has recently been banned in Europe and it is only be possible to use 6 per cent hydrogen peroxide sealed into a root canal. In addition, the strong concentrations of hydrogen peroxide in combination with previous trauma to the tooth may result in cervical resorption (Cvek 1985, Hierthersay 1999) which has been extensively described in the literature.

This treatment has been modified with the use of a bleaching tray and a segmental bleaching tray. Nowadays, 16 per cent carbamide peroxide is sealed into the root canal. The patient uses the bleaching tray to whiten the external surface of the tooth, so it is effectively whitening from the inside and the outside of the tooth with the same technique.

A modification was described by Dr Willie Liebenberg in 1997 where he advocated leaving the access cavity of the non-vital tooth open. He also recommended that patients apply the whitening syringe directly into the access cavity every two hours thereby whitening the

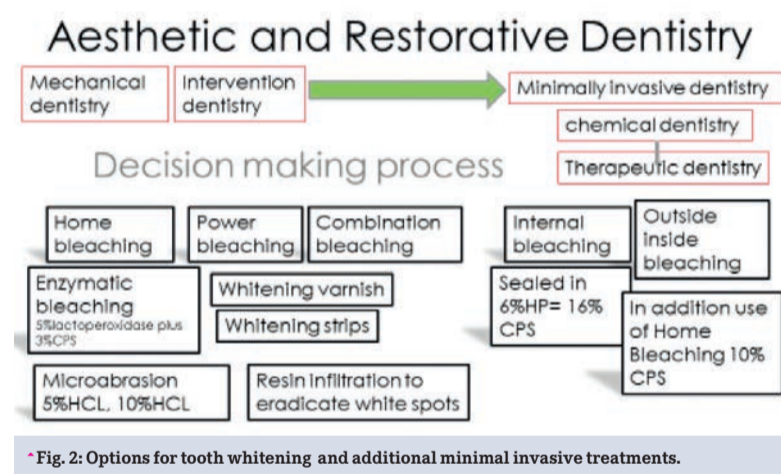


Fig. 2: Options for tooth whitening and additional minimal invasive treatments.

minimal invasive perspective. The key is to preserve as much healthy enamel as possible and enhance the smile through whitening, microabrasion and direct composite bonding. While porcelain laminate veneers revolutionised smile creation back in the 1980s, they still required some type of preparation of healthy teeth. Nowadays, methods involving porcelain and composites used for veneers use a minimal invasive approach and in most cases not touching the healthy enamel.

Treatment options in aesthetic dentistry

- Tooth whitening.
- Microabrasion to remove white spots from teeth.

- Improving smiles through creating symmetry and harmony of the smile.
- Assessment can be undertaken through digital analysis of photographs and imaging software to create a beautiful smile.
- Combination of treatments (as above) can incorporate different treatment modalities to create a beautiful smile.

Tooth whitening techniques were revolutionised with the publication of a key research paper called "Nightguard vital bleaching: effects on enamel surface texture and diffusion" by Quintessence Publishing in 1989. In this paper, the authors Van Haywood and Harald Heymann described the use of a bleaching



Fig. 3a: This patient had a basic inherent yellow grey shade of his teeth. His upper central incisors experienced trauma 30 years prior. At that time, the teeth were bonded.— Fig. 3b: The appearance of the upper teeth after whitening and before new bondings were placed on the teeth. Streaked white areas are present on the teeth during the whitening as the whitening gel has penetrated quickly in the incisal tips of the teeth. The patient is reassured that this effect is only temporary and will even out with further bleaching.— Fig. 3c: Teeth after whitening and the placement of new direct composite bonding on the upper central incisors and upper right lateral incisor.

tooth over the course of the weekend. The patient was to return at the end of the weekend. The access cavity was disinfected and cleaned and the pulp chamber restored with glass ionomer.

Tooth sensitivity

Sensitivity is by far the most common side effect which affects up to 85 per cent of patients. It can range from a mild awareness of the teeth to a throb or specific ache on one tooth. While for some patients it is just the teeth that are sensitive, for others it is the soft tissues and gingivae.

Tooth sensitivity is manageable most of the time. Extensive research has been conducted to understand how and why patients experience tooth sensitivity when undergoing tooth whitening procedures. For example, it was discovered that the whitening gel penetrates the tooth within 5 to 15 minutes after the application of the gel. Therefore, it is essential to assess the pulps in all teeth and ensure that they are healthy. This can be done by testing the teeth with a cold stimulus or an electric pulp tester. If whitening was to be undertaken in the presence of a periapical lesion in a non-vital tooth, the affected area could flare up and require root canal treatment.

Furthermore, it has been found that oftentimes the patient is the most sensitive on the third day of tray bleaching owing to the fact that there is maximum saturation of oxygen inside the tooth at this time.

The new generation of whitening products also contains extra soothers such as potassium nitrate, fluoride and amorphous calcium phosphate. Patients are given soothing toothpastes to use prior to and during tooth whitening procedures. Many of these contain remineralising agents, enzymes, fluoride, calcium and phosphate, some contain Novamin and hydroxyapatite. Patients may use these toothpaste two weeks prior to bleaching to soothe any existing sensitivity.

Patients are also given proprietary soothing agents like Soothe (Southern Dental Industries, Australia) and Ultraeze (Ultradent, USA). These products contain either potassium nitrate, fluoride or both. In addition, some products contain amorphous calcium phosphate for an additional desensitising effect. One of these products is relief gel from Philips Oral Health Care which is loaded in a double barrel syringe so it is mixed freshly every time. It is placed into the bleaching trays and the patients wear them for an hour before or after bleaching. If sensitivity is really severe, they may skip one night. One reason explaining the sensitivity is that the whitening gel travels through the weakest part of the tooth which is often a crack.

Tooth sensitising is always transient and the patient is not left with permanent sensitive after whitening treatment.

Whitening maintenance

If the protocol, described by Professor Van Haywood is followed precisely, the research has shown that the whitening can last up to

17 years. However, some patients like to top up their whitening after three years. However, it is not necessary to top up whitening each month. It is essential that during the initial whitening treatment the bleaching potential of the tooth is reached effectively. Once the bleaching potential is reached then whitening maintenance only needs to be undertaken approximately three years later. When the patient re-whitens their teeth, they would whiten for a shorter period from 3 to 7 days.

Considering the time period since contemporary whitening techniques have been introduced, it is expected that patients will whiten their teeth periodically to maintain

ucts on the market containing oils that claim to have a whitening effect, but these products have been fined in the UK by the advertising standards authority for false advertising. However, there are many of the new professional mouthwashes on the market contain oil as an ingredient to be able to utilise this ancient Ayurveda technique (Greenwall 2015).

Whitening strips have been also used for whitening maintenance. They have been shown to be beneficial for whitening but are normally for removing basic discolouration from teeth rather than patients experiencing advanced discolouration such as deep tetracycline



Fig. 4a: Teeth before whitening. Multiple recession areas of the gingivae are visible. This patient was treated with a whitening tray containing a soothing gel for a week prior to undertaking whitening to ensure that the patient was free of sensitivity. Fig. 4b: This patient was treated with 10 per cent carbamide peroxide and two sessions of microabrasion (Opalustre paste, Ultradent) to remove the remaining white marks on the teeth.

a white smile. Normally, during this time the patient may whiten 4 to 5 times within a 27-year time span.

Avoiding staining: Keeping your teeth clean?

While maintenance is essential, the use of whitening toothpaste and sometimes the reduction in food and drinks that cause staining is recommended. Beverages that induce stains are black tea (without milk), herbal teas, fizzy drinks like cola, espresso coffee and red wine. Stain inducing foods are curries, spicy foods, soya sauce, some berries, beetroot, vinegar and fried food. There, the oil molecule penetrates the tooth structure causing a browning reaction inside the tooth comparable to when fried foods are cooked. Habits such as smoking cause black discolouration on teeth that is both intrinsic and extrinsic. Antibiotics also cause staining on the tooth surface but more commonly antibiotics taken by patients cause intrinsic discolouration of teeth. For example, in patients who are taking lower doses of antibiotics for treating acne (i.e. Minocycline), teeth can become grey. Dentists should discuss this with their patients in order to have the medication changed by their GP.

Keeping a sparkling smile requires maintenance. This included regular visits with the oral hygienist as necessary, the use of an effective toothbrush to remove the superficial stains. Some patients find that an electric toothbrush is more effective at removing stains from teeth, but this can be up to personal preference. A mouth wash can be effective in improving oral health and can be used daily as recommended by the dentist. There is a new oral health maintenance technique which has been researched called "oil pulling" in which patients swish their mouth for 20 minutes with coconut oil. This is believed to reduce surface stains and maintain a healthy gingival environment. Controversially there are some prod-

ucts on the market containing oils that claim to have a whitening effect, but these products have been fined in the UK by the advertising standards authority for false advertising. However, there are many of the new professional mouthwashes on the market contain oil as an ingredient to be able to utilise this ancient Ayurveda technique (Greenwall 2015).

The future of tooth whitening

There are exciting new developments in the field of tooth whitening like the introduction of whitening varnish (Philips Zoom QuickPro, Philips Oral Health Care). Here, the tooth is coated with a varnish containing 6 per cent hydrogen peroxide. This hydrophilic varnish adheres well to the tooth, delivering the active agent directly into the

teeth. Achieving a perfect smile with perfectly white teeth, however, is not always possible. Expectations need to be kept realistic and defined. Dentist should be able to explain exactly the reasons for undertaking whitening treatment, as well as what patients can and cannot expect from it.

There is a time factor associated with tooth whitening. The darker the tooth, the longer it will take to whiten it. Not all teeth can be whitened within two weeks. Darker and more difficult discolorations can be treated with home bleaching products containing 10 per cent carbamide peroxide, however, this will extend the duration of the treat-

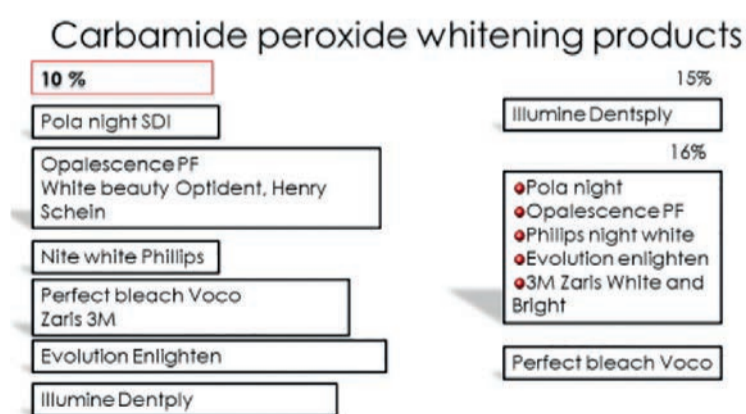


Fig. 5: A selection of whitening materials containing carbamide peroxide for night time use in a bleaching tray.

enamel and dentine. A hydrophobic sealant layer dries on the tooth with the aim to lock the hydrogen peroxide layer in place. The two layers do not mix during application. The varnish is left on the teeth for half an hour each day and then it is brushed off with a toothbrush.

There are also new developments involving enzymatic bleaching where two products are mixed together to activate and speed up the process of whitening using a 3 per cent carbamide peroxide gel in combination with the enzyme lactoperoxidase.

Treating tetracycline stained teeth (Type 3 and 4) can even last from 3 to 12 months. A basic bleaching case with no requirement of restorative dentistry will take 4 to 6 weeks to achieve a whitening effect.

There are no age restrictions for teeth whitening. (Kelleher et al. 2011) However, older teeth have thinner enamel, thicker dentine and are more heavily compacted with secondary dentine. Therefore, they will take longer to whiten. Younger teeth will whiten faster as their structural anatomy is

characterised by open odontoblastic processes when the enamel is young. Despite the fact that there are larger pulp canals and pulp chambers, young patients who undertake whitening do not show more sensitivity than older patients (Greenwall 2009).

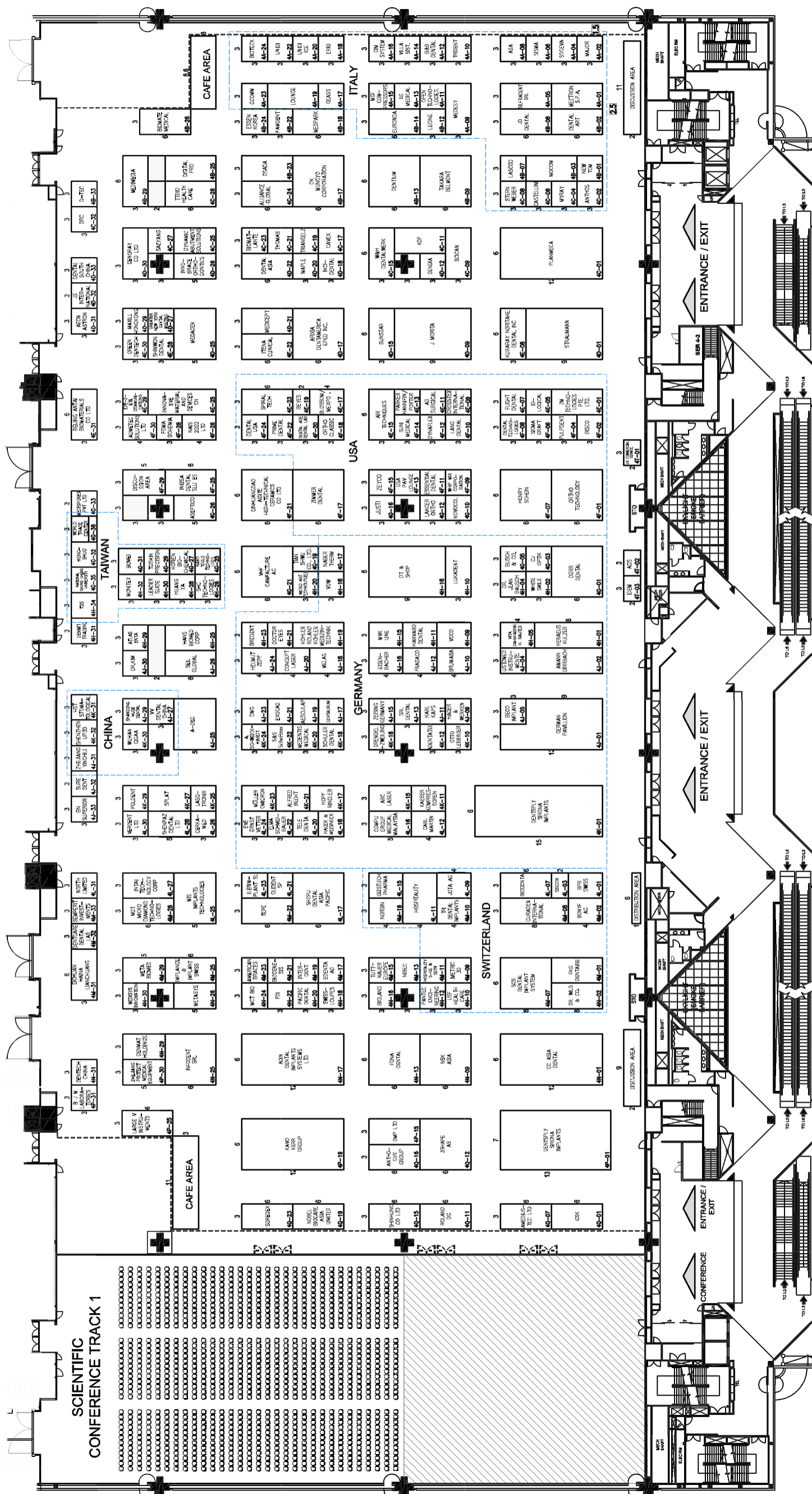
Over the last 25 years, it has been possible to whiten teeth beyond the normal original Vita classic shades. There are some patients that have developed a syndrome where they continually seek whiter teeth. This phenomenon is associated with body dysmorphic phobia and low self-esteem. It has been described as bleachorexia (Kelleher 2014) but actually it should be referred to as a bleachoholic. These patients using tactics similar to those that are never satisfied with their dentures. It is essential that the dentist knows how to detect signs of this syndrome and is not be seduced into undertaking unnecessary whitening treatment for only the patient's sake of getting attention. Normally, these patients can be detected early as their teeth are whiter than the sclera of their eyes. It is essential that when whitening treatment is completed the patient is told that no further whitening is necessary at that point. Each whitening cycle will require the dentist to reassess the patient in order to decide whether additional whitening is necessary.

New shade guides have been developed to match the new shades of white and porcelain and composite shades have been introduced onto the market to be able to restore these teeth to the new whiter shade. There are now new bleached shades of composite restorative material so that after whitening, restorations can be placed at the new lighten and whiter shades so that the composite filling materials match the new shade of the teeth.

Conclusion

Professional tooth whitening products are safe, effective and predictable. Side effects such as sensitivity can be managed well since the latest generations of whitening products contains extra soothers such as potassium nitrate, fluoride and amorphous calcium phosphate. Patients have benefitted from treatments that are being able to improve their smiles in a natural and non-invasive way. It can be expected that the amount of professional tooth whitening materials available for dentists will continue to increase. In addition, there are many new innovative whitening products which are being brought onto the market for patients to continue to enjoy a whiter, brighter smile.

Dr Linda Greenwall will be speaking at the IDEM Singapore 2016 conference to be held from 8-10 April, 2016. Do join us at IDEM Singapore 2016, gateway to the Asia Pacific's dental market, with a massive 18,000 sqm of exhibitions space, over 550 international exhibitors and many of the world's experts in dental practice, education and research! To find out more information about what Dr Greenwall will be speaking on, please visit her page. Also, you may visit IDEM's social media sites on Facebook, LinkedIn and YouTube. ◀



Last update was 22 March, 2016. May be subject to change.

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