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JANUARY 2015

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January 2015

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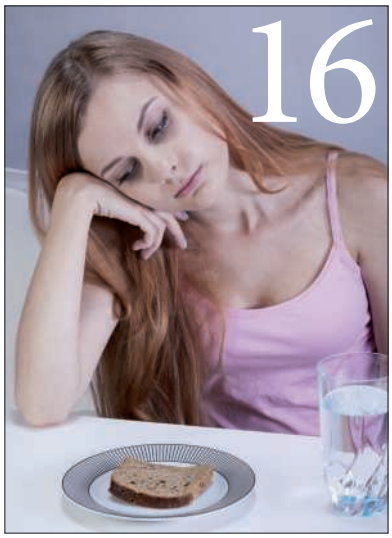

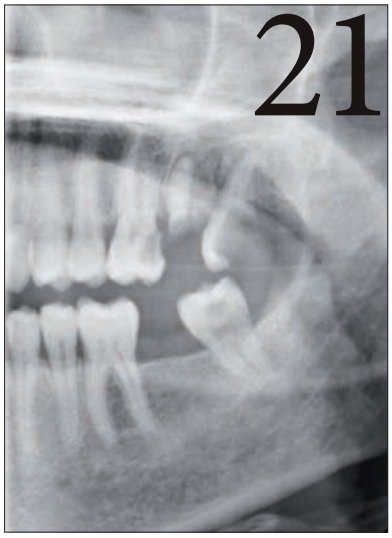

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GDC DEFEATED BUT ARF HIKE FOR DENTISTS STANDS

In a landmark judgement on 18 December 2014, the General Dental Council (GDC) was found to have acted unlawfully on setting professional fees.

The British Dental Association (BDA) initiated Judicial Review proceedings to prevent the regulator implementing a £15 million increase to the fees levied on the dental profession. The consultation behind the annual retention fee (ARF) rise has been deemed unlawful, but the judge declined to reverse the fee rise for dentists, their counsel citing the risk of 'administrative chaos' at the GDC.

The BDA reacts

Mick Armstrong, Chair of the BDA, said: 'We regret that it came to this, but there was so much more at stake here than just fees. We've seen patients and practitioners left in limbo for over 18 months when complaints are raised, and hearings with an average price tag of £78,000. Health professionals should not have to subsidise failure at their regulator.

'This super-sized fee rise still stands, and now serves as a monument to the failures of health regulation. This case has revealed that a regulator, unaccountable to government, can be found to have acted unlawfully but still walk away with its ill-gotten gains. We are now looking to the Government to act.'

The BDA has written to the Department of Health to outline the worrying implications of this case.

DCPs

Although the ARF has been increased for dentists, the fee for dental care professionals (DCPs) was reduced from £120 to £116.

The British Society of Dental Hygiene and Therapy (BSDHT) expressed its bitter disappointment at the outcome of the Judicial Review.

BSDHT President Michaela ONeill said: 'Throughout the process we have fully supported our dentist colleagues. Although the proposed increase in the ARF is not significant for our members, it could potentially have a severe effect on the landscape of dentistry in the UK, a strained relationship between the profession and its regulator, and a decrease in practice investment in order to pay the increased fee. [...]

'We look forward to the GDC striving to be helpful by plugging any information gaps in future consultation documents so that its membership can retain confidence in its continuing role as our regulatory body.'

DENTAL NURSES HELP THE HOMELESS AT CHRISTMAS

A team of dental nurses gave up their free time over the festive season to provide free dental treatment to homeless people. From 23-29 December the group of volunteers for Crisis at Christmas tended to the oral health needs of almost 400 people living on the streets taken in and cared for by the charity. They provided treatment around London inside four mobile surgery units lent by various community dental services, using sterilisation equipment provided by Henry Schein.

First time volunteer, dental nurse Egle Valeikaite, said: 'Volunteering with Crisis Christmas was one of the most memorable things I have ever done. I saw pain disappear and grateful faces appear and, rather than spending my money and going ahead with consumerism trends, I spent my time at service to others.' For further information about volunteering with Crisis at Christmas, visit www.crisis.org.uk/pages/dental-servicevolunteer.html

DENTISTS MUST VIEW DENTISTRY AS A TEAM EFFORT

The British Association of Dental Therapists (BADT) is asking all dentists to make a New Year's resolution to view the delivery of dentistry as a team effort.

The call comes as a study predicts a sharp hike in demand for dental therapists in the next ten years. The study – from the Centre for Workforce Intelligence (CfWI) – indicates a likely steep increase in demand for dental hygienists, dental therapists, orthodontic therapists and dental nurses in the run up to 2025.[1]

BADT president, Fiona Sandom, has warned that for this to work, the profession needs dentists to be 'open minded and embrace the changes within dentistry' by developing a multi-skilled dental team and delegating tasks to other members.

In a bid to support this step change, Fiona has already pledged to work towards changing the 'unfair' status quo on prescribing rights for dental therapists.

The BADT is meeting with the UK's chief dental officers early this year to discuss the 'extremely limiting' Patient Group Directions, something the BADT sees as a barrier to dental therapists carrying out their full scope of practice.

1. Centre for Workforce Intelligence. Securing the future workforce supply: Dental care professionals stocktake. October 2014. Available at: http://www.cfwi.org.uk/publications/dental-care-professionals-stocktake/@@publication-detail (accessed January 2015).

AN A TO Z OF ROOT CANALS

Harley Street endodontist Julian Webber has compiled the UK's first 'Rootipedia': an online glossary of terms with the aim of demystifying root canal treatment.

Rootipedia can be accessed at www.roottreatmentuk.com and is in an easy-to-navigate A-Z format compiled by a trusted source. It contains both information and advice is intended to give patients a clearer understanding of this complex treatment and easy anxiety and uncertainty.

Do you have a news story that you would like included in BDJ Team*? Send your press release or a summary of your story to the Editor at bdjteam@nature.com.*

Training Essentials

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Management of medical emergencies CORE

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Essential CORE CPD is delivered by expert speakers in this one-day course to help you keep up to date with latest standards and procedures and give you the confidence to deal with any medical emergency that could arise in practice.

An IRMER course in dental radiography and radiation protection CORE

MANCHESTER – 13/03/2015 – 6 hours verifiable CPD

This one-day course will be of interest to general dental practitioners as well as IRMER operators: hygienists, therapists and dental nurses who have already obtained their dental radiography certificate.

Safeguarding children and vulnerable adults

LONDON – 20/03/2015 – 4 ½ hours verifiable CPD

Speakers Rosie Carter, Founder of SAFEcic and Sue Ward, Lead Dentist, Children's Safeguarding, NHS Sussex, will guide you through your legal and ethical responsibilities and ensure you and your team are compliant with Regulation 11 and outcome 7 of the CQC Essential Standards.

Grow your dental practice using effective retail strategies

LONDON – 27/03/2015 – 4 ¾ hours verifiable CPD

Receive unique insights into how practices grow in this highly practical course that will motivate and inspire you to grow and develop your practice. Speaker Simon Hocken has over 15 years' experience of business coaching having helped over 750 dental practices reach their business potential.

One day courses:

BDA members	£215 per person
Non members	£315 per person
DCPs	£135 per person

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Books for dental care professionals

Members of *BDJ Team*'s reader panel review some of the latest publications on the market.

Putting health at the heart of your practice

This book is written by Sheila Scott and published by Dental Protection. It can be ordered from www.sheila-scott.co.uk for £13 (ISBN 9780992932107).

'It's not all about dentistry': this is a symbolic message from Sheila Scott's new book *Putting health at the heart of your practice*. Her insightful and no-nonsense philosophy shows us what makes a successful ethical practice and how to tap into the 'well-being' culture that has emerged in the UK in the last few years.

> 'Sheila ultimately highlights the crucial role hygienists have in delivering periodontal care to patients.'

With this book Sheila really shows us how to embrace a preventative approach and sets us on a path that will ultimately lead us to better health for our patients.

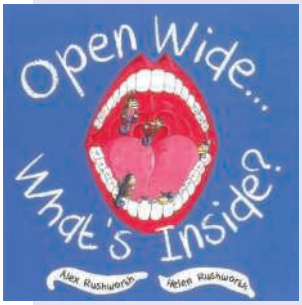
She hits the right note with her dedication to helping to lift the role of dental hygienists within the dental team; we are not simply in practice to provide 'routine scale and polishes' and she ultimately highlights the crucial role hygienists have in delivering periodontal care to patients.

This is a simple, effective book that makes great reading. Sheila really nailed it with this one!

Gemma Langford, dental hygienist;* BDJ Team *reader panel member

Open wide... What's inside?

This children's book is written by Alex and Helen Rushworth and published by Rushworth Publishing. It can be purchased from all good book shops and websites (ISBN 9780957439917).



I have been an oral health educator for four years now and I like to look for books that are suitable for children for the purpose of reading in the waiting lounge, in surgery or during community awareness sessions.

I am also mum to two young girls: Olivia who is six and Seren who is almost three.

Open wide… What's inside? provided a great bedtime reading session. The use of language and pictures was spot on for my six-year-old. Alex and Helen Rushworth have been really clever in their tale of the sugar bugs who fill themselves up on the foods that we eat then when they have big fat bellies they need to poo!

'On top of your leftovers, which look like furry goo, there's now a pile of eye-wateringly stinky poo. It's nasty stuff. It drips and runs down your teeth onto your gums. And unless you brush them twice a day on your teeth that poo will stay.'

It then goes on to tell the reader how brushing twice a day will find those sugar bugs and chase them away, emphasising the importance of visiting a dentist as well. The book also includes some interesting facts for the older reader.

> 'The book had a big impact on my six-year-old; not only did it provide giggles and screams of "yuck!" but the message remained with her.'

The book had a big impact on my six-year-old; not only did it provide giggles and screams of 'yuck!' but the message remained with her. She was able to discuss with me what the sugar bugs do and how to fight them, which did make her more enthusiastic about toothbrushing and understand why we have to do it instead of 'because I said so'.

Several of my patients also enjoyed reading the story; I found it quite useful to give to mums to entertain younger siblings while I delivered oral health education to the older child. Again the general feeling was that it was spot on for children in a language that would engage and entertain them.

My only criticism I would give is that I feel the book should be bigger, more of a board book, as currently it's quite small. I think the pictures would have a greater impact and also the font used would be easier for a child to read if in larger type.

I really would recommend this book as a great addition to your waiting area library, at home and in education sessions.

Rachel Hughes, Clinical treatment coordinator/Training manager and* BDJ Team *reader panel member

Editor's note: A larger version of the book is also available: 210 mm square. The smaller version that Rachel reviewed offers an affordable option to oral health promotion teams when purchased in bulk.

Diabetes and periodontal disease

L. Casanova,[1] **F. J. Hughes**[1] and **P. M. Preshaw**[2] provide practical guidance for the dental team in assessing and managing periodontal status in people with diabetes.

Introduction

Periodontitis and diabetes are both highly prevalent conditions, and the association between these two common diseases has been recognised by dental professionals for many years. Epidemiological studies have clearly identified that diabetes is a major risk factor for periodontitis, increasing the risk approximately three-fold compared to non-diabetic individuals, particularly if glycaemic control is poor.[1] In recent years, the precise relationship between periodontitis and diabetes has been the subject of much interest, given that both conditions are highly prevalent, and also because it has become increasingly clear that there are interactions between the two diseases that have important clinical implications for dental professionals, physicians and, most importantly, patients. This narrative review aims to summarise our current understanding of the relationship between diabetes and periodontitis and to discuss the clinical implications of these findings for the dental professional. Relevant literature was identified from Medline and PubMed database searches together with scrutiny of reference lists from published articles.

[1]King's College London; [2]School of Dental Sciences, Newcastle University

Periodontal disease

Inflammatory periodontal diseases are the most common chronic inflammatory conditions of man, affecting – if including gingivitis as well as periodontitis – up to 90% of the world's population.[2] When considering severe periodontitis (which typically refers to the presence of pocketing ≥6 mm), the prevalence is generally estimated to be around 5-15% of adults globally.[3] Consistent with this are the findings of the 2009 Adult Dental Health Survey for England, Wales and Northern Ireland, which identified that 8% of adults have at least one pocket of 6 mm or deeper.[4] The inflammation in the periodontal tissues that characterises periodontitis is initiated by the accumulation of the subgingival biofilm; however, susceptibility to disease is determined by a number of factors independent of the absolute levels of plaque. Pre-eminent among these are the major environmental risk factors for periodontitis, tobacco smoking[5] and diabetes.[6]

The tissue damage that results from the chronic inflammation in the periodontal tissues (loss of attachment, breakdown of periodontal ligament fibres and alveolar bone resorption) is largely irreversible. It is also typically painless, so may remain unnoticed for many years unless the patient is seen by a dental healthcare professional. The consequences of periodontitis, such as gingival bleeding, compromised aesthetics, recurrent periodontal infections, tooth mobility and tooth loss, may all have negative impacts on daily living and quality of life, with implications for function, comfort, self-confidence, social interactions and food choices.[7-9]

Diabetes

Diabetes is a group of metabolic disorders characterised by hyperglycaemia (elevated blood sugar). The main types of diabetes are type 1 diabetes, type 2 diabetes and gestational diabetes.

Type 1 diabetes (in the past, referred to as insulin-dependent diabetes, or juvenile diabetes) describes a condition in which

there is a failure to produce insulin as a result of autoimmune destruction of the insulin-producing β-cells in the pancreas. Genetic susceptibility is a major risk factor in type 1 diabetes, and in susceptible individuals, the onset of diabetes appears to be triggered by environmental factors such as viral infections and diet, rather than being related to lifestyle factors. The onset of type 1 diabetes is usually in childhood or young adulthood. Type 1 diabetes constitutes about 5-10% of all cases of diabetes, but accounts for more than 90% of diabetes cases in young people less than 25-years-old. Complications arise as a result of hyperglycaemia and include acute conditions such as diabetic ketoacidosis, as well as chronic disorders such as nephropathy, neuropathy, cardiovascular disease, and acute coronary syndrome. Many patients with type 1 diabetes do not develop serious long-term complications, however, particularly if their blood glucose levels are well controlled. The condition is typically managed by blood glucose monitoring and insulin therapy.[10]

Type 2 diabetes (previously referred to as non-insulin-dependent diabetes, or adult onset diabetes) results from insulin resistance; that is, there is reduced responsiveness of the cells in the body to insulin, leading to a reduced capacity to transfer glucose out of the circulation and into cells. This leads to hyperglycaemia (elevated blood glucose levels). In the early stages, insulin secretion by the β-cells of the pancreas may be normal, but this can diminish over time, leading to insulin deficiency as well as insulin resistance. Type 2 diabetes constitutes 90-95% of all diabetes cases, and is typically associated with lifestyle factors such as overweight/obesity and lack of exercise, as well as genetic factors. The management of type 2 diabetes typically involves combinations of lifestyle change, weight loss, dietary modification, oral hypoglycaemic drugs and, in severe cases, insulin injections. The age of onset of type 2 diabetes was previously typically considered to be in the 40s and 50s, but increasing numbers of cases in younger age groups are now being identified.

Gestational diabetes is a form of diabetes that occurs in pregnant women without a previous history of diabetes who develop hyperglycaemia during their pregnancy. It is characterised by reduced insulin secretion as well as insulin resistance, and usually improves after pregnancy, though a small proportion of affected women may be found to have diabetes (usually type 2) after their pregnancy.

The adverse effects of diabetes are associated with the hyperglycaemia that characterises the condition. Diabetes has negative impacts on multiple body systems and disease states throughout the body, including cardiovascular disease, renal disease, peripheral vascular disease, ocular disease and neuropathy. The level of glycaemic control is routinely assessed by measuring glycated haemoglobin (HbA1c) in the blood. This has traditionally been expressed as a percentage, being the percentage of haemoglobin that has glucose molecules absorbed onto the haemoglobin molecule, that is, the percentage of haemoglobin that is 'glycated'. However, the way that HbA1c values are reported has now switched from a percentage to a measurement in mmols/mol (Table 1). The lifespan of a red blood cell is typically around three months, and therefore HbA1c measurements give an indication of the level of glycaemic control over that period. In a non-diabetic person, HbA1c is typically around 5.5% (37 mmol/mol). In people with diabetes, HbA1c levels of <7.0% (53 mmol/mol) would typically indicate good glycaemic control (though many clinicians will strive to work with their patients to achieve HbA1c <6.5%, 48 mmol/mol). Levels of 8-9% (64-75 mmol/mol) or higher indicate poor glycaemic control. The complications of diabetes are closely linked to the level of glycaemic control, and it has been shown that each 1% reduction in HbA1c has been associated with measurable reductions in risk of diabetes complications, a 21% reduction in deaths related to diabetes, a 14% reduction for myocardial infarction, and a 37% reduction for microvascular complications of diabetes.[11] It is, therefore, extremely important to work with patients to optimise their glycaemic control.

'WE ARE CURRENTLY WITNESSING A GLOBAL EPIDEMIC OF TYPE 2 DIABETES'

We are currently witnessing a global epidemic of type 2 diabetes, with huge increases in the numbers of people affected in countries throughout the world. This has major implications for provision of healthcare services, as well as individual impacts in terms of life expectancy, morbidity, quality of life and healthcare costs. It is estimated that currently 347 million people suffer from diabetes worldwide[12] and this figure is predicted to rise to approximately 439 million, almost 10% of adults, by 2030. In the UK it is estimated that about 6.5% of the total population are affected by diabetes.[13]

The effects of diabetes on periodontal disease

Epidemiological studies have consistently shown that diabetes is associated with increased risk of periodontitis. The majority of research has focused on type 2 diabetes, although type 1 diabetes appears to have an identical effect on risk for periodontitis.

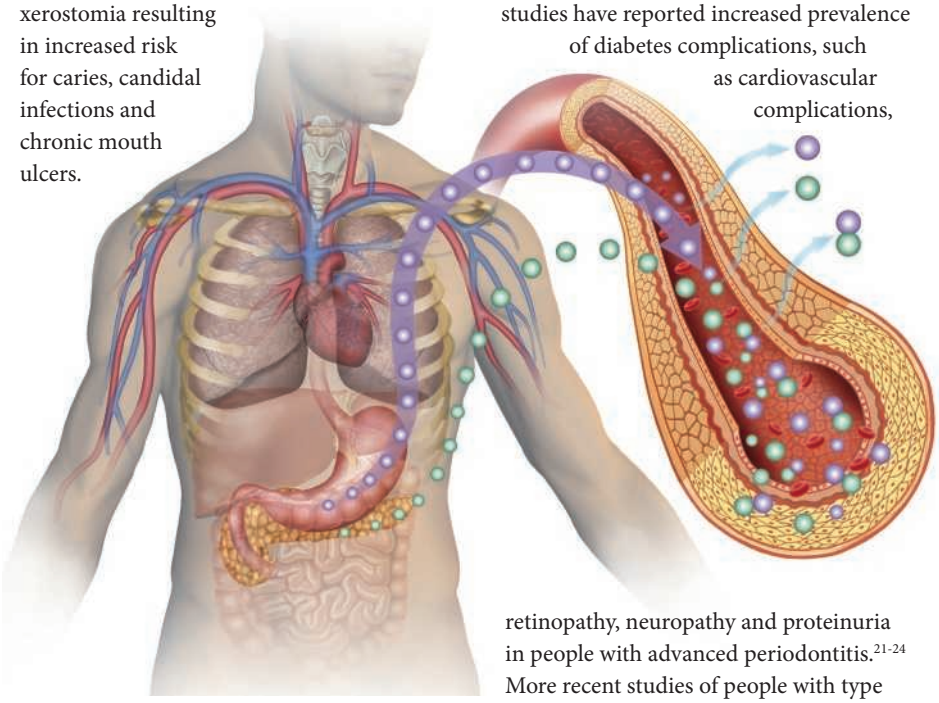
Table 1 Measurement of blood glucose: what do the numbers mean?

Glycated haemoglobin (HbA1c)
Measuring HbA1c indicates how much haemoglobin in the blood has become glycated (chemically bonded with glucose)
It provides an indication of blood glucose levels over the last three months (this being the life span of a red blood cell)
Traditionally, this was expressed as a percentage (the % of haemoglobin that was glycated), but there has now been a switch to express HbA1c in mmol/mol
Example HbA1c values expressed as a percentage and as mmol/mol: 5% = 31 mmol/mol 6% = 42 mmol/mol 7% = 53 mmol/mol 8% = 64 mmol/mol 9% = 75 mmol/mol
Blood glucose measurements
Blood glucose is measured on a regular basis by people with diabetes as part of their daily self-monitoring
It measures the concentration of glucose in the blood at the time of the test, and is measured in mmol/l (millimoles per litre)
The aim is to achieve blood glucose concentrations that are as close as possible to non-diabetic values
Target values are approximately 4-7 mmol/l before meals, and below 8.0-8.5 mmol/l two hours after meals. Target levels are individual to each person, and will be agreed between the person and their diabetes care team.

The magnitude of the increased risk of periodontitis is known to be dependent on the level of glycaemic control, as it is with the risk of all complications of diabetes. Thus, in well controlled diabetes with HbA1c of around 7% (53 mmol/mol) or lower, there appears to be little effect of diabetes on risk for periodontitis. However, the risk increases exponentially as glycaemic control deteriorates. Overall, the increased risk of periodontitis in patients with diabetes is estimated to be between 2-3 fold – that is, it increases the risk for periodontitis by 2-3 times.[1,14]

Diabetes increases the prevalence of periodontitis, the extent of periodontitis (that is, number of affected teeth) and the severity of the disease. It has been reported that patients with diabetes may present to the dental professional with multiple recurring periodontal abscesses, and although this may sometimes be the case, it is not typical. Thus, there is not normally any particular characteristic clinical presentation of periodontitis in patients with diabetes other than the normal clinical features of the condition.

In addition to the effects of diabetes on periodontitis, various other oral conditions may also be associated with diabetes. Many patients with diabetes may also take calcium channel blocker drugs such as amlodipine and nifedipine for hypertension, and this may result in gingival overgrowth in some cases. Occasionally, medications can also have other oral manifestations, such as lichenoid mucosal reactions to metformin. Other oral consequences of diabetes may include xerostomia resulting in increased risk for caries, candidal infections and chronic mouth ulcers.



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The mechanisms that link diabetes and periodontitis are not completely understood, but involve aspects of inflammation, immune functioning, neutrophil activity, and cytokine biology.[15] Both type 1 and type 2 diabetes are associated with elevated levels of systemic markers of inflammation.[16] Diabetes increases inflammation in periodontal tissues, with higher levels of inflammatory mediators such as interleukin-1β (IL-1β) and tumour necrosis factor-α (TNF-α).[17,18] Periodontal disease has been associated with higher levels of inflammatory mediators such as TNF-α in people with diabetes.[19] Accumulation of reactive oxygen species, oxidative stress, and interactions between advanced glycation end products (AGEs) in the periodontal tissues and their receptor (RAGE, the receptor for advanced glycation end products) all contribute to increased inflammation in the periodontal tissues in people with diabetes. A detailed review of the pathogenic mechanisms that link diabetes and periodontitis is beyond the scope of this article but this subject area has been recently reviewed.[15]

The effects of periodontal disease on diabetes

Evidence to support a negative impact of periodontal disease on diabetes was first postulated following studies of the Gila River Indian Community, a population of Native Americans with a high prevalence of diabetes. It was noted that severe periodontitis was associated with increased risk of poor glycaemic control (HbA1c >9.0%, 75 mmol/mol) at follow-up (minimum of two years later), suggesting that periodontitis may be compromising diabetes control.[20] Other studies have reported increased prevalence of diabetes complications, such as cardiovascular complications, retinopathy, neuropathy and proteinuria in people with advanced periodontitis.[21-24] More recent studies of people with type 2 diabetes from the Gila River Indian Community identified that the incidences of macroalbuminuria were 2.0, 2.1 and 2.6 times as high in those who also had moderate periodontitis, severe periodontitis, or who were edentulous, respectively, compared to those with no/mild periodontitis ($p < 0.05$). Furthermore, the incidences of end-stage renal disease (ESRD) were 2.3, 3.5 and 4.9 times as high for those with moderate or severe periodontitis, or who were edentulous, respectively ($p < 0.05$). The authors concluded that moderate and severe periodontitis and edentulousness predicted the occurrence of nephropathy (characterised by macroalbuminuria and ESRD) in a 'dose-dependent' manner in the individuals with type 2 diabetes.[25]

The impact of periodontitis on deaths from cardiovascular complications and diabetic nephropathy has also been investigated in a longitudinal study of Pima Indians with type 2 diabetes. Age- and sex-adjusted death rates (deaths per 1,000 person-years) were 3.7 for those with no/mild periodontitis, 19.6 for those with moderate periodontitis and 28.4 for those with severe periodontitis. After adjustment for known confounders, it was shown that diabetic individuals with severe periodontitis had 3.2 times increased risk of cardiorenal mortality (ischaemic heart disease and diabetic nephropathy combined) compared with the reference group (those with no periodontitis, mild and moderate periodontitis combined).[26]

Changes in HbA1c in non-diabetic individuals who were monitored for a period of five years have also been associated with the presence of periodontitis. In a longitudinal study, the (non-diabetic) participants with the most advanced periodontitis at baseline were found to have a five times greater increase in their HbA1c values over five years (change in HbA1c 0.106 ± 0.03%) compared to those who did not have periodontitis at baseline (change in HbA1c 0.023 ± 0.02%).[27] This is the first study to suggest that periodontitis results in increased HbA1c levels in individuals who do not have diabetes, and is continuing further to identify whether this translates into an increased occurrence of incident diabetes (new cases of diabetes).

The effect of periodontal treatment on diabetes control

A large number of studies have now been carried out to investigate the effects of treating periodontitis on glycaemic control in people with diabetes. Some of these have been performed as randomised controlled trials, in which periodontal treatment was

compared to no periodontal treatment (or delayed periodontal treatment) in people with diabetes and periodontitis. To date, up to seven systematic reviews and meta-analyses have been published which investigated in detail the outcomes of these studies, and a consistent finding has been that periodontal treatment is associated with reductions in HbA1c of the order of 0.4%.[28-34] One of these studies was a Cochrane review, which similarly identified a reduction in HbA1c of approximately 0.4% following non-surgical periodontal therapy.[33] Although such an improvement in HbA1c may appear to be relatively modest, it may, in fact, have very significant clinical impacts, because, as reported above, every 1% reduction in HbA1c is associated with a measurably reduced risk for diabetes complications.[11] Furthermore, periodontal treatment is a relatively straightforward clinical intervention, that doesn't have unwanted effects that might be associated with additional medications taken as part of diabetes therapy.

However, it is recognised that not all clinical trials which assessed the impact of periodontal therapy on glycaemic control have identified similar findings, and in particular, a recent multi-centre study of over 500 patients failed to demonstrate any benefit of periodontal treatment on glycaemic control.[35] However, this study has been criticised on account of three main issues: (i) for recruiting patients with moderately good glycaemic control already (HbA1c <9%, 75 mmol/mol) who would therefore have limited potential for improvement following periodontal treatment; (ii) for achieving only a relatively poor response to the periodontal treatment; and (iii) for having a very overweight/obese study population (average body mass index [BMI] of approximately 35 kg/m2 in the treatment group, indicating marked obesity, which would mask any decrease in inflammatory response resulting from periodontal treatment).[36] It is clear that further evidence is required to address the specific question of the impact of periodontal treatment on glycaemic control.

Implications for the dental professional

In 2007, the World Health Organisation (WHO) Executive Board acknowledged the intrinsic link between oral health, general health and quality of life.[37] It has been suggested that oral health is a neglected area of global health, and an editorial in *The Lancet* proposed that promoting and improving oral health should be part of the routine agenda of healthcare policymakers and clinicians.[38] Periodontal disease and diabetes are directly and independently associated chronic diseases of high prevalence in the population, and the global prevalence of type 2 diabetes, in particular, is rising dramatically. In 2000, the US Surgeon General referred to a 'silent epidemic' of oral and dental diseases, and stressed the importance of oral health as being essential for general health and well-being.[39]

'IN 2007, THE WORLD HEALTH ORGANISATION (WHO) EXECUTIVE BOARD ACKNOWLEDGED THE INTRINSIC LINK BETWEEN ORAL HEALTH, GENERAL HEALTH AND QUALITY OF LIFE'

A patient with diabetes may have a number of specific direct implications for the dental professional:

- Patients with (particularly type 1) diabetes may be at risk of hypoglycaemic episodes while attending the dental surgery
- People with diabetes are at higher risk of oral disease, particularly periodontitis, and particularly if their diabetes is poorly controlled
- Patients with undiagnosed diabetes may present at the dental surgery and provide an opportunity for referral for opportunistic screening based on the presence of periodontal disease and other diabetic risk factors
- Patients with diabetes may experience some improvement in their glycaemic control following successful periodontal treatment.

The management of medical emergencies involving diabetic patients in the dental practice setting, particularly hypoglycaemic episodes, has been addressed in detail[40,41] and will not be repeated in this paper.

Regarding increased susceptibility to periodontitis in people with diabetes, this has a number of implications for dental management. Firstly, it is important that diabetic patients are aware of the potential impact their condition may have on their oral and periodontal health. Patients who are newly diagnosed with diabetes should be told about this impact and we should continue to urge our medical colleagues to recommend a dental examination to their patients. Unfortunately, many patients with diabetes and also many medical clinicians are unaware of the links between periodontitis and diabetes, and of the potential benefits that periodontal treatment may have for diabetic patients.[42,43]

Routine periodontal assessment should be performed in all patients, including those with diabetes. Ask the patient about their level of glycaemic control: many will be able to tell you their most recent HbA1c measurements. If the patient does not have periodontitis, then long term preventive care and monitoring should be undertaken (that is, same as for all patients). Diabetic patients should also be evaluated for the other potential oral complications of diabetes, including caries, dry mouth, burning mouth, candidal infections and co-morbidities such as those associated with medications.

If periodontitis is diagnosed, it should be managed as appropriate. This would typically involve (similar to non-diabetic patients) patient education and empowerment, oral hygiene instruction, non-surgical therapy (root surface debridement), and monitoring of treatment outcomes. Effective periodontal treatment is particularly important in people with diabetes, given that periodontitis has potential negative impacts on glycaemic control and diabetes complications, and that periodontal treatment has been associated with improvements in HbA1c.

In most cases, conventional (non-surgical) periodontal treatment is very effective in diabetic patients, including optimisation of plaque control to control the inflammation that leads to periodontal destruction along with a major emphasis on self-management and patient education. There is little or no evidence to suggest, for example, that diabetic patients require antibiotics as part of periodontal therapy.

The escalating human and economic burden of diabetes requires a multidisciplinary approach for the prevention, diagnosis and management of the disease and its complications including periodontitis. Many cases of diabetes in the UK are undiagnosed and therefore, the dental health professional may have a useful role to play in opportunistic screening of dental patients for risk of diabetes. A study from the USA

has demonstrated that a combination of age (over 45), presence of periodontal disease and at least one other diabetic risk factor (for example, positive family history, self-reported BMI >25, hypertension) was very successful in identifying undiagnosed cases of diabetes.[44]

Recently, a diabetes screening programme was undertaken in dental patients in different clinical settings in the UK (general dental practices, a dental hospital clinic, and a dental school outreach clinic).[45] The dental clinicians performed the screening procedure, and patients who were determined to be at moderate or high risk of diabetes were recommended to visit their medical GP for further investigation. This study identified that dental professionals who were trained in the screening procedure valued this process, as did the patients, who received the diabetes screening in the dental setting very favourably. The major downside was the time required to perform the screening, which added around 20 minutes to the length of each dental appointment. Clearly that would not be practical within current contractual arrangements for NHS dental practices, but it does highlight that dental healthcare teams could potentially play an important role in screening their dental patients for systemic conditions such as diabetes.

Conclusions

Diabetes increases the risk for periodontitis (particularly if poorly controlled) and evidence suggests that advanced periodontitis also compromises glycaemic control. Periodontal treatment has been associated with improvements in glycaemic control (with HbA1c reductions of approximately 0.4% reported in systematic reviews and meta-analyses), though more research is required to investigate this further. Oral health (including periodontal health) is a fundamentally important component of general health, and particularly so in diabetes. Periodontal assessment is as important in people with diabetes as it is in people who do not have diabetes, and people with diabetes should be made aware of their increased risk for periodontal disease. The dental team has an important role to play in the management of people with diabetes. An emerging role for the dental team is envisaged in which, through the use of relatively simple screening tools, they may help to identify patients at high risk of diabetes.

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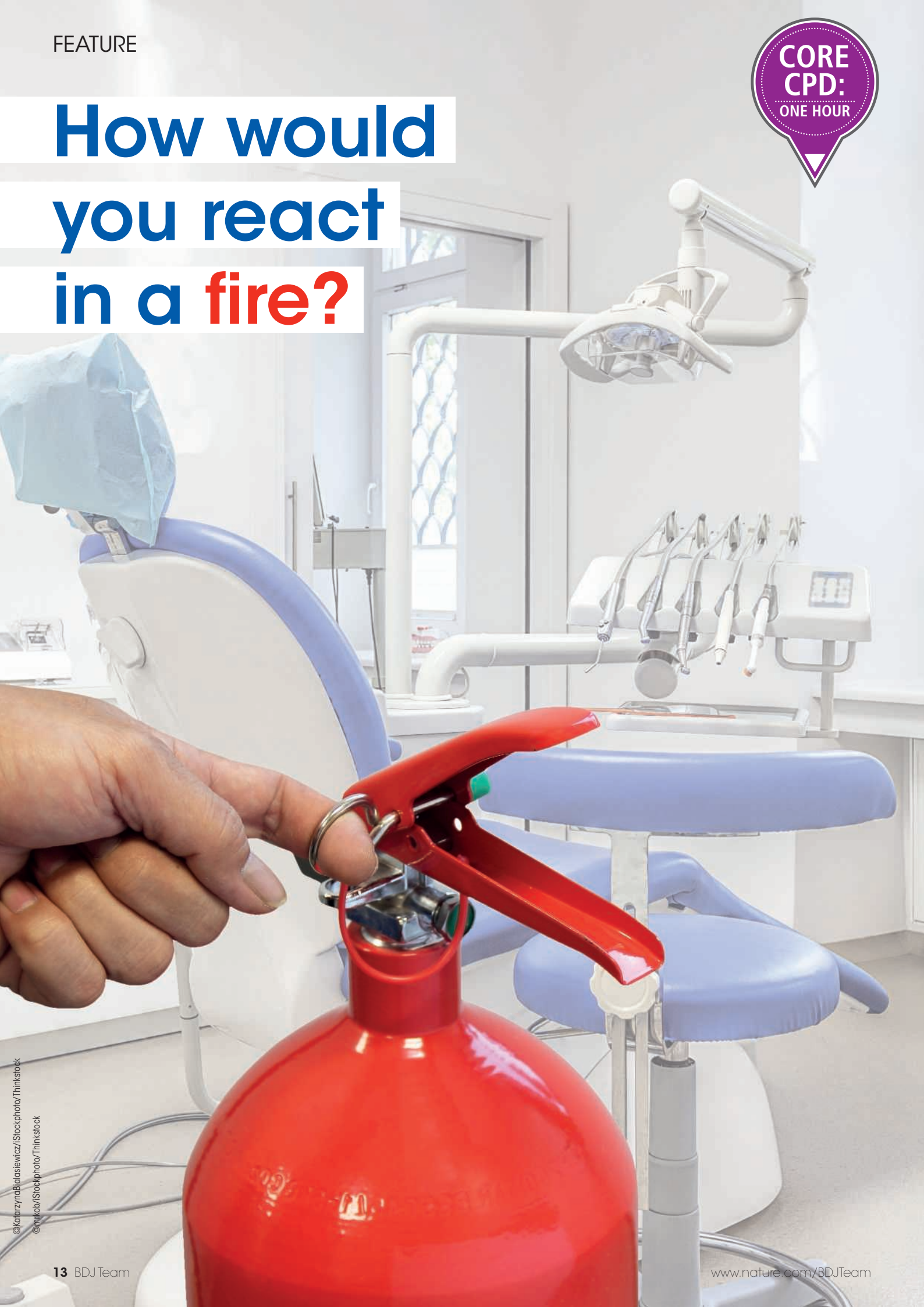
How would you react in a fire?



Bricks and mortar are easily replaced after a fire, but the emotional, financial and physical scars may be visible forever. **Jon Kyle Anderson**[1] trains dental practices in fire awareness and fire safety.

Legislation

The Regulatory Reform (Fire Safety) Order 2005 is a single piece of legislation that clearly identifies the employer as the Responsible Person with a duty to ensure that buildings are safe. Part of this duty is to ensure that a Fire Safety Risk Assessment (FSRA) is undertaken and that such an assessment is reviewed at least annually. An FSRA answers questions such as:

- Have you identified anything that could start a fire?
- Have you identified anything that could burn?
- Who could be at risk?
- Who could be especially at risk?
- How will everybody escape?

Causes of workplace fires

Causes of workplace fires include:

- Arson
  - Disgruntled employees or ex-employees may start a fire
  - Ensure buildings are secure
  - Check that tamper seals on fire extinguishers are intact
- Faulty and misused electrical equipment
  - Do not overload electrical sockets and extension leads – these can overheat and burn
  - Cables that are frayed are also a personal injury risk
  - Check that plugs are not cracked or show signs of overheating
- Cooking
  - Do not leave pans unattended
  - Clothing (particularly sleeves) can catch alight on a gas hob
- Poor housekeeping
  - Storing goods and equipment in corridors. The corridors become narrowed, and the goods and equipment might be knocked over and thus delay or prevent escape from a smoke filled area. The goods and equipment are also a potential ignition source
  - The build-up of rubbish, whether it is waste bins or recycling bins, is a fire risk. Do not allow such rubbish to accumulate
- Smoking
  - Discarded cigarette ends
  - Covert smoking.

Fires and people

People react very differently when confronted with an emergency situation:

- The sound of a fire alarm may be completely ignored, or occupants will look for the reaction of others before doing anything themselves
- Panic can lead to distress and confusion, with occupants bypassing a fire exit in order to leave a building by the front door
- Occupants can become extremely frightened.

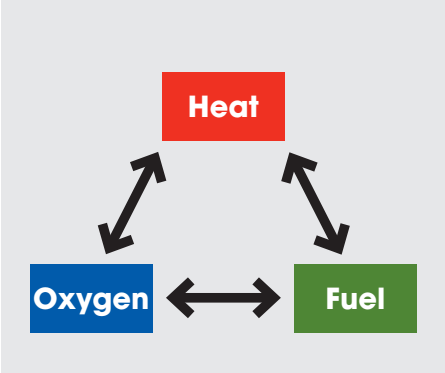


Fig. 1 The fire triangle

The classifications of fire

Fire is classified according to the material that is burning. The six classifications are:

A – Solids
B – Liquids
C – Gases
D – Metals
E – Electricity (this is a cause of fire rather than a material)
F – Cooking fats and oils.

The fire triangle

The fire triangle in Figure 1 highlights that fire needs heat, oxygen and fuel to develop. The fire cannot continue if the heat, oxygen or fuel is removed.

'HAVING FIRE EXTINGUISHERS AND FIRE BLANKETS IN THE WORKPLACE DOES NOT MEAN THAT TACKLING A FIRE IS SAFE – YOU HAVE TO DECIDE WHETHER OR NOT YOU FEEL SAFE IN DOING SO.'

Table 1 Selecting the correct extinguishing medium in the event of a fire

Material that is burning:	Extinguishing medium:
Class A – Solids	Water or Foam
Class B – Liquids	Foam, Carbon dioxide gas, Dry powder
Class C – Gases	Dry Powder
Class D – Metals	Dry Powder (special)
Class E – Electricity	Carbon dioxide gas, Dry powder
Class F – Cooking fats and oils	Wet chemical

[1]*Trainer and former paramedic. Visit www.st4training.co.uk for more information on bespoke training for your dental practice in resuscitation, anaphylaxis, defibrillation, manual handling, first aid, evac chair and fire awareness. Or call Jon on 07837 130700.*

'THE RESPONSIBLE PERSON NEEDS FIRE MARSHALS TO BE THE EARS AND EYES ON THE GROUND, HELPING TO KEEP PEOPLE AND BUILDINGS SAFE FROM FIRE.'

Fire extinguishing media

Fire extinguishers and fire blankets kill a fire by removing either the heat or oxygen (or both). Following discussions with your supplier, you will be able to make a decision as to which fire extinguishing medium is most appropriate for your individual needs. Selecting the correct extinguishing medium is vital (Table 1).

A fire blanket usually measures 1 m^2 or 1.2 m^2 and is ideal for extinguishing fires involving cooking fats and oils. A fire blanket can also be used to extinguish a small Class A fire (provided the blanket excludes oxygen from feeding the fire) and for covering a burning person. In all such cases, the blanket kills the fire by depriving the fire of oxygen – it smothers the fire.

Having fire extinguishers and fire blankets in the workplace does not mean that tackling a fire is safe – you have to decide whether or not you feel safe in doing so.

Tacking a fire

Never tackle a fire:

- That is bigger than a waste paper bin
- That is spreading
- If the room is filling with smoke
- In the presence of gas cylinders, gas appliances or chemicals.

If you feel it is safe to tackle a fire:

- Sound the alarm
- Ensure the fire service has been called
- Only use an extinguisher if you are confident to do so
- Choose the correct extinguisher
- Only use one extinguisher
- Keep your back to the nearest exit route.

Leave the building immediately if the fire:

- Is getting bigger
- Is not reducing
- Has not been extinguished with one extinguisher (never used a second extinguisher).

The PASS word

Operating instructions vary depending on the make and type of fire extinguisher. In general, the acronym PASS is a good way to help remember how to use an extinguisher:

P **PULL** the safety pin which will also break the plastic tamper seal

A **AIM** the nozzle, discharge horn or hose at the base of the flames

S **SQUEEZE** the handles together so the extinguisher discharges

S **SWEEP** from side to side at the base of the flames until the fire is extinguished

The Fire Marshal

Prevention is better than cure, so fire marshals are an invaluable asset. The role is proactive (helping to prevent a fire from starting) and reactive (taking definitive action on discovering a fire or when hearing the fire alarm). The Responsible Person needs fire marshals to be the ears and eyes on the ground, helping to keep people and buildings safe from fire.

- Examples of the proactive role are:
  - Having an understanding and working knowledge of the Fire Safety Risk Assessment (FSRA)
  - Knowing the organisation's response to the fire alarm – being aware of the actions to be taken in the event of an emergency
  - Conducting regular inspections – an example being to check that corridors are clear of obstructions and combustible materials, and that fire exits are clear on both sides of each exit
  - Checking that in the event of a fire alarm sounding, every employee or visitor should be immediately able to see a sign indicating the location of the nearest fire exit
  - Knowing of any specific hazards within his/her zone of responsibility (eg where oxygen cylinders are kept)
  - Maintaining an awareness of the location and work processes of contractors
  - Reporting and writing down any concerns

- Examples or the reactive role are:
  - Activating the fire alarm
  - Ensuring that somebody calls 999/112
  - Evacuating people from his/her designated zone
  - Understanding the additional time needed to ensure the evacuation of people affected by problems associated with their age, sight, hearing, mobility and cognition
  - Carrying out a final sweep of his/her designated zone, closing any doors and windows (if safe to do so)
  - Carrying out a roll call at the assembly point
  - Reporting to the fire officer.

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bdjteam20158

CARING FOR DENTAL PATIENTS with eating disorders

By **Linda Douglas**, RDH, BSc, a British dental hygienist based in Ontario, Canada

This article has the following learning objectives:

1. Describe the oral, psychological and systemic complications of eating disorders
2. Recognise the warning signs of eating disorders
3. Describe an evidence-based dental care and support protocol for patients with eating disorders
4. Increased awareness of resources for individuals with eating disorders.

Introduction

Several years ago, a concerned patient confided in me that her teenaged daughter was recovering from an eating disorder, and she asked me to be vigilant for oral signs of relapse. Of course I readily agreed; as a dental hygienist, I was in an ideal position to detect oral signs of eating disorders. On reflection, however, I found that my knowledge of these signs was limited, and according to the 2005 research by DeBate, Tedesco and Kerschbaum,[1] I was not alone in this predicament. I was aware of one classic sign - dental erosion related to the purging by vomiting seen in bulimia - and I could recognise some oral signs of malnutrition, but soon realised there were gaps in my knowledge.

I was also uncomfortable with broaching this sensitive topic with a patient if an eating disorder was suspected. However, I understood my ethical obligation to increase my knowledge and participate in secondary prevention of eating disorders, as it could improve prognosis and even be a life-saver: eating disorders have the highest mortality rate of all psychiatric illnesses.[2]

My mission was to improve the care and support for my young patient, and others who might need it, by acquiring further knowledge of the oral and systemic signs of eating disorders. I needed the capability to initiate timely interventions, and minimise damage to the oral hard and soft tissues. It was

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> ***'DENTAL EROSION OCCURS DUE TO PURGING BY VOMITING…'***

also necessary to be able to instigate medical referral, in order to facilitate referral to therapists specialising in treating eating disorders.

An overview of eating disorders

Eating disorders are psychiatric illnesses characterised by disordered eating, and disturbed attitudes to eating and body image; they are often accompanied by inappropriate, dangerous methods of weight control. The three most common eating disorders are bulimia nervosa, (binge-purge), anorexia nervosa, (starvation) and binge-eating disorder (bingeing without purging).[3]

There are variations of disordered eating, and eating disorders not otherwise specified (EDNOS).[4] These include *diabulimia*,[5] where individuals intentionally take insufficient insulin in order to lose weight; *anorexia athletica,* which is obsessive, excessive exercising to the point where it becomes detrimental to health; *bigorexia*, or muscle dysmorphia; *orthorexia nervosa,* an obsession with the quantity and quality of the food consumed; *night eating syndrome,* the compulsive, excessive intake of food during the hours normally reserved for sleep - often getting up multiple times during the night to eat; *pica*, the persistent eating of non-food substances, and various food phobias.

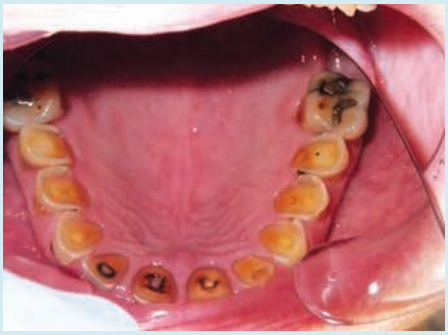
Prevalence of eating disorders

According to a 2002 survey, 1.5% of Canadian women aged 15-24 years had an eating disorder.[6] The UK has the highest rate of eating disorders in Europe: recent figures suggest that one in 100 British women has a clinically diagnosed eating disorder.[7] In the USA, anorexia nervosa is the third most common chronic illness among adolescents.[8] Eating disorders occur mostly in females aged 15-25 years of age, but also occur in males, in children as young as seven, and in people aged over 50.

Bulimia nervosa

Bulimia nervosa is the most common eating disorder and is characterised by a pattern of consumption of massive amounts of food (binge-eating) and recurrent inappropriate behaviours to control one's weight. These include purging through self-induced vomiting, abuse of laxatives, diuretics, or emetics, or other behaviours such as fasting (not eating for at least 24 hours) or excessive exercise. The weight of bulimic individuals tends to fluctuate, but is usually within normal limits. About one third of bulimics have a history of anorexia nervosa, and some have a history of obesity.

During bingeing, bulimic individuals usually consume between 1,500 to 3,000 calories within one or two hours, but have been known to consume as much as 60,000 calories in one bulimic binge. They typically eat sweet, high-calorie foods which are easy to consume quickly, like ice cream. This is followed by depression, panic and guilt, and a compulsion to purge. These episodes occur at least twice weekly over a period of several months; some bulimic individuals vomit five



Severe dental erosion related to bulimic purging. Produced with permission from Dr S. Weinstein

Erosive and abrasive lesions on the teeth of a 35-year-old woman with anorexia and bulimia (from *BDJ* 2014; **216:** 463-468)

Initial cervical erosive lesions in a young patient with anorexia (from *BDJ* 2014; **216:** 463-468)

Reflux from vomiting led to acidic dissolution of the lingual side of the maxillary incisors in this patient (from *BDJ* 2014; **216:** 463-468)

A bizarre palatal haematoma in a 30-year-old female bulimic (from *BDJ* 1999; **186:** 109-113)

or six times per day. Most bulimics who die do so in the act of purging. According to the National Institute of Dental and Craniofacial Research in the US, 28% of patients with bulimia are first diagnosed during a dental appointment.

Anorexia nervosa

Anorexia nervosa is marked by four main features:

- A refusal to eat enough to maintain body weight within 15% of the minimally normal weight for age and height: the anorectic individual is often 20% to 40% below a healthy body weight
- An extreme fear of gaining weight
- A distorted body image: thinking they are fat, even when they are emaciated
- Amenorrhoea (absence of menstruation).

A significant number of anorectic individuals also purge, and some have pica; for example, consuming cotton balls soaked in orange juice to control hunger. The main difference between bulimia nervosa and purging anorexia is that the individual with anorexia is underweight.

Binge-eating disorder

This is characterised by frequent consumption of abnormally large amounts of food in one sitting, while feeling a loss of control over their eating. Individuals with this disorder do not purge afterwards, but feel depressed and guilty after overeating. Most individuals with binge-eating disorder are obese, with the related increased risks of diabetes, heart disease, certain cancers, and arthritis.

Aetiology

The aetiology of eating disorders is multifactorial, and not completely understood: contributing factors include a culture where thinness is admired. There are unrealistic depictions of beauty and thinness in the media; at about 6 feet tall and 117 pounds, today's fashion model weighs 23% less than the average woman. Some over-achieving perfectionists who do not fit this questionable ideal develop eating disorders: they have low self-esteem, a distorted perception of body shape, and a poor body image.[9]

The risk of a female developing anorexia nervosa increases 10-20 times if she has a sibling with the disorder. Eating disorders often occur in individuals who have suffered physical or psychological trauma,[10] and are frequently accompanied by other psychiatric illnesses[11] such as depression, anxiety,[12] self-harm (such as cutting), obsessive-compulsive disorder, and chemical dependency.

Table 1 Medical complications of eating disorders[13,14]

General

- Fatigue
- Dehydration, malnutrition
- Electrolyte imbalance
- Hypoglycaemia
- Anaemia
- Low white blood cell count, and impaired immunity
- Slow metabolism
- Osteoporosis
- Loss of muscle mass - causing 'stick-like' limbs

Skin

- Extremely dry, scaly, itchy skin with a grey cast[15]
- Decreased scalp hair, which is short and brittle
- Increased *lanugo* hair - fine hair on the back, abdomen and arms (the body's attempt to retain body heat after excessive loss of body fat)
- Bloodshot eyes and broken capillaries (*petechiae*) of the skin around the eyes, related to forced vomiting

Heart and major organs

- Cardiac arrhythmias, and cardiac arrest related to electrolyte imbalance (especially low potassium), dehydration, or starvation-induced atrophy of the cardiac muscle
- Slow pulse rate
- Low blood pressure
- Impaired capacity to think, due to starvation-related brain changes
- Kidney damage
- Liver damage due to starvation of substance abuse[16]
- Hypothyroidism
- Infertility related to disruption or cessation of the menstrual cycle

Digestive system

- Abdominal pain
- Chronic constipation
- Poor muscle tone of the colon, and incontinence related to misuse of laxatives
- Ruptured oesophagus, or *Mallory-Weiss lesions (gastro-oesphageal laceration syndrome)* - bleeding, lacerated oesophagus due to vomiting
- Gastric bleeding
- Ruptured stomach might occur during bingeing
- Liver damage due to starvation or substance abuse[16]
- Swollen parotid glands and sore throat related to purging

Extremities

- Clubbed fingers related to cardiac complications, or overuse of laxatives
- Cold hands and feet related to peripheral vasoconstruction
- *Russell's sign:* callouses, scars or abrasions on the knuckles of the dominant hand, related to inserting the fingers in the mouth to induce vomiting
- *Carotenoderma*-orange pigmentation of skin, especially on the palms of the hands, related to a restricted diet with excessive intake of foods containing carotene

Table 2 Psychological aspects of eating disorders[17]

- Depression, anxiety
- Perfectionist, over-achiever
- Low self-esteem
- Mood swings
- Guilt, shame
- Alienation, loneliness
- Social isolation
- Eating alone
- Compulsive behaviours
- Misperception of hunger and satiation
- Obsessive thoughts about food, calories and weight - often weighing oneself several times a day
- Secrecy and denial of their illness: individuals with anorexia nervosa often dress to hide their body shape, and they might put coins in their pockets when being weighed
- They often claim to have food allergies in order to justify their restrictive diet

The medical complications of eating disorders are shown in Table 1 and the psychological aspects of eating disorders in Table 2.

Oral findings

Traumatic lesions on the palate and oropharynx are caused by insertion of objects to induce vomiting. Signs of nutritional deficiencies occur, such as angular cheilitis, candidiasis, glossitis, and oral mucosal ulceration. Individuals with eating disorders also experience a dry mouth related to dehydration, or xerogenic medications such as antidepressants, and anxiolytics. They have a high caries risk related to dry mouth and impaired salivary buffering capacity, and bulimics tend to consume foods high in refined carbohydrates. In addition, individuals with eating disorders often consume acidic drinks like citrus juices and carbonated diet drinks.

Dental erosion occurs due to purging by vomiting[18] and becomes apparent about six months after onset. Vomit has a pH of about 3.8; during purging, the vomit hits the palatal aspects of the maxillary anterior teeth. This erosion eventually undermines the palatal surfaces and leads to incisal fractures and chipping, and overeruption of the mandibular teeth. Erosion also occurs in the posterior teeth, causing *perimylolysis* - the tooth tissue surrounding restorations is eroded, leaving the restorations with a raised, island-like appearance. Eroded occlusal contacts also lead to loss of vertical dimension. Dental hypersensitivity is also common, and loss of bone density increases the risk of jaw fracture during extractions.

Medical treatment[19]

Medical treatment of eating disorders often includes nutritional therapy to address the medical complications, and also the starvation-related brain changes that perpetuate the condition. This is combined with psychotherapy and medication, such as antidepressants.

Dental management of patients with eating disorders[20,21]

These individuals need regular dental visits for continuing care and support, and we should provide an environment in which the patient feels comfortable. Patients with eating disorders must be regarded as medically compromised, due to the risk of grave medical complications, particularly cardiac arrhythmias or cardiac arrest due to electrolyte imbalance.

'WE SHOULD BE TACTFULLY OBSERVANT OF THEIR GENERAL DEMEANOR…'

Thorough clinical assessment

General appraisal begins as soon as we greet our patient. We should be tactfully observant of their general demeanor, gait, and facial symmetry; the skin should also be observed for lesions and pallor, and the hands for *Russell's sign,* or *nail clubbing* (for an example, see http://commons.wikimedia.org/wiki/File:Clubbing2.JPG).

A comprehensive medical history is needed, and monitoring of the blood pressure and the pulse.

Extra-oral examination and intra-oral examination of the oral hard and soft tissues is needed, plus comprehensive documentation that includes detailed clinical notes, periodontal charting, radiographs, intraoral photographs and study models to monitor damage.

When an eating disorder is suspected, this sensitive topic needs to be broached in a non-judgmental, non-threatening manner. It is beyond our scope of practice to diagnose eating disorders, but we can present the findings of our examination to the patient.[22] For example, if there is dental erosion, mention some possible causes: acidic drinks, acid reflux or frequent vomiting. This gives the patient an opportunity for disclosure. If they disclose their eating disorder to us, they should be referred to their physician; if they are not ready to tell us, we can still be supportive and initiate a prevention protocol based on our clinical findings.

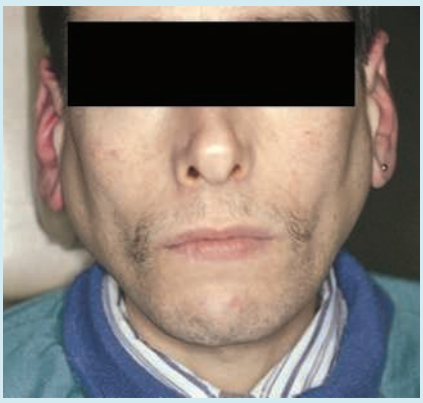
Definitive dental restorations such as crowns cannot be completed while a patient is purging regularly, as acid erosion will shorten the life of the restorations. Only essential restorative work should be done, sufficient to limit tooth damage and keep the patient free of pain. Pending recovery from their eating disorder, the dental hygienist can provide interventions to limit damage to the oral hard and soft tissues, and relieve xerostomia and dental hypersensitivity.

During dental hygiene appointments, polish with a non-abrasive fluoride paste. A protocol to reduce caries risk should include in-office fluoride varnish applications, plus self-applied neutral fluoride, and calcium and phosphate products such as Novamin, Recaldent, or nano-hydroxyapatite, to promote remineralisation and relieve dental hypersensitivity.

Xylitol products are also beneficial. When used for five minutes, five times per day, xylitol stimulates salivary flow, reduces the oral population of cariogenic bacteria, and reduces oral acidity. There are toothpastes, gum and candies containing xylitol. The patient should brush three times per day with a soft brush, and a toothpaste containing 5000 ppm fluoride. They need to clean interproximally daily, and also clean their tongue, to remove biofilm and acid residue.

A mouthguard can be used to protect the dentition during vomiting. The patient should not brush directly after vomiting, as this causes more loss of tooth structure, and rinsing with water will reduce the protective properties of the saliva. Instead, the oral pH should be neutralised by rinsing with one teaspoon of bicarbonate of soda in 8 oz of water, or a product with calcium and phosphate ions. For

Callus on the back of the hand (Russell's sign) in a 37-year-old male with a history of bulimia nervosa of 20 years' duration (from *BDJ* 1999; **186:** 109-113)



An example of bilateral parotid enlargement; this is episodic (from *BDJ* 1999; **186:** 109-113)

additional support, as dental hygienists we can also share information about resources for those with eating disorders.[23]

Conclusion

Eight years after that worried mother took me into her confidence, her daughter is healthy. However, others still battle eating disorders, which are potentially fatal. Armed with increased knowledge and experience, we dental care professionals can be more observant during assessment, and better able to detect the warning signs of eating disorders. This is a crucial aspect of good patient care and improved outcomes for our patients.

Resources

The SCOFF questionnaire (Table 3) uses an acronym in a simple five question test devised for use by non-professionals to assess the possible presence of an eating disorder. It was devised by Morgan *et al.* in 1999:
Morgan J F, Reid F, Lacey J H. The SCOFF questionnaire: assessment of a new screening tool for eating disorders. *BMJ* 1999**; 319:** 1467-1468. Available at: http://www.bmj.com/content/319/7223/1467 (accessed January 2015).

Online Eating Disorder Screening

http://www.nationaleatingdisorders.org/online-eating-disorder-screening

UK

NHS Choices. **Eating disorders: advice for parents.** http://www.nhs.uk/Livewell/eatingdisorders/Pages/eating-disorders-advice-parents.aspx
Central and North West London NHS Foundation Trust. **Vincent Square Eating Disorder Service.** http://www.cnwl.nhs.uk/vincent-square/further-information-resources/outside-support/
anorexia & bulimia care. **Information and statistics.** http://www.anorexiabulimiacare.org.uk/information-and-statistics-media

Table 3 The SCOFF questions* (from *BMJ* 1999; 319: 1467-1468)

- Do you make yourself **S**ick because you feel uncomfortably full?
- Do you worry you have lost **C**ontrol over how much you eat?
- Have you recently lost more than **O**ne stone in a three-month period?
- Do you believe yourself to be **F**at when others say you are too thin?
- Would you say that **F**ood dominates your life?

*One point for every 'yes'; a score of ≥2 indicates a likely case of anorexia nervosa or bulimia

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TEST YOURSELF
One hour of non-verifiable (general) CPD

1. Eating disorders:
A. have the highest mortality rate of all psychiatric illnesses
B. are often accompanied by other psychiatric illnesses such as depression, anxiety, self-harm and chemical dependency
C. often occur in individuals who have suffered physical or psychological trauma
D. all of the above

2. Repeated vomiting typically causes erosion of the:
A. palatal aspects of the maxillary anterior teeth
B. lingual aspects of the mandibular anterior teeth
C. distal surfaces of the second or third molars
D. facial aspects of the entire dentition

3. Russell's sign is found in bulimic individuals, on the:
A. palate
B. knuckles of the dominant hand
C. around the eyes
D. corners of the mouth

4. Why should individuals with eating disorders such as anorexia nervosa or bulimia nervosa be regarded as medically compromised during their dental appointments?
A. malnutrition, dehydration, and loss of electrolytes raise the risk of cardiac arrhythmias
B. they are at risk for osteoporosis, and jaw fracture during extractions
C. they are at risk for gastric bleeding
D. all of the above

The correct answers will be published in the February online issue of BDJ Team

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FROM THE VITAL ARCHIVE

Vital guide to radiography and radiation protection

- How is dental radiography used?
- How can radiation risks be minimised?
- What are the recommended techniques?

VITAL GUIDE TO Radiography and radiation protection

Stuart Grange* explains some of the key features of safe and effective dental radiography, and the legal requirements.

Dental radiography

In the dental setting, techniques exist for imaging the teeth, mandible, maxilla, temporomandibular joints and the oral and labial soft tissues. Virtually all dental practices will have one or more intra-oral units for periapical, bitewing and occlusal radiography. Many will have units for extra-oral radiography such as dental panoramic tomography and lateral cephalometry. A few centres may have cone beam computed tomography units, particularly where complex orthodontic and implant work is performed.

Due to the risk of radiation induced injury or misdiagnosis from incorrectly produced images, radiography should only be undertaken by appropriately trained personnel and under well-designed systems of work. Maximising diagnostic benefit and minimising radiation risk requires that practitioners are judicious in their selection of techniques for each patient.

Radiation protection

Radiation protection refers to the implementation of practices to reduce radiation exposure to patients, workers and the public. The fundamental aim of radiation protection is to reduce risk of harm by ensuring that any dose received is justified and 'as low as reasonably practicable' (ALARP).

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We may consider harmful effects from x-rays to fall into two types, deterministic or stochastic.[1] For deterministic effects, the subject must be exposed to considerable amounts of radiation before any damage becomes apparent. Skin burns and cataracts in the lens of the eye fall into this category. We should never expect to observe these effects from dental radiography due to the small amount of radiation used. Stochastic effects include the development of cancer – a known potential outcome of exposure to ionising radiation. Increasing exposure is believed to be associated with increasing risk, and therefore there is no unequivocally safe maximum dose.

Patients may ask about the risk from exposure to x-rays. Dental professionals physically directing exposures should be able to give information to the patient that helps them set any risk from the exposure in context. The risk of adverse effects from dental radiography is very small, but it is inaccurate to state that it is non-existent. It is helpful to compare the risk from radiography to other readily understood and accepted risks from everyday life, for example, the amount of radiation received from natural background radiation or from short-haul air flights. Persons requesting and conducting radiographic investigations should be familiar with the size of doses from specific examination types. Table 1 shows typical dose from common dental exposures.

Radiation effects

Deterministic effects – **the severity** of the effect is related to the amount of exposure, and only occurs after a certain threshold is exceeded.

Stochastic effects – **the risk** of the effect is related to the amount of exposure. Theoretically, there is no maximum limit below which stochastic effects, such as cancer induction, may occur.

We should never see deterministic effects from dental radiography and we must seek to minimise the risk of stochastic effects.

Legislation governing medical radiography

There are two pieces of legislation which embody the legal requirements for use of ionising radiations in the UK: The Ionising Radiation Regulations 1999 (IRR 99),[3] and The Ionising Radiation (Medical Exposure) Regulations 2000 (IR[ME]R 2000).[4] Together they provide the legal framework to ensure that risks from the use of ionising radiation are minimised.

The Regulations are of course written in the kind of legalese that is inaccessible for many people, and for that reason are accompanied by Approved Codes of Practice[5] that help to interpret the relevant features and legal obligations. For dental radiography, the National Radiological Protection Board produced the Guidance Notes for Dental Practitioners in 2001.[6] They are primarily

Table 1 Typical doses from dental radiography[2,13]

	Typical effective doses (mSv)	Equivalent period of natural background radiation
Teeth (single bitewing or periapical)	0.002	A few hours
Teeth (panoramic)	0.01	<1.5 days
Chest (single PA film)	0.02	3 days
Return flight to Spain	0.02	3 days

UK average background radiation = 2.2 mSv per year

IR(ME)R 2000 key principles

Justification
Medical exposure to x-rays should always be justified. The person authorising (practitioner or operator) the exposure should anticipate a significant benefit to treatment decision-making from having the information that the radiograph provides.

Optimisation
Where justification is present, the amount of x-ray exposure used should be the smallest necessary to achieve a diagnostic image. IRR99 and IR(ME)R 2000 use the words 'As low as reasonably practicable' to express this concept.

intended to be used as guidance by dental practitioners outside of the hospital sector, where access to medical physics experts is less readily available. All staff involved in radiography would benefit from familiarity with these. They may be downloaded from the Health Protection Agency website.

IRR 99[3] relates to the responsibilities of the employer in ensuring safe working environments for employees and the general public. This is achieved by:

- Appropriate restriction of personnel and the public from areas where radiation is used by designation of 'controlled areas'; practically in dental radiography this means outside of the primary x-ray beam and 1.5 metres away from the x-ray tube or patient in any other direction[6]
- Local rules which identify the controlled area, persons entitled to operate the equipment and a summary of operating instructions
- Having a radiation protection supervisor; a suitably trained member of staff who is sufficiently senior that they have authority to ensure compliance with the local rules
- Presence of safety features on equipment that restrict exposure
- Regular maintenance.

IR(ME)R 2000[4] is primarily concerned with protection of the patient. The principles of justification and optimisation are core to these regulations. IR(ME)R also identifies a number of roles of people involved in exposing a patient to radiation. These help to ensure that an appropriate chain of responsibility exists when referring for and undertaking radiography.

- Referrer – the registered medical or dental practitioner referring the patient for radiography
- Practitioner – the registered medical or dental practitioner that justifies the exposure to x-rays as having sufficient net benefit
- Operator – the adequately trained person permitted to undertake practical aspects of radiography. This may include direct involvement with the x-ray exposure, processing the film or carrying out quality assurance procedures.

In general dental practice, the dentist may undertake all three roles or may delegate the role of operator to another adequately trained dental care practitioner such as a nurse, hygienist or therapist.

Practical dose reduction

Doses to patients may be minimised in the following ways:

1. Justification of exposure and optimum selection of technique
2. Optimised equipment
3. Careful execution of technique
4. Quality assurance programme.

1. Justification of exposure and optimum selection of technique

An x-ray should only be taken where it is likely to affect the patient's dental management. General radiographic screening of new patients prior to clinical examination is not justified.[7] The radiograph taken should include only that which is required to answer the diagnostic question. Selection of bitewings or periapical films in preference to panoramic films is recommended where these are likely to adequately demonstrate the problem. Dental radiography of pregnant patients is permissible so long as the exposure is justified, and the dose kept to the practical minimum. Foetal doses from dental radiography are very small, and correspondingly, risk of foetal harm is extremely low.[14]

2. Optimised equipment

Doses from dental radiography have come down as equipment design and features have improved.[8] However, there is some evidence that dental practices do not always take full advantage of all the opportunities that exist to reduce dose.[9]

Rectangular collimation and film holders

A rectangular collimator reduces the beam dimensions in periapical and bitewing radiography (Fig. 1). The fixed collimation of older intra-oral units is often circular giving a larger beam area than necessary for rectangular films.

A greater degree of accuracy is required when using the rectangular collimator to avoid 'coning', that is, missing part of the film with the beam. Accurate beam alignment with the film is facilitated by the use of beam aiming devices such as film holders (Fig. 2). They also confer image quality advantages:

a) The film is more parallel to the tooth and allows a more reproducible and less distorted image to be taken. Periodontal bone levels are far more accurately assessed using paralleling as opposed to bisecting angle techniques
b) Most film holders incorporate a stalk which is outside the mouth that allows accurate location of the x-ray beam to cover the film

Fig. 1 Rectangular collimator on an intra-oral x-ray unit

Fig. 2 Film holder and film showing beam aiming ring

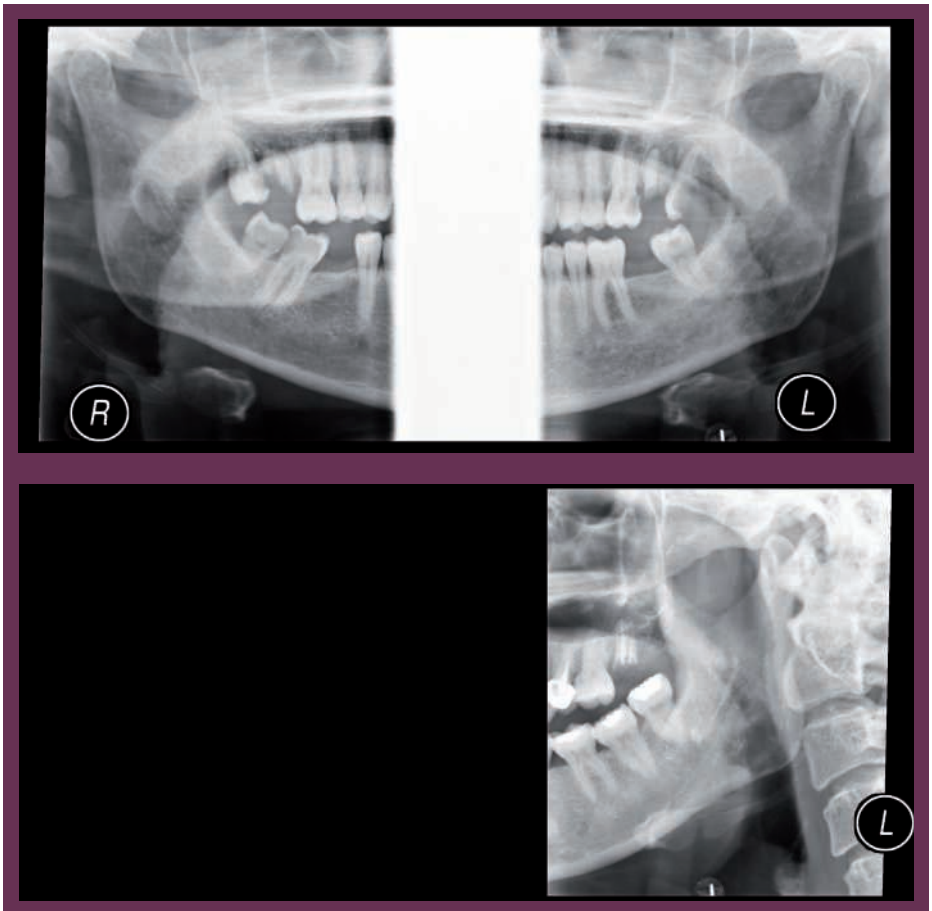

Fig. 3 Examples of exposure restriction in panoramic tomography

c) Used properly the film is less likely to move than if held by the patient.

Beam limitation in panoramic tomography

Where the facility exists consideration must be given to the limitation of the exposed area to only that portion of the dentition considered relevant to the clinical problem under investigation eg one quadrant, the anterior teeth, the TMJs etc (Fig. 3).

Film speed

The current recommendations are that an intra-oral film of at least E speed is used.[6] If all other exposure factors are equal the use of E or F speed film results in a dose reduction relative to D speed film of 45% and 60% respectively. The slight increase in image graininess that results is not likely to affect the diagnostic efficacy of the image.

For extraoral radiographs using intensifying screens, increasing speed of the system is expressed in increasing numbers eg 100, 200, 400, 800 and so on. It is recommended that intensifying screens utilise rare earth technology rather than older calcium tungstate to take advantage of the higher intensifying factor and thus reducing the dose required.

Digital radiography

Digital radiography is able to accept a greater range of exposures and still produce a diagnostically acceptable radiograph. The operator may electronically manipulate the image with post-processing software to adjust contrast and brightness for optimum viewing. With film radiography a significant under or over exposure will probably result in a useless radiograph.

Nevertheless, it is important that exposure times are adjusted to give only enough radiation to obtain a diagnostic image. Overexposure of a digital detector is unlikely to result in an unacceptable radiograph, but gives an unacceptable dose since it is not as low as reasonably practicable. Manufacturers should be able to advise on the necessary level of exposure for adequate image formation.

3. Careful technique

Careful technique includes:

- Good communication with patient to let them know what is expected
- Head immobilisation using head rest for intra-orals or chin rest and head clamp for panoramic films
- Correct positioning of film and angulation of tubehead for intra-orals
- Correct set up of anatomical planes for panoramic radiographs
- Use of film holders to help achieve the correct relationship of teeth, film and beam
- Correct exposure selection
- Removal of radiopaque objects prior to exposure. Earrings, necklaces, braces, spectacles will all cause obvious artefacts on the image, and may obscure important features.

4. Quality assurance programme

Quality assurance (QA) is an essential part of dental radiography. The purpose of QA is to set standards according to the available evidence for best practice, to regularly audit that these standards are being met and to record compliance. Implementation of QA procedures allows identification of equipment problems, or working practices that are not up to standard. These can then be corrected.

a) Image quality

Every radiograph should be rated for quality and the rating recorded in patient notes to identify if there are consistent problems. A 1-3 scale has been suggested for this purpose.[6]

b) Patient dose and x-ray equipment

Typical doses (diagnostic reference levels) for particular examinations should not be exceeded. Regular maintenance and testing of equipment to ensure correct functioning of warning lights and audible alarms, and stable radiation output should help to ensure this.

Image evaluation

1 **Excellent**. No errors of patient preparation, exposure, positioning, processing or film handling.

2 **Diagnostically acceptable**. Some errors of patient preparation, exposure, positioning, processing or film handling, but which do not detract from the diagnostic utility of the radiograph.

3 **Unacceptable**. Errors of patient preparation, exposure, positioning, processing, or film handling, which render the radiograph diagnostically unacceptable. Errors should be identified and film retaken.

The HPA offers a Radiation Protection Service for dentists that will assist in complying with the Regulations.[10]

c) Darkroom, films and processing

Poor quality film handling and processing will negate any advantages from good technique if the resultant image quality is compromised. Processing is one of the most obvious areas that will benefit from a well thought out QA programme. Processors must be regularly serviced, checked for light tightness and undergo regular cleaning of rollers and chemical tanks. Solutions should be tested, to ensure the correct strength of developer and fixer, and be changed when necessary. Film should be stored in a cool, dry place and rotated to ensure that older stock is used first.

d) Training

IR(ME)R 2000[4] stipulates that all practitioners and operators involved in exposing patients to x-rays must be 'adequately trained'. Schedule 2 of these regulations details aspects of radiation science and practice as are deemed relevant for safe radiography.

Qualified dentists receive their training in dental radiography as part of their BDS qualification. Dental nurses, hygienists and therapists may access approved training courses provided by the British Dental Association, and certain dental and radiography schools within the UK. The National Examining Board for Dental Nurses administrates the nationally recognised exam leading to the Certificate in Dental Radiography entitling them to take radiographs unsupervised.[11]

It is expected that all dental professionals involved in requesting or taking radiographs should be updated every five years on the use of ionising radiation.[6] A QA programme should note the date of the last update and when another is due. As well as reiterating important principles in radiation protection, updates should expose practitioners to up-to-date guidance that helps ensure they are using the best practice as it is understood at the time.

Adequate training on individual pieces of equipment is essential since it cannot be assumed that an understanding of one sort of equipment will transfer to the use of another. Dental panoramic tomography is particularly susceptible to compromise of image quality due to machine-based variations. Practitioners should be trained in the use of equipment by an experienced and suitably qualified member of staff, or by the manufacturer; most will provide staff training as part of the sales package negotiated at the time of purchase.

None of the training described above is deemed sufficient to enable practitioners to operate cone beam CT equipment. The Health Protection Agency recommends at least half a day's training from the manufacturer or other well qualified person such as dento-maxillofacial radiologist or specialist radiographer.[12]

e) Audit

Audit is the basis on which the effectiveness of a QA programme is verified. The date of audit and its outcome should be recorded within an audit record. Regular assessment of how well an establishment matches up to its own standards will allow deficiencies to be identified and remedial action to be taken. Frequency of individual aspects of QA must be established locally based on accepted norms, but overall review of the QA programme as a whole should be conducted not less than annually to ensure that it continues to be effective and includes up-to-date practices.

Conclusion

Radiography is an essential tool in clinical diagnosis and treatment decision-making. Extensive legislation exists to protect the patient, public and workers. Careful application of the Ionising Radiation Regulations together with the employment of best practices in radiation protection help to ensure that the risk to all from x-rays is kept as low as possible.

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The original version of this article was published in Vital *in 2009. This version has been updated with up-to-date references. You can read the whole ten-year archive of* Vital *articles for free at http://www.nature.com/vital/archive/index.html.*

bdjteam201510

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THE CRUCIAL EARLY DIAGNOSIS OF TOOTH WEAR

On 9 June 2014, GSK Consumer Healthcare, the manufacturers of Pronamel, held a meeting of dental professionals from NHS and private practice, as well as academics. The meeting discussed ground-breaking data from a recent ESCARCEL study which was sponsored by GSK. This study revealed that 29.4% of young European adults aged 18-35 years already have moderate tooth wear.[1]

To help dental professionals in the crucial early diagnosis of tooth wear, the meeting suggested the use of the Basic Erosive Wear Examination (BEWE), which facilitates consistent measurement and recording of tooth wear in practice and offers useful management guidelines.

The duration over which acid is consumed and method of consumption must be considered in risk management.

The BEWE is featured in the 2014 *Delivering better oral health* toolkit as a method for the prevention of acid wear.[2]

For more information on acid wear and using the BEWE to identify and manage the condition in practice, visit www.gsk-dentalprofessionals.co.uk.

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INNOVATIVE PRODUCTS AND POSTERS

Waterpik International, Inc. delighted delegates at the 2014 British Society of Dental Hygiene and Therapy (BSDHT) Oral Health Conference & Exhibition.

Visitors were able to observe the latest products, as well as marvel at all the brilliant poster competition entries.

On show was the incredibly popular Waterpik Complete Care system, combining the Waterpik Water Flosser and the Waterpik Sensonic Professional Plus Toothbrush. This outstanding system is clinically proven to be up to 159% more effective at improving gingival health than a manual toothbrush.[1]

Delegates were equally impressed by the display of individual Waterpik Water Flossers that can remove up to 99.9% of plaque from treated areas in just three seconds.[2] They have also been proven to be up to 50% more effective than string floss for improving gingival health.

Visit www.waterpik.co.uk for more information. Waterpik products are available in Boots and Superdrug.

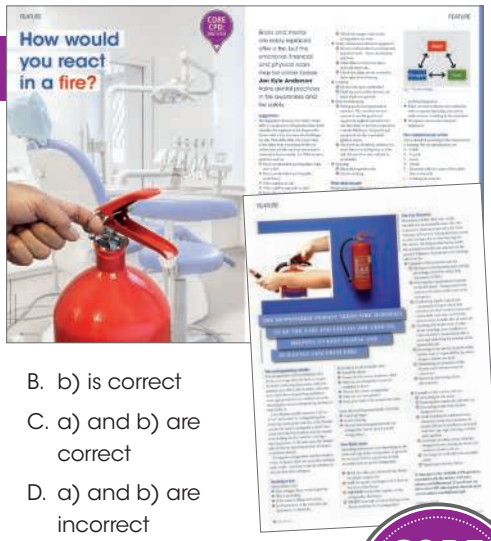
1. Goyal C R, Lyle D M, Qaqish J G, Schuller R. The addition of water flosser to power tooth brushing: effect on bleeding, gingivitis, and plaque. *J Clin Dent* 2012; **23:** 57-63.
2. Gorur A, Lyle D M, Schaudinn C, Costerton J W. Biofilm removal with a dental water jet. *Compend Contin Ed Dent* 2009; **30 (special issue 1):** 1-16.

BDJ Team continuing professional development

CORE CPD: ONE HOUR

CPD questions – January 2015

CPD ARTICLE: How would you react in a fire?



1. Which statement is **false**?

A. heat, oxygen and fuel are needed to produce a fire

B. oxygen in the air and in medical gas cylinders feeds a fire

C. fire is classified according to the material that is burning

D. a fire only needs heat and fuel to develop

2. What is the correct extinguishing medium for liquids (Class B)?

A. wet chemical

B. dry powder (special)

C. foam, carbon dioxide gas or dry powder

D. carbon dioxide gas or dry powder

3. Select the **correct** statement:

A. when the fire alarm sounds, everyone will react in a calm manner

B. during a sweep of a designated area, there is little point in a fire marshal closing doors and windows even if it is safe to do so

C. if a room is filling with smoke, you should try and extinguish the fire

D. wherever a person is within a building, there should be a sign indicating the direction to the nearest emergency/fire exit

4. a) You have used a gas carbon dioxide extinguisher in an attempt to extinguish a fire in a computer, but it is still burning and the plastic casing is melting. You should use another extinguisher. b) You are a fire marshal. If in doubt about your personal safety, you should leave the building immediately.

A. a) is correct

B. b) is correct

C. a) and b) are correct

D. a) and b) are incorrect

CORE CPD: ONE HOUR

How do I take part in *BDJ Team* CPD?

BDJ Team is offering all readers **TEN hours of free CPD** in 2015 through our website. The ten free hours of free CPD that we offered in 2014 are also still available until the end of 2015.

Just go to www.nature.com/bdjteam/cpd to take part!

Missed **core** CPD?

You can complete *BDJ Team* CPD through our website, any time in 2014 and 2015.

Just go to www.nature.com/bdjteam/cpd to find out how!

Topics covered so far

➤ April 2014: **Disposing of clinical and dental waste**

➤ May 2014: **Emergency oxygen therapy in the dental practice**

➤ July 2014: **Needlestick and occupational exposure to infections**

➤ August 2014: **Medical emergencies: the drug box, equipment and basic principles**

➤ October 2014: **Radiation protection in dental X-ray surgeries**

BDJ Team CPD – through the post

Can I take part in *BDJ Team* CPD through the post?

YES! Just print off this page, complete the form and send it with your payment of £6, to cover administrative costs. **Send to: BDJ Team CPD, Nature Publishing Group, 4-6 Crinan Street, London, N1 9XW.** We will check your answers to the CPD questions, process your payment and send you a certificate through the post.

You can now participate in this *BDJ Team* CPD through the post until the end of December **2015**.

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3. I am answering the CPD questions in the _____ issue (PLEASE ENTER MONTH):

	A	B	C	D
Q1	☐	☐	☐	☐
Q2	☐	☐	☐	☐
Q3	☐	☐	☐	☐
Q4	☐	☐	☐	☐

4. Please add any comments or feedback that you might have below or email bdjteam@nature.com.