Hundreds of complaints against Singapore dentists in 2017

By DTI

SINGAPORE: Despite the high quality of dental work being performed throughout Singapore, there are still occasions when standards are not met. According to the Singapore Dental Association, 270 complaints were lodged against dental practitioners in 2017, including performing of procedures outside of the dentist’s scope, long waiting times, overcharging and dissatisfaction with treatment outcomes.

In a recent report with Channel NewsAsia, Singapore Dental Association President Dr Lim Lii said: “The complaints were mainly due to misunderstanding on both the part of the patient and dentist about the treatment rendered.”

“Due to a lack of proper communication, patients may not fully comprehend the advice like the limitations of treatment procedures given by the dentists. Similarly, the patients may not have adequately expressed their expectations to the dentists, resulting in apparent unmet expectations from the treatment,” she continued.

With misunderstandings often leading to lodging of complaints, some Singapore-based dental professionals believe the problem concerns the lack of awareness of the general public regarding dentistry and dental services provided by various types of dentists. Dr Elaine Tan, a consultant in clinical orthodontics at the National Dental Centre of Singapore, told Channel NewsAsia: “I think people have been thinking that all dentists are the same and that their job is just to extract or fill teeth. But in dentistry, we have different specialties.”

Complaints were mainly due to misunderstanding on both the part of the patient and dentist about the treatment rendered, SDA President Dr Lim Lii said.

There are no current restrictions in Singapore on the treatment dentists are allowed to provide, but dentists are expected to practise within their competencies and encouraged by the Singapore Dental Council to refer patients appropriately according to the body’s ethical guidelines. It is also illegal for a dentist to state that he or she is a specialist in a particular field if not registered in that field with the Singapore Dental Council.

In a move to help combat misunderstandings between patients and dentists and to minimise complaints lodged, the National Dental Centre of Singapore will be initiating a new awareness campaign. Aimed at informing the wider public about oral health and dentistry in general as well as the provision of dental services, the campaign is set to be launched in March.

Cavitating jets may provide easier removal of oral biofilm

By DTI

SENDAI, Japan: Just like natural teeth, dental implants require proper care and oral hygiene to prevent disease. In a recent study, Japanese researchers looking for better ways for dentists to remove plaque from implant fixtures compared the effects of a cavitating jet with the standardly used water jet. They found that the cavitating jet removed biofilm from the rough surface of an implant fixture more effectively.

Prof. Hitoshi Soyama from Tohoku University and his team compared the cleaning ability of a cavitating jet to that of a water jet. With the former, high-speed fluid is injected by a nozzle through water to create minuscule bubbles of vapour. When these bubbles collapse, they produce strong shock waves with sufficient force to remove surface contaminants.

To test the two different jets, four volunteers performed oral care for three days to allow biofilm to develop in their mouths. Their fixtures were then cleaned using both methods, and the researchers measured the amount of plaque remaining at several time intervals.

While there was little difference between the amounts of plaque removed by both methods, the researchers used a certain type of nozzle to create the cavitation bubbles. (© Hitoshi Soyama/Tohoku University)
By DTI

CANBERRA, Australia: A senate committee report recommending the passage of legislation that changes the way the Therapeutic Goods Administration (TGA) regulates medicines and medical devices has been welcomed by the Australian Dental Industry Association (ADIA). It delivers a long-standing legislative reform that ADIA has been lobbying politicians of all political persuasions to undertake for nearly a decade.

“The bill contains important reforms that will cut the red tape associated with introducing into the Australian market new and innovative patient treatment and diagnostic options,” said ADIA CEO Troy Williams.

“This legislation, combined with the legislative changes made last year that ADIA also secured, from past practice where only the TGA could perform such evaluations.

“This legislation, combined with the legislative changes made last year that ADIA also secured, from past practice where only the TGA could perform such evaluations.

Williams went on to say that ADIA has been pushing for the changes because they create a regulatory framework for dental products that is based on a risk management approach designed to ensure public health and safety. He added that the reforms will simultaneously free the dental industry from any unnecessary regulatory burden.

The legislation is said to create a far more efficient system for dental manufacturers to introduce new products to the Australian market. The bill will reportedly also make changes that support amendments to the Therapeutic Goods Act 1989 made in 2017. The reforms will allow the TGA to authorise Australian companies to undertake conformity assessments, a significant departure that will create a far more efficient system for dental product manufacturers to introduce new products to the Australian market. Whereas previously the TGA was the sole source of authority, the increasing use of overseas regulators and third-party Australian conformity assessment bodies will provide alternate non-compromising patient safety,” said Williams.

In the December issue of the Implant Dentistry journal,

“Conventional methods cannot clean plaques on the surface of dental implants very well, so this new method could give dentists a new tool to better manage these fixtures which are becoming more common,” said Soyama.

Previous research has shown that water flow exerts shear stress to remove biofilm. In addition to this shear effect, the cavitating jet produces considerable force when the bubbles collapse: allowing the removal of biofilm particles. The researchers suggested that the two processes work in synergy to make the cavitating jet superior to the water jet when cleaning plaque off the irregular surface of dental implants. The study, titled “Removal of oral biofilm on an implant fixture by a cavitating jet,” was published in the December issue of the Implant Dentistry journal.
Presentations, lectures and workshops all set to feature at IDEM 2018

By DTI

SINGAPORE: The 2018 International Dental Exhibition and Meeting (IDEM) Singapore will be held from 13 to 15 April. With lectures presented by dentists, educators and researchers from around the globe, as well as presentations on contemporary clinical advancements, the tenth edition is poised to be as well received as that of previous years.

Furthermore, in addition to the main conference, a number of workshops will be held. According to the IDEM organisers, the workshops will seek to widen attendees’ understanding and knowledge on particular topics. One such workshop will be held by Dr Galip Gürel. Based in Istanbul in Turkey, Gürel runs a six-chair practice with an in-house laboratory and presents across the globe. In a preceding session of lectures on 14 April, he will take participants through the process of a personalised smile design, detailing how the concept of Visagismile can be applied to achieve harmony between the patient’s personality and the final smile. The session will begin by detailing the importance of communication when applying a digital workflow, then move on to discussing the importance of a mock-up. Additionally, Gürel will touch on the soft tissue, implants and veneers. The lectures will also explain the differences between applying the 2-D Visagismile concept and using the 3-D REBEL program for smile design.

In the workshop on 15 April that leads on from Gürel’s lectures, participants will have the opportunity to see the importance of the mock-up by creating one of their own based on the Visagismile concept. They will perform the entire process, including digital intraoral impression taking, creating the 3-D design in REBEL and 3-D printing in digital wax. In participating in the entire process, attendees will learn how to prepare teeth in a minimally invasive way through the aesthetic pre-evaluative temporaries.

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More information on IDEM and the workshops can be obtained at the official event website www.idem-singapore.com.
Study shows positive influence on dental caries using a multilevel approach

By DTI

SAN FRANCISCO, US: According to a new study, a multilevel approach that includes a dental caries risk assessment, aggressive preventive measures and conservative restorations can dramatically reduce caries incidence. The findings, which support earlier research demonstrating positive results of the assessment and treatment method in a university setting, show that the protocol has the potential to transform dental care for high-risk patients.

“We put the 2012 UCSF [Caries Management by Risk Assessment] clinical study into the real world and showed it works,” said lead author Dr. Peter Rechmann, Professor of Preventive and Restorative Dental Sciences at the University of California, San Francisco (UCSF) School of Dentistry. “The patients at high caries risk who used prescription products went down significantly over time in their risk level. Those in the control group also reduced their risk to a lesser degree, simply by using over-the-counter products that also protect teeth and affect the bacteria.”

Caries Management by Risk Assessment (CAMBRA) is a method that was originally developed in 2003 by a team led by the Dean of the UCSF School of Dentistry Prof. John Featherstone. The method adopts a multilevel approach in which dentists collect patients’ dental and medical histories, conduct clinical examinations to assess caries, and utilise behavioural approaches and chemical treatments to optimise protective factors.

For their two-year study, Rechmann and his colleagues recruited 30 dentists to take part, 18 from private practices and three from community clinics. The study involved 460 patients aged between 12 and 65, split into two groups: the CAMBRA group and control group, with 239 and 221 participants, respectively. In the CAMBRA group, high-risk patients received prescription fluoride toothpaste, a chlorhexidine antibacterial rinse, xylitol mints and a fluoride varnish. The control group received regular fluoride toothpaste, an assumed inactive mouthrinse, sorbitol candies and a nonfluoride varnish.

In follow-up visits at six, 12, 18 and 24 months, new carious lesions or changes in caries risk level were recorded. According to the results, a significantly greater percentage of high-risk participants were classified as lower risk after receiving CAMBRA preventive therapies. Dental caries was low in both groups.

Among 242 patients (93 intervention, 99 control) initially identified as high risk for caries, only a quarter of the patients remained at high risk in the CAMBRA group at 24 months, and just over half (54 per cent) in the control group. Of the 192 low-risk participants (91 intervention, 91 control), most participants remained low risk. The researchers believe this points to the assessment correctly identifying those at risk for caries.

The study, titled “Changes in caries risk in a practice-based randomized controlled trial,” was published in the February issue of the Advances in Dental Research journal.
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WORLD NEWS

By DTI

LONDON, UK: Together with dental caries and periodontal disease, dental erosion ranks among the top three most prevalent dental conditions. According to a review paper by researchers in London, the reason some people suffer more from erosive tooth wear than others depends not only on their diet, but also on how they consume acidic beverages and foods.

The researchers, from King’s College London Dental Institute, aimed to identify how different behaviours increased the risk of developing severe tooth erosion. Their research drew on a previous study at Guy’s Hospital in London that compared the diet of 300 people with severe erosive tooth wear and of 300 people without.

The Dental Institute researchers found that those most affected were not those that simply consumed acidic drinks or food, but those who did so between meals. People who drank acidic drinks like soft drinks or fruit-flavoured teas twice a day were 11 times more likely to have moderate or severe erosion compared with those who did not.

Among the groups with high potential for tooth erosion are wine drinkers, long-distance drivers and video gamers, all of whom continually expose their teeth to acidic drinks by swishing or rinsing the liquid around or holding it in their mouths, the researchers said.

“It is well known that an acidic diet is associated with erosive tooth wear; however, our study has shown the impact of the way in which acidic food and drinks are consumed,” said lead author of the study Dr Saoirse O’Toole, clinical lecturer in prosthodontics.

She continued that, with the prevalence of erosive tooth wear increasing, the preventable aspects, such as reducing dietary acid intake for the purpose of delaying progression of tooth erosion, have to be addressed. The risk from soft drinks, for example, can be halved when such beverages are consumed during meals.

“While behaviour change can be difficult to achieve, specific, targeted behavioural interventions may prove successful,” O’Toole added.

In countries like the UK, currently over 30 per cent of adults are estimated to suffer from tooth erosion, which can lead to severe loss of enamel and dentine over time.

The study, titled “The role of the diet in tooth wear”, was published online in the British Dental Journal on 23 February 2018.
New W&H image campaign to support everyday heroes

By DTI

With its new image campaign “From a patient to a fan”, W&H is directing the spotlight on dentists and dental professionals. These everyday heroes ensure their patients are in safe and reliable hands in every treatment situation. They always show great dedication to their work and continuously manage to put a smile on their patients’ faces, simply because they care. Even the smallest of their patients’ difficulties is a major concern. That is why they are always gaining new “fans” and succeed again in making their patients happy.

The new W&H image campaign gives these heroes the recognition they deserve. With a perfect balance of know-how, empathy and technology, they can achieve optimal results. W&H supports the practice team with its daily tasks and is a cornerstone of its success with its innovative product portfolio.

“The daily challenges faced by the practice team are our motivation. As a solutions provider, our products help ensure that the workflow in the dental practice is as smooth as possible,” states W&H Managing Director Peter Malata. “With innovative dental technology that is ideally suited to the users’ needs, the team can give their full and undivided attention to what really matters: the patient. We play an important role in our customers’ success and assist them in turning patients into fans.”

The new campaign aims to portray W&H in an eye-catching manner and differentiate it from the competition, all with the customary twinkle in the eye. In the eyes of their patients, dentists become Dr Phil Good, Dr X. Pert or Dr Sue Perstar, and thus the living embodiment of well-being, expertise, innovative spirit and trust. The result is a modern, internationally adaptable campaign format with emotive images from dental practice. A striking nameplate has been developed as an overarching key visual, clearly communicating the respective names such as Dr Phil Good or Dr X. Pert.

“With innovative dental technology, they can achieve optimal results. W&H supports the practice team with its daily tasks and is a cornerstone of its success with its innovative product portfolio.”

“The new W&H image campaign gives these heroes the recognition they deserve. With a perfect balance of know-how, empathy and technology, they can achieve optimal results. W&H supports the practice team with its daily tasks and is a cornerstone of its success with its innovative product portfolio.”

“The new W&H image campaign was launched across all W&H media channels beginning March 2018.”

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The new W&H image campaign was launched across all W&H media channels beginning March 2018.

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A whole new dimension of imaging precision

By Julia Maciejek, DTI

Albrecht Reither, the Milan factory manager. He explained that, by changing the factory’s layout and the flow of materials, new workflow processes were established. The manufacturing plant is continuously expanding, and with additional operators, it is able to meet the demands of the market.

“In this factory, we use the Kanban approach principle, which means that we produce on stock, but finalise the product based on order. This way, we can balance demand with available capacity,” added Reither.

Moreover, ACTEON applies significant quality controls during all processes, from the assembly of the core of the machine to final testing, which includes checking of the components and the configuration of the workstation. According to the factory manager, this procedure has been streamlined significantly in comparison to last year. Reither showed us a large number of testing cabinets containing devices being checked. With complete concentration, employees in front of computers verify the correctness of every step before the X-Mind truim units are distributed. It is in this context that a large quantity of X-Mind truim devices are manufactured, tested and shipped each week.

“We have an excellent product quality. We want to ensure a high-quality standard, so employees take turns at the workstations. We also want to make sure that each employee knows and understands all the processes leading up to the finalisation of the product, establishing an appreciation of the importance of each step in the assembly. We further want our employees to respect ACTEON’s standard of quality. This follows the two steps of the quality control: (1) checking that all cables and parts are well assembled, and (2) testing the machine’s functionality in the testing cabinets. Our quality manager also inspects the components when they are sent to us and before we put them into stock. No parts are assembled externally. A mix of components, cables, mechanical parts, motors and sensors are assembled by hand. That is also part of our quality management,” Reither detailed.

“X-Mind trium combines CBCT, panoramic and cephalometric imaging, which is why it is called a three-in-one device,” explained Claudio Giani, director of imaging research and development at the Milan site. He demonstrated that CBCT imaging is accomplished using a rotating gantry with a fixed X-ray source and a detector. Giani told us that, during the rotation, multiple sequential projection images, ranging from 150 to 450, are acquired to complete the arc. This procedure varies from a conventional medical CT scan, which uses a fan-shaped X-ray beam in a helical progression to acquire individual image slices of the field of view (FOV) and then stacks the slices to obtain a 3-D representation.

When we first approached X-Mind trium, we noticed right away the distinctive ergonomics of the radiographic unit. The device has an extremely short U-arm, which moves around the patient during the image acquisition phase. This is supported by the patented kinematics and collimation and aids comfortable positioning of the patient’s jaw. The entire system is designed with ergonomic efficiency in mind and takes up very little space in the practice room.

With a secondary collimator (X-ray tube assembly) installed, the patient is not exposed to additional radiation, and with additonal collimator movements.

Smart images

Excellent image quality is essential for treatment planning and diagnosis. In CBCT, exposure is incorporated in the FOV. This means that only one rotational sequence of the gantry is necessary to acquire enough data for image reconstruction. “In implantology, a CBCT image is indispensable for planning simulation and determining the exact nerve location. With only one image, the entire dental arch can be visualised, which allows for optimal diagnostic planning possibilities. X-Mind trium has a range of FOV options displayed in detail and without movement artefacts. He emphasised that the exposure time is very low and the reconstruction time is three seconds. We saw that, with a cephalometric image, the entire maxillofacial area is shown, making it highly suitable for oral and maxillofacial surgeons. Furthermore, it has a small voxel size of only 75 μm and a fast reconstruction time of 29 seconds. X-Mind trium can be equipped with one or two sensors for an efficient workflow.

With ACTEON’s expertise in medical imaging, a dedicated analytical algorithm has been implemented for X-Mind truim. “We have achieved exceptional results, which are able to provide advanced clinical indicators that will be helpful for practitioners in the future,” stated Giani proudly. “The analytical algorithms have been developed in terms of the graphics processing unit (GPU) and a specific type of GPU is installed inside the workstation of X-Mind truim when the CBCT function is configured,” explained Giani.

This algorithm is used to determine the apparent image definition and bone density to facilitate clinical decision-making. The filters ensure detailed recording of the image acquisition by low-noise microstepping motors.

Low radiation dose

With X-Mind trium, high radiation exposure is a thing of the past. The low-radiation protocol decreases the required amount of X-ray emissions by a third using the algebraic reconstruction technique. This means that the radiation dose for the patient can be reduced by 50 to 70 per cent. This low-dose imaging guarantees a maximum FOV with minimal radiation exposure to the patient. “This is essential because we do not care only about good images but also about the well-being of the patients,” stated Reither. Furthermore, the software of X-Mind trium monitors radia-
tion and ensures that the levels of exposure are kept low.

User-friendly software

Computer scientists would say the software is as important as the hardware. ACTEON provides intuitive and ergonomic imaging software that has all the required functions—scanning, measuring, editing, commenting. In the factory cellar, Reither explained the special features of the ACTEON Imaging Suite software and stated that it can be linked to most practice management software and all ACTEON imaging products, such as the X-Mind trium, CBCT and panoramic devices, and intraoral scanners. It is compatible with both macOS (and soon iOS) and Windows and has a TWAIN driver for full compatibility with all imaging software. This gives practitioners the ability to move around and interact directly with their patients.

The radiographic unit is in continual operation at most dental practices. It is clearly imperative then to ensure that dental professionals have the skills to adequately handle the devices and take high-quality images with the correct settings. "The user-friendly software enables the customer to either use the workstation provided or use their own. However, with the workstation provided, our professional and efficient team of service technicians can perform remote connections to solve problems of configuration or calibration. We want our customers to choose the software option that is best for them," explained Reither.

Safe surgery

X-Mind trium offers extraordinary functionality in the field of implantology, making it suitable for more demanding treatments. Misleading or insufficient information obtained from a radiograph can lead to the loss of an implant, one of the worst scenarios for both the patient and the dentist. "In pre-implant procedures, accurate measurements of the bone density and volume are essential to guarantee a higher success rate in implantology. The 3-D capability of X-Mind trium also facilitates safer osseointegration," said Giani. Clinical decision-making has seemingly become easier than ever with X-Mind trium.

Certainly, our tour would not have been complete without a look at ACTEON’s well-known Piezotome ultrasonic brand. Thousands of dentists worldwide have adopted the company’s celebrated Piezotome devices as their choice for pre-implant surgery, with Piezotome Cube representing ACTEON’s new standard. It is a powerful ultrasonic device with a rotary motor, as well as a handpiece and a tip, ensuring optimum performance. Leading oral surgeon and implantologist Dr Angelo Troedhan successfully uses Piezotome Cube in his everyday treatment procedures. "The Pie-
“Good oral health is for life, not just for World Oral Health Day”

An interview with FDI President Dr Kathryn Kell and Philips CEO of Business Group Health and Wellness Sinéad Kwant

Since 2016, the FDI World Dental Federation and oral health product manufacturer Philips have been partnering to promote World Oral Health Day on 20 March. In this interview, Dental Tribune International (DTI) speaks to FDI President Dr Kathryn Kell and Philips CEO of Business Group Health and Wellness Sinéad Kwant about the significance of this day, challenges in improving oral health globally and how the collaboration between the two organisations can help.

DTI: In your opinion, is oral health improving?

Kwant: Since 2016, the FDI World Dental Federation and oral health product manufacturer Philips have been partnering to promote World Oral Health Day on 20 March. In this interview, Dental Tribune International (DTI) speaks to FDI President Dr Kathryn Kell and Philips CEO of Business Group Health and Wellness Sinéad Kwant about the significance of this day, challenges in improving oral health globally and how the collaboration between the two organisations can help.

Kell: The global burden of oral disease remains significant and widespread, most people will be affected in their lifetime. The message that good oral health is an essential part of overall health and quality of life is still not fully embraced everywhere, and individuals across the globe continue to suffer from poor oral health. Oral health promotion, as well as prevention and control of oral disease, is key to ensure that people around the world are prioritising their oral health. As the authoritative voice of dentistry, it is our responsibility to step up to the challenges and drive the fight against oral disease to ensure that we are fulfilling our vision of leading the world to optimal oral health.

Kwant: While there is a growing trend for people to integrate technology into their lifestyle to improve their health and well-being, such as using apps to track diet and fitness or oral health goals, there remain larger global issues that impact oral health. While people in the developed world live longer, increasingly sedentary lifestyles have led to a rise in chronic diseases, including obesity and diabetes. These in turn have significant implications for oral health. With almost four billion people worldwide affected by oral disease, it is our job to raise awareness of and educate people on the link between oral health and overall health and encourage them to develop healthy habits that last a lifetime.

In your opinion, what are the main risks or barriers to people not focusing on oral health?

Kell: Oral health is affected by a wide range of social determinants that can impact access to care. Lack of education is a key concern, however, remains a barrier to people maintaining good oral health. Therefore, we work hard to raise awareness of the importance of oral health and educate people on the intrinsic link between oral health and general health. We advocate preventative care, early detection and treatment to encourage people to adopt good oral hygiene habits and follow the advice of oral health professionals on how they understand the impact of oral disease on their overall health and well-being.

Kwant: One of the main barriers to people focusing on their oral health is education and awareness about the importance of good oral health habits and the impact on overall health. Another reason is that many people do not visit their dentist or hygienist regularly and discuss their oral health. They go when there is something wrong, rather than practicing preventative care. Working with the FDI, we hope to raise awareness of the importance of building good oral health care routines and encourage people to visit their dental professional and, importantly, to follow his or her advice and maintain good routines between visits.

What do you hope your World Oral Health Day campaign will achieve?

Kell: This World Oral Health Day, we hope that people will embrace the campaign theme of “Say ahh: Think mouth, think health.” We want people to make the connection between their oral health and the risk of oral disease and vice versa. Oral disease can impact every aspect of life, including personal relationships and self-confidence, school and job performance, and even enjoying food. Maintaining a healthy mouth contributes to a lifetime of well-being and helps people live a better quality of life into old age.

Kwant: We believe that we will see a move to more preventative care owing to the rise of digitally connected technology. This also has the potential of transforming the relationship between the patient and dental professional by introducing the ability to share brushing results or work towards goals. This will change the way dental professionals communicate with their patients and hopefully improve patient compliance between visits.

What does your partnership with dental professionals help to improve oral health globally?

Kell: Dental professionals are the principal providers of oral disease prevention and treatment and play an indispensable role in working to improve oral health around the world. They must take every opportunity to serve as global ambassadors for health and encourage patients to live healthy lifestyles in their daily practice. Education leads to action and action fuels change. It is up to our profession to step up to the challenges and take action against the burden of oral disease.

Kwant: Oral health and general health have a close two-way relationship. The mouth is a mirror of the body and offers clues about the status of overall health. Many general health conditions increase the risk of oral disease and vice versa. Oral disease can impact every aspect of life, including personal relationships and self-confidence, school and job performance, and even enjoying food. Maintaining a healthy mouth contributes to a lifetime of well-being and helps people live a better quality of life into old age.

Kwant: We are continuing to explore the link between oral health and systemic health, but we know that it has an important effect on overall health and wellness. A well-documented example of this is the link between diabetes and oral health. Diabetes affects hundreds of millions of people worldwide, and the difference good oral health care can make to the overall health of those with the condition can be significant. Taking care of one’s mouth can have an important longer-term influence on overall health and wellness.

If you could give one tip or piece of advice about oral health, what would it be?

Kell: It is never too early or too late to start looking after your mouth, your body will thank you! Adopting good oral hygiene habits, having a healthy diet that is low in sugar, quitting tobacco use, keeping away from excessive alcohol consumption, and having regular dental check-ups help protect the mouth and body at all ages.

Kwant: I would recommend visiting the dental professional, especially from a young age. I would like to encourage people to visit their dental professional or hygienist regularly and to follow his or her advice. We all must act now, together, to prevent the spread of oral disease and to protect our patients.”

Thank you both for the interview.
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Cracking the code of fractured teeth

By Aws Alani, UK

The need for an endodontic skill set within the profession is higher than it has ever been. Culturally and socially, there have been significant changes in patient perception to the news that a tooth is in trouble, where the solution is either root canal treatment or removal. I am old enough to have treated patients who needed the replacement of complete dentures that were a “wedding gift” in their youth. As a gesture of goodwill to the bride in waiting, wholesale extractions and the provision of complete dentures were gifted to ensure the absence of dental problems or expense throughout their new found love.

How things have changed. Patients can now attend seemingly endless repairs, solitarily incidentals of biting down on something unexpectedly hard, such as an olive stone, are also common. Such catastrophic incidences may be more common in undermined, weakened heavily restored teeth. The prevalence increases in patients who are middle-aged and is greater in females than males, with the overwhelming majority affecting posterior teeth. The fate of such teeth varies from simple repair of a bobbled cusp to the need for endodontics and extraction. One interesting feature in the literature seems to point to teeth with steeper cuspal inclines being more susceptible to fracture. This morphological feature is likely to result in the wedging effect of deep cusp–fossa relationships between teeth. Frequently first molars have been implicated as common teeth to fracture owing to their closeness to the masticator muscle and the temporomandibular joint hinge. When loss of vitality is considered and root canal treatment is delivered, protecting what remains to prevent crack formation seems to be the consensus through cuspal coverage. This apparent susceptibility may be caused by a weakened tooth, but may also be due to the loss of proprioceptive feedback that the now-removed pulp once provided on occluding.

Cracked teeth provide patients with an odd experience. The pain is brought on when they eat a Snickers with their coffee on a Tuesday morning (between 7.30 and 7.32 a.m.), chewing from side to side, and on the fifth stroke of their mandible from left to right they get a shooting pain. Forget simple hot and cold sensation; the pain can be brought on by things that the patient likes eating the most. It looks the same as every other asymptomatic amalgam you have ever placed during your career, your thumbprint is uncanny. As your senses have been sparked, the eye of faith takes over: there is a bit of faceting on the cusps, there are some craze lines, the patient does tend to wear her restorations. “It’s cracked, the tooth is cracked.” Your patient creeks their neck up to look at you more intensely: “Can you fix it?” You see our patients, as much as we do, are perplexed by cracked teeth. The tooth looks “normal”, feels “normal” outside of the occasional painful episode, why can it not be “mended” or “stuck together again” like some old china vase?

The diagnostic conundrum is over. Balance, you know what the problem is, as does the patient now, despite being fairly unconvinced with your antics. The next riddle is how to treat, if at all. Although you cannot be 100 per cent sure that there is a crack, it might not propagate, it may stay the “same” and the patient may not need any treatment as long as he avoids the tooth. What about their Snickers though?

Some patients may accept this. Generally, patients are in two camps with whatever diagnosis we provide them with. Some are proactive “Right there’s a crack, you can’t mend it. Let’s whip it out—I’ve still got another six teeth in my top jaw I can chew on, no worries”, while others are reactive “You know, let’s just sit on it and if it gives me a problem, then I’ll come back”, to which you may reply it could catastrophically snap or fracture. The alternative, and the evidence for this is fairly light on the ground at the current time, is to instigate strategies to reduce the likelihood that the tooth will become more symptomatic—in other words, you want to brace the crack. Similar to my uncle’s wrinkly belt and his ever expanding waistline, you can hear the leather strain as he tucks into his pie. What did we get taught? Use a copper band or an orthodontic band, both of which may be difficult to source in primary care. Or we could crown the tooth and risk it going pulpitis. I imagine that to be so humbling. Having fitted the
A dental nurse in a specialist setting complained of toothache all of a sudden with no prior warning or premonition. The pain was excruciating, it was visible on her face. Her expression was one of despair and fear. In the early hours of the morning, she woke up with a swollen and tender face, her teeth were loose and her gums were bleeding. The following day, she was unable to bite or chew and the dentists she worked with all sympathised. She saw one endodontist in the unit and, despite all the signs being inconclusive at the time, he suggested a crack (Fig. 1). Of course, it was at the back of everyone’s mind that this tooth was unrestored and she had a pristine mouth. She saw a second endodontist in the practice owing to the escalation of her symptoms. By this time, she wanted the tooth extracted, but the romantic amongst us all felt the tooth could be saved, so it was extirpated! The pulp positively nuked and the tooth dead. That should have sorted it right? Unfortunately, her symptoms continued. Could it have been something atypical?

She had been stressed and grinding. More deliberation, still no further was the diagnosis. The tooth was dressed once again, with a change in the medicament. Still no joy. A restorative dentist then proceeded to drill the crack out and restore with composite. Still no joy. The tooth was taken out of occlusion when one dentist noticed the development of periodontal ligation widening on one of the long cone periapical radiographs. The root canal treatment was completed jointly by two excellent endodontists and the second mesiobuccal canal was located. Under any other circumstances, it was a fantastic clinical outcome. Unfortunately, the pain was unabating (Fig. 2). Let us see as much as we can. A CBCT scan was taken that was also inconclusive (Fig. 3). Was it some-thing atypical?

The tooth was taken out of occlusion when one dentist noticed the development of periodontal ligation widening on one of the long cone periapical radiographs. The root canal treatment was completed jointly by two excellent endodontists and the second mesiobuccal canal was located. Under any other circumstances, it was a fantastic clinical outcome. Unfortunately, the pain was unabating (Fig. 2). Let us see as much as we can. A CBCT scan was taken that was also inconclusive (Fig. 3). Was it something to do with the sinus? The radiographic report was suggestive, but again nothing conclusive. Towards the end of the two weeks, the patient marched herself into the office of the exodontist to have the tooth extracted. Misery. We had failed.

With the tooth in hand and a wry smile, the nurse dipped the tooth in disclosing solution, which identified one large crack in the furcation area of the palatal root with several accessory ones (Fig. 4). The relief was palpable on her face. Despite losing a tooth, the culprit had finally been identified. It seems as though the mechanical failure of teeth, unlike our old adversary bacteria, has the ability to trump us from diagnosis through to treatment, despite our best intentions, knowledge and experience.

The question that crosses my mind is: ‘Can I stop the tooth from grinding their teeth needlessly during the day and have to instigate strategies to reduce the likelihood of parafunction in the night? One emerging issue is psychological health. Patients are increasingly stressed and depressed, which is a recognised risk factor. One fairly paradoxical issue is that medication may actually increase the likelihood of bruxism, so the pharmacological industry may be perpetuating the problem in that stressed people who already grind are medicated and grind even more.

Cracking the code of fractured teeth is going to be difficult and will be a contemporary challenge for us all. One of my trainers from yesteryear, who had more wisdom than Yoda, once said, “From these words never depart, lips together and teeth apart”.

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Mastering the implant digital workflow

Whether we like it or not we are embracing the digital era in our brave new world. Many dental practices are now becoming paper free—a digital innovation—and even using tablet computers to record patient details and medical histories. We are continually surprised by the rising age of the technologically savvy patient, particularly those of a certain generation that perhaps we assume to be less “digital” than the perceived smartphone generation. This change in patient demographic and attitude towards technology is filtering through to us in the dental profession.

Dental implantologists tend to lend themselves more readily to the digital revolution of dentistry in the UK and globally. Many practitioners opposed to or reluctant to embrace it, are actually being influenced by it from shifting workflows in dental laboratories even where more traditional clinical practices are followed chairside. Quite often wet impressions are poured, and stone models are scanned to produce digital stereolithography (SL) files for laboratories to process during crown and bridge unit manufacturing.

As an implant clinician you do not have to invest in a computer tomography (CT) scanner or chairside intraoral scanner—there are ways that other centres and laboratories can provide these services—however having these tools at your disposal greatly increases your efficiency and you are not relying on external services for your patients.

So how do we begin the implant digital workflow?

Treatment planning

Successful implant treatment begins with thorough case assessment and planning of the proposed restoration. This is important for all cases not just what we deem the complex ones, even the most experienced implant placer can miss a potential treatment planning hazard especially during a busy day.

Accurate study model casts are an essential part of this, however we can now use intraoral scans preoperatively to begin the digital workflow. We take a scan rather than impressions to form digital models. Our laboratory can then use these to create digital wax-ups of proposed treatment outcomes (Figs. 1 & 2).

We are routinely used to 2-D radiograph imaging techniques within dentistry but with the availability and access to cone beam computed tomography (CBCT) scanning devices now we are able to access bone quantity and quality of proposed implant surgical sites (Figs. 3 & 4). With ever reducing doses of 3-D imaging and improving accuracy we have the option to use CT scans combined with clever software packages such as coDiagnostiX™ (Dental Wings) to plan safe and accurate implant placement and restoration. We are able to preoperatively plan precise implant placement with safe surgical margins away from important anatomical structures such as the inferior alveolar nerve or maxillary sinus. From this we are then able to design and either mill or print a surgical guide to use for precise implant placement (Figs. 5–7).

Surgical treatment phase

Even with assisted or guided surgery there are sometimes certain restrictions that prevent us from achieving the most ideal implant placement, such as in the case presented here, where posterior access in the second molar region is reduced, making it extremely difficult to achieve the perfect parallel (Figs. 8 & 9).

There are fully guided systems available which allow for absolutely precise implant placement, but these are fraught with complexities and should be reserved for experienced placers. The accuracy of surgical guides should not be used to make up for a lack of surgical competency.

There are many factors to be considered when using surgical guides, depending on whether the guide is tooth-, soft-tissue- or bone-supported. Tooth-supported allows the greatest degree of accuracy.

If tooth-supported:
- Are there windows in the guide which demonstrate full seating of the guide?
- Are the teeth which support the guide mobile? Any mobility adds a degree of inaccuracy.
- Is the guide made from a direct intraoral scan or a scan of a study model? If scanning a study model, would this be an accurate stone model representation? Otherwise one could risk poor seating and inaccuracy of the guide.

If soft-tissue-supported:
- Mobility completely negates any accuracy of the guide, so it should only be used for a pilot drill and then a more conventional surgical protocol should be adopted.

If bone-supported:
- Raising a very large surgical flap is likely.
- It is very difficult to get accurate full seating of a bone-supported guide in the precise planned position, thus one has to rely upon external fixation.
Prosthetic reconstruction

Once the implants are placed in situ and fully integrated we then have the option to choose between conventional wet-impression techniques and digital intraoral scanning devices. For the majority of cases intraoral scanning is extremely predictable and reliable—more so than conventional techniques—with milled (and lately printed) models having excellent properties and fewer accumulation of processing errors. However deeply placed implants, relative to adjacent teeth with deep contact points, are very difficult to scan and pick up. Straumann tissue-level implants offer a very straightforward restorative platform to scan from (Figs. 10–13).

With greater numbers of implants and fewer teeth to act as reference points intraoral scanning becomes less reliable, particularly across the arch. Therefore, we need to act with caution and be aware of its limitations. We have used composite flow stuck to the soft tissues to increase reference points for our scanners increasing their ability to stitch images more accurately together. With this in mind we cannot assume the scan to be accurate and any framework fabricated would be non-passive, we therefore are obliged to use other methods to verify the scans accuracy. We have found locking temporary abutments within a composite framework intraorally the easiest and most reproducible way to do so. It then allows us to design and mill a truly passive framework by Createch and a temporary acrylic bridge (Figs. 14–17).

Conclusion

There are many opportunities to opt in and out of using technology regarding the digital implant workflow. For anyone considering capital investment, the most important question to ask is, how will or can this improve the outcomes I provide to my patients and then determine whether that warrants the expenditure. Too often we are subjected to sales pitches of the next biggest thing by company sales representatives and gadgets and gizmos end up by the wayside.

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