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INTERVIEW

Silver diamine fluoride could be an easy and inexpensive way to manage early childhood caries, according to Dr Rana Yawary. In this interview, she explains why.

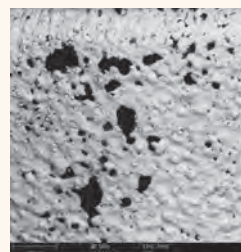
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PROPHYLAXIS

Australian periodontist Dr Lisa Heitz-Mayfield about the importance of implementing a preventative approach for successful implant treatment.

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IMPLANT TRIBUNE

MegaGen has just been awarded the Trusted Quality Mark certificate by the CleanImplant Foundation. Read about the project in our specialty section.

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Chewing causes microwear

By DTI

CHENGDU, China/FAYETTEVILLE, USA: A team of researchers from the University of Arkansas in the US and the Tribology Research Institute at Southwest Jiaotong University in Chengdu has documented the effects of chewing on the nanosized structures that make up tooth enamel. Using tips made from different types of material, pressure was applied to the surface of human molars, which had been extracted for orthodontic purposes. The researchers scratched the teeth, moving the tip across the surface to simulate the action of teeth moving against each other during chewing. They also indented the tooth surface, pressing the tip against the enamel to simulate the pressure caused by crushing food.

The researchers observed that, at every level of pressure, scratching led to more damage than indentation, but both types of stress resulted in three different kinds of damage. Plucking occurred



Food leaves permanent traces on teeth. A team of international researchers has now examined these marks—or microwear.

when the crystallites were separated from each other. Applying more pressure to the enamel led to deformation, or the bending and squeezing of the crystallites. At even higher levels of pressure, fragmentation resulted when the chemical bonds holding the crystallites together broke.

“Hydroxyapatite crystallites are the fundamental units of enamel, each less than 1/1,000th the thickness of a human hair,” said co-author Prof. Peter Ungar from the University of Arkansas. “Most research on tooth wear to date has focused on effects at much larger scales, but we have to study

enamel at this finer level to truly understand the nature of how the hardest tissue in our bodies resists wear and tear.” The study, titled “Enamel crystallite strength and wear: Nanoscale responses of teeth to chewing loads,” was published online on 25 October in the *Journal of the Royal Society Interface*.

Women in dentistry

SYDNEY, Australia: The latest figures out of Australia show that, for the first time in the island continent's history, there are more women working in dentistry than men. According to data from the Dental Board of Australia, 50.2 per cent of dental practitioners, including dentists and dental therapists, across the country are female. Additionally, of the 732 current members of the Australian Dental Association Victorian Branch, 410 are women and 322 men.

With its flexible hours, creativity and good pay, many women are choosing the profession over medicine. Speaking to *Dental Tribune*, President of the Australian Dental Association Victorian Branch Dr Susan Wise said, “There is now more diversity of dentists with respect to gender and ethnicity. Women are attracted to dentistry as a career, as it is possible to do part-time work and fit in bringing up young children. This is more difficult in many fields of medicine, law, accounting and architecture.”



Pioneering dental research: Australian molecular biologist Prof. Eric Reynolds (middle) is this year's winner of the Prime Minister's Prize for Innovation.

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Legal loopholes

Dentistry and cosmetic surgery are two fields that may be especially vulnerable to exploitation of legal loopholes concerning the administration of local anaesthesia, according to the Australian and New Zealand College of Anaesthetists. To address this issue, the medical body has called for tighter and uniform national regulation for administering sedation in these fields.

Changing taste

Caffeine is a powerful antagonist of adenosine receptors, which promote relaxation and sleepiness. Depressing the effect of the receptors may make people feel more awake, but a new US study has found that it also decreases their ability to taste sweetness—which makes food and drink seem less sweet and may trigger sugar cravings, the researchers concluded.

Crown and go

Aiming to find a safer, more effective and faster treatment method to reduce the high prevalence of dental caries in children in New Zealand's Whanganui district, a three-year study has set out to test an alternative method of treating caries, the Hall technique. Instead of removing the diseased tissue under anaesthesia, in the Hall technique, dentists leave the decay as is and cement a small metal crown on the tooth.

The method was first introduced in 1991 by Scottish dentist Dr Norna Hall, who used the treatment on her patients for 15 years until she retired. Some clinicians think the treatment is wrong because it leaves bacteria behind, explained lead researcher Dr Foster Page from the University of Otago. However, the study's provisional results have been promising, she said.



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Aussie dentist awarded prize for innovation

By DTI

MELBOURNE, Australia: University of Melbourne molecular biologist Prof. Eric Reynolds has claimed the Prime Minister's Prize for Innovation for his pioneering dental research. Thirty years ago, the then-young dental researcher discovered a protein in cow's milk that repairs and strengthens teeth. Today, that protein, sold as RECALDENT, is used by millions of people every day in the form of chewing gum and professional applications by the dentist.

As an inventor and laureate professor, Reynolds now leads the University of Melbourne's dental school and travels the world working with Australian and global businesses to create new products to further improve oral health. "Oral diseases are the most prevalent diseases of humankind," said Reynolds.

With one in four Australians suffering from caries and/or periodontal disease, the cost of treatment is A\$8 billion a year, with worldwide costs around A\$400 billion a year. Since Reynolds's discovery, products using RECALDENT have generated sales of over A\$2 billion, and it has been estimated that they have saved over A\$12 billion in dental treatment costs worldwide.

"I am very honoured to receive the Prime Minister's Prize for Innovation and extremely grateful that the judging panel recognised the importance of innovation in oral health research," said Reynolds.

In his early dental academic career, there was anecdotal and some epidemiological evidence that dairy products could reduce the risk of dental caries. Through

a series of experiments, Reynolds and his team were able to confirm this and found that the effect was due to a unique form of calcium present in milk, in a protein called casein.

When Reynolds started talking at international meetings about the product, the large oral companies wanted samples to evaluate. That is when the Australian dairy industry became involved—first Bonlac Foods (now part of Fonterra) and then Dairy Australia. They started manufacturing the material, trademarked as RECALDENT. Today, all the RECALDENT used around the world is made in Melbourne using Australian dairy milk, and Japan is the largest seller of sugar-free gum containing RECALDENT.

Reynolds continues to improve RECALDENT, and a recent



Big in Japan: RECALDENT gum is the largest selling sugar-free gum in the Asian country. Furthermore, Japanese dental company GC has incorporated RECALDENT into a wide range of products.

US study showed that use of a combination of RECALDENT products, including a new toothpaste, completely eliminated caries in children. As part of the Prime Minister's award, Reynolds received \$250,000.

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IDEM 2018 larger than ever

By DTI

SINGAPORE: Around 9,000 visitors representing at least 83 countries are expected to attend the tenth International Dental Exhibition and Meeting (IDEM) Singapore that will take place from 13 to 15 April 2018. With an increased exhibition space, the anniversary edition of IDEM will not only be the largest show to date, it will also review nearly 20 years of dental history and feature a memory lane of past events, including photographs, statistics and quotes from participants covering all previous editions.

As announced by the co-organisers, German event arranger

Koelnmesse and the Singapore Dental Association, the exhibition space has been increased by over 2,000 m² to 20,000 m². Eighty per cent of this has already been reserved by country pavilions, manufacturers and distributors from across the world, who will be showcasing the latest technologies, products and services in dentistry. The Singapore pavilion at IDEM 2018 will be the largest to date, with 34 exhibitors occupying 666 m², a 21 per cent increase to the previous edition. New to the IDEM exhibition will be two pavilions from Australia and Poland, bringing the total number of country and regional pavilions to 14.

"IDEM continues to be the foundation exhibition and scientific conference for dentistry in the Asia-Pacific region," said Mathias Küpper, Managing Director of Koelnmesse. "This year, we are proud to bring delegates an even stronger programme that is dedicated to helping them achieve clinical excellence in dentistry."

The IDEM conference programme will include an inaugural live patient demonstration on stage, as well as lectures and masterclasses presented by leading experts and world-renowned dentists. The key conference sessions will include masterclass talks by Dr Galip Gürel, founder and honorary

President of the Turkish Academy of Esthetic Dentistry. He will also be holding a hands-on workshop titled "Revolution in 3D smile design: The REBEL". Additionally, specialist prosthodontist Dr Christopher Ho will be presenting a paper titled "The additive approach to complex rehabilitation: Digital workflow meets the art and science of dentistry". Other particularly noteworthy lectures will focus on a rational workflow in the treatment and restoration of endodontically treated teeth, periodontal treatment in the twenty-first century (from research to clinical practice), and skills and techniques for treating older patients.

In addition to the main scientific programme, attendees can take part in a number of hands-on workshops being held before, during and after IDEM. These offer the opportunity to learn the latest in dentistry and earn continuing professional education credits.

"IDEM is the best event in Southeast Asia to uncover the latest trends being discussed in dentistry. The Singapore Dental Association is proud that IDEM calls Singapore home and, taking the tenth edition to look forward, is excited to see what new innovations the leading dental exhibition and conference in the Asia Pacific will continue to bring to the region," said Dr Lim Lii, President of the Singapore Dental Association.

Online registration for IDEM 2018 is now open at www.idem-singapore.com.



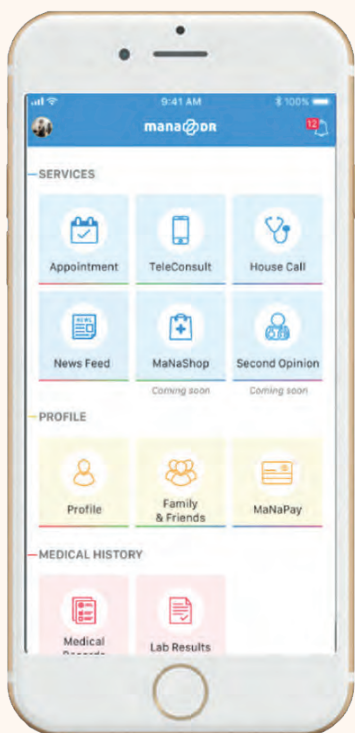
Hosted at the Suntec Singapore Convention and Exhibition Centre, IDEM 2018 will be held under the theme "Striving for clinical excellence".

Texting for advice: New app enables medical consults round the clock

By DTI

SINGAPORE: Tele-medicine and tele-health apps are increasingly emerging. Just last month, the MaNaDr app for mobiles was launched in Singapore. Through the app, which is accessible to patients in Singapore and Australia, users can tele-consult and schedule appointments with over 500 clinics and 600 general medical and dental practitioners and specialists in the two countries.

The app is part of the larger MaNaDr healthcare platform, which is owned by Singaporean company Mobile Health. At the launch event, which was held at the Singapore Press Holdings' News Centre, Mobile Health co-founder and CEO Dr Tung Yeng Siaw said he and his team of doctors were motivated by the vision of a mobile platform that would empower patients to take charge of their healthcare.



Officially introduced on 26 October, the MaNaDr app was already soft launched in January. Since then, almost 100,000 appointments have been booked through the app, the developers stated.

In tele-consulting medical professionals, patients can text doctors and send photographs of their medical conditions through the app. If the user's preferred doctor is unavailable, he or she will be referred to another professional.

According to Siaw, doctors do not have to pay a fee to list their services on the app. Instead they are provided with an extra stream of revenue through the paid tele-consults.

An advantage of the system, which is mainly intended for follow-up consultations and minor health issues, is that patients have access to medical advice anytime and

anywhere. In addition, text consulting with medical and dental professionals costs less compared with face-to-face consultations at the clinic, the developers stressed.

For example, Dr David Cheong, one of Mobile Health's co-founders and its chief medical officer, charges S\$3 (US\$2.20) for the initial messages for the tele-consult

and S\$0.50 (US\$0.36) for subsequent messages—substantially less than his usual consultation fee of S\$30 (US\$22), the *Straits Times* reported.

The app is available for iOS and Android devices and can be downloaded free from the iTunes Store and Google Play. More information is available at www.manadr.com.

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“The pattern of decay is slowly changing”

An interview with paediatric dentist Dr Rana Yawary, Australia

In Australia, dental caries is the highest cause of preventable hospitalisations of children. In search of a potent anti-caries approach, Dental Health Services Victoria has announced that it is conducting a

Can you explain how and why SDF is used in dentistry?

Topical application of 38 per cent SDF, a liquid cavity cleanser and desensitiser, has been shown to arrest 81 per cent of active caries

Can you briefly introduce the study design and its objectives?

For the first time in Victoria, we aim to standardise a protocol incorporating oral health education in twice-daily toothbrush-

childhood caries in children that aren't able to cope with extensive dental treatment in the chair. It doesn't require local anaesthetic—the needle! With each successive dental visit, even the

Dr Rana Yawary is a specialist paediatric dentist with significant experience in public oral healthcare. In collaboration with Dental Health Services Victoria, she aims to trial and implement new models of care and drive initiatives relating to oral disease prevention and improved health outcomes.

“[...] even the youngest children are consistently more cooperative because they experience their dental visits without pain or discomfort.”



study on the use of silver diamine fluoride (SDF) for the management of caries. In an interview with *Dental Tribune*, research project manager Dr Rana Yawary spoke about the benefits and drawbacks of the method and why she thinks SDF has the potential to increase treatment compliance and thereby help ease social inequalities.

in primary teeth. Because this treatment is non-invasive and easily performed, it can be a promising strategy for management of dental caries in very young children and avoids dental general anaesthesia. Apart from staining the arrested lesion, there has been no reported significant complication of SDF use among children.

ing with a fluoride-containing toothpaste, comprehensive dietary counselling and twice-yearly application of 38 per cent SDF.

The study will closely follow more than 400 children aged 2–10 years. The researchers will treat children and monitor them over a year to study the impact of the protocol on cavity progression. They will also measure oral health-related quality of life and treatment satisfaction and acceptability. These results will be compared with those for children who are referred for treatment under general anaesthesia.

What are the benefits of SDF compared with other anti-caries approaches?

The use of SDF provides an alternative in managing early

youngest children are consistently more cooperative because they experience their dental visits without pain or discomfort. It's easy to apply and non-invasive and has the potential to significantly increase access to oral healthcare across the state.

There is one major drawback to the substance, at least aesthetically: it can cause carious tooth structure to turn brown or black.

That is right, and this forms an important component of the informed consent. However, the



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undesirable effects of SDF—dark discoloration of carious SDF-treated dentine—are outweighed by its desirable properties in most cases, and no toxicity or adverse events associated with its use have been reported. The use of a second application using potassium iodide can reduce the staining without affecting the efficacy.

If the study proves successful, could SDF help ease social inequalities in the prevalence of dental caries in children?

Absolutely. Dental caries prevalence occurs on a social gradient, with more disease in children from low socioeconomic groups. SDF application can be a cost-effective means of treatment for many disadvantaged children or in areas where there is a great shortage of dental staff. It can even be applied in outreach settings outside of the dental clinic, such as schools, early learning centres, maternal and child health clinics, and playgroups.

So, it would be relatively easy to implement treatment with SDF in daily dental practice?

Yes. The treatment is low-cost. It does not require expensive equipment or supporting infrastructure. Therefore, the programme is easy and inexpensive to set up.

When one compares the costs of the protocol to the cost of managing severe early childhood caries under general anaesthesia, the cost of dental general anaesthesia is disproportionately high. Dental caries is the highest cause of potentially preventable hospital admissions in Victoria for children in the 0- to 19-year-old age bracket. In fact, around 4,500 Victorian children aged 0–14 years are hospitalised every year owing to dental conditions.

Do you think, when addressing the global burden of dental caries, measures such as this are more effective than educational initiatives? Or do they always need to go hand in hand?

Tooth decay is caused by lifestyle factors such as diet and oral hygiene. To eradicate tooth decay, there needs to be education addressing the cause of the disease. Improving global oral health literacy and addressing the social determinants of poor oral health are the keys to reducing the global burden of tooth decay. Topical fluorides form an important part of managing caries, but they do not resolve the need for oral health education and prevention. In fact, we know that if one doesn't address the cause of the decay process, one can get secondary caries around an arrested cavity after one has applied SDF.

From your personal experience, do you feel that the number of children suffering from severe

dental caries has increased or declined in the last few years?

I believe the pattern of decay is slowly changing. The recent Victorian Preschoolers Oral Health Survey revealed that over 56 per cent of Victorian children between the ages of 3 and 5 years present with signs of dental caries. The evidence demonstrates significantly worse figures for children of health-care and pensioner concession

cardholders, Aboriginal people, Torres Strait Islanders and those from non-English-speaking backgrounds. These high-risk communities need to be targeted to help close the gap in the fight against early childhood caries.

It is a proven fact that dental caries is a preventable disease. Why is it that most countries—industrial nations and developing coun-

tries alike—still struggle with a high prevalence of dental caries?

Tooth decay is preventable, but government bodies and public health organisations need to take the lead in creating strategies to reach those most in need. There is considerable inequality in the distribution of oral disease, with 80 per cent of the burden of disease in Australia concentrated in only 20 per cent of the population. Dental Health

Services Victoria has taken on the challenge, using the latest evidence and data, to help provide an equitable and effective oral healthcare system. Our aim with this protocol is to provide an example of a safe, evidence-based solution that has been trialled and found to be effective in Victoria.

Thank you very much for the interview.

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For the practice team, this translates not only to stress-free working but also to optimal support as far as efficient time management is concerned. Together

with a simple operating concept, the ergonomically arranged instrument ports also offer additional convenience. Furthermore, an enhanced method of oil application and the use of a HEPA (high-efficiency particulate air) filter provide short cycle times, high cost-efficiency and improved reliability.

Running smoothly

According to the company, instrument servicing with the Assistina TWIN makes maintenance as effortless as possible for the dental team. While the first in-

strument is being serviced in the closed chamber, the user can already start connecting the next one in the second chamber. The device thus promotes a continuous workflow—without any waiting time and entirely free from stress. The ease of operation of the W&H device, requiring just the push of a button to start the maintenance process, is yet another highlight.

Furthermore, the dental professional is given the option of using any adaptor. This means that the new handpiece main-

tenance solution can easily be adapted to the particular requirements of the practice.

Record cycle time thanks to oil nebulisation

A particular highlight of the Assistina TWIN is the device's short service cycle time. During servicing, the spray channels are flushed with cleaning solution and dried with compressed air, and all gearing components are lubricated perfectly with W&H service oil. With this all-round maintenance concept, the Assistina TWIN makes a valuable contribution to the continued good functioning of instruments and helps to extend their lifetimes.

W&H's innovative oil nebulisation technology guarantees the Assistina TWIN's record processing time. The oil is first nebulised before being blasted through the instrument at high pressure. The fine mist produced reaches even the most remote parts without any need for the gearing components to be set in motion first. This makes it possible to remove debris and dirt from the instrument completely and efficiently. Equipped with a state-of-the-art process monitoring system, the device checks that the exact quan-

tity of oil required for each instrument is applied, ensuring uniform and optimal handpiece maintenance results.

The device's HEPA filter removes bacteria, viruses, dusts, aerosols and smoke particles, among others, from the air, and thus also offers optimal safety in its use. Aerosol mists that form during the maintenance process are captured by a fan and filtered out, ensuring the practice team of a safe working environment in the course of the hygienic reprocessing.

Efficient, sustainable and ergonomic

Specially designed to the requirements of dental practices focusing on cost reduction through improved performance, the Assistina TWIN optimises oil consumption and the cycle time during the service process. As such, it is a particularly cost-effective solution that also helps to save resources.

All of the device consumables, such as cartridges and HEPA filters, are offered in the new Assistina TWIN Care Set and can be replaced by the user without any tools. More information can be found at www.wh.com.

Simple starting of the handpiece maintenance process with just one button.



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China accelerates registration process for foreign drugs and medical devices

BEIJING, China: The Chinese State Council has announced its facilitation and expediting of the approval process for overseas pharmaceuticals and medical device manufacturers seeking to enter the Chinese market. The measures are part of efforts to lower research and development costs and reduce delays for new medical products entering the domestic market.

As reported by the *Global Times*, one of the changes announced in October is that foreign clinical trial data obtained from overseas centres can now be used in registration applications—as long as the trials comply with Chinese pharmaceutical and medical device registration requirements.

“Previously, clinical trial data carried out overseas was not accepted in China. Thus, international drug makers had to repeat the trials if they wanted to bring new drugs and medical devices into the Chinese market, which could take several years,” explained Yingtao Wang, head of the Beijing representative office for Germany-based dental material manufacturer DMG.

According to Lifeng Wang, a representative of the China Food and Drug Administration, the accelerated procedure will reduce repetitive trials and thereby significantly improve efficiency in domestic registration. As a result of the expedited process, approvals for new treatment will be cut by several years and the latest products and devices will likely be available without delays, benefiting medical professionals and patients alike. In addition, prices of pharmaceuticals and medical devices from overseas are expected to fall.

The current market approval procedure has been insufficient in supporting scientific innovation, resulting in the Chinese market lagging behind global advancements, the State Council said in a statement. The changes thus ought to boost the domestic pharmaceutical industry by adjusting the industrial structure, encouraging innovation and making Chinese pharmaceutical manufacturers more competitive.

To ensure data accuracy in the new process, the authorities are expected to strengthen supervision of foreign clinical tests through efforts such as setting up an overseas clinical trial examination system, among other measures.



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Fig. 1: Initial situation: Composite restoration of tooth #21 after distal transverse fracture of the tooth crown.—**Fig. 2:** After matching the wax-up with the master model, the functional crown was designed.—**Fig. 3:** The crown framework, prepared for veneering.—**Fig. 4:** After determining the basic tooth shade of 5M2 with the VITA Toothguide 3D-MASTER (VITA Zahnfabrik), the layering scheme was sketched.—**Fig. 5:** After a dentine firing, VITA INTERNO can be used for a second time to give depth with individual shade nuances.—**Fig. 6:** The VITA INTERNO stains allow for a multifaceted and age-appropriate reproduction of the natural teeth.—**Fig. 7:** The patient was very satisfied with the final aesthetic result.—**Fig. 8:** The shading and lighting of the restoration fitted in perfectly with the overall picture.—**Fig. 9:** The final full-ceramic crown had an age-appropriate morphology, surface texture and shading.

By Carolin Wehning, Germany

For dental technicians, it is especially challenging to produce natural-looking, age-appropriate reconstructions in the visible area of the mouth in older people. It is recommended to follow a systematic procedure based on the characteristics of the natural teeth for the individualisation and characterisation of such a restoration. This is the only way results can be achieved that blend harmoniously with the remaining dentition. In this case study, I show how such a complex case can be solved with VITA VM 9 veneering ceramics and VITA INTERNO materials (both VITA Zahnfabrik) for internal characterisation.

Assessment and planning

A 77-year-old patient presented to the dental practice

after a coronal transverse fracture of tooth #21 that had already been treated with a direct composite. Clinically, the results were morphologically and aesthetically inadequate (Fig. 1). On the adjacent natural tooth (#11), age-related discolorations, initial white and brown spot lesions in the cervical area, and a vestibular transverse dark-brown crack were apparent. The dentist and patient decided on restoration of the tooth with a full-ceramic crown for long-term stabilisation, on which the colour effect of tooth #11 was to be reproduced in detail. In order to achieve a predictable result, the situation was moulded and a model was developed for a wax-up. Tooth #21 was prepared for a full crown and a master model was produced using a precision mould (Fig. 2).

CAD/CAM fabrication and veneering

The crown framework was made of CAD/CAM-supported VITA YZ HT zirconium dioxide (Fig. 3). For a deep initial fluorescent effect, a wash firing was performed with EFFECT LINER 5 (orange) and EFFECT LINER 6 (green-yellow). Layering with VITA VM 9 was the foundation for reproducing the basic shade (Fig. 4). The VITA INTERNO materials then enabled intensification of the deeper individual shade nuances after the wash and dentine firings (Figs. 5 & 6). Int 04 (orange) and Int 11 (grey-brown) were used in the cervical and interdental areas; Int 05 (terracotta) was used in the centre. The inside areas were nuanced with Int 08 (blue), Int 05 (terracotta) and Int 07 (anthracite), and the incisal edges

with Int 02 (sand). Cracks and brown spots were reproduced with Int 10 (brown), and white spots with Int 01 (white).

Finalisation of the restorations

After establishing the basic morphology with a stone and the details with a fine diamond-coated bur, the interior crack was recreated from the outside with a fissure bur to achieve a 3-D effect. The surface texture was kept as smooth as possible, in accordance with the patient's age. After the glaze firing, only a goat hair brush and diamond polishing paste were used to slightly reduce the gloss effect. After trying out the full-ceramic crown, the patient was very satisfied with the result (Fig. 7), and a self-adhesive bonding agent was applied. The shade

and form of the restoration integrated harmoniously with the other teeth (Fig. 8). The veneering ceramic, in combination with two stain firings, made it possible to achieve age-appropriate aesthetics (Fig. 9).

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