

# EDSA

## Magazine

Summer 2020



# Bacteriophages

*Promising weapon in the fight  
against antibiotic resistance*



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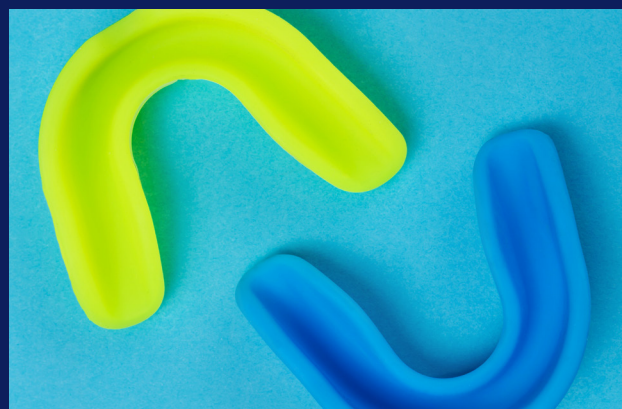
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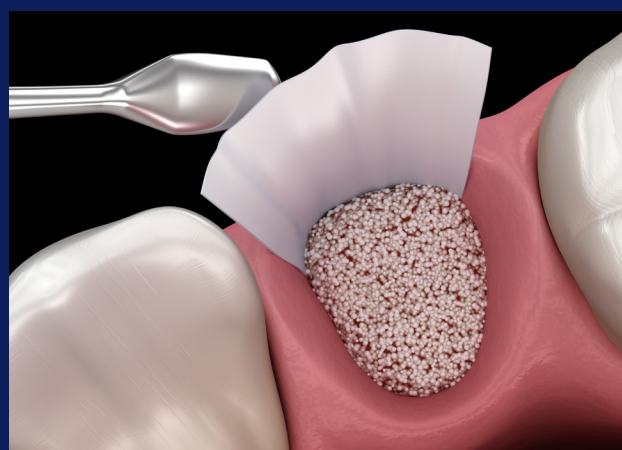
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# Editor's Word

Dear European dental students,

Years ago I came across a quote by Miguel de Unamuno: „Fascism is cured by reading, and racism is cured by traveling“, and it has stayed with me ever since. As far as reading and traveling go, they are some of my favourite activities. I also think the sentiment holds true now more than ever. Meeting many different people while traveling, listening to them and trying to see the world from their perspective has been changing the way I think about every „vulnerable“ group that has been created by society. Whether bigotry arises in the form of homophobia, racism, xenophobia, or countless other unjust prejudices, how can you judge and define someone who, in every other way, is just like you? Most online hate speech may be avoided if these people talked to each other in person and had shaken hands. Most of the hate would never have arisen if people just tried to be empathetic with the person they are hating.

In the COVID-19 times, the option of traveling has been a bit harder. That's why I've been reading much more than before; reading books about difficult topics like wars, genocides, political regimes. It's clear to me that the world is not black and white, more like different shades of grey. In the horrible moments of history, there were also soldiers saving lives of the opposition, desperate people not wanting to hurt anyone, people risking their lives to save others, and they were always on both sides of a conflict. We tend to be afraid of anything unknown, of „them“, whichever group that might be. What if we just listened to them and tried to see the world through their eyes?

I am thankful to EDSA for giving me, amongst the rest of us, the opportunity to talk to people from different countries, to hear not only about their dental studies but about their culture, religion, politics and their daily life. Because I feel like I can grow and educate myself, being surrounded by other European dental students.

I would like to thank my amazing EDSA Executive team for amazing support throughout the whole year, for reminding me to believe in myself, and for all the amazing time we've had at our online meetings.

I also want to thank my brilliant Co-Editor Neil Unnadkat for helping me making the right decisions, being productive, smart, and also being a great friend.

And the biggest thank you goes to all the writers, readers and supporters of the magazine, it was a great honour for me to be the editor of the magazine older than myself.

Ivana Ligusová, *Editor-in-Chief*



# Messages From The Team

Dear EDSA Family,  
Dear Partners of the Association,

Welcome to the last issue of the 2019/2020 term's Magazine for which you can enjoy reading from the safety of your home. COVID-19 had a big impact on the functioning of the Association, however we managed to maintain the activity, representation and continuity of EDSA on the high level. I am truly grateful for the commitment, energy, skills, and knowledge you have invested in the dental students' community and it was a great pleasure working for you and with you. As I am counting my last days as the President of EDSA, I would like to encourage you to join our community and be the change you want to see-you won't regret it, mark my words. I am wishing you to stay healthy and to fulfill all of your endeavours that you set in front of you.

**Tin Crnić, EDSA President**



Hello everyone!

I hope you are all well and safe. Normally, this foreword would be a bit more exciting and in anticipation of another phenomenal conference. However, the COVID-19 pandemic is still looming large. It is important to remind ourselves that it is a test of our strength, as well as patience as a society, and more importantly, as healthcare professionals. I wrote a similar piece to this one for the Spring edition of the EDSA magazine hoping to see all your beautiful faces in late August of 2020. While I am unable to see you in person, my social media has been graced with warm wishes and overwhelming positivity from old and new EDSA faces alike. I am also grateful that we live in an era where communicating with you all is at the touch of my fingertips. I can only pray that each of you is managing to look after yourselves, your friends and family during these unprecedented times. Rest assured that we will all be able to see each other soon, and we will rejoice. In the interim, thank you to all of you who have helped contribute to the Summer edition of the EDSA magazine. It has been a pleasure reading and editing your articles. A special thank you to my VPPR, Ivana too. Without you, none of this would be possible!

**Neil Unnadkat, Magazine Co-Editor**





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# CED-EDSA Internship experience: *from Brussels, with love*

In October 2019, the Council of European Dentists (CED) welcomed the first CED-EDSA intern in the Brussels Office. The CED-EDSA internship was an ambitious idea that was put forward by the EDSA Executive several years ago with the aim to implement a position that would provide a crucial link between the CED and EDSA, facilitating close collaboration of the two organisations. Bringing the students' and young professionals' point of view to the table is one of the main principles on which this cooperation relies and will work in the future.



**Daniela Timuş, CED Intern**



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The Council of European Dentists is a European not-for-profit association which represents over 340,000 dentists across Europe. The CED concentrates its activities on promoting high standards of oral health and aims to contribute to safeguarding the protection of public health by actively lobbying the European Insti-

tutions.

Having the expertise in areas of paramount importance for dental health, the CED advocates through its policy statements and drafts amendments to proposed EU legislation so as to ensure that the views of European dentists and patients' needs are reflected in all EU decisions regarding oral health. Therefore, by functioning in a political environment, it has the purpose to ensure that oral health is taken into account during relevant decision-making processes.

Oral health is essential to general health and contrary to common public misconception, consists of much more than having healthy teeth. The Lancet Series on Oral Health published in 2019 points out that oral health has been neglected globally and despite the mostly preventable impact of oral conditions on almost four billion people in the world, we are still facing deficiencies in oral health care

and preventative services in all countries. The Global Burden of Diseases Study shows that oral health has not improved in the last 25 years and oral conditions remained a major public health challenge all over the world in 2015. Clearly, oral diseases pose a very serious public health challenge to all actors, including policy

**“Being placed in a different working environment that was still focusing on dentistry allowed me to acquire a broader perspective on our profession, especially as an integrated part of general health.”**

makers.

Therefore, dentistry matters to health policy, and health policy matters to dentistry. That's why EDSA has been focusing more on policy work during the last year. Besides introducing a new position within the Executive, i.e. Policy Officer, the internship at the Council of European Dentists has proved to be paramount in order to involve and represent European dental students on a political level.

The work of the CED-EDSA intern is





different from what we are used to doing in dental school. I switched the scrubs with the smart office outfits, the dental chair with the adjustable office chair (ergonomics is still very important) and the dental probe with the European Parliament pass. It is nevertheless exciting and equally important. Understanding how health policy works and the process behind EU legislation and regulations that influence healthcare per se and the professions involved made me enjoy the internship. During the nine months in Brussels, I was involved in various aspects of CED work, including activities of Working Groups and Task Forces, communication activities and administrative tasks. During the last months of 2019, I focused mainly on the update of one of the main CED publications - the EU Manual of Dental Practice, one of the most important publications of the CED aiming to offer a comprehensive overview of the dental profession across the European Union.

Being in the heart of Europe is a unique experience that comes with many perks, including a broad networking environment. Besides meeting dentists from all over Europe, you get to meet healthcare professionals and students, interns in Brussels as well. Our sister-associations, EPSA (European Pharmacy Students' Association) and EMSA (European Medical Students' Association) have an impressive number of internship opportunities to get familiar with the multiple facets of their profession – from regulatory affairs to industry and policy work.

During my internship I took every chance to take part in European events, such as the Make Sense meeting in the European Parliament and the "Promoting lifestyle medicine: competencies and

education of health professionals in the EU today" workshop organized by the European Commission in Luxembourg. The latest was an event where, as a dental students' representative, I contributed to achieving the objectives of the workshop to update knowledge and discuss the current practice of health promotion; map the competence profiles of health professionals and best practices in education in the EU and brainstorm about the essential elements of lifestyle medicine (in education and practice), barriers to lifestyle medicine promotion, and best ways to increase commitment on this topic.

The CED intern position allowed me to be in contact with other healthcare associations, representing both students and professionals. I believe this is fundamental mainly because when working together, the European healthcare professionals can add genuine value to common and individual efforts to improve the effectiveness of dentistry as a profession and deliver patient-centred-care to their communities.

Being placed in a different working environment that was still focusing on dentistry allowed me to acquire a broader perspective on our profession, especially as an integrated part of general health. This experience has most definitely encouraged me to seek other career opportunities and to have a better understanding on how European healthcare students' associations, by getting involved and presenting policy work, can contribute

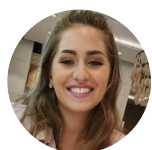


to achieving the European community's fullest health potential. Evidence shows that health is a complex policy area crossing social, economic and environmental sectors, which all should be considered. Hence, EU institutions, Member States, dentists, doctors, pharmacists, public health experts, educators, patient groups and students together with other relevant stakeholders should create a multi-sectoral framework to work together to deliver high-quality and equitable care in a sustainable way.

The CED-EDSA internship is a unique opportunity and a heartfelt recommendation that I have for students all over the European Union. The 2020 world pandemic was an unfortunate event that interfered with the continuity of having an intern in Brussels. However, the position is still open and we are planning to welcome the next intern in January 2021. I would like to encourage all the dental students and freshly graduates interested in policy work and experiencing the "Brussels bubble" (and beyond) life to submit their application and get curious, motivated and enlightened. I look forward to seeing you in Brussels, the city of delicious fries and waffles that became my new home for another few months, soon!



# From Barber's Shop, to Clinic: How Dentistry has Evolved to Reduce the Spread of Infection.



Eleanor Rea, UK

In every day practice, as students and professionals, we take for granted the measures that we have for infection control. They are simply the rules of our workplace, and without them we would be in a completely different position as a profession. But have you ever thought about how these measures came about? How did dentistry move from a non-sterile barbers' shop to a clinical setting? In modern day dentistry, the challenge of disease transmission has brought about the innovation of exceptional infection control. Historical outbreaks and the discovery of new disease containing particles has led to a whole host of measures, which, for us, have become normal. Covid-19 has come to be the new challenge, bringing along a new chapter of hygienic and precautionary practice, with the prospect of reshaping dentistry as we know it- for how long? - We just don't know...

## Creutzfeldt Jacob Disease and Endodontic Treatment

Creutzfeldt Jacob Disease, CJD, is a fatal prion disease, causing gradual degeneration of neural tissue, as the prion proteins survive in nervous tissue. It is thought to have been acquired by humans through consumption of Bovine Spongiform Encephalopathy (BSE) infected meat products.

CJD became a worry to dental professionals in the early 2000s when it was discovered that with inadequate decontamination procedures, CJD could be transmitted through endodontic treatment when a reusable instrument had been used. This has led to a high increase in the use of single use endodontic files, as well as more advanced sterilisation procedures used on dental instruments. It is an example of how dentistry has evolved to reduce infection spread in practice.

## Explaining the theory of how endodontic treatment could result in CJD transmission

A patient who had eaten BSE infected meat products could consequently develop CJD. Symptoms take a while to develop, as the disease has a long, yet still unclear incubation period; according to the UK National Health Service, there is thought to be an incubation period of more than 10 years in some people.

If this asymptomatic infectious patient needed endodontic treatment, the endodontic file used for the treatment would become contaminated with CJD prions existing in the patient's nervous system, from the pulp chamber as dental pulp originates from neural crest cells during tooth development. That instrument would then be decontaminated, however standard decontamination procedures are theoretically insuf-



ficient for prion removal, because “the proteins are very stable and resistant to usual sterilisation procedures”, as stated in “Cross infection control measures and the treatment of patients at risk of Creutzfeldt Jacob Disease in UK general dental practice” by J. Bagg, C.P. Sweeny et al. Subsequently, when the next patient came to have endodontic treatment with what was thought to be a ‘clean’ endodontic file, the file would be a vector for the prions to get into the pulp of an uninfected patient.

Although theoretically possible, there have been no recorded cases resulting from dental treatment, according to nature.com’s article “vCJD & dental treatment” by Fiona Ord and Pauline Watt.

### **Covid-19 and Aerosol Transmission**

Following the information given by the Centre for Disease Control and Prevention on Guidance for Dental Settings, dental professionals are known to be at high risk of upper respiratory tract infections; every day dental procedures produce droplets and aerosols, which may contain pathogenic particles and would be breathed in by the receiving practitioners. This information has led to an increased level of anxiety for dental practitioners and students going back to work, and as such, has resulted in an array of new precautions both from the dental chair and the patient’s chair.

**I was able to speak with Dr Bethany Rushworth MChD/BChD, editor of the Oxford Handbook of Clinical Dentistry, who has been experiencing impact on day to day practice herself:**

**“Dr Bethany, how is Covid-19 currently affecting your practice dynamic?”**

“We are wearing enhanced PPE to protect ourselves and our patients, which is making communication quite difficult with patients. Usually I would be talking to patients without a mask during the consultation, however now with a mask, patients find it more difficult to understand me.

The pandemic has brought new stresses to general practice and financial worries for many practitioners due to the fact that treatment is less cost effective.

Some patients feel like they have time on their hands due to being furloughed, but then others can’t afford treatment due to the financial instability that the pandemic

has brought. There is also the added anxiety from patients that they do not want to attend until things settle down- but we don’t know when that is going to be, which makes us worry about the future attendance of patients. This isn’t helped by recent advice published by the WHO advising patients against going for routine dental care (a paper entitled “Considerations for the provision of essential oral health services in the context of COVID-19” states that only patients requiring urgent or emergency treatment should be treated and others should be given over the phone triage).”

**“From the decrease in access to dental services over the past few months, would you say that this has resulted in a decline in oral health?”**

“Well, I expected the rush of people coming into the practice was going to be like black Friday! However, my expectation was wrong, as our patients in general have been looked after. It hasn’t been this way everywhere though, especially for some of my NHS colleagues who now have huge backlogs to manage.

Periodontal assessments that were previously every 3 months have unfortunately been pushed to a 6 month treatment interval due to the pandemic, so certainly in those higher risk patients I can see a difference.

The most notable difference though has been the increase in DIY dentistry, which no dentist would ever recommend!

However, the time that dental professionals were not at work meant that more oral hygiene instruction has been provided online or over the phone, and dentally aware patients have had a lot of access to dental education from good sources, so to a certain extent this has benefited patients.”

**“As a dentist under this new pressure, how are you managing yourself?”**

“In truth, there is no end date to this yet. That uncertainty is causing anxiety for many of us. Usually when there is a challenge, there is also a deadline, in this case it’s indefinite which is hard to process.

Keeping it in perspective and trying to be positive has really helped me to manage my mental health at this time. I have been trying to not over consume negative information, I haven’t been following fo-



rum or groups where people are complaining because I want to try and switch off at the end of the day and not fill my head with negativity.

Following guidelines, everything can be backed up, and so this is what I have been doing. I feel that I am doing the right thing, and doing things properly makes me feel happier.”

**“Finally, how are you ensuring that things are operating in an organised way under this new pressure?”**

“I am good at knowing how long I need for patients, and between patients, which means I very rarely run late.

I have an amazing nurse Katrina who is exceptionally organised! We have worked together for a while and know each other really well. Even through little communication with the added PPE, we understand each other, and we can work effectively as a team- I actually think we could get through a whole day of working together and not have to talk, she usually predicts my next move before I do!”

It is fair to say that Covid-19 is the most drastic strain that has been put on the world in recent years, and it is perhaps the most drastic strain that has been put onto modern day dentistry. All over Europe there has been a slightly different approach, but we are all taking the measures we need to ensure that patient safety is our upmost priority.

Over the years, dentistry has truly modified to become evidence based, medical, and hygienic. Recent and historic scientific developments have meant that dentistry has changed to heighten infection control. It is not until we sit down and think about developments in dentistry that we can really see the change over time, from barber’s shop, to clinic!

# Sugar Tax and Its Effectiveness

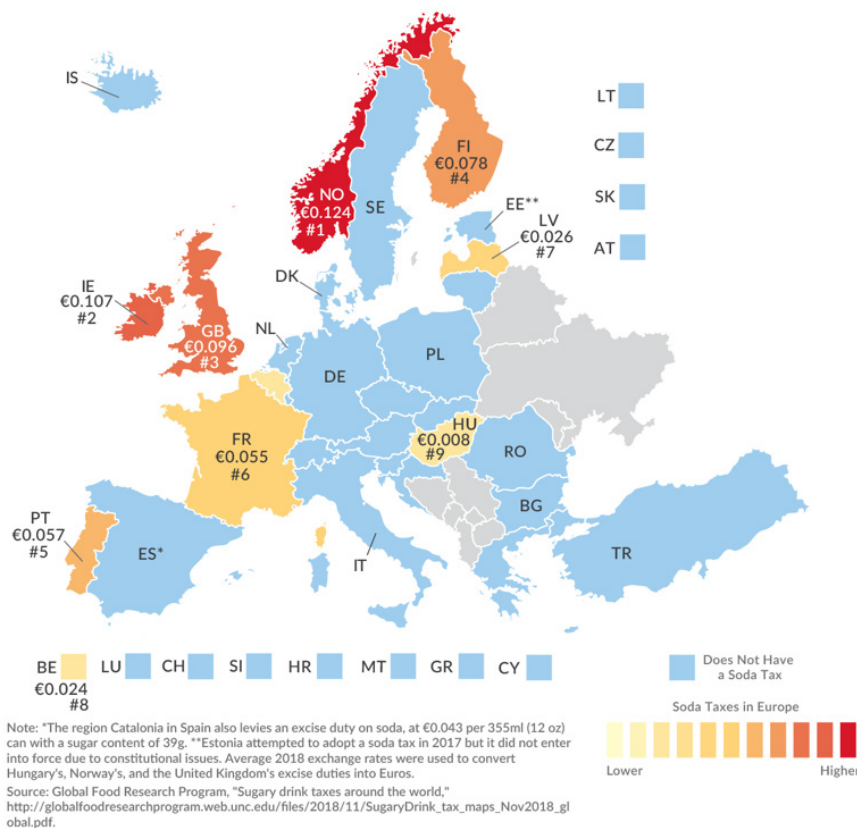
The Sugar Tax has been used by some European countries to reduce sugar consumption, has it really worked?



Asad Ali, UK

## Soda Taxes in Europe

Excise Duty on a 355ml (12 oz) Can of Soda with a Sugar Content of 39g or Sweeteners, as of November 2018



TAX FOUNDATION

@TaxFoundation

The image has been used with the approval from the Tax Foundation.

Few with a sweet tooth would be thrilled at the prospect of paying more for their sugary drinks. However, according to the Tax Foundation the countries shown in figure 1 have imposed the sugar tax to reduce sugar consumption. Since its introduction, it has not been without significant controversy, and begs the question from businesses, politicians and public health officials: does the sugar tax really work?

The tax is imposed to companies that produce a drink with added sugar above a certain threshold which varies

per country. By increasing the cost of production for companies, this increases the cost to the consumer, thus reducing demand and consumption.

Sugar is a risk factor for numerous diseases such as obesity, cancer and caries. By lessening the consumption of one risk factor, multiple diseases are reduced known as the 'common risk factor approach'.

This holistic approach to health care is one which reduces the cost of treating obesity via prevention. In 2014/2015 the UK's national health service (NHS) paid

£6.1 billion (3) for treating obesity related diseases, and such there is a huge financial implication to the taxpayer which should be reduced.

In addition to obesity, sugar is a risk factor for dental caries which cost the NHS £3.4 billion in 2014/2015 with an estimated additional £2.3 billion cost to the private sector. Although, this cost is less than the cost of treating obesity related diseases, one must consider that on average each child lost 3 days of schooling due to caries, 2/3rds of children had pain in their teeth and 38% of children had sleepless nights due to the pain. This social cost must be factored in and the effect dental caries has on people's lives is stark.

## Has it worked?

Having introduced this tax many are questioning whether it has actually achieved its goals in reducing sugar consumption. According to a meta-analysis in 2019, a 20% increase in price showed an average 20% decrease in consumption thus preventing obesity and diabetes. This is a substantial decrease and should be considered to be a major success of the tax.

Further evidence by Public Health England shows drinks which are not subject to the sugar tax (have less than 5g per ml) were purchased more than those which were subject to the tax as shown in figure 3, showing that consumers were picking drinks which are lower in price, therefore lower in sugar.

Research from PHE showed that across socioeconomic groups total sugar consumption per 100ml had decreased between the baseline 2015 and 2017, once the tax had been imposed. However, the effect is lessened in the poorest group with only a 7% decrease in total sugar. This maybe due to the 22% increase in



total sales of sugary drinks by the same group. Therefore, a sugar tax may not be the best way to reduce sugar consumption in the all socioeconomic groups, as such other public health policy should be used in conjunction to support the sugar tax.

However, a different result was observed in group D where total sales went up by 4% and sugar consumption reduced by 26% having the largest effect. It is important to note that there was a decrease in total sugar consumption across all groups, a large success.

### Negatives of the tax

This tax is not without its negatives, which sceptics are keen to point out. In France, not all manufacturers have changed the sugar contents of their drinks. Coca-Cola decided to reduce the volume of their drinks and increase the price to compensate for lost margins,

having a direct negative effect on consumers. Therefore, despite major advances, manufacturers can avoid the tax through changing the volume of their drinks.

It is a “Regressive tax” meaning that the tax proportionally effects the poor more than the rich thus widening inequality in society. However, should the formulations of the drinks be changed and not the prices then there will be no difference for all income groups.

Public Health England found that to reduce sugar consumption one must: reduce the volume and number of price promotions in retail and restaurants, the marketing and advertising of high sugar products to children, the sugar content in and portion size of everyday food and drink products. The latter policy has been affected by the sugar tax, however to reduce the consumption of sugar further the former two policies

must be targeted. This multipronged approach is likely to increase effectiveness and to benefit those who the sugar tax has less of an effect on.

Furthermore, it is important to find out where the increase in tax income is going as it may not be used to fund other healthcare initiatives it is designed to benefit, for example the income generated could be used to fund the public health policy stated above. The combination of the sugar tax and other public health policy is more likely to be effective. The amount of money raised in 2017-2018 in the UK was £275 million representing a large amount of money which could be used for public health.

Overall, although the sugar tax is regressive and does have some drawbacks, I believe that it has been shown to reduce sugar consumption and as such should be implemented to improve general and oral health.

# Smile Shops Coming to Fix Your Smile

„Smile shops“ – does that term sound familiar? It’s no surprise if it does. Smile shops have begun to spread to many countries. In this article, we will look at them in more detail, and discuss it from the perspective of both clinician, as well as patient.



**Deniz Özkuyucu, Ataberk Kayhan, Turkey**

**T**eledentistry is a combination of telecommunication and dentistry. It is the use of interactive audio, video, data communication as well as storage and forward technology to provide and support the provision of dental care, diagnosis, consulting, treatment, dental information transfer, and education.

Smile shops produce 3D-printed clear aligners and provide people a cheaper treatment option for teeth straightening without dentist visit. Smile shops provide aligners with 3D scans or impression kits. There are lots of different companies and locations of Smile Shops across the world. Some of the compa-

nies that offer teeth straightening are: SmileDirect, SnapCorrect, Byte, Uniform Teeth, Candid, etc.

### Why People Seek These Companies?

Quite simply, they are cheap, quick and invisible. This makes them incredibly convenient to use. Smile Shops are more affordable than in-office options like braces and professionally-made aligners. Smile Shops can often offer a shorter treatment time than regular therapy, taking an average of 6 months. There is often a white-coat syndrome associated

with visiting the dentist. Smile Shops can help to mitigate stimulating or triggering this fear by offering a very different environment to a conventional dental or clinical practice.

### Are Smile Shops Safe to Use?

Orthodontic treatment can be risky, especially without a patient-specific approach. This is compounded by the distinct lack of trained clinicians within Smile Shops. Regular orthodontic visits are key to avoiding new dental problems during treatment. It is imperative that patients receive a clinically acceptable diagnosis and radiographs. They also must



visit a dentist who ensures a healthy oral cavity with no active disease processes before undergoing orthodontic treatment. The American Dental Association states: Teeth are complex living organs comprising many elements. They have nerves and require blood circulation. Moving teeth that are next to other teeth, are rooted in

bone, and are held in place by ligaments is often a complicated procedure dependent on multiple individual variables. There really isn't a "one-size-fits-all" methodology for providing competent, professional orthodontic treatment.

Aligners provided by Smile Shops may create new problems that

would require traditional dental procedures to fix. Patients may also suffer severe injury, tooth loss, bone and nerve damage, jaw pain, exposed teeth roots, receded gums, aggravated or entirely new bite maladjustments, as well as other related injuries. Can clear aligners straighten teeth? Absolutely. However, straight teeth does not necessarily mean correctly aligned teeth. Teeth can begin to shift excessively and if your bite gets misaligned, no specialist steers the course and makes revisions.

### Conclusion

In light of the recent COVID-19 pandemic, teledentistry has become a pioneering tool in providing dental care contemporarily. Unfortunately, the concept of teledentistry is confused with Smile Shops. The demand for Smile Shops is growing worldwide, as they are cheap, fast, and easily accessible. Procedures that provide by smile shops, promote the achievement of targeted aesthetics, and lead to more serious health problems.

## Is it possible to go eco-friendly and also have a good oral health?



**Ioana Onicaș, Romania**

It is a well known fact that toothbrushes evolved over time as a necessity. First evidences of people cleaning their teeth date back as far as 3000 BC when Egyptians and Babylonians used 'chew sticks'. Archaeologists found this primitive form of the toothbrush in the Egyptian pyramids. In order to clean their teeth, they chewed on one end of the stick until the fibers of the wood formed something similar to a brush.

In the 15th century, the Chinese were credited for inventing the first toothbrush with bristles, as the Library of Congress mentions. It is said that they took the hair of a Siberian wild boar and attached it to a handle that was made of bamboo. These toothbrushes were similar to the ones we use today.

In England, around 1780, William Addis created a modern design of the tooth-

brush. Its handle was carved from cattle bone and the brushing zone was made out of swine bristles.

Even though hair bristles had disadvantages like falling out, being hard to dry and prone to bacterial growth, they continued to be used for a long period of time, until the 1930s when nylon was created by Wallace H. Carothers in the Du Pont laboratories. This invention changed the game forever. It made a huge impact on the toothbrush companies, that were finally able to replace the hair bristles with nylon, which had numerous advantages like the ability to control bristle texture and also shape the filament tip in order to improve its performance.

Today, toothbrushes come in many shapes and sizes and are typically made of plastic manufactured handles and nylon bristles, but the basic fundamentals have

not changed since the Ancient times due to the fact that we still need a handle to hold the toothbrush and bristles to clean our teeth.

In this day and age, it is a worldwide matter that the plastic has made a huge impact in our lives and on our planet. As National Geographic mentions in one of their articles, more than 448 million tons of plastic are produced every year, which can lead to serious environmental problems due to the fact that it can take many years for plastic to decompose. As we go deeper into the problem, finding practical ways to reduce plastic usage and waste is becoming increasingly important. In dentistry, plastic seems unavoidable. It has become a mainstream ingredient for toothbrushes and toothpaste packaging but here are some oral care products that are eco-friendly and helpful in the battle





against plastic.

### The Bamboo toothbrush

One of the products we use daily in our oral hygiene routine that it is impossible so recycle is represented by the plastic toothbrush. Due to the fact that people become more concerned about the environment, the bamboo toothbrush seems to be the perfect alternative. The Chinese used to brush their teeth in the 15th century with a toothbrush that was made out of bamboo and its bristles were made from the hair of Siberian wild boar. So it seems like it's not a brand new invention.

#### **How to use it**

It has the same design as a traditional plastic toothbrush, the main difference is that the plastic handle is replaced with the one made out of wood. Therefore it can be used in the same way as an usual toothbrush, and with a good brushing technique, it could possibly have the same effectivity as the regular toothbrush.

#### **Why is the bamboo toothbrush better for the environment?**

Firstly, the unrecyclable plastic handle is being replaced with the bamboo one, that can be recycled. Most of the bamboo toothbrushes have bristles made of nylon and in order to compost the handles, the removal of the bristles is needed first, because nylon can not be recycled. There are also some bamboo toothbrushes that are entirely biodegradable from the bristles

to the handle, if the bristles are fabricated out of boar hair, but they tend to be rougher than nylon ones and can lead to gum bleeding.

#### **Advantages**

Bamboo is a sustainable resource that grows really fast, needs little care and may thrive without fertilizer or pesticides. Moreover, it captures a lot of carbon as it grows, around 30% more than most other wood. One of the most important factors is that it has antimicrobial properties and there is no fear of harmful bacteria growing and spreading on the handle of your toothbrush. With little creativity, they can be given a totally new purpose after usage, such as plant markers in the garden.

#### **Disadvantages**

It has some downsides such as being less available on the market in comparison to the plastic ones, that are to be found in every store. In monetary terms,

they are more expensive than the plastic toothbrushes. Also, the process of disposing the bamboo toothbrush is more time consuming, because it should not be just tossed away. If bamboo toothbrushes end up in the trash, or the nylon bristles are not removed before recycling, they aren't significantly more environmentally friendly than their plastic counterparts.

To conclude, the bamboo toothbrush is the perfect way to reduce the use of plastic and be more eco-friendly as long as we are willing to give a little part of our time to respect all the steps in the process of recycling it.

### The toothpaste tablets

It is estimated that approximately 1.5 million plastic toothpaste tubes that are not recyclable end up either in landfill or the ocean every year and the worst part is that, in order to dissolve, they can take up to 700 years. As a result, the toothpaste tablets were invented with the mission to minimize this kind of plastic waste. Toothpaste tablets are the solid version of regular toothpaste. Usually they are small, circular shaped tablets that resemble the paracetamol or aspirin pill.

#### **How to use toothpaste tablets**

The tablet is placed in the mouth, and it has to be crushed in pieces with the posterior teeth, so the ingredients of the

tablet can mix with the saliva and this will lead to a paste-like consistency. Meanwhile the head of the toothbrush should be wet and then the teeth can be brushed as usual.

#### **Why are the toothpaste tablets better for the environment?**

The most important fact is that they do not come in tubes, so there is no need for plastic. They are usually packed in a glass that is refillable or in a recyclable bag. Also, they don't contain microbeads, which are used to add abrasiveness to the toothpaste and make it look more cosmetic. Microbeads are non-biodegradable and due to the fact they are almost microscopic, they can easily pass through treatment stations and end up in the ocean, poisoning the marine life that is one of our food sources.

#### **Advantages**

- 1.They are eco-friendly because their packaging is recyclable, unlike toothpaste tubes.
- 2.They are often more natural and have less chemical ingredients
- 3.They are TSA approved, so there is no need to worry about the restrictions on carry-on liquids for flights and they save space when traveling
- 4.They are easy to carry around in any bag without being worried that the toothpaste can leak
- 5.They are suitable for people who want to brush their teeth after a meal at work or any other place that is not home
- 6.Usually, they come in two ways: with fluoride or fluoride free

#### **Disadvantages**

- 1.They are less available on the market, usually being sold online
- 2.Their shelf life is less than a regular tube of toothpaste due to the fact that they contain less preservatives or no preservatives at all.
- 3.They are more expensive than a regular tube of toothpaste
- 4.It takes time to get used to them and some people might find it difficult to chew the tablet
5. Some brands don't offer an option with fluoride, so the consumers might end up using products without anti-cariogenic effect only.

### Dentist opinion

Some dentists stated that the distribution of the paste to all the teeth can be a bit more difficult, but there were no studies made on large number of people to see if the tablets are as effective as the regular toothpaste.



# Dental Care Under the Clouds of COVID-19

The dental industry has a crucial role as well as dental professionals to play in the return of dental treatment. The 'new' normal will most likely not look like the 'old' normal for a long time, if ever again. Things will change, but not certainly for the worse in the long term.



Arzu Şeyma Demir, Turkey

The outbreak of novel coronavirus started in Wuhan, China now spreaded 215 countries and regions, and influenced every aspect of life. According to Worldometer, to this date, over 9 million people got diagnosed with COVID-19. Study by Ren et.al., 2020 stated that when compared with other recent pandemics, COVID-19 is less severe but spreads more easily, causing a significantly higher number of deaths worldwide. Unfortunately, there is no antiviral vaccine available on the market, but on 16th March 2020 the first clinical trial was initiated by the National Health Institute (NHI), USA. Therefore, patients have to rely on supportive therapy and general healthcare until the body's immune system can eradicate the infection.

Healthcare professionals, especially dentists, are exposed to a higher risk of getting infected due to close contact with infected patients. On 15 March 2020, the New York Times published an article entitled "The Workers Who Face the Greatest Coronavirus Risk", where an impressive schematic figure described

that dentists are the workers most exposed to the risk of being affected by COVID-19, much more than nurses and general physicians. Numbers from the paper by Khader et al., 2020, show that over half of the dentists (n=214, 58.2%) knew whom to contact in a situation of an unprotected exposure to a known or suspected COVID-19 patient, and 75.8% (n=279) reported that they knew what to do if they had signs or symptoms of a suspected COVID-19 infection. Protection of dental patients and staff during COVID-19 is challenging due to the existence of patients who are infectious yet asymptomatic. Considering the current rapid spread of infection, the American Dental Association (ADA) highlighted key steps to be taken by dentists in addition to the standard universal precautions such as taking patients' recent travel history; assessing signs and symptoms of RTI; recording patients' body temperature; mouth rinsing with 1% hydrogen peroxide prior to commencement of any procedure; using a rubber dam and high volume suction during procedures; and frequently cleaning and disinfecting pub-

lic contact areas including door handles, chairs and, washrooms. Although the ADA has published preventive guidelines, the majority of dentists are still reluctant and feel fearful of treating patients in such a situation. In fact, most dentists may not even be aware of the recent guidelines.

## Fear and anxiety assessment of dental care professionals

A total of 650 participants from 30 countries worldwide submitted the completed questionnaire with a total of 22 questions comprising of two sections about fear or anxiety level and practice modification due to COVID-19. According to the recent study, 87% of participants were afraid of getting infected with COVID-19 from either a patient or a co-worker. While treating a coughing or a patient suspected to be infected with COVID-19, 90% were anxious. More than 72% of participants felt nervous when talking to patients in close vicinity, 92% were afraid of carrying the infection from dental practice to their families, and 77% were afraid of getting quarantined if they got infected.



The anxiety rate concerning the cost of treatment if they got infected was 73%, while 86% felt afraid while they learnt about mortalities because of COVID-19. A considerable number of dentists (66%) wanted to close their dental practices until the number of COVID-19 cases start to decline.

### Precautions during the outbreak

Dentistry is generally classified as a very high-risk category of occupations involved with aerosol production. The size of the particles are ranging from 60 to 140 nanometres (0.06 to 0.14 micrometres), with an average of 0.125 micron, which makes them a significant aerosol threat. The majority of everyday dental procedures that use low- or high-speed handpieces, electrosurgery units, ultrasonic scalers, air polishers, prophylaxis angles, hand instruments, air/water syringes or lasers can create bioaerosols, with everyday routine equipment like ultrasonic scalers and high-speed handpieces producing more airborne contamination than any other devices. As we have seen, the significant aerosol risk attributed to the majority of routine dental treatments has led to the suspension of general dentistry and to emergency treatment being undertaken in dedicated urgent care centres using 'full' personal protective equipment (PPE) as outlined in official guidance.

Dentists have been recommended to take several personal protection measures and avoid or minimize operations that can produce droplets or aerosols; moreover, the use of saliva ejectors with a low volume or high volume can reduce the production of droplets and aerosols. Taking into consideration the severity of the pandemic COVID-19, and in the light of the massive commitment of several dental associations and the most prestigious dental journals, it is essential to give clear and easy guidelines to manage dental patients and to make working dentists safe from any risk. A fundamental concept is that the transmission of the virus is mainly through inhalation/ingestion/direct mucous contact with saliva droplets; but the research by Spagnuolo et al., 2020 has stated that the virus can even survive on hands, objects or surfaces that were exposed to infected saliva in the previous nine days.

When dentists treat patients, they should intercept the potentially infected person before they reach the op-

erating areas; for example, those with a body temperature above 37.5 °C and the posing of a few questions about the patient's general health status in the last 7 days, and about the risk of having been in contact with other infected persons. At the start of any dental procedure, rinsing with an antimicrobial mouthwash also significantly reduces the microbial load. According to Kitamura et al., 2007, mouthwashes containing agents with anti-viral activity such as povidone-iodine have exhibited effectiveness against various respiratory viruses. During the outbreak of COVID-19, the importance of hand hygiene has been emphasized repeatedly and this is even more important in the case of dental practitioners.



Various studies (Jefferson et al., 2007, Fung & Cairncross, 2006) have shown that proper hand hygiene, including handwashing with soap and water and cleaning using alcohol-based sanitizers, is an essential measure in controlling the spread of respiratory illness including SARS. Therefore, WHO recommends frequent hand washing or using an alcohol-based hand sanitizer in the dental practice. The use of a particulate respirator such as the N-95 mask has been recommended for treating patients suspected of COVID-19. Otherwise, at least a surgical mask must be used while treating all patients when the distance between the dental healthcare worker and the patient is less than 1 m.

In terms of physical risk mitigation, it is generally understood that the risks of dental aerosols can be reduced with the use of high-velocity air evacuation, wearing the correct PPE,

using advanced filtration, purification and decontamination systems, and, where appropriate, pre-procedural antimicrobial mouth rinses, as well as waterline disinfection discipline. Cleaning and disinfection regimes in the surgery and for equipment will also be critical. During treatment, the sites showing the highest microbiological contamination due to aerosol are visors and masks, the unit lamp, surfaces close to spittoons and mobile instrument material tables. Some other suggested mitigations include dental practices installing negative pressure rooms or airborne infection isolation rooms in which procedures generating aerosol can be performed.

### Specific Treatment Recommendations During Outbreak

- Dental professionals should follow standard, contact, and airborne precautions including the convenient use of personal protective equipments and hand hygiene practices.
- According to latest studies procedural mouth rise with 0.2% povidone-iodine most likely reduce the coronavirus load in saliva.
- Use of disposable devices is a must for preventing cross contamination.
- Extraoral imaging has an crucial role due to preventing from cough reflex during intraoral imaging.
- Dentists should use rubber dam to isolate the mouth from saliva and prevent the platter generation.
- High-speed handpiece use should be minimized to decrease the spreading contaminated aerosols.
- Patients with suspected or confirmed COVID-19 infection should not be treated in a routine dental practice setting. Instead, this subset of patients should only be treated in negative-pressure rooms or AIIRs.
- Clinic staff should make sure to disinfect inanimate surfaces using chemicals clinically approved for COVID-19 and maintain a dry environment to inhibit the spread of SARS-CoV-2.

The significant limitation of clinical and surgical activities in the medical and dental sector has represented a very impactful measure on the economy of the sector. It is important to make informed clinical decisions and educate the public to prevent panic while promoting the health and well-being of patients during these challenging times.

# For young people too, interdental brushing should be a daily habit

curaden  
academy

According to Prof. Denis Bourgeois, dental professionals should instruct patients from a young age to make interdental brushes an integral part of their daily brushing routine. This is important in order to avoid future periodontal and systemic disease. Recently, he was part of a team of researchers who evaluated the efficacy of calibrated interdental brushing for the prevention of periodontal pathogen infection in young adults. The results of the study showed that participants were able to decrease interdental inflammation and re-establish symbiotic microbiota.



For the study, which was conducted at the dental faculty of the University of Lyon in France, real-time polymerase chain reaction methodology was used to identify 19 periodontal bacteria—including *Porphyromonas gingivalis*, *Treponema denticola* and *Tannerella forsythia*—in the interdental biofilm of 25 periodontally healthy participants between the ages of 18 and 35. Although the presence of such periodontal pathogens in the interdental biofilm of young and healthy individuals had already been established, the new study aimed at evaluating the efficacy of daily, calibrated interdental brushing in reducing the number of pathogens in the mouth. Over the course of three months, the number of bacteria associated with periodontal disease decreased drastically, allowing a reversion to symbiosis of the interdental microbiota. Moreover, the percentage of the test sites bleeding on interdental brushing—initially 66%—decreased by 85%.

## The interdental space: Crucial but overlooked

“The major explanation for the number of pathogens in the interdental spaces of seemingly healthy young people is that interdental space is an ecological niche where traditional brushing methods fail to disrupt biofilm,” explained Bourgeois, co-author of the study and dean of the University of Lyon’s dental faculty. A pioneer of oral prophylaxis, Bourgeois has conducted invaluable research on interdental biofilm management and interdental brushing techniques, both of which are yet to become commonplace. “Using a normal toothbrush should be inseparably linked to using calibrated interdental brushes. The daily disruption of the interdental microbiota is crucial in order to re-establish and maintain symbiosis of the oral microbiome,” Bourgeois said.

“Interdental prophylaxis is universal,” he continues. “It does not only apply to adults with a history of periodontal or peri-implant disease. For young people too, interdental brushing should be a daily habit. The argument that it is not possible to penetrate narrow, healthy interdental spaces is no longer valid. The

newest generation of interdental brushes are small enough to access 99% of the interdental spaces of healthy young adults.”

## Calibration is key

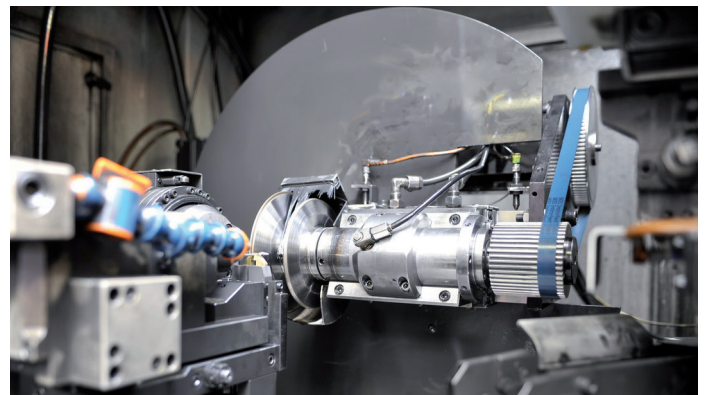
Interdental brushes are the most efficient when the bristles fill out the interdental space completely. “Calibration means determining the correct diameter of interdental brush so that it will come into contact with all of the tissue surfaces of the interdental space where the microbiota are located,” explained Bourgeois. “For our study, we used the colorimetric probe to determine the necessary diameter. The colorimetric probe is fundamental, compulsory. It is like a tuning fork for interdental prophylaxis.”

## The role of dental professionals

According to Bourgeois, dental professionals should provide patients with the knowledge, tools and techniques they need in order to disrupt their interdental microbiomes on a daily basis. “Starting at the top, it is the responsibility of dental faculties to teach individual prophylaxis to students. Dental professionals should practice what they preach and, in turn, teach patients. Then, it is their responsibility to pass this knowledge on to their patients and guarantee them an optimal quality of life.

Bourgeois concluded: “If every dental professional were to instruct patients about interdental brushing from adolescence, we would be able to prevent dental and periodontal complications caused by microbiota in adulthood. The positive impact this would have on patients’ systemic health and well-being would be an added bonus.”





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In Germany Meisinger is already well known for its workshops and lectures at universities – especially in the field of implantology and oral surgery. With our young dental experts camps we also succeeded in putting together a premium program especially meant for students in their clinical semesters as well as for medical assistants.

We are looking forward to meet you at the next EDSA Meeting, which hopefully can take place again next year. There we will inform you about our activities regarding international students and answer your questions in person.

**Until then you can contact our student supervisors Lutz Grätz and Yannick Wienecke:**

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# To BEWE or not to BEWE – That is the question...

“Effective investigation is the first step towards effective treatment. Is the BEWE the future of recording tooth wear, or are there better options?”



Neil Unnadkat, EDSA Magazine Co-Editor, UK

Erosive tooth wear is the third most commonly observed oral condition, after caries and periodontal disease. However, Bartlett et al. (2019) found that it is not routinely screened or tracked during a normal dental examination. The Basic Erosive Wear Examination (BEWE) is a screening index designed to record and track tooth wear in adults. A deviation from the established Tooth Wear Index (TWI), the BEWE shares many similarities to the Basic Periodontal Examination (BPE) conceptually. Its incorporation into the New Patient Examination could prove to be straightforward and therefore, very useful in the screening and recording of tooth wear in new patients, according to Dixon et al. (2012).

## The importance of recording tooth wear

Across Europe, erosive tooth wear is becoming increasingly more prevalent. This is due to a plethora of factors, including easier and earlier access to erosive factors, such as carbonated drinks, to the younger generation. Recent publications showcase this, with the latest version of Delivering Better Oral Health (Public Health England, 2017) stating that 77% of adults in the UK having some form of tooth wear, and suggesting an increase in moderate tooth wear, especially in younger adults.

National surveys also suggest increasing tooth wear in teenagers:

- **United Kingdom:** 22% of 15-year olds demonstrating wear on first molars and 11% on incisors labially and 33% palatally (Chadwick et al., 2006)

- **Iceland:** Dental erosion was seen in 30.7% of subjects (38.3% boys, 22.7% girls) aged 15-years old (Arnadottir et al., 2010)

Mehta et al. (2020a), has also found a link between higher BEWE scores and higher Oral Health Impact Profile (OHIP-26) scores. A higher OHIP-26 score indicates a lower oral-health related quality of life in patients. Therefore, higher levels of tooth wear were found to be significantly associated with a deteriorating oral-health related quality of life.

These statistics highlight the importance of screening and recording tooth wear early, so as to be able to track and mitigate its progress.

## Using the BEWE

The BEWE has been designed to be used alongside other screening indices during the initial patient examination. It assesses the percentage of tooth surface affected, regardless of depth into dentine, unlike the TWI. The index and scoring are described in Figure 1. Each sextant is recorded in the same grid format as the BPE, scored based upon the worst affected surface in that sextant, with lone-standing remaining teeth in each sextant added to the adjacent sextant. To get an overall score for the mouth, each sextant score can be added together to give a maximum value of 18. The highlighted similarities between the BEWE and the BPE means that the two can be performed simultaneously, allowing for more efficient recording of pathology. In the deciduous dentition, the same protocols should be used. However, during the mixed dentition, while the same assessment should be carried out, it must

be noted that deciduous teeth are more prone to wear than permanent teeth, therefore scoring is likely to be higher. Consequently, the risk assessment should account for this and the time interval for repetition of the examination should be decreased to between 6 to 12 months in high-risk cases (Aránguiz et al., 2020). Figures 2a-e are clinical photographs showcasing different BEWE scores, adapted from Aránguiz et al., 2020.

Score	Description
0	No erosive wear
1	Initial loss of surface texture (brightness loss, opaque surface, or 'frosted glass' appearance)
2	Distinct defect, hard tissue loss, less than 50% of the surface area. Dentine could be involved.
3	Hard tissue loss more than 50% of the surface area. Dentine could be involved.





### **BEWE vs other indices**

Due to the BEWE still being in the early stages of its adoption by general practitioners, its use and application is still largely misunderstood. Mehta et al. (2020b) found some dentists reporting a preference for the TSI due to being more descriptive, requiring a more thorough, extensive examination. However, it is important to recognise that the BEWE was not created to act as a replacement for other, more illustrative indices, as it was never intended to be used for long-term monitoring. It should instead be used as an adjunct, helping dentists to demonstrate they have made and recorded an initial assessment and recorded. O'Hara and Millar (2020) found that also offers some form of guidance on the most appropriate treatment to offer at that stage.

### **Conclusion**

Promotion of the BEWE as a contemporary tool in identifying and addressing erosive tooth wear in new patients is important. This is due to the increasing prevalence of erosive tooth wear globally, as well the stage in patient assessment where the BEWE can be implemented. Exposure to the BEWE in the earlier years of dental school can improve in student calibration, increasing the likelihood of accurate diagnoses from both students and consequently practitioners.



**Figure 1: Occlusal surfaces of upper premolars and molar showing no signs of erosive tooth wear.**



**Figure 2: Lower molar showing no signs of erosive tooth wear on buccal or occlusal surface**



**Figure 3: BEWE score 1 on the molar - Early signs of erosive tooth wear. Small, distinct erosive lesions on occlusal surface.**



**Figure 4: BEWE score 2 on the first premolar - Erosive tooth wear < 50%**



**Figure 5: BEWE score 3 on both molars - Erosive tooth wear > 50%**

# 3D Printing in the dental field



**Benjamin Huberson, France**

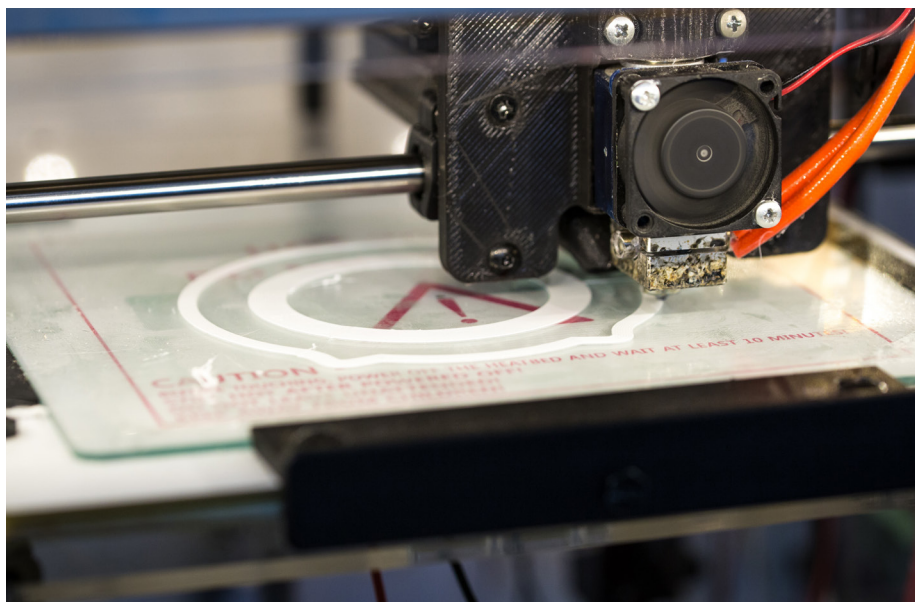
The first 3D printers were born in the 1980s with the help of Charles HULL. They were normally reserved for prototypes but gradually extended their field of application to aeronautics, medicine, or dentistry. This technology has a particular affinity with dentistry, and advances in medical imaging and modeling such as CBCT and intraoral scanners, and the use of CAD-CAM which is becoming more important. The evolution of this method pushes us, as dentists, to evolve towards a digital area. The choice between printing and milling depends mainly on the material used. For metals, ceramics and zirconia milling seems more suitable while 3D printing is preferred for resins.

These 3D printers adapted to the dental field allow the creation of physical models for orthodontics, surgery, and prosthodontics, the manufacture of dental and craniomaxillofacial implants, occlusal splints, or even orthodontic aligners.

## 1. Printing technologies

There are several printing technologies, each of which has its advantages and disadvantages. Unfortunately, the common feature is that the equipment comes at a high cost, both for materials and for machine maintenance and repairs.

In the 90s, the **FDM technique (Fused Deposition Modeling)** was born. It creates a three-dimensional part by adding molten material, layer by layer. These are generally plastics (ABS, Nylon, or PLA). The resin wire passes through a nozzle heated to high temperature and a molten filament comes out. It is deposited and comes to stick by fusion on what was deposited before. This printing technique is the most affordable, but its accuracy is average. This technique is useful in manufacturing models because the materials are not approved for intraoral dental use, but also because of the fact that manufacturing layers are visible in the final product.



The **SLA or Stereolithography Apparatus** uses a scanning laser to build parts layer by layer. In this technique, the part is photopolymerized by a laser, point by point, which shoots into the surface of a photopolymerizable resin vat. Once the layer is finished, a new layer of liquid resin is applied, and the process is repeated. This method requires a post-treatment step. At the end of printing, the parts must be cleaned to remove unpolymerized resin residues, then must be photopolymerized to ensure their stability. There are many compatible resins, some of which are developed specifically for dental applications. Thus, there are resins to print the models, for surgical guides, others for splints and still others for making denture bases or temporary crowns.

The **DLP technique (Digital Light Projection)** is actually an improvement on the SLA technique. Rather than "drawing" the part to be printed, we project the image of each layer in one go, using a projector. Since each layer is "flashed" all at once, the printing speed is improved compared to the stereolithography method. Today, the majority of 3D printers offered for the dental sector operate on the principle of DLP. They allow to achieve a model or a surgical guide in less than 30

minutes!

## 2. Applications

The easiest way to use a 3D printer in the office is to make models. Once you have an intraoral scanner for taking an impression, it is very easy to retrieve the files generated in .stl format (STL stands for Stereolithography) and open them in the 3D printing software. These models, once printed, allow us a precise study of the patient's dental condition and facilitate the choice of the treatment plan.

In orthodontics, treatment is planned, and devices are manufactured. The processing can be computerized using data from intraoral cameras and / or CBCT. There is the Invisalign® system which allows to digitally realign the patient's teeth, and to make an aligner. It gradually repositions the teeth over several months or years. The aligner can be created from a 3D printer and a specific resin.

An increasingly important application of 3D printing is manufacturing the drilling guides. Drilling guides are plastics forms that are individually produced for the patient. It fits the teeth perfectly. The place of future implant contains a hole with a stainless-steel sleeve to



guide the doctor's drill while implanting. Guides are helping with placing the implant in the right angle and height, and they already have a use in endodontics as well. These tools must be robust and precise, and capable of being sterilized or disinfected as used in a surgical environment. The bone volume information should be taken by a CBCT and an intraoral scan should be performed. The use of drilling guides makes it possible to transfer a virtual 3D plan, created on the screen in the software on the operating site.

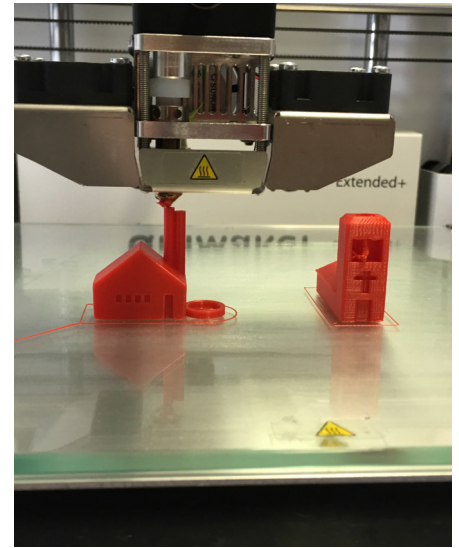
Even though implantology is a frequent indication of the use of 3D printers, the prosthesis is no exception. Today, it is possible to quickly print crowns, bridges and even temporary removable dentures. This can be very useful for patients and dentists.

### 3. Conclusion

In dentistry, 3D printing already has various applications and is very promising for making many treatments possible. They allow numerous indications: from the case study to the rapid and clean production of provisional prosthetic elements, including the production of surgical guides, occlusal splints or orthodontic aligners for simple cases. 3D printers now find their place in dental offices equipped with intraoral scanners.

3D printers are becoming more and more accessible. However, the operating and maintenance costs must be taken into account, as well as the need for a post-treatment step and compliance with strict health and safety protocols.

However, we have to stay awake on the fact that: "because it's digital, it's better"! Additional research is needed to



define usage standards and ensure that the equipment is as good as our current know-how.

## Veneers Considerations in Esthetic Treatment



Paul Cristofari, France



Nowadays, many patients are influenced by the mass promotion of a Hollywood Smile. As materials become thinner, and preparations become more minimalistic, the ideal treatment when combining these factors is veneers. The goal is to reach a superior aesthetic, an

adequate resistance, chromatic stability and a strong bond to the teeth.

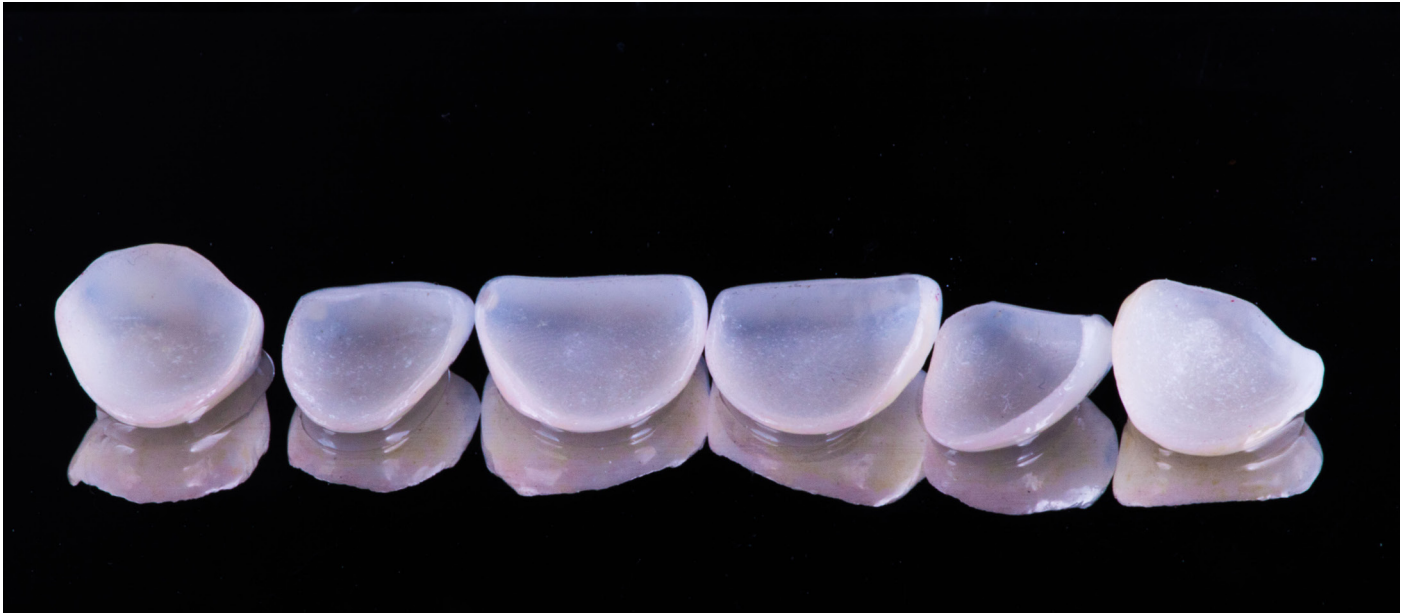
The better the preparation, the easier the placement and the stronger the resistance of the veneer. The preparation must be influenced by the final shape, position and colour of the future

veneer restoration. A strategy including an additive wax-up and a direct intra-oral acrylic mockup can lead to tooth preservation to fulfil the requirements of the patient: preservation of the enamel and the recovery of incisal length and vestibular volume.

According to P. Magne, « the tooth and the tissue preservation are now the central focus of our concerns instead of the necessity to adapt these to the specificities of the chosen materials. Biology finally becomes the main pillar of this new era ». Enamel is fragile but can resist to occlusal wear, while dentin is flexible and does not resist to wear when directly exposed to the oral cavity. The mutual relationship between the two tissues gives them their beauty. Ceramic has a high modulus of elasticity and reacts as a shock absorber.

### Types of preparation

There are three main types of prepara-



tion when preparing for a veneer:

- **incisal overlaps:** buccal, incisal and lingual preparation. P. Magne advised against this form.
- **incisal bevel:** buccal and incisal preparation. It allows for great shape changes.
- **feather edge preparation:** only buccal preparation. It is contraindicated in incisor but can be used for canines.

Studies demonstrate that the incisal bevel provides the best stress distribution. It improves the thickness of the porcelain, the geometry of the preparation, the resistance to functional and parafunctional activity and an improvement in adhesive bonding.

The accuracy of the preparation is fundamental as it directly impacts the tooth volume. That's why to simplify the technique, the preparation will be done using a depth cutter bur following the acrylic mockup. A chamfer bur is used along the tooth axis for homogenization and an interdental preparation is done with the use of bur or an oscillating instrument. The incisal edge will be reduced by 1.5mm. The preparation will be finished by removing all the sharp angles. This technique, described by G. Gurel, called the aesthetic pre evaluative temporary (APT) technique gave a result of 80% preparation confined in enamel with a 0% failure and debonding after 12 years follow up.

### Patient Analysis

A good perception of patient sensitivity will help in the planned treatment. However, it is important to consider that aesthetics is a subjective topic and the wish of the patient must be respected. Dental planification comes with a clinical examination, aesthetic evaluation and dental photography.

Clinical examination will help to identify problems like worn teeth, abfraction, or cracked and traumatic teeth.

Dental photography is used to determine the micro aesthetic (tooth secondary and tertiary anatomy, line angle, incisor translucency) and macro aesthetic (dental midline, tooth shape, occlusal plane, lip or colour arrangement).

The match between the design possibilities and patient expectations will be evaluated with the mock-up. The position of the teeth plays a fundamental role in lip support. As described by Paula Cardoso, a correct lip classification needs to be done as thin lips are more affected than a thick one. Small and lingual positions teeth are cases of choice in minimal preparation. Colour of the ceramics is fundamental, as, if the expectations of the patient are not fulfilled, the treatment will not be considered successful. To determine the colour, a shade guide is used.

Non-vital bleaching, prior to the dental restoration, can improve the colouration and make the treatment easier. Traumatized teeth can show dark discolouration and become a cosmetic challenge. Previous treatment on dark stained tooth could be aggressive and thanks to the bleaching, a ceramic ve-

neer can require minimal preparation. Gingival inflammation and recession should be treated before cementation and the oral hygiene rules should be applied and respected by the patient.

A ceramic veneer will be indicated in coronal fracture, enamel hypoplasia, anomalies, diastemas, alignment defects, enamel abrasion or chromatic alteration. A minimally invasive preparation will not be possible on all these indications.

A veneer of smaller thickness will be indicated in case of improvement of the esthetics by changing the form and the size. The minimally invasive preparation is particularly recommended in patients with a heavily worn dentition.

The ceramics show great biocompatibility, good colour stability and capacity of translucency interesting in aesthetics.

### Wax up and Mockup

The additive diagnostic wax-up and the bis-acrylic mock-up are two essentials tools in smile design. The preliminary objective, by using the addition of wax on a preliminary stone cast model, is to determine some strategic elements about tooth anatomy and clinical situation. The silicone index, made in putty and light silicon, is useful to fabricate an acrylic mockup. It is used a self-curing poly-methyl-methacrylate resin directly in the patient's mouth and on a natural tooth that is unprepared. For improved stability, the two adjacent teeth should be added to the silicon key. The uniform acrylic mask will provide good information about the function



and aesthetics outcomes of the restoration.

After 2 weeks, the patient can give their feedback and the clinician can evaluate the phonetics, the occlusion and the esthetics. Once the patient has approved the mockup, the dentist can focus on tooth preparation. The dental preparation will be restricted to the enamel and the bonding obtained will be better than for dentin.

### Bonding protocol

A try-in paste, with glycerin, will be used to determine the colour of the cementing agent and will help to obtain predictable outcomes results. It is removed after using water, followed by air drying. The ceramic used for veneer will be etched to increase the surface area of resin bonding and prevent the

microleakage that the ceramic can suffer. The lithium disilicate appears to be more effective in its monolithic form but a high esthetic concern is obtained with a layered one.

Adhesive cementation has a critical importance for the long term success of laminate veneer. The mechanical bond toward enamel is more strong than the bonding to dentin, affected by moisture and collagen fiber. A larger quantity of enamel will give a higher strength resistance. Orthophosphoric acid on enamel and fluorhydric acid on porcelain veneers are used to etch. Silane is applied on the ceramic surface. Then, an adhesive agent is used on tooth and veneer. A light-cured bonding agent is appropriate for cementing veneers.

After the treatment, a follow-up appointment 2 weeks later should be

taken to have patient feedback. The failure in dental veneer is usually due to debonding or fracture (account for 67% of failure according to a study of F. Man-gani). A problem of adhesion will appear normally during the first year.

### Conclusion

Nowadays, an attractive smile is one of the most important factors in the esthetic field and it is concerning every generation.

In general dentistry, one of the principal objectives is to be as conservative as possible to protect tissues and avoid any fractures, fissures or retentions problems and for that, optimal mechanical properties are needed. Good communication with the prosthetic laboratory is fundamental for case success.

## Methods of Decreasing Bone Resorption: Alveolar Ridge Preservation

Significant bone resorption after tooth extraction likely impacts the future dental implant placement and makes it harder to provide sufficient prosthodontic treatment. Luckily some procedures can help us reduce undesirable horizontal and vertical ridge reduction when dental implant placement is to be delayed.



**Ivana Ligusová, EDSA Magazine Editor-in-Chief, Slovakia**

After extraction, a blood clot forms in the socket which is followed by conversion of a blood clot to granulation tissue. According to the article by Trombelli et.al., 2008, the granulation tissue is then mineralized into a woven bone, later being remodelled to the lamellar bone. Soft tissue remodels above the defect, and the whole extraction place eventually heals. The whole process of bone remodelling can continue for several months, but most of the changes happen in the first three months. Lamina dura that surrounded the tooth is resorbed after every extraction, regardless of whether an implant is placed immediately or not.

Every extraction is followed by some bone reduction, two-thirds

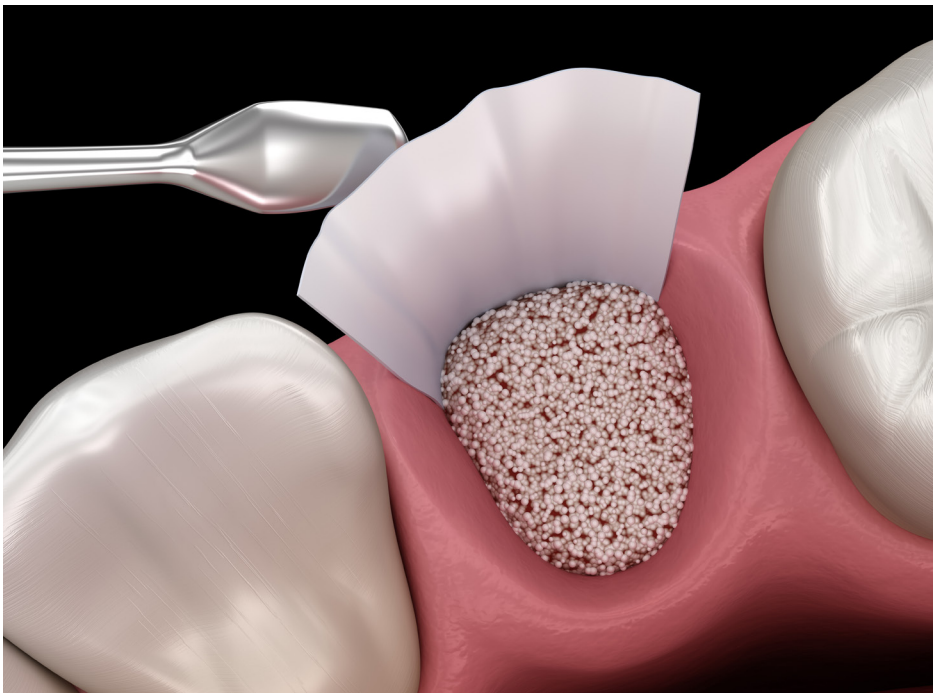
of this reduction happens in the first three months. The mean alveolar bone resorption, according to Tan et al. (2012), is 3,8 mm in width and 1,24 mm in height over the first six months after the extraction. The buccal part of the bone resorbs faster, the bone crest moves lingually with more pronounced resorption in the mandible. An analysis by Chappuis et al. (2013) proved that when a buccal bone wall is thinner than 1 mm, expected vertical bone loss of this wall will be 7,5 mm. Thicker buccal bone wall (thickness of 1 mm or more) can make a tremendous difference – only 1,1 mm vertical loss of a bone occurs.

### Causes of alveolar ridge resorption

The main reasons behind bone loss after extraction, according to Ashman et al. (2000), are disuse atrophy, lack of blood supply and inflammation. There might be more systemic factors influencing the resorption, such as impaired healing, immunosuppression, smoking, genetics, periapical infection, chronic periodontitis, socket wall integrity, surgical trauma and number of adjacent teeth extracted.

### Alveolar ridge preservation

Alveolar ridge preservation is a method of minimizing alveolar ridge resorption after the tooth extraction. ARP involves the use of different methods and materials to fill the socket after extraction, maintain soft and hard tissues and prepare the best environment for



a new bone formation. The aim is to maintain vertical and horizontal alveolar ridge form, to prepare it for implantation. From all the methods, there is no consensus for case selection, clinical technique and material choice. Salama and Salama (1993) have prepared a recommendation for ARP according to the socket anatomy. In case we managed to extract the tooth atraumatically, with all bone and soft tissue present, we should use bone graft alone, bone graft with a membrane, or membrane alone. In the case of the labial defect (fenestration or dehiscence), bone graft covered by a membrane should be used. In case of dealing with more serious – labial and interproximal vertical defect, orthodontic extrusion should be done before extraction – otherwise, the bone loss will be too severe.

### Indications

Osteology Workshop has presented the recommendations for alveolar ridge preservation. ARP is used on the extraction site, where the future implantation will be needed in the future. The first indication is for cases with delayed dental implantation – when immediate or early implantation is not recommended, when a patient is not available for immediate implantation, when primary stability of the implant can't be obtained, or in adolescent people. ARP is often needed to prevent the need for elevation of the sinus floor in the future, or for contouring the ridge for conventional prosthetic treatment, like pontic site de-

velopment. Finances can also be a reason for choosing ARP, some patients may wish to keep their options for delayed implant placement open.

## 1. GBR – Guided bone regeneration

### **a) Non-resorbable membranes**

The principle of placing a membrane between the gingiva and the bone tissue lies in preventing gingival epithelium from entering the defect, to allow the bone to be produced in the defect. Non-resorbable membranes may be made of cellulose, Teflon, or Teflon with titanium. The negative aspect of non-resorbable membranes is the need for their removal. The positive aspect is, that the non-resorbable membrane can be exposed into the oral cavity, therefore it can be used in large defects without a requirement of closing a flap.

### **b) Resorbable membranes**

The membranes can be made of human tissues, animal tissues, plants or synthetic material. Acellular dermal matrix (ADM) is a human skin tissue, washed and freeze-dried, that is being used in periodontal surgery. Collagen membranes from animals have many benefits like having haemostatic properties, enhancing fibrin linkage, attracting fibroblasts and adapting to the bone. Despite the many advantages, resorbable membranes don't show to give more or less bone than the non-resorbable membranes.

## 2. Socket grafts

Socket grafts stimulate bone growth and induce capillary formation. Membranes can be used to cover the socket graft.

### **a) Autografts**

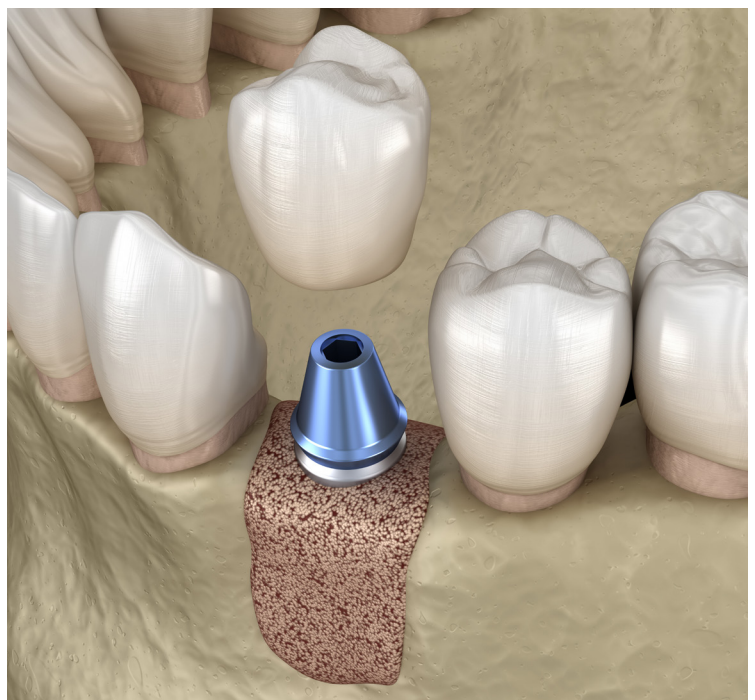
Autografts are grafts harvested and applied within one individual, for example, bone blocks taken from the iliac crest, ramus of the mandible, maxillary tuberosity and so on.

### **b) Allografts**

An allograft is tissue from the same species but another human individual. They can be made of mineralized or demineralized freeze-dried bone, and they are being stored in tissue banks. The graft is mixed with the blood of a patient and placed into the socket after extraction.

### **c) Xenografts**

Xenograft means receiving tissue from an animal. DBBM – Deproteinized Bovine Bone Mineral is the most popular xenograft between dental surgeons. This graft preserves alveolar ridge shape and





size, but with decreased bone formation according to some studies (Froum et al., 2004). According to Bashara et al., 2012, there might be no difference between the use of membranes alone and using DBBM socket graft with the membrane.

#### d) Alloplasts and growth factors

Alloplasts are synthetic materials like calcium sulphate, hydroxyapatite, bio-active glass polymers etc. They show a similar result as a DBBM material.

#### e) Collagens sponges

Collagen sponges are made of denatured bovine collagen and they offer wound protection and clot stabilization. These materials resorb completely, and

although they provide bleeding control, they have a limited benefit compared with naturally healed sockets according to Kim et al., 2017.

#### Summary

According to a systematic review of ridge preservation procedures by Barallat et al., 2014, there is limited evidence for helping us to choose the best treatment option from available materials. There are other modern ways to preserve the alveolar socket like adding growth factors, human platelet-derived materials, platelet-rich fibrin, stem cells

and bone marrow, however, they require further scientific studies for validation. According to the article in British Dental Journal by Amardip S. Kalsi et al. (2019), socket grafts containing DBBM covered by a membrane are still considered a gold standard for the alveolar socket preservation procedure. The choice between the methods comes down to the preference of the operator. Bone grafts with a slower process of resorption like DBBM and bioactive glass seem like a better option for delayed implant placement.

## The enemy of my enemy is my friend: The use of bacteriophages in the fight against antibiotic resistance

Bacteriophages, commonly shortened to phages, are viruses that target bacteria. Treating patients with phages has been researched for over 60 years, but there has been a recent surge in interest in this area, likely due the increasing prevalence of antibiotic resistant bacteria.



Arun Vasudevan, UK

Bacteriophages, commonly shortened to phages, are viruses that target bacteria. Treating patients with phages has been researched for over 60 years, but there has been a recent surge in interest in this area, likely due to the increasing prevalence of antibiotic resistant bacteria. According to the World Health Organisation (WHO), currently at least 700,000 people a year die as a result of bacterial resistance, with a predicted 10 million deaths a year globally by 2050 if the current situation does not improve. This has led researchers to look at alternatives to antibiotics, such as phages.

#### Structure of bacteriophages

While the structure of phages can vary, many share common characteristics. They consist of an outer protein hull, typically in an icosahedral structure made up of repeat protein subunits, enclosing genetic material and are much

smaller than bacteria, usually between 20nm and 200nm. The main structural difference between a typical virus and a phage is the presence of a tail structure.

#### Comparison with antibiotics

Phage therapy offers many advantages over antibiotic use. The first being that phages are bactericidal agents, actively killing pathogens, whereas some antibiotics are only bacteriostatic, which may allow for bacterial evolution towards resistance. Phages are capable of “auto dosing”, which means they can increase their numbers specifically where their target hosts are, meaning there is potential for one single low dose to be sufficient for the treatment. Phages are made up mostly just proteins and nucleic acids meaning they are inherently non-toxic. One of the biggest benefits is their high specificity to just a few or sometimes only one strain of bacteria, because of

this there is minimal disruption of the normal gut flora bacteria, in comparison to antibiotics which tend to have a much broader spectrum of activity, which can result in side effects like diarrhoea, yeast infections and C.difficile colitis. Also, because of the different mechanisms of phages and antibiotics, just because a bacterium has a specific antibiotic resistance, this does not translate into phage resistance, meaning that phages are a good choice to treat multi drug resistance bacteria.

There are some disadvantages with using phages, most notably is simply the lack of good quality studies showing the efficacy of phages in humans. One of the phages’ biggest benefits of high specificity is also one of its drawbacks, for cases where the exact species of infecting bacteria is unknown or there is an infection cause by multiple bacteria, a broader spectrum antibiotic may be a



better choice. Phages are not free from bacterial resistance either, bacteria have numerous methods of evading phages, for example: receptor blocking, extracellular matrix production and competitive inhibitor production. However, phages and bacteria have evolved together, and both are still constantly evolving to find new ways to overcome each other.

### **Phage therapy studies.**

There are numerous studies involving animals showing positive results. Phages have successfully treated animals infected with several different antibiotic resistant bacteria, including vancomycin-resistant *Enterococci* (VRE), imipenem-resistant *Pseudomonas aeruginosa* (IMPR-Pa) and multidrug-resistant *Staphylococcus aureus* (MDRSA) using an injection of an isolated phage strain. However, for phage therapy to become more widely accepted, human trials need to show the same positive results. Unfortunately, there is a significant lack of high quality human clinical trials which is limiting the progress that phage therapy can make. Despite this, there are still several case reports of patients being treated successfully by phages, usually as an emergency last resort.

One case from the Queen Astrid Military Hospital, in Brussels, Belgium, involves a 61-year-old man who was hospitalised for peritonitis found to be caused by *Enterobacter cloacae* and severe abdominal sepsis in June 2018. As an emergency measure, fifty micro-litres of purified bacteriophage cocktail BFC1 was administered as a 6-hour

intravenous infusion for 10 days. Almost immediately after beginning the phage therapy, blood cultures turned negative immediately, CRP levels dropped, and the fever disappeared. No unexpected or adverse side effects that could be attributed to the application of bacteriophages were observed. The patient unfortunately died four months after the start of the phage therapy due to cardiac arrest, caused by *Klebsiella pneumoniae* confirmed by blood cultures.

In 2009 small randomised control by A Wright et al, double-blind clinical trial looked at the potential of phage therapy to treat chronic otitis. 24 patients who all had chronic otitis caused by an antibiotic-resistant *P. aeruginosa* strain were randomly divided into two groups of 12, one receiving phage therapy and the other a placebo. The treatment was given four times in total by a clinician that was blinded to which treatment they were giving. Swabs measuring the quantity of *P. aeruginosa* and phage present were taken. The results were positive, showing visually improvements and statistically significant reduction in *P. aeruginosa* only in the phage treated group. No adverse side effects were reported. This was the first controlled clinical trial of a therapeutic bacteriophage preparation.

### **Phage therapy in dentistry**

Researchers from the Institute of Dental Sciences at the Hebrew University of Jerusalem explored the idea of using phage therapy to target *Enterococcus faecalis* biofilms that can form inside of root canal, resulting in persistent infec-

tions. They isolated phage EFDG1 from a sewage treatment facility and tested its effectiveness against *E. faecalis* in both liquid culture and biofilm form. The phages were effective regardless of the form, which is promising considering eradicating *E. faecalis* in biofilm form has proved extremely difficult using antibiotics. Additionally, they showed EFDG1 was effective in treating root canal infections in vitro and ex vivo in tissue samples.

Several in vitro studies look at phage therapy targeting common oral pathogens such as actinomyces, aggregatibacter, enterococcus, streptococcus and others. There is also research about preventing caries, periodontal disease, endodontic lesions, peri-implantitis and oral mucosal infections using phages. There are even researchers looking at putting phages targeting *Porphyromonas gingivalis*, a bacterium associated with periodontal disease, into a toothpaste with the hope of preventing periodontal disease.

### **COVID-19**

On March 11th 2020, the World Health Organisation announced that the COVID-19 virus had become a pandemic, resulting in schools and universities closing, lockdowns enforced and increasing strains on health services across the world. There was an initial delay in frontline NHS workers being tested for COVID-19 when the virus began to increase in prevalence in the UK. Part of the reason could be associated with a lack of resources and knowledge about



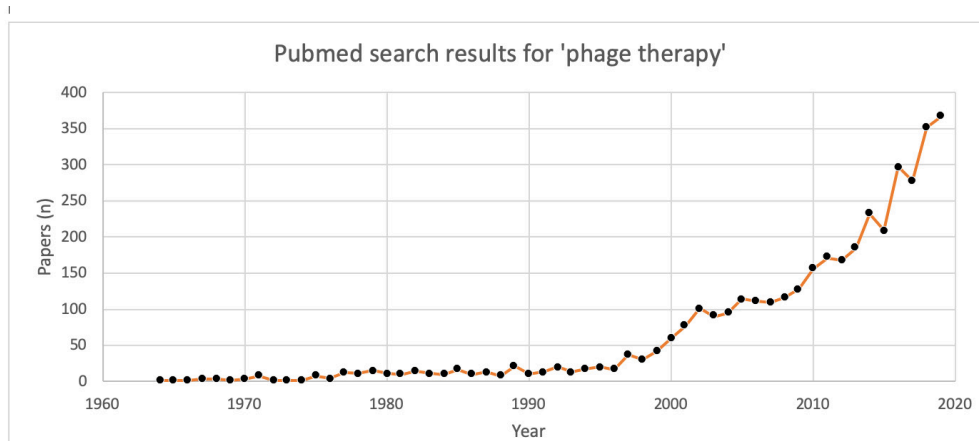


Figure: Graph of the number of PubMed search results for 'phage therapy' over the last 55 years.

the virus itself to create and distribute a reliable test to the quantity of workers requiring testing. In the US, a company called Thermo Fisher was granted emergency use authorisation (EUA) by the US Food and Drug Administration (FDA) for a kit that tested for SARS-CoV-2, the virus that causes COVID-19. The kits contain primer and probe sets specific to SARS-CoV-2 as well as primers and probes for bacteriophage MS2 and a MS2 phage control reagent.

While this isn't the only test developed to detect SARS-CoV-2, it is promising news, showing that even today phages can be used.

Researchers from the University of Waterloo in Canada are in the process of developing a nasal DNA-based vaccine. The idea behind this vaccine is to stimulate an immune response in the nasal cavity and targeted cells in the respiratory tract. It will release a virus-like particle (VLP) similar to SARS-CoV-2

that itself is harmless but aims to trigger an immune response. Additionally, the VLP will attach itself to the same location that Covid-19 would normally bind to, thus reducing the number of sites available for Covid-19

### Conclusion

While the benefits of phage therapy are clear, establishing high quality data involving human trials is a necessity

for the development of phage therapy. Below, Figure 2 shows a graph of the number of PubMed search results for 'phage therapy'.

This rapid increase in interest in phage therapy over the last 20 years is promising. Hopefully we can see more high-quality human trials emerging over the coming years and as the evidence supporting phage therapy increases, we may one day see phage therapy as a common treatment option alongside or possibly replacing the use of some antibiotics.

# Family Inheritance of Periodontitis

Periodontitis is a ubiquitous and irreversible inflammatory condition and represents a significant public health burden. According to a 2015 Journal of Clinical Periodontology issue, severe periodontitis affects over 11% of adults, is a major cause of tooth loss impacting negatively upon speech, nutrition, quality of life and self-esteem, and has systemic inflammatory consequences.



**Martina Tomić, Croatia**

It is now evident that there is a genetic basis for many diseases including periodontitis. Elucidation of the genetic basis of periodontitis should permit a better understanding of disease etiology, allowing improved classification, diagnosis, and treatment of periodontal diseases.

Aggressive periodontitis is a group of infrequent types of periodontitis, characterized by early age of onset and rapid destruction of the tooth-supporting tissues

in otherwise healthy individuals. Since it is the most well-researched form of periodontitis, this article will focus on illustrating the principle findings of genetic research conducted so far.

It is commonly believed that family studies remain the best approach for studying possible genetic causes of aggressive periodontitis. Most commonly used genetic analytical methods in periodontology are: 1) pedigree analysis, 2) segregation analysis and 3) linkage analysis.

### Familial aggregation

Familial aggregation of a trait or disease can suggest genetic etiology. Meng et al in 2007 found that root abnormality could be a local contributing factor for aggressive

periodontitis. Inherent anatomic and morphologic features may also affect the severity of periodontal destruction.

Shearer DM et al in 2011 found that parents with poor periodontal health tend to have offspring with poor periodontal

health. Family/parental history of oral health is a valid representation of the shared genetic and environmental factors that contribute to an individual's periodontal status, and may help to predict patient prognosis and preventive treatment need.

To determine the evidence for genetic factors in familial aggregation of a trait, more formal genetic studies are required, but until now, the research tools to pursue this have been unavailable.

### **1. Pedigree analysis**

Pedigree analysis is an important method in medical genetics. Most early family studies used a pedigree analysis method. The findings of this analysis are very variable ranging from supporting the hypothesis of X-linked dominant inheritance to autosomal-recessive and autosomal-dominant inheritance. Pedigree analysis is direct and simple, but it has its shortcomings in that only the pedigree structure and the disease phenotype are considered.

### **2. Segregation analysis**

Segregation analysis is a formal method of studying families with a disease to assess the likelihood that the condition is inherited as a genetic trait. There are two types of segregation analysis; simple and complex segregation analysis.

Simple segregation analysis performed by Melnick et al in 1976 found that aggressive periodontitis was most probably inherited as an X-linked dominant trait with a decreased penetrance. Saxe'n proposed an autosomal-recessive model of inheritance for aggressive periodontitis. Some unpublished studies have also suggested the autosomal-dominant model of inheritance.

Complex segregation analysis is a method that compares various genetic and nongenetic models, with support for the best-fitting model being assessed using maximum-likelihood statistical tests. Using this approach, support for earlier claims of an X-linked dominant transmission for aggressive periodontitis has been refuted and the autosomal recessive model is preferred.

### **3 Linkage analysis**

Linkage analysis is a technique used to localize the gene for a trait to a specific chromosomal location. To date, considerable effort has been expended to identi-

fy gene polymorphisms associated with the risk for periodontal diseases. Several localized aggressive periodontitis loci on chromosomes 1, 4, 6 and 9 have been identified by linkage analysis.

Meng et al also support the thesis that these studies may reflect the heterogeneity and

complexity in genetic etiology among different families, which is consistent with the fact that human diseases and syndromes with a similar clinical appearance are known to result from different mechanisms.

have been investigated as possible markers of increased susceptibility to aggressive periodontitis.

### **Family-based association tests**

To date, only very limited family-based association studies of aggressive periodontitis have been reported. Diehl et al. studied the association between genetic polymorphisms at interleukin-1alpha and interleukin-1beta and aggressive periodontitis in 28 African-American families and seven Caucasian-American families. They obtained highly significant evidence of linkage disequilibrium



### **Assocation studies**

Association analysis is another gene-mapping approach. It has two subtypes: population-based association tests; and family-based association tests.

### **Population-based association tests**

Kornman et al. first reported an association between polymorphisms in the genes encoding interleukin-1 and an increased severity of chronic periodontitis. Subsequently, many gene polymorphisms, like in genes encoding interleukin-6, interleukin-4, interleukin-10, tumor necrosis factor-alpha, Fc-gamma receptors, human leukocyte antigen, vitamin D receptors, N-formylpeptide receptors and S100A8,

for both African-American and Caucasian-American subjects with generalized aggressive periodontitis. These findings indicated that aggressive periodontitis is a complex, oligogenic disorder, with interleukin-1 genetic variation contributing an important, but not exclusive, influence on disease risk.

### **Twin studies**

Twin studies have been invaluable in studying the genetic basis of simple and complex traits.

Michalowicz et al. studied dizygous twins reared apart (dizygous-A) and reared together (dizygous-T) and monozygous twins reared apart (monozygous-A) and reared together (monozygous-T). The mean probing depth and clinical attach-





ment level scores were found to vary less for monozygous-T than for dizygous-T twin pairs, further supporting the role of genetics in this disease.

For periodontal diseases, all twin studies have studied the more prevalent forms (chronic periodontitis and chronic gingivitis). Heritability estimates indicated that 38–82% of the population variance for measures of periodontal disease may be attributed to genetic factors. Chronic periodontitis was estimated to have approximately 50% heritability. However, to date, no twin study on aggressive periodontitis has been reported.

### Conditions that are genetically linked to aggressive periodontitis

Periodontitis is generally associated with syndromes. Klokkevold PR in 2010 found that syndromes such as Chédiak-Higashi syndrome, lazy leukocyte syndrome, leukocyte adhesion deficiency (LAD), Papillon-Lefèvre syndrome, and Down syndrome showed the features of periodontitis.

Genetic tests may be used as screening tools because they play an important role in knowledge of specific risk factor and its genetic association.

Mc Guire et al in 1999 showed that IL-1 genotype individuals are at increased

risk of periodontitis with 2.7 times more tooth loss, and smoking increased risk 8 times more.

Despite tremendous efforts and published papers in the field of genetic association with periodontitis over the past decade, the causative gene polymorphisms of periodontitis and their pathophysiological effect are still very controversial.

At present, current dental treatment and/or periodontal treatment does not commonly use the available knowledge of genetic factor for treatment. There will be need of a proper approach (protocol) for patient treatment which will incorporate genetic knowledge on a regular basis.

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# Do #BlackLivesMatter to Dentistry?

## Reflections of a mixed-race European student



Owens Iguodala, UK

We can all admit the last few months have been unexpected. Certainly, graduating from dental school in the midst of a lockdown is not something I envisaged for myself four years ago. The sudden halt this placed on my life gave me a lot of time for self-reflection. As a man of mixed White Italian and Black African heritage it was inevitable, watching the brutal murder of George Floyd at the hands of the police and the subsequent rise of media interest in the BlackLivesMatter movement, that many questions and emotions would resurface. What did this most outward symbol of racial discrimination mean to me? Furthermore, as a former dental student and recent graduate, what has been my experience of racial discrimination in

dental school and what can I expect of the future?

I think whichever terms we choose to describe it with, this incident is just the tip of the iceberg of what racism can do. A recent statement made by the British Medical Association called *We stand in solidarity*, depicts racism and discrimination in healthcare as the breeding ground of “health inequalities impacting on our patients” and continues by saying “it adversely affects our colleagues and at its worst it kills”. Although more evident in certain branches of medicine, racial discrimination is also present in dentistry. The 2018 King’s College London clinical trial by Patel et al, which highlights the presence of unconscious bias when treatment planning for teeth

of questionable prognosis based on skin colour, disturbs me. What other subconscious clinical decisions are based solely on the perceptions we have of certain people?

As someone with an eye on the perpetual problem of oral health inequality and, having recently sworn the Hippocratic Oath, I feel obliged to challenge these preconceptions. Only then, I feel I can engage with all sectors of society and provide the best care for my patients irrespective of race and any other protected characteristics.

And what about for me, and other students and colleagues “of colour”? It has been my experience that where everyone is mostly Caucasian, I am referred to as “the black one”. Conversely,



in settings when I am in the company of black people I have been referred to as “the white one”. This is something I do not personally get offended by. However, it is the sentiment and context behind the words used that can cause offense. For example, it is when my race is used to put into question my abilities, for instance, when someone told me “you probably got a place in dental school to fill the diversity quota” or when I hear stories of people refusing to be treated by somebody just because of their name or skin colour that I find it unacceptable. It is also just as bad when colleagues and so called “friends” choose to stay silent when witnessing injustice and tell you to calm down as it’s “all in your head”.

These are just some examples of what people might call racial abuse. Keeping a professional cool-head is particularly tough when faced with a stressful day on a background of difficult personal situations and a demanding course. I certainly feel lucky to have the temperament to let most of these comments wash over me and have the support of a select group of friends who are good listeners. I have learned to use these transgressions as a way to motivate me to work harder but it is easy to see how mental health can chip away and knock someone’s confidence or assume a “very defensive stance” when relating to people who are not the same race as oneself. However, as someone who has been trained to diagnose problems and formulate treatment plans, it is not my aim to just call out problems; it is just as important, if not more, to think about ways to overcome these. What can we do to move forward?

First of all, I found it essential to recognise BlackLivesMatter as a highly contentious and longstanding battle against overt and institutionalised white privilege and discrimination. I see how inconsiderate it is to dilute the motive by talking about other injustices. By facing these issues head on and acknowledging that discrimination in all forms is wrong, other types of prejudice can be tackled simultaneously.

Putting my “dentist” hat on and having spent a long time thinking about this, I have come to the realisation that racism and any type of prejudice can be likened to periodontitis. Similarly, racial discrimination is an insidious and destructive disease. Although it has common signs and symptoms, it affects everyone differently. At times it is very occult; other times it is very evident. Its

effects can be both local (personal and only acting in certain aspects of life) or generalised, and can have direct and indirect systemic effects which ultimately affect quality of life. However, just like periodontitis, when taken seriously through the meticulous and continuous effort from all parties, resolution can be achieved. I believe the thought process to treatment planning can be applied dealing with racial discrimination.

## **“The 2018 King’s College London clinical trial by Patel et al. highlights the presence of unconscious bias when treatment planning for teeth of questionable prognosis based on skin colour.”**

### **“Taking a good history”**

Gathering information on the scale and cause of the problem within each specific setting is important to formulate a strategy which is specific, measurable, achievable, realistic and can be delivered in a timely manner, just as it is for any clinical problem faced. For example, it may be necessary within the context of dental education, to look into admissions data. Furthermore, increasing research on health inequality driven by race, can be beneficial to see whether the patient population served by dental services is representative of the general population it serves.

### **“Cause related therapy”**

Just like promoting good diet and oral hygiene habits to improve overall oral health, global approaches may be applied to tackling racial discrimination. Highlighted in a recent article published by Dentistry.com quoting Cronin and Roger (1999) “the success of minority groups in certain disciplines or professions is dependent on their ability to

move through three key phases.” These include gaining access, completion of studies and finally, progression and development in their career.

Improving access can be solved by adopting effective widening participation schemes to recruit a student population representative of the general population.

Completion of studies and further progression can be aided (as advocated by the UK Council of Dental Schools) by “creating an inclusive environment” and “tackling the award gap”. Appropriate channels need to be established for reporting and handling complaints of racial harassment by students and staff in an appropriate and sensitive way. Other things include “diversifying curricula” by ensuring it is representative of diverse patient and student groups and implementing mentorship schemes. Progression could be aided following the advice of the UK NHS Equality and Diversity Council which stands to promote, for example, leadership capability and capacity to reflect the workforce’s demographics

### **“Maintenance phase”**

As for periodontitis, maintenance is key, yet it is often overlooked. Quality standards should be assigned, and any implementations made should be audited regularly to assure they are still fit for purpose.

Ultimately, to create a healthcare system capable of delivering care to all strata of society, every effort should be made to make it as diverse and inclusive as possible at all levels of its structure to reflect the population it serves.

I am not here to provide any answers nor make a guidance document. I am well aware that many things have been overlooked and I acknowledge the complexity of this problem goes far beyond anything I could write in a single article. I suppose my wish is for this to serve as a conversation starter for a talk on racial discrimination which has been long overdue and as a reminder, for myself, of how I would like to practice my profession. After this long exercise, rather than coming up with excuses as to why this cannot happen, I feel invigorated with the notion that, if the positive energy I have witnessed by many in these last months is channelled in the right direction, it can lead to making lasting and positive change.

# Incoming call: EDSA President

It usually takes years and a ton of effort to make your way up into becoming a president of the European Dental Students' Association. Months of thinking, planning, and defining your goals before you send out your application...but no amount of time would ever prepare a president for the situation EDSA was facing this year. We sat down with Tin Crnić to find out more about the most unique and the strangest presidential term from all in the history of EDSA.



**Tin Crnić, EDSA President; Ivana Ligusová, Magazine Editor-in-Chief**



a lot about the dental students' community, dentistry, and the functioning of the association. As EDSA has a powerful voice among various institutions, my primary goal was to make EDSA more visible to students, powerful stakeholders, institutions, and of course, more accessible to dental students. I was also encouraged by my friends, family, and also the past presidents of EDSA to run for the position and I have to tell you that it was a valuable experience and I loved and enjoyed serving the dental students' community every single day of my mandate.

**How did you find the courage and confidence to run for the highest position in the association? I bet the weight of incoming responsibility is something that scares many potential candidates off.**

The courage and confidence came firstly from the big support I had from my friends and family, but it was mainly built through the years I spent in EDSA—either as a member of the Organising Committee of the EDSA mobility projects, or as a board member of EDSA where I had the opportunity and pleasure to meet a lot of people and created a great network. The position itself brings loads of responsibilities and for sure it looks scary when you put things on the paper, however, if you have the vision and the goal in front of you and the path you wish to direct the association too, the work you have to do and responsibilities you have, things do not look so scary in the end, but of course to put your visions into acts, you must have good quality people on the board,

**G**ood morning Tin, thank you for agreeing to be interviewed. The year of your presidency is almost over and we would like to hear your insights. Why don't you take us to the very beginning, how did your journey in EDSA start, and how did you come to the idea to run for EDSA President?

Good morning Ivana, thank you for having me. My journey with EDSA started with the EVP Zagreb back in 2016. Where I was a member of the Organising Committee; I was a second-year dental student at that time. It was a rewarding experience for me and it did not take long since I decided to join my very first EDSA meeting which

was the 59th EDSA Meeting in Cardiff, Wales, Luka Banjšak was the President at that time. At first, it was the EDSA family legacy experience that caught my attention but because of that meeting, I got very interested in the functioning of the association and its activities. The same year I became a member of the Organising Committee of the EDSA Summer Camp Dubrovnik and I also enrolled as an EVP Officer of EDSA, during Valentineng Garyga's Presidency. The year after I became the General Secretary, under Alyette Greiveldinger's Presidency, and the term after that I became the President of EDSA. During those two years in EDSA, I have learned



and I have to say, if I had to draw, think, wish of a better team, I wouldn't have chosen as good as I had during my term, it was the group of such a great, positive and hardworking people for whom I will forever be grateful to have met and work with, I simply cannot express more of how grateful I am to have work with them.

**You are the first President in the history of EDSA that had to cancel both of the meetings due to the unprecedented circumstances: a COVID-19 pandemic. How was the term before the pandemic?**

COVID-19 was a big gamechanger in this term and had a significant impact on EDSA's activities.

The term has started dynamical, there were loads of things put on the table and we wanted to make sure that they are handled thoroughly and maintained on a higher level. Some of the board members have been sent to attend trainings, e.g. TNT (Training new trainers) in Bucharest, organized by EGEA (European Geography Association for students and young geographers) which would improve the quality of EDSA's trainings and working groups during the EDSA meetings. EDSA has been invited to meetings of valuable stakeholders and it was crucial for EDSA to attend those meetings to integrate the students' point of view but also to broaden its network-obviously this social contact, events are currently not possible which is a big hit not just for EDSA but for every other body.

When it comes to the board of EDSA, we managed to organize on-site team meetings on the private basis which bonded us a team and had a significant impact on the functioning of the team-this kind of meetings created a strong bond between us and has created a big friendship among us which made the work we had to do into pleasure and fun, which created great results in the end.

**And how did your presidency change when COVID-19 started to spread in the European region?**

It was a big hit mentally for all of us on the team, there has been put loads of the work and effort on the preparation of the EDSA Meetings in Istanbul and Strasbourg and of course on the other EDSA activities. I was invited to several meetings from the partner associations and stakeholders which were cancelled in the end but some of them have been organized online-I have to tell you that



even though Online meetings function normally, they are very exhausting and that social contact is greatly missing, some things you wish to comment on a one on one basis but you simply cannot do it over the online meeting where everyone is listing. All of the hard work and the preparations we did for the spring and summer part of the term needed to be reorganized and managed online which asked for a lot of reshaping, online team meetings, consultations and brainstorming how to effectively continue the work of the association during this unprecedented time. The team has acted maturely and has shown a great quality on the individual and team level.

**“Being a President does not mean you are the smartest person on the team, you must know the quality of each person on the team and what are they mostly competitive at, once you know so, it is easy for you to delegate the task and to establish a good working environment. ”**

**How did you feel at that moment when you realized you have to cancel the meeting? What contributed to that decision?**

When the first cases were reported in Europe, I honestly didn't expect it would spread that quickly across Europe and that it would have made such an impact on the society, economy and everyday life routines. When the situation became

more serious it has been clear that the EDSA events needed to be cancelled. When it came to that point, I have to be honest with you, I was devastated, but I had to be there mentally for the team to bring them up and to continue our work no matter what. We are representatives of the Healthcare community and we must act responsibly and not risk the spread of the infection by physically bringing students, academics, members of partner association to the meeting venue. During those days, not just EDSA events have been cancelled but all the others of the EDSA's partners. We proceeded with care and prioritized the safety of our members and the dental students

**Was it hard to break it to your colleagues and the general public?**

It was probably the hardest decision I had to make and to discuss it with the team. During the team meeting, there was silence and tears from every single one of us, but in the end, it was an only logical thing to do to cancel the physical events and to scope for the best possible alternative.

**If you knew what would happen during your term, would you run for EDSA President anyway?**

Being on the board of EDSA, carrying any sort of the position on the team, has loads of its great moments but also the hard ones. When I took over EDSA, I knew there won't be only great moments and I did prepare for the hardships, however, no one could have expected this case scenario. I find myself as a person who has a really strong character and it is really hard to bring me down, so I believe my personality and character has



made me go through this all term with still holding all of his strings attached and being there for the team 100 %. I would have still run for the position as I had the goals I wanted to fulfill with the Association, however, is maybe easier to answer this question now that my term is behind me and I went through this entire situation.

**Could you name the most interesting events (in person or online) that you took part in as an EDSA President?**

It is really hard to choose as every event was special in its way and I played different roles at them – on some I was an observer, at some an active participant.

**Were you satisfied with your team? Is there a big difference between the previous committees which had a chance to „build a team“ on the meetings, and an online committee we had this year?**

As I said in the previous questions if I had to wish for the best team, I wouldn't have wished for a better that I had, a truly remarkable and great group of people who fuelled one another with energy, laughter, love and also has driven every each of one us to push and to work harder. The social events, on-site meetings, cannot be replaced with the online meetings, that is for sure some things cannot be addressed as good as when you are face to face with someone – it is the gestures, the contact that makes the quality of the conversation and good networking. I have to be honest with you, coffee breaks during the on-site meeting are a valuable part of the meeting, where you can easily communicate a deal and create a good network. These are different times right now and we simply must adapt to it and make the best out of it. When I took over the team in Berlin, it was easy to shift from one person to another to communicate the plans and to explain your expectations of each position/person on the board-today it will be more time consuming as we will be shifting and forced to create different virtual rooms to talk those things through.

**Apart from the specific COVID-19 situation, let me ask you about your position in general. What do you think is the most difficult thing about being an EDSA President?**

First, during my presidency I was still a student, meaning, one day I am sitting in the lecture room listening to lectures, sem-



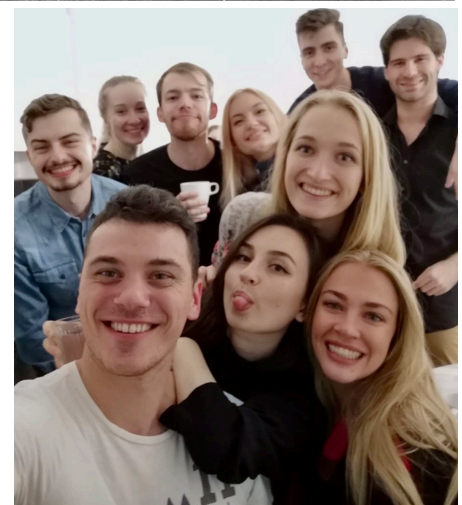
inars, in the clinics treating patients and the other you are in the heart of Europe sitting at the table with the representatives of the valuable stakeholders making an impact on dentistry and dental students' community and the third day you are flying to meet with the representatives of the dental industry and the fourth day you are sitting an exam. At all of the above mentioned, you must bring your 'A game' being competitive at all matters discussed. In order to do so, you need to know how to properly manage your time and how to organize yourself, if you cannot do so.

**Are there any acts of other EDSA Presidents that you find particularly impressive and inspiring?**

I was holding the position of an EVP Officer during Valentin Garyga's term and the General Secretary during Alyette Greiveldinger's term and had to opportunity to attend the meeting when Luka Banjšak was the president. From all three I have to say I was happy to meet them and to be friends with them, I did learn a lot from all three of them. Luka had a good charisma, Valentin was good in diplomacy and Alyette brought that mother figure in the team which made her a good team manager. There are many more good qualities they hold, but these are the ones I most looked up to. The acts that I mostly find impressive is their friendship and willingness to help out and show up when most needed.

**If you had to name three attributes every EDSA President should have, what would it be?**

I would say the EDSA Presidents should be good team managers, diplomatic and



charismatic.

Being a President does not mean you are the smartest person on the team, you must know the quality of each person on the team and what are they mostly competitive at, once you know so, it is easy for you to delegate the task and to establish a good working environment. The EDSA President might be put against the wall during some conversations, he/she might be under pressure to deliver something that he does not necessarily can/should deliver, he must know how to find a good/diplomatic way out. Being diplomatic means to be sensitive in dealing with others, their opinions, beliefs, ideas, feelings and who can achieve peaceful resolutions or facilitate discussion and to be effective in communication, especially during negotiations and when attempting to be persuasive or assertive. And finally, charismatic, at some point he/she will have to speak up to deliver the ideas, points, stand of the association in front of a group of people, good charisma will bring the attention of the listener.



# Mandibular Esthetic Perception of the Modern Era



Pouria Moshgani, The Netherlands



Attractiveness bias plays an important role in modern-day society; many studies from 1985 to 2020, have shown that individuals get treated differently depending on their physical attractiveness. For example, attractive individuals have higher chances in the job market, an easier time forming friendships, more partner choice, and even benefit from leniency bias in court situations. Studies show that these could be attributed to them being perceived as more likeable, intelligent, successful, extroverted and higher in the social hierarchy. This realization could have brought about the increasing esthetic demands in the facial area, which dentists, orthodontist, oral and maxillofacial surgeons, and cosmetic surgeons have to face. Moreover, according to a recent systematic review by Samsonyanova from 2014, among the many factors for which clients seek orthodontic treatments, facial esthetics is the primary.

It is thus of utmost importance to understand societal preferences for facial esthetic preferences to deliver

more patient-centered care. However, orthodontists are frequently biased in their esthetic perception by their educational background, often overestimating or underestimating treatment effects. It has even been recommended to them not to establish self-made esthetic ideals that may not comply to the untrained eye.

Among the craniofacial anomalies for which patients seek treatment, sagittal discrepancies remain one of the highest complaints; they are reported more critical

than maxillary height and chin height. Moreover, people mythically considered the protruded chin as a sign of a strong character in a person. For this reason, all available evidence pertaining to the last 10 years, comparing the esthetic perceptions of orthodontists and laypeople (people without any dental educational background or education) regarding sagittal discrepancies was compiled in a systematic review. With this, treatment recommendations for border-line cases with regard to facial esthetics is made possible, to aid in delivering care that is more patient-centered.

The esthetic perceptions depend partly on the assessors' races. For instance, in a Brazilian study evaluating two states of varying ratios of European-African heritage, Rio Grande do Sul (higher European heritage) preferred straight protrusive profiles, whereas Rio de Janeiro (mainly African descent) preferred protrusive lips more. Furthermore, Chinese assessors were more likely to rate retrusive profiles as more

attractive, and protrusive profiles as unattractive than Caucasians. The race of the patient also influences the most esthetic mandibular position. Multiple studies indicate that both laypeople and orthodontists consider Caucasian males to most ideally have a slightly protrusive mandible and Africans a straight profile, particularly in men. This epitomizes the need for differing cephalometric norms that orthodontists use for differing races.

Society also tends to be more critical evaluating female facial esthetics. For instance, orthodontists and laypeople desired surgery for women at earlier sagittal mandibular discrepancies (from the Straight Profile) than for men. The included studies showed that esthetic perceptions between orthodontists and laypeople did not significantly vary. Furthermore, the most frequently rated attractive profiles was the straight profile, followed by the slight mandibular protrusion; and mandibular retrusion was least frequently rated as the most attractive profile.

It thus can be recommended to clinicians dealing with sagittal complaints, that slight protrusions (within the normal range) are perceived as attractive in the modern era. Of course, this will depend on the patient's wished as to opt for a complete straight profile. If a Class III skeletal relationship can only be restored to a slight mandibular protrusion through orthodontics, perhaps it is better to leave it be, informing the patient of how esthetically it is regarded nowadays, without ignoring the patients' wishes. This would minimize surgical needs and costs to correct only slight mandibular protrusions. However, more research still needs to be done on mandibular esthetic perceptions due to the everchanging societal perceptions that occur over time.

# Soft Skills: Why are they important for individuals and organizations?



Dora Srdoč, Croatia



Soft skills are defined as personal attributes needed for success in a job or an organization. On the other hand, hard skills are job-specific skills, an exact knowledge needed to perform a job. Both hard and soft skills are equally important for a person as an individual and while working with different people in a team or organization. Hard skills can be gained through education, training programs, workshops. They are easy to define and evaluate e.g. for an IT professional a hard skill would be computer programming. Soft skills are harder to define or evaluate as they are considered interpersonal skills.

Most famous soft skills are communication, listening, empathy, emotional intelligence, critical thinking, time management, public speaking, teamwork, problem-solving, leadership. Soft skills define how one person interacts with others in a group and as an individual, it shows their personal traits,

communication abilities, the ability to provide a constructive feedback and motivate people they are working with.

Why are soft skills considered so important? The answer is quite easy, while those help an individual in a matter of personal growth they also reflect to a whole group that this individual is working with. Every individual that is a part of an organization should bring equal skills and knowledge as every other individual in order for an organization to run efficiently. Another reason why soft skills are always required while working with a group of people is because soft skills are transferable skills that can be used regardless of the job at which the person is working and also can be thought to others. This makes people with soft skills very adaptable to different situations and environment.

People as individuals or as a team should never stop working on themselves throughout life. Both soft and hard skills can always be improved over time or be used as a tool to teach other people and inspire them to work on themselves. In order to improve your soft skills a person can enroll in various training sessions and also attend a Training New Trainers seminar and become a certified Soft Skills Trainer. There is no better feeling than helping people develop themselves, inspire, motivate and teach them how to grow while also learning from their journey on becoming new trainers.

Being a soft skill trainer means teaching other people new skills in a way of non-formal education. Trainer compass is a tool that aims to identify and evaluate the competences of a trainer. Those are: behaviour, skill, attitude and knowledge.

Trainer's attitude represents

the foundations of a trainer's practice. It holds the structure for knowledge, skill, and behaviour. It is the core of the trainer, the first and most important thing the trainees will see, feel, connect to, and what people will remember. A trainer should be open minded, free of stereotypes, but also be confident, reflective, patient and overall positive.

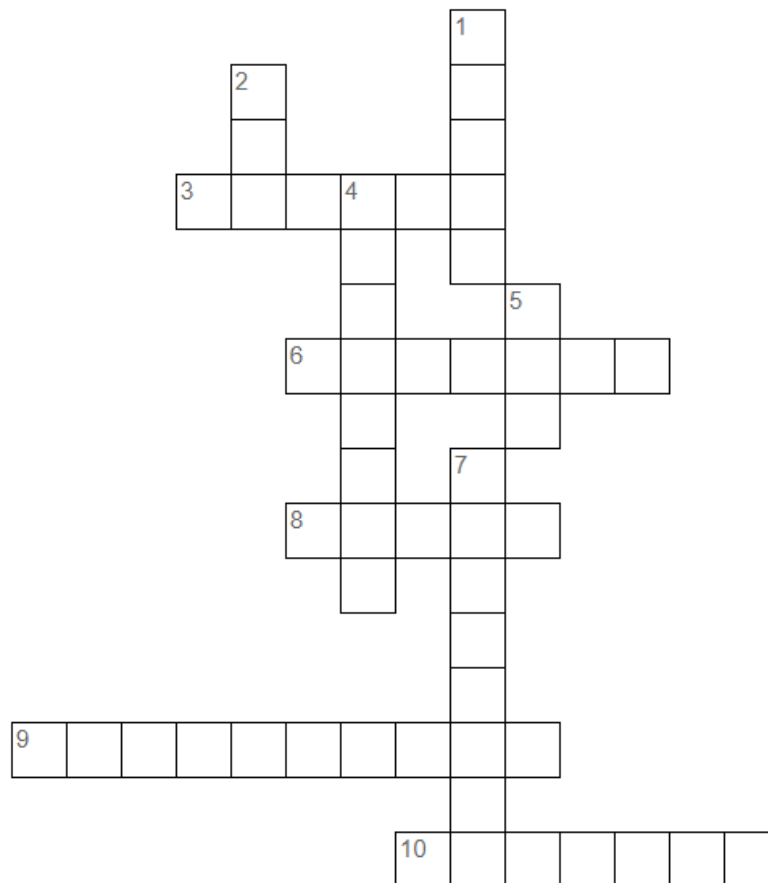
The knowledge a trainer needs can be divided into knowledge regarding how people work and learn (how learning happens and what are the most effective ways to stimulate long term understanding and mastering), the knowledge essentially needed to facilitate the learning process, and knowledge related to the content of the training being delivered.

Next to knowledge, trainers also need some well developed transferring skills that can be roughly named communication skills, as main tool for knowledge exchange and how to properly engage with the audience to start the learning process, and delivering skills (how to speak and present the information so that the audience understands and remembers), making it accessible for the audience to master the skills related to the content.

Last but not least, behaviour: no matter whom one is and all the things that one knows and can, it's not worth much if one doesn't do something with those experiences, skills and knowledge. The impact of a trainer is only as far reaching as the actions and behaviour that a trainer exhibits. Talking and demonstrating what a trainer is teaching in her/his own behaviour, both in training and everyday life, is absolutely essential for a great trainer.



# EDSA Crossword

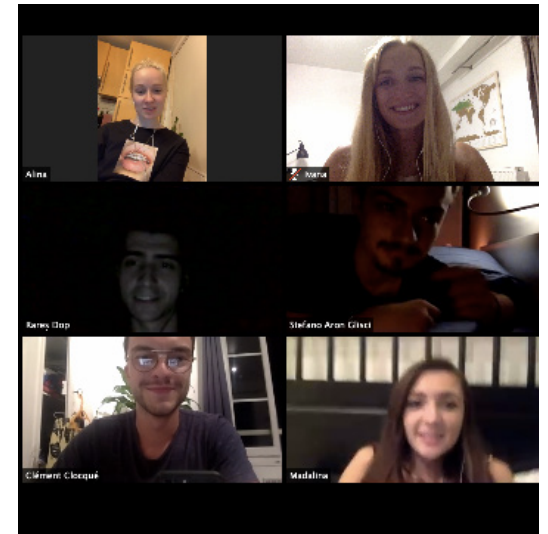
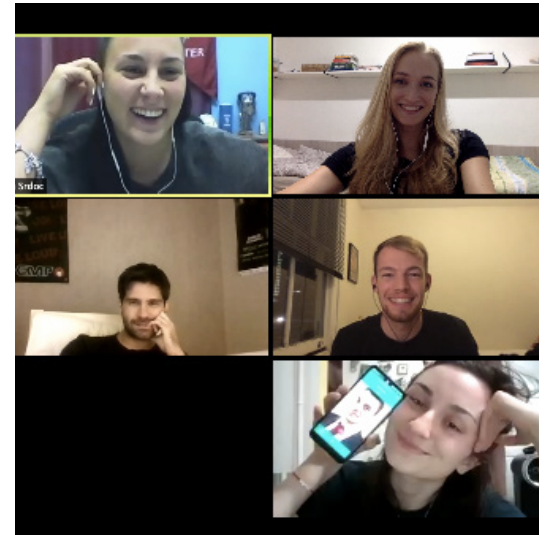


## Across

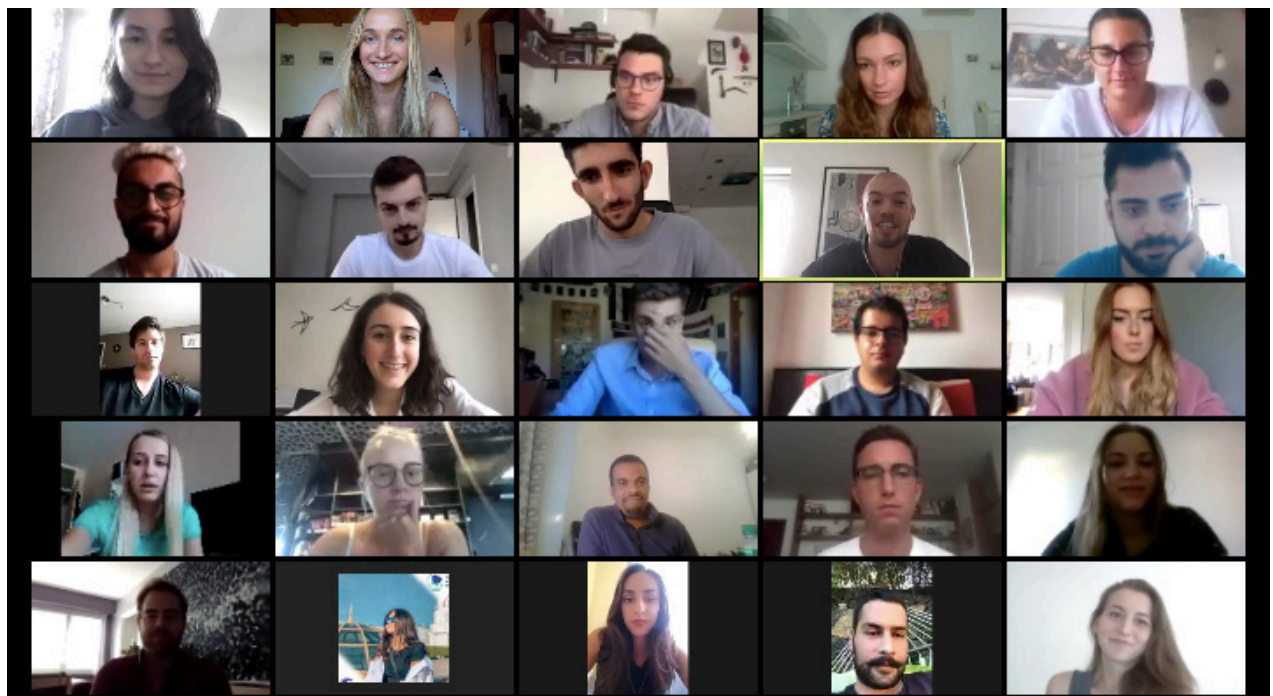
- 3 What tooth is an Elephant's tusk equivalent to?
- 6 What city was the 59th EDSA Conference held in?
- 8 What band's most famous ballad did the UK delegation belt out during EDSAVision in Kazan? Hint: MAMA, JUST KILLED A MAN
- 9 Enamel is formed from what cell?
- 10 The city of Strasbourg sits on the border of France and which other country?

## Down

- 1 How many roots does an upper first molar usually have?
- 2 What country was Co-Editor Neil born in? Hint: He's voting for Biden!
- 4 What city was the 65th EDSA Conference to be held?
- 5 What ExCo member's name could be shortened to Sn on the periodic table?
- 7 How do you say dentist in French?



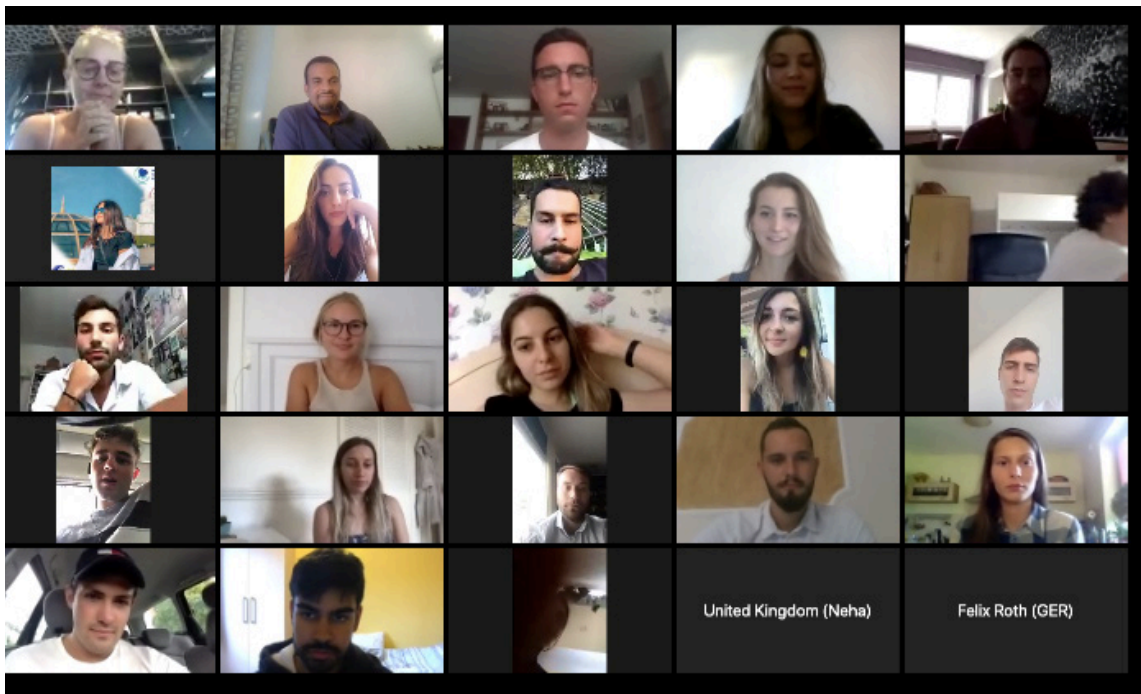
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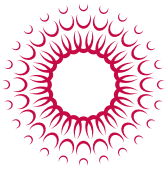




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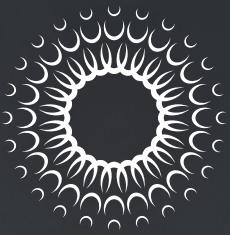
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