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1. Araujo MW, et al. *J Am Dent Assoc* 2015;146:610-622.
2. Johnson & Johnson. Data on file.

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BRING OUT THE BOLD™



BDJ Student

the British Dental Association's official magazine for students

VOL 25 ISSUE 3

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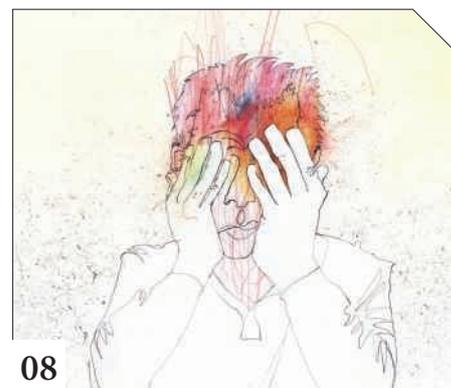
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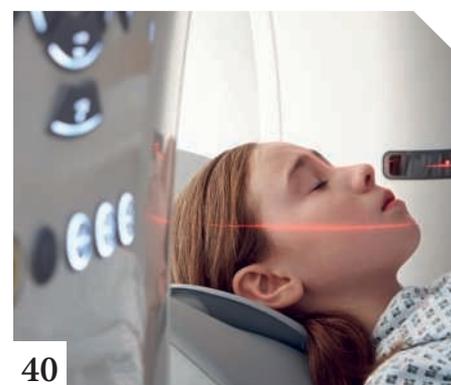
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EDITORIAL



David Westgarth,
Editor,
BDJ Student



Beth Bradley,
Student editor,
BDJ Student



Hello and welcome to the latest edition of *BDJ Student*.

To all of those starting on their journey, a very special welcome. I hope you find *BDJ Student* an engaging, insightful and useful aid as you motor towards joining the profession. To those entering their fifth and final year, rest assured that your association is right behind you as you make the leap into the profession.

To the issue, and we're continuing the focus on providing you with what you have asked for. Professional development, career options and clinical tips will help you to develop into a well-rounded clinician, and that's exactly what we've got for you.

This issue's cover feature looks at why the '7Ps' are a vital part of your development, and how perfect planning goes a long way to perfect provisionals. While the focus is very much on the clinical aspect of getting it right, there are a number of great takeaways that are more than simply clinical excellence.

Part of being a great student, dentist and clinician is having the right work/life balance. It's a term you've probably heard hundreds of times, but what does it actually mean and why is it important? We have seven tips on how to achieve it and what that can mean.

With so many options available post-graduation, sometimes it can feel like you're on a roulette wheel, not quite knowing where you're going to stop. In this issue we compare the LDFT and DFT routes. Which one is

right for you? Read what Nicola and Emma have to say.

One of the biggest issues that underpins any dentist from a new student to a qualified veteran is confidence. It can be the difference between being the best you can and not. Barry Oulton aka the Confident Dentist offers some tips on how you can reach the highest level.

Enjoy the issue, and we'll see you in the next semester!

David Westgarth ■

Dear students,

I would like to introduce myself to you, I am a final year dental student at the University of Leeds from Ireland.

I am very excited to be writing my first editorial for *BDJ Student* and feel lucky to be a part of such an excellent publication. I look forward to contributing to its useful and exciting content alongside such fantastic authors.

In the previous issue Shyam Karia wrote an insightful article on the importance of communication in dentistry. I am sure you are all very aware of this, however as I reflect on the few short years I have been studying dentistry it has become apparent that our methods of communicating with our patients are changing.

In our society filled with bloggers and influencers it was only natural that these roles would reach the dynamic and ever changing world of modern dentistry. As I look down the many feeds each and every one of us see every day I see inspirational role models, advertisements and cases demonstrating amazing skills and techniques. Personally, this encourages and motivates me to continue to learn and improve each day.

It is clear to me that social media is our next platform for communicating with not only our patients, but with colleagues and the public too.

As students and millennials we embrace social media with open arms. This I hope can only benefit us as we go forward into the minefield of using social media in both personal and professional capacities.

It is vital that we remember that any image speaks a thousand words, as Shiraz Khan once said, 'for every perfect smile case presentation you see online, there are a dozen other images which were the stepping stones to this perfection'.

So my message to you is this, we as students and future dental professionals should grasp every opportunity to learn, be that through media, print or experience. We should embrace the power of social media and use it to motivate, educate and communicate effectively.

I hope you enjoy this issue of *BDJ Student* and find it both inspiring and educational. I wish you all the best of luck in the upcoming semester.

Beth Bradley ■



SMILES ALL ROUND AS UCLAN REACHES TEN-YEAR MILESTONE IN DENTISTRY TRAINING



The University of Central Lancashire (UCLan) is celebrating a decade of training the next generation of dentists.

The School was the first to pioneer a new mode of dental education, in which the graduate entry Bachelor of Dental Surgery students gain their experience in local community Dental Education Centres (DECs) rather than city centre hospitals, which has provided a good alternative to the traditional approach. The DECs, located in Accrington, Blackpool, Carlisle and Morecambe Bay, were established in areas of high need and poor dental health where access to NHS dentistry was limited, in part, owing to difficulties in attracting qualified dentists to the area.

When UCLan's School of Dentistry opened its doors ten years ago, it was one of only two new dental schools to be created in England for over 100 years. Since then, UCLan dental students have treated more than 23,000 patients during their training and the School has produced 224 new dentists who have expanded the region's dental workforce considerably. Almost 60 of its new dental graduates have chosen to establish their careers in the Preston area with more settling in the wider North West region.

The University invested £5.25 million in its state-of-the-art dental school in Preston,

which has one of the most sophisticated 'phantom head' rooms in Europe where students learn their skills on simulators before progressing to patients. It is also one of the few universities in the country to boast its own on-campus Dental Clinic, allowing undergraduate students to obtain practical experience in high-end dental work.

At a special 10th anniversary event, which welcomed graduates and former staff back to the School, NHS England's Deputy Chief Dental Officer and UCLan Honorary Professor Eric Rooney commented: 'Over the last 10 years many of the initial aims of the School have been fulfilled, helping patients and creating a vibrant dental academic community. Our population, their needs, and the way we care for them is changing and UCLan is well placed to develop and adapt over the next 10 years and beyond.'

This 10 year landmark comes as the UCLan School of Dentistry is expanding its teaching programmes, leading nationally in the way it delivers quality inter-professional dental education in the DECs and increasing research activity to include dementia and brain degeneration, head injury management, clinical sciences, nanotechnology medicine and general dental health education.

Angela Magee, Head of the UCLan School of Dentistry, commented: 'The University set up the School as a direct response to the needs of the region's healthcare economy when the Government made a clear commitment to improving access to NHS dental services. What we have achieved over the last ten years is phenomenal, producing more than 220 fully qualified dentists who have gone onto work in the NHS and filling a skills gap in areas of the region that lacked local dental services.' ■

Q&A with Elie Martin, 5BDS, President of the University Dental School Society at UCLan

What first drew you towards a career in dentistry?

I can't remember a time when I didn't want to be a dentist, but I think my first true memory of it must have been when I was 14 years old and getting my braces fitted. I was so fascinated by how the braces worked, how they could twist and pull my teeth into alignment, with bone removed and replaced where needed to facilitate this. It was so interesting!

I always had a passion for science, particularly human biology, and creative subjects such as art and catering, so as I progressed through school and further education, I just knew Dentistry was the career choice for me.

How do you feel about your dental school reaching its 10-year anniversary?

It's a proud moment for everyone, you forget how young the dental school is but how far it has come since opening. Our dental school provides very unique opportunities to its students, which sets it aside from other dental schools in its own way. The small class sizes (approximately 30 to a year group), graduate-entry scheme and early exposure to practical experience with patients being just a few reasons for the school's success. I hope the future of our dental school remains bright and look forward to being invited back as alumni for its 25th!

What does the future hold for your dental school?

Our school is becoming increasingly recognised amongst the dental community; for its graduates, teaching and research. I hope our BDS course remains graduate-entry (there are so many benefits to it being so) and I hope we continue to make our mark for years to come.

PAST-PRESIDENT OF ORAL HEALTH CHARITY PRESENTS AWARDS TO DUNDEE DENTAL STUDENTS

Immediate Past-President of the Oral Health Foundation, Janet Goodwin, has visited the University of Dundee School of Dentistry to judge community oral health projects and present an award to the winning group.

Fourth-year dental students were asked to select an area or group of the community, in or around Dundee, and raise awareness of oral health by showing them how to develop good oral health routines.



As part of their dentistry degree, the students worked in tandem with voluntary and community organisations which helped them reach out to individuals with mental health issues, the homeless and those with learning disabilities.

The winning group of students worked with autistic children and created a storyboard explaining the process of visiting the dentist. The design was targeted towards children with Attention Deficit Hyperactivity Disorder (ADHD), but it was also noted that it could be some benefit to other groups such as anxious patients.

On her visit to Dundee, Ms Goodwin

their students and their wonderful projects and each year they continue to impress.

‘Each and every project that was presented to the panel highlighted several fantastic ways we can get important oral health messages and education to those who are most in need of help and support in our society.

‘I was especially impressed by the students in the winning group who used a unique approach to helping patients. Their concept is highly flexible and can be adapted for use in different circumstances, such as to target anxious or vulnerable patients.’

said: ‘This is the third year that Dundee Dental Hospital have invited me to be involved with the judging of



MEET YOUR BDSA PRESIDENT!

Hello! My name is Ella Holden. I'm currently a fourth year student at Bristol Dental School and I will be your BDSA President for 2018-2019.

I've been lucky enough to have been involved with the BDSA and BDA Student Committee previously, as well as being Vice President of my Dental School Society over the last academic year. I'm really looking forward to taking on this new role and working together with your new BDSA Executive Committee over the coming year.

As your BDSA president, I will make sure that the committee continues to ensure we give dental students a voice in the wider community of dentists. The BDSA Executive Committee and I will work hard to continue the successes of the previous committee, including promoting fundraising for the BDSA's chosen charity of the year, encouraging applications for the Douglas Jackson Grant and working with the BDA student reps to try and get as many dental students as possible involved with the BDSA.

I am so excited to be leading the committee this year and I hope all students feel they can approach us with any views, issues or queries. Please feel free to contact us on bdsaexeccommittee@gmail.com

Find out more at bda.org/bdsa

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BSC CENTRE OF DENTAL SCIENCES TO PARTNER WITH THE CITY OF LONDON DENTAL SCHOOL



Barnet and Southgate College and the City of London Dental School have announced a new collaboration which places them at the forefront of UK dental technology training; the delivery of digital technology focused courses will not only benefit patients in the region, but will also benefit employers and those wishing to advance their dental career or qualifications.

The Dental Sciences Centre at the College opened in September 2017, as part of an extensive refurbishment of the Southgate Campus and includes state-of-the-art resources such as a decontamination room, processing and casting labs, as well as three dedicated specialist laboratories equipped with the latest industry-standard equipment.

Professor Stewart Harding from the City of London Dental School said: 'We look forward to working with Barnet and Southgate College; the facilities here really are state-of-the-art and the College is at the forefront of dental training in the region, if not the UK. In the next five years the dental technician's world and dentistry will take a paradigm shift into digital technology and current messy artisan techniques will slowly become obsolete.'

For example, we currently take impressions of a patient's teeth, which are then sent off to a dental laboratory

that then create a plaster cast and dental appliance which is then sent back to the practice, but this can now all be done digitally with a 3D laser scanner, which we will have on campus, to enable students to use as part of their training. Dental technicians will inevitably need to hone their digital skills and our partnership proposes to do just this.'

'Barnet and Southgate College is the only further education college in the UK with a specialist centre for Dentistry'

Barnet and Southgate College is the only further education college in the UK with a specialist centre for Dentistry. Serving students such as 24 year old, dental technologist Jordan Diggines-Wallis, who is already reaping the benefits of training at the Southgate Campus dental facility.

Jordan is on the Level 5 higher apprenticeship and said: 'I work for a dental lab in Bedford, they arranged for me to start the higher level dental apprenticeship at Barnet and Southgate College. It's great that the facilities and equipment are the same

as at work, if not nicer and brand spanking new! 'This means I've really settled into my training. It's nice to see the machinery that I recognise and I look forward to using all the equipment that I've never used before as well. When you tell people that you're studying dental technology, most people don't really know what it is. But I'd say if you're creative and intellectual and want to use both of those skills then a dental technology course is the one for you and it's very good. My training is very integrated; what I learn at College I take back to work and what I learn at work I bring back into College and apply here. Everyone on the course is lovely and the tutors are really nice. In fact, I look forward to coming into College each week, it's a lot of information to take in as you only come in one day a week and the rest of the week you're still working.'

'I started this course at university, but then decided to start the apprenticeship. I had to take a step back and see that getting the work experience as part of my placement is what is most important and I really enjoy my job, as I actually get to see the relevance of what I'm learning. I also started to accrue some debt from being at Uni, which was a massive contributing factor of doing an apprenticeship, alongside improved job prospects. The fact I'm currently on placement within a laboratory is positive and providing I do well on my course there'll be a job vacancy offered to me. I've been thinking about continuing to a full degree after my apprenticeship at Barnet and Southgate College and after that the natural progression would be for me to open my own lab and to possibly focus on something as a speciality, the prospect of that is really exciting for me.'

David Byrne, Principal of Barnet and Southgate College said: 'We're proud to be the only FE College in the UK with a specialist centre for Dentistry. We offer a wide range of dental courses and the hi-tech training we deliver moves away from the messy, artisan craft of dental manufacturing to the cleaner tech driven world of CAD design and 3D printing, which will change technical education within the dental industry bringing it firmly into the 21st century and beyond.'

For more information please call: 020 8266 4000.

Email: info@barnetsouthgate.ac.uk ■

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- *BDJ Student* – student magazine
- *BDJ In Practice* – everything dentists in practice need to know (posted to years 3 – 5)
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Supporting you with your studies

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- eJournals – access 13 different journals online
- Library – specialist revision packs on key topics
- BDJ Clinical Guides – 50% discount for students
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Expert advice

- *Career Guide* – the essential guide to dental career options (fourth years)
- *Getting your first job guide* – the



STUDENT MEMBER

essential guide to securing your first job (final years)

- Help and advisory service – available online and by phone
- Student finance advice

Support on the ground

- BDSA events – discounts for student members
- Network of branches – where you can meet other local dentists

For more details go to bda.org/students

Job hunting on the horizon?

If you are moving into your final year in autumn and starting to think about Dental Foundation Training and Vocational Training recruitment, you will be pleased to hear that we have a useful support package to help you prepare:

- *Getting your first job* guide – the essential guide to securing your first job
- Interview skills lecture – touring all UK dental schools
- DFT interview skills workshop – to polish up your interview technique.

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THE STRESSFUL LIFE OF A DENTAL STUDENT

By Wasim Ido, DCT1 in OMFS, Blackburn Hospital



Sir, Stress, anxiety and pressure. These are words that we so often come across as students and dentists. Some of us may hear them more than others. Every person undergoes some form of stressful situation in life, regardless of race, religion or education. But what exactly is stress? Stress can be defined as a physical or psychological pressure which the body undergoes during demanding circumstances. It is when the body's internal balance is disrupted.

As a student, there are almost certain periods when you are likely to experience some form of stress. These can commonly be around times when essays or assignments need to be submitted. A presentation needs to be delivered to an audience. A speech needs to be given. Or most commonly, you have an exam on the horizon. Whatever the reason, we react and handle it in different ways. Some will try and tackle the problem head on, others may choose to ignore it and hope it goes away by itself. Many sadly turn to alcohol and even drugs to deal with it. An interesting study conducted at the University of Newcastle¹, found that a high proportion of its dental students were drinking excessively and experimenting with a range of illicit drugs because of stress and anxiety. The same study went on to say that majority of final year undergraduates had admitted to suffering from some form of stress and anxiety. It can be safe to assume this isn't the only dental school in the UK where this pattern of behaviour has taken part.

I have personally experienced some very stressful periods at university as a student. Although most of these were during my first degree in Neuroscience, those studying Dentistry as their first degree will have experienced something similar. There were times where I would be staying up till the early hours of the morning, typing up the last few pages of an assignment that was due on the same day, but had been set months earlier. I remember once studying for an exam, only

to realise with a few hours to go, that I had completely overlooked key aspects of the course. I know what it's like to be drinking five cups of coffee a day, crates of *Red Bull* energy drinks and eating *Double Decker* chocolate bars from the vending machine in the foyer for sustenance. Going through the weight loss and hair loss, constantly feeling tired and struggling to see the light at the end of the tunnel. It wasn't till my fourth and final year where I finally managed to turn things around and I found ways of managing with the stresses of university life.

‘Stress can be defined as a physical or psychological pressure which the body undergoes during demanding circumstances. It is when the body’s internal balance is disrupted.’

Don't get me wrong, I still found periods during my dental degree where the workload was sometimes building to a point that I would feel a lot of pressure and stress. However, I had learnt effective ways of managing it because of my previous experiences.

One of the most useful pieces of advice I can give is to keep a close group of friends that you can talk to in confidence. Sharing your problems with each other and by supporting one another, you may find that others have encountered similar issues and can offer advice. Like the old saying, a problem shared is a problem halved and from my own personal experience, it really is.

I found regularly attending classes at the gym helped a lot, although it wouldn't deal with the cause of the stress, it certainly helped reduce some of the emotional strains that stress can put upon a person. Another simple yet effective technique is to buy a diary and set targets for the next day. I would often set three to four realistic targets; for example, a typical day of targets for me would consist of mind mapping up to two lectures, reading a chapter from a textbook and buying the evening's grocery so I could cook a planned meal for the next day. This way I felt I had a plan and with every task I ticked off, I gained a sense of achievement, satisfaction and motivation.

Various studies have shown that having a balanced and healthy diet is paramount in your physical and mental well-being. Regular consumption of fruits and vegetables daily, as well as staying well hydrated with water is clinically proven to be better for both body and mind. Finally, you must ensure that you have some chill out time. Find something you enjoy doing, whether it's a sport or going to the movies, it's important to give your mind a break.

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1. Nwebury-Birch D, Lowry R J, Kamali F. The changing patterns of drinking, illicit drug use, stress, anxiety and depression in dental students in a UK dental school setting: a longitudinal study. *Br Dent J* 2002; **192**: 646-649.

Useful links

www.nhs.uk/conditions/stress-anxiety-depression/understanding-stress
www.headspace.com

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➤ *Emma is currently doing a DCT2 post in Oral and Maxillofacial Surgery and Orthodontics at Morriston Hospital having completed her DCT1 at the University Dental Hospital of Manchester.*

What pathway did you take following graduation?

NG I was fortunate enough to gain a place on a two-year training scheme, Longitudinal Dental Foundation Training (LDFT) within Yorkshire and the Humber Deanery. Even at this early stage, I knew that I wanted to continue training and gain as much experience as possible, not only in a dental practice but also in a secondary care setting.

EF After graduation, I secured a DFT post on the Wythenshawe Scheme in the NW of England. After my undergraduate training, I wanted to experience working full time in a general dental practice, with the aim of determining whether working as a GDP was a career I would like to pursue.

What is LDFT?

NG LDFT posts (also named DFT/DCT or GPT) are completed over two years. On completion, you are awarded with both DFT and Dental Core Training year 1 (DCT1) certificates.

In your opinion, what is an advantage of completing DFT compared to LDFT?

EF DFT was a compact, challenging and rewarding year. An advantage which many of my colleagues utilised was the ability to take some time after DFT to go travelling or work abroad whilst still early on in their careers. I feel like an advantage of the DFT over LDFT was its duration. We all hope that we will thrive in every position we take, however, the risk always remains that a position might not be best suited to us for one of many possible reasons.

LDFT VS DFT: AN INSIGHT INTO POST GRADUATE DENTAL FOUNDATION TRAINING OPTIONS IN THE UK

Both **Emma Foster** and **Nicola Gallacher** graduated from the University of Liverpool Dental School in 2016. Following graduation, they have embarked on different training pathways. This brief interview aims to provide an insight in to the foundation training options available in the UK; options which are mainly but not exclusively available to recent dental graduates. It is our hope that this will clarify some of the concerns and answer questions which might be held by newly qualified dentists.

In your opinion, what are the main advantages of LDFT?

NG For me, the main advantage of being a trainee on a LDFT scheme is the broad range of experience gained. Some patients seen within secondary care require more complex behaviour management or dental/medical care. A second advantage is the ability to stay within the same post for two years. If you opt for a DFT post, you have to consider whether you would like to apply for DCT1 or continue within primary care by January. This is only four months into the post, at a point where I was just starting to feel comfortable in my job.

Describe a typical week on a two-year post?

NG My timetable alternates on a weekly basis between primary care and community centres. Each deanery offering LDFT posts have a variety of secondary care placements available to choose from, therefore, I would recommend checking this prior to applying. As my undergraduate studies progressed, I developed a passion for paediatric dentistry, therefore the community dentistry post was the ideal option for me. I work in two community dental centres providing care for patients that have additional needs or more complex behavioural or medical conditions.

‘We all hope that we will thrive in every position we take, however, the risk always remains that a position might not be best suited to us for one of many possible reasons.’

Why did you apply for a DCT post after DFT?

EF DCT is a voluntary 1-year training post that provides the opportunity to work in a secondary care setting, within a number of different dental sub specialities. Some of these include Restorative Dentistry, Oral and Maxillofacial Surgery and Oral Surgery to name but a few. I was fortunate enough to be offered a split post at the University of Manchester Dental Hospital (UDHM), which combined time in the Restorative and Oral Surgery Departments. DCT1



► *Nicola is a DCT2 Maxillofacial and Oral Surgery at Bristol Hospitals having completed her DCT1 in Yorkshire and Humber Deanery – Special care and Paediatrics.*

allowed me to develop skills which are not routinely performed in general practice, treatments including minor oral surgery, restoration of implants and rehabilitation of oncology patients. DCT was the ideal way for me to continue to progress clinically in a supported environment, whilst also keeping my options open.

What is your plan for after DCT1?

EF I have secured a DCT2 split post in Oral & Maxillofacial Surgery (OMFS) and Orthodontics in Swansea. My motivation for wanting to complete this post is twofold. Firstly, I feel I will relish the chance of being part of a team that delivers truly life changing and often lifesaving care. Secondly, I understand that maxillofacial surgery plays a crucial role working alongside many other dental specialties, and should I wish to specialise in the future, this experience will be invaluable.

What are your next steps?

NG The LDFT post was a steep learning curve but I have thoroughly enjoyed the opportunities and challenges faced working within secondary care and would recommend this post to all. I have secured a DCT2 OMFS post in Bristol with the hope of specialising in paediatric dentistry in future!

Nicola Gallacher and Emma Foster ■

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ETHICAL DILEMMA

John Makin, Head of the DDU, on why you should take all the time you need to plan your career...

I will shortly be qualifying as a dentist and discussions with my peers have recently focussed on which areas of dentistry some of them want to specialise in. I am completely unsure about what I want to specialise in. Is it necessary at this stage of my career?

Not everyone who completes foundation training will know the exact path that they want their dental career to take. For those dentists there is much to be said for spending time in a general practice setting in order to work it out and it can be just as beneficial for a dentist's professional development.

Nobody emerges from foundation training as the finished article: the GDC expects you to update and develop your professional knowledge and skills throughout your working life and general practice offers ample opportunities to do this. Given that the learning curve is particularly steep for newly qualified dentists, staying on in general practice enables you to develop your technical skills and experience within a familiar environment and get support from a strong network of colleagues. This can only help build your confidence to work independently, whether or not you decide to remain in general practice long-term.

The GDC expects all dental professionals to have 'a holistic and preventative approach to patient care' which takes account of patient's 'overall health, their psychological and social needs, their long time oral health needs and their desired outcomes.' There is no doubt this is easier if you have had the chance to build a professional relationship with the patient over time, learn what makes them tick and support them with their oral health.

One of the most valuable lessons general practice can teach is an appreciation of the bigger picture, which should be advantageous in any speciality. As a

specialist, you will need to work effectively with colleagues in general dental practice when a patient is referred to you. The GDC says you should only accept a referral if you are clear about what you are being asked to do and if you feel the treatment is appropriate for the patient. You should also be able to communicate clearly and effectively with colleagues in the interests of patients. Experiencing the pressures and challenges of general practice at first hand yourself, should also enhance your working

'Nobody emerges from foundation training as the finished article: the GDC expects you to update and develop your professional knowledge and skills throughout your working life.'

relationship with referring colleagues which may help you to resolve any problems that arise.

Being able to communicate effectively with patients is a central principle of good practice. In the words of the GDC, this means listening, recognising patients' communication difficulties, if any, and trying to meet their needs. General practice is the ideal setting to improve your skills as a communicator. Not only will you encounter patients from a variety of backgrounds with differing needs, personality types and learning styles, but you will need to establish their trust and listen to their concerns

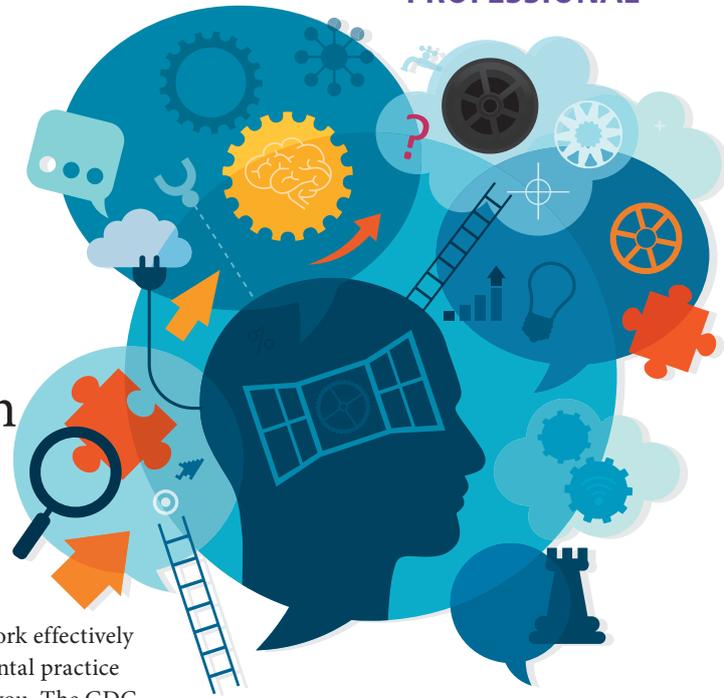
before you can recommend a suitable treatment plan. Another important aspect of being a GDP is the ability to deal with challenging situations in a professional way, from an uncooperative or distressed patient to a complaint. Such 'university of life' experiences can be challenging yet provide useful experience.

While most dentists don't regret their choice of speciality, there are obvious risks to committing to a specific career path immediately after foundation training. If you later find that your choice doesn't meet your expectations, you may be left feeling disillusioned or worry that your career has stalled. It's perfectly possible to change course at a later stage but you may wish you had investigated other options before committing to a chosen career path. Even if you do

want to specialise, general practice will give you opportunities to explore different areas of dentistry and discover what interests you the most or what gives you the greatest satisfaction. Working in practice will also give you time to research your preferred speciality.

There is no one-size fits all dental career. Many dental professionals will enjoy a hugely fulfilling life as a GDP, while others opt for a life as a specialist or choose to work in the community service. The important thing is to understand what is right for you.

John Makin ■





7

TIPS FOR A HEALTHY WORK/LIFE BALANCE DURING DCT



Laura McKay, DCT2 in maxillofacial surgery/ paediatrics, on how to manage your way through a DCT post...

I started my Dental Core Training life fresh from Foundation Training with a year of OMFS in the Ulster Hospital Belfast followed by another six months (I'm a sucker for it, it would seem) in University Hospital Aintree, Liverpool. Before I started I had no idea what I had let myself in for, but was mainly concerned about the work itself and hadn't given much thought about what it would do to me. What it did was physically, mentally and emotionally exhaust me. A new city, new people, new house and the most hectic job I'd ever done all in that first day.

If you're lucky you may have a few days induction but if you're unlucky (hello me) you will be on call that first night with a bleep you can't work, in a hospital you don't know and around 3am really question your life decisions. But morning came, I survived (more importantly the patients survived) and I thought how on earth am I going to do that again?

But I did and 18 months later I am still going, slightly more haggard looking but a better dentist for it. There are plenty of things I learnt along the way but the most important is to look after yourself and here are a few tips to do just that.

Eat healthily

This may sound like pretty basic advice but you'd be surprised how tempting it is to come home, collapse on the sofa and phone for a pizza. And sometimes waiting for that pizza is too long so you eat some cereal (and not the teeth-friendly kind) in your pyjamas in bed.

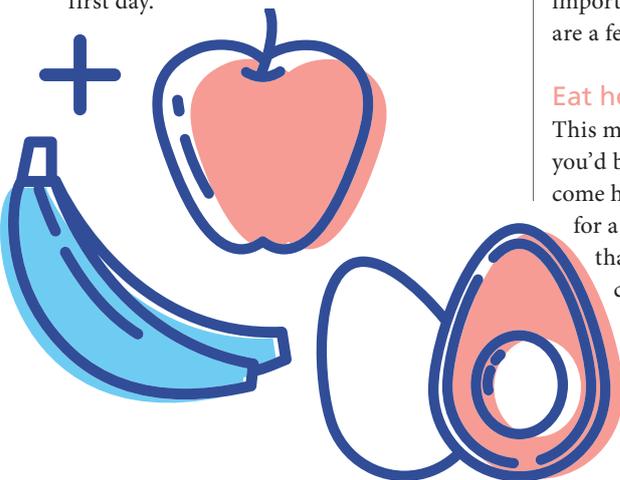
So, in order to stop yourself Uber Eat-ing a McDonalds, plan ahead. Bulk make some meals and freeze

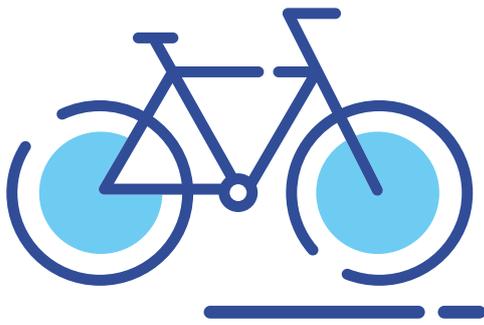
them. Have some healthy snacks in before you start night shifts or an on-call block. Plan dinner rotas with flatmates – they'll be grateful for you cooking when they're working late too.

Sleep

'Obviously', I'm sure you're thinking. But you'd be surprised how difficult it is to switch off after a hectic day on call. Your head hits the pillow, exhausted but your mind is buzzing. You sit on your phone or laptop mindlessly scrolling on Instagram or Facebook, and before you know it it's midnight and you're up in six hours to do it all over again. Switch off from social media – it will be still there in the morning – and take time to unwind before bed.

The blue light emitted from phones and laptops mimics daylight and tricks our poor tired bodies into thinking it's time to





be awake, so instead read a book, talk to flatmates, do some stretches or relaxation exercises.

Exercise

Something many of us (me included) are not keen on but it will make you feel 100 million times better. I'm not talking about weight lifting or running a marathon (unless that's your thing), but a gym class, swimming, a walk with



friends a few times a week can make all the difference to your mood.

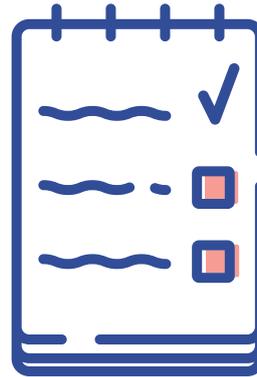
Socialising

There's a high possibility that you may end up moving to a different city (ah national recruitment) and so not only have to worry about a stressful new job, but also making new friends. This isn't as easy as university where you bond during fresher's week over that 5th tequila shot, but it can be done. Most of your new colleagues will be in the same boat, so make an effort to meet up with them outside of the hospital – suggest a drink after work, a group dinner, bowling or anything that tickles your fancy. These people know exactly what you are going through, will be the people you turn to for help and support, to rant and rave to and will end up being people you couldn't live without.



Prioritise

Learning to prioritise is a valuable skill, and it will come with practice. However, if you do find yourself overwhelmed in those first few weeks with calls from the ward, A&E or outside referrals, pause for a second. Your priority follows basic life support ABC – if someone has a laceration on their lip that isn't bleeding, they can wait. The septic abscess on the ward not so much. Have a notepad and paper to hand and if you are in the middle of something, take a number to call back or ask switchboard to get people to ring back in half an hour.



Don't take things to heart

Difficult as it may seem not to take things personally, you will have to develop a thick skin. Everyone is under a lot of pressure and sometimes you may be the unlucky person who gets the brunt of that.

After a busy night on call you may feel like you want to cry, punch someone or just sit on the floor and give up but don't. This is not a reflection of you or your skills so take a deep breath, count to 10 and smile (more than anything it freaks people out).



Don't forget, this is a high-pressured job. You are not expected to know everything medical, but you are expected to be a good dentist, to work hard and be willing to learn. You will probably cry at least once – hopefully not on the bus on the way home – and be more stressed than you thought possible, but you will meet some fabulous people. The dentists, doctors, nurses, support staff you will meet will help you grow in confidence and skill which will make it all worth it. I promise.

Also, wine helps. In moderation of course.

Laura McKay

'This isn't as easy as university where you bond during fresher's week over that 5th tequila shot, but it can be done.'

Another aspect of prioritisation is looking after yourself. Drink plenty of water throughout the day, take 15 mins to eat lunch, and make sure you go to the loo – you'd be surprised at the things you forget!

Ask for help

Don't be afraid to hold your hands up and say this is out of my depth. You have a support network in place for this very reason – so use it. Even if it's 3am and you need advice, it's better to be overly cautious than not. You won't 'look

stupid' and your seniors will be happier trusting you when they know you will run things by them. Your nurses have a wealth of experience so use them too.



Laura is currently a DCT2 in maxillofacial surgery/paediatrics.

She graduated from Barts and the London, completed DFT on the South Coast and then a DCT1 year in maxillofacial surgery in Northern Ireland.

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‘You’ll see an abundance of dental swellings and postoperative complications in a maxillofacial setting, and therefore your management with such patients will greatly improve.’



HOW TO GET THE MOST OUT OF YOUR DCT POST IF YOU’RE NOT HAPPY WITH IT

Kavita Ravi-Shankar on making the most of a bad situation

There comes a time mid-way through dental foundation training when the buzz of Dental Core Training applications comes along. ‘Should I apply?’ ‘What do I have to lose?’ are the thoughts most of us have. Unless you are certain on your career pathway, which not a lot of recently-qualified dentists are, this can be confusing. We jump from year to year at dental school without putting much thought into our definitive career goals, and now we are faced with the important decision; do I want to explore my options further, or am I happy to be in general practice for the rest of my career.

As most would suggest, if unsure about career paths, a year in hospital gives extra thinking time in which to decide, and also gives insight into different specialties of dentistry. However, it is important to choose your post wisely as each hospital SHO post is different in their own way. For example, Oral & Maxillofacial Surgery posts can differ within themselves; some being trauma-based, some being more head and neck cancer-based, some having overnight on-call commitments and so on. It is important to find this information out before preferencing and accepting a post so as to know what to expect, as embarking on a 12-month post of something too underwhelming or overwhelming can disappoint! Doing a dental core training post can be extremely useful, however only in a post that suits you and matches your objectives of what you would like to gain from the year.

If you realise early in the year that the hospital training post that you’re on is not for you, don’t give up! It is understandably easy to get disheartened if you find yourself in this situation, however rather than counting down the days until the year finishes, try to use your

year in hospital to your advantage.

Being in a secondary care environment comes with a lot of perks. One being that it is an extremely supportive environment, and if you find yourselves stuck, there will be plenty of people that you can ask for help.

The Maxillofacial team members will have come from different pathways, so talk to people to get some idea of career pathways if you’re still undecided on your own. It can be very inspirational and it may help to clarify your future plans.

If you do find yourself being in the operating theatres more than you’d like, use this as an opportunity to practice transferable skills, such as suturing. Cannulation is another skill that can be practiced widely in hospital. This would come in useful in a dental settling for procedures such as IV sedation. You can practice cannulation on the ward or in A&E where patients are being admitted.

You will become more confident with managing medical emergencies in hospital, which is a vital skill to have in dental practice.

Another skill learned in hospital is knowing when to refer. Being on the other side of the fence helps to clarify which cases will be acceptable to refer, and which cases can be managed in general dental practice. You’ll see an abundance of dental swellings and post-operative complications in a maxillofacial setting, and therefore your management with such patients will greatly improve. This is a fundamental skill to have in dental practice, as such patients could present to you as a GDP, and knowing the first line of management is crucial.

Top 3 things that have I learned

1. Managing difficult patients and practitioners

Day in and day out in hospital you will come across an assortment of personality types. For example, a challenging dentist or doctor who is referring in a patient. It is easy as a dental core trainee to accept all referrals on the basis of being too afraid to say no to a more senior health professional, however it is important to ask all the necessary questions and make your own decision as to whether a referral is necessary. Rather than succumbing to a demanding referrer, I have learnt to have some set questions to ask to assess if I think an immediate referral is appropriate. These include:

- ▶ Can the patient breathe and swallow comfortably?
- ▶ Is the patient pyrexia?
- ▶ Is there any swelling? Is the swelling rapidly increasing?
- ▶ Is the floor of the mouth firm or raised?
- ▶ Is the patient systemically well in them self?
- ▶ What is the patient's mouth opening in centimetres?
- ▶ Full medical history including allergies
- ▶ What is your differential diagnosis?
- ▶ Do you think it is something that needs urgent treatment/ admission?
- ▶ When did the patient last eat/ drink? (In case they need to go into theatre for an emergency treatment under general anaesthetic)

You will also come across challenging patients. During your first few weeks, your registrar will be more than happy to see patients with you and it is important to

observe their management techniques as you can pick up many tips.

2. Prioritising treatment

When you are on call, you may accumulate several patients in A&E, as well as having a busy ward to manage. It is important in these instances to prioritise tasks in order of urgency. For example, if there is a patient you need to discharge on the ward and a patient in A&E with a rapidly increasing swelling, you must make the decision of which to do first. This is an easy decision as the patient in A&E is more unstable and therefore will need urgent decision, albeit frustrating for the inpatient as their discharge will be delayed. However, you may come across cases where it is not so easy to decide the order in which to complete your tasks. When you join the hospital, you can seek help from senior colleagues and through the year you will be able to make these decisions independently.

I find it useful if there is a patient with a dental emergency in A&E to ask the nurse practitioners to get a set of observations, a set of bloods and an OPG x-ray. This not only buys some time in a non-urgent setting but allows you to have the results of the investigations with you when you assess the patient, so you are in a better position to come to a diagnosis.

3. Recognising abnormalities

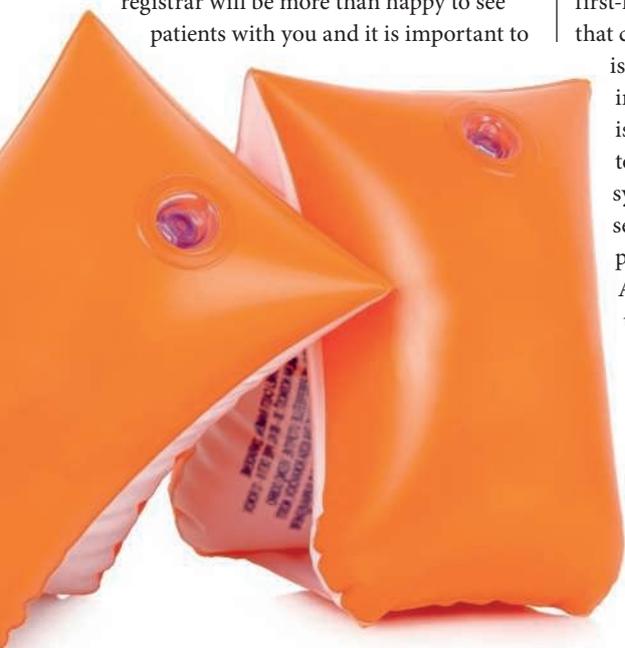
The hospital setting allows you to see a plethora of diseases and syndromes, some common and some very rare. During clinics, you will be able to see an array of conditions first-hand. This will form a knowledge base that can be used for the rest of your career. It

is one thing to read about these conditions in a textbook, but seeing them in a clinic is a real privilege. You will also start to be able to recognise the features of syndromes, and therefore if you ever leave secondary care, you will know which patients to refer to hospital.

All in all, it is important to remember that this year is all about you broadening your knowledge and skills as a dentist, and therefore do not be afraid to speak to your educational supervisor if you feel this is not the case! Take advantage of the hospital setting and practise skills that you wouldn't usually have a chance to in dental practice. You get out of the year what you put in, so make the most of it!

Kavita Ravi-Shankar ■

‘Rather than succumbing to a demanding referrer, I have learnt to have some set questions to ask to assess if I think an immediate referral is appropriate.’





CHRISTMAS

All I
want for

is ...



KNOWING WHAT I WISHED I KNEW BEFORE FINISHING DENTAL SCHOOL...

By Rima Sadhia Hussain BDS*

Regret: To feel sad, repentant or disappointed over something that one has done or failed to do.

Having regrets can stem from a variety of reasons. From something small, such as a wishing you had spent longer revising for examinations to other bigger, life changing experiences such as why you decided to come to university. It's clear that with any decision, there's always going to be the 'what

if's', the 'grass is always greener' and 'if only.'

As people, we have an innate nature to want to spread ideas and regrets we may have onto younger generations, in the hope that they learn and do not make the same mistakes we made. I do hope that as a student the number of regrets remain low, however I do want to share some of my experiences where perhaps I may have regretted or been slightly naive about.

Working as an associate

We all know the golden age of dentistry has long gone. It only takes a few lectures into the first term of dental school for that to be evident. Experienced tutors are forever mentioning and discussing stories that in this day, we could never dream of happening. I think the biggest underestimation is just how hard you have to work for potentially little money. Yes, of

that always comes to mind is if you can't deliver it on the NHS, you'll never be able to do it privately.

Dental Foundation Training Year

Despite final year feeling like everything is getting on top of you and feeling chronically stressed, final year is nothing compared to life as an associate. DFT/VT is a nice cushy year where you feel protected and able to go at your own pace. Do make sure you take every opportunity to attend voluntary study days, courses and carry out audits and get involved with research.

Take part in the competitions and prizes on offer at dental school. So many people (sadly including myself) just can't find the time to research and put together a report or article. I've lost count of the countless amounts of times I've started writing, only to leave it on the backburner like an old used clinnel wipe. I'd say enter in as many as possible, as you want to start getting your name out there as early as possible.

Year 3

Third year: the year of dental materials. The advice I would give would be to start going

to seminars, CPD events and dental fairs as early as possible. Professional networking and social media has become such a big part of the dental profession. Sign up to BDJ, BDA, BACD and other organisations. Sure you don't get any CPD, but you keep the evidence of your certification as proof of attendance. Plus, it allows you to start building your CV early. Additionally, you have a fantastic opportunity

to network and talk to experienced clinicians, which is fantastic for career growth and progression. A key quote one of my tutors said to me in third year was that no-one is going to ask you to become involved in projects such as research, audits, presentation, or organise talks – its only if you ask you get.

Year 2

Despite the limited clinical exposure, year two gives an excellent time to start building on your CV. Once you get to final year it's so easy to start forgetting what amazing skills and achievements you've done.

Rima Sadhia Hussain ■

*Rima qualified from Kings College London in 2016 and went on to complete her dental foundation training in the North East London scheme. She has since started working as an associate dentist in a busy mixed practice in Lewisham.

'Always advise that you think of final year like a beginning and not an end. The DFT application process forms a large part of this year. Really push yourself for the interview process, including the SJT.'

Make the most out of your trainers by shadowing them and other associates and maximising the number of opinions. Take this year as an excellent opportunity to learn and grow – I used to take dental photographs for the majority of my patients so I can show patients my capabilities as well as being able to critique myself.

Year 5

Clinical quotas should never have been a priority, but rather good quality efficient dentistry. I always advise that you think of final year like a beginning and not an end. The DFT application process forms a large part of this year. Really push yourself for the interview process, including the SJT. It would be ideal so early on in your career to be in a place which is close to a main city and/or a dental school and that you're surrounded by a strong network of dentists.

Year 4

At this point, you're closer to leaving dental school. Don't just wait for your elective, start researching dental volunteering early on.

course dentistry remains to be one of the most profitable professions, however, once qualified and working within the limitations of the NHS, I've found I have to work long hours (5 days a week including one long day) to provide a stable income. Your first year as an associate inevitably includes large deductions – tax, indemnity, accountant fees to name but a few – all factors no-one really considers whilst trying to pass the gruelling years at dental school.

In my experience, it takes *years* to start becoming competent and confident with delivering NHS care to a stable patient list, within which time you are working proportionally more than what you're earning. For me, this is never an issue, the NHS is so amazing that you can do practically anything, giving you an excellent basis to practise advancing your skills, pushing the boundaries, and becoming more confident with delivering NHS care. A quote



COMMUNICATING 'CONFIDENTIAL-LY'

The idea of leaving academia can be daunting for all sorts of reasons, not least because of the need to meet patient expectations and avoid patient-perceived 'mistakes'. Bearing this in mind, **Barry Oulton** offers an introduction to building rapport with patients, and how effective communication can help to alleviate concerns about complaints and/or a fitness to practise hearing.

Over the decades that dentistry has been regulated, new treatment philosophies have come to the fore, such as preventive and minimally-invasive dentistry. More recently, a new practice has emerged and, arguably, is growing – that of defensive dentistry.

In essence, defensive dentistry is the result of a clinician choosing not to perform treatment for fear of a complaint ensuing – even if valid consent is gained after all of the risks have been explained to the patient.

Dr Barry Oulton has owned Haslemere Dental Centre in Surrey for nearly 20 years, turning it into an award-winning practice with a reputation for outstanding customer service. In 2017, he founded The Confident Dentist, created to help dental professionals learn effective communication skills, selling with integrity and the art of ethical influence and persuasion so they can have more impact and make a bigger difference, both professionally and personally.

The quandary of wanting to do the very best by patients but at the same time being worried about complaints and/or a fitness to practise hearing is something that seems to be affecting newly qualified dentists more than any other cohort of dental professionals.

The good news is that one's confidence can be built, in part, through honing communication skills. As recently qualified dentist, A Al Hassan, wrote in late 2017, *'Time and again we have seen cases where patients have not gone down the litigation route just because they have a great relationship with their dentist; whether that be not complaining at all or resolving the dispute locally which is most appropriate anyway. This trust relationship is as crucial in the management of patients as the treatments themselves, especially in the current climate. It is this relationship which along with contemporaneous, accurate notes of 'valid' consent to treatment, provides the strongest defence against complaints and further proceedings.'*¹

So, how do you do it?

Neuro-linguistic programming

Neuro-linguistic programming (NLP) is an effective tool to achieve exactly what we're looking for. Before diving into the practicalities of NLP in the desired context, it's worth first considering in overview what it is all about:²

Neuro – the nervous system (the mind), through which our experience is processed via five senses:

- Visual
- Auditory
- Kinaesthetic
- Olfactory
- Gustatory.

Linguistic – language and other non-verbal communication systems through which our neural representations are coded, ordered and given meaning. This includes:

- Pictures
- Sounds
- Feelings
- Tastes

- Smells
- Internal dialogue (self-talk).

Programming – the ability to discover and utilise the programmes that we run (our communication to ourselves and others) in our neurological systems to achieve our specific and desired outcomes. Basically, this is our behaviours.

Offering a succinct definition, NLP Master Trainer Michael Stevenson wrote, ‘NLP is how to use the language of the mind to consistently achieve our specific and desired outcomes.’²

Focusing for a moment on the linguistic aspect of NLP, how language is used is very important, as it can build confidence and trust, and foster a sense of well-being for the patient. It is also important to remember that language is not just verbal – body language is significant, too. In fact, Albert Mehrabian suggested that non-verbal communication is as much as 93% of our communication.³

To that end, mirroring and matching are NLP techniques that are well worth considering; essentially, they help to build that all-important rapport. It has been said that people who act like one another, like each other, so you want to subtly match and mirror things like physiology, tone of voice, breathing and key words.²

Offering an example, one element of building rapport is physical mirroring of the individual’s physiology. As Michael Stevenson wrote: ‘Actually physically copying their posture, facial expressions, hand gestures and movements, and their eye blinking will cause their body to say unconsciously to their mind, ‘Hey, (s)he’s like me!’ It’s undeniable to the nervous system.’²

Matching comes in to play in relation to:²

- Their voice – match tone, tempo, timbre, and volume
- Key words – if a word is used commonly, such as ‘basically’, you may want to use it too in your sentences
- Breathing – match their breathing pattern
- The size of pieces of information – for example, if someone likes to deal with the big picture, they may find details distracting, so you need to communicate the big picture as well, and vice versa
- Experience – find common ground.

For all your patients, you need to adjust your approach to their needs and that is how you build rapport quickly, easily and successfully, greatly diminishing the

chances of them feeling anxious about – or disinterested in – any part of their journey in your care.

A positive outlook

It is important to remember that the majority of patients will be happy with your treatment and time in the practice. Yes, there will always be those few who complain – and let’s not forget some do have validity – but most of the time your best efforts will meet – if not exceed – patient expectations and it is with this positive mind-frame that young dentists may embrace communication development with confidence.

If you would like to be supported in moving forward, using NLP and other techniques proven to build careers and practices successfully, The Confident Dentist offers face-to-face training, online courses and one-to-one coaching to help dentists and their staff improve their interactions with patients, and make the experience in the dental chair as comfortable as possible.

Barry Oulton’s top 10 tips for building rapport with patients

1. Smile!

2. Shake hands

The handshake makes a big impression, laying the foundation for your future relationship; it’s important to get it right. Try to match the pressure of your handshake with your patient’s, and how far they extend their hand from their body.

3. Make eye contact

Making eye contact says you can be trusted.

4. Keep an open mind

Set aside any judgements you may make about your patient based on your initial impressions and don’t let ideas about financial circumstances affect the treatment options that you offer. All patients should be given the opportunity to select the treatment that is right for them.

5. Allow plenty of time

Allow time in your appointments to get to know your patients and build rapport. If you are rushed and anxious or stressed, patients will sense this and feel the same.

6. Identify your patient’s ‘direction filter’

Recognise that different personalities like to receive information in different ways. Some

people want detail while others just want the basics, some talk about what they want to achieve while others about what they don’t want. By matching your patient’s ‘direction filter’ you make them feel understood.

7. Match and mirror

We like people who are like us. Subtly matching and mirroring another person’s gestures, words and body language helps to build rapport. Observe your patient’s posture, for example the angle of their head or their body position, and subtly do the same. If they use hand gestures when they talk, try introducing similar ones yourself.

8. A little more conversation

Find your patient’s interests and what they enjoy talking about by asking questions. Good places to start are family and sports. Reinforce your relationship by building on your patient’s ideas as you chat.

9. Watch your language!

Consider the words and phrasing you use with patients. People tend to ignore anything that precedes a ‘but’ so, when suggesting two treatment options, for example, try giving equal weight to both parts of the sentence by using ‘and’. Use ‘but’ when you want to present the second option as better.

10. Relax – be honest, warm and genuine

Be genuine and sincere. If you don’t know the answer to a question, promise to find out and respond later. Building rapport will come easily if you are relaxed and genuinely interested in your patients. Enjoy the opportunity to meet so many new people!

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For more information on The Confident Dentist or to make a course booking, email team@theconfidentdentist.com, call 0333 220 2447 or text [tcdinfo](tel:07490079117) to 07490 079117.

LIFE AS...

In our regular feature, we talk to students past and present about what it's like to spend a day in their shoes



A DFT DCT'S LIFE

THE POSITIVES AND NEGATIVES OF A TWO-YEAR SCHEME

Clare Hutchison graduated from Newcastle Dental School in 2016, and is currently working as a DFT DCT 2 in Yorkshire and Humber deanery. She completed her Dental Foundation Training year in Guiseley, and Dental Core Training aspect within Bradford Teaching Hospitals.

The two-year scheme has lots of benefits. You are still in FT, which means you have regular study days and lots of support. You are with the same group of people for two years, so have many people to rely on. Aside from the social aspects, there are also opportunities to volunteer and expand your CV, whether by audits, research, case reports, or presentations. In general, I have found people on the two-year courses have a lot more academic input earlier on, which is helpful for any career path.

Clinically, it is also advantageous. I really enjoyed working in paediatrics, and so have been given the opportunity to pursue this. The flexibility of the hospital enabled me to go to Leeds Paediatric department weekly for both consultant and treatment clinics. Similar opportunities have been organised for colleagues wanting to pursue careers in orthodontics. If you are unsure what career path you want to follow, you are given



plenty of opportunity to explore.

On a basic level, you also have longer to get your head around things.

Previously, the two-year programmes have come with

a pay cut, and have been paid around £30,000 a year. The average salary for DCT1 in Yorkshire (without on call) is approximately £36,000. This year it was decided salaries will now be averaged from both to avoid a pay cut.

Being there for two years also gives you time to build rapport with colleagues, and for consultants to build trust in you, allowing you to do more complex things. By the second year you are a lot more comfortable, and can work on honing your skills, as well as seeing operations you had read about in text books.

But it is not without drawbacks. A disadvantage to the two-year scheme is the lack of consistency. As you are only in every second week (and if off for a week, you're not in for a month), in practice, this

can make treatment planning, and continuity of patient care difficult. Early on, you end up a bit behind in everything.



When you start in hospital, the DCT 1 and DCT DFTs are complete beginners, but as they are the ones who are in every day, and do on-call as part of their job, they do develop faster than you. All your friends, in practice, will be on their tenth root canal, and you will be lucky to do one.

It can be stressful, but there are always people to talk to – from your trainer in practice, trainer in hospital, and your training programme director.

Final thoughts

Though I took a gamble with my choice, I have thoroughly enjoyed my experience so far. The variation between general practice and hospital is complimentary. The opportunities you have in hospital are invaluable, and keep pushing you to expand your horizons.

Of course, it has its ups and downs, but being able to switch off from one setting to another every week helps keep things balanced.

The experiences you have really complement each other, and by the end of your training you will no doubt be more confident taking out a tooth, or explaining to your patient what geographic tongue is.

I have been given an invaluable experience, able to explore so many potential career options, with lots of support.

At the end of this year, when I finish both my DCT 1 and DFT years, it will be sad to say goodbye to maxillofacial, it's not the career path I want to follow, but the experience I have gained will support my chosen speciality.

Overall, I could not be happier with my decision, and would urge final-year students to consider this as an option when applying for DFT.

Clare Hutchison ■



BUILDING YOUR CV, A DAY IN THEATRE AND THE SOCIAL SIDE

In the second part of their series, **Kishan Patel** and **Mohammed Dungarwalla**, two Oral and Maxillofacial Surgery (OMFS) Dental Core Trainees (DCT) based at King's College Hospital (KCH), London give their insight into their roles at a major London trauma centre and why they feel a post in OMFS is an absolute must for any young dentist, regardless of career intentions.

Audits, research, publications, presentation, communication and negotiation, time management, teaching and prioritisation: these are all but a few ways in which our skills have developed, aside from our clinical knowledge. We have developed these skills rapidly as we are put into unfamiliar situations on a daily basis- sink or swim, and there's no option for the former!

We have had the perfect opportunity to 'pad' our CVs with research and audit projects and for those considering specialty training, this is invaluable. Between the two of us, we have presented at an international conference, submitted two presentations to a national conference, partaken in two audits resulting in local presentations, submitted a paper to a national journal and edited, reviewed and written books.

I don't think that we appreciated the importance of the 'softer skills' required to undertake this role successfully. These skills developed considerably as we manage difficult patients, difficult colleagues and difficult scenarios all the time, and often all at once!

'Get scrubbed! The patient is asleep'

Once a week, we are designated to an elective operating list with a consultant and registrar. Operations range from orthognathic surgery where we see controlled detachment of the midface and mandible using saws, drills and osteotomes, to cranioplasties (reconstruction of the cranial vault using custom titanium implants). It is our job to ensure the patients are correctly worked

up for their operation, and on the day, the operating list runs glitch free- which is easier said than done.

Emergency operations include reduction and fixation of fractured mandibles and midface fractures, draining dental abscesses and suturing paediatric and complex lacerations, all of which we get to actively participate in with senior supervision and input. It is great to see a patient in ED, clerk them, operate on them and see their recovery through to discharge and subsequent follow-up. There is a great sense of accomplishment when we see one patient through their journey under our care. It is a real privilege to be able to assist and undertake operations, however there is a lot that goes on pre- and post-operatively which neither of us appreciated before commencing an OMFS post.

Work hard, play harder

It's fair to say that we work long hours. But with that, we have grown closer as a group – we see ourselves as friends, not colleagues. The Friday afternoon post-teaching socials at the Phoenix (the pub around the corner) are an absolute must and seeing your consultant dance to *Gangnam Style* at the

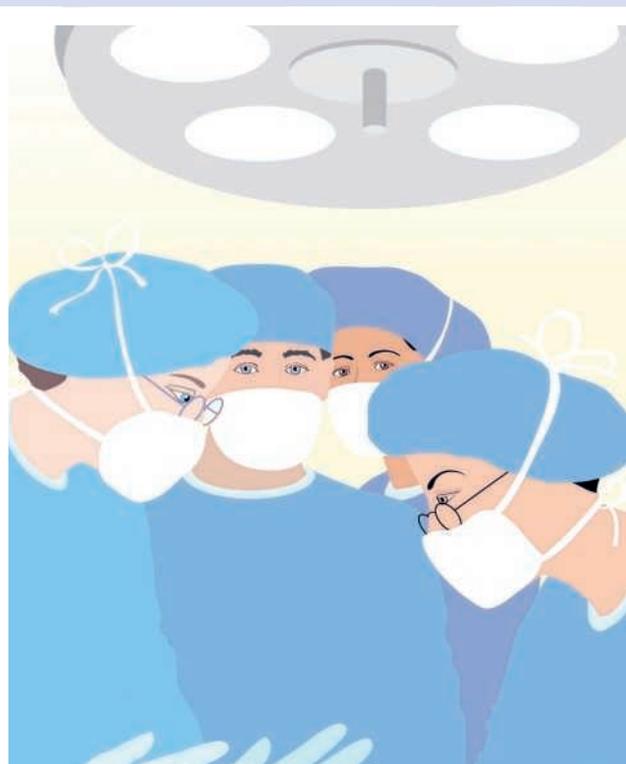
Christmas Dinner party is something that has been etched into our memories for years to come- and we're not sure it's for the better!

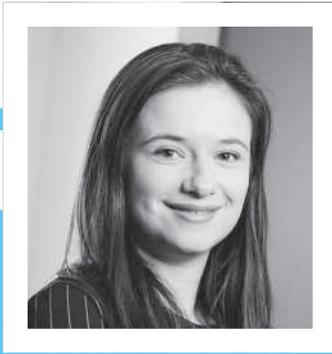
It's a good social environment. We have our own DCT office, allowing us to debrief from the gruelling 30 patient tertiary referral TMJ clinic that we have just survived, or to hide from that one registrar who just wants another five minutes from you on that Friday afternoon at 5 to 5!

We'll be seeing each other for many years to come, and that's part of the job. Mo will still be giving us lifts after a heavy night, and visiting our Senior Fellow in Melbourne is never off the cards! We've had an enjoyable six months so far, and we look forward to the next!

Kishan Patel & Mohammed Dungarwalla ■

In their final article, Kish and Mo discuss being first on-call for the OMFS department at a tertiary trauma centre, conducting a ward round with the OMFS team, and how the current NHS situation impacts on the specialty.





A TAXING ISSUE

Sophie Kwiatkowski, Senior Accountant for PFM Townends LLP, on running taxes in an efficient way

As fifth year students near the end of their studies and attention will soon turn to your first associate role, I am sure you have a lot of questions about how to run your business in the most tax efficient way possible.

Most people wait until March to look at ways to reduce their tax bill, but why not get into the routine from the start of your self-employed career. As part of your FD year, you will have had talks from financial professionals who will most likely cover the basics about which expenses can be claimed and gain you tax relief. These are often the standard costs such as subscriptions, insurance etc. There are other ways apart from the essential expenses that can be useful tax minimising tools.

The first area is pensions. For those of you embarking on roles in NHS practices, you may have opted-in to the NHS Pension scheme and will be making monthly contributions of superannuation via your associate pay schedules. Your principal will also be adding 14.3% of your net pensionable earnings into your fund. But why stop there? Considering a private pension, can act as both an additional saving tool for your future as well as gaining additional tax relief for you in the year you make the contribution. You will need to make the contributions before the 5 April to get tax relief within that tax year.

For the tax year 2018/19, tax relief is awarded on the lower of; pension contributions up to 100% of your earnings, or the £40,000 annual allowance. Basic rate tax relief is given by adding 20% to the net contribution made, so that the gross amount is invested into your pension. For example, if you pay a monthly net contribution of £400 per month; basic rate tax of £100 is added, so your gross

contribution is £500 per month. For higher rate taxpayers, tax relief is given by extending the basic rate band – so more of your earning are taxed at 20% as opposed to 40%.

It is also worth noting that if you have unused pension allowance from the past three tax years, that you can carry the unused amounts forward. It is worth speaking to a financial advisor to see the different pension options available to you. If you don't choose to invest straight away, it is useful knowing that the option is there.

Another potential tax reducer is to make some charitable donations. Donations made through gift aid entitle the charity to an extra 25p for every £1 donated, without costing you more. Gift-aid assumes you have been taxed at source at the basic rate. So higher rate taxpayers can claim back the additional 20%.

Although these solutions to help reduce your tax-bill require surplus funds to invest, a pension is a useful way to save for the future – so see it as a long-term investment as well as a short-term way to minimise your tax liability. There are however, a number of smaller expenses that you can claim for that people often overlook.

Capital assets are often essential to your business. As an associate dentist, you will need items such as loupes, cameras and other dental equipment in order to perform your work. All these items that are used solely for business purposes are given 100%

tax relief. You receive the tax relief through capital allowances on your Tax Return. Aside from dental specific assets, you may also need to use your phone/computer a lot more for business use due to the nature of your associate position. You can also have tax relief on these items, but only up to the extent of the business use of them. For example, if your phone is 50% business use, 50% for personal use, then you can have tax relief on half the cost of the asset.

Training expenses are another area with dual-benefit. In order to keep at the forefront professionally, you are required to maintain your knowledge and skills. This is often a costly expense, but you can have tax relief on the costs of the course. HMRC's guidance on courses is that they are 100% allowable if they are enhancing and updating existing skills and knowledge.

Planning is essential to ensure you get into the most tax efficient position, without making unnecessary purchases. Having a pro-active accountant can be key to achieving this.

Sophie Kwiatkowski ■

Sophie Kwiatkowski is a Senior Chartered Accountant with PFM Dental Accountancy which provides a chartered accountancy service exclusively for dentists. The PFM Dental group is one of the leading specialist providers to dentists within the UK. www.pfmdental.co.uk



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- Dr E Lago Garcia

"I approached PFM to act as my accountant last year. The service and advice has been exceptionally good. They were very helpful in dealing with the switch over to a new accountant, and with any queries or questions I have had regarding my tax affairs. The accounting and tax advice has been clearly explained and they have always been available to deal promptly with any queries I have had. I would highly recommend their services." - Dr M Troy

"As a new practice owner the challenge of tax planning, accounts and payroll etc. was extremely daunting. However, thanks to the team at PFM we have been able to get on top of it all with minimal fuss and stress. They are extremely professional and are always on hand to answer our questions, even going so far as to give me a tutorial about the use of Xero - something completely new to me. I wouldn't hesitate to recommend and indeed I already have."
- Dr J Alker

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THE 7 Ps; PROPER PLANNING AND PERFECT PROVISIONALS PREVENT POOR PERFORMANCE



By Mr M Mustafa Zaman*,
Mr S J Hayes** and
Ms F Q Zaman***

INTRODUCTION

From the phase where a tooth is prepared for a crown to when it is fitted with one, it is protected by a *provisional restoration*. Provisional restorations, Indirect and Direct are important when providing definitive treatment. A provisional restoration is often required as interim while a final dental prosthesis (FDP) is being made. For minimally invasive procedures, e.g. resin retained bridges or veneers, temporisation is usually not required. However, they become necessary for more invasive preparations such as those for crowns and bridges.¹⁻²

To keep patients comfortable during the interim period, it is of great significance that prepared teeth are protected with provisional restorations and they must remain *in situ* until the final restoration is delivered.¹ Successful management of this phase can not only help the dentist gain his patient's confidence but also favourably influence the long-term success of the definitive restoration.³⁻⁴

Provisional restorations as shown in table 1 have an important role in serving biological, mechanical and aesthetic functions, therefore time and effort should be put into constructing them.¹ To highlight importance of a well-constructed and fitting provisional restoration, *Wassell* and colleagues stated that provisional restorations should not just be an afterthought when taking a definitive impression. Instead equal amount of time should be taken to construct them as is spent on preparing the tooth.⁵ For many years provisional restorations have been called *temporary restorations* which has unfortunately led to dentists ignoring their importance.⁴

Provisional restorations are routinely used to provide coverage to freshly cut dentine and prevention of unwanted tooth movement. They can also be used as a diagnostic measure when restorations are being planned, and also partly to test aesthetics and occlusal changes.⁵ This way they provide stabilisation to the tooth ensuring aesthetics, phonetics and masticatory function.⁵⁻⁶

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**Simon Jeremy Hayes, BDS, FDS, MRD, Consultant in Restorative Dentistry, Morrision Hospital, Swansea

***Faiza Qureshi Zaman, BDS, MFDS RCS, Restorative dentist

Table 1: The functions of provisional restorations

1) Coronal Coverage/Protection	As coverage for freshly cut and exposed dentine to prevent sensitivity, pulp pathology, plaque build-up and subsequent caries
2) Occlusal stability	Maintenance of proximal and intercuspal contacts to avoid unwanted tooth movement during the interim period
3) Function	If care is taken to ensure that a restoration provides the above two, the patient will be able to function without problems
4) Gingival Health and Contour	It is imperative that provisional restorations have smooth, accurate margins with cleansable contours. This will not only help maintain good oral hygiene but also prevent gingival overgrowth which is unfavourable in aesthetic zones. Instances where poorly fitted crowns are removed or following crown lengthening, it is critical that the provisional restorations are ideal so they can aid in healthy soft tissue healing which will in turn define the final aesthetics of restorations
5) Aesthetics	In order to be aesthetically acceptable, they should either be identical to the newly prepared tooth or to the final planned restoration
6) Diagnosis	This is important in assessing aesthetics, occlusal changes and phonetics
7) Other	To measure tooth reduction during preparation, assess prognosis during endodontics by isolating the tooth in question and as a matrix for core build ups

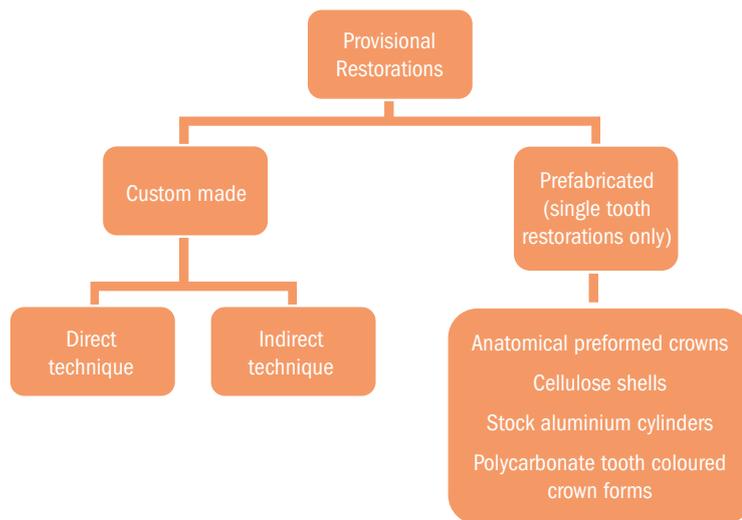


Fig 1: Methods and techniques available

RESTORATIONS

Types of provisional restorations

Direct restorations are made chair side on prepared teeth inside the mouth whereas indirect are made using a poured cast in dental plaster/stone. Fig 1 shows various types of provisional restorations based on the method of fabrication and the materials used.

Replica Technique

Direct technique is useful as it provides opportunity to replicate pre-operative occlusal contacts, pre-operative tooth shape and provide a closely fitting crown.¹ Due to its quick, inexpensive and relatively straight forward nature, it is commonly used to make

Chair side direct restorations

Armamentarium	
Impression trays	Monomer and polymer
Alginate	Straight handpiece
Rubber bowl	Coarse and fine highspeed burs
Spatula	Abrasive discs and mandrel
Quick set plaster	Temporary cement
No:11 blade with scalpel	Interdental brushes/floss
Separating medium	Articulating paper



Fig 2 – Armamentarium required for chair side provisional restorations

provisional restorations. If done right, it allows customisation of the crown or bridge to the patient's tooth.

Prior to tooth preparation, a pre-operative impression is recorded. Although material selection depends on individual situations, alginate, monophase silicone wax or silicone putty can be used. Fig 2 shows the kit needed for making a crown using the replica technique. Although impression

material allows the matrix to re-seat better. It also prevents distortion of the impression while in storage or transit. Tooth preparation should involve even removal of tooth tissue circumferentially, a clear finish line and no undercuts. Application of separating media on the prepared tooth and the adjacent teeth facilitates easy retrieval of the provisional from the tooth once polymerisation is complete.

When using the direct method, the provisional restoration must be removed from the tooth prior to complete polymerisation to prevent it from locking into undercuts. However, Philips *et al* found that upon complete polymerisation, Polymethylmethacrylate (PMMA) shrinks by around 8%.^{4,9} Also, continued polymerisation outside the oral cavity without support can result in distortion and a sub optimal fit.^{4,10-11}

‘Once recorded, it is always worthwhile to check the impression in good light for any potential tears or air blows. This may save the operator from repairing and excessive trimming of the provisional restoration.’

trays are essential for alginate, impression putty can be moulded free hand around the tooth in question or be used in a tray to help with support and reseating of the impression material.² Once recorded, it is always worthwhile to check the impression in good light for any potential tears or air blows. This may save the operator from repairing and excessive trimming of the provisional restoration. Using a number 11 blade, trimming away excess impression

Impressions (Alginates/elastomers)

Alginate can absorb the exotherm due to polymerisation and is a cheaper alternative but cannot be used again due to dimensional instability and unlike silicones cannot be disinfected and re-used if a new provisional crown is required. Elastomers on the other hand are re-usable, they can be stored and used again.^{1-2,12} For patients who suffer from periodontitis and exhibit recession, the interproximal areas should be blocked with



Fig 3 – Preformed crowns come in a variety of forms



Fig 4 – When planning aesthetic or occlusal changes, provisional crowns can be formed in the mouth with laboratory-made matrices

wax prior to recording the impression.⁵ If the tooth is badly broken down, red sticky wax can be used to build the tooth prior to taking a pre-operative impression.^{1,5}

Preformed crowns

These can be metal (stainless steel, nickel chromium and aluminium) which are

normally used for posterior teeth, or tooth-coloured (acrylic/polycarbonate) shells that need a tooth-coloured temporary material to fill them and provide a close fit. Both of them can be found in various shapes and sizes which are predetermined by the manufacturer and therefore need to be manipulated to fit on the preparation. They require adjustment at the margins, occlusally and internally. Despite the amendments made, it can still prove to be difficult in establishing occlusal and interproximal stability.^{1-2,7} Fig 3 shows some of the most widely used preformed crowns.

Vacuum formed matrices

A duplicate of a waxed-up cast can be used to make a vacuum formed matrix (Fig 4) in the laboratory using a clear vinyl sheet. These need to be used carefully as they are flexible and can distort. This is more so when there are less adjacent teeth to aid placement. Despite the limitation of use, the possibility of moulding light cure materials makes them invaluable to use as templates for provisional restorations.⁵

‘To prevent voids and trapping air especially around incisal angles, ensure that the tip is not removed until all necessary material has been syringed out.’

Regardless of the type of matrix chosen, it should be used carefully. Following tooth preparation, apply separating media such as petroleum jelly to the tooth in question and those adjacent to it to aid easy retrieval of set material. The matrix should be dried with resin material directly syringed into it. Ideally syringing should begin from the deepest part of the matrix until it fills.⁵ To prevent voids and trapping air especially around incisal angles, ensure that the tip is not removed until all necessary material has been syringed out. The matrix is then seated back till the resin acquires a rubbery consistency. Always follow the manufacturer’s instructions with regards to working and setting times for desirable results. Removing the matrix too soon may result in distortion while leaving it *in situ* for too long may cause difficulties in removal from the mouth. A useful tip

Table 2: Adapted from Burke *et al*¹ shows the available provisional crown materials

Name	Manufacturer	Principal components
Protemp	3M ESPE (Seefeld, Germany)	Dimethacrylate/strontium glass fillers
Unifast	GC, Leuven, Belgium	Methyl methacrylate/fillers
Provilec	GC, Leuven, Belgium	Bis-acrylate resin/glass microfillers
Structur2SC	Voco, GmbH, Cuxhaven, Germany	Dimethacrylates/glass microfillers
Tempphase	Kerr Mfg Co., Orange CA, USA	Bis-acrylate resin/glass microfillers
Integrity	Dentsply, Milford DE, USA	Multifunctional methacrylate/Barium glass/fumed silica
Trim	Harry J. Bosworth, Stokie, Illinois	Polyethyl methacrylate resin
Snap	Parkell, New York, USA	Polyethyl methacrylate resin

to monitor setting is testing consistency is by injecting a small amount of material onto the front of the seated matrix. Following partial polymerisation, the matrix is then removed, and any excess interproximal material trimmed. Once the fit and margins are checked again, the provisional restoration is ready for further refining, polishing and cementation.⁵

Direct syringing

In the absence of a preformed crown or for some reason if the matrix is not available, the resin material can directly be syringed over the preparation. Materials based on Polyethylmethacrylate (Trim) are ideal as they can be mixed to a reasonable viscosity, yet be syringed onto the preparation. Syringing starts from the preparation finish line and involves spiralling material over the axial walls. Contours should be overbuilt if possible as trimming down excess is easier than adding more material later.⁵

Self or Light cured resins

With newer materials, provisional crowns can either be self or light cured with physical properties similar to that of composite resins with good fracture/wear resistance. When resin crowns have been adapted, moulded

and occlusally adjusted, they can be light cured for a few seconds and then removed from the mouth and light cured fully. The fit is then checked by reseating, and the crown is polished. Problems include air voids or insufficient resin causing fractures whilst trimming.

Polyethylmethacrylate (PMMA) – Trim Plus is a slightly older material and predominantly used in manufacturing laboratory indirect provisional restorations. This material can be self or heat cured, easily added to and maintains strength and good aesthetics for longer periods. It has high resistance to wear but due to high polymerisation shrinkage, it can affect the fit and is highly exothermic and releases free monomer, which can cause pulpal damage and gingival damage respectively.

Polyethylmethacrylate (PEMA) – Snap is a monofunctional acrylate monomer and has a more direct application. In comparison to PMMA this is less exothermic and involves less polymerisation shrinkage. However, there is reduced aesthetics and colour stability as they can darken more readily. Resistance to wear is also lower.^{1,5,8} It is also undesirable to use these materials during pregnancy as dibutyl phthalate is a presumed reproductive toxicant². Therefore, materials such as Trim have now become less popular.

Bisacrylate composite – Protemp has a good marginal fit based on reduced polymerisation shrinkage and reduced exotherm. It is more colour stable than PEMA but is still prone to staining with



Fig 5 – An ill-finished restoration is not only un-aesthetic, but more importantly will compromise long-term treatment success

certain foods, has various shades thus providing good aesthetics. It is good for single unit restorations, has minimal odour and taste, is quick setting and easily trimmed. It has better surface micro-hardness and better wear resistance than PMMA. It is however, brittle in thin section, difficult to add to and can be expensive due to its method of delivery through a gun cartridge and mixer tip system.^{1,5}

Composite-based resin – Provipoint DC can be light cured and the operator can control the working time. It has various shades and colour stability. However, it is still prone to staining, is expensive, has a poor marginal fit. It is also highly exothermic.

Restorative composite can also be used, facilitated through the use of a preformed clear matrix constructed from a diagnostic wax-up. This requires additional time but is useful for long term provisional restorations^{5,8}

Finishing

Finishing and polishing of provisional restorations is important as this will not only define the aesthetics and function of the restoration but also the pattern of gingival remodelling following tooth preparation.¹⁴ The way the gingival tissues re-contour around the provisional restoration during the ‘waiting’ phase will affect the aesthetics of the final restoration. In order to produce a ‘perfect provisional’, finishing is very important and a number of steps need to be carried out to achieve well fitting, aesthetic



Fig 6 – A well-finished and well-polished provisional restoration

and cleansable provisional restorations. Fig 5 shows a four-unit bridge with unfinished margins, and gingival inflammation that followed in just two weeks of the bridge *in situ*. A definitive restoration cannot be placed on such tissues and any attempt to do so will most surely result in further inflammation and certainly compromised aesthetics, eventually leading to failure. Fig 6 demonstrates the level of finishing

‘Once cemented, the restoration margins and occlusion should be assessed and any excess cement removed as it can cause gingival inflammation, occlusal trauma, discomfort and poor aesthetics’

and polishing required for predictable long-term results. This will provide the operator opportunity to deliver a well-fitting definitive restoration on time and gain the patient’s confidence in return.

When it comes to finishing, there are a number of ‘sandpapers’ available for the final finishing (Fig 7). Each colour denotes a different grit. Whichever polishing system is used, it is important to carry out the

finishing procedures under good light and whenever possible magnification. A handy tip during the finishing process (Fig 8) is holding the restoration with the fitting surface facing up. This allows the operator to have a better view of the margins and reduces the risk of accidental alteration of the margin while finishing with coarse discs. Once the desired finish is achieved with the discs, a coating of glaze can be applied to improve the aesthetic appearance.

Luting

Provisional cements should be soft and easily removable, without damaging the tooth preparation.⁸ There are a range of luting products available (Fig 9). Traditionally Zinc Phosphate was used if a provisional restoration needed to be placed for a long period of time.

Zinc Oxide was also the material of choice but was difficult to remove. Now TempBond has proven to be more popular. It has a modifier which softens the cement to ease removal of the provisional restoration. TempBond (Non-Eugenol) NE is designed for patients with eugenol allergy. They can compromise surface hardness and bond strength of resin to resin e.g. to composite cores, therefore if a resin adhesive based bonding system

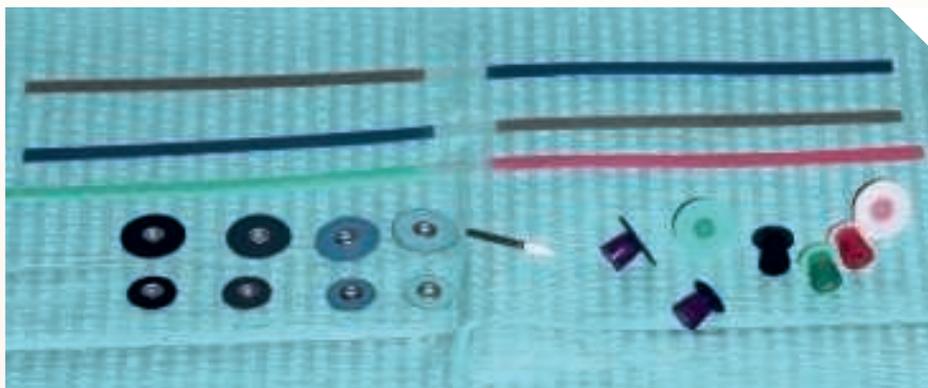


Fig 7 – Sandpaper discs of various sizes and grits

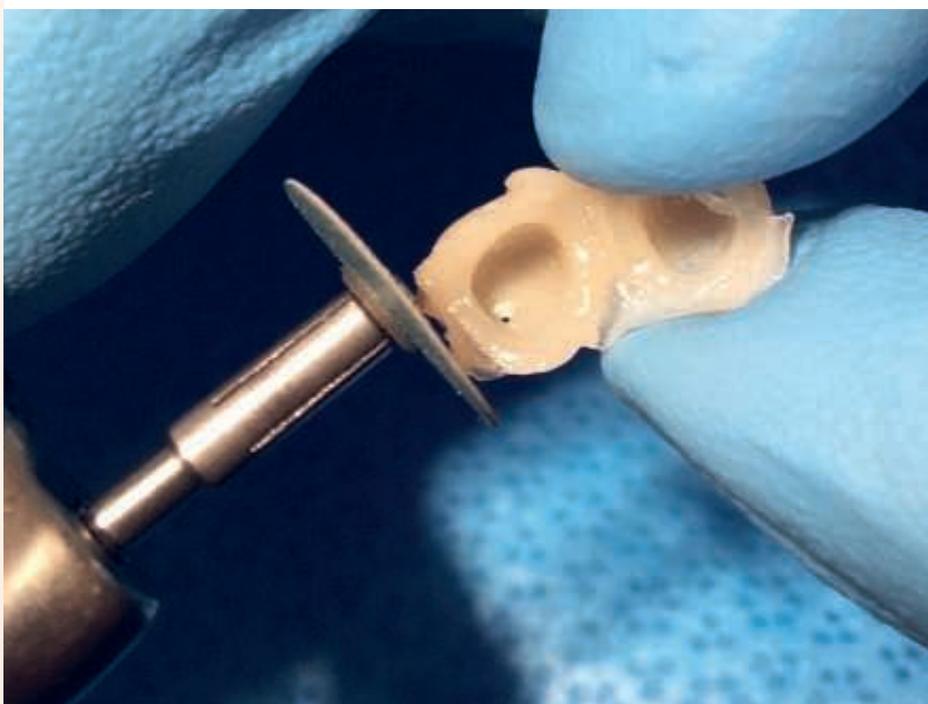


Fig 8 – A handy tip for the finishing process

is used, a eugenol based cement should be avoided.^{2,13} The bond strength, however, to etched enamel and dentine, is unchanged if pumice and water are used to clean the prepared tooth surface after removing the provisional restoration.^{2,5,7-8}

Temp Bond Clear can be used to prevent



Fig 9 – Some of the luting agents used for provisional restorations

luting material showing through for minimal preparation crowns as it is tooth coloured. However, glass ionomer and resin-based adhesive cements are not a material of choice as they adhere to the prepared tooth and are strong, making removal more difficult.

Once cemented, the restoration margins and occlusion should be assessed and any excess cement removed as it can cause gingival inflammation, occlusal trauma, discomfort and poor aesthetics.^{2,7} This can be done initially using a straight probe to remove the gross excess material, followed by micro brushes for more thorough cleaning. Small interdental brushes can be placed interdentally beneath connecting temporary bridges, crowns or retainers to allow excess cement removal, as it can be difficult to dislodge once set. To avoid

material from flowing under the pontics on a multi-unit provisional, which can be difficult to remove and can compromise hygiene, loop floss around the units and apply petroleum on the fitting surface.

Conclusion

Provisional restorations should be considered more than just temporary restorations and due attention needs to be paid to constructing them. Their advantages and functions need to be kept in mind while constructing regardless of whether they are direct or indirect. A properly planned, ‘perfect’ provisional restoration will most definitely prevent poor performance and frustration on the part of both patient and dentist and will also ensure better aesthetics for longer lasting restorations.

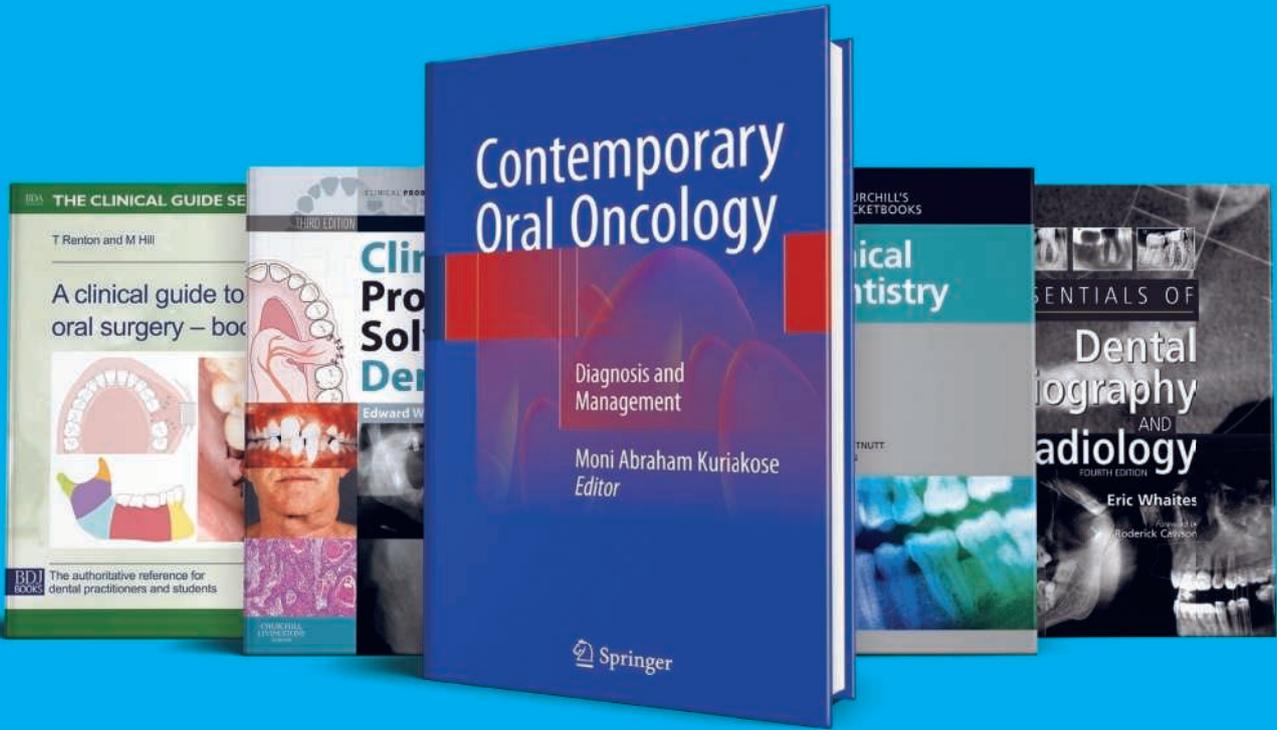
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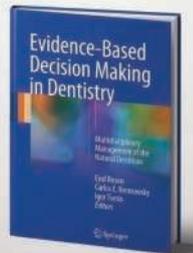
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Question 1

Theme: Postoperative considerations

Options:

- A. Canine space infection
- B. Cavernous sinus thrombophlebitis
- C. Hyperparathyroidism
- D. Infra-temporal fossa
- E. Pain and swelling
- F. Paraesthesia of the distribution of the inferior alveolar nerve
- G. Pterygomandibular space
- H. Reactionary haemorrhage
- I. Secondary haemorrhage
- J. Trismus

For each of the following statements, choose the most appropriate option from the list above. Each option may be used once, more than once, or not at all.

Scenario 1

A patient presents 1 day post-operatively and complains of bleeding.

Scenario 2

This condition commonly occurs following an inferior alveolar nerve block injection, due to involvement of the medial pterygoid muscle.

Scenario 3

This is caused by the release of prostaglandins as a result of tissue damage.

Scenario 4

This condition is characterised by marked oedema and congestion of the eyelids, leading to exophthalmos.

Scenario 5

This space is involved when there is an acute infection of an upper third molar.

Question 2

Which one of the following conditions is associated with premature loss of teeth?

- A. Down syndrome
- B. Hereditary gingival fibromatosis
- C. Hypophosphatasia
- D. Hypothyroidism
- E. Williams syndrome

Question 3

Look at this radiograph.

- A. What complication has occurred?
- B. What symptoms might the patient be experiencing?
- C. What are the other causes of these symptoms?



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Question 4

Please look at this lesion and indicate which type of biopsy is indicated and what you think the lesions are.



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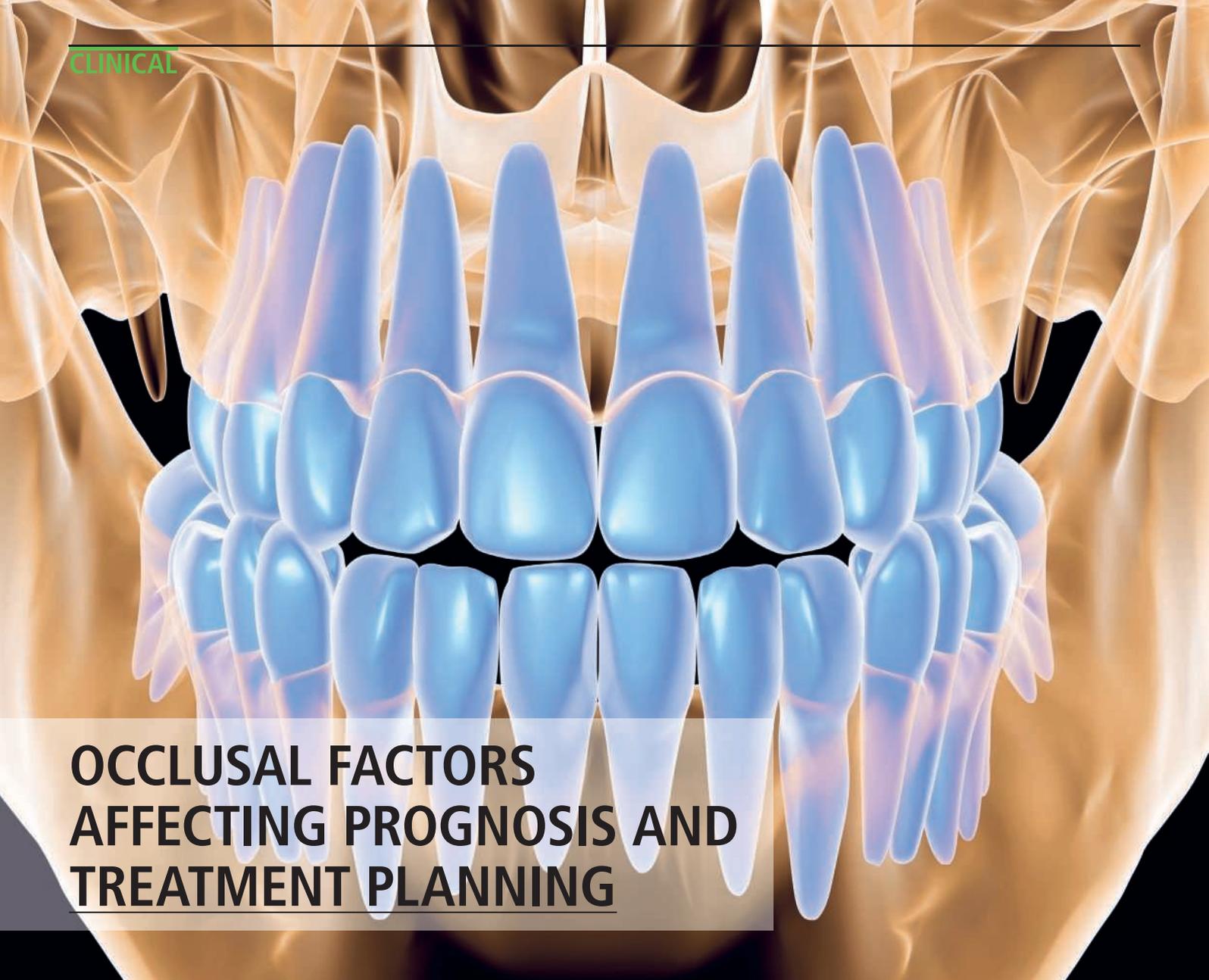
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OCCLUSAL FACTORS AFFECTING PROGNOSIS AND TREATMENT PLANNING

By **Darren Tsang**, 4th year dental student at the University of Central Lancashire

INTRODUCTION

Occlusion plays a role in many everyday functions, including mastication, speech and swallowing. As such, it is inevitably affected by many routine treatment options. An understanding of occlusal concepts with regard to a therapeutically ideal occlusion, and the consequences of deviations from this ideal, is necessary for the clinician to be able to correctly determine prognosis and to treatment plan for the patient.

Section 1.14.1 of the GDC's 'Preparing for Practice' states that the dental undergraduate must be able to 'assess and manage caries, occlusion, and tooth wear'.¹ Despite this, it has been observed that dentists do not feel that their undergraduate education was sufficient with regard to the articulatory system.² This is confounded by the divisive nature of the topic; ambiguity

lies in terminology and clinical endpoints, and there are many competing concepts of the ideal occlusion.³ Furthermore, there is disagreement about the extent of the clinical impact of occlusion, which partially stems from the low level of evidence supporting the relationship of occlusion with pathological processes. These factors may lead to the inadequacy felt by such dentists and may be a source of specious clinical decision making which ultimately negatively impacts patient care.

CENTRIC RELATION: A FUNDAMENTAL TERM IN NEED OF CLARITY

The confusion in the field is typified by the lack of agreement about simple terminology, especially the term 'centric relation', a basic and fundamental occlusal

concept in prosthodontic and restorative procedures. The most current definition of centric relation, according to the Glossary of Prosthodontic Terms Ninth Edition (GPT 9), is, 'a maxillomandibular relationship, independent of tooth contact, in which the condyles articulate in the anterior-superior position against the posterior slopes of the articular eminences; in this position, the mandible is restricted to a purely rotary movement; from this unstrained, physiologic, maxillomandibular relationship, the patient can make vertical, lateral or protrusive movements; it is a clinically useful, repeatable reference position'.⁴

There have been a multitude of definitions of centric relation in recent decades. Perhaps most notably, there has been a shift in the position of the

Table 1: The Gnathological concept of occlusion

Gnathological Concept
Centric relation that coincides with maximum intercuspation
Bilateral balanced occlusion (simultaneous contact of anterior and posterior teeth on both the working and non-working sides in static and eccentric occlusion)
Adequate occlusal vertical dimension
Anterior guidance
Condylar paths which are independent of each other

Table 2: The Pankey-Mann-Schuyler philosophy

Pankey-Mann-Schuyler (PMS) philosophy
Incisal guidance that functions in harmony with the functional inclines of posterior teeth
Anterior teeth in functional contact in both centric and eccentric positions
No deflective (premature) or excessive balancing side contacts
No contact of the posterior teeth on protrusion
Freedom of movement in centric occlusion (this is an area which allows some eccentric movement before being affected by forces from cuspal inclines, as opposed to a static centric occlusion)
Occlusal load spready evenly over a maximum number of teeth
Group function rather than canine guidance i.e. where lateral excursive forces are also shared by the working inclines of the posterior teeth
Note: The Pankey-Mann-Schuyler (PMS) philosophy of occlusal rehabilitation is also widely used. It refers to a technique of oral rehabilitation described by Pankey and Mann, ^{15,16} who were guided by Schuyler's principles of occlusion. ^{11,12,17-19}

condyle relative to the glenoid fossa from a posterior superior position to an anterior superior position.⁵ These changes have ultimately culminated in a state of ambiguity throughout the profession – an investigation of faculty and students from 7 dental schools showed that not only was there a lack of consensus between schools, but also internally. Interestingly, it also demonstrated a demographic correlation; individuals who graduated before 1975 were more likely to choose an older definition, with a posterior or retruded condyle position as opposed to an anterior or superior position.⁶ Similarly, a survey of the Fellows of the Academy of Prosthodontics indicated that those who

graduated before 1970 used definitions that did not refer to an anterior-superior position.⁷ Furthermore, a survey of 69 orthodontic and oral and maxillofacial programmes illustrated a discrepancy between the specialisms regarding the definition of both centric relation and centric occlusion.⁸

THE IDEAL OCCLUSION

At its most basic level, occlusion refers to the contacts between teeth.² The GPT 9 defines it as 'the static relationship between the incising or masticating surfaces of the maxillary or mandibular teeth or tooth analogues'.⁴ A functional understanding of occlusion requires the clinician to

appreciate the relationships, both static and dynamic, between elements of the masticatory system that contribute to these contacts; the teeth, periodontium, temporomandibular joints, neuromuscular system and craniofacial skeleton.³ An ideal occlusion attempts to harmonise these elements; unfortunately, it is not so easily defined. Competing concepts of occlusion are further complicated by the fact that the objectives of occlusal schemes for the natural dentition may differ from those for the edentulous patient.⁹

When it comes to the concept of ideal occlusion, it is pragmatic to understand the philosophies of full mouth rehabilitation, as they effectively define tenets of the 'ideal'. These considerations can then be used in practice. Three of these concepts (the Gnathological concept, the Pankey-Mann-Schuyler philosophy, and Beyron's concept) are outlined below.

The first of these is the Gnathological concept of occlusion, which has its roots in gnathology - defined as 'a general term for the study of the biology of the masticatory mechanism and the kinematic recording of mandibular position'.³ The gnathological concept of occlusion is outlined in Table 1.¹⁰⁻¹² This concept has since developed; bilateral balanced occlusion has been superseded by mutually protected occlusion. Here, the anterior teeth protect the posterior teeth in eccentric movements while the posterior teeth protect the anterior teeth in centric occlusion. This is achieved when centric relation coincides with maximum intercuspation, with canine guidance on laterotrusion, and anterior guidance on protrusion.^{13,14}

Even though these concepts are taught in modern dentistry, their origin is questionable. One study investigated the scientific processes used to establish these occlusal concepts, highlighting the fact that these assertions are based on expert opinion rather than substantiated with proper study design.²⁰ Notwithstanding, there is evidence, in the form of systematic reviews of cohort studies, individual cohort studies and systematic reviews of case-control studies,²¹ that supports an occlusal concept proposed by Beyron.²² This concept for a functionally optimal occlusion is comprised of five elements (Table 3).

The variation seen in these clinically accepted concepts demonstrates the difficulty that the clinician may face when

carrying out any treatment that alters the occlusion. Further, the level of evidence is poor, yet dogmatic concepts often prevail in clinical opinion. It may therefore be prudent, especially at the undergraduate level, to treat patients with a conformative (where pre-treatment occlusion is preserved) rather than a re-organisational approach.

CONSEQUENCES OF DEVIATIONS FROM IDEAL OCCLUSION

Occlusion that deviates from the ideal is often perceived to be pathological. As a result, it can affect tooth prognosis and be used to validate treatment. Some clinicians may choose to use techniques that are irreversible and reorganise the occlusion. Considering the potentially destructive nature of this type of clinical activity, it is useful for the clinician to examine the evidence base concerning the pathological role of ‘less than ideal’ occlusion in temporomandibular disorder (TMD), tooth fracture, and the periodontium.

OCCLUSION AND TEMPOROMANDIBULAR DISORDER

The extent to which occlusion is related to temporomandibular disorder (TMD), if at all, is contested in the literature. Much of the research over the past 30 years supports a weak or non-existent association.²³ For example, one study reviewed and found no association between TMD and either occlusal interference, occlusal guidance patterns, or a retruded contact position to intercuspal position slide.²⁴ On the contrary, an aetiological association between occlusal factors and TMD is supported by a series of studies from one research group, including a controlled clinical trial in which preventive occlusal adjustment (elimination of occlusal interference) was demonstrated to result in a decreased incidence of TMD.²⁵⁻²⁸ However, the study suffers from attrition bias in the adjustment group compared to the mock adjustment group.

Aetiology is not the only issue here – the treatment of TMD through alteration of the occlusion is also contentious. The efficacy of occlusal adjustment as a method to relieve TMD pain has been explored, with studies suggesting that it is an effective tool in dealing with TMD.^{29,30}

Conversely, evidence from meta-analyses, systematic reviews and critical reviews conclude that TMD pain is not

Table 3: Beyron’s concept of occlusion

Beyron’s concept

Simultaneous, bilateral contact on closure, where even distribution of these contacts results in stability between the mandible and maxilla

Freedom of movement from the retruded contact position (RCP), where maximum intercuspation is directly in front by 1mm or less. This is also known as ‘long centric’ or ‘freedom in centric’. Even though RCP is the only reproducible position and is used to build to occlusion clinically, functional contact is often made anterior to it, therefore there must be freedom in this position

On closure, the forces on posterior teeth should be axial

Smooth multifunctional movement where there is group function on the working side during lateral excursions with no contact on the balancing side, and anterior contacts only on protrusion

Acceptable interocclusal distance – although this distance is not explicitly specified

relieved by occlusal adjustment, although occlusal appliances such as splints have been effective.^{31,32} In light of this, the irreversible treatment of TMD through occlusal adjustment is no longer advocated. It should be noted that acute iatrogenic malocclusion remains a reasonable situation in which to carry out occlusal adjustment.³²

29% and 21% in mandibular second molars, mandibular first molars and maxillary first molars respectively.³⁴ Similar rates have been reported in other publications.³⁵ Given the high incidence of tooth fracture, it is important to identify whether occlusion plays an aetiological role, as it will allow the clinician to treatment plan appropriately.

Despite claims from numerous authors that occlusal factors other than accidental or parafunctional masticatory forces are aetiological linked to tooth fracture, e.g. ‘eccentric contacts and interferences’ or ‘uncontrolled contact of opposing teeth’, many of these articles contain no empirical data and are without adequate study design.^{36,37}

On the other hand, a survey of 51 patients over 18 months in an observational cross-

sectional study found that teeth with excursive interference are indeed more likely to fracture.³⁸ An association between the steepness of cuspal inclines and tooth fracture has also been reported. The authors suggested a pathology whereby a cuspal incline that is not compatible with lateral excursive movements, i.e. occlusal interference, can result in fracture.³⁹

‘The extent to which occlusion is related to temporomandibular disorder (TMD), if at all, is contested in the literature. Much of the research over the past 30 years supports a weak or non-existent association’

OCCLUSION AND TOOTH FRACTURE

There are many classifications of tooth fracture, which include, but are not limited to, incomplete and complete tooth fracture, greenstick fractures and cuspal fracture odontalgia.^{33,34} A six-year study evaluating 8,175 patients identified an incidence rate of 9.7% in all teeth, and incidences of 30%,

OCCUSION, THE PERIODONTIUM AND PERIODONTAL DISEASE

The direct effect that excessive occlusal forces have on the periodontium is well defined. 'Occlusal trauma' is the term given to describe injury to the periodontium caused by occlusal forces which exceed the reparative capacity of the attachment apparatus. When an individual has an occlusion that causes this type of injury, it is known as 'traumatic occlusion'.⁴⁰ This section will consider whether these forces influence the pathology of periodontal disease.

Evidence from human and monkey studies suggest that occlusal trauma does not cause gingivitis or gingival pockets,^{41,42} nor does it alter the quality or quantity of gingival crevicular fluid.^{43,44} This reflects the fact that while occlusal trauma damages the supporting periodontium, the rich blood supply of the marginal gingivae is spared,⁴⁵ whereas plaque accumulation causes gingival inflammation in gingivitis. Therefore, the research suggests that if occlusion does have a role in periodontal disease, it is likely to be in the transition from gingivitis to periodontitis, or in the progression of periodontitis.

Human cadaver autopsies were used in early studies to determine whether occlusion plays a causative role in periodontal disease. These studies identified a 'zone of co-destruction',⁴⁶ whereby a combination of trauma from occlusion and gingival inflammation results in infrabony pockets and angular defects once the inflammation has travelled from the gingivae to the periodontal ligament. The authors suggested that occlusal forces may propagate the spread of this inflammatory exudate.⁴⁶⁻⁴⁸ This is contested by other human autopsy studies with larger sample sizes, which found no evidence that occlusion is a co-factor.^{49,50}

These human cadaver studies laid the foundation for more recent clinical human studies, which support the theory that occlusion plays a role in the progression of periodontal disease. Rather than examining occlusal trauma, which is diagnosed histologically, these clinical studies established a relationship with occlusal discrepancy itself – with increased attachment loss, probing pocket depth and alveolar bone height in patients with periodontal disease.^{51,52}

In this context, it can be seen how occlusal discrepancies such as non-working

side contacts and lateral discrepancies between centric relation and central occlusion can become traumatic due to their impact on periodontal disease as well as their role in the aetiology of occlusal trauma itself. An obvious issue here is that without a definition of the ideal occlusion, 'occlusal discrepancy' becomes a vague definition and therefore difficult to investigate.

Clinically, occlusal adjustment can improve the prognosis of periodontal disease.^{53,54} Unfortunately, as it is an

'Clinically, occlusal adjustment can improve the prognosis of periodontal disease. Unfortunately, as it is an irreversible treatment that is difficult to perform without unintended consequences, its use is not generally advocated for the general dental practitioner and it should certainly not be a first line approach to treat periodontal disease.'

irreversible treatment that is difficult to perform without unintended consequences, its use is not generally advocated for the general dental practitioner and it should certainly not be a first line approach to treat periodontal disease.

CONCLUSION

Our understanding of occlusion is constantly evolving, and over time this has led to many iterations of the ideal occlusion. Issues with terminology and endpoints are common in occlusal research, for instance, differences in the definition of the term 'occlusal interference' have resulted in

studies often using different diagnostic criteria, resulting in discrepancies between research bodies.⁵⁵ It would be useful to employ a clear diagnostic criterion for components of occlusal research, such as occlusal interference. Further disagreement stems from the fact that clinicians are perpetuating rationale designed by authors of early occlusal research, much of which is based on expert opinion and 'clinical convenience' rather than from substantiation through systematic research designs.⁵⁶

While many aim to provide a therapeutic, 'ideal' occlusion, some authors argue that there is a huge scope for adaptation, giving rise to the idea of a 'physiologic occlusion'.^{57,58} It is argued that this is in fact the norm – a survey conducted in the U.S., found that 25.2% of 12-17 year olds had definite malocclusion with a further 34.8% displaying minor malocclusion.⁵⁹ Whether occlusion plays a role in the pathological processes of tooth fracture, periodontal disease or TMD remains to be seen, and additional research is needed to justify occlusal treatment carried out on these grounds. The clinical implications of the literature are largely equivocal; however, irreversible occlusal adjustment is not indicated. Until this happens, a sensible course

of action suggested by one critical review (especially for the undergraduate),³ would be to avoid re-organisational treatment in the functioning patient with a 'physiological occlusion'.

ACKNOWLEDGEMENTS

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REFERENCES

A full reference list is available from the author on request. The author can be contacted by email at DKTSang@uclan.ac.uk

Darren Tsang ■



ARE YOU READY FOR A MAXILLOFACIAL POST?

By Dr Shaadi Manouchehri*

The short answer is no.

The long answer is definitely no.

Before starting my rotation, maxillofacial surgery always struck me as a peculiar specialty where medicine and dentistry were combined, and there was somehow no conflict or confusion over whether we could refer to ourselves as doctors or not. But nothing, and I mean nothing, no courses or handbooks or pep talks could have prepared me for what I was about to go through.

We have all as practising dentists read the resuscitation guidelines on medical emergencies in dental practices and know about the signs and symptoms of anaphylaxis and its management. However, when you receive that first alarming call and you are told that your patient is in the resuscitation room (resus), all your knowledge and preparations suddenly vanish, leaving you at the mercy of the situation. Your number one priority becomes avoiding fainting and becoming a medical emergency yourself because you know they will be busy in resus and you do not want

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to be the junior doctor whose only involvement in the situation was to occupy the bed next to the patient with the cardiac arrest.

That is not what they meant when they taught us about sympathising with the patient as an undergraduate.

Thrown in at the deep end is an understatement. More like thrown out of a plane at an altitude of 20,000 feet without a parachute. But you do learn to fly, metaphorically speaking, mainly because there is no alternative.

New concepts

As Dental Core Trainees (DCTs), we are used to clinics and dental hospitals but rarely a District General Hospital environment. Everything seems much more fast-paced and intimidating. Being in Majors for the first time makes you feel like you are a pedestrian in the middle of a busy motorway or a civilian in the middle of a warzone.

You may find yourself feeling small and vulnerable. That is, until you realise that A&E doctors cannot interpret an OPG, which is when you begin to gain confidence in your own abilities.

Your BDS is not to be underestimated. Your manual dexterity and fine surgical skills can come in very handy in attending to facial injuries and managing traumatised dentition.

Another concept to familiarise yourself with is that every day is potentially a work day.

Bank holidays, nights and weekends no longer apply to you. A fact that your non-medical friends and family will struggle to come to terms with, regardless of how many times you remind them.

Being on call

For me, being on-call was the most challenging aspect of the job. Our medically qualified colleagues are familiar with the concept of being available for long periods in case they are needed, but as dentally qualified DCTs, this phenomenon is totally new to us.

Being on-call normally consists of 12 hours of continuous palpitations, hoping that your bleep does not go off and your heart skipping multiple beats when it does.

Any specialty in the hospital could consult us for maxillofacial input or alternatively clinicians outside the hospital could call us for advice. Initially most cases seem new and challenging, however as you become accustomed to the various maxillofacial cases, you begin to understand which cases would benefit from maxillofacial input and which ones would best be suited to other specialties. Ear, Nose and Throat (ENT) for example is a specialty that we work closely with. Occasionally there may be overlap of cases that we treat and confusion as to which specialty should accept the patient. This may sometimes depend on your workload as on a quiet day you may accept a laceration on the

tragus of the ear, whereas on a busy day you may direct the case towards ENT. Different hospitals and trusts may have different protocols regarding this.

Handover is also something that is new. You receive a handover from the person on-call before you and you handover to the person on-call after you. A handover is essentially a concise update of what has been happening on that shift and an opportunity to pass over any outstanding jobs. It is very important to have a smooth and concise handover ensuring all outstanding jobs are highlighted and none are 'lost in transit'. Some shifts may be more chaotic than others and it is our responsibility to ensure that the handover does not suffer as a consequence. Always make sure you are on time for handovers and bear in mind that the person covering the night shift has not slept! Try and be compassionate.

The cases that are referred to us can be very diverse. It could be an extensive laceration, a dental abscess, a sebaceous cyst or fractured facial bones. You need to ascertain whether the patient needs to be admitted or if it is safe for them to be discharged following treatment. Always discuss with your senior if you are unsure. A submandibular swelling for example may require admission if there is a risk of airway compromise, however in less severe cases the patient may be able to go home with oral antibiotics.

Top tips

Take care of yourself on long shifts. It is very easy to forget your basic human needs when looking out for those of your patients. Remember to stop and assess your own vital signs occasionally. It is very likely that you will become overwhelmed by all the outstanding jobs and the patients waiting for you in A&E, but remember to stop and rest, and maybe even eat something once in a while. The moment you start to ignore your own situation and exert yourself, you start making mistakes which could drastically affect your patient care.

Make sure you have the full picture before accepting a patient. It is very tempting to run to A&E to assess the patient as soon as you receive a referral. As you become more experienced, you will become more conscientious when accepting referrals. Make sure you take a full history and that the patient is stable before you accept them. If there is a history of assault or trauma, make sure the patient is cleared of a head injury first. The last thing you want is for the patient to become acutely unwell due to an

intracranial haemorrhage that was missed as you are attending to their superficial facial injuries. In the vast majority of cases, the maxillofacial input can be delayed until the patient is declared haemodynamically stable.

Ensure you ask for all relevant tests to be done before assessing the patient: these can include observations, bloods and radiographs.

Be kind and polite to the nurses. They can make things very easy or very difficult for you depending on how you treat them. On a busy shift, it really makes a difference if the nurses help you by taking blood, administer your treatments in a timely manner and help you with managing your patients.

‘A handover is essentially a concise update of what has been happening on that shift and an opportunity to pass over any outstanding jobs. It is very important to have a smooth and concise handover ensuring all outstanding jobs are highlighted and none are ‘lost in transit’

Resist the urge to become overwhelmed. Easier said than done, I know. Take each case step by step and tackle it systematically. This will make your life a lot easier.

Do not compare yourself to others and do not become disheartened at your own perceived inexperience. Everybody in your team will have a different level of maxillofacial experience. Use it to your advantage and learn from those who are more experienced.

Remember that you are in a training post. Try and be pro-active and direct the training if you have to. Ask to be shown how to carry out procedures and volunteer to do these. Operating theatres are great places to learn and practise. Ask your seniors if it would be ok for you to carry out that procedure, impress them, gain their trust and hopefully next time they will trust you to do it.

Identify your own reason(s) for embarking on your maxillofacial journey. It may be that

the maxillofacial pathway beyond this year is not for you, in which case make sure you make the most of this year as you may not get a chance like this again.

Challenges

As you may have already gathered, this year has not been without its challenges. There have been many times when I have stopped to re-assess my life choices. Times where I have left the house before sunrise as my family sleeps peacefully and times when I come home after they are all sound asleep. Times when I have been the first to arrive in the multi-story car-park and amongst the last to leave as I hear rumours of ‘no parking spaces left’ during the

day. Times when I have fainted in theatre (luckily not over the patient... yet) and times when I have spent endless hours retracting and suctioning only to be told I am doing it wrong. Times when I have realised there is a right and wrong way of suctioning. And that time when my patient in A&E was more concerned about my wellbeing than his fractured mandible saying I look much more unwell than he does.

Despite all of this, there have also been times where I truly felt I had made a difference to a patient's quality of life. Patients

presenting to A&E are amongst those who are most distressed and commonly attend with their loved ones who are also very concerned. It can be a very humbling experience to address their concerns and provide necessary treatment to alleviate their symptoms.

Final thoughts

As with many things, there are positive aspects alongside the negatives. Despite all the challenges, this has been an incredibly rewarding year. You will grow in strength, both mentally and physically. You will learn a great deal about team work and hospital dynamics. And the skills you acquire are transferrable to almost any other post you would undertake in the future.

No matter where life takes you, at least you will be able to say ‘I survived a year in Maxfax’. A phrase that will gain you my respect any day.

Shaadi Manouchehri ■

THE JUSTIFICATION AND OPTIMISATION OF THE USE OF CONE BEAM CT IMAGING IN THE FIELD OF ORTHODONTICS



By Victoria Soraya Sampson,
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This piece was awarded the 2017 Dental Undergraduate Prize by the British Society of Dental and Maxillofacial Radiology

INTRODUCTION

Dental cone beam computer tomography (CBCT) is a medical imaging technique in which divergent X-rays are directed to form multiple sequential projection images, creating a 3D image of a given area of the body.¹ Originally developed for angiography in 1982, CBCTs were then introduced to the realms of dentistry in 1998 to aid diagnosis, mainly in Orthodontics.² Although there is a myriad of advantages of using CBCT for imaging, due to its high radiation exposure, much controversy surrounds its use.

Whilst it is understood that CBCTs produce more precise, clear, 3D images compared to conventional 2D radiography, one must question whether such a high-quality image is worth the increased radiation exposure. In 2010, the publication of an article entitled 'Radiation Worries of Children in Dentists' Chairs' in the New York Times stirred controversy regarding the use of CBCTs on children, reporting that dentists were blindly requesting them for ease and 'more profit per unit chair time'. The article underpinned the need for definitive guidance on the safe use of CBCT in practice. Today, there are measures for protection and safe use of CBCT both by Public Health England^{3,4}, and the American Association of Orthodontics.⁵ Both guidelines

strongly emphasise the need for any CBCT undertaken to be 'justified' by the IRMER practitioner, and 'provide extra information to aid the patient's management or prognosis, which cannot be gained from lower dose conventional imaging techniques.'³ This essay will explore the surrounding controversy and discuss when a CBCT request is justified in the realms of orthodontics.

THE ADVANTAGES

One major advantage of a CBCT over any other conventional radiographic image is its ability to produce highly contrasting images, thus allowing accurate analysis of osseous structures and the craniofacial area. One can amass a great deal of information in order to aid diagnosis and treatment. Some such instances would be:

- Precise localisation of impacted or supernumerary teeth
- Determination of skeletal discrepancies and asymmetries
- Identification of skeletal causes of malocclusion such as TMJ abnormalities or maxillary transverse deficiencies
- Determination of root resorption; precise placement of temporary anchorage devices and
- Accurate measurement of tooth inclination.²

As CBCT imaging for orthodontics is relatively new, its applications will unquestionably increase or modify with time.

As previously mentioned, the precise localisation of supernumerary or impacted teeth is one of CBCT's most common indications. Traditionally, orthodontists had to use projectional radiography by exposing a patient to two different 2D radiographs at different angulations. This is called the Buccal Object Rule.⁶ Although this has served orthodontists well, it does not provide precise localisation of the supernumerary/impacted tooth, and can be further complicated by superimposition of structures. The combined effective dose of a dental panoramic and a bitewing/ periapical or an upper standard occlusal is at its most, 0.06mSv.⁷ Depending on the field of view, this could be more or less exposure than a dento-alveolar CBCT (0.01-0.67mSv).⁸ However, a CBCT has the ability to assess root resorption of adjacent teeth from all angles, identify any pathology and most importantly, define the optimal location for extrusion or removal of the impacted/ supernumerary tooth. Furthermore, a CBCT would be able to detect any abnormal anatomy of the tooth in question which may affect the treatment and prognosis, such as a dilacerated root. The advantages of CBCT in this particular situation are confirmed

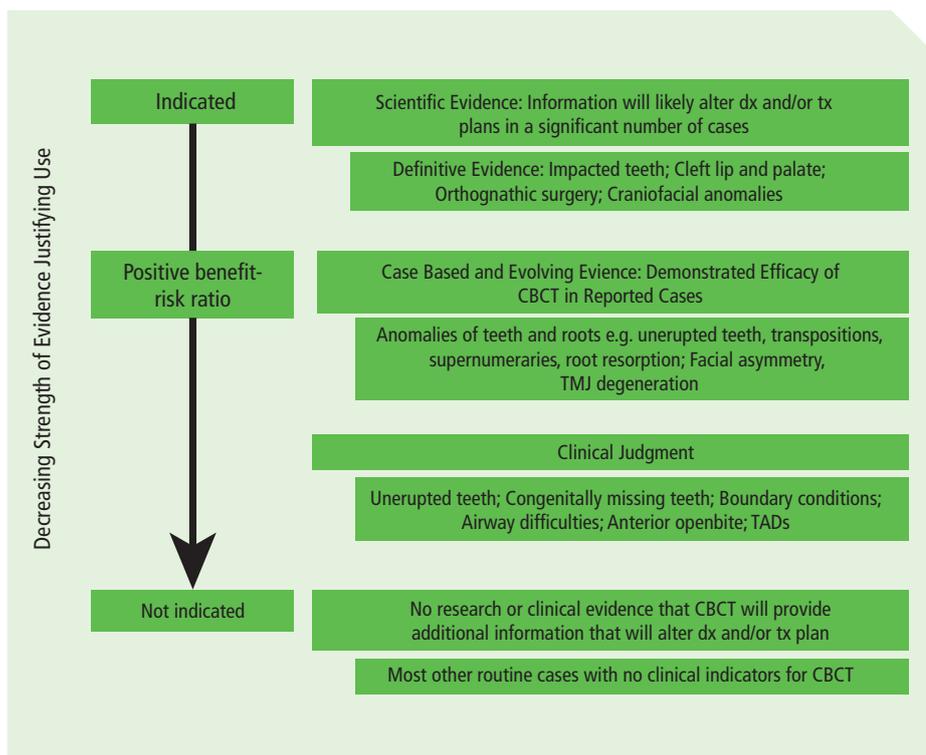


Figure 1: Clinical scenarios where CBCT may be indicated.²

by the finding that >25% of treatment plans originally created based on 2D images were later modified when orthodontists had access to a CBCT of the same tooth.⁹ Interestingly, more pathology was also visible and correctly located with CBCTs compared to with conventional radiographs.

Although a patient may be subject to a higher dose of radiation during a CBCT, if as a result they receive more efficient, tailored treatment with a better prognosis, the benefits certainly outweigh the exposure risk. Currently the British Orthodontic Society recommends that two conventional radiographs should be first taken. If these are insufficient to make a treatment plan, then consider a localised CBCT.⁸

Secondly, CBCTs allow 3D visualisation of facial and cranial morphology in adequate resolution. This aids orthodontists in orthodontic diagnosis, treatment planning and growth monitoring. Craniofacial and dental morphometrics is significant for comparing abnormal to normal anatomy of structures using quantitative analysis. This has allowed practitioners to overcome the traditional limitations of 2D imaging, such as magnification, geometric distortion and super imposed structures. Currently there are three methods for dental morphometrics using CBCT imaging, however the majority of

these methods derive from 2D measurement methods, thus resulting in loss of 3D information that the CBCT so distinctively provides. Although there is currently a delay in 3D dedicated development of quantitative analysis methods currently, researchers have made considerable improvements in CBCT assessment.¹⁰ This shows that while CBCT imaging provides orthodontists with 3D analysis and more in-depth knowledge, development of the skills of assessment and analysis requires improvement to take full advantage of CBCT imaging.

Thirdly, CBCT has been widely used to evaluate the residual alveolar bone thickness in the planning of dental implants. This can be adapted in orthodontics to temporary anchorage devices (TAD), the success of which depends on the amount and quality of bone available in the desired area of placement. A CBCT can provide a practitioner with information regarding the surrounding structures, root proximity, morphology of maxillary sinuses, and of course, bone thickness.¹¹ It can also reduce post-surgical complications, such as violating anatomical boundaries and potentially causing nerve damage, or failure of the TAD.

WIDER USAGE AND BENEFITS

CBCTs have also shown their use in orofacial

clefts (OFC). They provide 3D volumetric, surface and sectional information to aid the assessment of cleft palate cases both preoperatively and therapeutically. As part of the treatment for OFC, alveolar bone grafting is used to add bone for correction of defects in order to restore the form of the maxillary arch at approximately nine years of age (the maxillary arch is involved in 75% of patients with OFC).¹² A successful bone graft will allow maxillary stability, support for teeth and close oronasal fistulae. By the time the canines erupt into the arches at around 11 years of age, the bone graft should have healed adequately, thus allowing orthodontists to align the teeth.² Although conventional 2D radiographs have been used to assess shape and measurement of the size of the bone defect, they only provide linear and subjective measurements. Furthermore, numerous conventional radiographs would have to be taken to evaluate the defect as well as the quality and location of teeth near the cleft site. The incorporation of a CBCT allows 3D visualisation and accurate assessment of the volume of grafting material and the spatial placement required for a successful bone graft. A successful bone graft will then pave the way for successful orthodontic treatment and thence, a predictable treatment of OFC.

Previous research confirmed that the use of a CBCT as opposed to a panoramic radiograph improved the treatment outcome as it enabled the visualisation of the buccal-palatal width of bone, a measurement a panoramic cannot provide.¹³ A more recent study compared the estimated volume of alveolar cleft using CBCT scans preoperatively, with the actual amount of bone graft needed by the syringe compression method intraoperatively (the gold standard for graft assessment). There was no significant difference between the two tests, confirming that CBCT is an accurate diagnostic tool to use preoperatively for alveolar bone grafts. CBCTs can therefore help estimate the amount of bone needed to harvest and better estimate the prognosis of the procedure.¹⁴

A common cause of malocclusion is maxillary transverse deficiency, often resulting in posterior crossbites, crowding and an increased overjet. Often, orthodontists will attempt to correct this deficiency through rapid maxillary expansion (RME) in which the mid-palatal suture is widened resulting in a widened arch and an improved posterior occlusion. CBCT has enabled research into the responses of

teeth and bone to RME, and the effect of age on the extent of expansion that can be achieved. Age plays a huge factor in the success of RME, with most failures occurring in non-growing adults because of the lack of fusion of the sutures. The main question that CBCT could answer, is when RME might be indicated in a patient, versus when surgically assisted rapid maxillary expansion (SARME) might be indicated.

Although most literature agrees that RME is clinically indicated in growing patients and SARME in non-growing patients, the exact age has been disputed. Some recommend 14 years of age,¹⁵ whilst others recommend 25 years.¹⁶ Studies have argued that the lack of consensus is due to histological and micro-CT studies demonstrating that age and gender are not reliable parameters for the fusion of the midpalatal suture. Instead, individual assessment of midpalatal suture maturation on CBCT would be the most efficient diagnostic tool, thus allowing an informed decision to be made on whether RME or SARME is indicated. This informed decision would reduce the risk of failure and therefore the chance of pain, mucosal ulceration, accentuated dental tipping, and palatal necrosis.

CBCT AND TMJ

Another clinical application that CBCT could improve is the examination of temporomandibular joint (TMJ) morphology and pathology. Prior to orthodontic treatment, TMJ disorders should be addressed as they can contribute to skeletal malocclusions and displacements. Not addressing TMJ disorder will result in not treating displacements.

Due to a CBCT's 3D nature, morphological analysis of articular fossa and condyles is possible without any superimposition of other structures. Conventional radiographs can be used for examination, although the superimposition of structures makes it difficult to diagnose erosion of the condyle, ankyloses, or hyperplasia/hypoplasia.¹⁷ By using CBCTs to optimise the visualisation of the TMJ, the extent of pathology and the precise location of it can be distinguished. Whilst it is certain that CBCTs do provide better imaging for visualisation of TMJD, in terms of orthodontics, there is a relatively low association of occlusal factors characterising TMJ.¹⁸ It is useful to record any TMJ abnormalities during assessment of patient, however a CBCT is not indicated to assess the TMJ prior to orthodontic treatment as it will not affect the treatment outcome.

Table 1: The relative attributable lifetime risk based upon a relative risk of 1 at age 30

Age Group (years)	Multiplication factor for risk
<10	x3
10-20	x2
20-30	x 1.5
30-50	x 0.5
50-80	x 0.3
80+	Negligible Risk

DRAWBACKS AND DISADVANTAGES

The main drawback of CBCT is the higher radiation dose patients are exposed to compared to conventional radiographs. The effective radiation dose expressed in microSieverts (mSv) for a CBCT of the mandible and maxilla is between 0.01-0.67 mSv, whereas the effective radiation for a DPT is 0.0027-0.038 mSv.⁸

tissue weight. This essentially represents the stochastic risk to health that a radiograph will expose the patient to. A CBCT can multiply the risk of damage to DNA molecules due to ionisation by approximately five-fold. Although the tissue weighting factor of the maxilla and mandible are relatively low (0.01 wT according to the ICRP 103),⁴ the tissue's sensitivity to radiation is amplified in children, as their tissues have 'higher radio-sensitivity,

greater rate of mitosis, and a longer lifetime span for carcinogenesis development'.¹⁹

As four in five (79%) orthodontic treatments are carried out on patients under the age of 17,⁵ this stress the importance of patient selection when justifying a CBCT request. The Image Gently Alliance, a coalition of health care organisations was set up in 2007 to raise awareness of the need to adjust radiation dose when imaging children precisely due to their amplified tissue sensitivity. This emphasises the current limited awareness in the community, and the need to assess each patient individually and modify exposure depending on age of the patient.²⁰

‘CBCT has enabled research into the responses of teeth and bone to RME, and the effect of age on the extent of expansion that can be achieved. Age plays a huge factor in the success of RME, with most failures occurring in non-growing adults because of the lack of fusion of the sutures.’

This clearly highlights the huge disadvantage of a CBCT, with a radiation dose nearly 6 times the dose of a conventional radiograph. The effective radiation dose is the sum of the dose received by irradiated tissues in the field of vision, considering the

WEIGHING UP THE OPTIONS

Like any imaging device, there is the possibility to reduce radiographic exposure. The ICRP system of radiation clearly stipulates three principles.

Firstly, the principle of justification, that a decision that puts a patient at an increased radiation exposure should have more benefit than harm. Secondly, the principle of optimisation, that if a patient is to be exposed to radiation, the number of people, and the magnitude of their individual exposure is kept at its lowest. Lastly, the principle of dose limitation. This requires that the radiographic exposure is kept to its minimum through any means.

In the case of a CBCT, there are numerous factors that can be used to reduce the effective dose in CBCT/ optimise the CBCT. For example, to use the smallest field of view (FOV) dimensions which meet the diagnostic needs, to use the lowest combination tube operating potential (kV) and tube current exposure time product (mAs), to collimate, and to shield the thyroid using a suitable C-ray absorbing material.²¹ Under IRMER, both practitioners and operators must have training to ensure they are up to date on CBCT radiation protection practice. They have a responsibility to ensure they use the equipment in such a way to keep the size of exposure as low as possible – for example, by making adjustments to take into account the FOV, and size and age of the patient, or by completing audits on patient dose measurements every three years with their medical physics expert.³

While it is pertinent to reduce the exposure settings as much as possible, it is important to find middle ground between reducing the exposure and still obtaining an adequate image quality. The extent of exposure reduction may vary depending on the diagnostic use of the image. If the image has been requested to detect root resorption or un-displaced root fractures, a higher image resolution will be required as opposed to its use for tooth localisation.⁸

CONCLUSION

Although CBCT imaging provides a whole new dimension to imaging and can therefore provide invaluable information, in most cases the new information provided would not benefit the patient enough to be justified, such as for TMJD examination or TAD placement. The only two situations where studies have shown improved confidence and consistency in treatment planning decisions are for unerupted teeth, and OFCs. Even in the case of an unerupted tooth, the European guidelines advise the use of only a small FOV CBCT, as there is limited efficacy of morphometric analysis using large FOV CBCTs.

As for OFCs, there is significant evidence

illustrating that a CBCT is superior to any 2D radiographs, as it can allow precise determination of the volume of the alveolar defect and the amount of donor tissue needed. This abides with the HPA CRCE 010 guidelines, as it provides additional information that will improve treatment outcome. In terms of RME, the use of CBCT would only be useful in certain older patients when there is uncertainty of success. However, it should not be routine practice to use a CBCT to predict the success of the fusion of the midpalatal suture. Nevertheless, the use of CBCTs in the dental world is still relatively new, with no recognised quantitative analysis methods established. With time, more information will undoubtedly be able to be obtained from a CBCT, perhaps making them a more useful diagnostic tool in the future and worth the increased radiographic exposure.

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Question 1

Theme: Postoperative considerations

Options:

- A. Canine space infection
- B. Cavernous sinus thrombophlebitis
- C. Hyperparathyroidism
- D. Infra-temporal fossa
- E. Pain and swelling
- F. Paraesthesia of the distribution of the inferior alveolar nerve
- G. Pterygomandibular space
- H. Reactionary haemorrhage
- I. Secondary haemorrhage
- J. Trismus

For each of the following statements, choose the most appropriate option from the list above. Each option may be used once, more than once, or not at all.

Scenario 1

A patient presents 1 day post-operatively and complains of bleeding.

Scenario 2

This condition commonly occurs following an inferior alveolar nerve block injection, due to involvement of the medial pterygoid muscle.

Scenario 3

This is caused by the release of prostaglandins as a result of tissue damage.

Scenario 4

This condition is characterised by marked oedema and congestion of the eyelids, leading to exophthalmos.

Scenario 5

This space is involved when there is an acute infection of an upper third molar.

ANSWER

Scenario 1

A patient presents 1 day post-operatively and complains of bleeding.

H. Reactionary haemorrhage. This begins up to 48 hours postoperatively, and can occur in response to overexertion or dislodgement of the clot.

Scenario 2

This condition commonly occurs following an inferior alveolar nerve block injection, due to involvement of the medial pterygoid muscle.

J. Trismus. A small haematoma may form in the area that is injected, causing mild trismus.

Scenario 3

This is caused by the release of prostaglandins as a result of tissue damage.

E. Pain and swelling. Due to the haemorrhage and trauma, pain receptors are stimulated leading to pain.

Scenario 4

This condition is characterised by marked oedema and congestion of the eyelids, leading to exophthalmos.

B. Cavernous sinus thrombophlebitis. This is a rare complication in which infection spread can occur into the cavernous sinus.

Scenario 5

This space is involved when there is an acute infection of an upper third molar.

D. Infra-temporal fossa. This is the anatomical space that is located posterior to the maxilla. Rarely, infection may spread to the infra-temporal fossa, and this can result in trismus.

Question 3

Look at this radiograph.

- A. What complication has occurred?
- B. What symptoms might the patient be experiencing?
- C. What are the other causes of these symptoms?

ANSWER

- A.** There is radio-opaque matter in the inferior dental canal beneath the lower second molar. This tooth also has some radio-opaque material in the distal root canal. A root canal filling was being carried out and material has extruded through the apex of the tooth and has ended up in the inferior dental canal.
- B.** If material is in the inferior dental canal it is likely that the patient will complain of altered sensation in the distribution of the inferior dental nerve, ie the lower lip. The altered sensation may be numbness (anaesthesia) or tingling (paraesthesia) and in some cases pain.



C. Other causes of altered sensation:

- Iatrogenic – trauma following surgery, eg surgical removal of wisdom teeth, lower premolars
- Infection – osteomyelitis
- Degenerative – multiple sclerosis
- Metabolic – tetany, diabetic neuropathy
- Neoplastic – space-occupying lesion.

REVISION

Answers
for
revision
questions
from PasTest



Questions are
on page 33

Question 2

Which one of the following conditions is associated with premature loss of teeth?

- A. Down syndrome
- B. Hereditary gingival fibromatosis
- C. Hypophosphatasia
- D. Hypothyroidism
- E. Williams syndrome

ANSWER

C Hypophosphatasia is an inborn error of metabolism in which there is a deficiency of the enzyme alkaline phosphatase, which is involved in hard tissue formation. This condition results in bone and cartilage defects. The other conditions are associated with delayed eruption of teeth or failure of eruption of teeth.

Question 4

Please look at this lesion and indicate which type of biopsy is indicated and what you think the lesions are.



ANSWER

Excisional biopsy – This is a fibroepithelial polyp.

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