Scientists from the Dental Institute at King's College London have reported on a new method to help teeth repair themselves. Exploring the potential consequences of the referendum outcome, Williams said that NHS dentistry could be one of the areas most likely to suffer from the country leaving the EU. Dental lawyer Alan Suggett about the Making Tax Digital scheme and why it is another headache for dentists. Tough Brexit could affect UK dentistry

By DTI

LONDON, UK: Earlier this month, Parliament cleared the way for government to invoke Article 50 in March that will open negotiations for the country to leave the European Union. Prime Minister Theresa May announced earlier this year that the UK will not remain in the single market regardless of the deal negotiated with Brussels. In an article, mydentist Clinical Services Director and member of the Association of Dental Groups Dr Steve Williams has now warned that this version of Brexit could have serious implications for dentistry in the UK.

"Dentistry is one of the areas of NHS care that is most heavily dependent on EU trained professionals," he said. "It will be vital to ensure that Brexit does not undermine our ability to provide NHS dental care by inadvertently disrupting the supply of dentists in the UK."

Currently, almost one-fifth of dentists currently registered with the General Dental Council are from Europe. To withdraw these professionals from the workforce would be devastating, especially in underserved areas, where there is already a shortage, according to Williams.

"The UK dental market relies strongly on the European workforce. Without them, the profession’s ability to recruit would be greatly affected. Unless training places can be increased, there will be a continued need for additional European dentists throughout the UK," he explained.

The government has announced no specifics about the status of EU nationals in the UK after the country has left the EU, however, the protection of their rights was included in the 12-point plan announced by PM May to guide the Brexit process.

"Any announcement made on whether European professionals will be allowed to stay in the UK will be hugely beneficial for dentistry, as at least some stability will be guaranteed," Williams said.

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Practice owners should expect the prices of consumables and materials to increase as a result of the plummeting exchange rate between the pound and other currencies.

"We are already seeing a ripple effect as a result of the referendum outcome. Indeed, not only did the pound plummet to a 35-year low shortly after the vote—which will likely continue to fluctuate and generally worsen as we get closer to Article 50 being triggered, but the exchange rate is also extremely poor right now," Williams said.

Things are not all bad, however, as a split from Europe could also mean restructuring legislation.

"There are a number of EU laws that affect dental practices—including regulations on tooth whitening and the concentration of hydrogen peroxide that can be used. What’s more, current EU legislation prevents the transfer of NHS contracts by any way except through the partnership route, which could change if the UK decides to create its own commissioning rules. The problem is that so much legislation will require changing, that it will be several years after leaving the EU before anything will actually take affect," Williams said.

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King’s proves method to help teeth repair themselves

By DTI

LONDON, UK: Scientists from the Dental Institute at King’s College London have reported on a new approach found to be successful in mobilising the growth of stem cells inside teeth. By delivering a specific type of small molecules through biodegradable collagen sponges in mice teeth, they were able to almost completely repair carious lesions within only six weeks.

According to the researchers, who published their results earlier this week in the Scientific Reports journal, as the sponges degraded over time, new dentine almost entirely formed in their place. Using this tooth’s natural ability to repair itself, the new approach could potentially reduce the need for fillings or dental cements, particularly for the repair of larger cavities, they said.

Currently, there are a number of trials underway worldwide that seek to use dental stem cells to repair tooth defects. Alternative ways to induce dentine regeneration include the use of keratin proteins and synthetic materials. At King’s, the scientists used small-molecule glycerol synthase kinase (GSK-3) antagonists to mobilise cell growth, including Tidegliouls, which could also help to fast-track the new approach to use in the practice, according to the researchers, as it has already been used in clinical trials to treat Alzheimer’s and other neurological diseases.

"The simplicity of our approach makes it ideal as a clinical dental product for the natural treatment of large cavities, by providing both pulp protection and restoring dentine," lead author of the study and head of King’s Craniofacial Development and Stem Cell Biology Division Prof Paul Sharpe said. "In addition, using a drug that has already been tested in clinical trials for Alzheimer’s disease provides a real opportunity to get this dental treatment quickly into clinics.”

The report, titled “Promotion of natural tooth repair by small molecule GSK antagonists,” was published in Scientific Reports.
Newcastle figures question reporting of dental emergencies

By DTI

LONDON, UK: With NHS trusts in crisis all over Britain, new estimates by Newcastle University’s Centre for Oral Health Research have indicated that a much higher number of people in the UK may present to medical emergency departments with dental problems than commonly believed. According to the three-year study, which looked at coded A & E attendance data from the Newcastle upon Tyne Hospitals NHS Foundation Trust, almost 1 per cent of all emergencies presented to medical emergency departments in the UK may actually be almost 150,000, adding to be 15,000 in 2014/2015, it could potentially be as much as 150,000, adding to the already huge pressure that A & E departments face in the UK.

By DTI

“Accident and Emergency entrance of St Thomas’ Hospital in central London.”

Calculations by the British Dental Association have suggested that the additional burden amounts to £5 to £6 million per year for trusts, which are also not equipped to deal with many of these problems.

Putting these figures in a national context, the results suggest that ten times more people with dental complaints are visiting emergency departments than in official government figures. While the latter estimated the number of dental emergencies to be 1,000 in 2014/2015, it could actually be almost 150,000, adding to the already huge pressure that A & E departments face in the UK.

“This paper, and other recently published data from Newcastle University’s Orofacial pain research team, suggest there are potentially significant problems in the care pathways both for toothache, and also the group of conditions that cause persistent mouth and face pain such as Temporomandibular Disorders and Trigeminal Neuralgia.”

“We are seeing patients who need our care pushed towards medical colleagues who aren’t equipped to treat them. As long as government keeps slashing budgets, and ramping up charges we will keep seeing more of the same,” added Dr Henrik Overgaard-Nielsen, Chair of the British Dental Association’s General Dental Practice Committee, on the figures.

“GPs and A&E medics are having to pick up the pieces, while government’s only strategy is to ask our patients to pay more in to plug the funding gap,” he also said.

Overall, there were 2,504 visits to the trust’s A & E department owing to dental complaints and 10 per cent of these were by patients who had attended the department for dental problems before.

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“‘You too?’

“You too?”

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CLINICAL AND LABORATORY PRODUCTS
Oral health improving, but not equally

By DTI

LONDON, UK: Compared with other countries in Europe, UK children score relatively low on the DMF index. Despite significant improvements in the state of oral health since the early 1990s, however, a large gap exists between children of different economic backgrounds, a new national health report has indicated.

The 144-page paper published by the Royal College of Paediatrics and Child Health (RCPCH) in London on the state of health in children in all four countries found that 5-year-olds living in the most deprived areas of England, Northern Ireland and Wales are three times more likely to suffer severe tooth decay than those residing in the most affluent areas.

Regarding the number of 5-year-olds with no obvious signs of tooth decay, England and Scotland had the largest proportion (70 in 100 children), while Northern Ireland and Wales lagged behind, with 60 and 59 in 100 children, respectively.

Nevertheless, children in Northern Ireland showed the most noticeable oral health improvement since 2003, together with Scotland, the report stated.

Caries remains the single most common reason that children aged 5 to 9 require admission to hospital, in many cases needing general anaesthetic for tooth extraction, it also said.

The figures for the report were derived from the Children’s Dental Health Survey for England, Northern Ireland and Wales and the National Dental Inspection Programme for Scotland. Despite the noticeable improvement in the oral health of children, it recommended the implementation and evaluation of national oral health programmes for children and young people across the country, building on existing initiatives, including Childsmile and Designed to Smile. It also called for improving access to dental check-ups as soon as the first tooth erupts and for water fluoridation in areas where there is high tooth decay.

Another key factor for the eradication of decay, according to the report, is the prevention of children consuming high-sugar food, particularly drinks, through education and national initiatives to reduce sugar in children’s food.

“We support all the recommendations contained in the report, the most important from the point of view of our patients is for universal early years public health services to be prioritised with targeted help for children and families experiencing poverty,” commented media spokesperson of the British Society of Paediatric Dentistry and paediatric dentistry consultant Dr Claire Stevens, in Westminster yesterday. “I trust that, as intended, the report will be a springboard for more campaigning and more change, especially in relation to early intervention and prevention in children’s oral health.”

Looking at a comprehensive list of 25 indicators, the RCPCH report identified some of the major issues concerning the health of UK children and recommended key actions for each government to improve the situation.

Educators recognised in New Year Honours

By DTI

LONDON, UK: Two dental professionals have made it to the Queen’s New Year Honours list this year. Acknowledged for their contributions to dental education and services to oral health were Associate Dean for Equality and Inclusion Prof. Elizabeth Kay at Plymouth University’s Peninsula School of Dentistry and Sarah Marianne Murray, Head of Centre and Programme Lead at Queen Mary University of London’s Institute of Dentistry.

Both women were appointed Members of the Order of the British Empire (MBE) in the list, which was published by the Home Office last week. They are among almost 1,300 awardees, including Olympic gold medallist Andrew Murray and fashion designer and former Spice Girl member Victoria Beckham, who were recognised for their achievements and services in various fields, such as sport, economics, health and literature.

As Foundation Dean of the Peninsula School of Dentistry, Kay has been pivotal in establishing the first new dental school in the UK for 40 years. Among her other positions, she works as a public health academic consultant with Public Health England and serves on the editorial boards of three dental publications, including the British Dental Journal. One of her recent publications is an introductory textbook for dental undergraduates, published by Wiley-Blackwell, for which she was the sole editor.

A leading dental hygienist in the UK, Murray currently manages and teaches the Foundation Certificate in Oral Health Education at Queen Mary aimed at qualified dental nurses. Among other recognitions, she was awarded the title of “Hygienist of the Year” in 2007. She is also a regular contributor to dental journals and magazines in the UK.

Both Kay and Murray will receive their awards, along with all the other recipients, in a ceremony later this year.

Patient charge revenue deductions

By DTI

LONDON, UK: According to the British Dental Association (BDA), deductions on patient charge revenue have become a major issue for GDP when dealing with the NHS. The organisation has now reached out to members to explain their case in order to prepare a legal case against the practice.

After consultation with its lawyers, the BDA announced that there is a strong case against the legitimacy of NHS England’s approach to patient charge revenue. Dentists who feel affected are requested to deliver their case through the BDA’s website. These are supposed to form the basis of a potential High Court challenge that could be worth thousands of Pounds, the organisation said.

The BDA argues that NHS England’s heavy handed approach to patient charge revenue subsequently means that a high number of dentists suffer ongoing financial losses simply for providing their patients with the necessary care.

“We’ve already been able to secure concessions from NHS England for the manifold failures by Capita on performer lists our members highlighted. Over 100 foundation dentists who faced having to stop working at the start of December can now continue,” commented BDA Vice Chair Eddie Crouch.

“Claims that would have fallen foul of the two-month rule due to slow performer attachments are now being permitted. We’re making progress, but there is so much more we can do,” he continued. “I urge all BDA members to raise this issue with colleagues and encourage them to share their experiences.”
WORLD NEWS

By DTI

WASHINGTON, DC, USA: According to US News & World Report, which releases a list of the top 100 jobs in America every year, the profession of dentist is the best in 2017, with regard to growth potential, work-life balance and salary. Overall, health care jobs dominated the rankings.

The analysts found that, among the 100 best jobs, 52 were in a health-related field, including seven professions in dentistry. Overall, dentist ranked as the best job, followed by nurse practitioner and physician assistant.

By 2024, the employment growth in the profession of dentist is estimated at 18 per cent, amounting to about 23,300 new jobs. On average, dentists earned US$152,700 in 2015, with the best paid earning more than US$187,200 and the lowest paid earning less than US$68,310.

The profession of orthodontist, which topped the list of best jobs last year, is now ranked the fifth best job in the US. Driven by increasing demand for specialised dental care, employment in the profession will grow by a forecast 18 per cent from 2014 to 2024, equivalent to about 1,500 new job openings. The median salary of an orthodontist was US$187,200 in 2015.

At ninth place in the list of best jobs in 2017 is the profession of oral and maxillofacial surgeon, with a median salary of US$187,200 in 2015 and a predicted employment growth rate of 18 per cent, or 1,200 new jobs, from 2014 to 2024. Oral and maxillofacial surgeon ranked third in the list of best-paying jobs in 2015, however.

The increasing demand for dental restorative work as a result of the growing aging population in the US is expected to drive growth in the dental industry in general and in the profession of prosthodontist in particular. Therefore, prosthodontist was rated the 21st best job of 2017. On average, these dental professionals earned US$119,740 in 2015 and employment in the profession is expected to see growth of 18 per cent too, translating to 100 new jobs.

Owing to a faster average growth rate than most professions, the market for dental hygienists is booming, mainly as a result of the growing oral health awareness among consumers. The occupation was ranked the 32nd best job and employment is expected to grow by 19 per cent by 2024, with about 37,400 new job openings. The average dental hygienist in the US earned US$72,330 in 2015.

The analysts ranked the profession of dental assistant 100 in the list of best jobs. It is expected that more than 58,000 new jobs will open for dental assistants by 2024, translating to employment growth of 18 per cent. The median salary of a dental assistant was US$35,980 in 2015.

US News & World Report compiled the list, taking into account the ten-year growth volume and percentage, with the projected number of openings from 2014 to 2024, the median salary, employment rate, future job prospects, stress level and work-life balance of various professions across 15 industries and businesses in the country. Data for the analysis was obtained from the Bureau of Labor Statistics.

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Dentist is No. 1 job of 2017 in the US

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Ancient dental plaque reveals dietary habits of early humans

By DTI

YORK, UK/BARCELONA, Spain: Based on their study of dental plaque from Europe’s oldest hominin, scientists have concluded that the region’s earliest humans did not use fire for cooking, but had a balanced raw diet of meat and plants. The research has once again demonstrated the potential of dental calculus to store dietary and environmental information over such a long period.

Archaeologists at the University of York and the Universitat Autònoma de Barcelona examined dental plaque from a 1.2-million-year-old hominin (Homo species), recovered by the Atapuerca research team in 2007 from the Sima del Elefante site in northern Spain. They extracted microfossils to find the earliest direct evidence of food eaten by early humans. These microfossils included traces of raw animal tissue, uncooked starch granules indicating consumption of grasses, pollen grains from a species of pine, insect fragments and remains of what might have been a toothpick.

All detected fibres were uncharred and there was no evidence showing inhalation of microcharcoal—normally a clear indicator of proximity to fire. The timing of the earliest use of fire for cooking is hotly contested, with some researchers arguing that habitual use started around 1.8 million years ago, while others suggest it was as late as 500,000 to 400,000 years ago.

Possible evidence of firemaking has been found at some very early sites in Africa. However, the lack of fire evidence at Sima del Elefante suggests that this knowledge was not carried with the earliest humans when they migrated from Africa. The earliest definitive evidence of the use of fire elsewhere is 800,000 years ago at the Spanish site of Cueva Negra and at Gesher Benot Ya’qov in Israel a short time later.

Taken together, this evidence suggests that the development of fire occurred at some point between 800,000 and 1.2 million years ago, providing a new timeline for when the earliest humans started to cook food.

“This new timeline has significant implications in helping us to understand this period of human evolution—cooked food provides greater energy, and cooking may be linked to the rapid increases in brain size that occurred from 800,000 years ago onwards,” said Dr Karen Hardy, lead author and Honorary Research Associate at the University of York and a Catalan Institution for Research and Advanced Studies research professor at the Universitat Autònoma de Barcelona.

According to Hardy, “Obtaining evidence for any aspect of hominin life at this extremely early date is very challenging. Here, we have been able to demonstrate that these earliest Europeans understood and exploited their forested environment to obtain a balanced diet 1.2 million years ago, by eating a range of different foods and combining starchy plant food with meat.”

The findings correlate well with previous research that hypothesised that the timing of cooking is linked to the development of salivary amylase, which is needed to process cooked starchy food, explained Hardy. “Starchy food was an essential element in facilitating brain development, and contrary to popular belief about the ‘Paleodiet,’ the role of starchy food in the Palaeolithic diet was significant,” she said.
ROOTS SUMMIT 2016 held successfully

By DTI

Dubai, UAE: Two months ago, over 300 people from over 45 countries gathered at the Crowne Plaza hotel in Dubai for the 2016 ROOTS SUMMIT. For the past 15 years, the meeting has been an open and inclusive global learning forum, accessible to anyone involved in the practice of endodontic therapy. Featuring 20 distinguished speakers and a comprehensive industry exhibition, the 2016 summit was one of the most important events of last year's endodontics calendar.

According to co-chairman Stephen Jones, the audience at the 2016 ROOTS SUMMIT was the most geographically diverse in the history of the event. It saw a large number of people from the Middle East and North Africa, as well as many attendees from Europe and India. Some members even travelled to Dubai from Brazil, Chile, Australia and Paraguay.

During the promotion of the event, the organisers encouraged all dental professionals who have an interest in endodontics to attend. This resulted in not only endodontic specialists attending, representing about half of the participants, but also in a considerable number of general dentists, oral surgeons, prosthodontists and dental students joining the meeting.

On 30 November, participants had the opportunity to attend a number of pre-congress hands-on workshops. Over the next three days, the scientifically and clinically relevant lectures, covering topics such as roots canal treatment planning, complex anatomy, clinical cases, irrigation, efficacy of treatment options and obturation, were all well attended.

In addition, almost 20 companies showcased their latest products in the field of endodontics at the ROOTS SUMMIT industry exhibition.

Since the establishment of a dedicated Facebook group in 2012, the ROOTS SUMMIT has increased its membership from just under 1,000 participants to its current level of more than 23,000, including many global endodontic opinion leaders. Well over 100 countries are represented in the group. Members of the community engage in discussions regarding endodontic treatment, the various issues that affect the patient, prognoses, current literature, new equipment, as well as new procedures and protocols, among others. The online community is also moderated by a volunteering group of endodontists.

In addition to this English-speaking, global ROOTS community, the Spanish-speaking global endodontic Facebook forum Endolatinos, which currently has 13,000 members, was established in 2010 from a mailing list of about 2,500 people. In 2013, Endolatinos organized the pre-congress of the Asociación Española de Endodoncia, the Spanish endodontic society, and about a month ago, the Asociación allowed Endolatinos to create the scientific program for its annual meeting, which was attended by 1,300 people.

The 2016 ROOTS SUMMIT was organized in collaboration with Dental Tribune International. At the closing ceremony, the organizers already disclosed that the next meeting will be held in 2018 in the German capital of Berlin. The exact dates are still to be announced.
Another headache for dentists

The challenges of HMRC’s Making Tax Digital scheme

By Alan Suggett, UK

According to the current timetable set, HMRC’s new Making Tax Digital (MTD) scheme is to commence on 6 April 2018. Announced by the government two years ago, it will present a severe headache for the majority of dentists and be yet another cost that they will have to cover.

The department has been holding consultations on the initiative, and these concluded on 7 November 2016. The aims of the scheme appear to be laudable in terms of simplifying and making the tax system more efficient. However, the dental industry will face specific challenges. Theoretically, MTD should be a positive step for all who embrace the Internet and digital commerce, and it should be a very efficient way to streamline tax calculations and submissions. However, until dental practices routinely have regular, accurate management accounts, which currently very few have, it will simply be yet another extra cost for most practice owners.

One of the key tenets of the scheme is the submission of quarterly updates to HMRC. This may not present much of an issue to most businesses, as they are used to paying VAT on a quarterly basis and preparing monthly management accounts. However, dentists are not registered for VAT, and even larger practices do not generally prepare monthly management accounts, and if they do, these are usually not a true representation of taxable profits, and various adjustments are required at the year end.

Practice owners usually do not have financially trained staff and use external accountants to prepare accounts under normal circumstances. In the case of associates, almost all will rely on external accounting support.

While there are fairly sophisticated software packages available that automate a large part of bookkeeping and can make this less tiresome, there is a potential problem with even the best accounting software. Accounting systems gather financial transactions, so would not take into account the reduction in profits due to falling behind in UDA performance (as the practice continues to be paid the full monthly contract value) in the case of an underperforming NHS practice.

The link between the accounting software and HMRC, unless manually overridden, will simply communicate the overstated profit level for three quarters and then the final year end return will adjust the profit downwards to the correct level. HMRC has not said what it will do with the quarterly information, but the danger is that such fluctuations will lead to greater scrutiny, and the only way to make the quarterly returns more accurate (for most practices) would be to obtain help from an accounting professional, at extra cost.

Another proposal of MTD is to widen the cash basis as a method for calculating profits for tax purposes. On the surface, this may appear attractive, but owing to accounting for NHS earnings and the link between these and NHS pension contributions, a move to do this could result in significant complications in relation to tax and pensions.

Alan Suggett is a chartered accountant and partner at UNW chartered accountants, where he is head of the Dental Business Unit, which looks after more than 400 dentist clients throughout the UK. He can be contacted at alansuggett@unw.co.uk.
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“We need to establish patient-centred care in all practices”

An interview with Dr Kashif Hafeez, UK

As a practising dental implantologist in southern England, Dr Kashif Hafeez regularly speaks on clinical governance and the concept of patient-centred care at congresses and seminars worldwide. In a presentation as part of AEEDC 2017’s scientific programme in Dubai, he recently had the opportunity to discuss the various aspects of this approach with an international audience of dentists. Dental Tribune had the opportunity to speak with him about the fundamentals and why he believes patient-centred care should be implemented in every practice.

Dental Tribune: While “patient-centred care” is a widely used term around the globe, there seems to be little understanding of what it actually entails. Could you explain the fundamentals of this concept in your opinion?

Dr Kashif Hafeez: There is indeed an international trend towards adopting a patient-centred approach and modern health care services are aiming to incorporate it in their policies. This approach refers to a system in which the patient is the focal point of practice and all the services health care professionals provide. I call it the democracy of the health care system, which translates to a system by the patients for the patients.

The basic principle behind patient-centred care is that patients provide the maximum input to improve their state of health. It is a self-critical and self-correcting mechanism that will allow patients to have their say in the system through feedback, including surveys, questionnaires and complaints. The system analyses the feedback data, learns from it, and makes changes to the policies and their everyday application. It is cyclical and keeps evolving.

The system has to be open to critical analysis and be prepared to make the desired changes. Audits are a fundamental part of this system and these allow an organisation to evaluate itself against certain standards and set goals to improve further towards excellence.

Dr Kashif Hafeez: While “patient-centred care” is a widely used term around the globe, there seems to be little understanding of what it actually entails. Could you explain the fundamentals of this concept in your opinion?

Dr Kashif Hafeez: There is indeed an international trend towards adopting a patient-centred approach and modern health care services are aiming to incorporate it in their policies. This approach refers to a system in which the patient is the focal point of practice and all the services health care professionals provide. I call it the democracy of the health care system, which translates to a system by the patients for the patients.

The basic principle behind patient-centred care is that patients provide the maximum input to improve their state of health. It is a self-critical and self-correcting mechanism that will allow patients to have their say in the system through feedback, including surveys, questionnaires and complaints. The system analyses the feedback data, learns from it, and makes changes to the policies and their everyday application. It is cyclical and keeps evolving.

The system has to be open to critical analysis and be prepared to make the desired changes. Audits are a fundamental part of this system and these allow an organisation to evaluate itself against certain standards and set goals to improve further towards excellence.

The value is that patients are an inherent part of their treatment. The journey of dental treatment with the patient sitting in the dental chair for hours after administration of dental anaesthetics and with the dentist holding a device in his or her hands to perform surgeries in the patient’s mouth is very daunting. Especially if patients feel that they are not in control and in charge of the whole process, it makes it even more scary for them. Involving patients in each aspect of treatment is very reassuring and comforting, giving them a measure of control. As dentists, we are often too occupied with clinical matters—the right proportions, angles and lines—sometimes forgetting what our patients really want. Listening to them and their concerns allows us to consider their wishes and needs in each aspect of dental treatment.

In our practice when the patient shows interest in dental implants, for example, our treatment coordinator provides all the necessary information to help him or her choose the most suitable treatment options. The patient is then consulted by our team and taken through the whole journey virtually. This helps us to explain the proposed treatment in great detail. With patient concerns at the centre of our planning, dental treatment is performed with the patient involved in every step. This allows our patients to enjoy the overall dental experience they have with us.

Are there lessons that can be drawn from the practice of patient-centred care in the UK, for example?

In the UK, we are very lucky to have an open culture receptive to criticism. We use criticism as an opportunity to learn and improve ourselves. I would like to mention anaesthetist Prof. Stephen Bolsin, who laid the foundation for the openness in our health care system. With regard to the deaths of 29 babies and children at the Bristol Royal Infirmary in the late 1990s and early 2000s, he tried first to raise this issue with colleagues, but when he was initially ignored, he took his concerns to the Department of Health.

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Education is a cornerstone of this approach, which allows health care professionals to learn new skills and techniques to improve patient treatment and provide them with the best care possible.

In our practice, we focus on implantology, we ensure that patients are the focal point of our services and pay special attention to their concerns. We understand that our primary aim is to address these concerns and allow patients to have the final say in our treatment plans. They are consulted through several appointments prior to treatment and given ample time to digest and understand the proposed treatment plan. With the help of mock-ups, patients are briefed about the final outcomes and assured that they are an integral part of the dental treatment.

What is the value of patient-centred care, and why should patients be generally more involved in their treatment process?

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In the UK, we have learnt a great deal over the last 20 years and have moved forward in improving ourselves. Now, we have a culture of transparency and placing patient concerns at the centre of our daily practice. The General Dental Council has made it mandatory for health care professionals to report any concerns about patient safety and patients possibly being at risk. It is also mandatory for health care professionals to receive continuing training throughout their careers on the issue of whistle-blowing and how to raise their concerns to the proper authorities.

Patient-centred practice breaks the cavalier attitude some of us may develop over the years. In our practice, we consider patient feedback as an important source of suggestions and inspiration to improve ourselves. We audit the feedback received and make appropriate changes to our system arising from this and follow this cycle on regular basis to achieve excellence.

How can this concept be applied in other dental practices, and what are the main components necessary to achieve it?

We need to establish patient-centred care in all practices. It is actually not that difficult even though the whole atmosphere and attitude of the practice has to be changed. We need to regularly identify shortcomings in our practices and audit our policies and methods. Lessons learnt from our audits should be implemented and regular re-audits should be planned. We also need to identify our educational needs, develop a personal development plan based on those needs and then plan our learning accordingly. Targets should be set realistically.

We have to develop a system of openness in our practices, and we need to encourage our colleagues to raise concerns if they are not happy with any methodology or policies. An environment of research and development has to be established, and we should keep up to date with the latest developments in dentistry, such as implantology. The world is moving at a very rapid pace, and with the advent of new technologies in our modern world, it is very easy to fall behind the rest. We should also move out of our comfort zones to develop new skills and methods.

It is a team effort after all, so training our team and keeping our team together in this effort is equally important. In our practice, we ensure that our health care professionals are well trained and up to date with recent advancements.

For those interested in making their practice patient-centred, what is a good way to start?

I think the first step is to develop a policy on clinical governance and implement it all practices. Clinical governance covers all the aspects of patient-centred practice and the various components will become clear with this policy in place. We offer courses in clinical governance and patient-centred practice policies for individual practices and educational institutions and will be happy to help any organisation that wishes to implement it.

Thank you very much for the interview.
Recruitment in dental practices
An insight into the candidate screening

By Luke Arnold, UK

Have you ever applied for a job, but were not successful? Or perhaps you are just curious about what actually goes into candidate screening once you have handed in an application? Altogether, there are a great many factors that are taken into consideration by an employer during the recruitment process, all of which help not only to ensure that the right candidate is given the job, but also to streamline the process for everyone involved.

To help with screening, employers often use an initial check-list that can be used to quickly and efficiently establish whether an applicant is a suitable candidate. On that list will be a number of desired skills that the prospective employer must have in order to advance to the next round. These typically include the necessary qualifications, accreditations and registrations. If a candidate does not have what the employer is looking for (what was specified in the job listing), he or she will be the first to be eliminated from the list of contenders.

The next consideration will be the applicant’s most recent employment, job description, and roles and responsibilities on his or her curriculum vitae to establish whether he or she has the relevant experience for the advertised position. While it is not always essential to have done the job before, it certainly helps. If you meet the specifications, do not sell yourself short when detailing your employment and experiences.

Furthermore, employers look at the length of time a candidate has spent in his or her previous roles. The reason for this is that most practices prefer not to take on a job hopper, since they do not want to be advertising the role again a few months down the line.

Locality can be another important factor that affects a candidate’s suitability, especially if the job is in a rural location or more difficult to reach. Besides it being useful to have staff who live relatively close by, practices have to consider what would happen in the event of adverse weather conditions preventing a staff member commuting to work. If a practice can avoid a situation in which it may lose revenue and custom, it would always consider that option.

Then there are personal qualities and the ability to work as a team player to give thought to. If two candidates are on an even footing in terms of qualifications and experience, these attributes could be the deciding factor between who is selected to fulfil the position.

However, it is important to remember that no two prospective employers are the same, so there will always be variety in what practices are looking for during their candidate-screening process. Some companies, for instance, are very relaxed and will consider interviewing anyone who applies, while others are very selective. Therefore, you can never assume that you know exactly what they are looking for. Time may also be a factor, so if a practice is up against the clock to fill a vacancy, they would have to be very choosy about whom they select to attend an interview.

Depending on their personal preferences, some employers might choose to conduct phone interviews, as well as paper screening and interviewing, although this can vary depending on whether the vacancy is for a permanent or locum position. In most cases, practices are willing to start a locum contract based on just a phone interview, as long as the candidate has all the necessary skills, qualifications and registrations, and is compliant and ready to start. As such, locum screening and recruitment processes can be much easier than those for permanent roles.

Bearing all of this in mind, there are a number of preparations that you can make to boost your chances of success during the screening process. Having the right curriculum vitae is the greatest initial opportunity to sell yourself, so it is crucial that you spend adequate time ensuring that all of the necessary information is included in a clear and concise fashion. You must also be sure that you have researched the company and the role thoroughly. The more prepared you are, the higher your chances of success during the recruitment process.

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Post-hygiene bleaching for everyone

By Drs Chiara Lorenzi & A. Genovesi

It is often amazing to see how a slightly different shade of colour can brighten up a smile and the whole countenance of patients who decide to undergo whitening treatment. If, on one side European regulations have introduced new limits in the use of peroxide and limited it only to dental professionals, on the other hand cosmetic treatments are becoming more and more popular. The number of patients wishing to improve their smile is increasing, including those who, up to now, were not deemed suitable for whitening treatments. Changes in lifestyle, less free time, and a higher average age have resulted in more cases of re-creating gums and fillings or restorations that do not change colour with a simple whitening treatment. These require specific treatments which the patient may not be willing to go through. Consequently, manufacturers are trying to satisfy customers’ needs and complying to new legal requirements at the same time by introducing products which are less aggressive than commonly used solutions and are suitable to all needs.

Case Report

A 34-year-old male patient presented to our practice. Although he smoked two cigarettes per day, he was in overall good systemic health and showed no dental symptomatology. The visit was originally scheduled for periodontal hygiene, but as it is often the case we were also asked to improve enamel colour for a brighter smile.

During the clinical examination, we noticed minor recessions and abrasions that will not be treated during the possible bleaching. We then proceeded with the routine hygiene session.

At the end, we presented to the client different kinds of whitening treatments in order to agree with him on which was the most suitable in his case.

We finally went with BlancOne Click (IDS, Italy) bleaching for owing to its unique characteristics. The solution contains 16% carbamide peroxide (HP < 6%) and allows fast, painless bleaching without the need to have gingival barriers positioned. The bleaching can be carried out after the dental hygiene session, which reduces time and costs both for the office and the patient.

Owing to a lower percentage of peroxide used, we were confident that the treatment will be gentle and not aggressive for tooth surfaces, thereby avoiding unpleasant hypersensitivity effects.

Another important characteristic is that of brightening the smile without altering harmony of the traits, the treatment has shown a whitening capacity of 4 to 5 shades, creating a limited gradient with reference to recessions, fillings and restorations.

After positioning the mouth gag to keep lips open, we determined the initial shade comparing the teeth with VITA Classic shades and detected an A2. Then we spread the mixed gel, which is now of a deep red colour, evenly on the smile surface after which we positioned BlancOne Arcus light on the mouth so that the light beam is perpendicular to the surfaces and we light-activate for eight minutes. The gel swelled and showed plenty of bubbles from the release of oxygen necessary for the chemical reaction of oxidation. Finally, we removed the gel and asked the patient to rinse thoroughly. Then we proceeded with the detection of final colour which was A1.

The patient was very happy with the result obtained in such a short amount of time and without any side effects to affordable costs. He announced his intention to undergo BlancOne treatment at every routine session which shows that bleaching treatments can also be an effective marketing tool and an incentive to maintain oral health.
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By Kristin Hübner, DTI

In her book What Teeth Reveal About Human Evolution (Cambridge University Press, 2016), anthropologist Prof. Debbie Guatelli-Steinberg describes what fossilised teeth reveal about history and the living conditions of our ancestors. One finding is that the high proportion of soft and sugary food people consume in the Western world these days is to blame for the steady rise of dental problems such as dental decay and malocclusion. Dental Tribune had the opportunity to speak to the Ohio State University professor about the causes of this development and the impact her research may have on modern life.

Dental Tribune: Prof. Guatelli-Steinberg, you are studying fossilised teeth in order to shed light on the living conditions of our ancestors. What can teeth reveal about earlier life and human evolution?

Prof. Guatelli-Steinberg: Teeth make up most of the mammalian fossil record, and this is true for human evolution as well. The reason: teeth are heavily mineralised, so they resist destruction and decomposition. The fact that teeth are likely to fossilise is extremely convenient for physical anthropologists because teeth lock detailed information about diet and dental development is linked to the development of the organism as a whole, it has been possible to use the pace of dental growth and development to gauge the evolution of the protracted childhoods that are a unique feature of humans among other primates. It is even possible, and much of my own research is about this, to use growth lines in teeth to assess the timing and duration of enamel growth disruption, providing insight into periods of physiological stress (malnutrition, illness) in the individual lives of our ancestors. So, one can gain information about growth rates and development in teeth or about the morphology of teeth, but that information requires a broader context for interpretation. For example, human first molars erupt at around six years of age, but that fact does not tell one much unless one compares it with other mammals, especially non-human primates. Dogs grow up fast and their first permanent teeth erupt around six months of age. Teeth erupt much earlier than we do (which is sad for dog owners). Chimps erupt their first molars more on the order of four years of age and do not appear to have natural lifespans that are as long as ours. In other words, rates of dental development reflect the developmental rates of species, but we would not really know that unless we compared humans to other primates. This applies to fossil teeth too: we need a broader comparative context to understand the indications they give us.

In your new book, you say that your teeth were adapted for a very different diet than the one we eat in Western societies today. Could you explain that briefly? What are the (negative) consequences of this change in diet?

Yes. Over most of our evolutionary history (until the rise of agriculture around 10,000 years ago), we humans were foragers, eating food that could be gathered or hunted. These kinds of foods are the foods that our teeth are adapted to eat. With the rise of agriculture, and particularly with the more recent introduction of processed and sugary foods into the diet, there was an enormous increase in dental malocclusion and pathology. Essentially, we are not adapted to the diets we eat today; as these dietary changes are quite recent in our evolutionary history, an optimal environment for caries-causing strains to flourish.

What sparked your interest in this field of research initially?

I have always had an interest in human evolution and non-human primates, and when I began my doctoral program at the University of Oregon, I met Prof. John Lukacs, who used teeth to answer questions related to these topics. This seemed like a really fascinating thing to me—that one could find out so much from fossil teeth.

How does one decode the information garnered from fossilised teeth?

Dental Tribune: What can teeth reveal about the oral environment we lived in? Was it more optimal than today?

Certainly, genetics plays a role. Some individuals are more prone to dental decay than others, but what one eats also plays a role. As far as that goes, there is no perfect diet, but diets that are low in sugar and eating tough foods that may stimulate jaw growth during childhood might help to alleviate our dental problems.

Thank you very much for the interview.
Clear aligners: How has the technology evolved?

By Brendan Day, DTI

Though still a relatively new orthodontic treatment modality, clear aligners have quickly become an increasingly popular alternative to fixed appliances for tooth straightening, since they provide an aesthetically appealing and comfortable choice. However, the recent rapid advancements in aligner technology are yet to be recognised by many dentists, leading to a low adoption rate. This article will provide an introductory overview of aligner treatment and its development.

Traditionally, malalignment has been corrected using fixed orthodontic appliances. However, in 1999, Align Technology made its Invisalign system available for commercial purchase, altering the future path of orthodontics. A clear aligner, Invisalign offered an effective alternative in orthodontic treatment, as its correct use can minimise the plaque build-up, gingival recession and inflammation of soft tissue sometimes associated with fixed appliances. Additionally, its complete lack of metal parts presented an aesthetic advantage, and the ability to remove it at any time (especially relevant during eating) allowed Invisalign patients a level of comfort and hygiene care previously unmatched in orthodontic treatment.

Through its recently introduced Invisalign Go system—a treatment programme aimed at guiding general dental practitioners through the process of identifying, planning and treating cases using the aesthetic tooth straightening solution—Align Technology has become entrenched as the global market leader in clear aligners. Other companies have since recognised the value of this therapy, though, and this increased focus has led to a rapid progression in the sophistication of aligner modelling and manufacturing. Dr Les Joffe, Secretary of the European Aligner Association (EAS), the only international organisation in Europe devoted to the promotion of education and research in aligner therapy, believes that these advancements have not yet been fully recognised by all dental practitioners. In an interview with Dental Tribune, Joffe said that dental professionals often pass judgment on the suitability of aligners based on outdated information and technology. "There is a misunderstanding by many clinicians that aligner treatments are limited," said Joffe. "Many clinicians base their view on the early stages of aligner development, from around 2001 to 2003. More than 15 years later, the huge strides that have been made in aligner performance are not fully understood and therefore the modality is either not adopted or provided.

These major advancements in clear aligner technology include the integration of much more sophisticated 3D modelling software, able to customise each aligner to an individual patient’s needs. ‘Clear aligners have deeply changed orthodontics,’ said Agnieszka Dziedziul, Clear Aligners Department Manager for NimrodDENTAL. "Aligner therapy is one of the fastest-growing areas in orthodontics, driven significantly by patients who regard it as a more comfortable, convenient and discreet alternative to fixed appliances. Given that market research firm Technavio has projected this market to grow at a compound annual growth rate of 12.68 per cent globally from 2016 to 2020, the need for organisational bodies to increase education and awareness of aligner therapy is essential. The German Association for Aligner Orthodontics was founded in 2007 and the Japan Academy of Aligner Orthodontics in 2013, with both organisations aiming to foster a space for increasing awareness of the applications and advantages of aligner therapy.

More recently, the EAS was established in 2003, with Dr Graham Gardner serving as its founding and current president. In order to promote education on the latest technologies used by clear aligners, the EAS will be hosting its first AlignerLab workshop on 18 February 2017 in Vienna in Austria. It follows on from the successful first EAS congress in February 2016 and will provide clinicians with an opportunity to engage in a variety of hands-on sessions covering 3D intra-oral scanning, 3D printing, virtual treatment planning techniques and tooth movement acceleration techniques.

Gardner believes the AlignerLab will highlight how far aligner therapy has come in such a short time. "With the explosion in the 3D treatment planning and manufacturing processes now available, we at the EAS believe that not only do we need to update our knowledge on the various aligner systems available, we also need to understand the associated hardware—scanners, computers, software, 3D printing—that is necessary to optimise the aligner system and improve treatment results," he told Dental Tribune. Gardner envisions the event ideally becoming a regular occurrence to allow dental professionals to trial and compare new systems and developments in aligner technology.
Obesity may influence response to orthodontic treatment in minors

By DTI

LONDON, UK: In Western countries like the UK, it is estimated that almost every third child is now overweight or obese. At the same time, an increasing number of children are receiving fixed braces to correct malocclusions at an early age. A new study conducted by researchers at King’s College London Dental Institute and published in the *Journal of Dental Research* has now indicated that the response to this particular type of treatment can significantly vary depending on a child’s body weight.

In the cohort study, the researchers followed a number of adolescent patients, who were classified as normal weight or obese based upon their body mass index, from the start of their treatment to the completion of tooth alignment. During the examinations, it was found that those patients who were obese had a significantly increased rate of initial tooth movement and required less time to achieve tooth alignment compared with normal-weight patients.

The researchers also noticed increased levels of inflammatory biomarkers in the gingival tissue of obese patients prior to orthodontic treatment.

The first of its kind to study the relation between obesity and orthodontic tooth movement, it demonstrates that the condition in adolescent patients influences the supporting tissue around the tooth, the researchers said, and this could have important implications for orthodontic treatment outcome in obese patients over both the short and long term.

Levels of obesity have increased significantly throughout all age groups in Western societies in the last two decades, and it has been linked to multiple chronic diseases, including periodontal inflammation. In a 2015/2016 evaluation, Public Health England found that 14 per cent of one million schoolchildren in the UK were classified as overweight and almost 20 per cent as obese.

The King’s study, titled “Impact of obesity on orthodontic tooth movement in adolescents: A prospective clinical cohort study”, was published online on 23 January in the *Journal of Dental Research*.
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Aligner therapy continues to improve
An interview with the President of the European Aligner Society (EAS) Dr Graham Gardner

Since it was commercially intro-
duced in 1999, aligner therapy has grown and developed substantially as an orthodontic treatment mo-
dality. Dr Graham Gardner fromウィーン、the first President of the European Aligner Society (EAS), an organisation dedicated to in-
creasing education and research in aligner therapy. The inaugural EAS AlignerLab workshop will be held in Vienna in Austria on 18 February and aims to provide a hands-on learning experience for dental profes-
sionals interested in upping their knowledge of aligner treat-
ment. Dental Tribune interviewed Gardner about the role of aligners in orthodontics and what the event organisers have in store.

Dental Tribune: What benefits do aligners offer over fixed orthodontic appliances, and how have these developments since aligners were first introduced?

Dr Graham Gardner: In my opinion, the advantages of aligner therapy for the patient are:
1) They are more comfortable than fixed appliances.
2) They are more aesthetic, and therefore less noticeable, com-
pared with fixed appliances. This is especially important for someone seeking orthodontic treatment because he or she is already concerned and self-
conscious about his or her teeth, as the last thing such a patient would then want is to draw at-
tention to his or her teeth with fixed appliances.
3) Improved maintenance of oral hygiene and no dietary restric-
tions, as the aligners are re-
moved for eating.

The advantages of aligner therapy for the orthodontist are:
1) Improved treatment planning capabilities owing to the 3-D treatment software. Virtual treat-
ment planning allows one to evaluate different treatment op-
tions that, crucially, can be more clearly discussed with the pa-
tient owing to the virtual pre-
presentation process. In my opinion, this allows the patient to make a more informed decision on the treatment.
2) Broken brackets and emergen-
cies are things of the past.

Additionally, a benefit shared by both patient and clinician is that adjustment appointments are often quicker and certainly more comfortable for the patient compared with fixed appli-
cances.

What have the main impedi-
ments been to the adoption of aligners by dental profes-
sionals?

I think that, initially, aligners were basic and our knowledge on how to move teeth with plastic was lim-
ited. Hence, in the earlier years, only minor tooth movement could be predict-
able treated with aligners, and this limited their use and then restricted the num-
ber of practitioners prepared to use aligners. Combined with the fact that the practi-
citioner now had to learn new software programmes and how to plan treatment on a computer—a vastly different skill to having the physical study model in one’s hands and brackets on teeth—one can see why the initial take-up was per-
haps less than would have been expected.

The first EAS AlignerLab is set to take place in Vienna in February. What prompted the EAS to hold this workshop, and what can par-
ticipants expect to gain from it?

We are excited about the first AlignerLab. With the explosion in the 3-D treatment planning and manufacturing processes now available, we at the EAS believe that not only do we need to update our knowledge on the various aligner systems available, we also need to understand the associated hardware, such as scanners, com-
puters and 3-D printers, and soft-
ware that is necessary to opti-
mise the aligner system and improve treatment outcomes.

It is therefore our objective to bring these two areas to-
gether at one event with the AlignerLab.

This will allow attendees an opportunity to listen to world-famous clinicians on different systems, to com-
pare these different aligner systems and to gain hands-on experience with the different equipment associated with these systems. We think it is a unique way to update our knowledge on aligner ther-
apy, with a bonus opportu-
nity to forge links with our colleagues across Europe.

Is the AlignerLab a one-off thing or is it intended to be-
come a regular event?

We hope this will become a regular event because technolog-
ical developments and advances will continue. Thus, an event at which practitioners can both make direct comparisons and trial new systems should become a popular and regular occurrence.

Thank you for the interview.

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Invisalign Go en route to success —2016 in review

By DTI

AMSTERDAM, Netherlands: With launches in Germany, the UK, France and Italy, numerous Invisalign Go introductory seminars and a series of enhancements for the system, Align Technology has just been completed an exciting year with its new product, Invisalign Go. Designed specifically for general dentists, the new aesthetic tooth-
straightening product that can treat mild crowding, spacing and orthodontic relapse has experi-
ced a huge demand in record time and promises great potential for the future.

Align Technology’s Invisalign braces are enjoying increasing popularity and have already helped over four million patients beautify their smiles. Until re-
cently, aligner treatment was lim-
ited to specialists, however, since the introduction of Invisalign Go this has changed significantly. With the help of case assessment software and a network of experi-
enced orthodontists, general dent-
ists are now able to treat cases of tooth misalignment between the first premolars.

Since its launch, hundreds of interested dentists have already be-
come familiar with the new system through introductory seminars run by orthodontists and long-term users.

Realising the potential of this new system, Align Technology explained everything very well,” Dr Jens Rathje summarised after the training day in Hamburg. The dentist from Lubeck, who special-
ised in implantology and aesthetic dentistry, and his wife, endodon-
tics specialist Dr Isabelle Rathje were interested in Invisalign Go because they want to expand the scope of their aesthetically-orien-
ted practice.

”Equally enthusiastic about the possibilities of the system was Dr Melanie Elger from Hamburg: “What I like about the system is that you have various tools to visualise the treatment for the patient and you have assessment tools to decide which cases can be done with an aligner system and which should rather be treated conventionally.”

Owing to the close cooperation between dentists and orthodon-
tists, Invisalign Go enables a strong bundling of competencies and therefore ensures medically opti-
mal results. In order to expand this approach, Align has published a series of improvements for the product in October that will make the application of the system even more efficient. This includes, for example, the new Invisalign Go Photo Uploader App for iPhone, which allows dentists or assistants to directly capture the intra-
and extra-oral photos of their patients and upload them directly to the Invisalign Doctor Site to start the case assessment.

The new ClinCheck Pro 5.0 software also allows for extended application possibilities. In addi-
tion to improved visualisation, ClinCheck Pro 5.0 includes a range of new features as a custo-
misable toolbar, a ClinCheck wiz-
ard for better orientation through the treatment plan and a modifica-
tion warning. Moreover, the case assessment and the tool for assess-
ing the progress of treatment will also be revised. The improvements will make use of the new system and the time spent with patients will be even more effective than before.

Invisalign Go will further ex-
pand their training programme due to proving successes in Germany, France, Italy and the UK and new product improvements are to be announced in 2017.
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**Vibration therapy in orthodontics: Realising the benefits**

**Dr Amit Lala, USA**

**Introduction to vibration therapy—multiple potential benefits**

Accelerated orthodontics and vibration therapy to fast track orthodontic tooth movement (OTM) have been hotly debated topics in the orthodontic industry in recent years. Periodontally Accelerated Osteogenic Orthodontics (PAOO) techniques such as osteotomy, open flap corticotomies, and piezocision have been shown to decrease treatment time. Unfortunately, these classical approaches have had limited patient acceptance because of their invasiveness and side effects. In the last several years, macroosteoperiosteal, which takes advantage of the same biological regional acceleratory phenomenon as these classical techniques, has been gaining rapid clinical adoption because of the simplicity of its chairside microinvasive nature.

There is also growing evidence that the application of mechanical energy-based therapies such as vibration can stimulate and accelerate bone formation and possibly bone remodelling. Orthodontic tooth movement, caused by the application of light continuous forces that induce bone formation and remodelling, could logically be accelerated by the application of vibrational force, with the benefit of reducing the overall treatment time. Since 2008,AccelerDent (OrthoAccel Technologies) has offered vibration therapy, promising the offer of accelerated orthodontic treatment based on delivering mechanical stimulation to the dentition. At this point, research on the efficacy of this device in accelerating OTM has been mixed, and clinicians debate its value.

The debate on vibration therapy as it applies to accelerated orthodontics in general, and the specific manufacturer device specifically, should consider other factors in evaluating efficacy. First, there is a distinct possibility that frequency optimisation of the devices concerning bone formation/remodelling has not been established. AccelerDent operates in a low frequency range, however, research points towards the benefit of high frequency in bone modulation. Secondly, current research indicates that high frequency low magnitude (HFLM) vibration therapy as applied to orthodontic treatment may have multiple potential benefits, including, but not limited to, accelerated OTM.

This article will discuss these additional benefits, including faster, more efficient aligner therapy when used as a nightly seating tool, relief of normal orthodontic discomfort from new tight fitting aligners and routine adjustments to fixed appliances, and enhancement of orthodontic retention. Additionally, it will touch upon evidence that HFLM vibration is useful in increasing bone density and trabecular bone thickness suggesting applications in implant dentistry and prosthodontics.

**Current vibration devices used in orthodontic therapy**

As mentioned previously, the most common, commercially available, vibration device for orthodontic treatment is AccelerDent manufactured by OrthoAccel Technologies. This device delivers a vibrational frequency of 50 Hz and requires 20 minutes per day user wear time.

Several early studies on the AccelerDent device seemed to demonstrate higher rates of OTM than the established norms. However, there are other more recent studies that have failed to establish the advantages of the same therapy. A study by Woodhouse et al. (2015) analysed the AccelerDent device to demonstrate its effect on OTM in extraction cases. They found that the supplemental vibrational force did not significantly increase rates of orthodontic alignment with a fixed appliance. Another comprehensive report on vibration therapy by investigators Yadav et al. (2015) concluded that low frequency mechanical vibration using AccelerDent had no significant effect in accelerating tooth movement.

The recent studies regarding the apparent ineffectiveness of AccelerDent may be explained by the relatively low vibrational frequency of the device. For purposes of this discussion low and high frequency are defined as:

- **Low frequency**—less than or equal to 43 Hz
- **High frequency**—greater than or equal to 90 Hz

In a 2010 study by Judex and Rubin, ovarectomised rats were subjected to either low or high frequency vibration therapy. Bone formation rates for subjects treated with high frequency were 199 per cent greater when compared to controls, whereas bone formation for low frequency rats were not significantly different than controls. Trabecular bone volume and thickness were also significantly higher for subjects treated with high frequency.

Similarly, Akhkan et al. found a statistically higher rate of alveolar bone formation (+190 per cent) at higher frequencies, with a five minutes per day application. In short, the most pronounced osteogenic effects of vibration seem to occur well above the AccelerDent's low vibrational frequency.

Practically speaking, five minutes of daily wear time may be beneficial, as it will reduce the dependency on significant patient compliance. In order to realise the maximum benefits of vibration therapy, shorter wear times would theoretically increase compliance, and improve results. Given all other factors being equal, the studies suggest that a higher frequency device would deliver equivalent amounts of HFA Energy to the dentition in a significantly reduced timeframe.

**The future of vibration therapy: Expanded application, multiple benefits**

The apparent limitations of current commercially available vibration devices should not diminish the potential importance of vibration therapy. Setting aside applications such as implant dentistry and prosthodontics suggested by the osteogenic properties associated with vibration therapy, there are at least four important clinically beneficial orthodontic applications that can be anticipated. These potential applications are:

1. As a nightly clear aligner seating device;
2. Analgesia, relief from normal discomfort associated with orthodontic treatment; 3. Accelerated orthodontic tooth movement; 4. And enhancement of orthodontic retention and alignment.

Theoretical advantages of vibration involve increased blood flow, which intercepts the ischaemic response and limits inflammation.

One theory is that low frequency vibration restores normal circulation to the PDL, which is otherwise restricted by compressive forces. Increased blood flow would likely result in more efficient, faster aligner treatment, even absent biomechanical anisotropy caused by vibration itself.

**Non-pharmacological analgesia**

Discomfort or pain is a common side effect of orthodontic treatment. The forces applied to the dentoalveolar complex which are required to move teeth, compress the periodontal ligament (PDL) causing inflammation. Pain is most notable when seating a new aligner, or immediately after wire changes and adjustments, when pressure on the PDL is at its greatest, and diminishes as the aligner material expands, and/or the dentition compensates. In a study accepted in September 2015 by the Angle Orthodontist for future publication, Lobreat al. found in a randomised clinical trial that vibration therapy resulted in significantly lower perceived pain and less OTC medication use.

One theory is that vibration restores normal circulation to the PDL, which is otherwise restricted by compressive forces. Increased blood flow intercepts the ischaemic response and limits inflammation.

**Improved aligner seating**

The importance of properly seated aligners, to efficient tooth movement in aligner therapy is clearly understood. Improperly seated aligners can slow treatment, forcing patients to backtrack to previous trays, and create unintended collateral tooth movements, with a consequent time consuming and costly refinements. Seating recommendations range from using chewies, to biting on hard objects. Some clinicians advise seating only when trays are new (immediately post change), while others recommend daily seating. With the current seating modalities, it is unlikely that patients consistently seat aligners fully. A seating protocol, that takes only five minutes nightly, delivering a range of other patient benefits, would insulate that aligners are fully seated throughout treatment.

Consistent proper aligner seating, with both animal and human models have demonstrated anaesthetic responses such as bone growth and changes in bone mineral density in response to vibration. Since OTM is fundamentally based on bone remodelling (formation and resorption) there is little doubt that HFLM vibration has the potential to favourably impact OTM.

In a recent split-mouth randomised trial involving bilateral maxillary canine distraction after first premolar extraction on 35 human subjects, Lee et al. (2015) investigated the impact of vibration on accelerated tooth movement.
Bone apposition and a decrease in bone resorption. Reports have demonstrated an increase in bone density, as well as collagen and non-collagenous matrix proteins. 14 The strong supporting data concerning the positive effects of vibration therapy on bone formation, bone density and collagen fibres reorganisation leads us to believe that this modality of treatment may revolutionise the concept of orthodontic retention.

The effects of high frequency vibration therapy may be useful in modifying the bone density to the clinician’s advantage in implant placement or to maintain the thickness of bone trabeculae in edentulous patients undergoing prosthodontic treatment.

Enhanced retention

Vibration therapy warrants the attention of the scientific community to further explore its effect during the orthodontic retention phase. Scientific literature documents the primary reason for orthodontic relapse is the inability of collagen fibres to reorganise quickly after the completion of orthodontic treatment and the delay in new bone apposition. Studies suggest that vibration can have potentially favourable impacts on both bone formation and reorganisation of the PDL fibres.

A study from Rubin et al (referred above) states that vibration therapy by itself has always been anaesthetic, which means it led to bone apposition and a decrease in bone resorption. Reports have documented an increase in bone density, bone formation, Type-I collagen and non-collagenous matrix protein expression in response to the therapy. 16

Recent studies by Yadav et al. (2015) and Alikhani et al. (both referred above) have demonstrated that vibration therapy improved not only bone density, but also restored the integrity and thickness of the collagen fibres. With evidence suggesting that vibration therapy positively impacts both bone morphology and the PDL fibres, vibration during the retention phase may play a significant role in preventing orthodontic relapse.

Conclusions

The current debate over vibration therapy and its impact on accelerated orthodontic tooth movement, should consider other potential benefits of this therapy including applications for aligner seating, relief of normal orthodontic pain, enhanced retention and applications to implant dentistry and prosthodontics.

It can be hypothesised that a vibration device operating in the high frequency range would likely be most effective in creating OTM as well as offering shorter wear times impacting compliance. The most commonly available commercial device operates at a frequency that is below thresholds having statistical significance in creating orthodontic tooth movement as documented in several recent studies, and requires a relatively long, 20–30 minutes daily wear time.

The strong supporting data concerning the positive effects of vibration therapy on bone formation, bone density and collagen fibres reorganisation leads us to believe that this modality of treatment may revolutionise the concept of orthodontic retention.

The effects of high frequency vibration therapy may be useful in modifying the bone density to the clinician’s advantage in implant placement or to maintain the thickness of bone trabeculae in edentulous patients undergoing prosthodontic treatment.
tough WHITENING TOOTHPASTE with ACTIVATED CARBON

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