BDJ Team
JULY 2017

TREATING CARIES in children

BDA
British Dental Association

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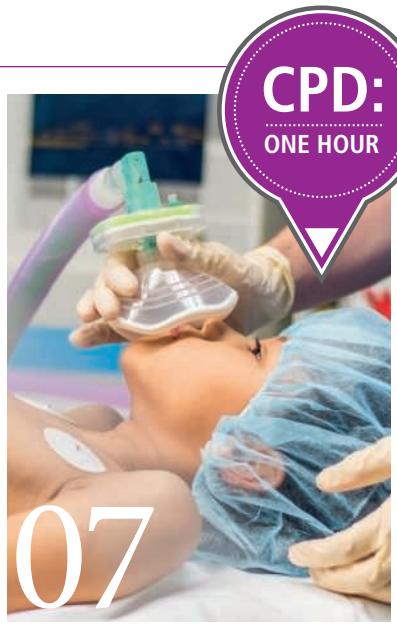
July 2017

Highlights

Regulars

In this issue



Ed's letter

Headlines reporting the amount of caries in UK children's teeth have become, like the disease itself it seems, rampant in recent years. Most recently (at the time of writing), it is reported that health professionals want cigarette-style health warnings on sweet wrappers, in a bid to prevent tooth decay and obesity. Meanwhile the British Society of Paediatric Dentistry has launched a campaign encouraging all dentists to try and see four additional children under two in the coming year - to bring down the number of general anaesthetics for dental extractions.

The authors of our CPD article this month from the Unit of Dental Public Health at the School of Clinical Dentistry in Sheffield focus on this area. They say: 'In 2015-16, in England alone, approximately 43,700 children aged 16 years and under were admitted to hospital with a primary diagnosis of dental caries, and most of these admissions were for the extraction of multiple teeth.'

The article considers dental general anaesthesia in more detail, with a particular focus on the impact of caries-related treatment under GA on the daily life of children and their families.

This month we also place the spotlight on the laboratory side of making a dental crown, from digital expert Ashley Byrne. Dentist and Corrective Exercise Specialist James Tang looks at how dental professionals can protect their spine; we meet two further multi-talented dental care professionals; and in the research section authors evaluate a periodontology training scheme pilot involving both dentists and DCPs.

We take a break in August, so have a fantastic summer and keep an eye on the *BDJ Team* Facebook page for regular updates.

Kate

Kate Quinlan
Editor
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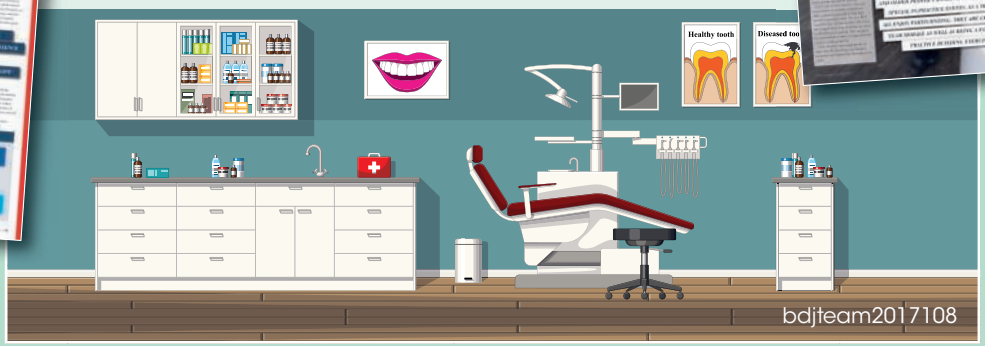
Treating caries under GA, p7 (CPD)

Behind the scenes with Ashley, p23

Hello old chap, how's your back? p26

A pilot periodontology training scheme, p13

A lady with many hats, p6



THE TEAM

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DENTAL AMBASSADORS RECORD RAP TO PROMOTE ORAL HEALTH

A team of adults with learning disabilities has recorded a rap to promote important messages about oral health.

Six people from CHAMPs – Cornwall Health and Making Partnerships – developed the 'Brush DJ' rap to the tune of the Robbie Williams song 'Rock DJ' and recorded it at the studios of Plymouth Music Zone.

The team, part of health promotion for Cornwall and the Isles of Scilly, came up with the idea while completing a dental ambassadors training course developed by the Community Engagement Team at Peninsula Dental Social Enterprise (PDSE).

They spent several weeks learning from PDSE experts about oral hygiene, tooth brushing, the importance of fluoride, healthy eating, reducing sugar intake and accessing dental care.

The dental ambassadors came up with the rap idea while working on presentations with activities for audiences to help them understand key oral health messages.

As part of their ongoing work across Cornwall, the CHAMPs take oral health knowledge to special schools, health centres and adults with learning disabilities at colleges and workplaces.

The dental ambassador scheme, which is supported by Henry Schein, offers people with learning disabilities the understanding, awareness and confidence to encourage their peers to adopt better oral hygiene and make regular visits to the dentist.

CHAMPs helps to make sure people with a learning disability and/or autistic spectrum condition get equal access to health services. Its main activities are checking health services, raising awareness of learning disabilities and promoting healthy lifestyles.

DCPs must renew their registration by 31 July

The window for dental care professionals (DCPs) to renew their registration has opened and will close at midnight on 31 July 2017.

The easiest way to do this is to use eGDC, where registrants can make their Annual Retention Fee (ARF) payment, declare indemnity and log continuing professional development (CPD) hours. You can also update your personal details.

Alternatively, renewal can be done using the automated telephone line (0800 197 4610) or by post using the business return envelope included in the notification letters, which were posted out in June.

To renew registration, registrants must pay the ARF, declare indemnity and update CPD hours, if it's the end of the cycle. Late payment or not declaring indemnity could result in being removed from the register and ceasing working as a DCP.

The ARF for DCPs for the period 1 August 2017 to 31 July 2018 is £116.

SCHEME FOSTERS CLOSER LINKS BETWEEN INDUSTRY AND DENTAL NURSES

The British Association of Dental Nurses (BADN) is re-launching its Affiliates Scheme, now re-named the Dental Industry Affiliate Scheme.

The Scheme is designed to foster closer links between dental industry companies and dental nurses.

BADN President Jane Dalgarno said: 'Many dental industry companies are still unaware of the vital role of the dental nurse within the dental team. Our Scheme is designed to enlighten those companies on the professionalism and varied responsibilities of the registered dental nurse, and to provide a conduit between dental nurses and dental industry companies'.

Dental industry companies participating in the Scheme will have access to the BADN's quarterly digital publication, *The British Dental Nurses' Journal*, special affiliate advertising rates in the Journal, a company profile on BADN's website www.badn.org.uk with links to their own site, and opportunities to promote their products and special offers through BADN's communication channels. Affiliate companies will also be able to display a Dental Industry Affiliate version of the BADN logo to indicate that they recognise dental nurses as professionals and as valued members of the dental team.

More information on the Scheme, and application forms, are available from the BADN Chief Executive at pam@badn.org.uk.

BSDHT CALLS FOR POSTER SUBMISSIONS

BSDHT
BRITISH SOCIETY OF DENTAL HYGIENE & THERAPY
promoting health, preventing disease, providing skills

As part of this year's Oral Health Conference and Exhibition, the British Society of Dental Hygiene and Therapy (BSDHT) is calling for submissions to its Annual Poster Competition.

Open to practising dental hygienists and dental therapists, and students, the Poster Competition provides a fantastic opportunity to showcase your work and share your passion with other like-minded professionals.

Posters might involve literary reviews, audits, evaluations or clinical cases you've collaborated on with colleagues, whether in NHS or private practice, community or hospital settings – the choice is yours!

In addition to celebrating your hard work and earning the recognition of your peers, your application will also have the chance of winning an amazing prize – the winner will receive £500 of vouchers plus glass ware and the runner up will £250 of vouchers. A student prize of £250 of vouchers will also be up for grabs.

All posters must be submitted by 5pm on 15 September 2017, in time to be evaluated by the expert panel of judges. The Oral Health Conference and Exhibition, which has the theme 'More to the mouth', will be held on 3-4 November 2017 at Harrogate Convention Centre.

For more information about the conference and the Annual Poster Competition, visit www.bsdht.org.uk/oral-health-conference-and-exhibition

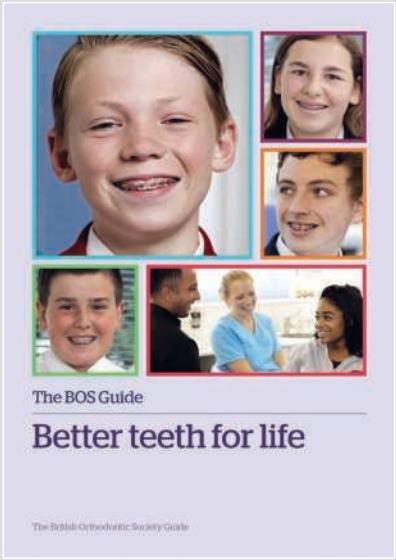
NEW BOS RESOURCE HIGHLIGHTS THE POSITIVE IMPACT OF ORTHODONTIC TREATMENT

The British Orthodontic Society (BOS) has launched a new online resource: 'The BOS Guide: Better teeth for life'. It highlights the positive impact that orthodontic treatment can have on both oral health and emotional wellbeing and provides practical tips on a patient's role in achieving excellent results.

This new guide is supported by recent research undertaken at the University of Sheffield School of Clinical Dentistry which found orthodontic treatment before the age of 18 improves oral health-related quality of life (OHRQoL), with most reported improvement around emotional and social well-being.[1]

The guide links in with World Oral Health Day which has been created by the World Federation of Orthodontists and both initiatives coincide with the UK's National Smile Month run annually by the Oral Health Foundation.

Alison Murray, President of the British Orthodontic Society, said: 'This new BOS Guide demonstrates how life-enhancing orthodontic treatment can be. We know that patients in braces are encouraged to keep their mouths really clean and there is evidence that once treatment has been completed, patients continue to look after their teeth. Orthodontics should be the start of a lifetime of excellent dental health'.



The guide can be accessed via: http://www.bos.org.uk/Public-Patients/News-Publications/Public-Patients-News.

1. Javidi H, Vettore M, Benson P E. Does orthodontic treatment before the age of 18 years improve oral health-related quality of life? A systematic review and meta-analysis. *Am J Orthod Dentofacial Orthop* 2017; **151:** 644-655.

New standards aim to improve oral health in care homes

The British Society of Dental Hygiene and Therapy (BSDHT) has welcomed new quality standards released by the National Institute for Health and Care Excellence (NICE) which focus on improving the oral health care of adults that move into care homes.[1]

The new guidelines outline the importance of assessing each new resident's oral health care needs on admission and furthermore, recording their oral health care needs in their personal plan to ensure they are continually reviewed.

The BSDHT fully supports the new NICE guidance as the organisation believes they are a vital part of providing effective oral health for adults in care homes.

President of the BSDHT, Helen Minnery, commented on the importance of the NICE standards: 'These guidelines are a massive step in the right direction to ensure that people in care homes receive the oral health care they need and deserve. We feel that there has previously been a lack of effective support and guidance in this area which has led to many care home residents not getting the support they need.

'With a lack of guidance and support for the oral health of many care home residents the likelihood of developing serious oral health problems is dangerously high. Without basic care oral health can quickly decline; this often leads to problems being able to eat and drink properly and therefore a person's nutrition can suffer.

'We will be advising our members to form strong links with local care homes around the UK to ensure we can effectively deliver this much-needed care'.

1. National Institute for Health and Care Excellence. Oral health in care homes (2107) [QS151]. Available at https://www.nice.org.uk/guidance/qs151.

‘I enjoy the variety of my work’

Karen Suarez, 47, is a dental practice manager, extended duties nurse OHE, an assessor for the BDA, an examiner for NEBDN, a Specialist Advisor for the CQC, and an Accredited School Governor. She is married with two daughters and lives in London.

I get up at 6:30 am and drive or sometimes take the train to work, which is 16 miles away. For breakfast I have coffee and occasionally porridge in the cafe near work with a breakfast club.

Monday to Thursday I work 9 to 5 as a practice manager; Fridays are for my other jobs - assessing and inspecting - and some evenings I do school governing.

I enjoy the variety of my work and the ability to share good practice in my managerial role. I also enjoy the interaction with my colleagues and the public. Time management can be challenging: fitting in all my different roles as well as quality time with my family.

In my dental team there are three dentists, two dental nurses, two trainee nurses, one administrator and me. We are situated in Islington, a very cosmopolitan area, and have a real mixture of social and ethnic groups among our patients.

Every year we have practice outreach programmes at nurseries, schools and older people’s homes and we also hold special in-practice events. We are a BDA Good Practice scheme member which has encouraged these sorts of events; as a team we all enjoy participating. They are great for team morale as well as being a fantastic practice building exercise.

I have had the same employer for 26 years now. He has always encouraged, mentored and inspired me throughout my career.

I usually get home at 6:30 pm. In my free time I enjoy salsa and Judo (not at the same time!) and of course spending time with my family. I am bracing myself this year as my eldest daughter will be starting her GCSEs!

I am the family nag when it comes to oral health, although I do not always practise what I preach ... I aim to be more successful at dieting this year!

I am usually in bed by 11ish.

‘EVERY YEAR WE HAVE PRACTICE OUTREACH PROGRAMMES AT NURSERIES, SCHOOLS AND OLDER PEOPLE’S HOMES AND WE ALSO HOLD SPECIAL IN-PRACTICE EVENTS. AS A TEAM WE ALL ENJOY PARTICIPATING. THEY ARE GREAT FOR TEAM MORALE AS WELL AS BEING A FANTASTIC PRACTICE BUILDING EXERCISE.’

bdjteam2017115

CPD: ONE HOUR

Treatment of dental caries under general anaesthetic in children

CPD questions

*This article has four CPD questions attached to it which will earn you one hour of verifiable CPD. To access the **free** BDA CPD hub, go to **http://bit.ly/2e3G0sv***

By R. Knapp,[1] Z. Marshman[2] and H. Rodd[3]

Introduction

Despite being largely preventable, dental caries in permanent teeth is the most common chronic disease globally, and the tenth most common in the primary dentition, affecting 621 million children worldwide.[1] In the UK, it affects approximately one third of five-year-olds, rising to nearly half of children surveyed by age eight.[2] Although the number of children affected is declining each year in the UK, there are growing inequalities, with those from lower socioeconomic groups disproportionately affected by dental caries, both in terms of prevalence and severity.[3]

Dental caries has a significant impact on children, and is associated with pain, impaired function and difficulty sleeping.[4-6] Oral health-related quality of life measures have been increasingly used to access the impact of caries on the everyday lives of children and their families, and aim to take account of functional, psychological and social impacts.[7]

Sometimes, children require treatment for dental caries to be carried out under general anaesthetic (GA) in a hospital setting. This may be for a variety of reasons, but the most common scenario is the need for multiple extractions in a young child or the presence of high levels of dental anxiety or learning disabilities. Although dental treatment under GA may be carried out for other reasons, for example removal of impacted teeth or acute trauma management, treatment for dental caries is the primary reason for a dental general anaesthetic (DGA). In the UK, dental caries remains the most common reason for a child to be admitted to hospital for a GA. In 2015-16, in England alone, approximately 43,700 children aged 16 years and under were admitted to hospital with a primary diagnosis of dental caries, and most of these admissions were for the extraction of multiple teeth.[8] Not only does this procedure carry risks of morbidity and, very rarely, mortality to the child, it also places a considerable financial burden on the National Health Service (NHS).

The number of children receiving DGA has been rising since 1997, and although the reasons for this are not entirely clear, some studies have noted a reluctance or lack of confidence of dental professionals to treat children in general practice which may contribute to the high numbers of children being referred.[9,10] The costs to the NHS of DGA are estimated at £30 million annually.[11] In this article, we consider DGA in more detail, with a particular focus on the impact of caries-related treatment under GA on children and their families.

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However, while treatment under GA has been compared to other management techniques (such as sedation), there is a paucity of research on these different treatment approaches under GA. The main gaps in knowledge include the relative costs of the different treatment approaches and which approach gives the best results, either from a clinical point of view or based on patient-reported outcome measures. This is therefore an area of caries management which requires further research.

Benefits of DGA

Many parents view DGA as an acceptable and often convenient method of treatment to address their child's oral health needs. Often children who require a DGA have severe caries affecting multiple teeth and a DGA allows all these teeth to be treated in a single session. Parents generally rate high levels of satisfaction with the treatment their child has received for this reason[10,13] Children also report positive outcomes following treatment under GA, including being pleased that all their dental problems are treated and feeling proud at having had the treatment done.[14]

'MANY PARENTS VIEW DGA AS AN ACCEPTABLE AND OFTEN CONVENIENT METHOD OF TREATMENT TO ADDRESS THEIR CHILD'S ORAL HEALTH NEEDS…'

Treatment approaches under GA

Treatment approaches under GA fall into two main categories, namely exodontia (extraction only) and comprehensive care (where restorations as well as extractions are carried out). The treatment approach is influenced by parental wishes and clinical-related factors, which include the restorability of the carious teeth, the caries risk of the child, the availability of comprehensive care services and any co-existing medical conditions.

In the UK, the majority of centres provide exodontia services under GA, and so DGA is mostly used for extractions only.[12] This is presumably because exodontia services require less time and equipment, and therefore represent a less expensive option than provision of comprehensive care under GA.

Disadvantages and limitations of DGA

There is a perception amongst some dental professionals and parents that treatment under GA may prevent children becoming more anxious about dental treatment, and potentially prevent avoidance of regular attendance in the future. This perception is based on the notion that DGA 'keeps the regular dentists separate from treatment'.[15] However, studies have shown that where children are already anxious about dental treatment, DGA does nothing to alleviate this anxiety,[10,16] with one study by Cantekin and co-workers[17] reporting that, according to the Children's Fear Survey Schedule-Dental Subscale (CFSS-DS), there was an increase in dental anxiety following treatment under GA.

Demand for DGA services is high, and subsequently waiting times for treatment can be long. One study found that average waiting times for treatment across six hospitals in the North East of England was eight months,[10] with a companion study revealing parental concern and frustration over the negative effects on their children because of these waiting times, including on-going or increased pain, difficulty sleeping and subsequent impact on school attendance.[15]

While the risk of mortality associated with DGA is low, approximately one in 250,000,[18] the morbidities associated with DGA are significantly more common. The most common associated morbidities include nausea, pain and bleeding, and are experienced by 40-90% of children following DGA.[14]

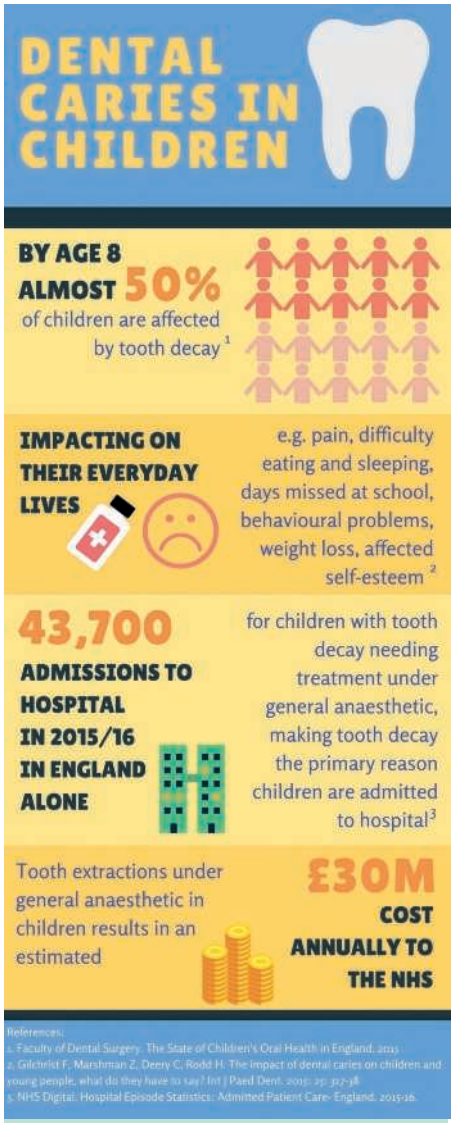

Fig. 1 Infographic summarising some of the key information regarding caries and treatment under general anaesthetic

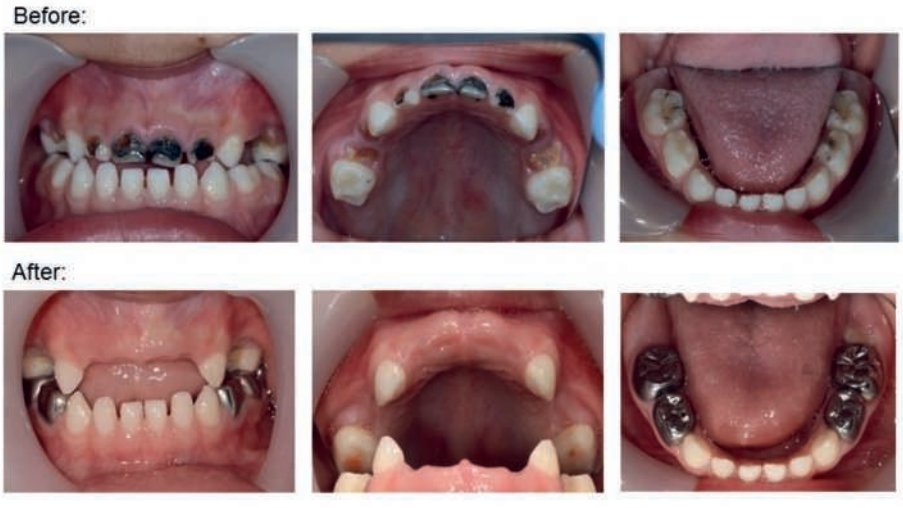

Fig. 2 Comprehensive dental care provided under GA for a four-year-old boy with severe early childhood caries included: extraction 54, 52, 51, 61, 62, 64; preformed metal crowns 74, 75, 84, 85; resin modified glass ionomer sealant restorations 55, 65

Impact of dental treatment for caries under GA on children

Studies have revealed that parental reports of impacts on children for oral health conditions do not always match the findings of studies which have used child-reported measures of impact. For example, Rodd and co-workers conducted a video-diary study which found that pain was not commonly discussed by children, and instead the most commonly described negative outcomes associated with the DGA were hunger and difficulty sleeping. This study also revealed impacts which had not been reported by parents, such as negative feelings of being worried or scared and the discomfort following placement of the intravenous cannula.[14] It has been shown that, in general, parents/caregivers have a low to moderate overall agreement with their child's ratings of health-related quality of life (HRQoL).[19,20] A systematic review of parent and child reports of HRQoL by Eiser and Morse revealed agreement between proxy and child ratings was worse in relation to less-observable aspects, such as emotional or social HRQoL, than in those which were more observable, such as physical symptoms.[21]

Measures of oral health related quality of life (OHRQoL) have been used to describe the impacts of oral health conditions and their treatment on the everyday lives of individuals, and have been used to assess the impact of dental caries and treatment under GA in children. A systematic review of the literature found 20 studies reporting on changes in OHRQoL following DGA for dental caries in children, although significant heterogeneity between the studies limited the conclusions that could be drawn.[22] The findings showed that only half the included studies used instruments which had been validated in the study population, and all but one of the studies relied on proxy reports of child OHRQoL. Overall, all the included studies reported improvements in OHRQoL following treatment. However, it was interesting to note that some individual subscales within the measures showed changes which implied worsened OHRQoL. Only one study to date has examined the impact of exodontia only versus comprehensive care in children, and while no significant difference between the two approaches was found, the sample size was small and no assessment was made as to whether there was a clinically significant difference between the approaches.[23] Further research is needed to examine the impact of dental caries and different treatment approaches under GA from the point of view of children themselves.

Conclusion

Treatment for dental caries under GA is sometimes necessary where other techniques to deliver care to children fail or are not appropriate. However, treatment under GA is not without risk and there is a need to ensure this treatment approach is conducted only when necessary. There is also a need for further research to assess the relative effectiveness of treatment approaches under GA, both to assess which approach gives the best outcomes and to justify the risks and costs associated with each. Future enquiries should also be directed towards assessing the impact of different treatment approaches under GA on the daily life of children, from their own perspective.

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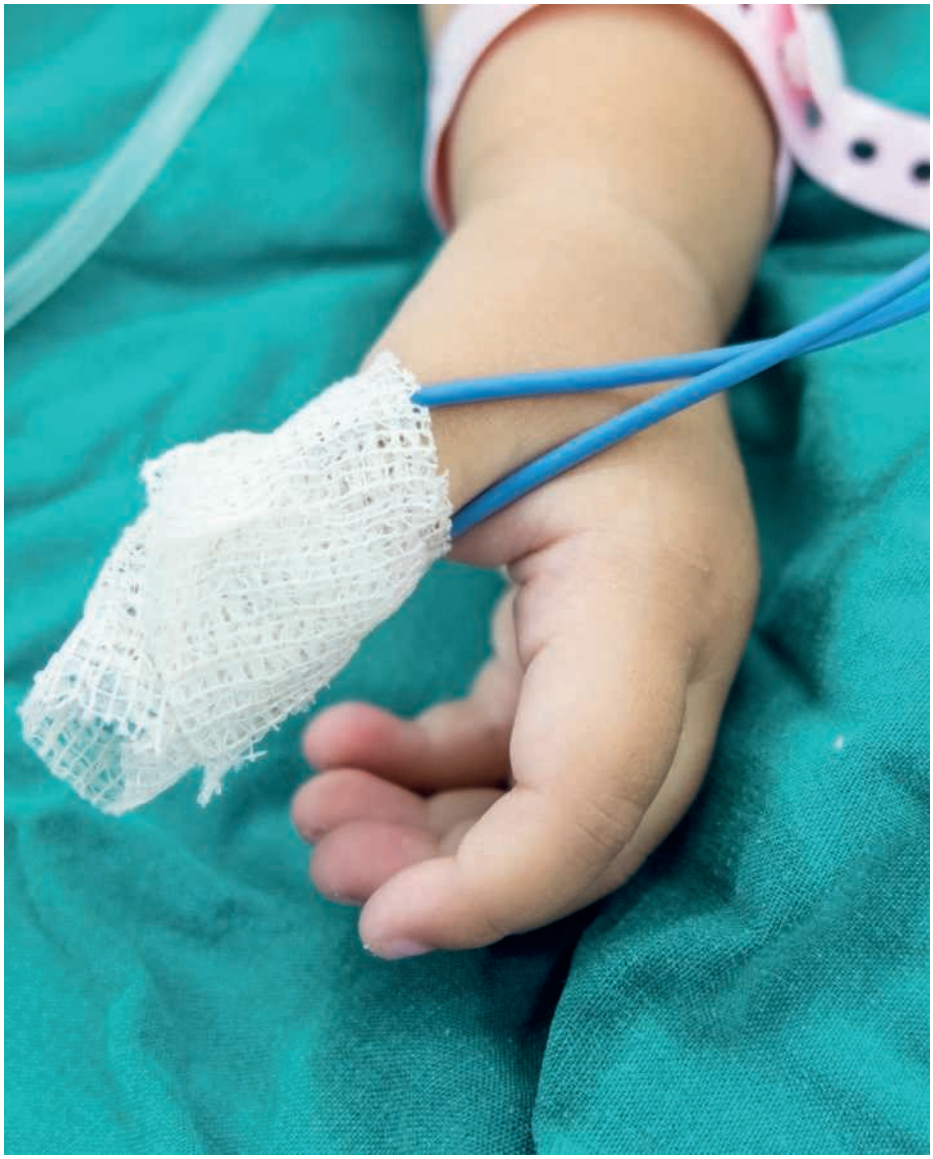

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'FURTHER RESEARCH IS NEEDED TO EXAMINE THE IMPACT OF DENTAL CARIES AND DIFFERENT TREATMENT APPROACHES UNDER GA FROM THE POINT OF VIEW OF THE CHILDREN'

CPD questions

This article has four CPD questions attached to it which will earn you one hour of verifiable CPD. To access the ***free*** *BDA CPD hub, go to* ***http://bit.ly/2e3G0sv***

bdjteam2017116

A dental practice manager's life

Anne-Marie Saxton, 35, is a practice manager and treatment coordinator in Nottingham, and also her practice's oral health educator and referral coordinator. Anne-Marie has a 5-year-old daughter called Freya.

I get up at 6:30 am and usually have a strong coffee to wake me up, followed by a selection of fruit and yoghurt. Work is half an hour away and I usually take the bus as it tends to get me into the city centre quicker than driving. This way I also get to check my emails on the way in.

I am lucky enough to work part time at present because of my child care commitments. I work generally 9:30 am to 2:30 pm Monday to Thursday in practice. This can differ depending on the needs of the practice.

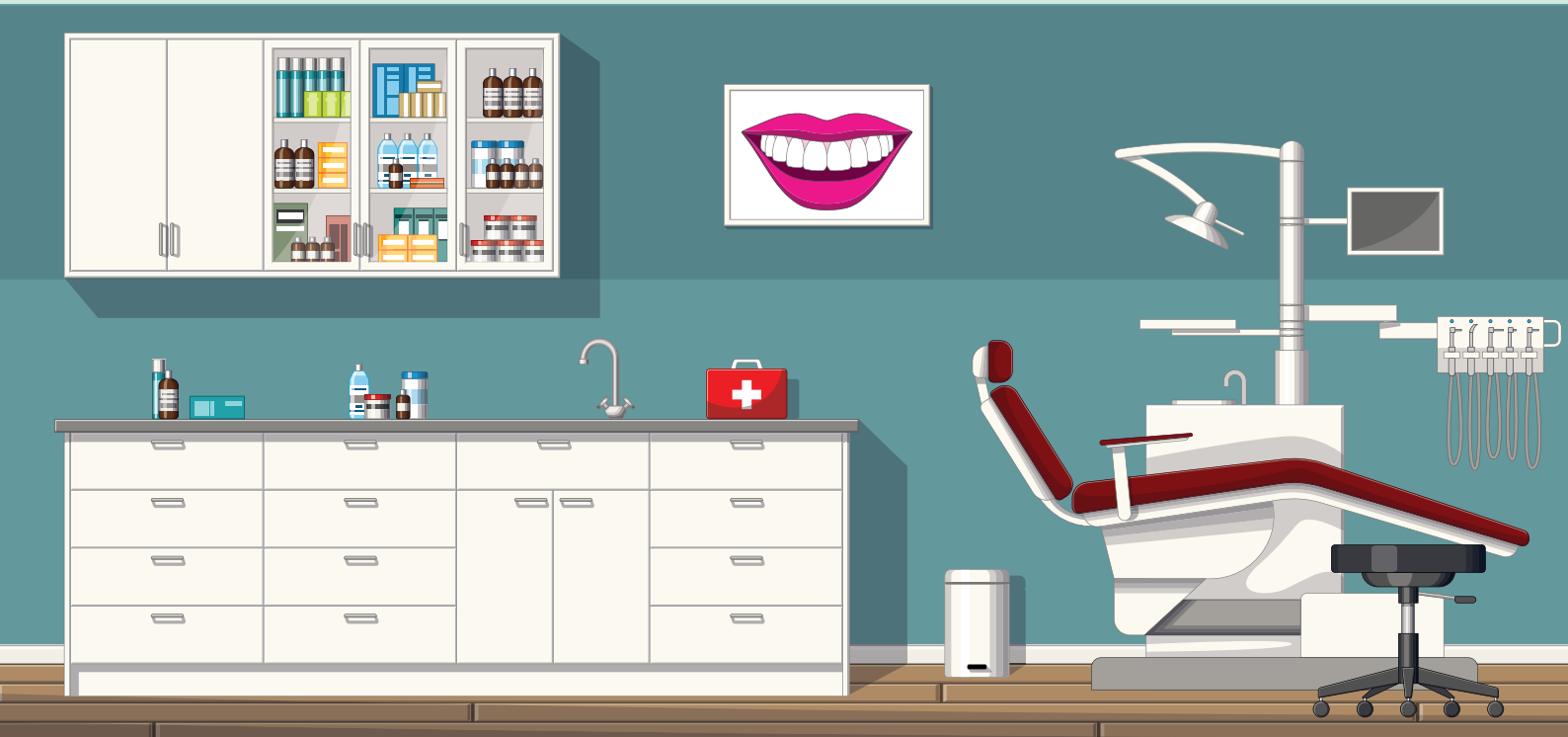
My days can differ dramatically week to week. Rather than planning my duties weekly I tend to plan my month ahead for specific tasks.

In a typical month, to begin with I do a full practice check - checking the practice room to room - ensuring the team has completed their tasks. This includes spot-checks, cleaning audits, reception audits and decontamination room audits. As I do this I check all compliance tasks are up to date. I have an app with all tasks on it so I know what I need to do for the following month and can work this into my calendar. These are tasks such as record card and radiograph audits, policy reviews and significant event reviews.

I also do finance checks, look at practice performance and review the last month. I also review interest free credit accounts and patient payment plan activity.

I am also responsible for software and appointment book management; staff one to ones/rota updates/personal file review/ training review and payroll. I prepare for and deliver staff meetings and in house training; review and prepare marketing activity, promotions and advertising; do stock takes and order stock.

With all of the above tasks, I'll plan my month out then it gives me time to fit in general day to day tasks and appointments.



Currently at practice I have the following appointments to offer our patients:

- Treatment coordinator appointments – to discuss treatment plans and finance options
- Oral health appointments – to offer advice to patients to improve their oral health
- Nervous patient appointments - to show patients the practice and explain what will happen at each appointment and see if the practice can do anything to help the patient
- OPG and general referral correspondence and also taking any OPG referrals sent to us by other practices.

I became a trainee dental nurse in 2004. I fell into it completely by chance at a time when I was deciding what to do. Since qualifying I have completed post-graduation certificates in dental radiography, oral health education, fluoride application and impression taking. In my current job I love the patient contact, so I particularly enjoy oral health instruction sessions and the nervous patient sessions, but I also like the compliance side of my role. I enjoy organising and helping develop team members. I like being able to help staff learn new skills and explore the different aspects of their job role.

A more challenging aspect to my job is making time to spend one on one quality time with staff within the working day, to really help develop them. We have seven people in our practice: the lead dentist and owner; a clinician who performs our implant cases; a dental hygienist; two qualified dental nurses; one trainee dental nurse; and one practice cleaner. Recently a doctor also joined our team to offer facial aesthetics and a pain management clinic. This service is fairly new to the practice but also exciting as we have not offered this service before.

We see a wide range of patients including children, students, professionals, families and the elderly. We are currently taking new NHS patients, we are a Denplan practice and we receive referrals from dental practices in the area as well.

In our area we are lucky to have the 'The Smile Squad' offered by the oral health promotions team which I am a member of. It offers events and training days helping us to promote oral health not only in our practice but also in the community. Previously this has involved attending schools or nurseries to help teach good oral health messages; I hope to do this again in 2017.

At the practice we also have various special events to promote different services, such as Invisalign or tooth whitening. We also try and have on-going sessions for our patients – we offer all patients oral health checks where after they have seen the dentist if they need further advice on how to improve their oral health they can book in to a session where toothbrush technique/interdental cleaning/diet and social habits are discussed. The focus at practice is very much based on preventative treatment.

We also offer nervous patients tours before they visit the dentist or attend a treatment appointment. At this appointment we will talk through what exactly will happen, show any instruments or equipment which may be used, and try and find out what exactly makes the patient nervous - to see if we can take any additional steps to make their journey with us more enjoyable.

Due to my short work days, I don't take a lunch break. I make sure I have something ready for when I get home. I leave work at 2:30 pm daily to collect my daughter from school then get home for around 4 or depending on after school activities, around 6 pm.

As well as my job, I am also assistant chair of the school PTA in which I spend time organising events and raising money for the school.

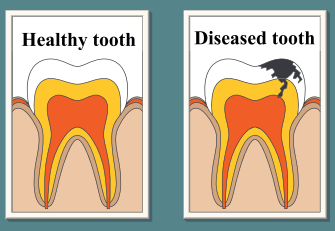
I am currently doing an online photography course and try to practise my photography as much as I can. I have recently taken photographs for our practice website and am soon to take staff portraits for social media.

This year I would like to start a dental nurse extended duties course or study club, offering training to local dental nurses in dental photography or perhaps along the lines of how to fit oral health education into a busy dental practice. Outside work I would like to finish my photography course and perhaps turn my hobby into a business.

Since having my daughter, I am very aware of the importance of reading food labels. I try to teach Freya about reducing sugar and eating healthy snacks.

Although I finish work fairly early I try to study my online photography course or do CPD in the evenings. Most of the CPD my practice has is sourced free online or available through the Midlands Deanery. We also have a lot of in-house training in the form of lunch and learns.

I usually go to bed between 11 pm and midnight.



'I LOVE THE PATIENT CONTACT, SO I PARTICULARLY ENJOY ORAL HEALTH INSTRUCTION SESSIONS AND THE NERVOUS PATIENT SESSIONS, BUT I ALSO LIKE THE COMPLIANCE SIDE OF MY ROLE.'

bdjteam2017117

Enhanced skills in periodontology: pilot evaluation

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evaluate an inter-professional periodontology training scheme for dentists and DCPs in London.

BACKGROUND

Reform of dentistry in England is required, and in progress,[1-5] to ensure patient needs are met in the right time, place and by the right person. Health Education England (HEE), Public Health England (PHE), Local Authorities (LAs) and NHS England (NHSE) are mandated to identify innovative means to meet the varying health (including oral health) needs of the population.[1,6,7] HEE and its network of local education and training boards (LETBs) now have the responsibility to not only recruit healthcare staff with the right skills and values but also to ensure their competencies and professional development to enable them to deliver excellent patient centred clinical care.[1,7]

Periodontal disease is one of the most common chronic inflammatory oral diseases seen in adults globally.[8,9] It leads to tooth mobility and/or loss,[10] affecting masticatory function, speech, appearance, and nutritional status,[11] which can result in reduced quality of life for patients.[12,13] Evidence suggests that almost half of adults nationally, and in London, have some periodontal disease, with prevalence of severe periodontitis doubling in the last decade of life.[14,15] This could be attributed to an increase in the ageing population and a decrease in extractions.[16] In addition, the cost-burden of periodontal disease nationally is significant with an estimate of almost £2.8 billion spent in 2008.[12,17] The complexity of periodontal disease makes it a significant challenge for primary care dentists and dental hygienists/therapists, with some studies reporting considerable under-diagnosis and treatment for periodontal disease at the primary care level.[18-21] Furthermore, there has been the suggestion that fee scales and regulations of General Dental Services (GDS) have impacted on the provision of periodontal care within the NHS resulting in progressive de-skilling of clinicians over the years.[21]

Many members of the dental professions are trained to provide periodontal care. At the routine end of care, periodontal skills are part of the *Scope of practice* of DCPs (both dental hygienists and dental therapists), as well as dentists themselves.[22] At the more complex end, periodontology is a mono-speciality and one aspect of the speciality of restorative dentistry.[23] There is currently emphasis on gaining additional and enhanced skills training among dentists and dental care professionals, to better meet the needs of the population.[24-28] In line with this trend, the former London Deanery (now Health Education England [HEE], London) established a training programme in clinical periodontology to enhance the skills of dentists and dental hygienist/therapists from primary dental care. Throughout this paper they will be referred to as the 'clinicians'. This was a shared educational and training initiative over a two-year period at King's College Hospital Foundation Trust (KCHT) in South London. The philosophy of the initiative was in line with

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Steele's 2009 review,[26] the original concept of 'Dentists with Special Interest (DwSIs)'[28-34] and the former London training programme for DwSIs in Endodontics.[35,36] However, this pilot of periodontal care was unique in that it involved training two different skill sets, that is, dentists and dental care professionals from dental hygiene and/or dental therapy together. NHS commissioners were not involved in the process.

Furthermore, roles within the dental team are expanding since the General Dental Council (GDC) announced a change in professional policy whereby since 1 May 2013 dental hygienists and dental therapists, who previously worked under the prescription of a dentist, may provide direct access to patients;[37] this is likely to become an increasing feature of healthcare[38] as the NHS evolves.[7]

The aim of this research was to explore the feasibility of training general dental practitioners (GDPs) and dental hygienists/therapists to develop enhanced skills in periodontics and make recommendations for service delivery and training. The objectives were as follows:

1. To explore the views of patients on their oral health and the dental services provided by the clinicians
2. To assess patients' clinical outcome based on the retrospective analysis of the logbooks of the clinicians
3. To explore the extent to which the perceived aims of the commissioners, educators, training providers and clinicians have been met through this course
4. To explore the programme's role in supporting clinical and professional development of the dental workforce
5. To identify learning from this project and make recommendations for the future models of dental service delivery in England as well as initiatives for 'enhanced skills training'.

Methods

This evaluation was multi-dimensional and utilised a mixed methods approach[39] within a non-randomised feasibility and pilot study. Ethics Committee approval was obtained from the National Research Ethics Committee (13/NS/0102), and research governance approval by King's College Hospital (KCH) NHS R&D committee (KCH 13-143). Data were collected from a variety of sources over a six-month period (October 2013 to March 2014) (Fig. 1), similar to that used for the London DwSIs in Endodontics programme.[35] In addition, clinical data on patients were available for inclusion with the support of the participating clinicians, hospital trust and dental practices.

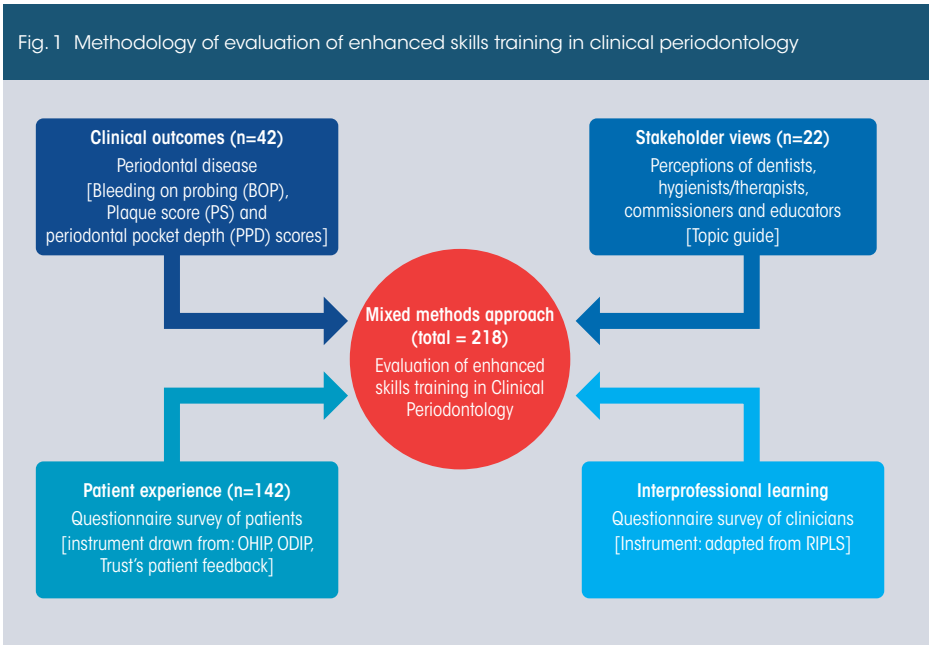
First, following approval of clinicians, a comprehensive analysis of patient notes included in the logbooks by the clinicians on this course was undertaken. The research team was provided with access to logbooks at the end of programme. Quantitative data on patients, teeth and aspects before and after therapy were entered onto computer and analysed using statistical software SPSS v22.0 and STATA v12.0. The primary aim was to detect a change in periodontal outcomes of the patient [Periodontal Pocket Depth (PPD); Bleeding on Probing (BOP), and Plaque Score (PS)] after receiving treatment through clinicians on this enhanced skill course. The secondary aim was to measure the effect of other variables and correlation of these outcome measures. Descriptive statistics were used to summarise the patient characteristics. Paired t-tests were used to test the difference in total scores of outcome measures, that is, PPD, BOP and PS pre- and post-treatment. The relationship between the change in PPD after treatment with respect to BOP and PS was tested using Spearman's correlation coefficient. Multivariate linear models were created to test the effect of predictors such as sex, age, smoking history, number of treatment sessions, patient setting (hospital or primary care), and treatment provider (dentist or DCP) on the four PPD score levels.

Second, a postal questionnaire survey of the patients treated by the clinicians during the programme was undertaken, both those identified through log books from hospital and practice, together with those treated in hospital clinical sessions. The questionnaire was compiled from the academic literature on quality of life, periodontal disease, national oral health surveys,[40-42] and the hospital trust's patient surveys at the dental hospital. Trust and practice staff assisted with the survey distribution to protect patient identity. Patients were provided with two reminders in a modified Dillman approach, to reduce their burden, while optimising responses to the questionnaire surveys.[43] Data were entered into SPSS for descriptive analysis.

Third, a self-completion questionnaire survey of clinicians enrolled on this

'ALMOST HALF OF ADULTS HAVE SOME PERIODONTAL DISEASE, WITH PREVALENCE OF SEVERE PERIODONTITIS DOUBLING IN THE LAST DECADE OF LIFE'

Fig. 1 Methodology of evaluation of enhanced skills training in clinical periodontology



programme was conducted towards the end of their course. The questionnaire, which explored clinicians' views on the course, skill-mix and team working, was adapted from an instrument developed at KCL based on the work of Morison *et al.*[44,45] and piloted with dental professionals not involved with the study. The clinicians were provided with reminders in line with Dillman's approach to improve questionnaire responses.[43]

Fourth, and finally, stakeholders including clinicians on the course (dentists and dental hygiene/therapists) and others involved in the programme and delivery of care (HEE commissioners, educators on the programme, dental public health consultants, and a practice owner) were invited to participate in the semi-structured interviews. Invitations were sent by post and paper, including an information sheet and consent form; invitees were subsequently followed up by phone to explore their interest and willingness to participate. Interviews were conducted in a mutually convenient location using a topic guide based on similar surveys,[35] with interviews recorded and transcribed verbatim. Data were analysed using framework methodology, as described by Ritchie and Lewis,[46] a common method used in health services research.[35,47,48] Based on themes and patterns emerging from the data, a detailed coding framework was developed and agreed through iterative discussion among the authors. The coding framework was then systematically applied to the interview data, using NVivo 9 to manage the coded data.

RESULTS

Clinical outcomes examined

All the clinicians were required to record at least four completed cases in their logbook (two each from hospital and practice) during the programme and submit it for assessment. Out of the 19 clinicians on the course, 12 consented to provide access to their logbooks for research purposes resulting in a total of 42 patient records with 'before and after treatment' clinical scores. Fifty-five percent (N = 22) of patients were treated by the dental hygiene-therapists. A total of 1,103 teeth (maxilla = 548; mandible = 555) remained following treatment and had 'before and after treatment' scores included. Teeth extracted were excluded from this analysis to avoid bias (5.3%; N = 62).

There was evidence of significant improvement in patient clinical outcomes with respect to all three measures: bleeding on probing (BOP), plaque scores (PS) and periodontal pocket depth (PPD) scores. BOP scores reduced by 70%; total plaque scores reduced by 52% (P = 0.001). For periodontal pocket depth (PDD), the average number of teeth with PPD of less than 4 mm before treatment in the maxilla and mandible was 5.4 and 6.5 respectively; and increased

Table 1 Change in mean PPD score by each tooth, quadrant and jaw after treatment provided by course clinicians

Tooth	Cases (n)	Before treatment (s.d)	After treatment (s.d)	Tooth	Cases (n)	Before treatment	After treatment
Upper right third molar (18)	15	3.74 (0.98)	2.93 (1.00)	Upper left third molar (28)	15	3.94 (1.16)	2.90 (1.21)
Upper right second molar (17)	36	4.04 (1.20)	3.13 (1.23)	Upper left second molar (27)	32	4.34 (1.47)	3.35 (1.28)
Upper right first molar (16)	33	3.66 (1.11)	2.83 (1.01)	Upper left first molar (26)	38	3.90 (1.31)	2.87 (1.38)
Upper right second premolar (15)	36	3.46 (1.22)	2.63 (0.95)	Upper left second premolar (25)	35	3.30 (1.02)	2.46 (0.62)
Upper right first premolar (14)	39	3.52 (1.46)	2.54 (1.19)	Upper left first premolar (24)	35	3.42 (1.14)	2.44 (0.83)
Upper right canine (13)	42	3.42 (1.41)	2.5 (1.13)	Upper left canine (23)	41	3.19 (1.11)	2.31 (0.81)
Upper right lateral incisor (12)	39	3.07 (1.12)	2.24 (0.97)	Upper left lateral incisor (22)	39	3.0 (1.22)	2.32 (1.17)
Upper right central incisor (11)	36	3.19 (1.63)	2.44 (1.39)	Upper left central incisor (21)	37	3.10 (1.27)	2.15 (0.69)
Lower right central incisor (41)	38	2.69 (1.60)	1.85 (1.03)	Lower left central incisor (31)	38	2.54 (1.21)	1.81 (0.64)
Lower right lateral incisor (42)	40	2.71 (1.51)	1.97 (1.12)	Lower left lateral incisor (32)	37	2.65 (1.16)	1.83 (0.71)
Lower right canine (43)	41	3.01 (1.40)	2.19 (1.16)	Lower left canine (33)	40	2.79 (1.16)	2.03 (0.86)
Lower right first premolar (44)	39	3.38 (1.48)	2.45 (1.15)	Lower left first premolar (34)	40	3.29 (1.44)	2.40 (0.94)
Lower right second premolar (45)	38	3.22 (1.30)	2.31 (0.97)	Lower left second premolar (35)	37	3.42 (1.65)	2.43 (0.81)
Lower right first molar (46)	32	3.99 (1.49)	3.00 (1.27)	Lower left first molar (36)	34	3.98 (1.27)	3.23 (1.20)
Lower right second molar (47)	31	4.68 (1.46)	3.41 (1.17)	Lower left second molar (37)	34	4.41 (1.40)	3.42 (1.29)
Lower right third molar (48)	19	4.33 (1.82)	3.37 (1.50)	Lower left third molar (38)	17	3.95 (1.86)	3.18 (1.54)
Upper right quadrant	**42**	**144.40 (43.56)**	**105.04 (38.47)**	**Upper left quadrant**	**42**	**145.73 (42.18)**	**101.00 (35.12)**
Lower right quadrant	**41**	**144.87 (50.25)**	**101.63 (41.73)**	**Lower left quadrant**	**41**	**144.29 (60.08)**	**100.95 (38.48)**
Maxilla (total score)	**42**	**290.14 (79.5)**	**206.04 (68.92)**	**Mandible (total score)**	**42**	**286.61 (105.13)**	**199.92 (78.26)**

Note: a. For all scores P value was < 0.01; b.Teeth extracted were excluded from the analysis

significantly after treatment to 9.5 and 9.7 respectively (P = 0.001). A reduction in the average PPD score was seen at tooth, quadrant and jaw after treatment (P = 0.001). Overall, 55% of the total 6,618 sites (six sites per retained tooth) for PPD scores were recorded as improved with 35% sites (N = 2289) having no change in PDD scores (Table 1).

In addition, there was no evidence for the change in PPD scores being affected by age, sex, smoking history, number of treatment sessions, patient setting (hospital or primary care) or treatment provider (dentist or DCP). Nevertheless, a positive correlation was seen between the change in average PPD and BOP score, for both maxilla (N = 38) and mandible (N = 38) respectively [maxilla (R = 0.62; P = 0.0001); mandible (R= 0.47; P = 0.003)]; however, the change in total plaque score was not correlated with the change in total PPD scores.

Patient experience and outcomes

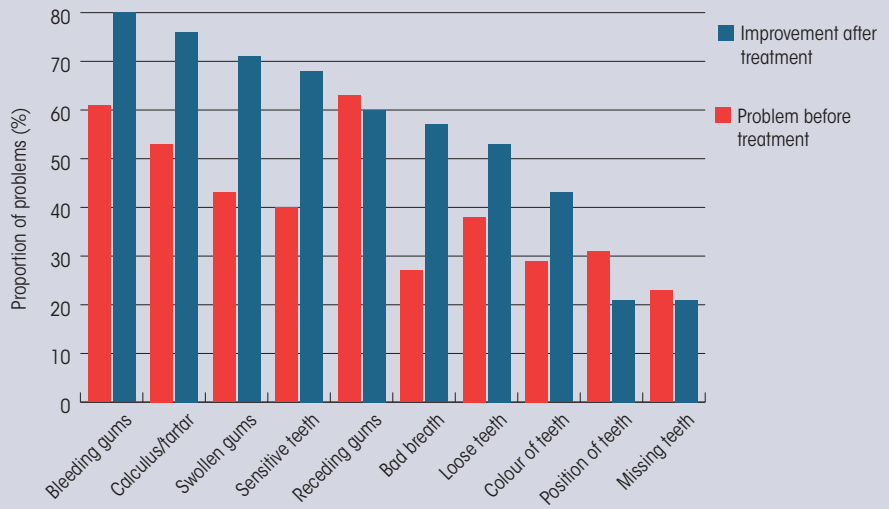
A total of 309 patients were identified as having been under the care of clinicians during the programme and were included in the survey; 142 questionnaires were received giving a response rate of 46% for the study, with just over half of the responding patients having been treated by dental hygienists/therapists (58%; N = 82). The majority of patient respondents were female (62%, N = 88) and the largest age-group was 55-64 years (31%; N = 44) within an overall range of 25-74 years. 'White British' (50%; N = 68) was the largest ethnic group, followed by 'Black African' (15%, N = 20) and 'Black Caribbean' (13%, N = 18).

The majority reported the most common reason to visit a dentist was for a regular check-up (64%; N = 88). Two thirds (66%; N = 91) of patients reported attending a dentist at least once every six months, with 93% (N = 127) attending at least once in a two year period, and the rest only when in trouble or less frequently (7%; N = 10).

A variety of periodontal problems were reported by patients before receiving treatment from clinicians (Fig. 2), most notably issues related to receding and bleeding gums. Quality of life was affected, with almost half (49%; N = 70) reporting having felt self-conscious 'occasionally to very often'; 45% (N = 64) having felt embarrassed, 44% (N = 63) having experienced discomfort while eating food and 44% (N = 62) being tense.

After treatment, considerable improvement in specific items was reported; the majority reporting their dental health 'improved a lot' (62%; N = 73), with only 22% (N = 26) reporting it to have 'improved a little'. Almost all the patients (more than 96%) rated the courtesy of dental hygienist/therapists (97%; N = 128), and dentists (96%; N = 131) as 'excellent' to 'good'.

Fig. 2 Proportion of dental problems before and after treatment reported by patients (N = 142)



Note: Responses for 'fairly often' and 'very often' for dental problems reported by patients prior to treatment were grouped together (in blue) Responses for 'improved a lot' and 'improved a little' for improvement seen in dental problems after treatment were grouped together (in red)

'ALMOST ALL THE RESPONDING CLINICIANS WELCOMED THE OPPORTUNITY TO TRAIN ALONGSIDE OTHER TEAM MEMBERS AND ALL REPORTED TO HAVE DEVELOPED POSITIVE PROFESSIONAL RELATIONSHIPS'

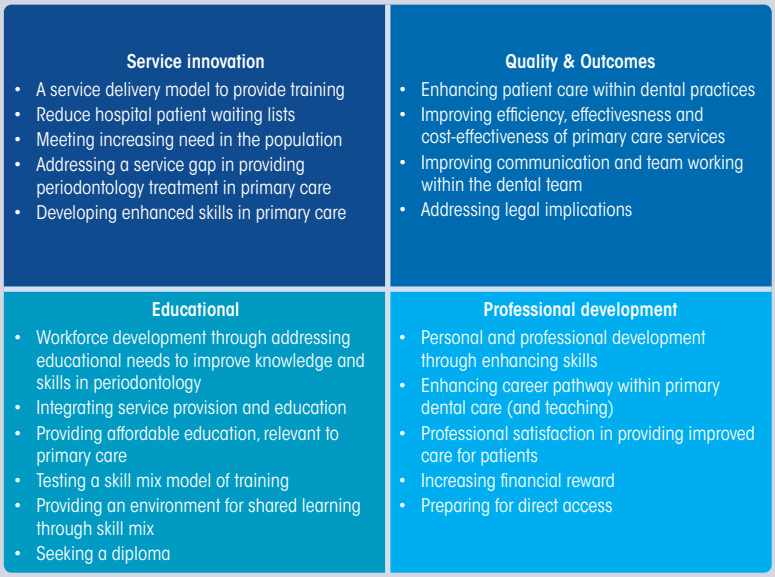
Clinician views

Twelve of the 19 clinicians on this course (six dentists; six DH/T) returned the completed questionnaire giving a response rate of 63% for the survey. Two-thirds (75%; N = 9) of the respondents were female and 'British' (42%; N = 5); almost all had additional qualifications (N = 11) and were working in predominantly NHS dental practice (42%; N = 5).

The clinicians reported universal (100%) support for team working and shared learning with other members of the dental team. Almost all the responding clinicians (92%, N = 11) welcomed the opportunity to train alongside other team members and all reported to have developed positive professional relationships (100%, N = 12). Over half of the responding clinicians (58%, N = 7) felt that the training they received not only reinforced their theoretical knowledge in periodontics but also helped them clinically, equipping them better in diagnosis and treatment planning of patients.

While none disagreed, the majority were neutral (55%), or positive (45%), regarding the training; dissent was related to the organisation and delivery of training 83% (N = 10), which parallels the qualitative findings. The majority of dental hygienists/therapists (67%) reported that their skills will be used more after completion of this training; however, the majority of dentists (67%) reported a neutral view suggesting no change in their approach.

Fig. 3 Perceived aims and expectations of enhanced skills training in periodontology in London



Stakeholder views

Interviewees (N = 22) included course participants, collectively referred to as clinicians [dentists (D) N = 4, hygienists/therapists (H/T) N = 8], HEE officials, referred to as training initiators (TI, N = 2), a dental public health consultant (PHC, N = 1), education and training providers referred to as educators (E, N = 6), and a practice owner from a practice where a course clinician was employed (PP, N = 1). The perceived vision of the training for clinicians and key stakeholders revolved mainly around following four domains: 'service innovation', 'quality & outcomes', 'professional development', and 'educational' (Fig. 3).

Service innovation

Developing a primary care periodontal service through enhanced skills training to meet the increasing need in the population was one of the main aims of the course identified by all interviewees.

We carried out surveys of adults... and one of the key findings was the amount of periodontal disease in the population, it was worryingly high, and when we spoke to practitioners, one of the things they mentioned was the difficulties in getting patients with problems beyond their skill set to be seen, […] they would refer patients to the hospital and the hospital would just answer those questions back. So err with that in mind I believe that there should be opportunities for those patients to be seen […] within primary care and for those skills to be developed. I think in developing a service, it should relate to the need of the population, and so if the need is there, then the service is there. (PHC219)

Clinicians, educators and HEE representatives highlighted service gaps in providing periodontal treatment in primary care and felt that this training course was important in addressing these.

I think the aim of the training, first of all, I think there is a gap in general practice, where, I think a lot of general practitioners, they're spread quite thin and I think perio's the first one to suffer. (E211)

> **'ONE OF THE MAIN AIMS OF THE COURSE WAS TO DEVELOP THE WORKFORCE THROUGH THE IMPROVEMENT OF KNOWLEDGE AND SKILLS IN PERIODONTOLOGY…'**

Quality and outcomes

HEE representatives, educators and the majority of clinicians considered improving patient care within primary care dental services as one of the aims of the enhanced skills training course. It was felt that this would contribute to improving the effectiveness, efficiency and cost-effectiveness of primary care services in the longer term.

(The main aim is) to ensure that patients have quality care, with trained personnel at the level of difficulty that they are trained for, in their local setting, rather than having delayed treatment, more complications and higher cost to the NHS, so this was a cost saving, it was a time saving, and it was getting patients to treatment, where they need to be treated. (TI 192)

As part of improving outcomes, a few participants also reported that encouraging and developing good communication and team working between dentists and dental hygienists/therapists.

Another perceived aim discussed by some clinicians and a course educator was to improve clinicians' ability to diagnose and determine prognosis which would lead to improved patient outcomes, and protect against litigation, as illustrated by the quote below.

General practitioners are also, being aware that they're weak in that area, but a, they're not, they don't feel like they're being remunerated for it, so, therefore, they're leaving it, but then there's the medico legal side of it as well, and I think they're realising the medico-legal aspect of it and that they can't ignore it, but I think their training, may be not great in terms of 'hands on'; everybody knows maybe how to diagnose but when it comes to how to treat it, how to diagnose, to determine prognosis for example… I think that's where this course really came into its own. (E211)

Educational

HEE representatives, educators and clinicians all reported that one of the main aims of the course was to address educational needs, to develop the workforce through the improvement of knowledge and skills in periodontology. And to testing out a skill mix model of training in a shared learning environment, where dentists and DCPs could learn from each other. These points are illustrated by the quotes below.

(The aim of the training was) to encourage good communication between dental care professionals and dentists so that they both appreciated their respected roles and realised some common paths, and to advance their knowledge and skills with regard to treating periodontal disease. (E200)

(One) aim is really to see how it would work to put dentists and dental care professionals, in this case, hygienists, together in the same learning environment to see how they interact and whether it's a good model to actually train the two different skillsets at the same level. (ID201)

You've got to have a purpose in life you see, at the present moment dentists feel deskilled in many respects and that's partly because they don't feel incentivised; but here, of course, it's the higher education and training. (TI 192)

Another benefit of the training perceived by clinicians and educators was the affordability of the training and the fact that it could be fitted into their working life in a general practice. HEE representatives and educators generally agreed that the vision for the course from the outset had been to provide a qualification and all clinicians stated that one main aim of attending the course was to gain a qualification in the form of a diploma. This anticipated integration into the educational process had not occurred and was a major source of concern for the participating clinicians.

Professional development

Clinicians reported that personal and professional development was one of their main aims for taking the course. Therefore, the course was viewed by some as a means of enhancing the career pathway within primary care and a potential opportunity to increase their earnings. Clinicians on the course highlighted the professional satisfaction from being able to improve the care they were able to provide to their own patients within their practice. While dentists would have valued more emphasis on surgical periodontics, the course focused on non-surgical care, which for some was a frustration. Some of the dental hygienists/therapists reported entering the training course as a part of their preparation for providing care on 'direct access' to patients, with the aim that the course would improve their confidence and skills in treating patients, as can be seen in the quote below, whereas dentists were interested in surgery.

Well the aim for me was to enhance my skills obviously in clinical perio, knowing what was going on two years with the Dental Council and then thinking about introducing direct access for hygienists, I was pre-empting that thinking well it would be good do anyway but if that did come in then we would also have been in trained diagnosis, treatment planning and treating and assessing a new patient. So probably my main aim initially was pre-empting that and allowing me to complete a lot more treatment in the practice and be seen by the other, well by all the dentists in the practice to be able to do advanced treatment confidently and competently. (HT 195)

I know all the dentists want to get a lot more clinical experience out of it and want to be doing surgery and want to be a lot more hands on. (D, ID199)

However, there was evidence that the diagnosis and non-surgical management formed an important aspect of the training:

'SOME OF THE [DCPs] REPORTED ENTERING THE TRAINING COURSE AS A PART OF THEIR PREPARATION FOR PROVIDING CARE ON "DIRECT ACCESS" TO PATIENTS…'

My technique has changed, so what instruments I'm using, I'm a lot more confident with the actual root surface debridement and the actual techniques, so that has all changed. […] I think those are the main things. So diagnosing I'm much more confident with, the actual treatment side of it – so oral hygiene and root surface debridement. I'm not doing any surgery so I know. I'm now a lot more clear about when someone needs surgery and when to refer those kinds of cases. (D, ID199)

Health policy and systems

It was strongly recommended that funding systems should be put in place to enable clinicians on future inter-professional training courses in enhanced skills in periodontology to apply these skills in a practice setting.[49-53] The need for health system reform in order to support the application of enhanced skills in practice to improve patient care was identified with a continuous programme of training to be established rather than a one-off course.

When we have trained these people, what is going to happen to them? We want them to deliver a specialist service in enhanced care, with enhanced skills, so how is that going to happen, where is the funding going to come from, who is going to appoint them, what is the contract going to look like, all that should have been decided before so as soon as they finish it happens. I think the initiative is a good one, my view is that […] the long term impacts […] should have been thought through and determined, I believe that a one-off training (course) doesn't necessarily deliver the capacity that is needed to provide care for the patients, and so there should be a continuous programme, and I believe that at the end of the training, what is needed to enable these people that have been trained to provide the service should have been determined and all the systems put into place. (PHC 219)

The need for NHS funding systems to support the appropriate use of enhanced skills in primary care in the care pathways that are currently being developed[4,6,54,56] was recognised, as illustrated in the following quote.

I think from the commissioners' point of view as well, the move nationally is around developing care pathways, and as you know the concept of a care pathway is a journey for a patient where the patient is seen in the service most appropriate to their needs, so you want to commission a complete care pathway which starts off from, by the patient accessing a general dental practice, on the other end of the scale accessing a hospital service, and so in order to deliver that pathway you need the intermediate service, so its commissioner wants to commission a complete care pathway. (PHC 219)

DISCUSSION

This paper presents the findings of an initiative involving inter-professional education to provide extended skills training in periodontology, which the authors believe is the first of its kind. The findings from this mixed methods evaluation suggest that the programme set out to contribute to service, education and professional outcomes, alongside improving quality of care and patient outcomes, and fulfilled these objectives to some extent. It tested the feasibility of assessing patient-outcomes, clinical and reported, which were positive overall. Furthermore, the evaluation highlighted the importance of formalising service, educational and professional outcomes. Thus, there is important learning from the pilot in relation to the feasibility of training and its evaluation, as well as expectations and outcomes for health professionals which can inform policy, practice and research.

First, patient care should be central to any professional development initiatives and there was clear evidence from two phases of the study that patients benefited from the care received. The findings from the clinical records in clinicians' logbooks demonstrated improvements in periodontal health, across patients responding to the survey from practice and hospital settings. It has, however, to be acknowledged that these patients are likely to represent clinicians' best cases during this period of oversight and training and there was no blinding. Triangulation, provided by the wider patient survey, supported the clinical findings with a reduction in periodontally-related symptoms as a result of their care. Additionally, patients were very supportive of the way they were managed and overall satisfaction ratings were high. One further caveat is that as many of these patients were treated in hospital, rather than under practice conditions, they may have received more time with clinicians. Thus, future research should follow patients managed by those with enhanced skills training in their natural practice settings, involve independent examiners and consider cost-effectiveness of care, if services are to be expanded to meet wider patient needs.

Second, this course has a clear role in supporting the professional development of the dental workforce. With any new initiative, it is likely that the course applicants are not representative of their profession and are likely to include enthusiasts. Skills at baseline were not assessed, and thus it is not possible to determine if they improved; however, there was evidence of inter-professional learning and good patient outcomes. It should be noted that not all clinicians achieved successful completion of the course; however, the fact that not all did so can be considered a positive feature of the initiative where successful completion was not an automatic outcome. The level of education appears to have been well suited to the dental care professionals' expectations. Professional development opportunities for dental care professionals are limited and this initiative was seen as particularly important for those interested in providing care on direct access to patients. The focus of this initiative was non-surgical periodontal care and this needed to be explicit from the outset as some dentists would have valued developing skills in periodontal surgery.

Third, while participating clinicians emerged with additional knowledge and skills in clinical periodontology, together with enhanced appreciation of inter-professional working which contributed to their professional status and development, all participants had hoped to gain a further qualification. The lack of legitimation of their status and expertise through the educational system was a source of great concern; this represents an important issue for health professionals in general and especially in cases such as training where they are the leaders in a new initiative. Ironically, there was more potential for clinicians working in the private sector to use their enhanced skills in a formal manner than in the NHS. This may be a consideration for the NHS in future as part of workforce developments.[5,57]

Fourth, the programme set out to contribute additional service capacity and capability to the NHS system of care; however, the NHS was going through a period of transition and therefore the potential to increase the capacity of periodontal care has not yet been utilised.

This was one of the perceived failures of the scheme and reflects the concerns of London dentists trained in a similar initiative to gain extended skills in endodontics.[35] Formalisation of this expertise ideally needs to be addressed at the earliest possible opportunity in line with aspirations. It is clear that the training of dentists and dental hygienists/therapists, with some adaptation for prior learning (or lack of it) has much to contribute to all participants and should be continued in future initiatives. Given the level of periodontal need among adults,[58] and our ageing population, consideration should be given to 'extended skills training' nationally, using both dental care professionals and dentists which is in line with emerging guidance on using enhanced skills.[5]

The strength of this research relates to the range of data from the mixed methods approach and the willingness of participants to share both the negative and positive aspects of this pilot scheme. The findings provide clear learning for future action and lend support to the development of future training, and tools with which to conduct its evaluation. One of the limitations was that some course participants did not contribute to the evaluation. The learning from this project suggests that when future educational and service initiatives are being planned, one requirement should be an expectation of participation in the evaluation for all dental professionals and their patients. New initiatives should have built-in evaluation of clinician and patient views from the outset, with clinical outcomes assessed blind for a sample of patients in order to minimise bias.

In summary, there was general support for enhanced skills training involving the dental team to contribute to patient health and the healthcare system. There is evidence that the care provided by these clinicians improved patients' periodontal health and they were very satisfied with the care received. The findings suggest that this two-year course has contributed to the professional development of clinicians, together with a fresh appreciation of inter-professional working. This initiative demonstrates the potential for inter-professional education with clear learning for future programmes and provides instruments for a robust evaluation involving a trial. It should provide clinicians with the confidence to contribute data to enable its evaluation when funded through public resources. Overall the findings suggest that clinicians with additional and/or enhanced skills have a role to play in developing and delivering future NHS services;[60] however, this should be supported by the opportunity to gain qualifications,[59] and compete for a service contract. Any future initiatives need to be firmly embedded in educational, professional and health service systems as initiatives for 'enhanced skills training', with a clear educational outcome, approved professional status and the opportunity to use these skills within the health service.

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Two *outstanding* DCP students

Susannah Palumbo and Felicity Slater were awarded the BDA Education Outstanding Oral Health Education Student and Outstanding Dental Radiography Student 2016 respectively at the recent BDA Honours and Awards ceremony in Manchester. *BDJ Team* caught up with the award winners to find out more about their experiences and their career aspirations.

Susannah Palumbo
BDA Education Outstanding Oral Health Education Student 2016

When did you first qualify as a dental nurse?
I qualified as a dental nurse in 1992.

What is the name of your current practice and how long have you worked there for?
I work at J Smallridge Dentalcare in Ipswich. The practice has been open just over a year. I was delighted to join Jackie Smallridge when she opened her own practice and it is because of her and her encouragement and support that I studied the oral health education [OHE] course.

How did it feel to be awarded the BDA Education Outstanding Oral Health Education Student of 2016?
I was totally overwhelmed when I received the letter to inform me I had won the award. It was a complete surprise and a very big honour.

How was the Awards Ceremony?
The award ceremony was set in the beautiful historic Town Hall building in Manchester. It was a great experience; I enjoyed a lovely meal and talking to some of the other guests. I was a little nervous and seeing all the other winners go up to collect their awards made me feel very proud that I had achieved my award and was included on this special evening. The other awards were presented to a whole range of roles within the dental team and it was very interesting to hear and read about the other award winners.

How did you feel about taking the final examination online, rather than going to an exam centre?
Taking the final exam online was completely new to me, having only sat exams within a formal setting. I found I was still nervous but not having to attend an unfamiliar setting eased some of the exam day stress.

What did you think of the BDA online course in Oral Health Education?
The BDA OHE online course was very enjoyable; I found the weekly modules interesting and informative. The course had a good mix of online and written course material. I did have to email the support team and they were very prompt at getting back to me with the information I required. I have a busy family life and I found that the course was able to fit around my lifestyle.

Since passing the exam how have you used your OHE qualification?
Since passing the OHE and gaining the qualification my confidence has grown; I feel I have more to offer within the practice whether it is within my nursing role or in my new role as an oral health educator. Giving patients time and information to help them improve and maintain good oral health is very rewarding.

Do you plan to take any further courses to develop your career in the future?
I have recently completed an online Fluoride Varnish Application course and found that this additional qualification works well with my OHE and has helped develop my career.

Felicity Slater
BDA Education Outstanding Dental Radiography Student 2016

When did you first qualify as a dental nurse?
I qualified in May 2009, passing with merit.

What is the name of your current practice and how long have you worked there for?
I work at Ferndale Dental Clinic in Devizes, and have been there for two and half years.

How did it feel to be awarded the BDA Education Outstanding Radiography Student of 2016?
I was very surprised but felt extremely honoured and proud also.

How was the Awards Ceremony?

I thoroughly enjoyed the ceremony and it was lovely to meet and chat with others in the dental industry. The venue was amazing and it was lovely to watch others accept their awards and hear about their contributions to dentistry.

How did you feel about taking the final examination online, rather than going to an exam centre?

I felt very comfortable taking the exam online. I didn't feel as nervous as I would in a more formal environment, and it was easier to arrange childcare around the exam.

What did you think of the BDA online course in Dental Radiography?

I found the course was presented very well online and it was very easy for me to fit the course in around work and looking after my children. I found the content was explained very well and using the online programme was very straightforward.

Since passing the exam how have you used your Radiography qualification?

I regularly use my qualification to take OPT x-rays and also additional radiographs as required.

Do you plan to take any further courses to develop your career in the future?

At the moment I don't have any plans to undertake any further courses however I am always looking to further my knowledge in the dental industry and may consider more courses in the future.

To find out more about the BDA's online qualifications in Dental radiography and in Oral health education, visit https://www.bda.org/dcps. The BDA also offers a short course in Decontamination; training courses on clinical and non-clinical topics; a course on Child protection and the dental team; and Cancer Research UK's oral cancer recognition toolkit.

Don't forget, *BDJ Team* provides ten free hours of verifiable CPD a year too! https://cpd.bda.org/login/index.php

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What happens in the lab?

Ashley Byrne[1] explains the basics of making a crown using digital dentistry.

A single crown can be constructed using various methods and techniques but in the modern dental lab the days of metal castings are all but gone and stone models are rapidly on the decline. At Byrnes dental laboratory we do still produce metal bonded with ceramic but the sub frame would now be produced using 3D printed metal, which is explained in this article.

Intra oral scan

The first stage of making a single crown starts with a scan of the mouth, the opposing occlusion and the bite registration. Whereas in a normal impression this is a three stage process of upper, lower and a silicone occlusal record, digitally this is now a half scan of the preparation arch and a close scan of the prepped tooth, flowing into the half scan of the opposing arch and then straight onto a simple scan of the upper and lower buccal surfaces in occlusion. This method is not only quicker and easier but it is also shown to be preferred by the vast majority of patients.[1]

IOS scan sent to the laboratory

This process happens via the Cloud and the laboratory will receive the digital scan, patient's details and the restorative prescription often while the patient is still at the practice. The file is then converted into what is known as an .stl file and this file is then used to design and manufacture a crown as well as the digital model. One of the great aspects of using digital files is that both the crown and the model can be designed independently and manufactured at completely different times without affecting one or other of the manufacturing process. In some cases we can now even manufacture the crown using a virtual model and never having an actual model in our hands but this is not common at this time. If we design the model using model builder software the model is then exported and can be either milled in polyurethane or printed using a resin 3D printer. This model is the true representative of the mouth and preparation and allows us to start the process of making a crown.

The single crown in digital dentistry comes in many forms and materials and every type has its advantages and disadvantages. The two most common ways to produce a crown are full contour all ceramic or cut back metal/ceramic coping and then veneered with ceramic.

The full contour crown

This type of crown is usually limited to the posterior of the mouth as the aesthetic demands are not as high as an anterior restoration. In this case the model or scan file .stl is imported into the CAD software. The margin is then selected and then a crown is designed virtually on the screen in 2D using the dental specific CAD software. The occlusion and contacts are checked as is the aesthetic position and we can even check the excursive movements if the virtual articulator in the software is used. The crown is then exported as another .stl file which then allows us to mill this in a variety of materials, however, this is most commonly a multi-layer all ceramic. This ceramic material is milled in a soft state then sintered overnight. The ceramic crown is then stained and glazed in the lab by a technician. The initial stain of the darker colours is fired onto the crown

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[1] *Ashley Byrne is the owner and managing director of Byrnes dental laboratory, a team of highly motivated dental technicians at the forefront of digital dentistry. They are based in Wheatley, Oxfordshire and were once featured in* BDJ Team's *predecessor,* Vital.[2] *Ashley lectures on digital dentistry and is constantly pushing the boundaries of digital dental technology.*

and then another two layers of lighter stain are added to create a natural looking crown. These stains are fired onto the crown around the 850°C temperature but vary depending on the ceramic stain manufacturer. This crown is then hand polished for a natural surface finish. Once all these stages are complete the crown is checked again for contacts and occlusion on either the milled or the 3D printed model before being sent to the clinician.

Cut back coping and veneered method

There are two groups of materials used in the cut back and veneer method and these restorations are used in both the posterior and anterior regions when a higher level of aesthetics is required. A veneered crown from a dental technician is considered the highest aesthetic option and so always used in the anterior. The digital CAD stages of producing a coping come from an initial full contour crown design; using this method is very similar to the above full contour however at the stage when the full crown is finalised, the crown is virtually cut back to allow porcelain to be added to the coping. This cut back is carefully done by a trained dental technician to ensure the space is large enough for the aesthetics required but also small enough to ensure good ceramic support so the risk of a ceramic fracture is reduced or even eliminated. Once this coping is designed then like the full contour, the coping is exported as an .stl and then milled or printed.

Metal coping

The metal coping can be milled from a variety of metals but more commonly we use selective laser melting and Combat Chromium. The metal is effective 3D printed in tiny 25 micron thick layers and then fused together. This technology allows copings to be produced accurately plus the material bond strength to the ceramic is incredibly high which vastly reduces fractures. The copings are printed on tiny legs which are then removed, trimmed and sandblasted ready for the veneering ceramic.

All ceramic coping

All ceramic copings are milled in the same way as the full contours discussed earlier but they are simply a different shape.

Veneering the coping

Both all ceramic and the metal 3D printed copings are produced using similar methods but the one main difference is the initial layer. On the metal coping due to its grey colour, an opaque layer of ceramic is added in the relevant base colour to mask the metal colour. This opaque layer is fired onto the metal at the ceramic manufacturers' recommendation which is usually around 950°C. The all ceramic coping is fired with a liner to aid bonding but this is not used to mask the colour as the all ceramic is already tooth coloured. Both metal and all ceramic is now treated the same way. The coping is then veneered with a variety of porcelain colours which vary in opacity, fluorescence and translucency as well as colour. Dentine is layered on first then enamels and translucent ceramics on top to create a beautiful natural looking tooth which is custom hand-made especially for the patient. After firing the ceramic will shrink so the skill of the technician is used to manage this and add ceramic where needed. This is then trimmed into the shape required as well as on the model to check contacts, occlusion and aesthetics. More ceramic is then added where needed. The crown is fired once more and then again for a final glaze firing. The very last stage is to hand-finish the crown for contacts, occlusion and to hand polish it for natural surface texture. The veneered crown is now ready for fitting into the mouth.

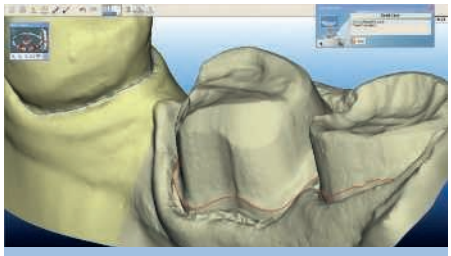

Image 1 - An example of a clear intra oral scan of a preparation

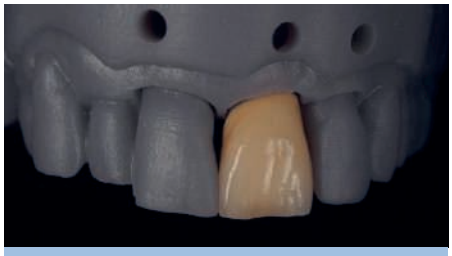

Image 2 - An anterior crown with ceramic bonded onto the metal for optimum aesthetics on a 3D printed model

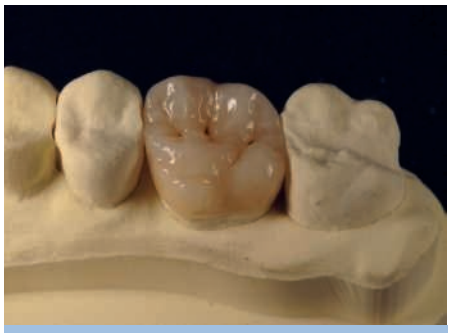

Image 3 - A full contour Zirconia crown stained and glazed on a milled polyurethane model

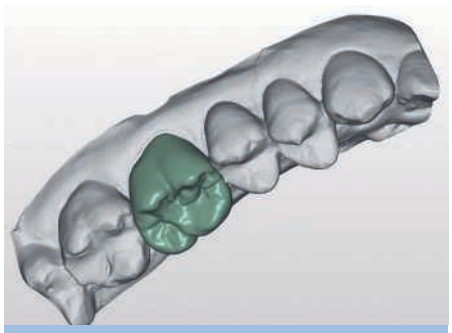

Image 4 - Designing a fill contour crown using lab CAD software

'THE SINGLE CROWN IN DIGITAL DENTISTRY COMES IN MANY FORMS AND MATERIALS AND EVERY TYPE HAS ITS ADVANTAGES AND DISADVANTAGES'

1. Joda T, Brägger U. Patient-centered outcomes comparing digital and conventional implant impression procedures: a randomized crossover trial. *Clin Oral Implants Res* 2016; **27:** e185-e189. doi: 10.1111/clr.12600.
2. Maynard K. 'I wouldn't change this job for anything' *Vital spring* 2012; 24-29.

Did you see *An introduction to crowns* in our March 2017 issue?

https://www.nature.com/articles/bdjteam201761

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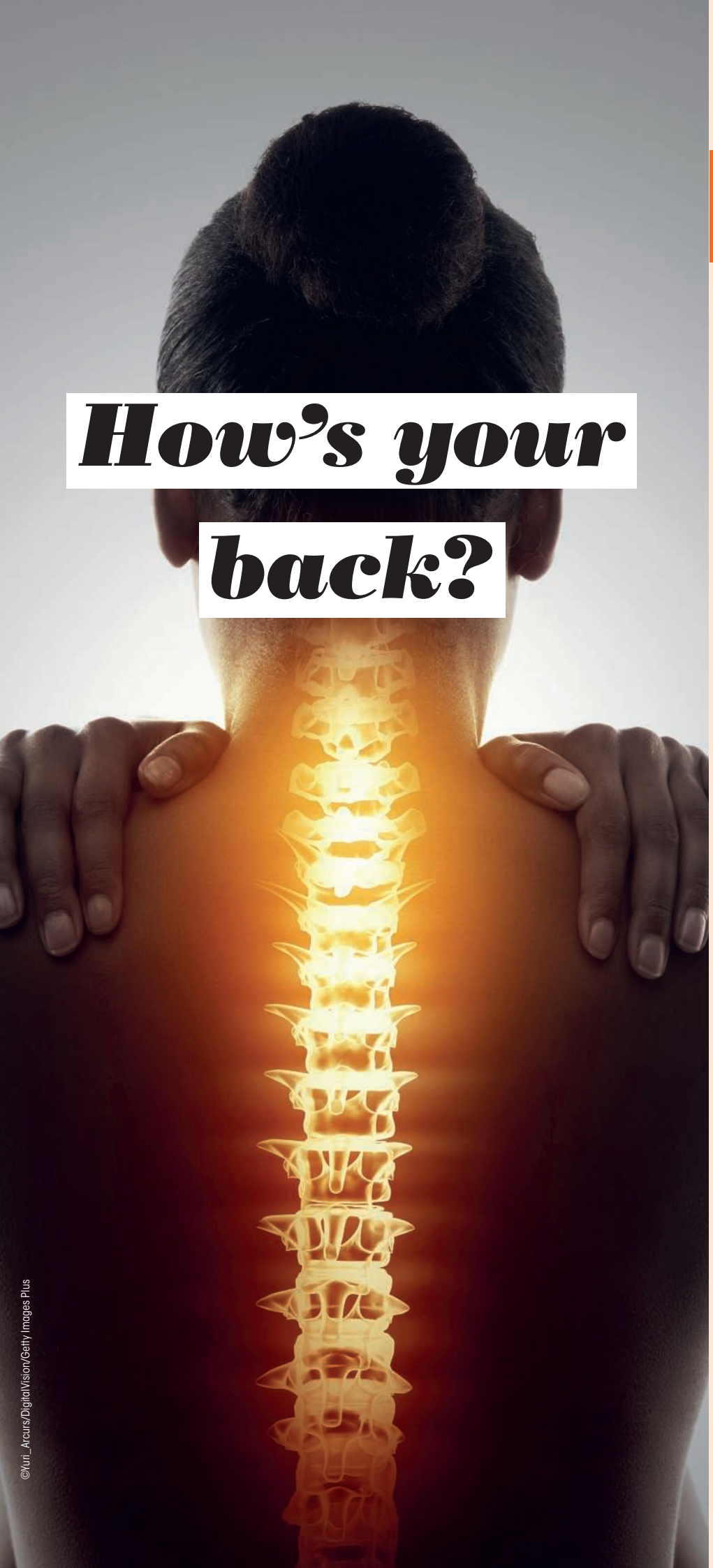

How's your back?

As a dental professional, it is difficult to avoid prolonged static postures. Dr **James Tang**[1] provides practical guidance for dealing with musculoskeletal disorders.

May I start by asking you two questions?

Do you think you are healthy? It may seem a bit strange to ask you this but according to the World Health Organisation, being healthy is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity.

Do you suffer from back/neck pain or have you had back/neck pain in the past? Although these conditions are common, they are preventable in most situations.

Introduction

The human movement system (HMS) consists of the muscular system, the skeletal system and the nervous system. Throughout the body, muscles work in synchrony and rarely does a single muscle work without other muscles contributing. This is because the functioning of the body is an integrated and multidimensional system and consequently impairment in one system or the components of each system can lead to compensation and adaptation in other systems, thereby initiating the cumulative injury cycle.

In order to explain why static postures are detrimental, whether standing or sitting, we need to understand that muscles adapt to the positions we put them in. The longer we hold them in a certain position, the more tissue adaptation occurs. Muscles can therefore become adaptively shortened or lengthened depending on the position we put them in.

[1] *GDP, NASM Corrective Exercise Specialist, Level 3 Personal Trainer (REP registration no R1045463), Sports Nutritionist & Level 4 Sports Massage Therapist, with special interest in postural dysfunction and lower back problems*

This is because our bodies are not designed to maintain the same body position hour after hour, day after day. But, unfortunately, dental professionals often cannot avoid prolonged static postures. Although the body is efficient in adapting to the stresses that we place upon it, these adaptations will lead to muscle imbalances, predisposing to back and neck problems. The sooner we master the economic use of movements, as well as a posture that is friendly to the spine, the greater the chance of preventing associated musculoskeletal conditions.

Why is good posture important in the prevention of neck and back pain?

The spine has four natural curves in the saggital plane (ie when viewed from the side) – cervical lordosis, thoracic kyphosis, lumbar lordosis and sacral kyphosis – and these curves are essential for shock absorption (Fig. 1).

In the neutral position, the spine is mainly supported by the bony structures of the vertebrae resting on top of one another. When these curves become either exaggerated or flattened, the spine increasingly depends on muscles, ligaments and soft tissues to maintain its erect position – causing tension in these structures – leading to lower back strain and trigger points. Over time, this will lead to spinal disc injury.

It is important to remember the following points:

- Back and neck pain are common amongst dental professionals
- The vast majority of these conditions are musculoskeletal in origin, commonly caused by poor posture, leading to muscle imbalances and the formation of trigger points
- If you are unlucky enough to suffer from persistent neck or back pain, such conditions can probably be managed by using corrective exercises
- How do you know if your back pain is related to serious spinal injury? Well, if the pain persists for more than six weeks, is constantly intense, or is getting worse, it is definitely worth further investigation
- Everyone is different and if you do suffer from back or neck pain, it is advisable that you first seek medical advice to eliminate any underlying pathology such as problems with your intervertebral discs, osteoarthritis or a tumour etc
- In this article, the author is aiming to give you general advice purely from the perspective of an exercise professional. Furthermore, it is advisable to seek help from an appropriate professional who is able to devise a bespoke set of corrective exercises to suit your own individual circumstances.

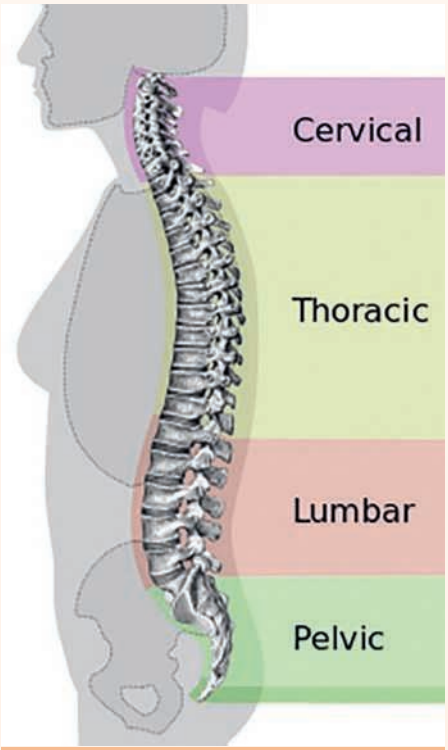

Fig. 1 Four spinal curves

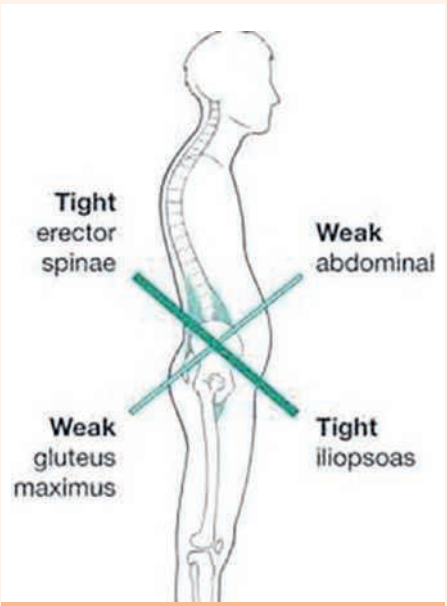

Fig. 2 Lower cross syndrome

Reciprocal inhibition

This is the process of muscles on one side of a joint relaxing to allow contraction on the other side of that joint.

If you sit down all day (hip flexion), your hip flexor will be in a constantly contracted state, whilst the gluteus maximus (antagonist) will be neurologically switched off through the process of reciprocal inhibition. The glutes are therefore not able to contribute to hip extension and stabilisation. As a result, other helper muscles (the synergists) have to take over.

Movement occurs through the coordinated contraction of a number of muscles around a joint. If the prime mover (glutes) does not contract properly, then the brain will look for alternative solutions to create the same movement, resulting in the synergist taking over the role of the prime mover (ie synergistic dominance). This is a temporary solution to ensure that the correct movement occurs. But, synergists are not designed to be the agonist and they are less efficient. Over time, this can lead to dysfunctional movement patterns which can result in injury.

Common postural problems associated with neck and lower back pain

Lower cross syndrome

This is the result of muscle imbalances in the lower segment which can occur when muscles are constantly shortened or lengthened in relation to each other. Lower crossed syndrome is characterised by specific patterns of muscle weakness and tightness that cross between the dorsal and ventral sides of the body (Fig. 2). There is tightness of the erector spinae and the hip flexor group of muscles. In addition, there is weakness of the glutes and the deep abdominal core muscles. The hamstrings are also usually tight. These imbalances result in an anterior tilt of the pelvis, increased flexion of the hips and a compensatory hyperlordosis in the lumbar spine. Generally speaking, this postural deviation is prevalent in those who sit for a prolonged period of time, such as dental professionals. Corrective exercises involve the activation of the deep core abdominal muscles alongside the glutes. The tight hip flexors need to be stretched.

Corrective exercises for lower cross syndrome

Hip flexor stretches

Kneel with one knee on the floor and your other foot in front of you with the knee bent at a 90-degree angle (Fig. 3). Push your hip forward and keep your back upright. Hold until the tension alleviates; then, take the stretch further once more until the tension subsides.

Activation of the transversus abdominis (TvA)

Due to years of misuse, eg sitting on a stable

Fig. 3 Hip flexor stretch (posed by the author)

surface for a prolonged period of time, these stabilisation muscles are 'switched off'. The TvA is one of the muscles responsible for the forced expiration of air when we cough. The TvA provides a stable base within the centre of the body for activities that are more distal, such as heavy lifting or indeed working on patients. With this in mind, it would be useful to be able to pinpoint the TvA and consciously activate it.

Teaching points: lie on your back with your knees bent at 90 degrees.
Find a position two inches below the navel and two inches to either side. Press lightly on each side using the first two fingers of your hands (this is the location of the transversus abdominis) and then cough. You should be able to feel the contraction under your fingers as the TvA fires.

Breathe out completely, try to draw your navel in as far as possible and tilt your pelvis up very slightly. You should feel the contraction of the TvA. Start breathing normally whilst maintaining the contraction of the TvA.

The aim of the exercise is to try and replicate the contraction felt whilst coughing but without actually coughing.

Once you can contract the transversus abdominis, perform the same action without holding your breath or contracting the rectus abdominis.

Glute activation exercises, eg glute bridge

This is probably one of the most useful exercises ever, but all too often its benefit is negated by poor technique; it is important to remember that you should not use your lower back or your hamstrings to perform this exercise.

Lie on the floor on your back. Bend your knees at a 90-degree angle. Contract or squeeze your glutes (you should be able to feel them tightening) to lift your hips and thighs off the floor to form a straight line between your knees and shoulders, maintaining a neutral spine with your core tightened.

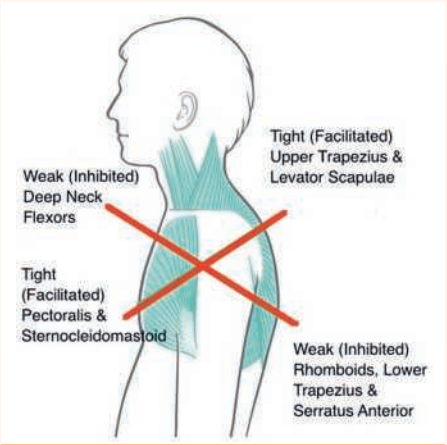

Fig. 4 Upper cross syndrome

Upper cross syndrome (Fig. 4)

For the upper body, dental professionals tend to bend forward, protracting their shoulders for a prolonged period leading to a hyperkyphosis and a forward head posture.

'DENTAL PROFESSIONALS TEND TO BEND FORWARD, PROTRACTING THEIR SHOULDERS FOR A PROLONGED PERIOD'

By holding the head and neck in an unbalanced forward position, the spine increasingly depends on soft tissues to maintain an upright position. For example, the upper trapezius and erector spinae must contract constantly to support the weight of the head in the forward posture, predisposing to the formation of trigger points in these muscles leading to the predictable referral pain patterns including tension neck syndrome characterised by headaches and chronic neck pain.

The pectorals are also tight. Those that are commonly weak include the deep cervical flexors, lower trapezius and rhomboids. If it has been determined that your neck pain is caused by muscle imbalances, this needs to be rectified by using the following corrective exercises.

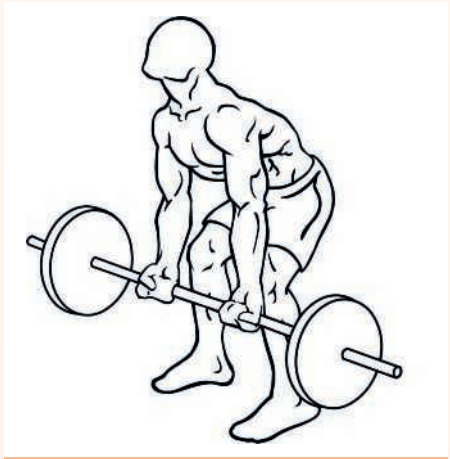

Fig. 5a Barbell bent-over row (begin)

Fig. 5b Barbell bent-over (end)

Corrective exercises for upper cross syndrome

An example of a pectoral stretch

Doorway chest stretch – stand in an open doorway and place your hands on the inside door frame with your arms at shoulder level, holding them straight. Lean forward until you feel a stretch in your chest.

Examples of strengthening exercises for the middle trapezius and rhomboids: 3-4 sets of 12 repetitions.

Barbell bent-over row (Fig. 5): stand holding a barbell with an overhand grip, your hands slightly more than shoulder-width apart. Push your hips back and bend forward until your torso is almost parallel to the floor. Draw the bar towards your rib cage. Pause and then lower the bar. Maintain a slight bend in your knees throughout the movement.

Fig. 6 Seated row with resistance band

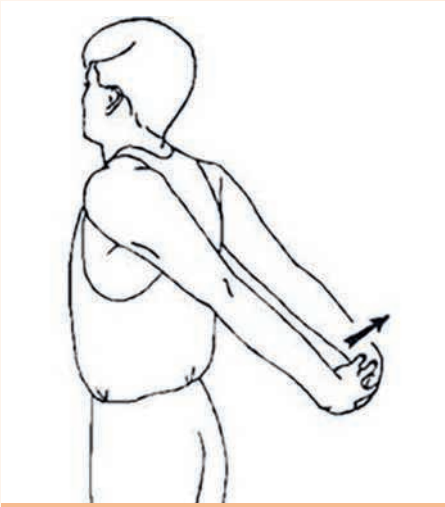

Fig. 7 Pectoral stretch with hands clasped at back

Seated row with resistance band (Fig. 6)

Teaching points: sit up straight on the floor and tighten your core to avoid injuring your lower back. Wrap the band around your feet, bend your elbows and pull the band towards your body, at the same time squeezing your shoulder blades. Hold for a few seconds and slowly return to the starting position.

You can actually stretch your pectorals and strengthen your upper back with one simple exercise that can be easily done regularly at work (for example, between seeing patients). Simply clasp your hands behind your back, retract your shoulders and squeeze your scapulae (Fig. 7) – hold this position for a few seconds before releasing.

Strengthening exercise for the deep neck flexors

Since weaknesses of the deep neck flexors are commonly associated with neck pain (similar to weakness of the transversus abdominis being commonly associated with lower back pain), there are exercises that can be used to reactivate these muscles.

Neck flexors can be activated by simple head-nodding motions (chin tucks), ie by moving the chin closer to your 'Adam's apple'.

Teaching points of chin tucks: stand against a wall so that when you retract your head, it just touches the wall. Hold this position while breathing normally for 10 seconds and repeat the process 12-15 times. Progression - hold for longer as you become stronger.

Conclusion

It must be emphasised that exercises alone are insufficient; you must also be mindful of the following advice.

Besides corrective exercises, it is imperative to develop good postural habits by improving your general work ergonomics. You should train your body so that you can recognise when you are adopting a poor posture. Correcting your posture may feel awkward initially because your body has adapted to sitting and standing in a particular way.

Only a limited variety of corrective activities for postural dysfunctions that predispose to neck pain have been mentioned and there are numerous alternatives available. The objective of this article is to simply highlight the harmful consequences of poor posture for the neck and lower back due to the practice of dentistry, as well as some of the ways to counteract these adverse effects. It is imperative that you engage an appropriate professional to give you advice and guidance to ensure that the correct activities are being selected for your particular situation.

The author of this article injured his back when lowering a piece of luggage around 15 years ago. He realised that the reason his back was so vulnerable was due to his job as a dentist, which inspired his special interest and studies in lower back pain and postural dysfunction.

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For more information on Waterpik International, Inc. visit www.waterpik.co.uk. Waterpik products are available on Amazon, in Boots, Costco UK and Superdrug stores across the UK and Ireland.

1. Jolkovsky D L, Lyle D M. Safety of a water flosser: a literature review. *Compend Contin Educ Dent* 2015; **36:** 146-149.
2. Lyle D M. Risk assessment a key to periodontal health promotion and disease prevention. *Compend Contin Educ Dent* 2014; **35:** 392-397.

A SMART TOOTHBRUSH WITH DRAMATIC BATHROOM APPEAL

Philips Sonicare has revealed a new flagship innovation – the DiamondClean Smart – dubbed the world's most intelligent toothbrush. The new brush uses unique connected technology to inspire and motivate patients to take better care of their oral health. It delivers exceptional oral care results by harnessing built-in smart sensor technology in both the toothbrush and brush heads and personalised coaching within the platform to help improve patients' brushing technique and ultimately achieve a healthier mouth. The new brush seamlessly syncs with the Philips Sonicare app, giving users real time data, feedback and guidance to empower them to proactively manage and improve their oral health.

DiamondClean Smart is smart in more ways than one – it also has dramatic bathroom appeal with its matt black handle, black brush head and charge-in-a-glass technology. The brush can also be charged using a computer USB to top up whilst travelling.

Philips interproximal cleaning device, the AirFloss, has been upgraded with a new Charge and Fill docking station. The new add-on allows users to automatically refill their AirFloss with water or mouthwash in less than ten seconds without worrying about juggling bottles or spills. The compact docking station filler holds enough liquid for two weeks' worth of cleaning, without the faff. At the end of the one minute, full mouth clean the AirFloss can then re-dock to keep the device charged and ready to use (although it holds two weeks charge for people on the go).

For further information on the latest Philips innovations visit www.philips-tsp.co.uk or call 0800 0567 222.

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TEST YOUR ORAL HEALTH KNOWLEDGE

Johnson & Johnson, the makers of LISTERINE, launched The Oral Health (OH) Challenge at the 2017 British Dental Conference and Exhibition.

The OH Challenge is a simple survey tool created for dental health care professionals to test their knowledge in relation to soft tissue health and preventive care, and to identify any gaps in current professional knowledge.

BDJ Team readers are invited to take part in this important survey challenge. Your involvement and the results gathered will help create bespoke articles for the dental profession, designed to increase understanding of these all-important issues.

The OH Challenge is supported by Iain Chapple, Professor of Periodontology, Consultant in Restorative Dentistry and Head of the School of Dentistry at the University of Birmingham, and Julie Rosse, a past President of the British Society of Dental Hygiene and Therapy and practising hygienist.

The OH Challenge is available online for all dental health care professionals. Visit www.listerineprofessional.co.uk now to test your own knowledge and follow the supporting programme of evidence-based content that will be released in instalments over the course of the year.

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BDJ Team CPD

CPD questions: July 2017

CPD: ONE HOUR

Treatment of dental caries under general anaesthetic in children

1. Which of the following statements is **not** made in this article?
A) dental caries is the most common reason for a child to be admitted to hospital for a general anaesthetic
B) DGA costs the NHS around £30 million a year
C) dental caries affects over 600 million children globally
D) the number of children receiving DGA has dropped since 1997

2. Which of the following might influence the treatment approach under GA?
A) co-existing medical conditions
B) the restorability of the carious teeth
C) parental wishes
D) all of the above

3. Select the **correct** statement.
A) the risk of mortality associated with DGA is high
B) nausea, pain and bleeding are experienced by up to 90% of children following DGA
C) one study showed that there was a decrease in dental anxiety in children following treatment under GA
D) the risk of mortality associated with DGA is approximately one in 25,000

4. a) the most commonly described negative outcome associated with the DGA by children was pain, in a study by Rodd; b) parents/caregivers have a low to moderate overall agreement with their child's ratings of health-related quality of life
A) only a) is correct
B) only b) is correct
C) both statements are correct
D) both statements are incorrect

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