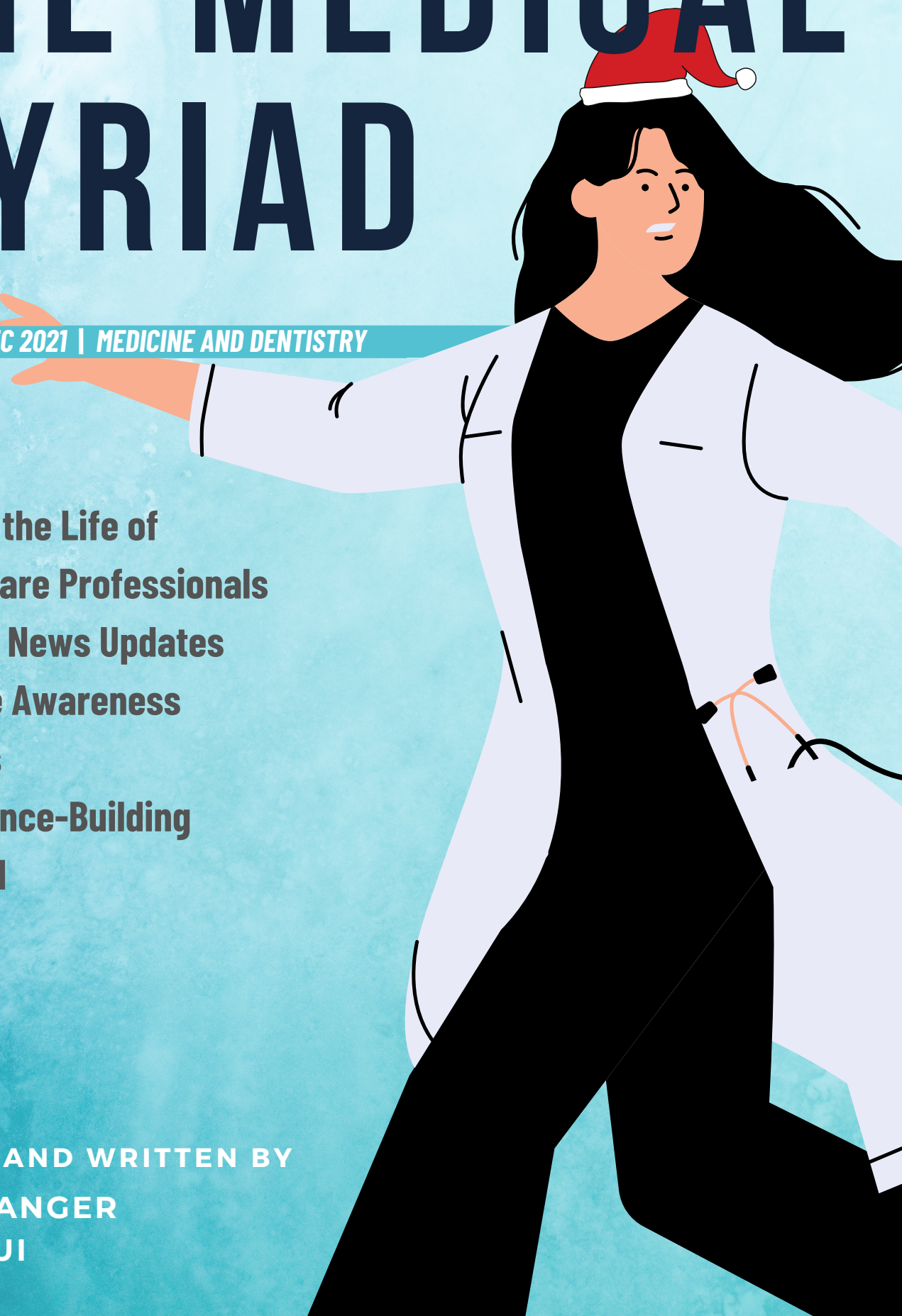
OXFORD HIGH SCHOOL

THE MEDICAL MYRIAD



VOLUME FOUR, DEC 2021 | MEDICINE AND DENTISTRY

INCLUDES:

- Q&As
- Days in the Life of Healthcare Professionals
- Medical News Updates
- Disease Awareness Articles
- Experience-Building Material

PREPARED AND WRITTEN BY
LEEN AL TANGER
EVELYN HUI

Q&A

WITH DR MAHMOOD, NEUROLOGIST IN DENMARK

Q: WHAT WAS THE HARDEST PART OF YOUR CAREER IN MEDICINE AND HOW DID YOU OVERCOME IT?

When I first got started as a doctor, my schedule was very tough and I would say I did not entirely understand how to take care of my work-life balance. Because of this I often found myself sleeping very little and getting too emotionally involved in my cases, which impacted me as a person and therefore my abilities as a doctor.

The hardest part of my career was understanding that my needs as a person are just as important as my patients' needs. This might seem obvious to people looking in, but not letting your professional life and medical cases keep you up at night, or not allowing yourself to relax with family and friends is harder than I think many people realise.

It is not something I thought I would struggle with - in fact, I thought that I would be an expert at holidays and relaxation! I don't actually think any doctor I know has ever entirely managed to put their needs on an equal level as their work, but I have definitely gotten better at it over the years.

Q: WHAT ADVICE WOULD YOU GIVE SOMEONE IF THEY ARE UNSURE THEY ARE SUITED FOR MEDICINE?

The best thing you can do is be honest with yourself: are you actually willing to put in the hours? Are you willing to take years to complete training? Are you willing to work in a team? Can you stay calm?

Talking to doctors, reading magazines (like this!), listening to podcasts and reading honest books about medicine as a career are also a great way to reflect. Basically, spend lots of time considering - don't think that this career is something you can easily enter or exit.

A good rule is: can you still love the profession after reading about all the drawbacks? If the answer is "yes", then you've got a solid start.

Q: DO UNIVERSITY RANKINGS MATTER?

It depends.

As a student, they only really matter as an indication of how rigorous universities are compared to one another. But, when you enter work, they matter only for some employers - mostly these are private practices. Even then, they will weigh up your education with other things, such as your overall experience, so it will never be a deciding factor.

This is something I would not be too concerned about - the people you work with will almost never ask about where you studied as it is your abilities that matter much more. So, when looking at universities, look at their courses and find something that you know you will do well in because it suits you and your style. Don't look at the rankings alone.

Q: WHAT ARE THE BIGGEST DIFFERENCES BETWEEN WORKING IN THE UK AND DENMARK?

Both the UK and Denmark are very lovely cities, but I would say the biggest difference between them is the work-life culture. I moved to Denmark around five years ago, after working in the NHS for around a decade.

Even before the pandemic, when I was working in England, the NHS was overwhelmed. I would say this contributed to a general sense of stress and tension, as we often had patients that did not understand our workloads and maybe even got the impression that we were not entirely focused on our jobs. This means that a minority of patients often lashed out, which always brought the morale of the medical team down.

In Denmark, while there is a schedule that we must be aware of and sign on in our contracts, I would say that we often work more hours than are called for and I sometimes find myself not leaving the hospital for days. I am not sure if this is only for those in neurology, but it is not entirely uncommon. I do not have a family and children so do not need to face their disappointment, but I would say this is the biggest downside to my current position.

On the other hand, both Denmark and the UK have very strong teams of people to work with, and so if you are looking to be a doctor in either country you will have a very strong support network at all times. You are never truly alone in medicine, and that is one of my favourite parts of the job.

Q: DO YOU HAVE ANY MEDICAL CASES THAT HAVE STUCK WITH YOU?

Yes, definitely.

This happened soon after I took my current job in Denmark but, even though it is years later, I still remember it clearly.

We had just finished a surgery that was very complicated and took maybe over eight hours, so I was getting ready to clean up and leave. The radio was on in the surgery theatre and we heard of a huge and violent collision on the highway. Because the hospital is not very close to the highway, we continued on with our cleaning up, but, as we were leaving, we were told that one of the people in the collision had survived and was being flown in. There are not many emergency facilities equipped like ours, which is maybe why they chose our hospital even though it was far away from the crash site.

We immediately prepared for the surgery and had to operate for twenty four hours.

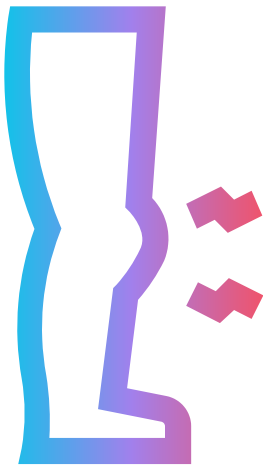
The patient had been hit head-on by an incoming truck with twenty four wheels. They ducked their head and the truck had taken off the top of their head. If it was even a centimetre below, it would have take their brain off, but as it was they were still alive and we had managed to make them stable. They were not driving, but the person that was did not duck their head and died on site. Sadly, we only managed to make them stable enough for family to be able to properly say goodbye. But, the entire team was still happy to have done that much for the poor patient's family.

They later sent us each huge gift baskets and homemade pastries, which we very much appreciated!

I would say this case stuck with me not only because of how amazing the chances must have been for the truck to have perfectly taken off the tissue just above the patient's brain, but also because the patient technically survived. Emergency cases are always interesting, but this was was also rare.

FIBROMYALGIA: A DISEASE OF CONSTANT PAIN

WRITTEN BY YEAR 12 STUDENT EVELYN HUI



Although the term 'fibromyalgia', first used in 1976, is relatively new, the disease has been around for centuries. Initially thought to be a mental disorder, it wasn't until the early 1800s that it was classified as a real, physical rheumatic disorder with physical symptoms. The first term for the disease was 'fibrositis' which was coined in the 1820s after the discovery of the tender points seen in fibromyalgia cases, as doctors thought the pain was caused by inflammation at the site. The current name, 'fibromyalgia' was derived from Greek and Latin with 'fibro' meaning fibrosis tissue, 'myo' meaning muscle and 'algia' meaning pain.

Fibromyalgia affects 2-8% of the population, and is most commonly diagnosed in young to middle-aged women. Fibromyalgia is characterised by chronic, widespread pain, as well as an increased sensitivity to pain in general, fatigue, stiffness, insomnia, problems with cognitive function (also known as 'Fibro-fog'), headaches, and irritable bowl syndrome. Fibromyalgia also often comes paired with other conditions such as migraines, painful bladder syndrome, anxiety and depression.

The symptoms of fibromyalgia can mimic those of other diseases, and patients suffering from the condition may need to see multiple doctors to get an accurate diagnosis. Additionally, it can be confused for thyroid imbalances, lupus, osteoarthritis, ankylosing spondylitis and polymyalgia rheumatica, conditions which also happen to cause pain and fatigue.

The causes of fibromyalgia remain largely unknown, but researchers believe that it can be caused by genetic factors, triggered by certain illnesses and psychological stress. This can contribute to an imbalance of chemicals in the brain which are essential in processing pain.

There is no current cure for fibromyalgia. Instead, doctors often attempt to treat the underlying cause of the disease, including antidepressants, cognitive behavioural therapy, counselling or managing the symptoms by using painkillers, and lifestyle changes such as exercise routines and relaxation techniques. Overall, fibromyalgia is a disease to be managed, but not one that can be cured.

A DAY IN THE LIFE OF A NEUROLOGIST

WRITTEN BY CONSULTANT NEUROLOGIST DR MAHMOOD

As a neurologist, I look after patients that are facing difficulties within their spine, brain and nerves.

Generally, my day starts as early as 6am, although this sometimes does mean that my shifts run so close to one another that I do not go home and instead sleep in the designated break rooms. But, once my shift starts, I go to the meeting room and discuss with my colleagues about the cases we will be seeing today both in the surgery theatre and in the examination rooms. Sometimes, although it's always polite, there is some discussion and debate about what the best course of treatment for a certain patient is. In this case, the doctor in charge of the case always makes the final decision, but very rarely without taking in the comments of fellow medical professionals.

After an hour or so of meeting, we then move on to consultations in the examination room.

We will spend an equal amount of time talking to the patient and asking questions, all the while taking notes - it is very important that everything discussed is kept on file. This is so that any meetings that take place, as mentioned before about courses of treatment, are informed and up-to-date.

Then, I will often perform one or two surgeries. If one surgery is very complicated and will take a lot of time, that will be all I am required to do before the end of my shift. But, if they are fairly routine, I will have multiple that day.

When I am on-call, my day is very different. The pace is much more fast-paced and almost all the time I am needed will be spent in the operating theatre. It is during this time that very critical cases come to me and communication is vitally important. We often have to make decisions on patients that have few notes on the system and are close to dying.

Not all cases that come to me are my responsibility, with some of my time also being spent in the theatre with another surgeon, consulting and watching in case the doctor is not very confident or needs someone to supervise. This is a very satisfying part of my job, as it means that I am able to speak to like-minded people about the latest advancements and procedures.

HENRY MOLAISON: HM

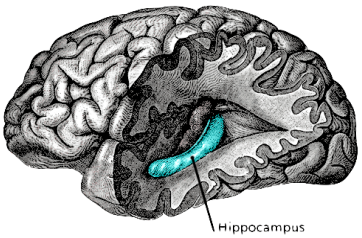
WRITTEN BY YEAR 12 STUDENT EVELYN HUI

In the history of neuroscience and neuropsychology, one patient stands out: a man named Henry Molaison, also known as HM.

HM was born on the 26th of February in 1926. He suffered from severe epilepsy for ten years after hitting his head and by 1953, when he was twenty-seven years old, his epilepsy was so severe and incapacitating that he was no longer able to continue his job as a motor winder on an assembly line.

HM was referred to a neurosurgeon, William Beecher Scoville, who isolated his epilepsy to his left and right medial temporal lobes and suggested that they be surgically removed. It was an experimental, high-risk procedure, but was carried out under his consent.

The surgery was partially successful in that it helped to control his seizures, but it severely impacted his memory. HM developed anterograde amnesia, which affects an individual's ability to form new long-term memories. Scoville was joined by Milner in studying HM and a few other individuals who had damage to their medial temporal lobes.

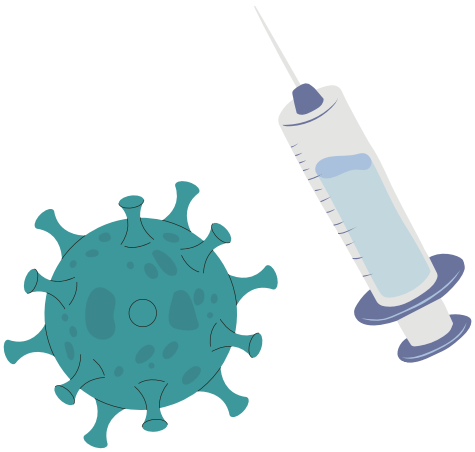


For example, he would underestimate his own age, forget the names of people he had met or just been introduced to, and had no recollection of events that had occurred just minutes before. He could remember things if he concentrated on them, but would forget them if he lost his concentration. He could remember his old address, but not his new one and had difficulty finding his own way home. He did the same puzzles and read the same things often, and would forget that he had a meal soon after he ate. When interviewed in 1955, two years after his surgery, he said that the year was 1953.

Despite problems with his memory of particular events, he had no problem with his short-term memory, or his memory of how to perform certain tasks. He was even able to adopt new motor skills, like tracing patterns while watching his hand movements in a mirror, although he did not remember ever doing the task.

HM contributed immensely to the knowledge of human brain structure and function, the formation of memories and the establishment of memory as a distinct cognitive function.

MEDICAL NEWS:



TOPIC: THE OMICRON VARIANT
WRITTEN BY Y12 STUDENT EVELYN HUI

Five out of twenty-four greek letters have been used to name COVID-19 'variants of concern'. The newest, Omicron, has sparked international concern as well as a quick reintroduction of previously relaxed safety measures.

Omicron was first declared a 'variant of concern' on the 26th of November, 2021, based on evidence that the Omicron variant has many mutations (including more than thirty on its spike protein, which is used to infect cells) that impact its behaviour. As of the 5th of December, 2021, the new variant has been detected in 38 countries, although no deaths have been reported.

It is not yet clear whether Omicron is more transmissible than the Delta or even Alpha variants, although it has spread rapidly across South Africa and cases are growing in other countries. However, preliminary evidence has indicated that Omicron has an advantage in escaping the body's immune system as there is a greater risk of reinfection in people who have been infected previously and received some protection against the virus.

TOPIC: PAROSMIA - AN AFTER-EFFECT OF COVID-19
WRITTEN BY Y12 STUDENT EVELYN HUI

Many people are aware of a common symptom and after-effect of COVID-19 - a loss of taste and smell, also known as anosmia, which can last up to a year. A far more disturbing and distracting after-effect, parosmia, has been developing increasingly in those who have recovered. Symptoms of parosmia include sensing a persistent foul odour, especially in relation to food, and difficulties recognising or noticing certain smells. Patients have reported that they sense odours such as sewage, gasoline, ammonia, vinegar and metal, among others. People suffering from parosmia may have a reduced appetite, weight loss, and depression.

Studies have shown that people who developed anosmia while suffering from COVID-19 may be at an increased risk for parosmia. A study of 268 people with parosmia after COVID found that 70.1% were aged 30 or younger and that 73.5% of them were female. A June 2021 survey has also shown that 10.8% reported parosmia after having COVID-19 and that those who had it were split half and half between sudden and gradual onset.

BUILDING YOUR EXPERIENCE

WORK EXPERIENCE & VOLUNTEERING

While the COVID-19 pandemic takes precedent in hospitals and other clinical settings, you can still be pro-active and sign up for remote medical experience courses. Many of these contain highly realistic scenarios and guide you through self-reflection, a key skill you need to develop when making your application to study medicine.

Medic Mentor - Medical & Allied Healthcare Virtual Work Experience

Brighton and Sussex Medical School Virtual Work Experience Programme

Observe GP

St John's Ambulance Volunteering

WIDER READING

A critical part of understanding what medicine entails and preparing yourself for both university and a future career is reading. It greatly helps in interviews if you are up-to-date on medical news and if you can draw from books written by doctors as a form of self-reflection.

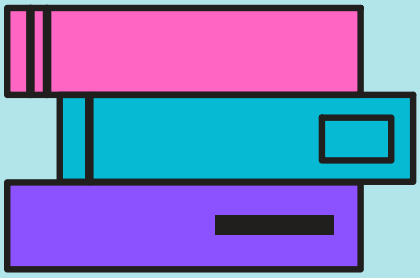
Medical News Today

This is Going to Hurt by Adam Kay

Everything That Makes Us Human by Jay Jayamohan

Behind the Knife Podcast

New Scientist Magazine



Q&A

WITH DR YASSER EL-ALI, SPECIALIST IN RESTORATIVE DENTISTRY

Q: WHAT ARE THE THREE MOST IMPORTANT SKILLS YOU HAVE DEVELOPED IN THE COURSE OF YOUR CAREER?

I would say that charisma, dedication and retrospective thinking are the three most critical traits you learn while running a dental clinic.

Charisma might sound like the wrong word, but it describes my methods perfectly! As there is still a certain stigma surrounding us dentists and many clients come in anxious, you really do need to be charming and social in order to get the most information out of them during the consultation period. This links in with retrospective thinking quite well. You need to be able to look at a patient and understand their lifestyle so that you do not perform a certain surgery or recommend a course of action that doesn't suit them well - this comes naturally with time, but at first be aware of your charisma!

Q: WHAT ADVICE WOULD YOU GIVE SOMEONE IF THEY ARE UNSURE THEY ARE SUITED FOR DENTISTRY?

Well, you can never know for sure without trying! I would highly recommend that anyone looking to enter any profession that has as much competition as dentistry seeks out clinical experience for a substantial period of time.

I know this is hard in the current COVID climate, so a good ballpark is someone who can easily juggle multiple, possibly complicated cases at once, has impeccable teamwork and organisation and an academic side. Dentistry is very fun, but also lots work, so be sure you can also balance your lifestyle.

Q: WHAT IS THE MOST FULFILLING ASPECT OF DENTISTRY?

Saying this might get me in trouble, but I would say that the fulfilling part of dentistry starts only after a few years, once you become confident! Quite simply, you have a lot of responsibility and many people need your help at any given time, so, when you're still new to the process, you can easily feel overwhelmed. Not letting this get in the way of your self-esteem was the challenge, but everyone gets there, and once you do the career becomes very fulfilling!

To me, the knowledge that I help people with pain and help people feel good about themselves makes me feel accomplished. Seeing the difference in clients from when they come in, shy about their smile or with swollen gums, shattered teeth, then seeing them walk out much happier makes the hours of work worth it.

Often, I can spend multiple appointments, all more than one or two hours long, with a client, but the longer the process the more fulfilling it is to see the end result.

Also, it would be unfair to not talk about the team that I work with. While working with experienced professionals is very nice, it is particularly fulfilling to work with young or training dentists or assistants. Not only can I see a bit of my younger self in all of them - we all get overwhelmed - but I also feel as if I have the potential to make a great impact on the next generation of dentists.

Q: HOW MUCH POTENTIAL IS THERE TO "BRANCH OUT" IN DENTISTRY AND WORK IN DIFFERENT HOSPITALS AND/OR CLINICS?

I specialised in restorative dentistry, which means that I do sometimes work in hospitals (generally two days a week) on top of my general practice in my London clinic.

When you "branch out", you need to undertake specific training - this can be in oral surgery or orthodontics, for example. This can only be done after your foundation training, though, and it is never guaranteed that you will be able to secure a place. Dentistry is only becoming more competitive.

On the other hand, once you finish your general training, you will be able to work in a wider variety of places, but you need to be able to balance your different commitments, as different settings demand different working hours. The hospital I work with, for example, sometimes has me on-call, so I need to be prepared for that change when compared to my slower-paced clinic in London.

NANOPARTICLES EVOLVING ROLE IN ORAL HEALTH

WRITTEN BY YEAR 12 STUDENT LEEN AL TANGER

Optimal oral health leads to the prevention of many illnesses, such as cavities. A cavity is an opening - often seen as little holes - on the surface of teeth due to damage. They are incredibly common, with the CDC estimating that 97% of people have had cavities by the time they turn twenty in America. If left untreated, complications can occur, ranging from inflammation to tooth loss.

Cavities, also known as caries, can arise due to poor oral practices (in brushing one's teeth, flossing, using mouthwash...) and a poor diet. Consuming lots of carbohydrates can contribute to the build-up of plaque and accelerate tooth decay. It should be noted that these findings are only in relation to fermentable carbohydrates: that is, carbs that turn into simple sugars once consumed and often have a high glycaemic index. Therefore, foods such as potatoes, are also considered poor for your dental health.

Research on nanoparticles, particularly **ferumoxytol** (iron oxide) nanoparticles, shows promise in the prevention of plaque build-up and therefore cavity development. Approved by the FDA, ferumoxytol binds to the biofilm found on teeth and releases free radicals. Free radicals are atoms or molecules that are highly reactive due to having an incomplete outer electron shell. In the case of ferumoxytol, free radicals are produced due to the presence of hydrogen peroxide, which will have also been placed topically before treatment. These free radicals react with the biofilm, which is notoriously difficult to reach otherwise, and disrupt it. It is in this way that cavity development is made less likely, with ferumoxytol also having the immense benefit of not causing any other adverse reaction.

This is incredibly important as dental illnesses related to cavities impact 3.5 billion people globally, many of whom will be unable to afford treatment and therefore be in increasing pain. Nanoparticles offer hope for the prevention of such cases.

A TYPICAL DAY AS A RESTORATIVE DENTIST

WRITTEN BY DR YASSER AL-ELI

Restorative dentistry is a specialty that concerns the teeth and its supporting structures. Examples of procedures that a restorative dentist would undertake include fixing crowns and managing gum infections - some will even remove teeth if this is needed.

I work in a hospital only twice a week with all other days being spent in my London clinic as a more general dentist. My more complicated cases are dealt with in hospital.

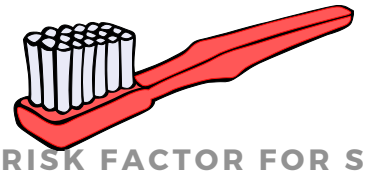
During those two days, I'm on-call, but I will come in from 7am to go through cases, sort out documents and speak to patients who I know are having long-term discomfort or illnesses. I will often also sit down with colleagues and discuss cases, especially if the patients are around the ages of 16-18, where they might not be old enough to see me, but I will still have transferable knowledge to help their case.

I very rarely deal with emergencies as a dentist, but there are some cases that come in that require urgent surgery as the patient will have put off seeing a professional. In these cases, I will often spend hours talking to colleagues and performing whatever procedure is necessary. Most often, these patients have advanced infections that will result in tooth loss or extensive and multiple surgeries. In the case of tooth extraction, there will often be follow-ups when they request implantations, which can either be dealt with in the hospital or in my clinic.

My London clinic has much more set hours - I will come in around 6am to organise all equipment and sort out the admin, such as ordering in stock that is running low, read through patient files and work on any custom implants (they need to be shaped per patient).

During the rest of the day, I will have multiple appointments that all entail consultations and most will then move on to procedures.

DENTAL NEWS



TOPIC: PERIODONTITIS AS A RISK FACTOR FOR STROKE
WRITTEN BY YEAR 12 STUDENT LEEN AL TANGER

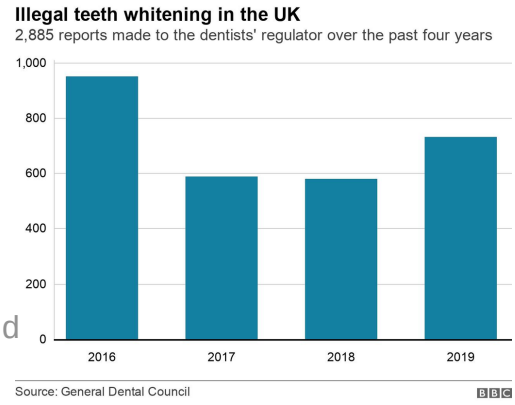
Periodontitis diseases relate to a variety of inflammatory conditions, such as gingiva, that lead to inflammation and potentially tooth loss as it impacts the gums. Studies have shown that periodontitis diseases and ischaemic events have a potentially positive association. Ischaemic events relate to conditions that arise due to problems with blood vessels, such as an embolism.

Research has shown that those with periodontitis disease show increased levels of IL-6, C-Reactive Protein and TNF alpha in blood flow. These are all associated with systemic inflammation, which Harvard-affiliated periodontist Dr Hatice Hasturk explains as increasing the "body's burden of inflammation". As such, Dr Alpdogan Kantarci, a colleague of Dr Hasturk, explains that "if you can control one type of inflammation, you might be able to control another", especially as the study, run by the aforementioned doctors, shows that lipoxin, a molecule derived from Omega-3 fatty acids and involved in treating inflammation, showed promise in treating rats that had both periodontal disease and higher levels of inflammation within the blood. Although more research is needed, there is some evidence that oral disease is intimately linked to systemic health.

TOPIC: ILLEGAL TEETH WHITENING DANGERS
WRITTEN BY YEAR 12 STUDENT LEEN AL TANGER

Teeth whitening is often undergone for cosmetic reasons, the procedure only safely being carried out by trained professionals due to the use of harsh chemicals. Yet, some companies offer cheap courses, lasting sometimes only hours, in order to help attendees gain certificates that they can later use to set up their own company.

Often, these courses do not cover emergency situations and so when customers face burns, tooth loss and blisters, there is little that can be done to safely navigate the situation.



Illegal teeth whitening reports made to General Dental Council were up by 26% in 2020 compared to the previous year, although still below the total number of reports made in 2016.

BUILD-A-BABY: THE ETHICAL ISSUES

WRITTEN BY YEAR 12 STUDENT NAOMI WALKER

In more recent years, the prospect of a ‘designer baby’ is becoming more and more of a reality for future parents - in fact, it is already happening today: November 2018 saw the birth of Chinese twins, Nana and Lulu, genetically modified babies that were successfully edited as embryos by He Jiankui in order to make them immune to the HIV virus.

Dr Kevin Smith, an Abertay University bioethicist, believes that the introduction of genetically modified humans will come with a new era of people whose life spans without disease will be “substantially extended” and the first “ethically-sound attempt” could be under two years away from us. He argues that the world we know, with dementia, cancer and even common illnesses present, has the potential to be a thing of the past should we become more open towards the idea of genetically modifying our offspring. Before this is even conceivable, Dr Smith agrees that there are medical issues that cause the general public to be opposed to the practice.

Despite this, there are some that believe that the concept of a baby customised to be immune to certain illnesses and disorders, for example, is the first step down a slippery slope into eugenics: “the practice or advocacy of improving the human species by selectively mating people with specific desirable hereditary traits”. The United Nations has publicly expressed their concerns regarding genetically modifying the human genome in the past and most notably, former Secretary-General, Kofi Annan, stated “The greatest fear is that we may be trying to 'play God,' with unforeseeable consequences, in the end precipitating our own destruction". The possibility that customisations will become increasingly superficial and unnecessary, such as being able to increase a child’s natural cognitive ability or athleticism, is plausible, meaning that tight regulations would need to be implemented to ensure that the practice has no room for a market and exclusively remains an option for parents in need of medical intervention. Still, the question of how these regulations would be monitored is not currently clear. The fact remains that, despite Dr Smith’s claims, the future of genetically modified babies is unknown to us and it is most certainly an area that we must tread carefully with when considering the bioethics surrounding it. There is still much that we have yet to discover about the outcomes and side effects of tampering with genetic makeup.

MANY THANKS TO:

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