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PM_{2.5} & ORAL CANCER

Scientists in Taiwan have investigated the association between fine particulate matter (PM_{2.5}) and oral cancer among Taiwanese men. Their results have increased knowledge in air pollution. ▶ Page 03



MB₂ ROOT CANAL

Group of researchers from the dental school of University of Lisbon analysed the worldwide prevalence of the MB₂ root canal and got understanding its possible relationships. ▶ Page 05



INTERVIEW

Dr Andy Euseong Kim, the Chairperson of IFEA WEC 2018, has explained on the theme of this year's meeting, "Endodontics: The utmost values in dentistry" in the interview with Dental Tribune Online. ▶ Page 07

Market share of value and discount implant solutions to increase in Asia Pacific

By Graeme Fell and Jeffrey Wong, iData Research

BURNABY, British Columbia, Canada: According to a new market report by iData Research, a leading provider of international dental market research, the Asia Pacific implant market is transitioning towards inexpensive implant products. Growth is being driven by rising demand for aesthetically pleasing long-term dental restorations and this has resulted in demand for more affordable options. However, this movement towards low-cost implants is occurring at differing rates across each of the five major Asia Pacific regions.



The Asia Pacific dental implant market is expected to significantly increase by 2024. (Image: iData Research)

Trends in overall dental implant market

The Asia Pacific dental implant market is expected to experience

high levels of growth by 2024, reaching almost US\$890 million,

as reported in a recent study by iData Research. This market anal-

ysis covered dental implants (premium, value and discount products), final abutments (stock, custom and CAD/CAM products) and surgical guides. Across all countries, revenue growth will be driven by the increasingly strong evidence in favour of implant-supported restorative solutions, along with a growing patient base. While competitive price cuts and inexpensive solutions have limited potential market growth, these factors are primarily spurred by high unit demand.

Japan: Surgical guides driving market

In 2017, the dental implant market in Japan exhibited modest growth. Japan has recovered since

its dental implant market bottomed out in the wake of negative press reports in 2012. While the rate of implants placed per capita remains relatively low in Japan, the market is now attracting interest from both patients and dentists. Renewed interest in dental implant treatment has resulted in high growth of the surgical guide market in Japan, in part due to past highly publicised reports of inaccurate placement.

South Korea: Reimbursement expansion driving significant growth

In 2014, the National Health Insurance Service of South Korea significantly increased dental implant coverage for those 75 years old and over.

>> Page 2

New study: 7 percent of children in orthodontic care at risk for sleep disorders

By DTI

CLEVELAND, Ohio, U.S.: Researchers at Case Western Reserve University's School of Dental Medicine have found that about 7 percent of children between ages 9 and 17 in orthodontic care are at a high risk for sleep-disordered breathing. This



Disordered breathing in children is often underrecognized. New research suggests that especially children on orthodontic care are at risk for sleep disorders. (Photograph: Africa Studio/Shutterstock)

disorder can lead to restlessness, hyperactivity and concentration problems.

For the study, 303 children or their parents completed a questionnaire about sleep and symptoms. About 7 percent responded with enough "yes" answers to put them at a high risk for sleep-disordered breathing.

"The rate is higher than we expected," said Prof. J. Martin Palomo, a professor in the Department of Orthodontics at the dental school, and senior author of the study. The researchers note that sleep-disordered breathing in children may be underrecognized and underreported. They also suggest that the same portion of adolescents in orthodontic care in the general population could similarly be at risk.

However, according to Palomo, orthodontists are well-positioned to help affected patients because they see children whose facial development or jaw alignment has been impacted by breathing problems. When spotting a potential problem, they can make a referral to a sleep specialist.

"Sleep is a tightly regulated and well-organized biologic process affecting daily functioning as well as physical and mental health," Palomo said. "Sleep, or a lack of sleep, affects adults and children differently."

Sleep-disordered breathing describes several conditions—including apneas—characterized by abnormal breathing patterns.

When adults get tired, they typically show signs of sleepiness: yawning, heavy eyelids and sitting down to rest. In contrast, children tend to get hyperactive. They also might snore, breathe through the mouth during the day, awake with dry mouth or become easily distracted.

Palomo hopes the study will help educate both the public and orthodontists. He also believes, based on published reports, that many children with sleep disorders are misdiagnosed with attention deficit hyperactivity disorder (ADHD), given that the symptoms of both are strikingly similar. "I think it's important to rule out sleep disorders before a patient is medicated for ADHD," he added.



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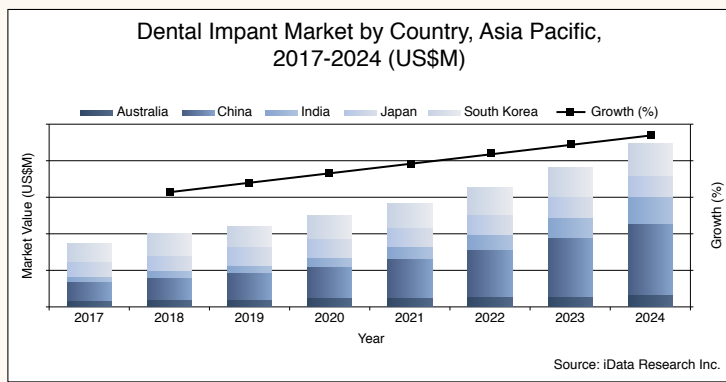
<< Page 1

The minimum age for eligibility was lowered to 70 in 2015 and to 65 in 2016. Coverage was similarly increased for dentures in 2016. This has driven what is already the world's most developed market for dental implants and final abutments, and it will continue to do so as more people take advantage of the insurance changes and as the population ages. South Korea is unique in that the market is dominated by domestic discount implant manufacturers. Thus, the transition towards inex-

pensive options has already occurred.

Australia: Shifting product types in growing market

In 2017, the market for dental implants in Australia was transitioning, as it was elsewhere, to more affordable implant products. However, another global trend in dental implantology that was most prevalent in Australia was the shift towards CAD/CAM final abutments, which are relatively new to the market and previously



were a very costly product. Manufacturers and dental laboratories have invested in improving CAD/CAM technology to make production more efficient and, therefore, more affordable to dental professionals. As a result of these cost-efficient technology improvements, a growing number of dental manufacturers and laboratories are now able to produce CAD/CAM abutments, making these products more accessible in Australia.

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China: Demographic and economic factors creating huge market potential

China is experiencing high growth across the dental industry and its dental implant market is expanding rapidly, even compared with the rest of the Asia Pacific region. Historically, dental health has been poor in China. Despite improvements, a 2010 survey by the Ministry of Health found that the vast majority of those between the ages of 65 and 74 have dental caries. In response to increasing discretionary income, demand for dental implant restorations has risen. To meet that demand, the number of private dental service clinics and chains is also rapidly expanding. Moreover, the Chinese population is ageing dramatically, with the over-60 population currently exceeding 200 million. The expanding patient base will generate demand for more affordable products, accentuating the transition to value and discount products in China.

India: Early development

While China is forecast to become the world's next major dental market, India remains the least developed of the Asia Pacific regions studied. Nevertheless, market growth in India is exceedingly high. Value and discount implant brands have already succeeded in capturing a significant portion of the Indian market. As the country continues to adopt dental implant technology at a growing rate, these brands will hold the majority of the market, significantly outpacing premium brands.

Discount and value implant brands crowding competitive landscape

The competitive landscape in the Asia Pacific dental implant market includes a diverse range of multinational companies. Global premium implant brands, such as Nobel Biocare and Straumann, attained leading market shares across the region, with the exception of South Korea. However, the competitive landscape is becoming increasingly crowded, with multiple affordable implant options achieving high revenue growth. In response to this, major premium companies have pursued acquisition strategies to broaden their market exposure. In 2016, Straumann acquired Equinox, a popular value implant brand in India, as well as Anthogyr's implant business in China. Dentsply Sirona has also acquired multiple implant brands in recent years, such as MIS Implants Technologies. The share of the market consisting of discount and value products is forecast to increase to over 55 per cent by 2024.

The reports can be purchased at <https://idataresearch.com/product-category/dental/dental-implants>.

Pollution may cause increased risk of oral cancer, study finds

By DTI

TAIPEI, Taiwan: The debate on climate change and its effects on the earth are a hot topic. One discussion, in particular, is around air pollution, which is increasingly becoming a global issue. However, in South East Asia, many people have been dealing with smog for decades. In a new study, scientists in Taiwan have investigated the association between fine particulate matter (PM2.5) and oral cancer among Taiwanese men, and their results have increased knowledge in this regard, pointing to more research being needed to further understand the risk.



Researchers in Taiwan have found that high levels of fine particulate matter in the atmosphere may increase the risk of oral cancer. (Photograph: testing/Shutterstock)

The number of new cases and deaths from mouth cancer are increasing in many parts of the world, and known risk factors include smoking, alcohol consumption, human papillomavirus, and, in parts of South East Asia, the chewing of betel quid ("paan"), a mix of ingredients wrapped in betel leaf. PM2.5 is known to be harmful to respiratory and cardiovascular health and to establish whether this might have a role in the increased number of mouth cancer patients, the researchers looked at a collection of data.

PM2.5 refers to atmospheric particulate matter that has a diameter of less than 2.5 µm, which is about 3 per cent of the diameter of a human hair. In the study, the scientists used 2012/2013 data from four linked health services and analysed a total of 482,659 cases of men of 40 years of age and above who had attended preventative health services and had provided information on their smoking and betel quid chewing habits.

According to the study's results, 1,617 cases of mouth cancer were diagnosed among the men in 2012/2013. Unsurprisingly, smoking and frequent betel quid chewing were significantly associated with a heightened risk of this diagnosis. However, so too were high levels of PM2.5.

When compared with levels below 26.74 µg/m³, those above 40.37 µg/m³ were associated with a 43 per cent heightened risk of a mouth cancer diagnosis. Thus, the researchers, after considering potentially influential factors, found that increasing levels of PM2.5 may be associated with an increased risk of mouth cancer.

However, owing to the study's observational methodology the authors pointed out that there are certain caveats to consider. These include the lack of data on how much PM2.5 enters the mouth and

on long-term exposure to this pollutant. Nonetheless, they do believe that, owing to the large

sample size, there is some room for further discussion regarding PM2.5 and its health effects.

The study, titled "Association between fine particulate matter and oral cancer among Taiwanese men",

was published online in the *Journal of Investigative Medicine* on 9 October 2018 ahead of inclusion in an issue.

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BÜRMOOS, Austria: Get your phone ready, smile, take a photo and post your selfie! W&H's "From a patient to a fan" image campaign is running a big competition until 31 December.

Advertorial

In spring, W&H launched its "From a patient to a fan" image campaign, which puts dentists and dental profession-

als in the spotlight. The aim is to celebrate these everyday heroes who ensure their patients are in safe and

reliable hands. Their dedication enables them to inspire their patients again and again, turning patients

into fans in the process. Owing to the excellent response, W&H is now going one step further and inviting

AD



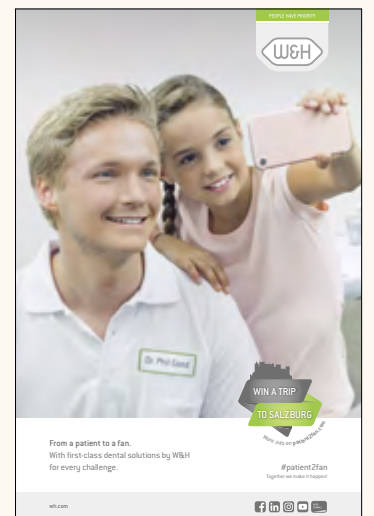
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Grab your phone and start taking pics! Your selfie could take you and your whole practice team to Salzburg. © W&H

entries for a fun competition with prizes for the whole practice team.

Your selfie could take you to Salzburg with the W&H image campaign.

This autumn, W&H is challenging practice teams to send in their snapshots—and you can enter now! The company is looking for the best selfies from everyday practice life that clearly represent dentists and their teams as everyday heroes. Show your creativity, wit and originality and let your imagination run wild! The best images will stand to win some fantastic prizes. The main prize is two trips to Salzburg, each for six people. So grab your phone and start taking selfies!

W&H has its fingers crossed for you and looks forward to receiving your creative ideas!

The prizes in detail:

- Two trips to Salzburg for six people (Thursday to Sunday in June 2019)
 - Flights to and from Salzburg
 - Four days and three nights in a four-star hotel
 - Factory tour at W&H's headquarters in Bürmoos
 - Evening meal on the Friday
 - Sound of Music tour
- Eight laser-engraved instruments: The winners will each receive a turbine or a contra-angle hand-piece, engraved with their choice of "Dr S. Mile", "Dr X. Pert", "Dr Sue Perstar", "Dr Phil Good", "Dr I. Trust" or "Dr B. Happy".
- W&H surgical caps: All entrants will each receive a surgical cap printed with "Dr X. Pert" or "Dr Sue Perstar".

Conditions of entry

The competition runs until 31 December 2018. The prizes are non-transferable and may not be redeemed for cash. Further information on the prizes and conditions of entry may be found at patient2fan.com.



It's that simple: take a selfie, upload the photo to patient2fan.com and, with a bit of luck, you could win! © W&H/Fotolia

Study analyses MB2 root canal prevalence among world population

By DTI



The differences in MB2 root canal prevalence may be associated with specificities within each region, as well as patient demographics. (Photograph: Sergii Kuchugurnyi/Shutterstock)

LISBON, Portugal: Previous research has shown that endodontic treatment failure in maxillary molars can result from missed second mesiobuccal (MB2) canals. However, an MB2 canal is present in as many as 95 per cent of maxillary molars. In a recent study, a group of researchers from the University of Lisbon's dental

school analysed the worldwide prevalence of the MB2 root canal to understand its possible relation to sex, age, side and root configuration.

In an interview with Dental Tribune International, lead author Dr Jorge Martins explained how he and his team went about the study.

Over the course of ten months, 21 observers from 21 countries and five continents were involved. They were calibrated to achieve a similar CBCT assessment methodology and instructed to collect data from 250 maxillary first molars from previous examinations. Intra- and inter-rater reliability tests were performed. The sample included 5,250 molars and was defined by way of a preliminary trial. Data collected included MB2 presence, sex, age, side, number of roots per tooth, and mesiobuccal root configuration.

"The calibration of the observers was done through sharing very strict written criteria, images and a tutorial video with the step-by-step assessment methodology that each one had to perform," Martins said. "Our main goal was to make sure everyone was assessing the morphology the same way. In the end, we shared ten CBCT scans of 20 maxillary first molars among everyone and every-

one performed their analysis so that we could perform some reliability tests of the group involved before going to the field. All this sounds easy, but it took a few hundred emails between the research team and observer team to achieve the calibration."

In the end, the difficult work paid off as the researchers made interesting findings: the worldwide CBCT-assessed MB2 prevalence was 73.8 per cent, ranging from 48.0 per cent in Venezuela to 97.6 per cent in Belgium. The prevalence in males and females was 76.3 per cent and 71.8 per cent, respectively. Significantly higher MB2 proportions were found in younger patients and three-rooted molar configurations. Overall, the MB2 prevalence in the analysed regions varied widely. The differences may be associated with specificities within each region, but also patient demographics, according to the researchers. Males, younger patients

and three-rooted configurations were associated with higher MB2 proportions.

As to what these findings mean for endodontic dentists and patients, Martins said: "It has been proven previously that the maxillary molar MB2 root canal is the one that more commonly is forgotten or not identified in endodontic treatment. These results show some influence of demographic factors in this anatomy prevalence, and that may be used as preoperative information that may anticipate more complex maxillary molar morphologies."

The study, titled "Worldwide analyses of maxillary first molar second mesiobuccal prevalence: A multicenter cone-beam computed tomographic study", was published online in the *Journal of Endodontics* on 19 September 2018 ahead of inclusion in an issue.

Smoking weakens mechanisms needed to fight pulpitis, study finds

By DTI

CLEVELAND, U.S.: The negative health impacts of smoking are widely known; however, few have researched its consequences regarding endodontics. In a new study led by scientists at the Case Western Reserve University School of Dental Medicine, Cleveland, researchers have found that smoking weakens the ability for dental pulp to fight illness and disease.

Speaking about the research, Dr. Anita Aminoshariae, associate professor of endodontics and Director of Predoctoral Endodontics at Case Western, said: "That might explain why smokers have poorer endodontic outcomes and delayed healing than nonsmokers. Imagine TNF- α [tumor necrosis factor α] and hBD-2 [human beta defensin 2] are among the soldiers in a last line of defense fortifying a castle. Smoking kills these soldiers before they even have a chance at mounting a solid defense."

In the study, the researchers set out to further understand why smokers have a greater possibility of developing periodontal disease and are nearly twice as likely to require root canal therapy.

From the pulp chambers of 32 smokers and 37 nonsmokers, all diagnosed with either normal, symptomatic irreversible pulpitis or asymptomatic irreversible pulpitis, the team collected samples



Researchers have found that smoking significantly affects the defense mechanisms needed to fight pulpitis—however, they may be restored after quitting. (Photograph: Ehab Edward/Shutterstock)

and measured the interleukin (IL) 1 β , TNF- α , hBD-2 and hBD-3 levels. "We hypothesized that the natural defenses would be reduced in smokers; we didn't expect them to have them completely depleted," explained Aminoshariae.

According to the study's results, pulpal concentrations of TNF- α and hBD-2 were significantly lower among smokers, whereas there was no significant difference in IL-1 β or hBD-3. Two-way analysis of covariance also revealed that smoking

status, not endodontic diagnosis (pulpal status), significantly affected TNF- α and hBD-2 levels.

Although the study results provide yet another argument against smoking, an encouraging

finding of the research was that two of the patients in the study who quit smoking experienced a return of the defense mechanisms needed to fight pulpitis.

New findings on chronic pain syndrome in the mouth

By DTI

GOTHENBURG, Sweden: The picture is becoming clearer regarding the chronic oral pain condition known

as burning mouth syndrome (BMS), which mainly affects women who are middle-aged and older. A scien-

tist at Sahlgrenska Academy at the University of Gothenburg has reported results on dissertation work

that is part of a larger research project aimed at finding a model for BMS that can facilitate diagno-

sis and treatment in the future.

BMS affects approximately 4 per cent of the Swedish population. The condition is characterised by a burning sensation of the oral mucosa in a person with otherwise apparently normal oral health. The tongue is most often afflicted, but the palate, lips and gingivae may also be affected. Other common symptoms include xerostomia and altered taste perception, such as a bitter or metallic flavour in the mouth.



Mainly middle-aged and elderly women are affected by burning mouth syndrome.
(Photograph: gnong/Shutterstock)

In her doctoral dissertation on oral microbiology and immunology at the Institute of Odontology, Dr Shikha Acharya connected clinical findings and self-reported findings from questionnaires from patients with BMS about their symptoms and background (other diseases, use of medications, etc.) along with saliva-related factors. These were compared with a sex- and age-matched control group.

The researcher found that 45 per cent of the BMS patients had altered taste perception and 73 per cent experienced burning or stinging or a combination of the two, but stinging and numbness also occurred. In addition to BMS, the examination of the study participants showed a higher incidence of other types of diseases, use of more medications, proneness to bruxism and more allergies than the control group. However, more advanced analyses showed that BMS was strongly associated with self-reported skin disease and subjective oral dryness.

That the BMS patients reported that they suffered considerably more from skin disease and skin problems, compared with the control group, is a new finding. The study also found that mucin proteins in BMS patients' saliva were altered and contained lower amounts of carbohydrate structures that affect the oral cavity's immune system, constituting another novel finding.

"Our hope is that the new findings will contribute to the development of objective diagnostic criteria and effective individualised treatment that are both currently lacking. It's important because the afflicted patients often feel that their surroundings and health care professionals doubt their ailment," explained Acharya.

AD

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Interview: “Endodontic treatment is an invaluable therapeutic technique

By DTI

From 4 to 7 October, the world of endodontics have been meeting in the South Korean capital of Seoul for the 11th International Federation of Endodontic Associations (IFEA) World Endodontic Congress (WEC). In light of the event, which has attracted dental professionals from all around the world for many years, Dental Tribune Online spoke with IFEA WEC 2018 Chairperson Dr Andy Euseong Kim.

Dr Kim, how would you describe your experience as chairperson of the IFEA WEC 2018 Seoul local organising committee?

First of all, it is my great honour and privilege to act as chairperson of the local organising committee. I've learnt so much while preparing for this gathering. I would like to express my sincere appreciation to everyone for the support they've shown us so constantly. I feel so blessed, and it could not have been done without that cooperation and support.

Second, I have been pleased to

see Korean dentists demonstrating their excellent capability. They perform excellent endodontic treatment, even in poor environments, and all the techniques of endodontic treatment are controlled under the government-led health insurance system. I can confirm that these researchers are conducting world-class research.

Finally, it has been a valuable experience to feel the unity of the members of the Korean Academy of Endodontics.

The theme of this year's meeting is “Endodontics: The utmost values in dentistry”. Can you explain what is behind this and how you identify with it?

Endodontic treatment is an invaluable therapeutic technique that can keep natural teeth healthy. The reach of its use depends on the country, and I have felt sorry that endodontic treatment has been more neglected than other fields, given its importance. We have various difficulties, especially with

the limited choices for dentists, because of the government's medical insurance system.

With this point of view, we came to the idea of going back to the basics and asked ourselves a fundamental question: what is most important for national oral health? A fancy building may be nice to look at, but it will not last long if the groundwork is not done properly. Likewise, our efforts to keep our natural teeth healthy for the long term should never be under-estimated.

Why do you think meetings such as IFEA's WEC are important for the endo community?

This is an absolutely necessary meeting. The American Association of Endodontists meeting, the European Society of Endodontology meeting and the WEC of IFEA are the standard meetings of international endodontic societies, but while the meetings arranged by the first two associations are locally constrained, the IFEA gathering is the only academic congress that covers

international endodontic treatment. Membership of IFEA continues to increase, and 36 countries have enrolled in IFEA as member countries.

It is natural that there's level of difference depending on the country, and I believe everyone will level up through this kind of meeting. By doing so, we can contribute to the positive development of human beings, which is IFEA's primary value. Also, the meeting promotes fellowship among endodontists and exchange of experiences and ideas. We will maximise synergy in our field by sharing information with one another.

What are your expectations/hopes for the meeting, and what are you most looking forward to personally?

I am so excited about the meeting. The largest number of participants of all of past IFEA WECs will come to Korea from 70 countries all over the world. Personally, I am thrilled to meet endodontists from all over the world. I know that it will be a wonderful



In the interview with Dental Tribune Online, Dr Kim disclosed that he is very excited about IFEA 2018 and is hoping that the event “will continue to grow”. (Photograph: Dr Andy Euseong Kim)

experience to meet participants from far away and from closer to home. Furthermore, I hope that IFEA will continue to grow into a global organisation representing the whole world.

Interview: “I saw a lot of improvements in every step of the endodontic treatment”

By DTI

Besides running a private practice concentrating mainly on endodontic dentistry, Dr Filippo Cardinali gives lectures in theoretical and practical courses on subjects related to the isolation of the operative field and endodontics. He also often participates as a speaker at courses and conferences in Italy and abroad including the 11th International Federation of Endodontic Associations (IFEA) World Endodontic Congress, which has been taken place from 4 to 7 October in Seoul in Korea. In an interview with Dental Tribune Online, Cardinali shared his thoughts on lecturing at the event.

Dr Cardinali, why did you pick endodontics as your specialty? Where do you see the challenges and the excitement?

After graduating in dentistry, I worked as a dental officer for one year at the Cagliari Military Hospital in Sardinia. At that time, military service was mandatory in Italy. The aim of the military surgery was to manage patients with emergencies. So, from the beginning of my career I started treating many patients with endodontic problems.

Once I had finished my military service, I started working as an assistant in dental clinics where I mainly dealt with endodontic and restorative problems. To improve my knowledge and to better under-

stand the importance of endodontic treatment as part of a multidisciplinary treatment, I started attending the meetings of the Italian Society of Endodontics. At that time, in 1995, the Internet was not as widespread as today and social media did not exist, so the only way to be updated about endodontic techniques and materials was to attend congresses. Being part of the Italian Society of Endodontics had opened up a new world for me. At the beginning, it was a bit frustrating because it seemed like a big challenge to reach the levels of knowledge and skill of the speakers. But, thanks to the Italian Endodontics Society meetings, I obtained the incentives and tools to improve myself over time.

Today, I am very proud to be on the board of the society as treasurer. Basically, in my daily routine, what I do is just to try to save teeth with proper root canal treatments. The challenge with endodontic anatomy is as exciting as it is satisfying to see long-term follow-ups that attest to the validity of our work.

Despite taking place in Korea, do you think that the IFEA congress is important for the international endodontic community? If so, why?

I honestly think that the IFEA congress is really important, be-



In his 26 years of practising dentistry, Dr Cardinali saw many improvements in the field of endodontics. (Photograph: Dr Cardinali)

cause it is a moment of aggregation between all the worldwide endodontic societies. In addition to the pleasure of meeting, and the opportunity to meet, many colleagues from other countries, there is the opportunity to compare, for example, how other endodontic societies face the daily challenges that all societies have today, like maintaining high quality in terms of instruction, how they interact with the scientific societies of other branches of dentistry.

What is the title of the lecture you will be giving at IFEA and what is it about?

My lecture is called “Solutions to simplify shaping and cleaning:

Improving the quality of the root canal treatment”. My thoughts are those of an endodontic enthusiast who, like every passionate clinician, tries to increase the success rates of endodontic therapy in the most predictable way possible. Also because my serenity and the quality of my life depends essentially on the satisfaction of my patients.

When I started my practice there were four to five hand files and three to four shaping techniques. Nowadays, the scenario has changed completely and clinicians have access to exceptional tools for endodontic therapy. There is a risk in relying on those very evolved instruments and in thinking that they are more important for a positive treatment outcome than the endodontic knowledge. If any problems occur during instrumentation, such as the separation of an instrument or the creation of a stripping or a ledge, whose fault is it? Is it the fault of the tool or the clinician? What is more important? Tools or technique?

You have been working as an endodontist for many years now. Where do you see the biggest development in the field?

In my 26 years of practising dentistry, I saw a lot of improvements in every step of the endodontic treatment. And what is

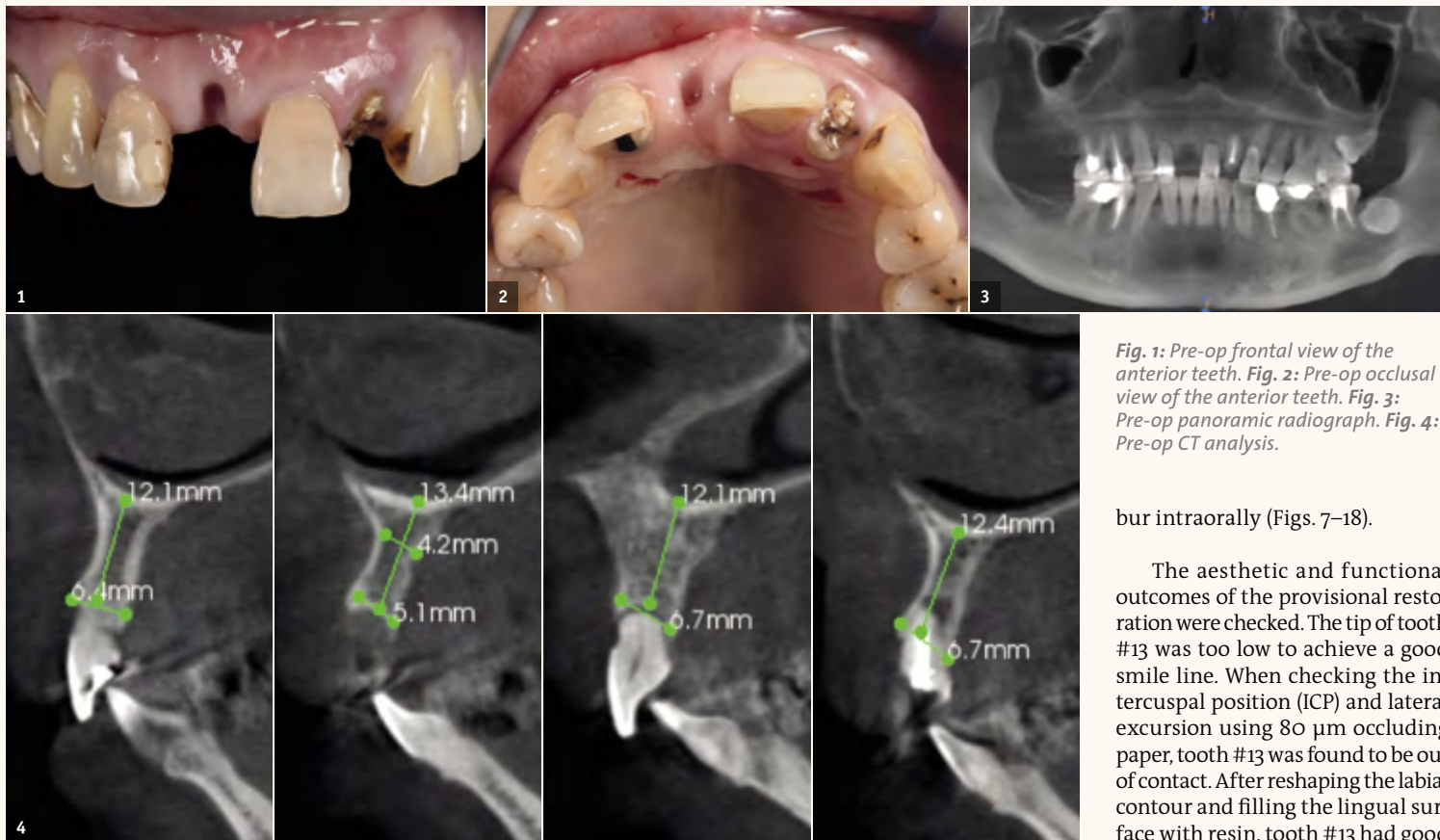
even more important is that these improvements eased the endodontist's life and at the same time improved the quality of the therapy. Our lives have changed and our outcome has increased thanks to the introduction of MTA, NiTi rotary files and ultrasonic tips dedicated to endodontics for cleaning, retro preparation in surgery or for the removal of separate files during retreatments.

Nowadays, diagnosis for complex cases is easier thanks to the CBCT. And, what about obturation with the introduction of bioceramic sealers? These are all innovations that a clinician that takes care of patients cannot miss. My workflow and my instruments have changed completely in comparison to the beginning of my practice. The difficult part is to change your own work habits, but when the final results are an improvement of the quality of your professional life and a better outcome for the patient, putting the work in is definitely worth it.

The continuous evolution makes endodontics a branch that certainly is not boring. And this is very exciting for the clinician and I am sure that in the future new techniques and materials will come that will further improve the quality of our treatments.

Immediate implantation with CAD/CAM and functional restoration in the aesthetic zone

Drs Feng Liu, Xiaorui Shi & Miaozen Wang, China



contact and guidance during ICP and lateral excursion (Figs. 19–23).

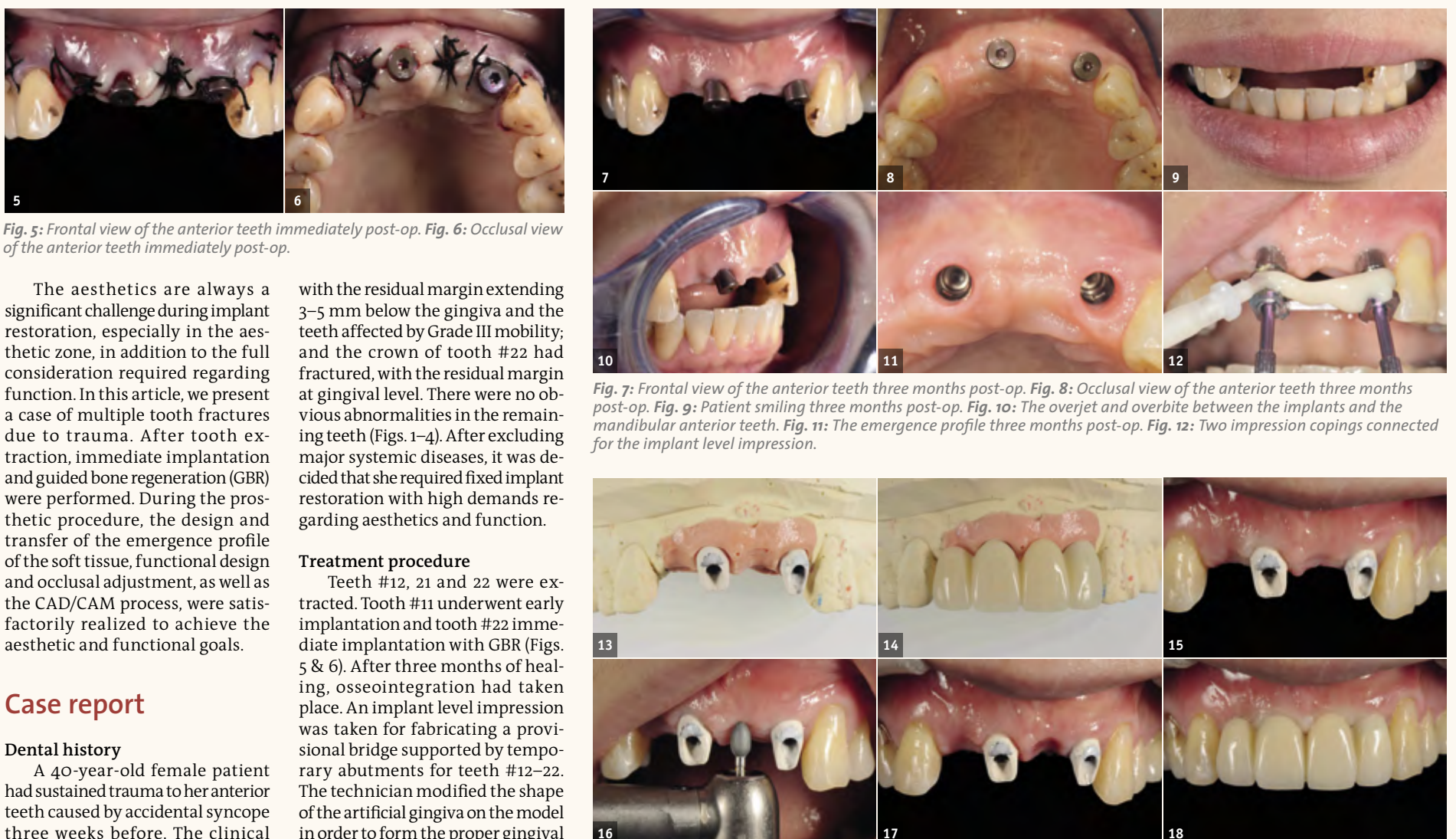
Once the aesthetic and functional outcomes had been confirmed, the anterior guidance of the provisional restoration was recorded on an articulator (Artex, Amann

Girrbach) and its individual incisal guide table (Figs. 24–27). Next, the emergence profile of the provisional restoration was transferred and the cast model was made and mounted on the articulator (Figs. 28–33).

The cast model was scanned step by step to obtain a digital model and this was integrated with a virtual articulator. The anterior guidance of the virtual articulator was set according to the data from the provisional restoration. Next, the design was completed on computer and the titanium-based zirconia abutment and fixed zirconia bridge produced via CAM. After staining and glazing, the final restoration was completed (Figs. 34–41). The final restoration demonstrated a good outcome, both aesthetically and functionally (Figs. 42–50).

bur intraorally (Figs. 7–18).

The aesthetic and functional outcomes of the provisional restoration were checked. The tip of tooth #13 was too low to achieve a good smile line. When checking the intercuspal position (ICP) and lateral excursion using 80 µm occluding paper, tooth #13 was found to be out of contact. After reshaping the labial contour and filling the lingual surface with resin, tooth #13 had good



The aesthetics are always a significant challenge during implant restoration, especially in the aesthetic zone, in addition to the full consideration required regarding function. In this article, we present a case of multiple tooth fractures due to trauma. After tooth extraction, immediate implantation and guided bone regeneration (GBR) were performed. During the prosthetic procedure, the design and transfer of the emergence profile of the soft tissue, functional design and occlusal adjustment, as well as the CAD/CAM process, were satisfactorily realized to achieve the aesthetic and functional goals.

Case report

Dental history

A 40-year-old female patient had sustained trauma to her anterior teeth caused by accidental syncope three weeks before. The clinical examination found that tooth

#11 had been luxated; the crowns of teeth #12 and 21 had fractured,

with the residual margin extending 3–5 mm below the gingiva and the teeth affected by Grade III mobility; and the crown of tooth #22 had fractured, with the residual margin at gingival level. There were no obvious abnormalities in the remaining teeth (Figs. 1–4). After excluding major systemic diseases, it was decided that she required fixed implant restoration with high demands regarding aesthetics and function.

Treatment procedure

Teeth #12, 21 and 22 were extracted. Tooth #11 underwent early implantation and tooth #22 immediate implantation with GBR (Figs. 5 & 6). After three months of healing, osseointegration had taken place. An implant level impression was taken for fabricating a provisional bridge supported by temporary abutments for teeth #12–22. The technician modified the shape of the artificial gingiva on the model in order to form the proper gingival curve and emergence profile, then finished the provisional bridge, while the dentist modified the gingival shape using an olive-shaped

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