

# DENTAL TRIBUNE

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## INTERVIEW

iData's Jeff Wong explains what is currently shaping the dental industry and how competitors have reacted to these trends.

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In the second article of this series, the 4dentists group will be looking at the financial and legal aspects of becoming an associate.

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## SHOW TRIBUNE

The Dentistry Show and Dental Technology Showcase will be held for the tenth time this year for all members of the profession.

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# Public satisfaction with NHS dental services at 20-year high

British Social Attitudes survey sees less discontent with public care

By DTI

LONDON, UK: People's satisfaction with dental care provided by the National Health Service (NHS) has risen further in recent years, as shown in the latest British Social Attitudes survey conducted by the National Centre for Social Research in London. According to the figures, only less than one in five patients were discontent with the dentistry services last year.

The numbers reflect some of the highest levels of public satisfaction with these services since the early 1990s and are a dramatic improvement over figures in the early 2000s, which saw dissatis-



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Satisfaction figures have dramatically improved over those on the early 2000s.

faction rise to almost 38 per cent, the report said. More satisfaction was only observed for general practitioner services, which scored slightly better in the recent survey than dental services.

Overall, 63 per cent of those surveyed said they were satisfied with how the NHS is run today.

The British Dental Association hailed the results, saying that dentists should take real pride in what they have achieved despite government indifference, sustained underfunding and the barriers presented by the target-driven 2006 contract that still remains in place.

"It's a miracle NHS dentists have been able to overcome all the hurdles placed in front of us to do right by our patients. It shows what might be possible if this 'Cinderella Service' received appropriate priority," commented

BDA Principal Executive Committee Chair Mick Armstrong. "This profession can take pride in the fact that public satisfaction in NHS dentistry has hit a near 20-year high in spite of chronic underfunding and discredited contracts."

The British Social Attitudes survey has been conducted among members of the British public since 1983. The latest survey was carried out between July and October 2016 and asked a nationally representative sample of nearly 3,000 people about their satisfaction with the NHS overall, as well as nearly 1,000 people about their satisfaction with individual NHS services.

# Goodwill decreases owing to uncertainty in practice sales market

By DTI

KESWICK, UK: Despite a drop back in the average of goodwill as a percentage of fee income, both NHS and mixed practices have continued to attract a significant premium, according to the latest goodwill survey by the National Association of Specialist Dental Accountants and Lawyers (NASDAL). Practices sold at an average of 126 per cent of goodwill

as a percentage of fee income in the last quarter ending 31 January, with NHS practices attracting an even higher rate of 156 per cent, the figures demonstrate.

With an average of 101 per cent of goodwill as a percentage of fee income, private practices too have remained steady compared with previous quarters.

According to Alan Suggett, specialist dental accountant and partner in UNW who compiles the goodwill survey, the results indicate a greater discrepancy between valuations and deals, but also a higher uncertainty in the market, particularly when mydentist withdrew from buying new practices in recent months.

"There seemed to be a general perception that the corporates, including mydentist, were buying up every practice across the country," Suggett said. "Whilst this wasn't true and mydentist was only responsible for a small percentage of sales, it does seem that their withdrawal may have led to a more general loss of confidence."

"With a time lag between valuations and deals done, it will be interesting to see if the quarters to come will reflect the optimism of these high valuations when it comes to actually signing on the dotted line," he added.

The goodwill figures are collated from accountant and lawyer members of NASDAL on a quarterly basis in order to provide a useful guide to the practice sales market.



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### IMPRINT

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Daniel ZIMMERMANN  
newsroom@dental-tribune.com  
Tel.: +44 161 223 1830

**EDITORS:**  
Kristin HÜBNER  
Yvonne BACHMANN

**ONLINE EDITOR/SOCIAL MEDIA MANAGER:**  
Claudia DUSCHEK

**MANAGING EDITOR &  
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**DENTAL TRIBUNE INTERNATIONAL**  
Holbeinstr. 29, 04229, Leipzig, Germany  
Tel.: +49 341 48474-302  
Fax: +49 341 48474-173  
info@dental-tribune.com  
www.dental-tribune.com

### Regional Offices:

**UNITED KINGDOM**  
535, Stillwater Drive 5  
Manchester M11 4TF  
Tel.: +44 161 223 1830  
www.dental-tribune.co.uk

**DT ASIA PACIFIC LTD.**  
c/o Yonto Risio Communications Ltd,  
Room 1406, Rightful Centre,  
12 Tak Hing Street, Jordan,  
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Tel.: +852 3113 6177  
Fax: +852 3113 6199

**DENTAL TRIBUNE AMERICA, LLC**  
116 West 23<sup>rd</sup> Street, Suite 500, New York,  
NY 10011, USA  
Tel.: +1 212 244 7181  
Fax: +1 212 224 7185

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## Trouble for single-handed practices

By DTI

**LONDON, UK:** Profits of single-handed practices in the UK have slumped by almost 12 per cent in the last two years, indicating that the model may be a thing of the past. According to figures released in the latest Benchmarking Report by the National Association of Specialist Dental Accountants and Lawyers (NASDAL), the average profit per principal in a single-handed practice was only slightly above £105,000 in 2016, compared with £119,732 in 2014.

In contrast, practices with associates achieved a net average profit per principal of £138,511 last year.

The problems, according to Ian Simpson, a chartered accountant and a partner in Humphrey & Co., which carries out the statistical analysis on behalf of NASDAL, could be linked to increasing costs in compliance and a general feeling among sole practitioners that they are unable to increase their fees. "As a 'compliance culture' continues unabated, the future

will be difficult for those going it alone," he commented regarding the figures.

"Whilst it is good news to see success for the majority of the sector, the increasing cost of compliance is a cause for concern," added Nick Ledingham of Morris & Co. specialist dental accountants and Chairman of NASDAL. "The arrival of Making Tax Digital will do nothing to allay dentists' fears that they are victims of a system that doesn't understand how they do business."

Reflecting the finances of dental practices and dentists for the most recent tax year, NASDAL's annual benchmarking statistics are gathered from its accountant members across the UK, who together act for more than a quarter of self-employed dentists. The findings also included an increase of average net profit per principal at NHS practices from £129,265 in 2015 to £134,102 in 2016 and a slight drop of average profits of associates from £68,024 to £67,389 in the same period.

## Negative effects of dental phobia confirmed

By DTI

**LONDON, UK:** One in three adults in the UK are estimated to have a persistent fear of going to the dentist. The fact that the phobia can lead to more active caries and missing teeth has recently been confirmed by researchers at King's College London Dental Institute. The findings were based on their analysis of data on thousands of Brits from the 2009 Adult Dental Health Survey with the aim of exploring common oral health conditions of those with dental phobia.

According to the study, people with dental phobia are more

likely to have one or more decayed teeth, as well as missing teeth, in comparison with non-phobic people, as they avoid seeing a dentist on a regular basis to have potentially chronic, but preventable, oral conditions treated.

Most adults with dental phobia also preferred an immediate solution, such as extraction, instead of undergoing a long-term care plan, the paper also showed.

In addition to oral health, related quality of life was also poor among those with dental phobia, the researchers further noted, with a large majority showing a high impact on their physiologi-

cal, psychological, social and emotional well-being, even when levels of dental disease were controlled.

"Other research has shown that individuals with dental phobia express negative feelings such as sadness, tiredness, discouragement and general anxiety, less vitality and more exhaustion," explained King's Dr Ellie Heidari, lead author of the study. "Embarrassment at their poor teeth will prevent them from smiling and showing their teeth."

By providing phobic patients with a detailed at-home oral healthcare plan, dental practi-

tioners could help reduce acute conditions with preventative care, the researchers recommended. A preventative programme for those with dental phobia, focusing on what can be done to help them avoid acute conditions, is being developed at the institute, they said.

The study, titled "The oral health of individuals with dental phobia: A multivariate analysis of the Adult Dental Health Survey, 2009", is to be published in the second April issue of the *British Dental Journal*. It was conducted among 10,900 participants, of whom just over 1,300 were considered to be dentally phobic.

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# Reduced peri-implantitis risk

Plymouth researchers successfully test effectiveness of a dual-layered silver–HA nano-coating on titanium alloy implants

By DTI

**PLYMOUTH, UK:** Investigating the effect of a new approach using a combination of silver, titanium dioxide and hydroxyapatite (HA) nano-coatings on the surface of titanium alloy implants, researchers from Plymouth have found that the method was successful in inhibiting bacterial growth and reducing the formation of bacterial biofilm. In addition, the coating created a surface with anti-biofilm properties, thus supporting successful integration of the implants into surrounding bone and accelerating bone healing.

One of the main reasons for dental implant failure is peri-implantitis, an inflammatory process affecting the soft and hard tissue surrounding dental implants caused by pathogenic microbes that develop into biofilms. Current approaches to managing the development of biofilms include application of antimicrobial coatings loaded with antibiotics or chlorhexidine. However, these are usually only short-term measures. In addition, chlorhexidine has been reported to be potentially toxic to human cells.

Investigating a new approach to the prevention of biofilm, research-

ers from the School of Biological Sciences, Peninsula Schools of Medicine and Dentistry, and School of Engineering at the University of Plymouth tested the effectiveness of a dual-layered silver–HA nano-coating on titanium alloy medical implants. The antibacterial performance of the coating was quantitatively assessed by measuring the growth of *Streptococcus sanguinis*, the proportion of live and dead cells, and lactate production by the microbes over 24 hours. The results showed that the combination successfully inhibited bacterial growth and reduced the formation of bacterial biofilm on the surface of the implants by 97.5 per cent. Uncoated controls and tita-

nium dioxide nano-coatings showed no antibacterial effect.

According to the researchers, no dissolution was detected for the HA nano-coatings. Thus, application of a dual-layered silver–HA nano-coating on titanium alloy implants further created a surface with anti-biofilm properties without compromising the HA biocompatibility required for successful osseointegration and accelerated bone healing.

“In this cross-faculty study we have identified the means to protect dental implants against the most common cause of their failure. The potential of our work for increased

patient comfort and satisfaction, and reduced costs, is great and we look forward to translating our findings into clinical practice,” commented Prof. Christopher Tredwin, Head of the Peninsula Dental School. In the next step, the effectiveness of the approach needs to be tested *in vivo*, according to the researchers.

The study, titled “Antibacterial activity and biofilm inhibition by surface modified titanium alloy medical implants following application of silver, titanium dioxide and hydroxyapatite nanocoatings”, was published online on 17 March in the *Nanotoxicology Journal*.

## British dentist known as “World’s fittest old-age pensioner” dies at age 97



Dr Charles Eugster (Photograph courtesy of Tarsh Consulting, UK)

By DTI

**LONDON, UK:** Most people of advanced age tend to prefer activities like gardening or watching TV. Not Dr Charles Eugster; just last year, the 97-year-old Brit broke the 200 m world record in the over-95s age group. This week, the “World’s fittest old-age pensioner” and veteran dental surgeon died due to complications after heart failure, according to his publicist.

In addition to the 200 m record he broke at the 2016 British Masters Indoor Championships in London, Eugster holds the 400 m record and several long-jump records for his age group. Recently, he competed at the World Masters Athletics Championships Indoor in Daegu in South Korea.

Born in London just after World War I, he graduated with a dental surgery degree from Guy’s Hospital in 1948. In addition to this, he obtained degrees from

universities in Zurich in Switzerland, where he also temporarily worked as a clinical instructor, Heidelberg in Germany and Chicago in the US. Eugster was in private practice until 1975 and continued to publish a newsletter on clinical dentistry in three languages for three decades after his retirement.

Earlier this year, he published his first book, *Age is Just a Number*. He gave his last interview on ITV’s *This Morning* programme, during which he criticised the way ageing is treated in today’s society and spoke out in favour of lifelong learning.

“We, along with everyone who knew Charles, are incredibly sad to lose such a truly inspirational figure,” his publicist said on Facebook. “He has shown, by remarkable example, how fantastic life can be in older old age. It has been a privilege to work with and learn from Charles.”

## Kings College dental researcher receives international honours

By DTI

**SAN FRANCISCO, US:** One of the world’s most important awards for

techniques to measure erosive tooth wear in the prosthodontics field. Over the past 20 years, among other things, he conducted

also been instrumental in bringing teaching on implants to undergraduates and at a level that is consistent with the expectations



research in dental medicine has been given to an academic from the UK. Prof. David Bartlett from King’s College London Dental Institute was presented with the Distinguished Scientist Award in Research in Prosthodontics and Implants at the recent General Session and Exhibition of the International Association for Dental Research (IADR) in San Francisco in the US.

With the award, one of the highest honours bestowed by the research association, Bartlett was recognised for outstanding research accomplishments, including conducting laboratory investigations and developing clinical

three large prevalence studies and collaborated internationally to publish the only systematic reviews on that particular topic in the literature.

He also published data from a study of 1,010 18- to 30-year-olds, together with an assessment of risk, and undertook a pan-European study of more than 3,500 participants to establish the risk factors of erosion.

Currently Head of Prosthodontics at King’s College London Dental Institute, Bartlett has developed teaching in the specialty to make it more relevant to modern general dental practice. He has

of dental students, the institute said.

In addition to research in prosthodontics and implants, IADR honours research in 16 more categories, including periodontology and regenerative dentistry. The awards are sponsored by prominent dental companies, such as Dentsply Sirona, DMG and Unilever.

IADR held its recent meeting in conjunction with the 46<sup>th</sup> annual meeting of the American Association for Dental Research and the 41<sup>st</sup> annual meeting of the Canadian Association for Dental Research in March in San Francisco.

# Dental technicians could be at higher risk of mesothelioma

By DTI

**MILAN, Italy:** Dental technicians could be at an increased risk of developing asbestos-related cancer, Italian researchers have suggested. According to their study results, past exposure to materials formerly used in the manufacture of dental prostheses could trigger the much-later development of

the Milan hospital. The men described the use of asbestos as a lining material for casting rings, while the woman was not able to confirm the use.

Dental technicians who worked with asbestos in the past may have inhaled microscopic fibres of the carcinogenic material, and this could trigger the develop-

ment of mesothelioma in later years.

The study, titled "Pleural malignant mesothelioma in dental

laboratory technicians: A case series", was published ahead of print on 13 April 2017 in the *American Journal of Industrial Medicine*.

AD



Now proven to be carcinogenic, asbestos used to be a common part of some dental production processes in the 1960s and 1970s.

malignant mesothelioma, a type of cancer that most often affects the pulmonary pleurae and less commonly the peritoneum.

Asbestos, a proven cause of cancer, was a widely used material in construction products, especially in the 1960s and 1970s. In dentistry, it was used as a binder in periodontal dressings and as lining material for casting rings and crucibles.

The Italian researchers, experts in environmental science and occupational health, conducted an analysis of more than 5,000 pleural mesothelioma patients between 2000 and 2014. They found four subjects whose only exposure to asbestos had been in their work as dental technicians.

"Three men had been working as dental laboratory technicians, with asbestos exposure for 10, 34, and 4 years, and one woman had been helping her husband for 30 years in manufacturing dental prostheses," wrote the study authors, among them Dr Carolina Mensi, from the Department of Preventive Medicine at the Fondazione IRCCS Ca' Granda of the Ospedale Maggiore Policlinico, a scientific institute for research, hospitalisation and health care at

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# European Parliament adopts new medical device regulations

By DTI

BRUSSELS, Belgium: The European Parliament has voted to implement two new regulations con-

cerning medical devices with the aim of improving safety in medicine and dentistry. The regulations were proposed in 2012 by the European Commission and experi-

enced several delays before being officially endorsed earlier this month. They will be applied after a transitional period of three years from publication for medical de-

vices and five years for *in vitro* diagnostic medical devices. Publication is expected to take place shortly in the *Official Journal of the European Union*.

Though the rules regarding the safety and performance of medical devices were standardised throughout the EU in the 1990s, significant progress in technology rendered these standards in need of updating. In addition, manufacturers could interpret the three existing directives on medical devices—which will be replaced by these regulations—in different ways, thereby creating inconsistencies in adherence to these rules. The new regulations aim to remedy this by ensuring that this progress and innovation continue in a way that is beneficial to the safety of all involved. At the same time, smaller and medium-sized companies are facing the challenge of meeting the new requirements for clinical data, new legal requirements and certifications for all dental products.

Some of the main elements of the regulations include:

- Stricter measures on the quality, safety and performance of devices released into the marketplace, with a particular emphasis on perceived high-risk devices
- A scrutiny mechanism for Class III implants and Class IIb active products
- The introduction of a comprehensive database for medical devices sold in the EU (EUDAMED), to be set up by 2020 at the latest
- Higher requirements for clinical data and technical documentation before and after placement of the respective product on the market
- A universal device identification system that will permit medical devices to be traced more easily
- An implant card that will be given to patients so that they, along with medical professionals, have access to information about any implants they receive
- A set of guidelines for providing appropriate financial recompense to patients for faulty products (the payment will vary according to the risk class and type of device, as well as the size of the company that manufactures the device, and will ideally expedite the remunerative process)
- Guidelines for manufacturers of substances that are carcinogenic, mutagenic or toxic for reproduction, as well as substances that can disrupt the endocrine system, to provide alternative and less harmful products.

The regulations will be applicable in each of the EU member states and aim to provide a clearer framework regarding device standards to patients, professionals, and relevant domestic and international regulatory bodies. A Medical Device Coordination Group, formed of experts from member states and chaired by the European Commission, will be established to help organise and enforce the correct implementation of these regulations.

In addition, conformity assessment procedures by notified bodies—intranational organisations that evaluate medium- and high-risk devices—will continue to be performed through joint assessments conducted with the assistance of other member states.

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# Continuing acquisition will be a strategy for larger key competitors

An interview with Jeff Wong, Strategic Analyst Manager at iData

The ever-progressing digitalisation, changing regulations and a tendency towards mergers are currently shaping the dental industry. At the International Dental Show (IDS) in Cologne, *Dental Tribune* met with Jeff Wong, Strategic Analyst Manager at international medical market research and consulting firm iData, to talk about how—major and emerging—competitors have reacted to these trends.

**Dental Tribune:** Digitalisation is one of the main trends that is changing the industry. Other than that, what developments are dominating the dental market?

**Jeff Wong:** Yes, digitalisation is still the up-and-coming trend and

everybody is trying to get into that market now. On the product side, I would say it is 3-D printing and intra-oral scanning. Three or four years ago, there was only a handful of competitors in both of those areas. This year at IDS, almost everybody was presenting some new product in these fields—knowing how fast these markets develop, everybody wants to participate.

**What consequences will this have for the market in general?**

Especially in these two areas, where the level of imitation is high, with so many competitors, it will definitely start diluting the market shares among the existing

companies. However, if these participants start focusing on specific regions or niche audiences, I think there will still be a great deal of benefit.

**What about the recent merger trend—is that something we will see more of in the future?**

From what we have seen in other industries, we definitely predict that the trend will continue. Of course, there will always be a couple of smaller companies that will end up becoming fairly large themselves and remain independent. However, we expect that many of the successful emerging companies will be acquired at some point. One advan-

tage that the larger competitors have is the amount of resources they have. They can always stay ahead of the curve. If they see somebody come to the market with something unique, they have the resources to quickly develop a product of their own.

continuing acquisition. However, the strategy of some of the larger regional companies, for example in Brazil, is to continue going and to expand their global presence instead of being acquired.

In addition, many of the current key participants—with the



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## THERE'S MORE TO THIS...

## ...THAN MEETS THE EYE

**What role do the emerging markets play? What regions will become more significant in the future?**

Regarding digital dentistry, I would say much of the development is linked to implantology and prosthodontics. The key countries where those areas are big as well are Brazil and Italy. Even though the penetration of digital dentistry might be relatively higher in those areas compared with others, I would say they have the greatest opportunities for growth.

**What are the main trends in implantology?**

In terms of implants, dozens of new companies are popping up every year, but many are also either acquired or close down. There are definitely certain regions that are experiencing a great deal of growth, for example many Asian countries. At the same time, traditional markets such as Italy, Brazil and the US are doing very well. These markets are well penetrated at this point, so in terms of market growth it will definitely slow down. However, there is still substantial growth opportunity for the lower-priced competitors, while the traditional premium brands will see considerable competition from other markets.

**Do you think this will lead to those companies buying local competitors? Or what will their strategy to succeed be?**

I think the strategy of most of the larger key competitors will be

regional regulations changing from country to country—are being forced to acquire new companies in order to be able to operate in the region.

**So, you are saying that larger companies are looking for smaller businesses to acquire in order to bring new technology to market?**

Not only on the technology side, but also to compete on the pricing level as well.

**In the current political climate, the Chairman of the Association of the German Dental Industry has issued a warning about protectionism and trade barriers. What are companies doing in this regard?**

At this stage, I think, companies are mainly waiting to see what will happen. Nevertheless, in light of what is happening in other industries regarding the whole Brexit issue—for example, European Union chiefs have warned airlines, including easyJet and Ryanair, to relocate their headquarters to the EU if they wish to continue their routes within continental Europe after the Brexit—if that can happen in the airline industry, who is to say it cannot happen in the dental industry. Again, for example in Mexico, which has a major dental tourism industry, if that is going to be affected in terms of procedural volumes, it is definitely going to affect the dental manufacturers as well.

**Thank you very much for the interview.**



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# What would Dr Mo Lar do? Part 2

## Financial and legal aspects of becoming an associate

By 4dentists, UK

Over the course of this 11-part series, the 4dentist group will explore ways to tackle a number of personal and professional challenges by providing advice and guidance to fictional character Dr Mo Lar. In this second article, they will be looking at the financial and legal aspects of becoming an associate.

Previously, we looked at how Lar should approach his foundation training year, with focus placed on how to find a job, student loan repayments, and the importance of taking out the correct insurance. In many ways, becoming an associate dentist is not so very different from finding and working in a graduate role—after all, Lar still has to find a job and organise his finances. Saying that, becoming an associate requires a great deal more organisation than stepping into a role straight out of university.

### The next level

Completing foundation training and becoming an associate is a rite of passage for every dentist. For Lar, it is an opportunity to find a role within NHS dentistry where he can complete some private work too. In an ideal world, he would like to work around ten NHS sessions per week so that he continues to develop his clinical skills (development that will help with increasing his private list in the future). As part of the process of becoming an associate is figuring out what you want from the role, Lar, in many ways, is a step ahead. Indeed, knowing which roles you want to apply for can make searching for vacancies much easier.

If Lar wants to find the best position in a suitable practice, however, in an easy and methodical manner, he would do well to utilise the services of a recruitment agency like careers4dentists to support him through the various recruitment processes. On some occasions, dentists are offered the opportunity to stay on in the practice where they have completed their foundation training, but as this is not a given, the necessary steps should always be taken to avoid disappointment.

### Being self-employed

Undertaking an associate role is usually done on a self-employed basis, and it is for that reason that this stage of a dentist's career is much more complicated than becoming a foundation dentist. For Lar, his first move would need to be the negotiation of his associate agreement with his employer—a particularly pertinent move when

you consider that these agreements have recently come under fire in light of the highly publicised Uber case. As a self-employed associate, employment rights, such as paid holiday, sick leave and maternity/paternity leave do not apply, nor does he or she have the protection of anti-discrimination legislation, so it is essential that these areas be detailed in the agreement. For optimum results, associates are advised to seek legal advice from specialist lawyers. The other legal aspect that all associates such as Lar should give thought to is insurance—not only his own occupation cover in case of sickness (which will be crucial in ensuring he can maintain his outgoings), but also indemnity insurance to protect against day-to-day risks and potential claims made by patients.

In addition to this, there are responsibilities pertaining to HM Revenue and Customs (HMRC) that would need to be taken into consideration. As soon as Lar has finalised the details of his contract and agreement, he would need to register with HMRC. There are time frames with this part of the process, so all associates must contact HMRC as soon as possible. Failure to comply can result in a fine. Once Lar's records are set up, he will receive a letter with a ten-digit reference—otherwise known as a unique taxpayer reference—which he will need to complete a self-assessment tax return each year.

Completing the self-assessment tax return can be a bit of a headache, but as long as Lar maintains accurate books and records on his income and expenditure, the whole process is relatively straightforward. As a new associate, Lar would also be advised to open a new business bank account to ensure that all business and private transactions are kept separate. Should he need additional help, accountants4dentists offers a number of services that would ensure he stays on top of his financial and legal responsibilities.

Lastly, Lar should consider how he intends to handle his money—he is, after all, about to go from earning £30,000 to in excess of £100,000. As he intends to purchase his first home, it would be prudent for him to meet with an independent financial adviser, such as those at money4dentists, who can advise him on savings and investment opportunities.



Altogether, there are a great many aspects to becoming an associate, but done right, you can rest as-

sured that you are prepared for the role, protected against potential risks and in control of your finances.

Next part: Dr Mo Lar buys his first home.

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# Apical transportation

## Microsurgical handling of a procedural error during apical mechanical preparation

Prof. Leandro A.P. Pereira, Brazil

Endodontics is the dental specialty that is concerned with treating or preventing pulpal pathologies and apical periodontitis. The main objectives of endodontic treatment are to clean and disinfect the entire length of the root canal system up to a healthy level.<sup>1</sup> When, through meticulous treatment, such objectives are achieved, success rates can exceed 94 per cent.<sup>2,3</sup> In pursuit of such results, during endodontic therapy, mechanical preparation is carried out with endodontic instruments and chemical preparation with irrigating solutions.

within the dentinal tubules. In addition, it increases the diameter and shapes the main canals, facilitating flow of larger volumes of irrigating solutions to the apical third.<sup>6,1</sup> It also creates a favourable conical shape for endodontic filling. Therefore, it directly influences the quality of the disinfection process and, consequently, the prognosis of the case.

Procedural errors during mechanical preparation may make it impossible to achieve the required disinfection levels. Yousof

nal wall structure on the outside curve in the apical half of the canal due to the tendency of files to restore themselves to their original linear shape during canal preparation; may lead to ledge formation and possible perforation.”

The inadvertent use of rigid endodontic files, such as stainless steel, especially of larger diameters, without previous examination of the internal dental anatomy as part of the procedure, increases the risk of transportation of the foramen.

appropriate bacterial control.<sup>12</sup> As a result, they worsen the prognosis of the clinical case involved.

According to Gluskin et al., transportation of the foramen can be classified into three categories:

- Type I represents a minor movement of the physiological position of the foramen.
- Type II represents a moderate movement of the physiological position of the foramen, resulting in a considerable iatrogenic relocation on the external root surface. In this type, a larger

rier to control bleeding and to serve as a physical shield to prevent extrusion of the endodontic filling material. In these situations, placing an apical cap with mineral trioxide aggregate (MTA), followed by conventional endodontic filling, can be considered. However, in clinical cases with apical transportation of Type III, it is generally not possible to achieve cleaning, disinfection and proper filling. Thus, these steps should be performed as well as possible and be followed by an apical microsurgery to remove the untreated apical region.

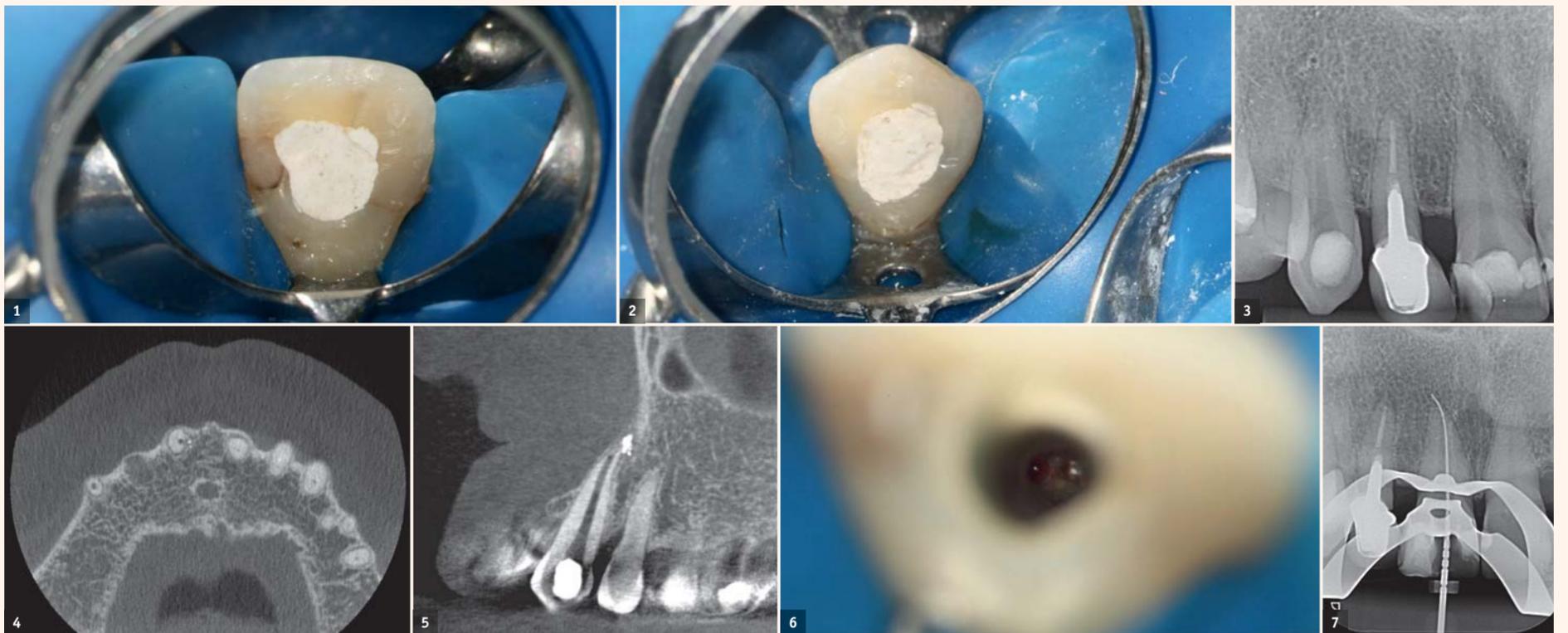


Fig. 1: Initial clinical view of tooth #11.—Fig. 2: Initial clinical view of tooth #13.—Fig. 3: Initial radiograph.—Fig. 4: Tomographic image demonstrating the transportation of the foramen of tooth #11.—Fig. 5: Tomographic image demonstrating the transportation of the foramen of tooth #13.—Fig. 6: Clinical image captured under the operating microscope showing the original canal trajectory and apical deviation of tooth #11.—Fig. 7: Radiograph of an endodontic file positioned in the apical deviation of tooth #11.

After cleaning and shaping, endodontic filling must be performed to fill three-dimensionally and seal the endodontic space in order to prevent bacterial recontamination, maintaining the sanitation conditions achieved through the previous steps. The mechanical preparation of the root canal system is of utmost importance in the process of establishing endodontic sanitisation.<sup>4,5</sup> It is responsible for physically removing the infected dentine and, consequently, bacteria located

et al. evaluated 1,748 endodontically treated teeth using digital radiography and found procedural errors in 32.8 per cent (574 teeth) of them. Transportation of the apical foramen, whether leading to root perforation or not, is among the most common errors during endodontic treatment, especially in curved canals.<sup>7-9</sup>

The *Glossary of Endodontic Terms* by the American Association of Endodontists defines “canal transportation” as “Removal of ca-

Insufficient cleaning of canals, especially the apical third, predisposes treatment to endodontic failure.<sup>10, 11</sup> Transportation of the foramen may not only impair disinfection of the canal system by disabling access to its original trajectory, but also irritate the periapex by extruding bacteria and their by-products and derail the ideal apical adjustment of a gutta-percha cone. These technical hindrances due to operational error in the preparation phase can negatively influence apical sealing and

communication with the periapical space exists.

- Type III represents a severe movement of the physiological position of the foramen and the canal, resulting in a significant iatrogenic relocation.

Treatment of apical transportation cases can be performed according to various clinical approaches. Canals with Type I transportation can usually be cleaned and filled. Type II may be filled after the application of an apical bar-

### Clinical case

A 55-year-old female patient (American Society of Anesthesiologists Physical Status Class I) visited the dental office complaining about spontaneous, constant pain, exacerbated during mastication and apical palpation in the region of teeth #13 and #11, which had been treated endodontically over the course of the last three months. The patient reported that she did not feel pain before the initial endodontic treatment began. After

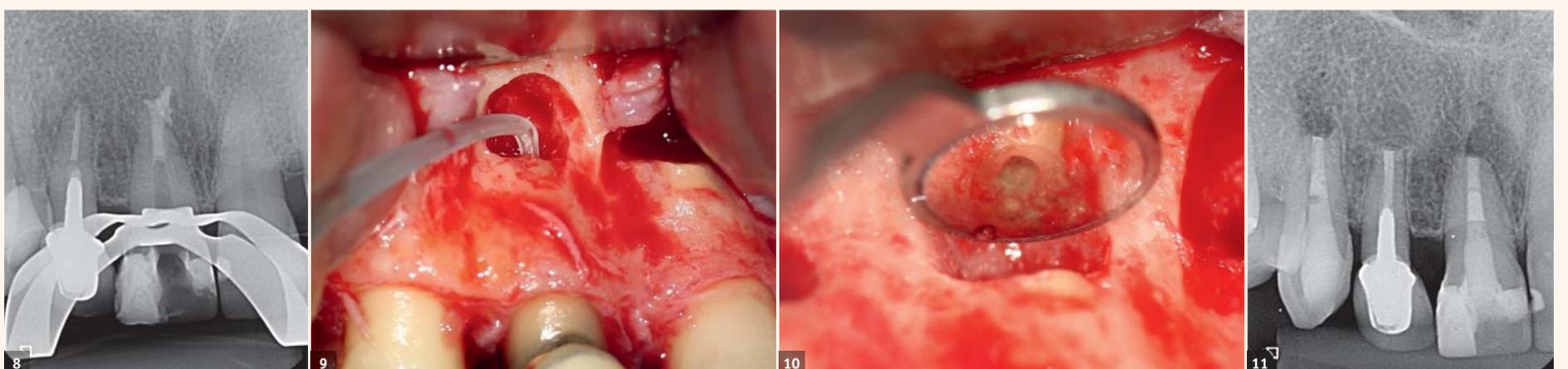


Fig. 8: Apical cap with MTA Repair HP.—Fig. 9: Canal drying of tooth #12 with SurgiTip (Ultradent Products).—Fig. 10: Retrofilling of tooth #12 with MTA Repair HP.—Fig. 11: Immediate postoperative radiograph.—Fig. 12: Control radiograph five months later of the periapical repair.

the first endodontic session, during which teeth #13 and #11 were treated at the same time, the pain began and had worsened after the third day. On the fourth day, the patient had to receive intravenous dipyrone and ketoprofen to control the pain. Concurrent with the systemic medication, an occlusal adjustment was performed. After two days, the pain returned and the patient went to another dentist, who administered sodium dipyrone 500 mg/ml every four hours and nimesulide 100 mg every 12 hours orally for seven days. The pain decreased, but did not cease.

Two days after systemic medication ended, the patient again felt pain. She went to a third dental professional, who initiated endodontic retreatment of teeth #11 and #13. However, the therapy performed was not able to control the pain effectively. After four days, the patient also began showing febrile conditions. It was reported that, in none of the endodontic procedures performed, was absolute sealing achieved.

Clinical examination established endodontic access at teeth #13 and #11. Inadequate geometric configuration of endodontic access already suggested problems

in chemical-mechanical preparation of the root canal system (Figs. 1 & 2). Endodontic therapy was begun in teeth #13 and #11, and transportation of the foramen Type III was radiographically observed. On tooth #12, there was a full crown, a metallic intra-radicular retainer and signs of a poor endodontic treatment (Fig. 3). On the CT scan, it was possible to visualise the transportation of the foramina of the two teeth (Figs. 4 & 5).

Owing to the severe apical deviation of teeth #11 and #13, the recommended treatment was endodontic retreatment, complemented by an apical microsurgery. Treatment of tooth #12 was also needed through cleaning, shaping and disinfection of the canal system with consequent endodontic filling. However, as the prosthetic crown of this tooth was adapted and microsurgery was already planned for the neighbouring teeth, the decision was to perform a retrograde endodontic treatment.

Treatment was initiated with the endodontic retreatment of tooth #11, followed by that of tooth #13. The canals were irrigated with 2.5% sodium hypochlorite, followed by 17% EDTA, both with pas-

sive ultrasonic irrigation and prepared with RECIPROC 50 (VDW). Using an operating microscope and periapical radiographs, it was possible to visualise the apical deviation of tooth #11; however, it was not possible to follow the original trajectory (Figs. 6 & 7). The same occurred with tooth #13. Owing to the great irregularity of the walls of the canals after transportation of the foramina, it was not possible to perform the proper locking of a gutta-percha cone. For this reason, the decision was to perform an apical cap of 4 mm with MTA Repair HP cement (Angelus; Fig. 8). The filling of the rest of the canals was performed using thermo-plasticised gutta-percha with MTA Fillapex cement (Angelus). MTA Fillapex contains particles of MTA in its composition.

After the end of this stage, the patient underwent apical microsurgery, during which the apical area corresponding to the apical iatrogenic region was removed with a piezoelectric instrument and a W1 tip (CVDentus). On tooth #12, a piezoelectric apicectomy using the same instrumentation was performed, and the canal was retro-prepared to the depth corresponding to the apex of the molten metal core present. After drying

the canal with a surgical suction pump coupled to a vacuum pump, the procedure continued with retrofilling using MTA Repair HP (Figs. 9–11).

MTA has been the material of choice for sealing perforations, retrograde preparations and apices with irregular, not circular, morphology due to root resorption or incorrect apical preparation. Its superior features of marginal adaptation, biocompatibility, sealing ability in wet environments, induction and conduction of hard-tissue formation, and cementogenesis with consequent formation of normal periodontal adhesion make it the most suitable material for these clinical situations. MTA Repair HP is available in powder and liquid form. It preserves all the features of traditional MTA with the addition of easier clinical handling. This last property is due to a change in the particle size of the MTA powder and the addition of a plasticiser to the liquid.

Five months after microsurgery, the patient returned for clinical and radiographic control. Clinically, she did not complain about pain or discomfort. Radiographically, a rapid repair of the

periapex of the three teeth involved was observed (Fig. 12).

## Conclusion

The chemical-mechanical preparation phase of the root canal system is of utmost importance for the success of endodontic therapy. Operational errors at this stage, including transportation of the foramen, can dramatically compromise the prognosis of a case.

Therefore, it is extremely important to prevent these. Depending on the severity of the error, however, it can be repaired. Post-operative clinical and radiographic control showed that microsurgical complementation can be a safe and predictable clinical option.

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



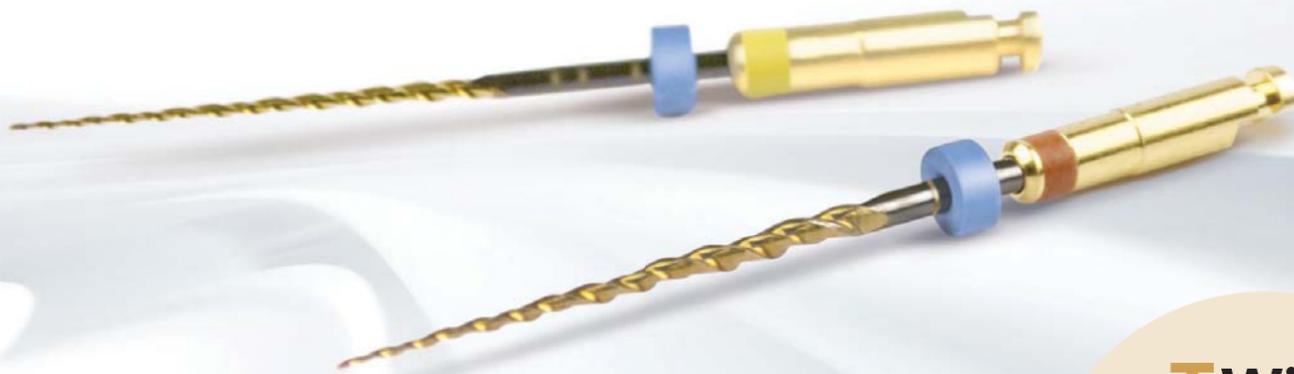
**Leandro A.P. Pereira** is a professor at the São Leopoldo Mandic Dental School in Brazil. He can be contacted at

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Prevention One is more than a comprehensive programme for oral health care. It represents a new business model for the dental practice to activate, reactivate or motivate all existing and future patients. Prevention One is designed to integrate easily into the

practice, as it perfectly interacts with all existing dental and prophylaxis offers of the practice. The business model includes specifically designed treatment programs, a wide variety of oral care products, supporting software solutions, online services, marketing and communication material, and a specifically designed educational program.

This business model is based on five basic pillars. First, it offers new products that have a major impact on the range of services offered by the dental practice. Second, it includes an in-depth training programme for all participating members of the practice team. Third, it provides a marketing and communication kit, such as posters, brochures, visuals or a specially designed treatment



Prevention One project manager and Curaden member of the board Clifford zur Nieden.

table, for the dental practice. Fourth, it offers software solutions

for monitoring performance and profitability, optimized appointment coordination and patient communication. Finally, it provides a means of evaluation, monitoring and management of the patient's oral health using a newly designed scoring tool aimed at developing individual strategies to improve oral health. Clients will not only feel the improvement in their overall health but will actually see it.

### You only improve what you measure

Theodora Little, a dental hygienist and therapist from London, has introduced the P1 scoring tool to her patients this year. She considers Prevention One the next step to improving her patients' overall health: "Prevention One is a modern and very effective approach to prevention. It combines tailored individual dental care with oral hygiene appointments and individual coaching using a scoring system."

### Proven expertise and success

Prevention One was developed using the combined experience of Curaden in partnership with experts in business development and oral health prevention. "Many patients do not know what they should pay attention to and how important oral health is for their overall well-being. They do not know what tools and instruments they should use, what quality they should be looking for and how they should apply them," explained Clifford zur Nieden, a member of the Curaden board of directors. "We will guide and coach them and provide continuous education and support. The actual training is done by the patient, or now called the client, himself or herself, but he or she receives the proper introduction, guidance, information and motivation to stay on track. That is why we like to call Prevention One a dental fitness programme."

The trainer or Prevention One (P1) coach, is a dental hygienist or dental assistant in the dental practice. The P1 coach designs a specific training program based on the individual requirements of the patient using a special P1 scoring tool, which forms the basis for an individual oral health strategy and a means of measuring oral health. Based on the P1 score, the coach can develop an individual strategy for each patient to achieve the best possible result.

The score guides your patient through a multiple-choice questionnaire, beginning with oral hygiene aids and how often they are used. It continues with the frequency of visits to a dentist and/or hygienist. The second part includes a health and lifestyle questionnaire, and the third part includes the oral examination, which quantifies a plaque and bleeding index. At the end of these sections, the patient receives a percentage score. The patient and the coach look at the data together and discuss where and how to improve the individual score.

At the end of the appointment, the patient receives a general score—the P1-Score—which can then be compared to past and future scores to show overall improvement in a patient's health. Theodora Little states: "This method motivates my patients to carry out effective oral hygiene at home because they want an improvement in their score at our next appointment. Even if a score only shows a small improvement, the patient feels happy and empowered by his or her own efforts." The positive information from the P1 score can encourage the patient to progress further and put forth a greater effort in brushing their teeth.

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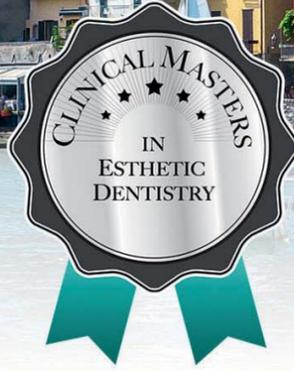
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# Mastering flare preparations with One Flare

Description of a new thermally treated instrument that simplifies access to the apex

By Dr Franck Diemer, France; Dr Jean-Philippe Mallet, France; Haifa Ben-Rejeb, Tunisia & Dr Walid Nehme, Lebanon

For more than 20 years, the use of nickel-titanium (NiTi) in endodontics has allowed the speed, quality and reproducibility of root canal therapy to be improved. Over the same period, the geometry of the relevant instruments has evolved significantly too. In 2008, the appearance of the asymmetrical cross section with Revo-S<sup>®</sup> (MICRO-MEGA) allowed for fewer restrictions<sup>2</sup> and the cleaning capacity of endodontic instruments to be improved. MICRO-MEGA's mastering of NiTi machining and changes in cross section and surface treatments (electropolishing and thermal treatment) have created a new instrument dedicated to enlarging root canal entrances.

The corono-radicular junction sometimes produces a particular form of mineralisation that partially obstructs root canal entrances. To give an example, sometimes this triangular mineralisation, at the level of the root canal entrances to the molars, is located opposite the furcation (Fig. 1). In order to prevent it from limiting the

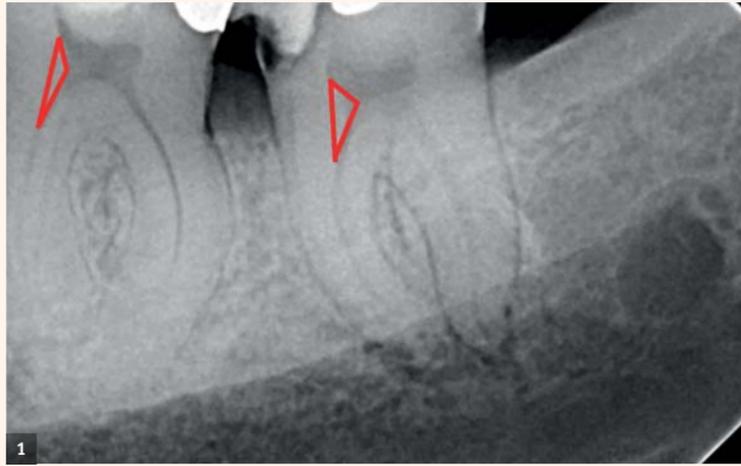


Fig. 1: Schilder triangle, mineralisation of the root canal entrance. — Fig. 2: Creating the access cavity and radiograph with scouting file in place (MB1 and MB2). The mineralisation of the root canal entrance limited the initial catheterisation.



use of files and to optimise initial preparation for endodontic treatment, it must be removed (Fig. 2). Generic instruments such as Gates-Glidden or Largo drills have been used for this purpose, but they present a risk of effecting major changes to the root canal anatomy, particularly in the case of the endodontic treatment of multirooted teeth.<sup>3</sup> This challenge was the rea-

son for the development of specific instruments such as ENDOFLARE (MICRO-MEGA) and ProTaper Universal SX (DENTSPLY, now Dentsply Sirona). A new generation of these files, whose design has benefited from advanced technologies related to asymmetry, cross section and thermal treatment, is now available in the form of MICRO-MEGA's One Flare.

At only 17 mm, One Flare is relatively short in order to be able to work at the root canal entrance at the corono-radicular junction. It features a triple-helix cross section, which has been found to be one of the sturdiest among those that are currently used in clinical practice. Like the one of Revo-S or One Shape (MICRO-MEGA), this cross section is asymmetrical, but with a progres-

sion from the tip to the shaft for optimised flexibility. One Flare has a constant cone taper of 9% and a tip diameter of 0.25 mm. This tip gives the file extraordinary strength while remaining sufficiently thin to be able to easily penetrate after a scouting file.

The sharpened section of the instrument (13 mm) is made from

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NiTi wire with a diameter of 1 mm. The active section therefore varies from 0.25 to 1mm, from the tip to the shaft, while the interval and angle of the helix increase. It also undergoes electropolishing treatment to remove machining burrs and

give it a smooth surface and straight cutting edges without any snags, as well as thermal treatment to increase its flexibility and resistance to fracture (Figs. 3a & b). This treatment proves particularly significant when enlarging the entrance

to a second mesiobuccal canal in the maxillary molar, for example.

The great flexibility also makes it possible to enter extremely curved canals or ones with extreme changes of direction, all without any risk of fracturing the tip or of creating blockages or stops. The geometry of and treatments used in the production of One Flare allow it to be used with a motor, with or without torque control, and continuous rotation of between 250 and 400 rpm, without pressure or with very low apical pressure.

After the initial scouting and securing using a hand file with a tip diameter of 0.1 mm or a continuous-rotation NiTi instrument such as One G (MICRO-MEGA), One Flare prepares the area of the corono-radicular junction. The instrument uses a conventional wave movement in three successive phases, from the crown to the tip, centred in the canal and allowing it to progress by a few millimetres. After treatment, the file is withdrawn from the canal and cleaned. The ca-

nal is irrigated once again and negotiated using the steel file used for the initial root canal exploration. Once the instrument has penetrated to a depth of 4 mm ( $\pm 1$  mm), it can be used with pressure on the walls to selectively collect samples, remove the initial dental irregularities and reduce the initial restrictions to the following shaping instrument (Fig. 4). This penetration (maximum of 5 mm) theoretically allows it to create a root canal entrance of 0.61 mm (maximum of 0.70 mm), which is less than or equal to the diameter of a No. 2 Gates-Glidden drill (0.70 mm).

pulp, fibro-calcic or even necrotic parenchyma and re-centring of root canal shaping instruments (Fig. 5), as well as ensuring the precision of the apical limit of endodontic preparation<sup>4 5</sup> and 3-D cleaning or filling of the root canal (Fig. 6).

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

**Dr Franck Diemer**

is a practitioner at the Centre Hospitalier Universitaire in Toulouse in France.

**Dr Jean-Philippe Mallet**

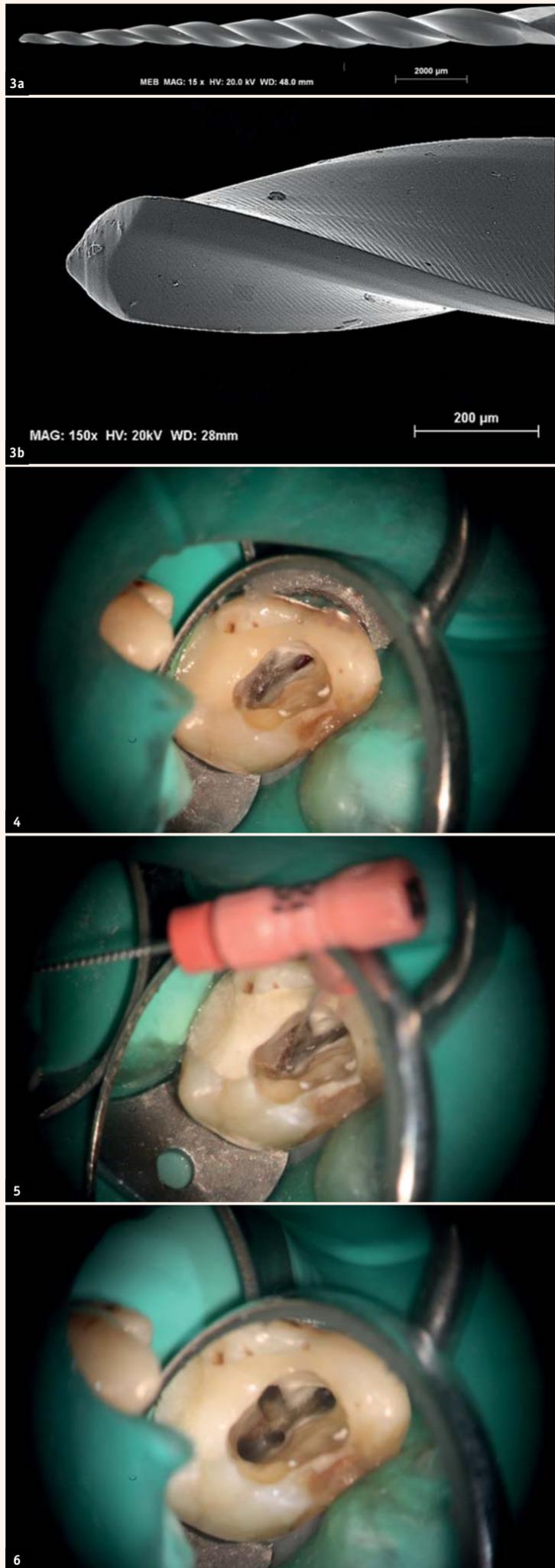
is a lecturer at the Faculty of Dentistry of the Université Toulouse III—Paul Sabatier in France.

**Haifa Ben-Rejeb**

works at the University of Monastir's Faculty of Dental Medicine in Tunisia.

**Dr Walid Nehme**

is a lecturer at the Université Saint-Joseph's Department of Endodontics in Beirut in Lebanon.



**Figs. 3a & b:** One Flare: MEB profile and tip view (Dr Franck Diemer). — **Fig. 4:** One Flare eliminates the Schilder triangle and the initial millimetres of the pulp parenchyma in order to permit root canal shaping without any coronal interferences to the instrument after the apical limit has been established. — **Fig. 5:** One Flare ensures the removal of the first millimetres of pulp parenchyma and removes the interferences to files, which are re-centred in the canal in order to facilitate access and the shaping to the apical preparation limit. — **Fig. 6:** The judicious enlargement of the root canal entrances using the One Flare instrument allows endodontic shaping and cleaning in total safety while preserving the root canal anatomy.

**Conclusion**

This new flaring instrument offers a new minimally invasive approach to endodontic treatment by selectively eliminating dentine formations at the corono-radicular junction. It meets multiple requirements of endodontic preparation, such as removing initial interferences to root canal preparation instruments, preliminary removal of the first millimetres of a dense



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# Acupuncture: Probing its way into dentistry—Part I

An introduction to acupuncture and its practical applications in contemporary dental practice

By Dr Wong Li Beng, Singapore

The history of traditional Chinese medicine (TCM) can be traced back to the Warring States and the Qin and Han dynasties more than 2,000 years ago. The *Huangdi's Inner Classic of Medicine*, of comparable importance to the Hippocratic corpus in Greek medicine, is a scholastic collection of medicinal doctrines and philosophies accumulated over the years. To date, it still provides a theoretical guide and basis for the development of contemporary TCM. It consists of two parts, *Suwen* [plain questions], which mainly addresses the theoretical aspects and diagnostic methods, and *Lingshu* [spiritual pivot], which covers the practice of acupuncture.

Acupuncture, according to the definition of the TCM Practitioners Act in Singapore,<sup>1</sup> means “the stimulation of a certain point or points on or near the surface of the human body through any technique of point stimulation (with or without the insertion of needles), including through the use of electrical, magnetic, light and sound energy, cupping and moxibustion, to normalise physiological functions or to treat ailments or conditions of the human body”. In order to understand the role of acupuncture therapy in TCM, we must first appreciate the fundamental treatment philosophies in TCM.

TCM is premised on the concept of holism, according to which the human body is seen as an organic whole; all the constituent parts are interconnected and they coordinate and interact with one another functionally. There is also recognition of humans' interaction with the external environment and its effect on the human body. The state of the constitution of the human body, at the point of challenge by pathogenic factors (both internal and external), will determine the occurrence and progression of disease. The constitution of the body can be regulated by maintaining the yin–yang and qi–blood balance. The vital qi, or life force, is viewed as keeping the entire body system going. It circulates all over the body along designated pathways called “meridians”. To put it simply, acupuncture therapy involves the stimulation of certain points along the meridians to allow the free flow of qi to maintain yin–yang and qi–blood balance. The pathogenesis of disease based on TCM philosophy is summarised in Figure 1.<sup>2</sup>

This concept of host–pathogen interaction, according to which the manifestation of disease presentation depends on both the virulence of the invading pathogens and the



host response, has parallels with some of the modern concepts of disease progression in Western medicine, for example the pathogenesis of periodontitis (Fig. 2)—an inflammatory disease initiated by oral micro-organisms, resulting in the loss of the supporting structures around the dentition.<sup>3</sup>

The story of *New York Times* editor James Reston, whose post-appendectomy pain was relieved by acupuncture, and the visit of US President Richard Nixon to China in 1971 brought acupuncture into the limelight and created much interest in the Western medical field. In 1979, the World Health Organization (WHO) endorsed the use of

acupuncture for treatment of 43 symptoms. In 1996, WHO's endorsement of acupuncture was extended to 64 indications. In the Geneva 2003 WHO report, pain in dentistry (including dental pain and temporomandibular joint dysfunction syndrome), facial pain and postoperative pain were listed among the conditions for which acupuncture had been proven, through controlled trials, to be an effective treatment.<sup>4</sup>

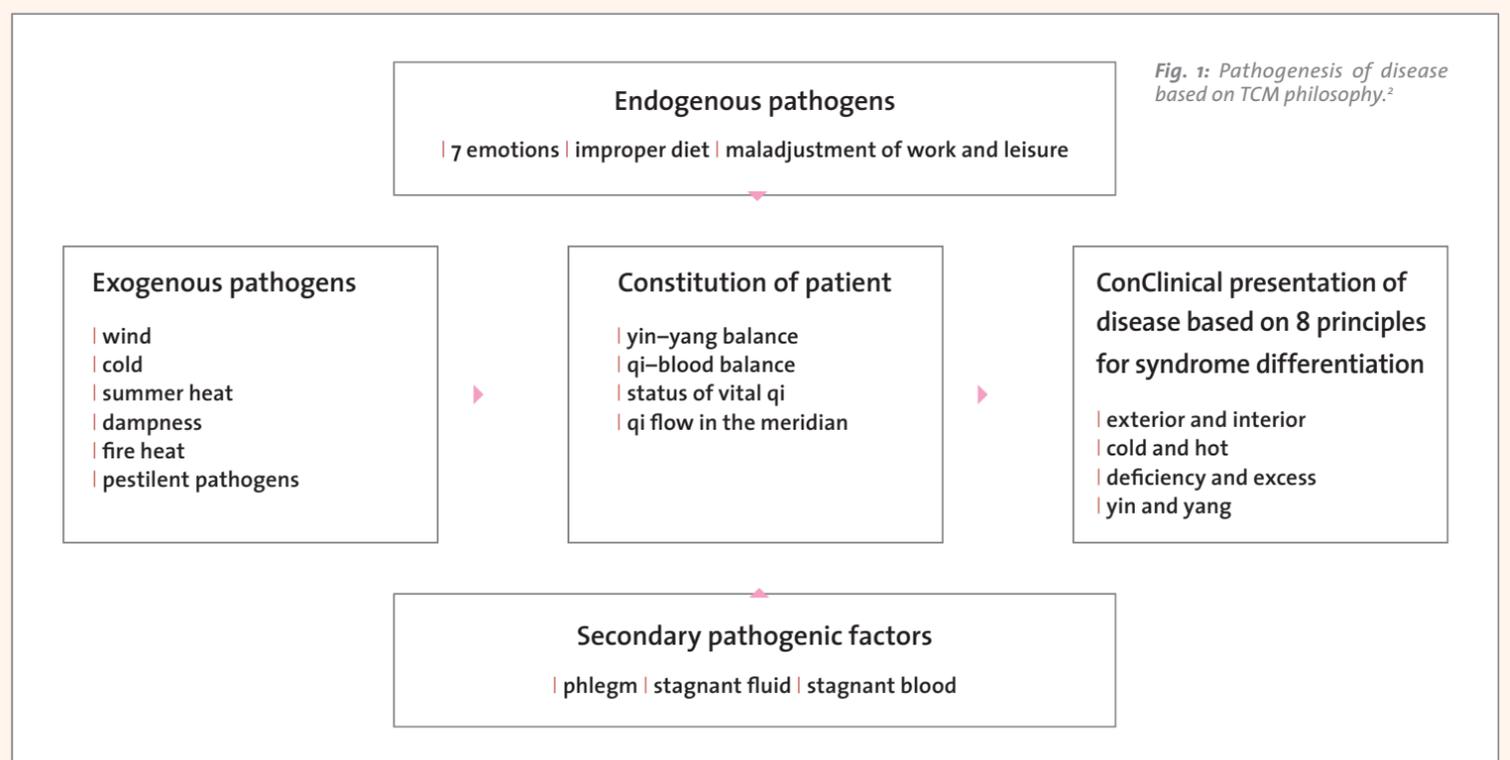
## Scientific basis of acupuncture

Acupuncture treatment involves the excitation of qi or “de

qi”, which is the transmission of needling sensation along the meridians, often described by patients as soreness, numbness, ache, fullness or a warm sensation as a result of needle manipulation. This is also perceived by the acupuncturist as a needle grasp sensation, which is key in achieving therapeutic efficacy. Recent histological evidence using rat models suggests that this needle grasp sensation is the result of collagen and elastic fibres tightening around the needle during needle manipulation.<sup>5</sup> The authors went further to postulate that this mechanical coupling between the needle and soft tissue is responsible for transducing mechanical

signals to fibroblasts and other cells, with resultant therapeutic downstream effects.

How acupuncture can relieve pain can be explained by the gate control theory of pain. It proposes that the activation of alpha delta and C afferent nerve fibres through acupuncture point stimulation sends signals to the spinal cord, with local release of dynorphins and enkephalins.<sup>6</sup> Upon reaching the midbrain, both excitatory and inhibitory mediators are activated in the spinal cord. Neurotransmitters, like serotonin, dopamine and norepinephrine, are produced, causing pre- and postsynaptic inhibition of pain transmission.





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When the signals reach the hypothalamus and pituitary gland, adrenocorticotropic hormones and endorphins may be produced. This forms the basis of our current understanding of the analgesic effect of acupuncture in Western medicine, although other therapeutic effects of acupuncture, such as in the treatment of nausea, gastritis, asthma and dysmenorrhoea, are yet to be fully explained. In the case of asthma, one of the therapeutic acupuncture points, BL13 (feishu), lies approximately 1.5 in. (38.1 mm) lateral to the level of the spinous process of vertebra T3. It has been hypothesised that the location of BL13 (feishu) corresponds roughly to the sympathetic ganglion at the level of T3, which sends postganglionic fibres to the pulmonary plexus and cardiac plexus.<sup>7</sup>

## Dental application of acupuncture

### Managing dental pain, analgesic effect and postoperative pain relief

According to TCM theory, local acupuncture points on the facial regions, like ST6 (jiache) and ST7 (xiaguan), and distant points, like LI4 (hegu), can be used to treat dental pain. They are part of the stomach and large intestine meridians, which converge at the facial region and link up with the maxillary and mandibular teeth, respectively. Western medical literature has proposed that acupuncture can produce an analgesic effect at a distant site by diffuse noxious inhibitory control.<sup>8</sup> This provides a possible explanation as to how the acupuncture point LI4 (hegu), which is located on the radial side of the second metacarpal bone on the dorsum of the hand, can elicit an analgesic effect in the orofacial region.

The role of acupuncture in contemporary dentistry may not be so much the removal of the aetiology of dental pain, but rather as an adjunct in achieving anaesthesia during dental procedures and providing postoperative pain relief. A pilot study was conducted to investigate whether the induction time of local anaesthesia can be reduced if acupuncture is given before injection.<sup>9</sup> The results showed that, in the group in which local acupuncture points SI19 (tinggong), ST5 (daying) and ST6 (jiache)—within the innervations of the mandibular branch of the trigeminal nerve—were stimulated before an inferior alveolar nerve block was given using prilo-

caine hydrochloride, the induction time was 62 seconds, versus 119 seconds in the control group, in which only the nerve block was given. Findings from this study suggest that regional acupuncture can accelerate the induction time after an inferior alveolar nerve block. The results of another study indicate that acupuncture before inferior alveolar nerve block may increase its effectiveness in endodontic treatment of mandibular molars with symptomatic irreversible pulpitis.<sup>10</sup>

Several studies have shown that acupuncture can reduce postoperative pain. A systematic review of 16 studies found that acupuncture therapy can help to alleviate postoperative pain, although heterogeneity in terms of methodological details among the studies reviewed may limit the conclusions that can be drawn.<sup>11</sup> The practical implication of acupuncture therapy in alleviating postoperative pain may be helping to reduce the patients' dependence on systemic analgesic medications. It is well documented that the use of non-steroidal anti-inflammatory drugs for pain control is associated with increased risk of gastrointestinal complications, like ulceration and bleeding. A randomised placebo-controlled trial was conducted to evaluate the efficacy of acupuncture in treating postoperative oral surgery pain.<sup>12</sup> The treatment group that received real acupuncture treatment immediately after the surgical removal of impacted lower third molars had a significantly longer pain-free postoperative period (172.9 minutes) compared with the placebo group (93.8 minutes). More importantly, the treatment group took a significantly longer time (242.1 minutes) to request analgesic medication compared with the placebo group (166.2 minutes). They also took significantly less medication (1.1 tablets of 600 mg acetaminophen with 60 mg codeine) compared with the placebo group (1.65 tablets); this difference was still evident at the seven-day follow-up (7.7 tablets versus 11.3 tablets). More randomised controlled clinical trials to verify the role of acupuncture therapy in dental pain management, particularly in postoperative pain, may be warranted.

### Management of temporomandibular joint dysfunction syndrome and orofacial pain

Temporomandibular joint dysfunction syndrome (TMD) is a term that includes a group of



Clinical posting module in graduate diploma in acupuncture course.



A patient receiving acupuncture treatment (left).—Modern prepacked, sterilised acupuncture needles used for treatment (right).

conditions that affect the temporomandibular joint (TMJ), the muscles of mastication, and the associated head and neck musculoskeletal structures. The clinical diagnostic criteria for TMD classify the most common forms of TMD into the main subgroups of masticatory muscle disorder, TMJ internal derangement and TMJ degenerative joint disease.<sup>13</sup>

The treatment of TMD depends on the aetiologies of the conditions. While acupuncture therapy may not be useful in eliminating the cause if it is due to structural anomalies, like capsulitis and degenerative changes, it may help to relieve the pain and discomfort associated with the conditions, especially if it is muscular in nature. It has been documented that acupuncture can help in muscle relaxation and reduce muscle spasm. Relaxing the lateral pterygoid muscles can reduce the anterior displacing force on the

meniscus of the TMJ and help to minimise TMJ clicking.

A systematic review of 19 randomised controlled trials was conducted to assess the effectiveness of acupuncture for symptomatic treatment of TMD.<sup>14</sup> The findings suggest moderate evidence for acupuncture as an effective intervention for the reduction of TMD symptoms, although more studies of larger sample sizes are needed to investigate the long-term effectiveness of acupuncture.

Trigeminal neuralgia is a sudden, unilateral, brief, stabbing, recurrent pain in the distribution of one or more branches of the trigeminal nerve. Carbamazepine is often the first-line treatment for this condition and is considered the gold standard, but it also has various side-effects, including drowsiness, dizziness and constipation. There are several case reports and case series in the Chi-

nese literature on the success of acupuncture treatment on patients with trigeminal neuralgia. Acupuncture points GB14 (yangbai) and EX-HN5 (taiyang) are used if the ophthalmic branch is affected, ST2 (sibai) and ST3 (juliao) if the maxillary branch is affected, and ST6 (jiache) and ST7 (xiaguan) if the mandibular branch is affected. The choice of acupuncture points coincides with the distribution of the nerve branches. There is however, a paucity of reports in the Western literature and a lack of randomised controlled trials to verify its effectiveness in treating trigeminal neuralgia.

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



**Dr Wong Li Beng** is a consultant periodontist at Ng Teng Fong General Hospital and Jurong Medical Centre in Singapore and Director of

Preventive Dentistry at the centre. In 2011, he obtained a graduate diploma in acupuncture from the Singapore College of Traditional Chinese Medicine and is now a registered acupuncturist with the Traditional Chinese Medicine Practitioners Board. He can be contacted at [Li\\_Beng\\_Wong@juronghealth.com.sg](mailto:Li_Beng_Wong@juronghealth.com.sg).

### Environmental, acquired and genetic risk factors

Specific pathogenic bacteria

Host immunoinflammatory response

Connective tissue and bone metabolism

Clinical expression of disease initiation and progression

Fig. 2: Pathogenesis of periodontal disease.<sup>3</sup>

# SHOW TRIBUNE

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## Anniversary dental event opens in Birmingham

Dentistry Show celebrates a decade of dental innovation and learning

By DTI

**BIRMINGHAM, UK:** Providing an ever-growing platform for learning and exchange of knowledge between the industry and professionals, the Dentistry Show and Dental Technology Showcase will be held for the tenth time this year for all members of the profession. Running on 12 and 13 May at the National Exhibition Centre in Birmingham, the anniversary edition will again present the latest innovations and clinical developments in the field.

After the International Dental Show in March, held in Cologne in Germany, plenty of innovations are expected to be presented across the whole industry. There will be over 420 suppliers, including the trade's biggest brand names, with many new products available to experience first-hand and purchase. At booth E95, the Dental Tribune International publishing group will be present with its extensive selection of general and specialist dental media. There, information will be available about the group's numerous educational offerings, including the Dental Tribune Study Club, Clinical Master Classes and spe-



Last year's Dentistry Show was attended by over 7,300 dental professionals. (© Daniel Zimmermann, DTI)

cial events, such as the ROOTS SUMMIT in 2018.

With thousands of dentists, practice managers, dental hygienists and therapists, dental nurses, dental technicians and laboratory owners, the show is the perfect event to network with industry peers.

Furthermore, visitors will have access to hundreds of hours of continuing professional development (CPD), available directly on the show floor. Presentations will include a wide range of topics,

such as new clinical techniques, exciting materials, patient oral health adjuncts and even business strategies to help grow a practice. Popular features from previous shows will return again, including the PerioLounge, EndoLounge, ADI Implant Theatre, CORE CPD Theatre and Short-Term Ortho Lounge. The British Academy of Cosmetic Dentistry has announced its support of the Aesthetic Dentist Theatre, which will provide interested clinicians with a thorough understanding of key aesthetic subjects as they relate to a modern dental practice.

According to the organiser, however, the Dentistry Show is designed with the whole dental team in mind. Consequently, there will also be two-day conferences designed specifically for dental nurses, hygienists and therapists, among others. Supported by Practice Plan, the Dental Business Theatre is ideal for dentists and practice managers to learn about the fundamentals and dos and don'ts of running a dental business.

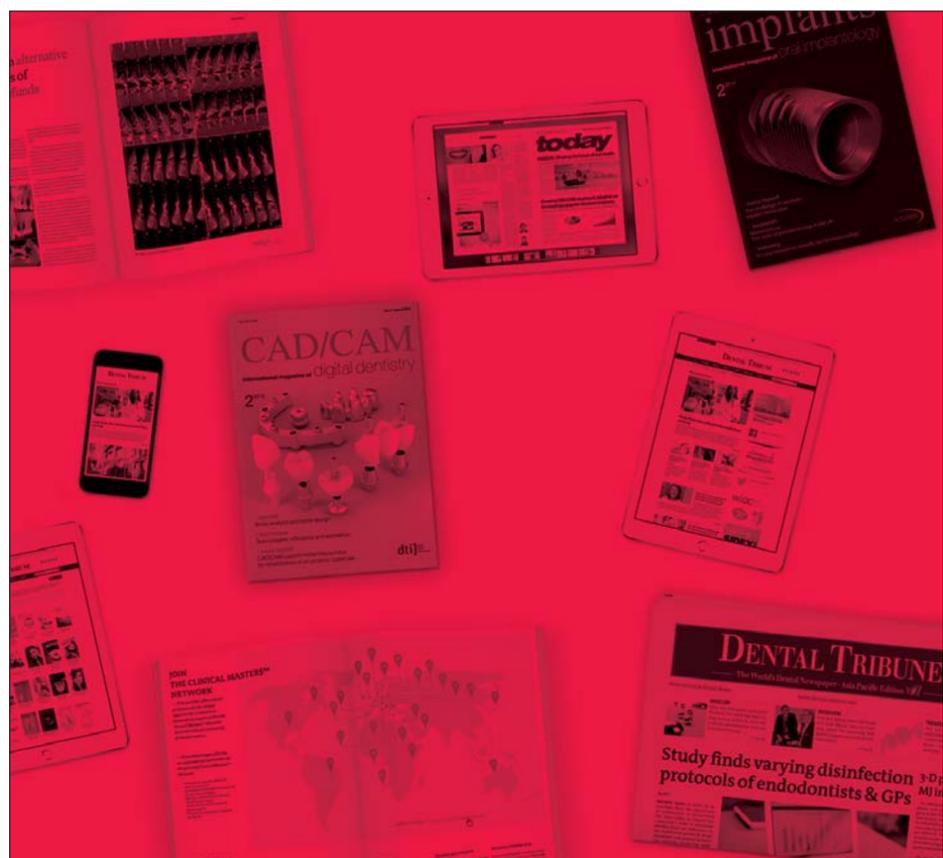
"The Dentistry Show is always a really good event," commented Deepak Simkhada, a London-based dental therapist who will be speaking at the Hygienist and Therapist Symposium. "There is a large selection of high-quality speakers covering a range of topics, plus many exhibitors showing the latest products and services. It's always a lot of fun too!"

In support of the BDA Benevolent Fund, the organiser announced that £1 will be donated to the charity for every hour of verifiable CPD gained by attendees this year. With a target of delivering 100,000 hours of verifiable CPD, this could see a donation as large as £15,000.

Co-located with the Dentistry Show, the Dental Technology Showcase will host more than 100 companies, which will be presenting groundbreaking products and tools in the dental technology segment. Its programme boasts over 40 hours of verifiable CPD education and will update attendees on the latest techniques, treatments and studies. In addition, it offers the perfect opportunity to network with and develop professional relationships with leading technicians.

First held a decade ago, the Dentistry Show has become one of the foremost dental events in the UK. Since its inception, it has provided high-quality education for the whole dental team, delivering up to 85,000 hours of free verifiable CPD. The last edition, held in April 2016, was attended by over 7,300 dental professionals.

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# How dental sensitivity can be improved with Biomin F

By Moira Crawford, UK

Sensitive teeth, causing discomfort and pain, particularly in reaction to hot or cold food and drinks, are a common problem. They are mainly affecting people aged 40-60, though sufferers can be of any age. Also known as dentine sensitivity, the condition is caused when the enamel surface of the tooth is worn

A wide variety of specialised toothpastes and products are available over the counter or on prescription for the treatment of dentine sensitivity, but a new solution has been found to the problem: a bioactive glass which acts with the saliva in the mouth to remineralize tooth enamel, oc-

and his team at the Dental Institute, Queen Mary University, London, and contains a bioactive glass which delivers a combination of calcium, phosphate and fluoride ions as it dissolves. This combination promotes effective remineralization of tooth enamel through the production of fluorapatite,

for example, BioMin F dissolves more rapidly to restore the equilibrium and prevent demineralization.

## Tubule occlusion

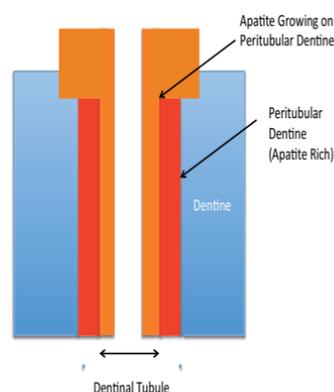
Importantly for the treatment of sensitivity, the glass needs to

Visitors of the Dentistry Show will find more information about Biomin F at the Trycare booth (E40). There, Dr David Gillam, clinical adviser to BioMin and Senior Lecturer at QMUL will be also giving two short presentations on Dentine Hypersensitivity Management at 9:30 and 11:00 on Friday, 12 May. He will also hold a longer lecture in the Perio Lounge at 13:30 that day.

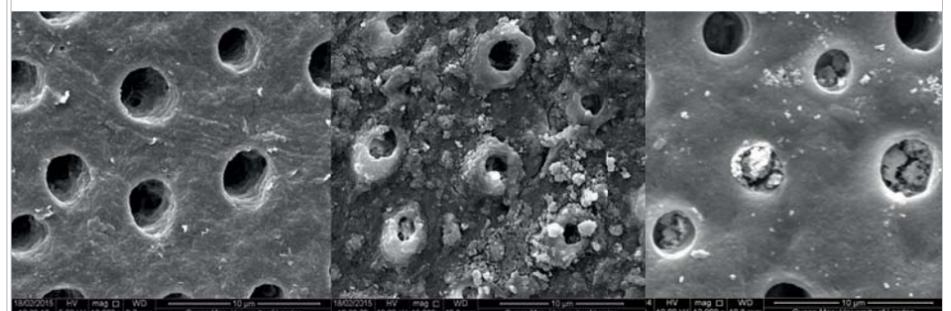
than other toothpastes tested (Fig. 3).

## Schematic Tubule Occlusion

- The fluorapatite formed with BioMin F forms not just on the surface but also preferentially on the apatite rich walls of the peritubular dentine within the dentinal tubules.



## Scanning Electron Micrographs Tubule Occlusion



Before Brushing

After Brushing with BioMin F

After Acid Challenge

Fig. 1: Schematic diagram of tubule occlusion.

Fig. 2: Scanning electron micrograph images showing tubule occlusion before and after brushing and before and after acid challenge.

## Comparison of BioMin F and BioMin C with Leading Brands

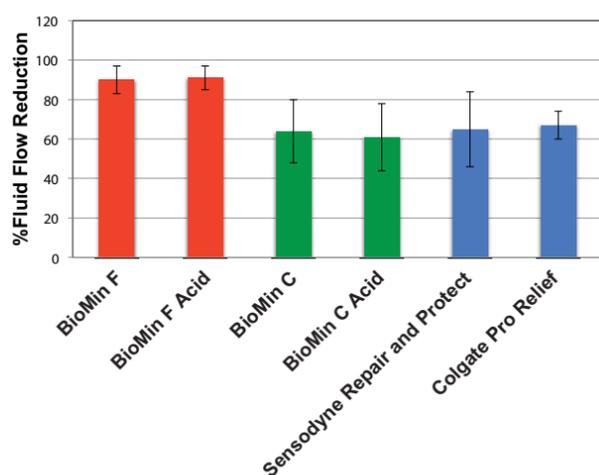


Fig. 3: Percentage fluid flow reduction compared with other toothpastes.

away or damaged, exposing the dentine layer below. The dentine contains microscopic tubules, and hot or cold fluids trigger flow through the tubules, stimulating the exposed nerve endings in the pulp chamber, causing sensitivity. Sensitivity is most common at the margin where the tooth meets the gums, gum recession exposes the tubules, or it can be due to erosion where the enamel, which is very thin in this area, has been dissolved away by acid attack.

cluding the dentinal tubules and effectively preventing sensitivity.

## How BioMin F works

BioMin F is one of a new generation of bioactive glasses, which were initially introduced for bone grafting. These new glasses, incorporating other components within their structure, are now finding uses in the dental arena. BioMin F toothpaste has been developed by Professor Robert Hill

the fluoride analogue of natural tooth mineral. Unlike conventional toothpastes which contain soluble fluoride, the fluoride component of BioMin F is incorporated within the structure of the glass and so is delivered gradually over up to 12 hours as the glass dissolves.

As well its fluoride component, BioMin F contains a higher phosphate content than the previous generation of bioactive glasses, such as NovaMin, which form hydroxyapatite material in the mouth. The increased phosphate content of BioMin F aids both the effectiveness and the speed of remineralization, and as the calcium, phosphate and fluoride ions are released, these work in concert with the saliva in the mouth to restore equilibrium following acid attack, and form fluorapatite material, which is more stable and resistant to acid than hydroxyapatite.

Tests using an NMR spectrometer have demonstrated that the fluoride in BioMin F is converted to fluorapatite in around six hours in buffer, but as quickly as within 45 minutes in artificial saliva, and the remineralization process continues for around 12 hours, with residual activity for up to 24 hours. At a lower pH, following consumption of an acidic drink,

dissolve right on the tooth surface, so BioMin F contains a polymer which bonds it to the calcium in the tooth enamel, holding it in place for several hours while the calcium, phosphate and fluoride ions are released. The size of the glass particles is extremely small compared with those of NovaMin, enabling them to enter the dentinal tubules (1-5 microns across) and work to occlude them and prevent fluid flowing through them.

Fluorapatite forms preferentially on the apatite rich walls of the peritubular dentine within the tubules (Fig. 1) gradually filling and occluding them, an effect still visible after acid challenge (Fig. 2). Professor Hill and his research team believe that fluorapatite crystals probably favour growing on the existing apatite rich surfaces within the dentinal tubules, which have a higher mineral content than elsewhere.

As the fluorapatite occludes the dentinal tubules, it reduces the flow of fluid through them, known as hydraulic conductance, the cause of sensitivity. Owing to the increased stability and resistance of fluorapatite, the tubules remain occluded more completely, and the hydraulic conductance shows a greater percentage reduction and faster remineralization rates

Importantly, patients appear to like it. A BioMin user survey in the UK, looking at patients who suffered from sensitivity, found that around 65% of them found their sensitivity had improved or even resolved, and almost half said it was more effective than other sensitivity toothpastes, while just under 40% found it roughly similar in effect. Overall 95% reported BioMin to be good or excellent, liking the texture, flavour, sense of cleanliness and level of foaming.

Crucially, though, rigorous testing in the state of the art laboratories at Queen Mary has shown that delivering this precise combination of calcium, phosphate and fluoride ions in the slow release format provided as the glass dissolves, forms an apatite material in the mouth which is not only quick to start occluding the dentinal tubules effectively, but continues to work over several hours and is stable and resistant to acid attack. Great news for sensitivity sufferers.

Moira Crawford

is a former dental editor and freelance health writer.



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# What's on in and around Birmingham

## Brian Cox (Science Tour)

- Date & Time: 12 May, 20:00
  - Location: Barclaycard Arena, King Edwards Road
  - [www.barclaycardarena.co.uk](http://www.barclaycardarena.co.uk)
- A Professor at the University of Manchester, Cox is best known to

the public as the presenter of a number of science programmes for the BBC, boosting the popularity of subjects such as astronomy and physics. His spring tour, which was extended due to popular demand, is taking audiences on a dazzling journey through space and time,



delving into 'high science' and freewheeling on the edges of the known cosmos. Whether an avid science reader or a total novice, Professor Brian Cox Live will test the limits of our knowledge and make highly complex ideas accessible to all.

## Lucky Sods (Theatre)

- Date & Time: 12 & 13 May, 19:45
- Location: 118 Great Hampton Street
- [www.blueorangetheatre.co.uk](http://www.blueorangetheatre.co.uk)

When Morris and Jean win the National Lottery to the tune of two million pounds—they can't believe their luck. But the cracks in their marriage widen, their past catches up with them and their



relatives become increasingly resentful. Jean keeps winning and Morris takes off to Amsterdam with an old flame, but will his prophecy that bad luck always follows good turn out to be true?

## Aida (Musical)

- Date & Time: 12 & 13 May, 19:30
- Location: Homer Road, Touchwood, Solihull
- [thecoretheatresolihull.co.uk](http://thecoretheatresolihull.co.uk)



The Solihull Theatre Company presents the Solihull premiere of Elton John and Tim Rice's Aida, the pop musical version of the classic Verdi opera. Spanning across the ages, it tells an epic tale of love, loyalty, and betrayal, chronicling the love triangle between Aida, a Nubian princess stolen from her country and enslaved, Amneris, an Egyptian princess, and Radames, the soldier they both love. Ultimately, with love and responsibility at odds, Aida and Radames must decide to follow their hearts or lead their people.

With a strong beginning, a tense middle and a heart-tugging ending and accompanied by Elton John's unforgettable musical score, featuring haunting ballads, upbeat Motown, rousing Gospel anthems—Aida promises something for everyone, never before seen at The Core.

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360 Visualise	D30	CosTech Dental Laboratory	C77	IAS Academy	M80	National Oral Health Promotion Group	N50	Seven Dentistry	G90
3M Oral Care	G42	Creating Smiles	L110	Implant Direct Europe	K60	Nationwide Dental Construction	A55	SHOFU UK	L16
3Shape	D70	CT Dent	C62	Implant Screwdriver (Omplant)	D62	NEOLIX	F105	Simplyhealth Professionals	D40
ACTEON UK	E30	CTS Dental Supplies	A60	Implantium	C58	Nobel Biocare UK	J60	Sinclair Goldberg Price	A09
Acumag - Deep Tissue Massager	B108	Curaprox UK	J50	In-Line Orthodontic	L75	NOHPG	N50	Sinclair Pharma	B85
ADAM	B95	Danville	D80	Insync Insurance	F58	Nuview	K25	Sintons Law	E68
A-dec	F30	DB Dental Australia	K52	IONYX	G86	NUVOLA	J80	Six Month Smiles	K95
Admor	F60	DB Dental Equipment	N30	IPREVENT HEALTHCARE	F42	Oasis Dental Care	K40	Sleep AI	K53
AG Dental	H90	DDS Multimedia	H60	ISFY	B54	OCO Biomedical	C75	Smile Concepts Dominic Hassall	
ALEXANDRA	E38	DE-UK	H90	Ismile	B50	Office of the Chief Dental Officer	M32	Training Institute	K51
Align Technology UK	H55	Defib Machines	K55	Ivoclar Vivadent	F35	Officeline CARE	M88	Smile Ortho	J78
Anglian Dental	F65	Denploy Recruitment	C84	JADENT	G100	OPRO Dental	F55	Snowbird Finance	F40
Apolline	L10	Dentaid	Dentaid Bus feature	JD Dental	H90	Optident	G25	Society of British Dental Nurses	N50
AppointMentor	B55	Dental Circle	F64	JPM Products	M16	Optiloupe	G50	Software of Excellence	J25
Ashley Latter	E62	Dental Defence Union	C80	JW Hinks Specialist Dental Accountants	F106	Optimum Dental Laboratory	K65	Solidents	L120
Aspired Finance	B65	Dental Design	D32	Kara	E110	OraCoat XyliMelts for Dry Mouth	C108	Southern Implants UK	A35
Association of Dental Implantology	D60	Dental Directory	B40+C40	KaVo Dental	H75	Oral 7	E92	Sparkle Dental Lab	J85
Aura Infection Control	M11	Dental Elite	G92	KCO Beauty	L82	Oral Health Foundation	N70	SS Dental	H90
Aura9	E72	Dental Practice Magazine	L120	Kerr UK	H65	ORAL-B	J40,K43	Status Point	L120
Awanza Surgident	L01	Dental Protection	M50	KIA ACCESSORI	J100	Oralieve Dry Mouth Relief	G87	Stoddard ICON	H80
AWB Textiles	M85	Dental Sky	K35	King's College Hospital NHS		OralPath	L70	Straumann	B10
BA International	L75	Dental Tribune International	E95	Foundation Trust	L13	Orasoptic	J70	Support Design	F38
BACD	BACD Lounge	DentalEZ	K98	King's College London	L13	Ortho-Care UK	J82	Surgery Express	H62+H70
BADN	N42	Dent-O-Care	L50	Knight Dental Design	M92	Ortho-Tain	J106	SURGISOL	F78
BADT	N80	DentoCorrect	L02	Knight Wolffe	G80	Osstem UK	E45	Survival-32	H72
Belmont	M20	Dentsply Sirona	C30	KOMET	H102	OW Warehouse	M75	Swallow Dental Supplies & Q-Optics	G88
bestdentist.co.uk	H104	DERMAPEN	B92	Kulzer	N55	Pars Dental	M70	Swish Dental	C60
Biomedical Tissues	E70	design4dentists	C66	Labelman	K20	Patient Comms	G67	SwissLoupes SandyGrendel	H108
Biomin Toothpaste	E40	DOLBY VIVISOL	M53	Lascod	B62	Patient Plan Direct	B70	Tandex	M58
Blue Sky People B53	B53	Donnerberg	M21	Lavadent	J22	Perfection Plus	K36	TBR Implants	H62+H70
Blueprint Dental	G20	DP Medical Systems	J20	Lease UK	J02	Performance Finance	F75	TDS E+W	B61
BlueRecru	K56	DPAS Dental Plans	L35	Lifeline Dental Agency	N45	Periochip	J90	Tempdent Recruitment & Training	K42
BOC Healthcare	K05	Duncan Technical Services	H90	LIFEPRESERVE	H21	PFM Dental	G81	TePe Oral Hygiene Products	H82
BOS	C82	Eclipse Loupes & Products	N35	Lilyhead Practice Sales	L42	Philips Oral Healthcare	J30	The Biomaterials Store	J72
Boutique Whitening	K70	Euro Dental Depot	K48	Lloyds Bank	M65	Pinders	A100	The Dr Bob Khanna Training Institute	C105
BPP University	H50	Evident	D80	Local Advertising that Works	C109	Pixelnebula	K45	The Himalaya Drug	E91
Brabnes	B100	ExamVision	D80	Lockton Companies LLP	B57	Planmeca	G30	The Keyboard Company	G85
Braemar Finance	L60	EZDAM	D80	Majestic UK	K114	Practice Supplies	B57	The Luke Barnett Centre	B60
Bridge2Aid	L20	F2 Medical Supplies	E74	Marsh Dental	B68	Practice Plan	G40	The Mortgage Explorer	E105
British Endodontic Society	G95	Fastbraces	N10	Maruchi	M55	Premier Dental Products	A50	The Team Training Institute	G82
BSDHT	N60	Fluid Network Solutions	B57	MC Repairs	D72	Prestige Dental	K54	Titan Care	B62
Brookson	B57	FMC	J55	MDDUS	A48	PreViser Oral Health Assessment	K18	Trycare	E40
Browns Locumlink	E98	Fona	H90	MDS Medical	G68	Price Bailey Chartered Accountants	F56	Turn Key Dental	D88
BSP	G84	Fooco Video and Marketing	N18	Medical Care Instruments	H105	Progress to Excellence	E100	UCL Eastman Dental Institute	E90
BTI	M36	Frank Taylor	E98	Medicruit	L90	Purple Media	C55	UEG Medical Imaging	B58
BurButler	D80	FTA Finance	E98	Medicsteel	H103	QED	F100	UK Loupes	L78
Busch & Co	B52	FTA Law	E98	Medident Italia	J98	Qudent	C70	University of Kent	M45b
Calaject	D80	Fusion GT	C75	MediEstates	L90	Quick Straight Teeth	K70	Vatech UK	C50
CALCIVIS	L48	G9 Medical	J92	Medifinancial	L90	Quickklase Quickwhite	A36	Velopex International	N95
Caradoc Dental Services	B57	GAMA Healthcare	K50	Mediplus	A55	Quintessence Publishing	H42	VIIISANA	N38
Carestream Dental	D38, E35	General Dental Council	M40	Mercia Dental Equipment	J58	R.O.C.S. Trading	G89	Visiomed	K110
Cattani ESAM UK	B75	GlaxoSmithKline	B30	Metrodentclinical.com	A70	RDT Technology	H09	Vision Perio Brush	F77
CB12	M60	Hague Dental	L25	MIAB	A52	RemPods	N41	VOCO	M98
Cfast/SmileTRU	C82	Happy Threads	N40	Micro Minder	K30	RF HR Solutions	G103	VSDent	L80
CFH Docmail	B57	Harley Academy	B72	Milkshake Dental Marketing	D87	RIS Healthcare	C65	VSS Academy	B35
Chiral Systems	L32	HDX Corporation	G70	MiSmile Network/MiSmile Marketing/		RPA Dental Equipment	L40	Waterpik International	K38
Christie & Co	D35	Health Education England		DentGro+	K90	Rsanti Impex	L55	Wesleyan Bank	G40
Clark Dental	H90	Kent Surrey & Sussex	M45	Mode Medikal UK	C72	S4S-SMILELIGN (UK)	K02	WHW + Amann Girrbach	K10
Cleancert	G83	Healthcare Learning	M10	Moneyppenny	L57	Sachdevs Chartered Accountants	K23	Wired Orthodontics	L85
ClearCorrect	H20	Healthcare Monitors	K110	Morris & Co Specialist Dental		Saga County	F72	Wisdom Toothbrushes	M82
Clinitech Medical	E76	Heine	F78	Accountants	H40	Samera	F62	Wisepress Medical Bookshop	F43
Cockburn Lucas	F73	Henry Schein	H25	Munroe Sutton	F108	Sandwell College	C100	Work-in-Style	B59
Cockburn Lucas for Women	F73	HL Dental	F44	Mydentist	E50	Schelle	N90	Wrights Health Group	E80
CODEplan	M30	HMRC	C110	Myofunctional Research	H100	School of Dentistry, University of Leeds	C102	YENOSYS UK	M90
Colgate	H45	HONEY FIZZ	L30	Narval CC	F57	Schottlander	B20	Zenopa	G106
Concentric Sales & Lettings	C103	HAST Stomatological Scientific		NASDAL	E79	SciCan	B80	Zero Gravity Skin	J92
Consult Search + Selection	G66	and Educational	B56	National Examining Board		Score Dental	F70	Zimmer Biomet	E60
Costco Wholesale	M91	Hu-Friedy	A30	for Dental Nurses	M45	Scott Richards Solicitors	J24		

### Dental Technology Showcase

Aey Dental Supplies	G10	Dental Flex Partials	D02	Formlabs	F14	Nacera CAD CAM		Solvay Dental 360	F25
AD2	C24	Dental Technician	F15	GC UK	A20	Ceramic Materials & Supplies	D29	Straumann	B10
Aidite High-Technical Ceramic	G06	Dental Technologies Magazine	F17	GSK	C20	National Dental Supplies	G12	Sweden & Martina	E25
AM3D	G17	Dentsply Sirona	C25	Handler Red Wing International	E01	Omnident UK	G09	TBR Implants	H70
AME Group	C22	Detax	C05	Henry Schein	H25	OTA	D04	Techceram	G01
Attenborough Detal	H12	Direct Route Collections	D01	HOIL	D10	P3D	G19	Technicare	A01
ACDT	G108	DLA	Members Lounge	Ivoclar Vivadent	F28	Panadent	D28	Tri-Tech 3D	G08
Bilkim	F12	DOF UK	F22	John Winter & Co	F18	RDT Technology	H09	WHW	J10
Blueprint Dental	G20	DTA		Kerox Dental	G13	Reitel	C08	WHW + Amann Girrbach	K10
Bracon Limited	D15	DWS s.r.l.	E22	Kulzer	B01	RENFERT	D26	XYZprinting	G14
Bristol CAD/CAM ad Upcera	F20	Elma Schmidbaer	F19	Labtrac Solutions	E02	Renishaw	H10	Yenadent	C01
Carbolite Gero	A06	Emco	D12	Macro Dent (INDIA)	D22	S&S Scheftner	F01	ZHERMACK	H18
Consilio 3D International	E28	Eurodontic	H01	Metrodent	C10	Sagemax	A02	Zirkonzahn	G24
Danville	D80	Evident	D80	Milnes Bros	G16	Schottlander	B20		
DB Lab Supplies	F16	ExamVision	D80	MR. Dental	F10	Sinclair Goldberg Price	A09		

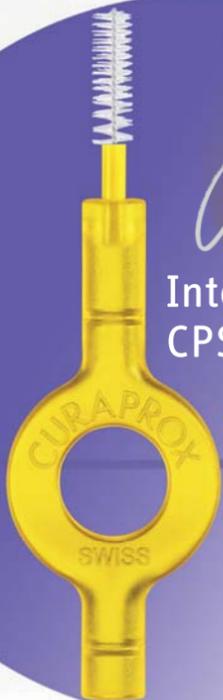
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