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The current and future dental implant landscape

By Dr Amit Patel, UK

The digital revolution continues

Like all areas of dentistry, implantology is going digital. A digital workflow can be applied to various stages in the treatment journey, often improving outcomes, as well as both the patient and professional experience.

We are seeing an uptake of intra-oral scanners, which can acquire highly accurate impressions while improving patient comfort compared with conventional

alginate methods. For the clinical team, digital scans can be easily integrated within the wider digital workflow and facilitate prosthetic design, as well as streamline communication and collaboration with colleagues. I would estimate that around 20%-30% of clinicians in the UK now own and utilise these scanners, but I would expect this to increase in the next couple of years as the technology improves and becomes even more accessible.

CBCT is the other digital solution supporting dental implantology today. These scans have become

central to precise and confident treatment planning, allowing clinicians to determine the ideal dental implant position, angle, depth and width in every single case. This, combined with prosthetically driven planning protocols, ensures that any dental implant placed can be restored correctly for good function, aesthetics, maintenance and longevity.

Attitudes to metal in the mouth

Another trend we are seeing in the UK is an increase in a patient-driven

“Effective new ways of cleaning the products that we use would be widely welcomed”

move away from metal. While certainly not yet the norm, my colleagues and I are receiving more enquiries about and requests for metal-free alternatives to conventional dental implants. This echoes some of the changes already seen across other disciplines of dentistry, such as restorative dentistry,

and creates an interesting dynamic for the future. Ceramic implants are available for clinicians to utilise backed by science and proved to deliver good clinical results and these are now being employed more regularly than they were just a few years ago.

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Evolving business systems into 2023 and beyond

An article series on five basic systems to improve practice management—Part 2: Marketing

By Chris Barrow, UK

In this article series, I address each of the five basic systems that dentists and dental technicians need to have in place and give advice on how they can best prepare for the future. In Part 1, I referenced the seminal work *The E-Myth Revisited* by Michael Geber and discussed financial systems in dental practices. In this current article, I will focus on Gerber's second business system: lead generation systems (how we attract new patients and sell more to existing patients), which is otherwise known as practice marketing.

Shortly, I will share with you a six-step process for ensuring that your marketing is contemporary and on point, but before that, I want to describe what I believe to be a hugely important distinction, between advertising and marketing: Advertising is the systems by which you make strangers aware

of your practice and aware of the products and services that you offer.

Marketing is the systems by which you encourage existing patients to buy more and to recommend you to their family, friends and colleagues.

The purpose of this article is to describe methods by which you can do successful marketing, according to my definition, and it is not within my scope of practice to talk about advertising.

When my clients ask me about advertising, I direct them to experts and agencies in this field, with the

warning that advertising can be costly and necessitate a huge attrition rate (essentially advertising is appealing to price shoppers and potential time-wasters) and that they need to carefully monitor what the agencies do with their money.

Can you detect a note of bias in my language? I apologise, but I have spent too many hours listening to practice owners and managers complaining about lack of results and lack of information. *Caveat emptor!*

My preference for marketing is based upon the knowledge that it can be a predominantly in-house activity, under your control, relatively low-cost and easy to monitor. So, let us look at my marketing systems, especially in this post-COVID digital world of ours.

Your recall system

It comes as a surprise to many clients when I suggest that a properly run patient recall system is the first rung on the marketing ladder. The COVID environment resulted in many recall systems being halted, and the demand for dentistry since has resulted in some recall systems being left unattended while the waiting list is dealt with.

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Yet to come

There are some interesting technologies currently being introduced and in development that could have a positive impact on dental implantology in the future. For example, there is navigation software that allows the clinician to prepare the dental implant site using the CBCT scan in real time as a kind of virtual guide. It offers an alternative way to provide guided surgery, allowing for a freehand approach that makes use of digital technology for more accurate and confident dental implant placement. This kind of technology is still quite new to the field, but it is likely to become a more popular technique as the software evolves.

The other area in which changes are afoot is the management of peri-implantitis. Prevalence is difficult to measure, but according to current research, it occurs in 12.5% and 19.5% of cases at implant level and patient level, respectively.¹ A leading cause of dental implant complications, it remains a disease

that is not fully understood by the profession or by patients. Prof. Niklaus Lang from Queen Mary University of London once said at a conference I attended: "Periodontitis was made by God; peri-implantitis was made by man." This illustrates the difference between the two diseases, and we must develop management techniques that take this into consideration. As a specialist periodontist, this is a topic I am passionate about, and the Association of Dental Implantology has long recognised it as an important area for the progression of the field. We have held events dedicated to discussing the challenges of peri-implantitis and exploring potential solutions for this very reason.

For the future, how we clean dental implants will likely be further scrutinised. There is already technology available for electrolytic cleaning of the dental implant surface, which has been shown to inactivate bacterial biofilm far better than using a powder-spray system.² Given the spotlight on prevention of bacterial infection in the UK dental implant field, effective new ways of cleaning the

products that we use would be widely welcomed.

Of course, this will be in addition to, or perhaps even second to, prevention of the disease in the first place. We know the risk factors for peri-implantitis, but if we can hone in on the exact mechanisms behind development, then we could change the game entirely for many patients. With more research, a greater understanding of the disease and the next generation of technology and materials, we will be even better equipped to stop peri-implantitis before it becomes a problem.

Aside from these, there will no doubt be a shift in some of the other clinical techniques and products employed as part of the dental implant workflow in the near future. For example, socket shielding is being brought to the fore at professional events, and novel dental implant designs are being worked on to help further minimise potential complications. It is an exciting time to be involved in the dental implant field and to utilise many new innovations as they reach the market. Concen-

trating on science-backed and evidence-based solutions remains crucial, but we can expect to deliver ever-better dental implant treatment to patients in the years to come.

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Dr Amit Patel

is a periodontist. He graduated in dentistry from the University of Liverpool in the UK in 1997 and obtained his membership of the Faculty of Dental Surgery of the Royal College of Surgeons of Edinburgh in 2000. Dr Patel also underwent a four-year training programme in periodontics and implantology at what is now King's College London Faculty of Dentistry, Oral and Craniofacial Sciences in the UK, achieving a master's degree in periodontics and clinical dentistry. Passionate about providing specialist dentistry to the highest degree, Dr Patel also trains other dental professionals. As associate specialist in periodontics and honorary clinical lecturer at the University of Birmingham's School of Dentistry in the UK, he teaches at undergraduate and postgraduate level. He also lectures both nationally and internationally and is the current president of the Association of Dental Implantology, the UK's leading professional organisation in the field. More information can be found at www.adi.org.uk.

High sugar levels in vegan ready meals, warns campaign group

Action on Sugar, a campaigning group which informs and influences sugar reduction policies in the UK, warns that vegan ready meals can contain more than seven times as much sugar as meat-based alternatives. They urge consumers to check food labels before purchasing these seemingly healthy options.

The sugar advisory group has highlighted a butternut, almond and pecan nut roast from the Plant Kitchen range at Marks & Spencer, which has 7.7 g of sugar per 100 g, compared with M&S's roast beef Yorkshire pudding meal, which contains 1.1 g of sugar. Additionally, the Plant Kitchen version of spaghetti Bolognese has 3.6 g of sugar per 100 g compared with 2.3 g in the meat version.

High sugar levels in vegan food isn't exclusive to ready meals. Action on Sugar also found that vegan food at restaurant and fast-food chains can also be high in

sugar and salt, including pizzas, chilli, burgers and pies.

Nutritionist Zoe Davies, of Action on Sugar, said products labelled 'vegan' and 'plant based' are not necessarily healthy, while there is research to suggest that many people wrongly believe they are.

Despite the decreasing levels of tooth decay over the past decades, it still remains one of the most common problems in the UK, second only to the common cold. It is estimated that one in three adults suffers from dental caries and close to one in four children equally suffer from some form of tooth decay.

World Health Organization research shows evidence that dental caries incidence is lower when free sugars intake is less than 10% of energy intake.

Dental hygienist and nutritionist Juliette Reeves comments: "Recent research suggests a link be-

tween dental erosion and the vegan diet. An increased consumption of acidic foods in the diet seems to be the culprit. In ad-

B12 is found only in animal produce, and although the body needs relatively small amounts, gastro-intestinal conditions, pro-

levels and inadequate protein intake can also affect B vitamin status. Avoiding processed foods and ensuring the inclusion of a wide range of fresh foods such as cereals, nuts and pulses provides adequate complete proteins, good vitamin B complex intake and lower sugar, salt and saturated fats in the diet.

So, whilst the adoption of a vegetarian or vegan diet has health benefits such as a lower mean BMI, cholesterol, and a lower mortality from ischaemic heart disease, simply avoiding animal products or relying on processed ready-made meals can be detrimental. The reality is that plant-based diets require considerable nutritional competence, determination and perseverance with diet and supplementation regimens to avoid both oral and systemic health consequences.



High sugar levels in vegan ready meals, warns campaign group.

dition, high levels of hidden sugars increase the risk of dental caries. The vegan diet is particularly at risk of vitamin B12 deficiency in the long term.

longed antibiotic use, potassium chloride supplementation and some cholesterol lowering drugs can adversely affect B12 synthesis and absorption from the gut. Processed foods and the refining of grains vastly reduces B vitamin

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Given the current economic landscape 'recession and inflation', I am advising my clients to look again at their recall systems and reactivate regular reminders for dental health reviews and hygiene visits. You should consider the following:

1. Are your existing patients being contacted on a regular basis to remind them that their appointments are due?
2. Are you able to triage dental health reviews and visits by zoning diaries to allow for ample time to review and to deliver higher value treatment?
3. Do you have a virtual consultation platform in place so that patients can talk to a treatment coordinator or clinician before visiting?
4. Do you offer an online booking system?
5. Do you offer an online chat facility (chatbot)?

At a patient review or recall, you will have the opportunity to upsell higher value treatment (if appropriate and affordable) and ask for word-of-mouth and digital referrals, as well as a Google review.

Social media

Complaining about social media is as pointless as complaining about the weather—it is here to stay. Irresponsible use of social media is inappropriate in dentistry. Responsible use of social media, however, allows our messages to travel further and faster than at any time in history.

I ask my clients to follow a simple rule in all their marketing, the 80/15/5 rule for content:

- 80% stories about real patients for whom you have made a positive difference;
- 15% stories about your team members and how working with you is enhancing their lives; and
- 5% oral health education.

Far too many practices reverse these proportions, and their social media becomes me, me, me—me on a course, showing off equipment, at team training or lecturing on oral care. These may be important, but are largely boring to the audience. Regarding social media engagement, you should consider the following:

1. Do you add three or four social media posts weekly?
2. Do they follow the 80/15/5 rule?
3. Do you engage and interact daily with any followers who engage with you?
4. Do you encourage Google reviews from every patient with a simple QR code on a card?
5. Do you regularly collect patient selfies and video testimonials (with the necessary consent)?

Correctly used, social media can be a godsend for your practice marketing and your marketing budget.

Many prospective patients, even those referred by others, will visit your website as part of their discovery process. Is your website modern, freshly designed and engaging? Many years ago, and in collaboration with a leading dental web design company, we described the six essential components to make your website earn its living.

Your website

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Profile

To begin with, address the profile of your dental practice—this includes your name, brand and unique selling points—and emphasise this throughout your website, especially on your home page and landing page. This will help build brand awareness so that you become a familiar name throughout your community. You want people to associate your profile with good customer service and quality dental care. Build up a collection of Google ratings and reviews from your existing patients to help emphasise this further.

Make sure that your home page and landing page are both unique, interesting and engaging so that they encourage prospective patients to explore the rest of your website and leave their details or contact you directly to either find out more information or book an appointment to visit you in person.

People and premises

Showcase the people on your team and the premises of the dental practice. This is very important in the marketing mix, as it helps prospective patients to familiarise themselves with you and your team as well as find out more about your surroundings to help ease their nerves when they visit you in person.

Price

The prices of your treatments are very important. Most patients will try to get the best deal possible. If you can offer better prices than the other dental practices in your area, then this is beneficial for you. If you have higher prices than your competitors, then work to emphasise the quality of dental care that you provide to justify your prices and help patients recognise your experience and expertise.

Promise and products

Promise your patients that you will provide them with fantastic dental care and excellent service and prove this using the Google ratings and reviews as well as before and after pictures of successful treatments carried out at the practice. Inform patients of individually tailored products in the form of treatment plans or smile makeovers that they can undergo at your dental practice.

Important considerations for your website include:

1. Is your dental website refreshed every three years?
2. Is your bounce rate low so that you know that visitors are staying to research?
3. Have you incorporated the six Ps?
4. Can you confidently say that your website earns you a living?
5. Does your website include videos of patient stories?
6. Is all your photography current and professional?
7. Do you have an online booking and chat facility?
8. Is all copy optimised for search engine optimisation?

The digital patient newsletter

Most of my clients publish a patient newsletter every month. The objective is to upsell treatment and to encourage patients to share the newsletter with family, friends and colleagues if they think an article will be of interest.

Although some may use a module in their practice management software, the majority will use a modern newsletter platform like Mailchimp. The content of the newsletter follows the same 80/15/5 rules, but allows you to go into more details, showcasing patients and team stories. The feedback is always that patients do enjoy these publications, provided they are not seen as sales documents.

The daily huddle

Given my focus on internal marketing, it will be no surprise that the morning huddle is a focal point, during which the list for the day is reviewed to identify patients visiting that day who could be approached for internal marketing. A typical daily huddle list would be:

1. New patients: Count the number of welcome packs sent out at the end of the day.
2. New treatment plans: Add up the total of the signed treatment plans at the end of the day.
3. Production: Collect the completed average daily production sheets and insert the total production into the sheet.
4. Facebook check-ins: Count the number of check-ins on the practice's Facebook administration page (practice manager or treatment coordinator).

5. Problems: List any problems reported throughout the day.
6. Follow-up calls: List any diarised follow-up calls. Also, note any difficult treatments or concerns from the previous day (clinicians).
7. Patients who failed to attend or cancelled: List any patients who failed to attend or cancelled on the previous day and actions taken.
8. Achievement against production target: Compare reception-booked average daily production sheets against the targets for each clinician.
9. Emergencies: Make sure that there are spaces in the appointment book for utilisation for emergencies etc.
10. Laboratory work due: Check the next working day for laboratory work and raise concerns if laboratory work is missing 'dental nurses'.
11. Email addresses: Check in the appointment book for an 'e' icon next to the appointment. If there is no 'e', then highlight for collection the next day.
12. Smile checks: Identify patients who have not had a smile check in the last 12 months and highlight them on the list for a smile check on arrival.
13. Handing out referral cards to patients: These are normally handed out to patients at the end of treatment reviews.
14. Facebook engagement: Explain to patients that the practice is having a charity drive for Facebook likes and reviews. Ask!
15. Testimonials: Make sure that at the end of treatment immediately after the final dentist review, patients are booked with the treatment coordinator for a six-monthly healthy mouth review booking and testimonial requests.
16. Membership: Highlight any patients not on membership (e.g. with a different colour in the appointment book) and ask whether they are aware of membership and its benefits.
17. Thank you: If a patient has referred a new patient to us (evident from a pop-up on the patient's file), thank him or her and ask whether he or she has received his or her chocolates yet? If not, find out why!
18. New patients: Make everyone aware of the time a new patient is coming in. Be prepared!
19. Access issues for any patients: List the appointment time and ensure surgery coordination.
20. Any known highly demanding patients: Find the time of attendance and make sure you are on time!

The end of treatment review

When patients reach the end of a course of cosmetic treatment, they should be at an emotional high point in their journey. That is the best possible time to engage them as an advocate for the practice—so be ready with your MR-CREST approach:

Membership: Would you like to join our dental plan?

Referral: May we give you three of our business cards to pass on to any family members, friends or colleagues who would benefit from visiting with us?

Check-in: If you have a Facebook personal profile, could we ask you to check in at the practice today?

Review: May we give you a Google review card with a QR code and request a review?

Email: Do we have your email address and may we add you to the subscriber list for our patient newsletter?

Selfie: Can we take a selfie?

Testimonial: Do you have time now to record a short video testimonial or can we invite you to one of our VIP evenings to be filmed?

Conclusion

By adding all these steps together, you create a full internal marketing system that will turn your patients into your unpaid sales force. Internal marketing is a fun team effort that strengthens and deepens your relationships—and it works!

Chris Barrow



has more than 50 years of work experience and has been active as a consultant, trainer and coach to the UK dental profession for over 25 years. His main professional focus is through his Extreme Business company, providing coaching and mentorship to independent dentistry around the world via virtual consultancy, practice visits, a workshop programme and an online learning platform. His blog, Thinking Business, enjoys a strong following. During the COVID-19 pandemic, Barrow created the Regeneration Coaching Programme to help practices to survive lockdowns and to bounce back higher after their return to work. More information on his work can be found at www.coachbarrow.com.



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The Dentistry Show

Poor oral health may contribute to a decline in brain health, according to new research

The link between oral health and systemic health has been long understood by dental experts. Now preliminary research, to be presented at the American Stroke Association's International Stroke Conference 2023, suggests there may be a link between oral health and brain health. Adults with poor oral health may be more likely to show signs of declining brain health than those with healthy teeth and gums. Early treatment of poor oral health may lead to significant brain health benefits.

Periodontal disease, missing teeth and other signs of poor oral health and poor brushing habits and lack of plaque removal can increase stroke risk, according to studies. Previous research has found that gum disease and other oral health concerns are linked to heart disease risk factors and other conditions like high blood pressure.

"What hasn't been clear is whether poor oral health affected brain health, meaning the functional status of a person's brain, which we are now able to understand better using neuroimaging tools such as magnetic resonance imaging (MRI)," said study author Dr

Cyprien Rivier, a postdoctoral fellow in neurology at the Yale School of Medicine in New Haven, Connecticut. "Studying oral health is especially important because poor oral health happens frequently and is an easily modifiable risk factor."

Between 2014 and 2021, researchers in this study analysed the potential link between oral health and brain health among about 40,000 adults (46% men, with an average age of 57 years) without a history of stroke, enrolled in the UK Biobank. Participants were screened for 105 genetic variants known to predispose persons to have cavities, dentures and missing teeth later in life, and the relationship between the burden of these genetic risk factors for poor oral health and brain health was evaluated.

Signs of poor brain health were screened via MRI images of the participants' brains, including white matter hyperintensities, defined as accumulated damage in the brain's white matter, which may impair memory, balance and



Diabetes and toothlessness together worsen cognitive decline.

mobility and microstructural damage, which is the degree to which the fine architecture of the brain has changed in comparison to images for a normal brain scan of a healthy adult of similar age.

The analysis found:

- People who were genetically prone to cavities, missing teeth or needing dentures had a higher burden of silent cerebrovascular disease, as represented by a 24% increase in the amount of white

matter hyperintensities visible on the MRI images.

- Those with overall genetically poor oral health had increased damage to the fine architecture of the brain, as represented by a 43% change in microstructural damage scores visible on the MRI scans. Microstructural damage scores are whole-brain summaries of the damage sustained by the fine architecture of each brain region.

"Poor oral health may cause declines in brain health, so we need to be extra careful with our oral hygiene because it has implications far beyond the mouth," Dr Rivier said. "However, this study is preliminary, and more evidence needs to be gathered—ideally through clinical trials—to confirm improving oral health in the population will lead to brain health benefits."

Treating vulnerable patients in UK practice improves lives and can be profitable for dental businesses

By Ben Atkins, UK



Dental care for homeless and vulnerable patients should not be left to charities, but a priority for the NHS, says Dr Ben Atkins, former owner of Revive Dental Care in Manchester and a Trustee of the Oral Health Foundation.

He believes a UK-wide, standardised care system within the scope of the NHS, and including improved treatment signposting, would hugely improve dental services for people who find it difficult to access services. And he stresses: "It also has to be profitable for the practice because then it becomes part of the normal and the focus of the NHS."

Dr Atkins, former chair of the Salford Local Dental Committee and a clinical expert to public health leads such as NICE and NHS England, was instrumental in lobbying the Greater Manchester commissioning team to fund a service for homeless people and those with complex needs some 15 years ago in his Ancoats Urban Village Medical Centre practice. He says: "One of the massive, personal reasons for me attending the LDC and MCN-managed clinical network meetings was to understand what was going on, where the extra funding is for dentistry, and get to know the commissioners. There are projects around currently, but if you don't read about them, or get involved, you will be the last to know."

He explains his practice was already operating out-of-hours and emergency services for Merseyside, Cheshire and a large area of Greater Manchester, which was inundated with vulnerable patients who'd found negotiating the NHS system a nightmare or banned from every other practice, who he and his team would see. "So we went back to our commissioner in

Greater Manchester and proposed a proper access session just aimed at hard-to-reach and homeless people."

The commissioner awarded a contract worth approximately £50,000, which Dr Atkins says enabled the practice to make a major difference to the dental health and wellbeing of vulnerable patients. "It also took the pressure off our actual out-of-hours service because we weren't having to field 10 or 15 patients a week who were very complicated. The service went from strength-to-strength and it's possibly the highlight of my career."

Since selling his practice to Rodericks Dental, Dr Atkins has continued to champion and consult on contracts for hard-to-reach patients; there is now one piloting a service in Leeds and another starting the journey in Cornwall, but he stresses more are needed. "As a profession, we're not really focused on where the actual needs are in society. We focus very much on the worried well and for me, they are not the patients I qualified to treat."

Dr Nigel Carter, chief executive of the Oral Health Foundation agrees, adding "The most challenging needs often come from individuals with the highest rates of dental decay. Frustratingly, access points for this group are becoming scarce—with a growing number of dental deserts in the UK."

However, Dr Atkins says there is now a drive towards getting a standardised process in place - not just for the homeless but also other disenfranchised groups that need prioritisation to access care. He stresses that the "building blocks are there" with dental practices operating to NICE guidelines easily able to accommodate hard-to-reach patients.

Aside from the issue of treatment contracts for vulnerable groups, Dr Atkins points to the hugely negative impact of COVID-19 in terms of the extra barriers now in place to accessing treatment for all patients, but particularly those who are already hard to reach. He explains: "There is already difficulty in the signposting journey throughout the NHS and because capacity has reduced across the

board, the people who will be the hardest hit are the most vulnerable." In Manchester, Dr Atkins' team worked with local shelters to identify patients needing acute care, which he says was a "real success".

He adds there are currently National Health Institute of Health Research projects looking into why some groups of people in society don't go to the dentist. "99% of the time it's about signposting - there are a lot of blockages we need to unblock before it becomes an easy journey."

In terms of how the UK's system of treating vulnerable patients benchmarks with other countries, he points to Canada having a good system of central referrals but adds that similar issues exist worldwide to those in the UK.

"We do it as well as any other country and there are some really good signs that things are changing," he concludes.

Gum infection may be a risk factor for heart arrhythmia, according to new research

Periodontitis can lead to a litany of dental issues from bad breath to bleeding and lost teeth. Now, researchers at Hiroshima University have found that it could be con-

Researchers found a significant correlation between periodontitis and fibrosis, scarring to an appendage of the heart's left atrium that can lead to an irregular heart-



nected to even more severe problems elsewhere in the body - the heart.

The study, published in the January issue of *JACC: Clinical Electrophysiology* examined the relationship between periodontitis and atrial fibrosis in atrial fibrillation.

beat called atrial fibrillation, in a sample of 76 patients with cardiac disease.

"Periodontitis is associated with a long-standing inflammation, and inflammation plays a key role in atrial fibrosis progression and atrial fibrillation pathogenesis,"

said first author Shunsuke Miyachi, assistant professor with the Hiroshima University's Health Service Center. He is also affiliated with the university's Graduate School of Biomedical and Health Sciences. "We hypothesized that periodontitis exacerbates atrial fibrosis. This histological study of left atrial appendages aimed to clarify the relationship between clinical periodontitis status and degree of atrial fibrosis."

The left atrial appendages were surgically removed from the patients, and the researchers analysed the tissue to establish the correlation between the severity of the patient's atrial fibrosis and their gum disease. They found that the more significant the periodontitis, the worse the fibrosis, suggesting that the inflammation of gums may intensify inflammation and disease in the heart.

"This study provides basic evidence that periodontitis can aggravate atrial fibrosis and can be a

novel modifiable risk factor for atrial fibrillation," said corresponding author Yukiko Nakano, professor of cardiovascular medicine in Hiroshima University's Graduate School of Biomedical and Health Sciences.

According to Nakano, in addition to improving other risk factors such as weight, activity levels, tobacco and alcohol use, periodontal care could aid in comprehensive atrial fibrillation management. However, she cautioned that this study did not establish a causal relationship, meaning that while gum disease and atrial fibrosis degrees of severity appear connected, researchers have not found that one definitively leads to the other.

"Further evidence is required for establishing that periodontitis contributes to the atrial fibrosis in a causal manner and that periodontal care can alter fibrosis," Nakano said. "One of our goals is to confirm that periodontitis is a

modifiable risk factor for atrial fibrillation and to promote dental specialists' participation in comprehensive atrial fibrillation management. Periodontitis is an easy modifiable target with lower cost among known atrial fibrillation risk factors. Thus, the achievement of this study series may bring benefits for many people worldwide."

Next, the researchers said they hope to conduct future clinical trials to clarify if periodontal intervention reduces atrial fibrillation occurrence and improves patient outcomes.

School dental program prevents 80% of cavities with one-time, non-invasive treatment

A study of nearly 3,000 school children has found that silver diamine fluoride, as well as sealants, protected against cavities. The liquid brushed onto the surface of teeth was as effective against cavities as dental sealants, the current standard of care. A single dose of either topical treatment given to primary school aged children was found to prevent around 80% of cavities, and kept 50% of cavities from worsening when the children were seen two years later.

Research conducted by experts at New York University explored caries prevention in children between the ages of four and nine. The findings, published in *JAMA Network Open*, presents an efficient and cost-effective approach to improving children's oral health.

Dental cavities are the most common chronic disease in children, and children from low-income families are at higher risk than those from higher-income families. The randomised trial of 2,988 children in schools in New York City compared the effectiveness of two cavity prevention techniques: A 'simple' treatment using silver diamine fluoride (SDF) and fluoride varnish, and a (complex) treatment using traditional glass ionomer sealants and fluoride var-

nish. Both are non-invasive and applied to the surface of teeth to prevent and arrest cavities in children, but for the same time and cost, dental professionals can treat more children with the simpler SDF therapy.

Upon visiting each school, the clinical research team, which included a supervising dentist, dental hygienists, registered nurses, and assistants, did baseline exams to measure any tooth decay, and then applied fluoride varnish and either sealants or SDF, depending on whether the school was assigned to receive the complex or simple treatment.

The researchers found that both the simple and complex treatments were successful. Just one cavity prevention treatment prevented more than 80% of cavities (81% for SDF and 82% for sealants) and stopped half of cavities from

progressing (56% for SDF and 46% for sealants).

"Without prevention, dental cavities grow continuously if not treated. One cavity prevention

treatment was remarkably effective over the following two-year period," said Richard Niederman, DMD, professor in the Department of Epidemiology & Health Promotion at NYU College of Dentistry,

co-principal investigator and the study's senior author. "I know of no other dental preventive intervention that had this great a beneficial impact across the pandemic."



School dental programme prevents 80% of cavities with one-time, non-invasive treatment.

Dental 3D-printing market is expected to grow an average of 12% per year

The growth of dental diseases and increased demand for dental treatments is correlated with the rise of the dental 3D-printing market, according to a new report. Between 2023 and 2035, 3D printing in dentistry is expected to grow an average of 12.6% per year over the 12-year period. The prosthodontics sector currently accounts for the largest share in global dental 3D printing, with 55% of the market share.

3D printing is an attractive solution to challenges faced by the dental industry, producing high quality and more accurate products, from crowns to implants. The process may save time and money for both patient and dentist, while the digitalised process could also allow for highly customisable products, offering a more precise and accurate solutions for even the most complex treatments.

The global growing incidence of dental caries has led to experts utilising the technology to prevent tooth decay. Dental caries currently affects 92% of the adult population, with global annual management and treatment costing over US\$300 billion, according to the World Health Organization.

A new study carried out by researchers at the Institute of Phar-

maceutical Sciences at ETH Zurich examined the use of 3D printing of a controlled urea delivery device for the prevention of tooth decay. Currently, caries prevention relies on topical formulations containing fluoride. Experts at the Institute of Pharmaceutical Sciences suggest these effective fluoride treatments may not be sufficient in high-risk individuals, leading to the exploration of alternative strategies—

such as the neutralisation of acid in the oral cavity. The study, published in the *International Journal of Pharmaceutics* fabricated 3D-printed personalised dental trays with a local and prolonged release of urea. The buffering capacity of urea in the printed object was investigated *in vitro* in the presence of *Streptococcus salivarius*, a common urease-producing bacteria from the oral cavity. Researchers demon-



The dental 3D printing market is expected to grow an average of 12% per year, as studies show 3D printing can be used to prevent tooth decay.

strated that urea can be incorporated in a 3D-printed dental tray, with the delivery controlled to certain parts of the dental tray. Importantly, the study suggests it is possible to unidirectionally release urea towards the enamel, with the ability to achieve high local concentrations. This may potentially improve the efficacy of the anti-cariogenic loaded agent. What's more, the study showed a reduced acidification of saliva by

carbohydrates in the presence of urea-loaded 3D-printed tooth caps. Dental 3D printers can also produce highly accurate restorations, from various materials including resins, plastics and ceramics. A new study conducted by the dual Departments of Prosthodontics and Orthodontics at Heidelberg University Hospital observed the fit of anterior zirconia veneers made by either 3D printing or milling. The study, published in the March 2023 issue of the *Journal of Dentistry*, found that the fit of 3D-printed ceramic anterior restorations meets clinical standards. In addition, 3D printing is associated with a greater geometrical freedom than milling, and allows for tighter adaption even after minimally invasive preparation.

Currently, North America captures 45% of the global 3D-printing market, while a third of the industry is conducted in Europe. However, researchers are predicting the Asia-Pacific region is likely to grow at the fastest pace over the next 12 years.

Gingival stiffness is biological and can lead to more infections, according to new study

Researchers have discovered that softer gums hinder the development of gingiva fibroblasts. A group of scientists from Tohoku University have discovered that the gingiva stiffness influences the properties of gingival fibroblasts, which in turn affects whether inflammation is likely to occur and make gingival fibers difficult to form.

Their findings were published in the journal *Scientific Reports*. "We discovered that soft gingiva results in inflammation and hinders the development of gingival fibres," says associate professor Masahiro Yamada from Tohoku University's Graduate School of Dentistry.

It has long been known that individuals with thick or stiff gingiva are less susceptible to gingival recessions. Many factors can lead to gingival recession, such as gum disease, over-brushing, and chewing tobacco. But this is the first time that gingival stiffness has

been attributed to biological reactions.

Although fibroblasts play an important role in the maintenance, repair and healing of the gingiva, they also produce various inflammatory and tissue-degrading biomolecules which degrade the gingival fibres. In addition, fibroblasts are associated with immune responses to pathogens.

Yamada, along with his colleague Prof. Hiroshi Egusa, also from the Tohoku University's Graduate School of Dentistry, created an artificial culture environment that simulated soft or hard gingiva and cultured human gingival fibroblasts on them. They discovered that hard gingiva-simulated stiffness activated an intracellular anti-inflammatory system in the gingival fibroblasts that prevented inflammation. Yet, soft gingiva-simulated stiffness suppressed the fibroblastic anti-inflammatory system. This increased the likeli-



A new study from Japan has shown that gingival stiffness is biological, and can lead to more infections.

hood of inflammation and resulted in less collagen synthesis.

"Our research is the first to demonstrate the biological mechanisms

at play in regard to a patient's gingival properties," adds Yamada. "The results are expected to accelerate the development of advanced biomaterials to control

local inflammation or microdevices that simulate the microenvironment of inflammatory conditions."

Global paediatric oral care industry is expected to grow 7% by 2033

The global paediatric oral care market is currently estimated to be worth US\$9 billion (GB£7.24 billion). A global Research and Markets report shares that the market size is expected to reach US\$15.5 billion in 10 years' time, a 6.9% growth. Researchers attribute the growth to the compounding issues of tooth decay, cavities and dental diseases - leading to a surge in demand for paediatric oral care products.

With a growing global demand for paediatric oral healthcare, there is opportunity for dental professionals to engage, educate and care for a younger population. There has been an increase in demand for new oral care products aimed at children, such as flavoured toothpastes and baby tongue cleaners. These novel products, which also include cavity protection toothpastes and car-

toon-themed mouthwashes has boosted the growth of the children's oral health market. The majority of these products are bought in supermarkets - over 35% revenue share in 2021. Supermarket dominance is attributed to easy availability of products and the large number of oral care products in one place, which the consumer can compare before purchasing. However, online retail growth for dental products is expected to register the fastest growth by 2033.

The Asia Pacific region has accounted for the largest market share, of over 35%. Experts at Research and Markets suggest this is due to the increasing prevalence of oral diseases in countries such as India, China and Japan. Oral diseases remain the most prevalent disease group in India over the last 30 years, which may be associated



with a high population consuming tobacco and tobacco products, alongside unhealthy eating habits. However, there is rising awareness amongst the general population in Asia Pacific countries regarding using paediatric oral care products, which may be attributed to the

market growth. Amongst a global population, toothpaste is the most widely purchased oral health product, with a share of over 30%. It may come as no surprise therefore that key companies in the global paediatric oral care market include Colgate-Palmolive

Company, Johnson & Johnson, Church & Dwight, Unilever, Procter & Gamble, Pigeon Corporation, Anchor Group and Amway.

Dentists who invest

How to leverage your value to your best advantage

When Dr James Martin badly injured his knee playing football, little did he know it would lead to a new career and a Facebook group with some 9,600 members and counting.

The accident, and subsequent surgery, happened in 2019, forcing James to take a hiatus from dentistry, giving him time to focus on what had until then been a hobby—money and investments. Then the pandemic struck, so with time on his hands, James created

Today, James focuses on two key ways of helping dentists: Mentoring them to leverage their time spent in practice to make more money—potentially in less time, and helping them to create strategies for growing their wealth in the longer term.

He explains that the dental profession is demanding—particularly for those running their own practice. This means that dentists are left with very little capacity or 'bandwidth' for

Earn more, don't work more

James believes dentists generally do want to understand how to manage their time more effectively while maintaining, or even increasing, their income but just don't know how.

"The trick is to understand the concept of leverage. The next step is to understand how we can apply this to our lives. This means we can earn more and also have more time to do the things that make us happy," he says, adding: "If you ask people (how can you earn more money), most will say, 'maybe I could work another day a week'. That works, but there's only seven days in a week and you can't ask for eight days. So the trick is to get more out of each day to increase wealth without necessarily working more - the leverage in a system is how much your input is multiplied by in order to obtain the output. Lots of dentists want to do less dentistry but feel like they're trapped because they don't necessarily have an understanding of how to make the same or more money but in less time."

James highlights the importance of dentists properly gauging how happy they are with their career and work/life balance. "Unlike most other jobs that you leave if you don't enjoy, dentistry takes you five years of studying to reach that understanding, which is pretty unique. Many dentists then think that now they've come this far, they have to keep going. Of

course, it's not that black and white. I'm not saying just drop dentistry but there has to be a sweet spot." He asks his clients to consider how happy they are on a scale of one to 10. If they score 10, then nothing needs to change; instead, he can help them with an investment strategy that will grow their earnings for the future when they retire.

However, if it's nine out of 10 or less, James believes they're still making compromises when it comes to their life satisfaction and that's when they should consider how they can continue to earn the same money but working fewer days per week.

Leverage your value

He stresses that dentists are in the perfect position to increase their earnings from the services they already offer because dentistry is value driven, rather than price driven. "People will pay more when they get a better service, particularly when it comes to their teeth. For instance, if you have a procedure done on your teeth that removes enamel, it is irreversible; it needs to be done correctly the first time. That means when someone is very good at their job, their value is exponential. The more value you give to someone, the more you are within your rights to ask for a greater amount of value in return.

"That sounds like a really simple theory, but the number of people who actually practice that and are

ready to implement that mentality is very small because dentists are human too; they have the belief that the best way to help someone is to charge them the least amount money, which makes no sense whatsoever. If you went to a hairdresser and they shaved your head for £5, would you feel they'd done you a favour? No, you'd actually be more grateful to the person who charged five times that price, who did a good job."

Instead, James advises his dentist clients to let their decisions to be guided by what they truly believe to be the most suitable treatment for the longevity and health of that tooth. He believes this leads to more profitable dentistry for two reasons: The first is that patients will be happier, more likely to return and to recommend the practice to friends and family; the other is that the best treatment is likely to be one at a slightly higher investment. "That's something dentists are scared of - pitching to somebody that think might be offended that the investment is more," he says.

James concludes that figuring out how to get more out of each hour of practice, to the point of earning the same in four days compared to five or even six days, will enhance someone's life tenfold: "Because now they have their optimum relationship with dentistry. Not in 30 years when they retire, but today."



Dentists who Invest in recognition that there was great scope to help dentists improve their financial literacy, in turn empowering them to make better financial choices.

anything else. "The 5% that's left over is either spent in downtime—with friends and family, or just trying to recover," he says.