EDSA Magazine

Summer 2021

The Role of WHO in Advancing Global Oral Health

Contents

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Editor's Word

Dear readers,

We have come to the end of yet another EDSA term – it has been an interesting and crazy ride for all of us.

I am immensely proud of what we have achieved together, and grateful for showing me that a group of very different but highly motivated and skilled people could do whatever they want. To anyone reading this and thinking if they should or should not take that opportunity for something – take it! Do as you feel would be best and do not worry – the path will take you to your destination, you only need to trust the process and embrace whatever comes your way.

As for the Magazine, I truly hope it kept its quality and tradition, and gained some new features. It has been an absolute pleasure and honour being responsible for this project and working on it together with Mohammed (whom I cannot thank enough) and all of our amazing writers. I have learned and gained a lot and I hope all of you did or will too.

Many thanks go to everyone who contributed to the Magazine (in any way), including the amazing LOC Košice, who made it possible to have the Magazine printed after nearly two years!

I hope you will enjoy reading this magazine – in Košice or anywhere else.

Wishing you all the best!

Until the next time our paths cross...

Amina Ibrahimpašić, *Editor-in-Chief*

Co-Editor's Word

It has been a great honour to prepare this, the second and final magazine of 2021, and the last of our tenure as EDSA committee members and co-leads.

Whereas in Spring, there was a focus on technological futurism and the evolution of our profession in an age of growing complexities and expectations, the Summer edition is significantly interspersed by detailed expositions on matters of policy, regulation and advocacy.

It is maybe understandable - the pandemic has encouraged a deep fervour of introspection and reflection regarding both the possibilities and the need for change, not only in dentistry, and not only in health and healthcare delivery, but in each and every system be it local or global.

We hope the articles are timely - we are sure they are incredibly well-written, interesting, bold and display the extraordinary commitment and excellence of each of our writers. If our writers are representative of the future leaders of dental public health, research and academia, then dentistry in Europe is in good hands.

Finally, it has been a great privilege to work alongside Amina as co-editor - I've never seen somebody work so hard and to such a high standard, and the most lavish praise and plaudits must be reserved for her work as VPPR, of which the magazine has been just one element.

A pleasant summer to all!

Mohammed Bux, *Co-Editor*

President's Word

Dear EDSA Family,

It is with mixed emotions that I write this, my final magazine introduction as President of this wonderful association. I am overjoyed that after 2 long years we will be able to meet in Košice, but also sad that this will be my final few days of being on the EDSA committee. After such a period of time, I hope you will allow me a few paragraphs of introspection about EDSA and the role of students.

EDSA has come a long way in recent years. Due to the pandemic there are a lot of people coming to the association who think that our work and partnerships are something that have always been there, but it is only because of past committees that these have built up. As a result, we are one of, if not the best connected dental student organisations. Our work over the last few years with professional organisations, with the EU and the wider global oral health community is a testament to that influence, as well as demonstrating the power of student engagement.

Dentistry and oral health are changing fast. Our profession will not look the same in 20 years as it does today, with new models of care, new technologies and new appreciations of the environmental impact of dentistry. We can see that even across rich countries and especially in poorer ones, that many people have no access to dental care, and live with pain. This needs to change, and students have a powerful voice to call for change, as EDSA has done this year.

At dental school we are taught to simply learn what we are taught, and not to question what we are not taught, what we should be taught. If Covid has taught us anything it is that dentistry is not resilient to shocks, not just from a pandemic, but from floods, fires and other catastrophic events, which will only become more common in years to come. Our education, despite best intentions, does not yet prepare us for the future.

As I move to my professional life and reflect on my time as a student, one thing I would urge all of you is to take an interest in these topics, to demand better from your schools, your governments and yourselves. You have the power to influence those with power. Demand better: politely, rationally and with evidence, but persistently.

It has truly been an honour to represent you all this year to the best of my abilities. I want to thank this committee for their support and work in a difficult year, and to all the past committees who have helped to shape EDSA and helped to shape me over the last three years. The task of leading EDSA now falls to my colleague and friend, Ivana, who I know will lead the organisation to new heights. I take with me from EDSA joyous experiences, lifelong friends and the knowledge that it has definitely shaped the course of my life for the better. Thank you for being a part of that.

Yours truly,

James Coughlan, *President 2020/21*

President-Elect's Word

Dear EDSA Magazine readers,

It is my utmost pleasure to address a few words at the beginning of the EDSA Magazine, the magazine that has been connecting European dental students since 1992.

I joined EDSA in 2017 and I quickly got used to repeated meetings that we had twice a year – little did I imagine that we would actually skip meetings for 2 years. I am very proud to be part of the Local Organizing Committee that is making it possible to meet again in Slovakia, and if you are reading this sitting in the Aula in Košice, I would like to sincerely welcome you. I hope you will have a wonderful time in Košice.

This meeting is going to be very different from the other meetings we had in the past – many of the attendees haven't attended any EDSA meeting before, even some of our Board members have never had a chance to attend it yet. We will have an important mission to explain our goals and activities, so don't hesitate to ask us whenever you have a question. I truly hope that you will get inspired by EDSA, just how I got inspired when I joined the meeting for the first time. Hopefully I will see many of you applying for EDSA positions in the upcoming years.

I remember attending my first meeting – I was still just figuring out the mission of the association, and you might be in the same situation now. That happened four and a half years ago, and I can tell you that EDSA has enriched my life tremendously. EDSA will completely change your approach to dental studies, you may realize that there are also other things you can get better at, not just cavity preparations. Becoming a confident public speaker will help you with talking to real patients, which is often a difficult task. You might be working for our Communication team, which will teach you some effective marketing strategies, how to create a website, or create some informational materials for your clinic. Talking to other students will definitely strengthen your foreign language skills and might make your social skills better, especially after they haven't been cared for during the pandemic.

But the most important part is the one you won't realize at the beginning – the fact that you might become more open-minded, tolerant and gentle to other people. I encourage you to talk to the person sitting next to you, be friendly to them, and try to get to know them. I say it as a shy person that I was, and still am sometimes. Don't be afraid to take the first step to find new friends and see how much you have in common, no matter where you came from and what your views on life are. As Albus Dumbledore said, „We are only as strong as we are united, as weak as we are divided".

We're very lucky to be together again, to meet dental students from more than 30 countries, and we should use this opportunity to find what connects us all. Person you meet today might become your friend for life, your travel buddy, your bridesmaid, your favourite dental colleague to share clinical cases with, even your partner (who knows, it happened on EDSA a few times before). I'm wishing you a great meeting, and for those who are reading this at home – I hope to see you on the next one!

Warm regards,

Ivana Ligusová, *President-Elect 2021/22*

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Water sports: An overlooked threat for oral health

Did you know that the pH of a swimming pool can affect teeth and cause "swimmer's calculus"? And that the pressure in deeper waters can lead to "tooth squeeze"? Understanding these and related concepts may help us raise awareness and prevent much-overlooked water-related oral diseases.

Mafalda Silva, Portugal

Water sports are physical activities that can be practiced in both indoor and outdoor saltwater and freshwater bodies. While most people engage with water sports as recreational activities, they can also be competitive. Their popularity has risen and sustained throughout the years due to the action-packed, and thrilling nature of the experience - one that promotes both physical exertion and mental stimulation. There is a wide range of aquatic sports - more than 30 acknowledged types - including swimming, water polo, surfing, diving, sailing and canoeing. Given that many of those who play water sports do so frequently and spend lengthy amounts of time in the water, it is not surprising to learn that their oral health is influenced as a result of this behaviour. What is surprising is the limited evidence-base and awareness regarding oral diseases in this field among both athletes and healthcare professionals.

Swimming and its impacts on the oral cavity

Swimming and other water sports practiced in gas-chlorinated pool systems can have a huge impact on an individual´s oral health. The changes that might happen in the teeth as a direct consequence of these sports include calculus accumulation, tooth-staining, dental pain and dental erosion, affecting mainly swimmers and water-sport enthusiasts that spend more than 6 hours per week (submerged) in the water. The CDC (Centers for Disease Control and Prevention) recommends the pH level of treated water to be between 7.2 and 7.8 and the free chlorine concentration to be at least 1 part per million in pools and at least 3 parts per million in hot tubs (CDC, 2016). In fact, if the pH of the swimming pool is neglected, it can cause extensive damage not only to the oral cavity, but also to the body, such as irritation to the eyes and skin. Regarding the oral cavity, an acidic pH can lead to the erosion of hard tissues, whereas a pH higher than 8 can lead to a decrease in the ability of chlorine to kill bacteria, thereby contributing to an increase in calculus build up.

Calculus accumulation, also known as "swimmer's calculus" is usually accompanied by tooth staining. Dental calculus is calcified dental plaque, composed primarily of calcium phosphate mineral salts, as well as inorganic and organic components (White, 1997; Jin et al., 2002). It can be generally classified into two main clinical types according to its position on the tooth: supragingival calculus, seen above the gingival margin, and subgingival calculus, found below the gingival margin (Hazen, 1995). The main consequences of bacteria and calculus build-up in these areas encompasses the subtypes of gingivitis and periodontal diseases, and, in more severe cases, structural damage to teeth and the bone supporting the teeth and gingiva. Regarding the pathogenesis, with an increase of the intraoral pH, the antimicrobials present in the water are more likely to break down salivary proteins, leading to the formation of organic deposits on the enamel surface. These hard, yellow-brown calculus deposits are often referred to as tooth stains (Moore et al., 2018).

Nowadays, despite its toxicity, swimming pools can be chlorinated with chlorine gas. This is mainly due to economic reasons, since chlorine gas has a relatively lower price when compared to other types of chlorine (such as liquid, granular or tablet chlorine), thus presenting an effective way to raise free chlorine levels in large public pool complexes. The disinfection with chlorine gas leads to the formation of hydrochloric and hypochlorous acids after interacting with the pool water. Unless these acids are neutralised with sodium carbonate, the pH of the water may decrease to less than 3, creating an acidic environment propitious to

the erosion of dental enamel (Dawes et al., 2008; Baghele et al., 2013). However, this can be prevented by appropriate pool management. Dental erosion is defined as the loss of tooth substance by a chemical process that does not involve bacteria. The pathogenic mechanism of dental erosion is based on the dissociation of hydroxyapatite and the impaired mineralisation of the enamel due to an increase of the H+ ions in the oral cavity. Eroded teeth are characterised by an increased translucency and sensitivity, tooth surface loss (assessed through various criteria such as the BEWE score), rough or gritty surface texture, diastemas, incisal chipping and fracture of the incisal edges.

It is, of course, impossible to avoid the exposure to chemically treated water during professional swimming training - or choosing to swim in a commercial pool as part of your exercise routine. Therefore, the emphasis should be on the history-taking of relevant individuals, early diagnosis and prevention. Regarding preventive options, pool monitoring should be highly encouraged with a focus on the balance of pH levels, mouth-rinsing with water, baking soda, or fluoridated mouthwash after each swimming practice and the usage of a soft toothbrush. Additionally, it is important to avoid brushing teeth immediately after swimming as the surface of the teeth is softened by the acidic chlorine and this can be very destructive (Rao et al., 2019).

On the other hand, if preventive measures fail, oral professionals can try to minimise the consequences of hypochlorous acid on the tooth. Usually, treatment goals include the elimination of dental sensitivity, replacement of lost tooth structure and correction of teeth aesthetics, dimensions and shapes. Minimally invasive restorations with laminate veneers, resin composites and minimal preparation-onlays could be carried out to achieve these goals (Jahangiri et al., 2011; Boitelle, 2019).

Common diving injuries

Underwater Breathing Apparatus (SCUBA) diving is a popular recreational and professional activity, with 27 million certified divers globally according to The Professional Association of Diving Instructors (PADI, 2019). One of the most common injuries among scuba divers is "barotrauma". Barotrauma is pressure-induced injury caused by a difference in pressure between a surrounding gas or fluid and an unvented body cavity - commonly the external and middle ear, paranasal sinuses, lungs, gut and teeth. This phenomenon can be understood in the light of Boyle's law, which states that the volume of gas at constant temperature varies inversely with the surrounding pressure. Hence, during ascent, as ambient pressure decreases, the volume of body gas-filled cavities increases, and unless internal pressure is equalised, compressive or expansive forces will be created, leading to an overstretching of tissues (Battisti et al., 2021; Newton, 2001).

Dental barotrauma can manifest as a dental fracture or as dental pain. The term "barodontocrexis" ("tooth explosion" in Greek) describes the phenomenon of tooth fracture, that occurs in decayed teeth or pre-existing leaked restorations. It takes place commonly upon surfacing when deep-water diving, and potential consequences include severe pain, swallowing of the tooth fragments or even their aspiration (Zadik et al.,2011).

On the other hand, the intraoral pain evoked as a consequence of barotrauma is known as "barodontalgia", or "tooth squeeze". This phenomenon was first named "aerodontalgia", when observed in air crews during World War II. Later it was also detected in divers. Its incidence is reported to be around 0.26–2.8% (Stoetzer et al.,2012). Barodontalgia is most likely to occur at a water depth of 33 ft to 86 ft (10-25 meters) and upon descent, as well as on upper teeth compared to lower teeth. Re-

garding its aetiology, several studies explored the possibility of air trapped within decayed teeth or beneath damaged restorations producing dental pain, by contracting or expanding abnormally during the progression of a dive (Alwohaibi et al.,2020).

It is important to highlight the difficulty in obtaining the causative pathology of barodontalgia, due to the need for identifying the affected tooth, that could be any tooth with a restoration, secondary caries or endodontic treatment, as well as the challenge in reproducing the environment's conditions - rapid barometric pressure changes that trigger the pain - in the dental surgery. According to one report, 14.8% of cases remain undiagnosed (Zadik et al., 2011).

The key feature in preventing barodontalgia is good oral health. The Fédération Dentaire Internationale (FDI) recommends an annual check-up for divers and encourages individuals not to dive within 24 hours of a dental treatment requiring anaesthetic or 7 days following a surgical treatment (Robichaud et al., 2005). Additionally, resin cements should be advocated in dental restorations due to its capacity of remaining unaffected by rapid pressure changes and providing a strong seal.

Conclusion

Exposure to the underwater environment has unique and demonstrable effects on oral health, and can result in peculiar disorders. The type of water sport practiced, the conditions of the water, the time spent in it and the baseline oral health are determinant factors for oral diseases and their control and prevention. Unfortunately, there is still limited information present in the published literature regarding these phenomena, which leads to a lack of awareness among both healthcare professionals, athletes and the ordinary public. It is of utmost importance for clinicians and patients to understand and acquaint themselves with this oral health hazard, so that when it comes to oral health, we are always in safer waters. ■

Dentistry in human identification: "Evidence that does not lie"

Forensic Dentistry is essential to identify individuals found in criminal cases or mass disasters.

Kyriaki Hadjichambi, Greece

Forensic dentistry is important in several areas, such as diagnostic and therapeutic examinations to establish a suspect or victim's previous dental history in order to evaluate damage to the maxilla, mandible, teeth and oral soft tissues. Forensic investigations with victims found with multiple injuries, in the vast majority of cases, are in a condition where conventional identification methods cannot be used, such as fingerprints. In such an instance, the patients' dental records are used, when they are sufficiently updated in their dental records.

Sex identification

Sex determination is the first step of personal identification in Forensic Medicine, as Jyothsna highlighted in 2013. Forensic Odontology plays a role in establishing the sex of victims with bodies mutilated beyond recognition due to major mass disaster. Consequently, the teeth and the skull are sometimes the only identification evidence. The recognition of sex based on craniofacial indicators is achieved in 55.8% of cases, and when combined with dental characteristics, it is possible to determine the sex in 86% of cases.

The sex determination based on dental characteristics is done mainly by comparing the dimensions of the teeth in men and women or unusual dental features. Characteristics such as Carabelli's trait of the upper molar, deflecting wrinkle of lower first molars, the distal accessory ridge of the upper and lower canines or shovelling of the upper central incisors differentiate many people.

More precisely, Vodanović (2007) demonstrated that there is a statistically significant difference between sexes in the buccolingual diameter of the crown of the maxillary canine, mandibular central incisor and the mandibular third molar. Furthermore, the height of the tooth crown of permanent teeth showed a statistical difference, with the greatest observed in the central incisor's height - with females' being on average 20% longer.

Age estimation

According to Baker et al. (2019), the factors related to dental ageing have been examined and standardised for age estimation techniques in forensic odontology. The dental pulp undergoes measurable regressive and reactive changes with ageing. Specifically, there is a decrease in odontoblast numbers, with a noteworthy difference between each decade of life. There is a significant reduction in blood vessels too. Also, the thickness of collagen fibres increases with age. If only one pulp parameter was to be used for age estimation, collagen fibre thickness would be an ideal candidate with 85.7% accuracy. The main methods used in age estimation, according to Rajendran (2009), consist of the visual method, the radiographic method, the histological method as well as physical and chemical analysis.

Facial reconstruction

Rai et al. (2012), noted that, if the identity of the victim is not visible, it may be important to reconstruct the person's appearance during his or her lifetime. This is the responsibility of forensic artists and forensic dentists who utilise dental parameters to help reconstruct the face. Photographs are used to allow the reconstruction of a face with the help of skeletal features and fractures of teeth in cases of identification.

Bite-mark analysis

It is now well recognised that bite marks provide detail and specificity comparable to that previously achieved through fingerprints alone. Bite marks can also be found in food stuff such as butter products, chocolates, cheese and, thus, these marks provide a kind of dental identification. In cases of child abuse, sexual assault and in situations of self-defence, bite marks frequently appear and assist scientists to confirm the identity of the aggressor and assess the level of alcoholic intoxication when appropriate, as well as conducting examinations that reveal the age of the individuals. Periodontal tissues, normal anatomical characteristics and teeth are assessed in comparative dental identification (Shamim, 2006) in cases like suicide, homicide, accidents and disasters.

DNA analysis

Forensic dentistry has been using simple methods of estimating age and analysing bites for many years, but has now evolved within a new era of genetic and serological research. In 2011, Muruganandhan and Sivakumar's research showed that DNA analysis in forensic science requires a sample or source from either an individual or the crime scene. Sources include soft and hard tooth and jaw tissues, saliva, biopsy specimens and mucosal smears. In teeth, the sources of DNA are pulp, dentin, cementum, periodontal fibers, and attached bone fragments.

Diluted saliva, rich in DNA, can be obtained from the subject by rinsing the mouth with a specified volume of mouthwash and spitting into a test tube.

However, the most common method in criminal investigations is buccal swabbing, which is very useful in identifying suspects in cases of homicide and physical and/or sexual assault. In cases of mass destruction and other disasters, skeletal and dental remains help to establish the identity of the victims.

Two examples of mass disaster victims' identification

Mass disasters are tragic situations such as earthquakes, severe floods or volcanic eruptions or disasters related to human activity, such as genocide or incidents relating to mass transit. Despite the many deaths, several victims

are often never found or identified. Dumanèiæ, et al., in 2001 noted that teeth, as the hardest and most durable part of the human body, serve as one of the most reliable elements in the recognition process. The authors highlighted the importance of forensic dentistry and cited examples of two mass catastrophes - one at Zagreb Central Station, and an air disaster near Vrbovec, Croatia.

Concerning the scene at Zagreb Central Station, after the 1974 train accident, they list some of the events that unfolded. The train made the turn before the station at a speed of 103.1 km/h, which caused the separation of nine passenger cars from the engine, their subsequent derailment and overturning. There were 152 people killed and 90 injured.

The 1976 airline disaster near Vrbovec, Croatia, resulted in an air crash and the two planes involved, crashed in two different locations. The wreckage of British Airways Trident Three fell on a field and 63 passengers and crew were killed. Similarly, the wreckage of the Slovenian lnex Adria DC-9 fell into the forest and all 113 passengers and crew were killed.

The results of the study revealed that, in the train accident, 111 victims were identified. Dental data and some other identification data were the basis for identification in 5% of cases. In all cases, the victims' fixed and removable prostheses provided dental identification. The assessment of dental age was a helpful indication in the case of three child victims. After the plane crash, British and German reconnaissance teams collected a significant number of dental details, and in some cases dental comparisons were the only basis for identification.

Digital forensics - the future?

More recently in the internet age, computers and online systems are usually the arena of cybercrime and cybersecurity, and thanks to the growing sophistication of digital forensics, law enforcement now uses computers to fight crime. Recent studies (Nagi, 2019), suggests that digital forensic methods are increasingly replacing traditional forensic research in the analysis, acquisition and reporting of forensic evidence. Digital criminology has revolutionised traditional forensic research in data collection and analysis. Due to software developments and relative efficiency and speed, the application of digital forensic dentistry research is becoming more common, especially in mass disasters such as terrorism, aviation, tsunamis and earthquakes. In the age of the growing relevance of facial recognition technology and its application and ethics, there may be new and interesting discussions to be had on personal dental information and privacy. ■

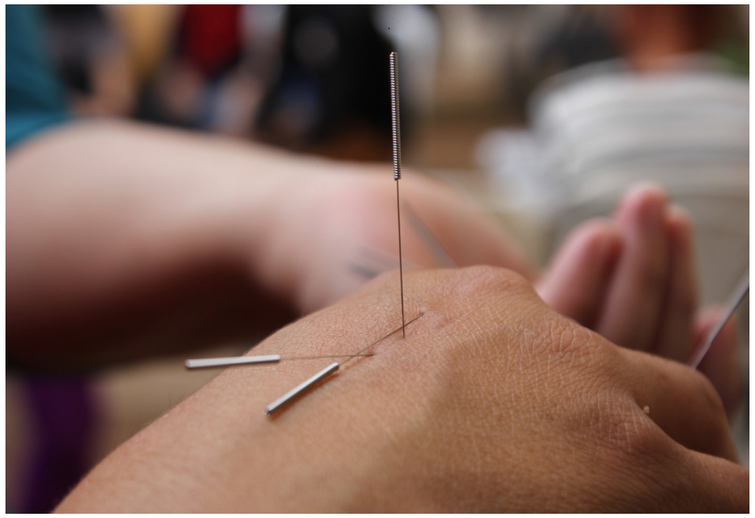
Acupuncture: Does dentistry really need more needles?

The mere thought of needles at the dentist often sends chills down the spines of many people. Nonetheless, more needles may be implemented as the scientific basis of acupuncture in dentistry is explored and solidified.

Christa Serban, Romania

Originating more than 2,500 years ago in China, acupuncture is based on the strategic insertion of needles at specific points of the body. According to traditional Chinese medicine, acupuncture therapy allows the body's life-energy (known as "qi") to balance. Acupuncture can be used for a wide range of applications in dentistry, including the management of dental anxiety, and can serve as an effective adjunct tool to many conventional dental treatments. Based on the principles of evidence-based medicine, Western medical acupuncture has become an adaptation of the traditional Chinese acupuncture and it has become one of the most popular complementary and alternative therapies used today.

The exact mechanism of acupuncture is not completely understood. However it is generally accepted that acupuncture needle



insertion is known to result in the release of natural painkillers, such as serotonin and endorphins. Ultimately, this stimulates the nervous system and alters the way it processes pain (Naik et al., 2014). This is known as the Gate Control Theory. In 2003, the World Health Organization (WHO) listed over 100 diseases and disorders for which it recommends acupuncture. WHO classified acupuncture for pain in dentistry (including dental pain and temporomandibular dysfunction) to be an effective treatment proven by controlled clinical trials.

Applications of acupuncture therapy in dentistry

Many aspects of dental practice can benefit from the use of acupuncture. Today, acupuncture is used as a tool across a wide range of healthcare disciplines. But how can acupuncture be applied in dental practice?

In dentistry, acupuncture is commonly used for pain management. Although acupuncture in dentistry does not serve to eliminate the cause of dental pain, research has shown that it may be an effective adjunct in achieving adequate anaesthesia (Wong, 2012). Following a nerve block, the induction time of a local anesthetic has been shown to decrease when acupuncture is used in conjunction with routine local anaesthesia (Rosted and Bundegard, 2003). Acupuncture can also be used to reduce post-operative pain and avoid the use of nonsteroidal anti-inflammatory drugs (Gupta et al., 2014).

Acupuncture therapy has also been employed in relieving pain and discomfort caused by temporomandibular disorders (TMD), myofascial and orofacial pain. Known as 'Stomach 7' acupuncture point, the trigger point for needle insertion for TMD is anterior to the ear. A systematic review found improved results when conventional treatments incorporated acupuncture therapy in the treatment of myofascial pain syndrome (Li et al. 2017).

Although the mechanism is not fully understood, acupuncture has been implemented in treatment of xerostomia. Observational studies have suggested acupuncture to be a viable modality of increasing salivary flow rate; however insufficient evidence exists and larger studies are needed to demonstrate acupuncture's potential role in treating xerostomia (Assy and Brand, 2018).

Acupuncture has also been used to manage dental anxiety. In order to avoid medications and potential adverse drug reactions, auricular acupuncture has been implemented for treating patients with fears related to dental treatments. A systematic review showed that auricular acupuncture can reduce dental anxiety. However, more studies are needed to exclude the possibility of the placebo effect (Allan et al. 2018).

Acupuncture has been demonstrated to be an effective and time-saving tool in controlling patients with severe gag reflexes (Hashim et al. 2017). For controlling the gag reflex with acupuncture, needles are inserts in the depression of the mentolabial groove or on the anterior forearm (Anand et al. 2015).

Advantages and disadvantages of acupuncture in dentistry

The use of acupuncture in dentistry brings forth many advantages. Overall it is considered to be a safe and nontoxic technique with minimal risks and adverse reactions. A major advantage of acupuncture in dentistry is that it can reduce the need for pharmacological treatments and thus minimise the risk of associated adverse drug reactions. In addition, it is a relatively low cost technique and simple procedure to perform if the practitioner is well-trained.

Despite the many benefits, there are a wide range of disadvantages and barriers to the implementation of acupuncture in everyday dental practice. Barriers to integrating acupuncture in dentistry exist due to the fact that acupuncture may not be effective for all patients. Oftentimes, patients seek the help of alternative medicine treatments only after medical therapy has failed; in these situations acupuncture is therefore less likely to be responsive. In addition, there is a lack of resources and dentists who have received formal training in acupuncture. Although acupuncture has minimal potential risks and adverse effects, it is possible to do harm with acupuncture without the proper training and knowledge. Nevertheless if the practitioner is well trained there is little that can go wrong.

Addressing challenges

A meta-analysis from 2021 found that healthcare professionals have an overall positive attitude towards the

implementation of acupuncture in Western medicine (Zhang 2021). In the medical field, the value of acupuncture has been recognised, however its existence and applicability in the dental field is just starting to emerge. A lack of dentists with proper acupuncture training and exposure is a barrier preventing the widespread integration of acupuncture into Western healthcare. By making education and training courses about acupuncture more available at the dental school and professional level, acupuncture can become a useful tool in the hands of every dentist.

Although research has shown promising results, there is still controversy and skepticism towards acupuncture within the scientific community due to the lack of existing scientific evidence. Nonetheless, it has found that healthcare professionals are more likely to incorporate acupuncture within their treatment plans when pain-management alternatives with less adverse side effects are necessary (Zhang 2021). There are various opinions on the appropriate stage of introducing acupuncture and if it should be used as an adjunct in treatment or only when all other conventional treatments fail. This indicates the need for the development of larger-scale research and interdisciplinary dialogue to better define acupuncture's value and applicability in Western medicine.

Conclusion

Acupuncture therapy has the potential to provide many therapeutic benefits in the field of dentistry. It is widely accepted that acupuncture is effective in pain management, however its other applications in dentistry need to be further explored. The use of acupuncture in dentistry should be regarded as a potential supplement to conventional treatment options, and more studies and health education around this approach may encourage evolving practice. ■

Are implants a valid alternative to RCT?

Root-canal treatment (RCT) is an excellent option when attempting to prolong the presence of a tooth inside the arch. Implants are deemed to be the 'gold-standard' approach for replacing missing teeth where possible. But should implants be offered as an option alongside RCTs?

Mohamed Aqib Nagori, Bulgaria

Concluding a treatment plan is not exclusively the right of the dentist. It is a concession between recommended practice, the clinician's abilities and the patient's desires. Root canal treatment (RCT) and dental implant placement are individual clinical interventions and are often indicated in clinical situations that do not overlap. While many consider both treatments as a continuum of care for a specific tooth, others argue that dental implants are an alternative option to RCT, or even a preferred one (Ruskin et al., 2005). Though each intervention has both merits and drawbacks and treatment needs vary patient-by-patient, the plethoric evidence base does allow for a blueprint to be developed to help navigate this clinical conundrum.

Comparison of prognosis

When considering dental implants, despite a high survival rate of over 90%, there are limited reliable courses of action if they fail to osseointegrate (Setzer and Kim, 2014). The option to re-implant has a reputed failure rate of between 48.3% and 51.7% (Kim et al., 2010), which renders it a questionable safety-net, and after which other prosthodontic options to treat edentulous areas must be considered (Budtz-Jorgensen, 1996). Conversely, the decision to save an existing tooth through endodontic treatment allows for future endodontic non-surgical retreatment, with a tooth survival rate of 78.2%, and surgical retreatment, with a tooth survival rate of 63.4%, if the initial RCT procedure is unsuccessful, before resorting to extraction followed by implant placement (Elemam and Pretty, 2011). Therefore, the endodontic treatment route, if applicable to the patient in question, allows for better fulfilment of the role of a treatment plan, and maintenance of the specific tooth's prognostic value.

Success/Survival

Treatment 'success' depends on the radiographic resolution of periapical periodontitis coupled with accompanying asymptomatic responses from the root-treated tooth. However, with dental implants, their osseointegration has constituted 'survival' without any consideration given to the presence or absence of peri-implantitis or bone loss (Albrektsson et al., 1986). When both RCT and dental implant placement were compared for their 'success', Iqbal and Kim (2007) found endodontic treatment to have an average success rate of 82.1%, with implants significantly below at 73.5% despite both clinical interventions having a similar survival rate ranging from 94.9% to 99% (ADA, 2004). This difference exists even though many consider endodontic success to be assessed according to strict criteria, while the criteria for implants "offer a much greater variety for the definition of success" (Setzer and Kim, 2014).

Economics

One cannot deny that an exclusive focus on outcomes is not the most prudent way of choosing one treatment option over another. At the heart of any treatment decision is the question of financial cost. Single-tooth dental implants are 70% to 400% more expensive than endodontically treated and full-coverage-crown-restored teeth (Moiseiwitsch and Caplan, 2001), without accounting for costly and lengthy additional procedures such as bone grafts, sinus lifts and crown-lengthening. Single-tooth implants become more cost-effective if repeated interventions such as crown lengthening or post and core placement significantly lower the survival of endodontically retreated teeth (Kim and Solomon, 2011). Treatment affordability for the patient is a pivotal factor in deciding the best possible course of action.

With the present high costs of implants, they are not widely available on the NHS in the UK. From a socio-economic point of view, implants' use should be restricted to situations where they are necessary (Iqbal and Kim, 2008).

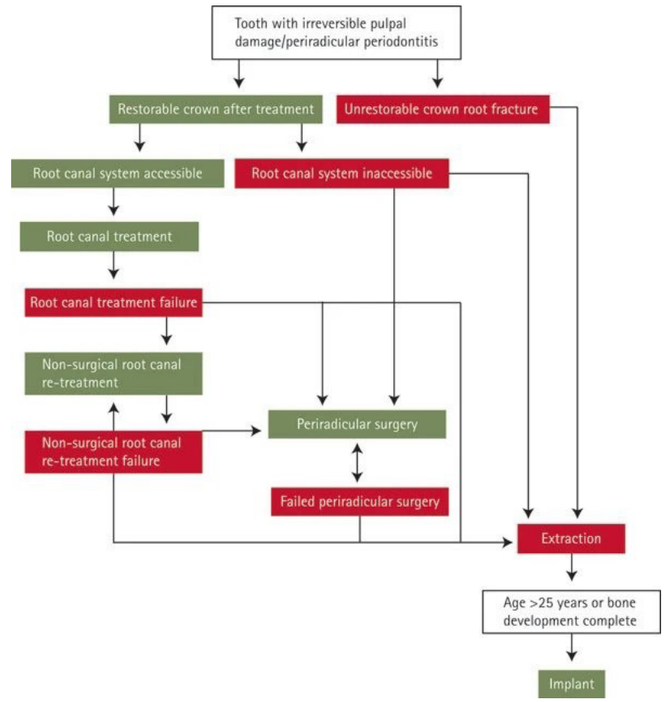
Practitioner skill

While all general dental practitioners will be able to perform most primary RCTs, not all can offer dental implant placement themselves and require further training. The survival of dental implants placed by inexperienced practitioners was 73%, though it was 95.5% for those placed by implant specialists (Morris and Ochi, 2000). This variation is potentially problematic.

Comparatively, the difference in the rate of tooth survival following RCTs between specialists and general practitioners is much less, with endodontist-treated teeth's survival rate at 98.1%, and the survival rate at 89.7% for general dentists (Alley et al., 2004). However, if the RCT failed, then the patient would need a referral to a specialist endodontist for non-surgical or surgical retreatment. Some studies have found practitioner preference for implant-supported restorations over RCTs that have resulted in a shift in treatment provision. Training has a measurable impact on the prejudices of a dental professional, too, with many endodontists less likely to suggest or offer dental implants over advanced endodontic interventions (Azarpazhooh et al., 2013).

Implants as the gold standard

Implants play an undeniably critical role in the treatment of fully or partially edentulous patients. In comparison to other methods of treating



Possible treatment pathways in the endodontic-implant continuum (Saunders 2014).

edentulous areas such as removable partial dentures and fixed prostheses, implants involve no preparation of sound adjacent teeth, no additional plaque retention and no dependence on the prognosis of abutment teeth (Setzer and Kim, 2014). However, in relation to endodontic treatment, implant placement should be considered a complementary treatment and not a competing option. If the extraction of a tooth is necessary, then the evidence suggests that single-unit implants have the most successful outcome as replacements. While the tooth remains restorable, the best available data coupled with the fundamental aims of dentistry point towards a treatment pathway that gives preference to endodontic treatment and retreatment before resorting to tooth extraction.

Conclusion

In dentistry, the most applicable conservative option that delivers patient health, quality of life, function and aesthetics is always preferable (Iqbal and Kim, 2008). However, as dental implant placement is a treatment with inherent value and success, patients must be informed of its advantages and disadvantages at the initial treatment planning stage, providing they fulfil suitability criteria (Elemam and Pretty, 2011). Unfortunately, data is regularly withheld by implant companies regarding a complete picture of clinical outcomes for implants. In the absence of a reliable and accurate protocol of reported findings, a dental practitioner must individually piece together the best available evidence in order to comprehensively inform and successfully treat the patient. ■

Atypical facial pain: manifestations and management

A guide to identifying and managing patients with atypical facial pain.

Angela Li, United Kingdom

Atypical facial pain (AFP) is a condition involving chronic facial pain that does not satisfy other diagnoses and where the pain source cannot be elicited (Knott, 2012).

AFP is more common in women than men and is estimated to affect 0.03% of the population (Mueller et al., 2011). However, due to unclear and unsystematic diagnostic features, the actual prevalence of AFP is disputed amongst researchers.

The process by which patients develop AFP is a widely contested area. Some research suggests facial pain onset is associated with surgical facial and dental procedures, although the pain is not always localised to areas with peripheral nerve supply (Van Deun et al., 2020).

AFP is known by a variety of names. More recently, the condition has been named as 'persistent idiopathic facial pain' by the International Association for the Study of Pain. However, the World Health Organisation and many clinicians still describe this condition as atypical facial pain. Other terms for AFP include atypical facial neuralgia and psychogenic facial pain (Madland and Feinmann, 2001).

Manifestations of atypical facial pain

Patients with AFP present with recurrent facial pain over a prolonged period. AFP patients experience poorly localised pain unrestricted to dermatomes. Pain can vary in intensity between individuals, from a dull ache to a stabbing or gnawing feeling (Benoliel and Gaul, 2017).

AFP is shown to be correlated with stress, and very often co-exists with psychological conditions such as depression and anxiety. Stress and traumatic life events may worsen AFP, perhaps raising stress within a perpetuating cycle (Williams et al., 2009).

Differential diagnoses

Common differential diagnoses for AFP include:

- trigeminal neuralgia - sudden sharp pain concentrated over regions innervated by the trigeminal nerve. This differs from AFP which presents over non-dermatomal areas. Herpes zoster may be persisting in the region;
- temporomandibular disorder; degenerative joint disease – may involve crepitus upon moving the mandible;
- eye-related;
- migraines;
- toothache.

Management of AFP follows a process of elimination, whereby differential diagnoses are excluded.

Management

As AFP is a diagnosis of exclusion, explanations of pain from other sources including dental, neurological signs and tissue damage should be addressed before a patient is diagnosed with AFP and the pain should not be associated with any of these causative factors (Benoliel and Gaul, 2017). It is worth noting that clinicians and dentists should be wary of over-treating patients and providing 'inappropriate and irreversible' treatment during the process of elimination (Madland and Feinmann, 2001).

This process requires multidisciplinary care drawing on expertise from fields such as neurology, dentistry, psychiatry and ENT. Tests involved in this process can include MRI/CT scans, ENT and dental exams and a neurological assessment (Madland and Feinmann, 2001).

One of the diagnostic features of AFP is that most treatments will not work on it and will only mitigate the pain, such as:

- medications including Amitriptyline, Gabapentin, Pregabalin and Capsaicin can be prescribed following normal results from blood tests;
- heat;
- cold;
- acupuncture.

A psychological referral may be necessary when the patient presents with poor quality of life or mental disorders. Studies show that cognitive behavioural therapy and medication when used together can decrease AFP's interference with life, and increases a patient's perceived control (Harrison et al., 1997). However, it has been disputed whether atypical facial pain is psychosomatic and if psychological treatment of this nature allows for a placebo effect.

Importance of atypical facial pain for dentists

Dentists may be an AFP patient's first port of call if a patient believes their pain is linked to toothache. Atypical facial pain is a difficult condition to diagnose, requiring management from a multidisciplinary team. After ruling out any dental causes of the pain, dentists are in a good position to flag potential AFP patients to specialist services.

Furthermore, its manifestations are not unique to AFP alone, requiring a lengthy process of elimination. Based on a patient's social history and signs of dental wear, a dentist may be able to glean whether a patient's occupation or lifestyle may increase their experienced stress levels. Stress, depression and anxiety have been shown to be correlated with AFP.

A usual part of a dental examination will include extraoral temporomandibular joint palpation. If crepitus or clicking is found, this could be a reason for a patient's facial pains. Maxillofacial specialists can evaluate a patient's occlusion and relieve pressure on the joint, which may reduce a patient's facial pains.

As people's lifestyles and conditions follow an upwards trajectory in stress levels, atypical facial pain levels may rise too in the future. Dentists should be well prepared to confidently manage, refer and support AFP patients. ■

Practice safe dentistry

The key to a successful dental treatment is in the thoroughness of the procedure and the absence of errors. Thus, it is important to know the most common mistakes in dentistry and how to avoid them.

Sabrina Pereira, Portugal

Iatrogenesis in dentistry

Iatrogenesis refers to a state of disease, adverse effects or complications caused by or resulting from medical treatment. The safety of every patient in a dental procedure is paramount - the first principle of medicine being to "do no harm". However, sometimes iatrogenic errors do happen and that is why we need to work in the most secure way, while also informing the patient of the risk of complications.

Iatrogenic errors are relatively common complications in dental practice. They arise from several factors including poor technique, inappropriate selection and use of materials and the lack of knowledge and experience on the part of the clinician.

Dentists must be aware of the ideal protocol for procedures and ensure the correct selection of materials for the treatment of choice, which results in a higher chance of a successful outcome (Botelho, 2011).

So, what are the most common iatrogenic errors, and how can they be avoided?

Errors during root canal preparation

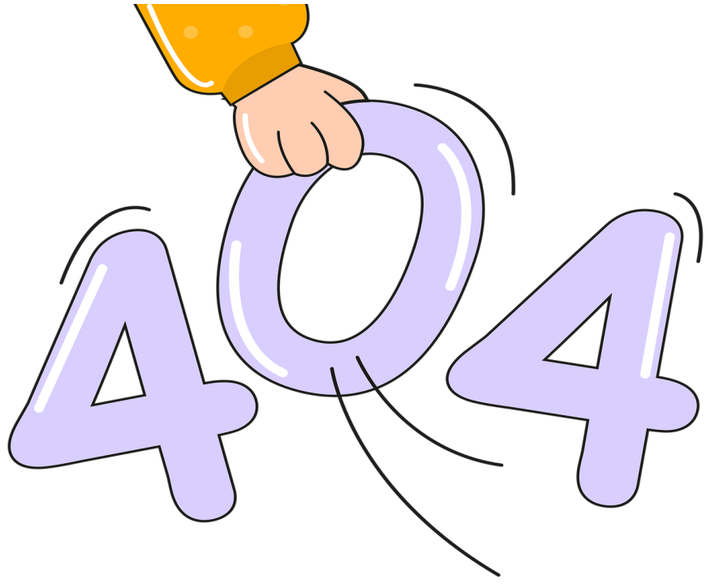
There are several errors that can happen during and following the completion of endodontic treatment like perforations, fractured instruments, presence of ledges, overfilling or underfilling. These are all inherent complications, which are more or less likely depending on the complexity of root-canal treatment, and the patient should be forewarned.

The overfilling and the underfilling are often related to suboptimal chemomechanical preparation of the canal(s). Where there is unsatisfactory instrumentation, ledge formation, inadequate filling technique or the use of inflexible files in curved roots, this can result in an underfilling. On the contrary, an over-instrumentation or the selection of an incorrect gutta percha (GP) point size may result in the extrusion of the gutta percha.

It is important to always confirm the working length, ensuring repeated and copious irrigation and recapitulation when changing files. When performing an endodontic treatment, most adversities can be managed and it is essential to have knowledge and skill in the area - to know your own capabilities and limitations, and when a referral to a specialist endodontist may be indicated (Haji-Hassani, 2015).

Pharmacological errors

The most common errors in this area are the prescription of an unsuitable or contraindicated drug, the wrong dosage of medication, errors in the application of medication in the clinic and omission of prescribing relevant drugs during or after treatment.



These errors can happen due to a lack of knowledge of pharmacodynamics and pharmacokinetics, patient allergies, drug interactions and contraindications, drug absorption, metabolism, distribution, mechanisms of action and excretion of drugs. Understanding the entire drug cycle is essential and indispensable for a safe prescription, also to avoid drug interactions (Nagelberg, 2015).

It is essential to have a complete anamnesis from a patient regarding the medication they are taking, to study the drugs carefully and confirm in case of doubt through an updated formulary. This is especially in the context of a patient who is pregnant according to the trimester of pregnancy, in patients who are on a range of drugs, and in patients with multiple comorbidities.

Anaesthetic errors

Errors that commonly occur in the administration of anaesthetics are inappropriate needle and drug selection, administration of excess anaesthetic or lack of anaesthetic, incorrect injection site, not waiting for an adequate length of time to allow the anaesthetic to take effect, accidental intravascular injection (due to lack of previous aspiration), needlestick injuries, trismus and nerve damage which can be permanent. Sometimes the needle may also break and may need surgical retrieval, so local anaesthetic should be administered slowly and calmly (Nagelberg, 2015).

The dentist must have a thorough knowledge of the types of anaesthetics and doses, as well as craniofacial anatomy.

Wrong tooth extraction

The factors that most contribute to this error are presence of multiple decayed or damaged teeth of questionable prognosis, overburdened workload and occupational stress, misleading communication or errors in note keeping, and the operator's cognitive failure (human error). For example, the different systems of dental notation used by dentists, as well as an incorrect diagnosis, are relatively small and common errors that can lead to confusion at the time of extraction - hence the importance of safer surgery checklists and the need for consent taking from the patient (Cullingham, 2017).

The dentist must pay attention to the guidelines and always confirm the diagnosis as well as the identification of the correct tooth to extract.

Incompetent restorations

Based on a study by Botelho (2011), restorative dentistry when practiced inappropriately causes damage to periodontal tissues, dental pulps and even occlusal harmony and the temporomandibular joint.

Some of the most common errors are excessive or insufficient extension of the edges of dental restorations, dissatisfaction with aesthetics, incomplete caries removal, poor material choice, retention of dental material below the gums, improper restorations regarding the anatomy of the crowns in the region of marginal ridges, as well as the inadequacy of the food flow zones, bad contact areas and interproximal spaces.

The familiarity of the restorative material, restorative techniques, biocompatibility, correct planning (such as the use of diagnostic wax-ups where appropriate) and satisfactory performance by the dentist are fundamental aspects for the success of procedures. Using radiographs and other clinical information as part of the planning can prevent iatrogenic damage, while also allowing the operator to spot and correct any areas of iatrogenic damage before the patient leaves.

Iatrogenesis in orthodontics

Orthodontic treatment, despite having many benefits, also has disadvantages and possible complications - the patient must always be informed prior to the commencement of treatment. Some unwanted side-effects are enamel demineralisation, root resorption, tissue damage (gingival inflammation, recession, black triangles), treatment failure and relapse (Meeran, 2013).

The dentist must always inform the patient about all the risks of the treatment and have their consent. The benefits and risks of intervention must be considered and communicated in all cases, reducing possible iatrogenic errors. For correct orthodontic treatment, it is essential to have a diagnosis, a good treatment plan, regular check-ups and patient cooperation (which highlights the importance of patient selection and working within one's scope of knowledge and experience).

Actions following an iatrogenic error

Trust is fundamental to the rapport between the patient and the dentist. That is why errors must be revealed and explained to the patient in order to address them, without losing the trust of the patient and putting the clinician in a legally dubious position. According to Schwartz (2011), errors during treatment cause a twofold effect on patients - both psychological harm and physical harm.

We must talk to the patient with jargon-free language, allowing them to understand the problem, what happened, and what the options are to address the problem. The steps to rectify and prevent this reoccurrence have to be explained. It is important to give time to the patient to process and rationalise the information. An apology is a central part of this process, and is not an admission of guilt or negligence. The conversation must be calm and in a quiet environment to avoid conflict (Schwartz, 2011).

To "do no harm", dentists must be wary of the risks of iatrogenesis during dental procedures - the patients must be informed of the risk, there must be a plan to mitigate that risk, and if an iatrogenic error occurs, the dentist must not hide it from the patient. ■

A growing relevance of botox in oral healthcare

It is formed using the most toxic substance known to man. Its use in facial aesthetics is widely acknowledged. But is there a serious place for botox as an everyday option in the management of oral health conditions?

Pelinsu Yıkılmaz, Turkey

Botulinum toxin, known conventionally as botox, is a lethal neurotoxin with wide application in facial cosmetics, medicine and dentistry. In recent years, many people choose to use botox with aesthetic goals in mind. However, it is also important to acknowledge the use of botox in addressing health concerns, such as relaxing spastic muscles of mastication in bruxism and reducing saliva secretion in sialorrhea, also known as drooling or ptyalism.

Effects of the toxin are also not limited to its paralytic ability - it can also relieve pain. Due to this effect, the use of botulinum toxin in different areas such as bruxism, chronic migraines, headaches and trigeminal neuralgia, remains an option. As the commercial production and usage of botulinum toxin increases, many researchers have started to examine the use of this product for a wider variety of conditions.

Poison or cure?

Botulinum toxin is one of the most toxic compounds in the world - its lethal dose is in nanograms, and just a small quantity of it can harm millions of people. But it is also the first toxin to be accepted for therapeutic use. When injected locally in adequately titrated doses (in picogram range), this toxin will have only, or mostly, local action and side effects (Matak and Lacković, 2014).

Botulinum toxin is a product of anaerobic bacteria that enters the nerve endings and cleaves the protein that is essential for neurotransmitter transmission. With this effect, it limits the release of acetylcholine, causing flaccid paralysis. It can produce months of lasting muscle relaxation in spastic muscles with planned dose concentrations. But as time passes, this relaxation may lose its effect due to the creation of new receptors (Victor et al., 2019).

Indications for botox use

Botulinum toxin has a long list of indications. The first and most popular one is aesthetic. It has been frequently used to prevent wrinkles, to create a more young and dynamic look with youthful facial angles and fewer muscle creases. Botox also has a wide range of effects when it comes to conditions that lie within the scope of dentistry and dental care:

a) temporomandibular disorders

Temporomandibular disorder is an umbrella label that includes various disorders which consist of temporomandibular degeneration, and joint and masticatory system dysfunction. These disorders may be myofascial, which is due to muscles of the masticatory system, or arthrogenic - related to the joint itself.

Treatments like occlusal rehabilitation, medications, and occlusal splints or a combination of these approaches remain options - though operative occlusal intervention continues to be controversial. Sometimes, surgery and arthrocentesis are indicated but they are highly invasive and not first-line. These treatments may not give favourable results either. According to Sanjeey et al. (2015), injecting botulinum toxin bilaterally to temporalis, masseter and lateral pterygoid muscles is an effective treatment in resolving pain and tenderness in temporomandibular disorders.

b) bruxism

Bruxism is a repetitive parafunction of the masticatory system with clenching and grinding. It may result in extreme tooth wear, headaches, noise and awaking at night, pain in the temporomandibular joint and muscle tenderness and hypertrophy.

Current treatments for bruxism focus on reducing the load on masticatory muscles and protecting the masticatory system (Manfredini et al., 2015). However, treatments like stress management, medications and splints may be limited in the curing of this condition.

When there has been no response to conservative treatment methods, botulinum toxin may be an alternative and effective treatment for the management of bruxism. Injection of botox bilaterally or unilaterally into masseter and temporalis muscles may provide relief for four to six months or, in some cases, may lead to a total resolution of bruxism. Side effects include soreness at the injection site and mild drooling. However, several limiting factors such as high cost and the necessity for repeated injections prevent its widespread use and prescription.

Also, according to an article published by Victor et al., (2019), adopting the criteria of the American Academy of Neurology, reviewed the uses of botulinum toxin in oral medicine and found it effective in treating bruxism.

c) new denture wearers

It may take longer than expected to get used to a new prosthesis in patients who have been struggling with edentulousness for a long time. Moreover, we must keep in mind that their muscle memory and joint programming is likely to be accustomed to a certain behaviour. Change can be difficult to get used to. Muscle relaxation can be achieved by injecting botox into the uncoordinated muscles and acquiring temporary paralysis in them can result in the muscles 'deprogramming', thereby allowing patients to get used to their new prostheses more quickly and easily.

d) gummy smile

A 'gummy smile' is defined as an objective excessive display of gingival tissue in the maxilla when smiling. Some patients who have gummy smiles may feel embarrassed, self-conscious, and psychologically affected because of how they look and thus seek an aesthetic solution.

A study that has been done on 30 patients with a 'gummy smile' by Marco et al., (2008) has shown great results by injecting botulinum toxin into the left levator labii superioris alaeque nasi, levator labii superioris and zygomaticus minor muscle sites. A positive result was achieved for both subjects and dentists because the amount of gingiva displayed was reduced after 24 weeks. However, 6 months following treatment, the gummy smile appearance reappeared slightly without returning to the extent of pre-treatment.

e) sialorrhoea

Sialorrhoea, also known as the condition of drooling, is a problem that is caused by poor muscle control. Without treatment, patients who have sialorrhoea may feel self-conscious when engaging in society. Sialorrhoea may leave a greater propensity for angular cheilitis, oral infections and halitosis.

Treatment for sialorrhoea can be either conservative or invasive. Conservative treatments for drooling include changes in diet and habits, some exercises, and intraoral devices. These treatments require regular and long-term compliance to see noticeable change. As a result, many patients default on treatment after a few months. Additionally, alternative invasive methods include surgery and radiation, and the side effects of these are considerable.

According to Amanda et al., (2013), when done with experienced hands, injecting botox to salivary glands is the most effective and safe way of treating sialorrhea. Botulinum toxin injections are given into the greatest contributors of salivary production - the parotid and submandibular glands. Dentists must be careful when injecting into parotid because of the facial nerve which is important in facial expressions.

Contraindications for botox use

The first thing that comes into mind with contraindication is allergy - though this is extremely rare, and more likely in those with other underlying conditions. However, there are several other factors to consider:

a) pregnancy is a notable contraindication - though there is no evidence to suggest an adverse outcome, this has not been tested in clinical conditions and it may be best to delay any Botox treatment to after delivery;

b) patients who are taking calcium channel blockers, quinine, amino-

glycoside antibiotics, and patients who are suffering from neuromuscular junction diseases like myasthenia gravis should be treated cautiously with careful doses and close monitoring;
c) regarding social factors to consider, singers, actors and people whose life is dependent on facial muscle expression are also on the list because of the paralysing effect of the toxin;
d)patients who have had major operations around the proposed injection site of the botox;
e) children who are below the age of 12.

Complications of botox use

The most disastrous complication to be mindful of is an overdose - doses must be carefully titrated, and where an overdose is suspected, an antidote must be given within hours. However, there are other milder complications to be vigilant of too:
a) muscle weakness at the site of injection;
b) increasing tolerance of the botulinum toxin;
c) mild pain in the injection region;
d) unwanted spread and paralysis of nearby muscles and structures such as the eye or muscles involved in maintaining an oral seal and preventing drooling;
e) oedema;
f) erythema;
g) mild nausea;
h) flu-like symptoms.

Conclusion

The application of botulinum toxin treatment is expanding, and it is often a minimally invasive approach to many conditions and cases. With the application of botox, patients can reach a positive treatment outcome quickly without long-term drug use, the need for continued compliance, hospitalisation, or changing their habits for a prolonged period of time.

Apart from its aesthetic use, this treatment method poses as a safe and effective option for many diseases that concern the face and the oral mucosa and gives a satisfactory result with fewer complications and side effects when done with practiced hands. Due to these properties, botulinum toxin, which is being increasingly used by dentists and health professionals, has scope and potential for wider application and possible incorporation into the dental curriculum and prescription guidelines. ■

HuFriedyGroup
The Best In Practice

Interview with Dr. Gary Finelle

HuFriedyGroup is proud to present a brief interview with Dr. Gary Finelle, Key Opinion Leader of the company and an expert in SSA Technique. The interview followed up on his lecture delivered at the last EDSA virtual meeting on the 21st of April.

Why or how did you decide to become a dentist?

As my father is a dentist, it was an easy choice for me when I graduate from high school. Beyond the obvious goal of patient care, I've always been attracted by the creativity and aesthetic dimension this job could offer. The need for microscopic precision in such a limited field of work have always fascinated me as well.
I've discovered later an unexpected side which is now essential and revolutionary: digital integration. I believe that to perform the best way today, we need to combine each of these skills: that is an exciting challenge!

What is SSA technique, how does it work and what is the benefit for the patient?

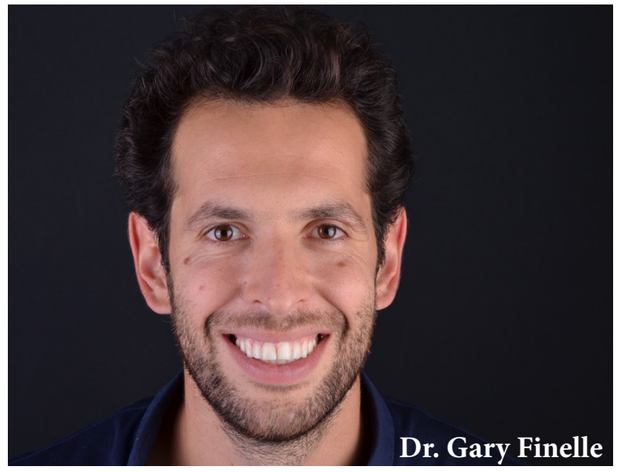
SSA Technique is a new strategy to ensure atraumatic socket closure after immediate implant placement. SSA stands for Sealing Socket Abutment and is dedicated mainly for molar sites for which we can immediately generate (generally chairside) a customized healing abutment that supports the soft tissue, maintains the intra alveolar blood clot but most importantly creates a physical barrier between the surgical site and the oral cavity. Beside the biological benefits, it has the positive consequence of improving patient experience by reducing the invasiveness, the number of surgeries and the overall length of treatment.

What message or advice would you give to a student studying dentistry currently?

I believe it is important to get involved and immersed so you reach the point where performing, learning, reading and striving for excellence does not feel like work, but as a passion. The second piece of advice would be don't be afraid to have doubts or uncertainty about things you are taught... don't be afraid to challenge intellectually what you learn because aside from biological mechanism, everything is evolving faster and faster so what was not possible yesterday, may be open for you tomorrow.

SSA concept, a biologically driven strategy for immediate implant placement in molar sites

More than 60% of the tooth involve 1st molar replacement. As of now, very few publications are addressing optimized clinical protocols and predictability of the overall treatment for this highly implanted region.
In this perspective, the use of an anatomical healing abutment after immediate implant placement for molar sites has the potential to improve treatment workflow from a surgical as well as prosthetic standpoint resulting in soft tissue stability and aesthetic achievement. This, so called SSA concept (Sealing Socket Abutment), offers a predictable and biologically oriented solution to protect wound closure, maintain the blood clot and provide mechanical support for tissue stabilization during healing. Additionally, it allows a minimally invasive approach and significantly reduces the conventional overall treatment length.


Dr. Gary Finelle

The next appointment organized by HuFriedyGroup for EDSA:

Dr. Bora Korkut, expert in restorative techniques, will handle the next amazing lecture in occasion of the **EDSA Summer Meeting in Košice**. Don't miss it!

We remember you:

In order to have free access to all of the benefits of HuFriedyGroup University Program, we invite you to visit **our website** and become part our community!

curaden academy

Beyond the clinic and into the jungle – An oral health mission for the less privileged in Nicaragua

Nicaragua, the largest country in Central America is home to around 6.5 million people, with nearly half of those people living in rural communities - the jungle. For many, physical access in and out of the jungle is not possible and with a system that does not cater abundantly to dentistry and oral health, many people are suffering from dental disease.

Hello, I'm Teddie a dental professional from the UK who decided to visit Nicaragua to work with an organisation called MAYSEA who support people living in rural communities. I left on the 12th of May, and although I was supposed to return on the 11th of June, I am still here in Nicaragua, continuing impact work in a variety of communities, including indigenous tribes. I continue to research, explore and learn from the people here as I support them in oral health prevention and I hope to educate others on the diverse conditions and systems that other countries hold.

During my time here, I have experienced and learned many methods and practices, and seen first-hand that dental decay is a prevalent disease here and rampant in every child I have met. As dental professionals, we are fully aware of the factors involved with such disease, yet dental education here is near non-existent. With almost half of the population living in rural communities, with very little financial recourse and no access to the towns and cities, many are suffering from the pain of dental disease and many children are not able to eat due to the abscesses they are living with. Heartbreaking it is, to say the least.
The hospital is for many, the only access to dental treatment as all clinics are privately run and the people do not have the financial recourses. By the time people access dental care in the hospital, it is often an urgent situation, and the only treatment being provided is that of extraction.

It is very common to see men and women with gold or silver restorations on their anterior teeth and I have been told many times that dentists are offering this treatment as an alternative for people who cannot afford composite fillings.
Unfortunately, education on prevention is a lacking entity as the culture is very much based on urgent care treatment and in the dental universities very little prevention education is being given to the students. Therefore, it is clear to see that there are many lacking avenues when it comes to providing prevention to the people.
Sugar is a huge factor and a luxury to the people. I have experienced myself, consumption of drinks such as oat milk, that have had copious amounts of sugar added and It is added to almost everything that is consumed, with many children being given coffee with sugar at a very early age.
As I continue my dental mission here in Nicaragua, I realise that prevention is not a requirement, it is an urgent need as it is the only option for these people to experience health and not that of pain, suffering, and loss of teeth at such an early age. However, it is not only one factor or system that has to change to enable that.
Yet one thought of mine remains, Prevention is the priority, and Prevention must be profound.
If you would like to follow my dental adventures in Nicaragua then please come and be my friend over on instagram: theodora_little

Meisinger

Whether interested in rotating instruments, implantology or Bone Management®: Get in Touch!

Hager & Meisinger is looking forward to meeting you at the EDSA Summer Meeting in Košice! There we will have a stand where you can ask any questions you have regarding our products, on the 25th of August! MEISINGER manufacturers dental instruments made in Germany since 1888 and develops products for oral surgery with passion!

Since, Hager & Meisinger focusses on innovation, sustainability, and future generations, we are keen to get in contact with future dentists – with you! That is why our student support will be at the EDSA Meeting to let you know what we can do for you and to hand a little gift to you.

Moreover, we will offer a Bone Management® course to those who are especially interested in having some practical insight into the world of oral surgery – on the 26th of August at the EDSA Summer Meeting. To those, who want to learn even more about implantology and oral surgery we can recommend our Young dental expert camps. There you will learn valuable lessons regarding this topic, through technical lectures and practical skill labs, while having great fun in the middle of the breathtaking landscape of Austria. Take part in our camps, held in German language, if you understand it sufficiently or trigger a Young dental expert camp in 2022, held in English for you and your fellow students. Just get in touch with us!

Of course, living in the 20th century, you do not have to be at the EDSA Meeting to get some more information. You can also get in contact with us via e-mail: Yannick.Wienecke@meisinger.de or mobile: +49 151 14 555 617.
Even though meeting in person will always be more thrilling!
See you soon!

Is it possible to live in a caries-free world?

Interview with Dr. Marco Mazevet, former EDSA President and ACFF Research and Development Partner

Deniz Naz Bilgiç, Turkey

What are the goals of Alliance for Cavity-Free Future (ACFF)?
The ACFF has one overarching goal: every child born in 2026 and thereafter should stay cavity free during their lifetime. I think that when we started, 2026 seemed achievable. Obviously, it has taken a bit more time, but the statement is still correct: there is no reason why we should still be seeing cavitated dental caries in patients. To accomplish this, we have tried to link pretty much everyone that has a role to play: academics, politicians, economists, dentists, hygienists, patients and representatives from the industry.

Could you explain your work as an ACFF Research and Development Partner?
It is an amusing question looking back at when it all started. My first collaboration was actually as the EDSA President in 2014/2015. We contacted the ACFF as we thought we had common objectives. About a week later I was invited to a meeting in Rome. There, I met Nigel and Cat, and immediately told them that I wanted to work with them. I went to London a year after to do my PhD, which was focused on dental payment systems and prevention, but worked on a variety of subjects such as guidelines formulation for dental practitioners, coordinating different 'chapters' around the world, organising meetings, managing international projects, working on policies and organising research projects.

The primary goal of the ACFF is for every child born from 2026 onwards to stay cavity-free during their lives. To achieve this goal and create global awareness by 2026, how important is it for you to work collaboratively with dental students' associations and organisations from all around the world?
It is very, very important. In a matter of years, dental students will not be just students anymore, and everything will be in their hands. We try to bring as much evidence as we can so that they are equipped to understand how important preventive dentistry is.

To me, aiming for a cavity-free world rather than just a cavity-free Europe is the most interesting aspect about the ACFF. However, do you not think that this is too utopic and idealistic? Is the possibility of living in a cavity-free future the same for a child in Sweden and a child in Turkey or Sudan?
That is a very good question. Whether it will be achieved or not, is a scientific assessment. However, whether children should stay cavity-free is a normative question. I am very comfortable to say that a child's nationality is irrelevant: a child in Turkey should be as cavity-free as one in Sweden. However, despite our objective being the same, the means to achieve our goal are fundamentally different in different local settings. This showed to be more difficult in some areas, which is what we are working on.

Do you believe that creating a cavity-free future is possible with solely individual-based oral health education, or are industrial, economical and political changes by governments also required?
Of course, a variety of actions are required, at upstream (national or international) levels. For example, sugar taxation, or bans of advertisements aimed at children are considered to be effective, as well as policies that focus on common risk factors. Nevertheless, it is also mandatory to reform dentistry at a chairside clinical level.

What is the best approach to creating a cavity-free future; convincing people one by one about the idea of a cavity-free future or trying to convince governments about putting industrial limitations in this capitalist world?
This a very old debate in dental public health. I would personally say both are necessary, and both can be done simultaneously. It is what we try to do at the ACFF, and what actors or policy entrepreneurs should be doing. The 'capitalist world' has undoubtedly driven a range of bad habits for people, which can be summarised as the commercial determinants of health, and these will need to be solved if we want to achieve our goal, but also promote good general health. However, actors need to be convinced one by one and we will welcome anyone that wants to work on this with us.

Finally, considering the topic of our interview, do you believe that it is possible to live in a caries-free world?
Of course! We have seen so many diseases in the past that are now almost extinct. It should be every dental professional's goal to work on this together with others, and I am sure we will progressively make it.

Thank you so much for the interview, Dr. Mazevet! ■

The role of WHO in advancing global oral health

Tooth decay in permanent teeth is the most common health condition worldwide, though it is entirely preventable. What are we missing in the global fight against oral disease? And where does the WHO place itself in this struggle?

Aurora Fratila, Germany

According to the Global Burden of Disease Study (2017), oral diseases affect 3.5 billion people, with dental caries being the most common affliction worldwide. Although most oral health conditions are preventable and even reversible in early stages, an increase in their prevalence is still noticeable to this day.

A significant factor which negatively affects oral health globally, regardless of the income-level, is the unequal distribution of oral health resources. Because dentistry is currently decentralised across most countries, obvious discrepancies arise among communities. While human as well as financial capital, and adequately expansive healthcare infrastructure, is lacking in many countries, access to basic oral health services is often limited. This is especially prominent among many communities in the global south, as well as underprivileged communities in more developed countries (MDCs). The cost for the treatment of advanced oral health conditions is often very high and usually not included in universal health coverage (UHC) programmes - in-

deed, basic examinations and assessments often pose barriers to access. There are signs that policy is shifting in the right direction, with the Scottish government pledging free dental care for 18-25 year olds on top of free dental care for children that is already in place.

According to Peres et al. (2019), there is a strong and direct link between the prevalence of oral diseases and the socioeconomic status of the population - poverty continues to be the single most potent predictor of caries status. Thus, it is proven that low-income countries and people that are socially-disadvantaged, are disproportionately affected by oral health conditions. Economic deprivation is linked to destructive habits, inability to access a dental professional, inability to procure necessary equipment and sustain satisfactory oral hygiene, and the tendency to depend on a highly cariogenic diet.

According to Petersen (2005), a major challenge for concrete improvements would be translating the existing knowledge (from studies, research, statistics) into concrete action and public programmes tailored for the specific communities and times we live in. We have the facts; we are familiar with the situation. Now, how can we work towards solving it? Often, we are limited to health promotion initiatives simply because concrete actions depend on political whims as it relates to policy priorities and budget allocation - and on a regional and national scale in country after country, when it comes to oral health, it is rarely deemed to be of critical importance.

The WHO is of great importance in this context and has an essential role in advancing global dental health, since it recognises oral health as an integral part of general public health and quality of life.

As a multilateral body with ties to most countries in the world, the WHO has remarkable reach and access to data, people and organisations across the planet. Given the fact that there already exists data on oral health in different regions and social stratifications, more targeted campaigns with the help of the World Health Organisation can be organised and overseen - and the WHO can provide the network for countries to help one another in terms of which interventions prove effective, and which interventions carry a negligible impact. What many countries and communities need right now in terms of oral health care, are materially significant programmes and action, not just social media campaigns - though health promotion is of critical importance too. It is not that social media is not an excellent medium for passing on information, raising awareness and educating, but many people who cannot afford oral healthcare; who lack access to basic needs and services from housing to education; who live in such low-income regions that they cannot afford good hygiene are among those who truly need our active support, as organisations, as volunteers, as doctors - and often, they are the very people not accessible on social media. We need long-term action plans for things to improve, like targeted nationwide oral healthcare programmes overseen by the WHO, designed according to evidence-based metrics and evaluation principles. Countries with a lack of resources must be supported by the countries and organisations which are better equipped - as opposed to hawkish neoliberal multilateral lending organisations - as health is a basic human right that must be defended globally, and not a harvest to be greedily reaped by insurance companies and big corporate pharmaceuticals.

The WHO has already identified these issues and is currently working towards implementing key strategies based on a three-year roadmap (2019-2021) within the WHO oral health resolutions. The development of a global oral health report is one of the top priorities, to serve as evidence for the urgency and importance of developing and implementing a global action plan, based on the status of oral health globally. With a focus on marginalised and underprivileged populations, where access to basic oral health is most limited, oral health reports are essential in serving as foundations for international conventions, local laws and as the evidence-base and data guiding different projects - and providing the shared goals of such projects.

Moreover, the WHO World Health Assembly newly approved a milestone Resolution on Oral health (January, 2021). The resolution urges Member States to recognise the association of oral diseases with noncommunicable diseases (NCD), address shared risk factors, include oral health interventions in universal health coverage (UHC), focus on shifting to a preventive approach and more. The plan is to translate the strategy that is put forward into a global action plan by 2023.

By promoting prevention and minimally invasive treatments, the costs of dental healthcare could be significantly reduced - and the impact of campaigns and interventions maximised. This can also be achieved by limiting the ability of pharmaceutical and medical technology companies in holding onto medical patents indefinitely and arbitrarily setting extortionate prices for equipment and drugs. Many people are only visiting the dentist, if at all, when the only treatment that can be applied is an invasive one. It is unavoidably true that this is deeply immoral - dental assessments are screens for oral cancer, a disease for which the prognosis is deeply dependent on early detection. Strategies regarding the promotion of prevention and self-maintenance and recognising it as one of the most important parts of a meaningful global oral health plan are already being worked on and should continue to represent a meaningful part of promoting oral health globally.

Certain countries already recognise prevention as a cost-effective solution for improving oral healthcare of entire nations and encourage regular check-ups that are funded by health insurance plans. This, of course, raises the concern for low- and even middle-income countries which cannot take advantage of such privileges. Yes, for a future dentist, it is daunting to think that there are still so many countries in the 21st century, where basic oral health is considered a privilege and not a basic right. Oral health systems must shift their focus from invasive dental treatments to prevention and minimally invasive treatments, and where they are unable to do so independently, they must be assisted with financial and intellectual aid. Some grassroots initiatives include educating staff, involving local and international universities for dental-aid programmes, regularly organised community projects, promoting oral health in kindergarten and schools, providing basic hygiene products (for example through sponsors) and so on.

We need a new, innovative global oral health plan, suited for the times we live in and tailor-made for the specific demands of the people in different countries and economic strata. The basic needs of any person, whether they are in Madrid or Manilla, Bucharest, or Brazzaville, are of equally critical importance. Moreover, some people need more help than others - a fact which must be acknowledged and translated into global health policy. Involving the public health associations in countries, local authorities, and community organisations, as well as governments, the health ministries, universities and learning institutions could have a major long-term impact on people's quality of life and oral health, and would represent a much-needed shift in the global fight against oral disease. ■

Food labels: implications and deceptions

Food labels depicting the quantity of fats, salts and sugars are often deceptive. This renders consumers uninformed when purchasing and consuming. This article looks into the implications of the deceptions present and suggests methods to overcome them.

Phillipa Agius, Malta

Once financial barriers are mitigated, education and motivation are the keystones of a healthy lifestyle. The general public must be informed regarding the different food groups and nutrients, their holistic effects on the body, and their specific relationship to oral health. Along with the necessary information, individuals must have the willpower to abstain from and limit the intake of processed and modified foods. Repeatedly succumbing to the constant temptation of unhealthy though easily available foods, inevitably contributes to systemic and oral diseases. However, the decisions of consumers are not the crux of the problem. The fault lies much above us, within manufacturing companies who mislead the common consumer by printing unclear food labels - if they are printed at all, and the failure of our political and legal defences to prevent such malpractice.

A change in the law

We must note that the European Commission updated a regulation in 2014 on the provision of food information to consumers.

Key changes to this law are:

- Improved legibility of information (minimum font size for mandatory information);
- Clearer and harmonised presentation of allergens (e.g. soy, nuts, gluten, lactose) for prepacked foods (emphasis by font, style or background colour) in the list of ingredients;
- Mandatory allergen information for non-prepacked food, including in restaurants and cafes;
- Requirement of certain nutrition information for majority of pre-packaged processed foods;
- Mandatory origin information for fresh meat from pigs, sheep, goats and poultry;
- Same labelling requirements for online, distance-selling or buying in a shop;
- List of engineered nanomaterials in the ingredients;
- Specific information on the vegetable origin of refined oils and fats;
- Strengthened rules to prevent misleading practices;
- Indication of substitute ingredient for 'Imitation' foods;
- Clear indication of "formed meat" or "formed fish";
- Clear indication of defrosted products.

Health as a multifactorial state

Oral and systemic health depend on a multiplicity of related factors. These include physical wellbeing, financial status and self-care ability. One factor requiring daily attention is our diet. To look at the body holistically, one must acknowledge that the body will be affected by any continuous habit and action. This includes the food we eat which has a direct effect on our bodies in terms of health and metabolism. Adopting the common risk factor approach by reducing the consumption of the following foods will result in a reduction in systemic complications. An example would be reducing sugar and thus diabetes, reducing salts to mitigate the onset of cardiovascular disease. To zero in on the impacts of diet on oral and systemic health, we must look into sugars, salts and fats.

Sugar

There have been countless research papers and observable instances which prove that there is a direct relationship between patients ingesting a higher quantity of sugar, and in higher frequency, and presenting with a greater DMFT (index of decayed, missing and filled teeth). Between 20% and 90% of 6-year-old children have dental caries, and at age 12, an average of 0.5–3.5 permanent teeth are affected by this disease. In European countries, nearly 100% of adults have experience of this disease and between the ages of 35–44 years, an average of 10–20 teeth have dental decay (World Health Organization, 2021). The World Health Organization (WHO) guidelines recommend that adults and children reduce their daily intake of free sugars to less than 10% of their total calorie intake. A further reduction to below 5% per day would provide additional health benefits. This would mean that 25g of sugar is the maximum limit that should be consumed daily. This however can be very challenging as food labels are misleading (as will be discussed later on), and due to the presence of 'hidden' sugars. The intake of sugar also affects systemic health. This would include some of the following adverse consequences: sugar may have a suppressive effect on the immune system (Childs, Calder and Miles, 2019), it can hinder calcium absorption, excess consumption can put a person at an increased risk of heart disease, autoimmune diseases, insulin-related diseases and behavioural variation. Excessive sugar can result in a loss of tissue elasticity and function by varying protein structure (Kim, Park and Kim, 2017). Sugar greatly assists the uncontrolled growth of Candida albicans which affects denture-wearing patients and the immunocompromised greatly (Van Ende, Wijnants and Van Dijck, 2019). Sugar is a common risk factor for many conditions such as obesity, heart diseases, certain cancers, caries, diabetes and the like.

Salt

The American Heart Association recommends no more than 2,300 milligrams (mg) a day and moving toward an ideal limit of no more than 1,500 mg per day for most adults. 1500 mg of sodium amounts to 0.75 teaspoons or 3.75 grams of salt per day, while 2300 mg amounts to one teaspoon or 6 grams of salt per day. Many people consume much more than that. The average intake of sodium in Europe is about 3400 mg, most of it coming from processed foods. Salt can have both adverse and beneficial effects. Unfortunately, salt is available through foods which are often also very high in carbohydrates. These break down from starches to simple sugars in the oral cavity, posing as substrates for cariogenic bacteria. On the other hand, salt topically increases the pH in the oral cavity which provides a hostile environment for certain bacteria to grow. The American Dental Association recommends sodium lauryl sulfate and other sodium-based compounds that act as foaming agents in toothpaste. A mild salt rinse is also recommended to soothe painful tooth sores or bacterial infections. Finally, if a patient has undergone oral surgery recently, infections, or gum swelling, warm salt water rinsing will help to remove swelling, acting as a natural disinfectant. Systemically, higher levels of salt intake result in higher chances of increased blood pressure (Cappuccio, 2013), stroke, cardiovascular disease including left ventricular hypertrophy, glomerular filtration problems due to fluid retention, kidney stones, bone demineralisation and in very rare cases, fractures (Acosta, 2021).

Fats

The dietary reference intake (DRI) for fat in adults is 20% to 35% of total calories from fat. That is about 44 grams to 77 grams of fat per day if you eat 2,000 calories a day. It is recommended to eat more of some types of fats because they provide health benefits, and avoid others. Dietary fats do not have a direct effect on oral health - however there are receptors in the oral cavity and the gastrointestinal tract that interact with dietary fats, which help in regulating fat intake. The beneficial aspects of fat on systemic health include acting as a source of energy, a source of essential fatty acids that our bodies cannot make (a necessary component of cell walls), a way to absorb fat-soluble vitamins (A, D, E, and K) and a way to insulate our bodies and protect organs. An increase in saturated fatty acids has been linked to a rise in low-density lipids (LDLs) which are thought to have a negative health impact as they lead to increased serum cholesterol levels and a subsequently higher risk of coronary heart disease. Therefore, all recommendations stress the importance of limiting the intake of saturated fats, though there is a difference of opinion regarding the extent to which their intake must be controlled. Monounsaturated fatty acids, on the other hand, have a positive impact on the serum lipid profile, leading to higher-density lipid production (HDLs) and decreased cholesterol production, thereby fa-

vourably influencing metabolism, especially in the case of diabetics. However, it is essential that monounsaturated fatty acids are generally consumed through plant oils like grape-seed or olive oil and not by foods that are simultaneously rich in other more unhealthy fats such as trans fats in hydrogenated oils. If the fatty acid composition of the diet is optimised, even a total dietary fat content of 35% of total energy intake can be adequate as long as there is enough physical activity and the diet is rich in plant-derived foods.

Discussion

Various products placed by the cash register generally do not have food labels on them. This is possibly because the food label was present on the box that they arrived in (for example 'Chupa Chups' lollipops), leaving the individual products without a food label. These, in comparison to other products, often seem low in price, and are strategically placed to tempt consumers and/or their little companions. Whilst waiting to pay for their items, it is common practice for someone to indulge by taking at least one of the various products which have been very intentionally placed in the vicinity of the cash register - for increased profitability. The fact that some of these items do not have food labels renders the public uninformed about what they purchase and consume.

This fact was noticed by the United Kingdom's government, and as part of their 'children obesity strategy', have banned stores from keeping such high sugar products next to the checkout as well as two-for-one deals on junk food - this should have been implemented in 2020. The UK government has also recently pledged to ban junk-food advertisement on television channels before the 9pm watershed. Such information is also often neglected in 'fresh-foods' served to eat, such as in the case of Subway - where an Irish court ruled that the 'bread' could not be labelled bread, but must be listed as confectionary, due to its astronomic sugar content. (Parker, 2018)

A number of chocolate bars were found to have deceiving food labels too. An example would be stating that one bar has a certain amount of calories. The first thought that would come to mind would be that the 'bar' is referring to the entire bar. This is not the case as there would be a diagram placed (normally at in the top right corner outside of the lines of the food label) stating that 1 bar multiplied by 4 would create the entire product. If one simply looks at the food table quickly without due diligence, it is easy to be deceived. This of course leaves the public clueless about the true nutritional data of the product. Some products don't have a food label on them at all. This is because they were originally shipped to the supermarkets in boxes which had the food label printed onto them. Individuals would have to find nutritional information online, or otherwise remain uninformed.

However, a simple tool like the traffic light system used in food labels greatly alleviates this issue. Upon assigning individual colours relative to the quantity of sugar, salt and fats and the effect on general health will inform the customer about what they consume. This is currently done with individual compounds such as sugar, fat and salt that have the potential to vary considerably within the same food item. This once again may be confusing to the common consumer. Taking this idea further, the traffic light system may be used to judge products as a whole, making informed decisions much easier. Supermarkets and mini-stores may then separate the foods according to their level of health, once again creating a supportive environment that facilitates good choices as opposed to the most profitable ones.

An interesting study put to light by the Faculty of Dental Surgery in Malta shows that 17.2% of the total respondents were aware of the WHO guidelines regarding sugar intake. 41.7% of people showed a good level of knowledge in reading nutrition labels. This suggests that people generally benefit from nutritional information, but more can be done to ensure essential information is communicated to and understood by the consumer (Cuschieri et al., 2020).

During Euro 2020, Cristiano Ronaldo, one of the world's greatest footballers, caused a stir (and financial consequences) when he removed bottles of Coca Cola from the desk he was sitting at during a press conference, recommending that people drink water instead. It is this level of pushback needed by international role models as part of global dietary change for the better. Misleading, confusing or absent nutritional information is just the tip of the iceberg - junk-food companies are able to advertise and sponsor events (including athletic and sporting events) with impunity, using unscrupulous marketing methods and flogging products disastrous for systemic and oral health to people of all ages - especially the more vulnerable youth who are at the age where they build habits and likes that they carry with them into adulthood. It is in the public interest for companies' labelling and marketing practices to be tightly controlled by legal and regulatory agencies, so that barriers are reduced in order for individuals to lead healthier lives. ■

Attitudes and behaviours of dental students regarding oral health

Does dental training make our future dentists better maintainers of their own oral health?

Dilara Kılıç, Turkey

Oral health does not simply pertain to the prevention of diseases but includes the nurturing of psychosocial well-being, so that people are able to perform functions like talking, smiling and eating with confidence, and feel comfortable participating in society. "Oral health is a key indicator of overall health, well-being and quality of life. It encompasses a range of diseases and conditions that include dental caries, periodontal (gum) disease, tooth loss, oral cancer, oral manifestations of HIV infection, oro-dental trauma, Noma and birth defects such as cleft lip and palate", according to the World Health Organisation (WHO). As estimated in the 'World Health Assembly Resolution paves the way for better oral health care', more than 3.5 billion people across the world likely suffer from oral diseases, indicating a remarkable burden of disease. Many oral conditions share modifiable risk factors with other noncommunicable diseases such as cardiovascular disease, cancer, diabetes, pneumonia, obesity, respiratory diseases and premature birth. Dental students are the future flag bearers of oral health in society, and are expected to be role models as much as they are healthcare providers for their patients, family members and friends. Written and visual media as well as dentists are the most common sources for receiving oral health information (Lin, 2001). Parents and carers also contribute to the oral health behaviours and attitudes of children. As with the wider population, an amalgamation of these factors also influence and inform dental students' oral health knowledge, behaviours and attitudes, in conjunction with the exposure and insight they receive as part of their training.

The survey

The survey was entitled 'Self-reported dental health attitudes and behaviour of dental students in Turkey'. In addition to the Hiroshima University - Dental Behavioural Inventory (HU-DBI) questionnaire, 1022 dental students from all five academic years across three dental faculties in Turkey were asked 7 additional questions. The questionnaire response format was binary (agree/disagree responses) - further categorisation regarding the strength of conviction may have enabled greater understanding regarding the varying levels of attitudes and behaviours. The first 3 years of dental education was deemed to be 'preclinical', and final 2 years were 'clinical' years. Out of 1022 dental students, 764 data points were included in the survey. 486 of this cohort were preclinical and 278 of them were clinical students. The questionnaire aimed to compare the differences in oral health behaviour and attitudes among preclinical and clinical dental students in Turkey. The final results indicated that there are significant observed differences ($P<0.05$) among students at different stages of dental school in their attitudes and behaviours towards key issues relating to oral health.

The HU-DBI scoring system is as follows: one point is given for agreeing to statements labelled 'A'; one point is given for disagreeing to statements labelled 'D'.

1) I do not worry much about visiting the dentist
2) My gums tend to bleed when I brush my teeth (D)
3) I worry about colour of my teeth
4) I have noticed some white sticky deposits on my teeth (A)
5) I use a child-sized toothbrush
6) I think that I cannot help having false teeth when I am old (D)
7) I am bothered by the colour of my gums
8) I think my teeth are getting worse despite my daily brushing (D)
9) I brush each of my teeth carefully (A)
10) I have never been professionally taught how to brush (D)
11) I think I can clean my teeth without using toothpaste (A)
12) I often check my teeth in a mirror after brushing (A)
13) I worry about having bad breath
14) It is impossible to prevent gum disease with tooth brushing alone (D)
15) I put off going to the dentist until I have a toothache (D)

16) I have used a dye to see how clean my teeth are (A)
17) I use a toothbrush which has hard bristles
18) I do not feel I have brushed well unless I brush with strong strokes
19) I feel I sometimes take too much time to brush my teeth (A)
20) I have had my dentist tell me that I brush very well
21) I am satisfied with the appearance of my teeth
22) I brush my teeth twice daily or more
23) I use dental floss on regular basis everyday
24) I use mouthwash on regular basis
25) I smoke cigarettes
26) I smoke more than ½ pack per day
27) I have been smoking for more than one year

Results

A significantly higher percentage (P=0.000) of the preclinical students are bothered by aesthetics - from the colour of their gums to the shade of their teeth. However, they are also more likely to not go to the dentist until they experience toothache. Preclinical students think that it is impossible to prevent gum disease with tooth brushing alone. The preclinical students more frequently agree that their gums tend to bleed when they brush their teeth; they tend to use a toothbrush which has hard bristles, and they don't feel they've brushed well unless with strong strokes (P=0.000). However, most clinical students, compared to preclinical students, brush each of their teeth carefully, think that they can clean their teeth without using toothpaste, and have had their dentist tell them that they brush very well (P=0.000). The clinical students were significantly less likely to use a hard bristled toothbrush than the preclinical students and while 32% of the preclinical students brushed with strong strokes, 17% of the clinical students did so (P<.001). The survey concluded that the HU-DBI score of clinical students (7.47±1.86) was significantly (P=0.000) higher than preclinical students (6.00±1.86). These results suggest that clinical students have better oral health attitudes and behaviours than preclinical students. Numerous studies in the literature (Messer, 2012) support the survey's results and highlight the link between the level of dental education and oral health attitudes and behaviour. There are also studies which show oral health behaviour and attitudes vary by sex. One of these studies which is named 'Level of education and gender-specific self-reported oral health behaviour among dental students' shows female students had better oral health attitudes and behaviour, especially towards visiting the dentist, toothbrushing habits and general oral hygiene practice (Al-Omiri, 2012). However, understanding the cognitive factors and discrepancies of males and females could better tailor dental health promotion approaches to modifying oral health behaviours of both groups, thus contributing to lifelong health maintenance.

Discussion

Dental students are future healthcare providers. Since they are expected to be role models and guides for their patients, family members and friends, they must receive adequate education about ideal oral health attitudes, practices and behaviours during their years at dental school. The results of the survey show that the majority of dental students care about their oral health. Interestingly, there was no significant difference between preclinical and clinical dental students regarding daily brushing habits. Where the survey was undertaken, lectures on oral hygiene are given in the 3rd year of education. It was expected that all of the clinical students should know how to brush, so as to instruct their patients. Nevertheless, 25% of clinical-stage students still declared that they had never been taught professionally how to brush. This may be explained by the dichotomy between dental students receiving tutorials and lectures in a clinical environment, and the experiences of dental students as patients in the dental chair - they may not consider the former to be professional instruction. In contrast to this survey, a study conducted with Indian dental students showed no difference between the clinical and the preclinical students with regards to their HU-DBI scores (Dagli, 2008).

Conclusion

Dental students, in line with the wider population of their age and socioeconomic cohort, have a rather low oral health awareness at the beginning of their dental education. There is an appreciably higher level of knowledge about oral self-care procedures in clinical students than in preclinical undergraduate dental students. There is a need to educate undergraduate dental students on oral care procedures, and personal oral health must be integrated within the curriculum. A key factor in education that is often lost in modern pedagogy, is learning to 'practice what one preaches' and to live the reality one seeks to instruct others to abide by. The dentist that seeks to promote oral health is also the individual who is in need of maintaining their oral health. The survey concludes that preventive dentistry and periodontology courses should be started from the first year of dental education, so as to nurture better oral health attitudes and behaviours from the preclinical stage. Dental students should have a comprehensive program that is inclusive of their own self-care regimes, starting from their first year of education. Most studies suggest that even though there are some positive changes manifested in the oral health knowledge, attitudes and behaviours among the students from first to final year of dental studies, preventive behaviour among students could still be improved. With dental students and dentists as with patients, it takes more than knowledge to build and maintain good habits. ■

Balancing act: A mother's journey through dental school (and a pandemic!)

Dental school is tough, being a parent at dental school is even tougher and being a parent at dental school during a world pandemic is the toughest! This is my 4-year journey through dental school, with a child in tow.

Azka Malik, United Kingdom

Dentistry is a difficult and demanding course, it feels like it takes over your life, becoming your ultimate priority, as otherwise surviving the tough environment of dental school becomes almost impossible. For me, starting dental school at 3 months pregnant was an intimidating thought, but the unrealistic optimism and naivety that came with being a first-time parent helped me through the initial few months, as I believed I would continue to manage everything once the baby was here. However, the rose-tinted glasses quickly shattered once I returned from maternity leave, and the challenges of the balancing act began.

I began to feel like I was inadequate, both as a dental student and as a mother. I wanted to achieve highly in both, yet no matter how hard I tried, one or the other would seem to suffer. Keeping up with the demands of an intense academic curriculum and those of a young child were more difficult than I could have ever imagined.

Although I was mostly surrounded by supportive Individuals, a few negative incidents deeply affected me. I was made to feel guilty for supposedly prioritising my child, so I would try even harder to prioritise Dentistry, and then felt guilty for doing so. This balancing act seemed impossible to master. Slowly I realised that my feelings were not isolated, in fact many women returning to work or education go through the same difficulties. According to a 2016 Equality and Human Rights Commission survey, three in four mothers said they had a negative or possibly discriminatory experience during pregnancy, maternity leave, and/or on return from maternity leave. It was almost inevitable for such experiences to be compounded in the gruelling space of dental education.

Despite facing many trials and tribulations, I drew my strength from my son, whose presence gave me purpose, determination, and motivation. I wanted to set a good example for him and to show him never to give up on his dreams. Gradually, the hard work started to show, I found a rhythm and routine, and I began to perfect the balancing act. That is, of course, until a worldwide pandemic struck.

The first lockdown completely shattered any progress I had made, and our established routine crumbled

entirely. I was not only home-schooling a now 3-year-old but was also expected to engage in online learning and prepare for end of year exams. During lockdown, unlike some who struggled to fill their time, and engaged in new hobbies and experiences, I was still struggling to find the time to complete all the tasks required of me. My husband being a key worker was busier than normal, and during initial lockdown restrictions, any wider family help was also impossible. Without doubt, the past year has been the most difficult year of my life. It has been challenging mentally, emotionally, and physically, with constant pressure for time.

Despite all the blood, sweat and tears, I kept going, and am now close to the end of my final year of dentistry. It seems surreal to have come this far. Do I feel like I ever truly mastered the balancing act? Honestly, I do not know - I do not feel the compulsion to know either. What I do know is that my son became my driving force, he helped me grow and develop into a better person and gave me a sense of purpose in this world. He is the reason I kept striving to reach my goals, and rather than posing a barrier as others may assume, I am unsure how I would have ever accomplished all of this without him. I must also recognise the immense support provided to me from my husband, family, friends, and peers. My friends and peers always encouraged me throughout the course and helped me tremendously, from sending me notes to revising with me. I cannot imagine where I would be without them.

If anyone else finds themselves in a similar situation and feels like their ability is maybe being questioned or they are being underestimated, I want to say that you can overcome anything you put your mind to and what others may perceive as your greatest weakness may in fact become your greatest strength. ■

EDSA Lecture Competition Spring 2021 Winners

1st Place
Barbara Gronwald, Pomeranian Medical University in Szczecin - 1st year graduated

Effectiveness Evaluation of Selected Muscles Relaxation Methods Modulating Neuromuscular Tension of Analog Astronaut's Masticatory System

INTRODUCTION:
As isolation may induce stress leading to an increase of neuromuscular tension, a study was conducted to evaluate the effectiveness of the Trigger Point Therapy (TrPt) and yoga exercises on mandible abduction range of Analog Astronauts (AA).

MATERIALS AND METHODS:
AA endured severe isolation conditions (no access to sunlight, no possibility to leave the facility, decreased physical activity, outside communication limited to an absolute emergency) for 14 days in limited space during consecutive AA missions at LunAres Research Station Habitat (Piła, Poland). Abduction measurements were conducted on the 3 groups of 5 Analog Astronauts: - Test groups: 1. AA who received Trigger Point Therapy; 2. AA who exercised yoga; - Control group: AA who did not receive Trigger Point Therapy nor exercised yoga. Trigger Point Therapy was performed in the area of the masseter muscle on the right and left side with closed mandible by trained medical officer. Yoga relaxation exercises were conducted by a certified yoga instructor. Maximum abduction measurements were made with electronic calliper (mm), i.e., placed between central incisors of maxilla and mandible.

RESULTS:
- Average abduction range change in AA with TrPt: 5,09 mm increase of mandible abduction. - Average abduction range change in AA with yoga exercises: 0,93 mm increase of mandible abduction. - Average abduction range change in control group: 2,32 mm increase of mandible abduction. - The largest increase in abduction range was observed in the group receiving Trigger Point Therapy compering to other groups.

CONCLUSIONS:
1. Trigger Point Therapy effectively decreased neuromuscular tension of Analog Astronauts.
2. Yoga exercises do not sufficiently decrease neuromuscular tension in mastication muscles area.
3. Observations concluded in LunAres Research Station regarding stress-related neuromuscular tension can help identify effective therapeutic methods for circumstances of pandemic isolation.
4. The study should be continued and confirmed on a greater number of cases.

ACKNOWLEDGEMENTS:
Leszek Orzechowski

KEY WORDS: isolation, stress, astronauts, neuromuscular tension, trigger point therapy

2nd Place
Christa Serban, Victor Babes University of Medicine and Pharmacy Timisoara - 4th year

Image Processing Techniques for Optical Coherence Tomography Imaging in Endodontics

INTRODUCTION:
The optical coherence tomography (OCT) is a non-ionizing, non-destructive, and non-invasive imaging method. It is an indispensable tool in ophthalmology and other fields of medicine. In dentistry, the OCT is an emerging tool as numerous studies have successfully demonstrated the potential of the OCT for dental applications. In endodontics, the OCT has been proposed for imaging voids in the obturation material and sealer. However, OCT images inherently contain noise which degrades the quality of the image and creates limitations in the diagnostic capabilities of the OCT. The aim of this study is to implement image processing techniques for OCT images that enable better evaluation of voids occurring in root canal fillings.

MATERIALS AND METHODS:
Images from OCT scans of 25 extracted teeth with root canal fillings were selected. The images were obtained from an OCT system working in Time Domain mode at 1300 nm. The images were subjected to image processing techniques commonly used in medical imaging using Matlab R2018b software. The techniques applied were contrast enhancement, edge detection, and image segmentation through k-means clustering algorithm.

RESULTS:
Contrast enhancement was useful in improving the quality of the images. Edge detection did not provide much benefit in the case of OCT images due to the noise present in the images. Image segmentation using k-mean clustering algorithm was successful in detecting the boundaries of voids occurring in the sealer or obturation material.

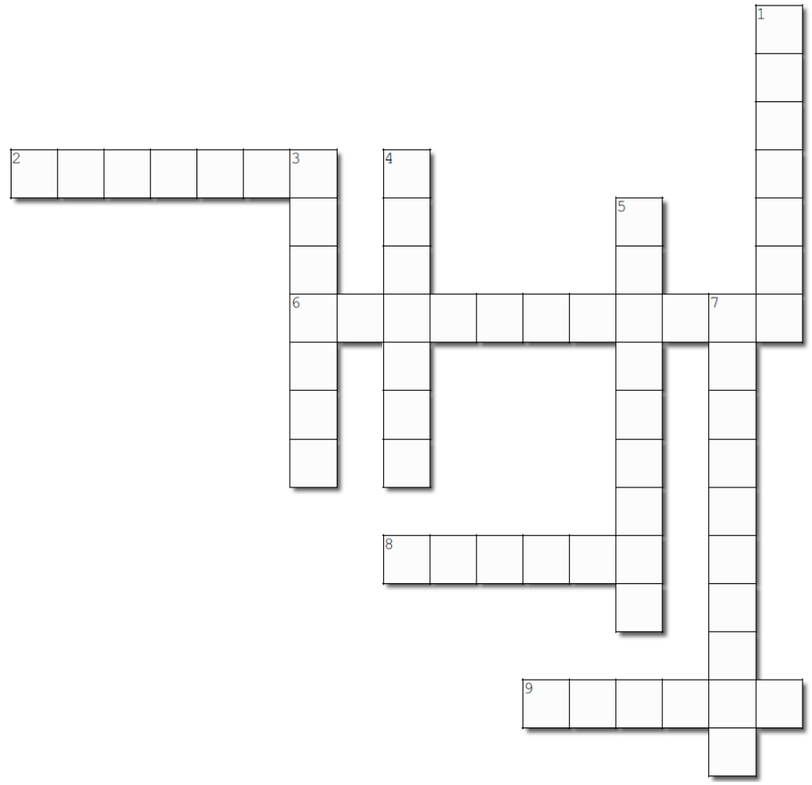
CONCLUSIONS:
Consumption of sugar is a key factor that causes dental caries. However, over the recent years the rise in dental OCT analysis through contrast enhancement and segmentation algorithms is challenging but produces useful results. Although no single process can be uniformly applied to all images, common steps can be taken to enhance the original image to aid in the evaluation of root canal filling voids. The techniques presented in this study can be useful for future studies aimed at understanding where defects are mostly to occur in a root canal fillings.

KEY WORDS: Optical coherence tomography, image processing, voids, endodontics, image segmentation

EDSA Board 2020/21

EDSA Crossword

An (unexhaustive) list of names of Covid-19 vaccines and makers.



Across

2. A one-shot wonder...
6. Oxford-made, met with unfound reluctance.
8. You'll pfeel great after this one!
9. Produced in a Caribbean country noted for its cigars and excellent doctors.

Down

1. There was Apple versus Samsung, now there's Pfizer versus...
3. Not yet in widespread use, despite millions of orders - boosters in Autumn?
4. Not a (5g) satellite, but named after one...
5. A Chinese-made vaccine - used in areas of the world where cold-storage poses problems.
7. Identical to another British-developed vaccine, but not according to the EU.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Košice 2021
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