

BDJ Team

APRIL 2017

INTRODUCTION TO CROWNS

BDA
British Dental Association

April 2017

CPD:
ONE HOUR

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Looks at what a gag reflex is, how the severity can be assessed and ways to manage patients with a prominent gag reflex.
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Rheumatoid arthritis is a common chronic inflammatory autoimmune condition affecting 400,000 UK adults.



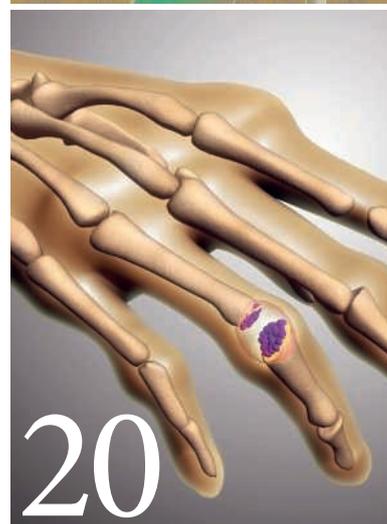
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Ed's letter

I am excited to publish an original piece of research written by Laura Cox (pictured, below) in this issue of *BDJ Team*. An experienced dental nurse, Laura graduated from the BSc (Hons) Dental Hygiene and Dental Therapy course at the University of Portsmouth in 2016. Laura's article on alternative methods of gag reflex control was inspired by the time she spent working with a dentist who provided acupuncture. Thank you to Laura and her supervisor, Joanne Brindley, for sharing her work with *BDJ Team* readers.



If you are a DCP involved with research and would like to share your findings with the wider dental community, I would be delighted to consider your article submission. Please email me at k.quinlan@nature.com.



We are also lucky enough to continue to share research from our flagship publication, the *BDJ*, in *BDJ Team*. This April we look at managing dental patients with rheumatoid arthritis, a common chronic inflammatory autoimmune disorder which affects the joints and can affect organs including the heart and lungs.

Dental graduate and freelance journalist Jess Standley has written this month's verifiable CPD article: an introduction to crowns. Jess skilfully takes us through the stages of restoring a patient's tooth with a crown, from planning to prep to placement, taking into account the importance of the roles of dental nurse and dental technician.

Our ever popular DCPs' lives this issue are Jessica Moss, Head Dental Nurse in a general practice, and Nicola Sherlock, a Dental Nurse Team Leader in the CDS.

If you would like to put yourself, or your dental team, in the spotlight, let me know.

Kate

Kate Quinlan
Editor

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THE TEAM

Cover
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Publishing
Publisher: James Sleight
British Dental Journal
The Campus
4 Crinan Street
London N1 9XW

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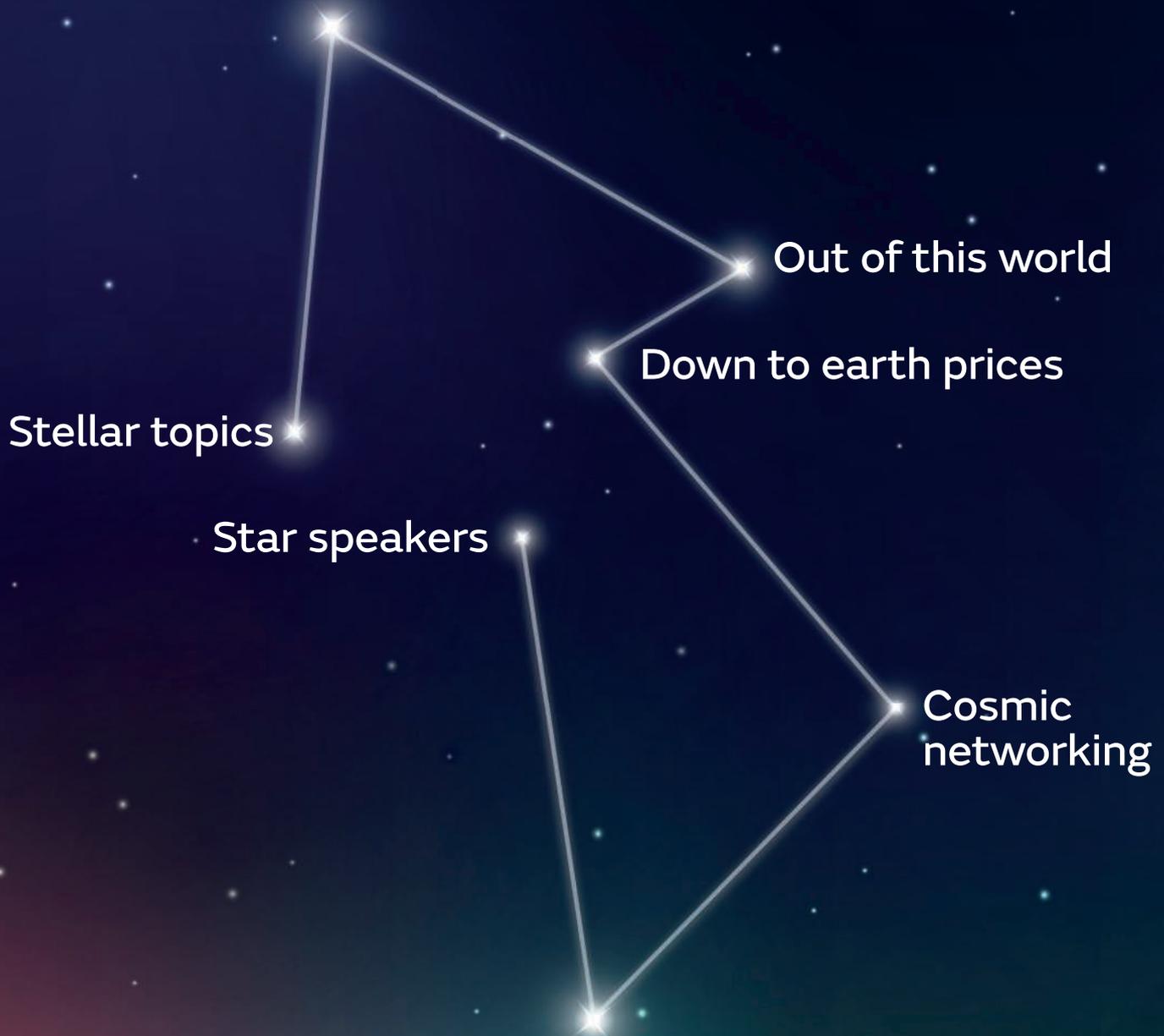
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UNIQUE FILM TACKLES PLYMOUTH'S TOOTH DECAY PROBLEM

Peninsula Dental Social Enterprise (PDSE), Peninsula Dental School and Plymouth University have produced a unique film aimed at tackling Plymouth's growing tooth decay problem.

The film, 'Open Wide and Step Inside', is a fun and interactive resource to help raise the profile of dental decay and disease and highlight the large number of children who are hospitalised for tooth extraction under general anaesthetic: 848 in Plymouth in 2015-2016.

In March, a special screening of the film was shown to parents and children (pictured) at Action for Children's Green

Ark Children's Centre in Devonport, an area of Plymouth.

The film stars Geoffrey the Giant and his friend Mouse who live in Smeaton's Tower on Plymouth Hoe. Geoffrey has toothache as a result of eating sweets, drinking fizzy drinks and neglecting to clean his teeth properly. Mouse persuades him to visit Daisy the Dentist who finds the problem and gives Geoffrey a filling.

The animation was created by Plymouth University's TELMeD team which produces e-learning tools and materials for medical, dental, Faculty of Health and other students.

Dr Robert Witton, Director of Social Engagement and Community-based Dentistry, PDSE, said: 'We devised and delivered every aspect of the project, which includes the film, teachers' resources and an oral health pack for every child. With more children being admitted to hospital for dental problems than for any health issue, data suggests new and innovative approaches are needed to encourage better cleaning, improved diet and frequent visits to the dentist.

'Our thanks go to the Wrigley Company Foundation, Henry Schein, local schools and the TELMeD team at Plymouth University.'

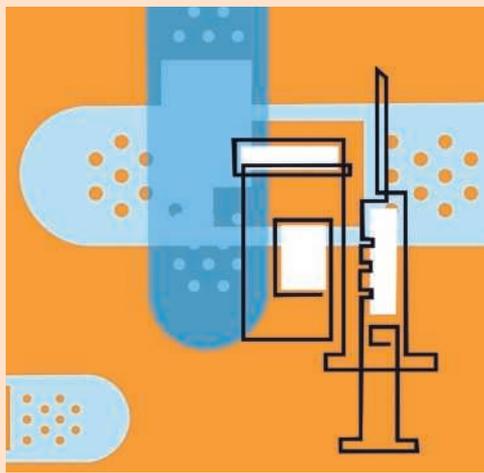
NEW NEEDLESTICK INJURY SURVEY

The British Association of Dental Nurses (BADN) are conducting a new survey into the incidence of needlestick injuries amongst dental nurses working in the UK and the Republic of Ireland, on behalf of Initial Medical.

The survey is a follow up to BADN's 2014 Survey to see if, three years on, the Safer Sharps Regulations have made any difference to the number of needlestick injuries and ways of working in dentistry.

To complete the survey, visit <http://bit.ly/2n5sDMn>.

The results of the study will be published later this year.



Do you have some news?

Does your dental practice or workplace within the dental industry have some news to share? Perhaps you have recently taken part in an event to raise money for charity, someone in your team has won an award, you organised a practice open day or oral health education activity in your community? *BDJ Team* would be delighted to share your news with our audience. Please send the details of your story and a photo to k.quinlan@nature.com.

DENTAL VOLUNTEERS RETURN FROM GREECE

Dentaid's first volunteering team has returned from the Greek island of Samos where they have been providing emergency dental treatment for refugees.

Dentist Jane Lelean (pictured, left) and dental nurse Claire Hooper (pictured, right) spent a week in Samos treating people who were suffering terrible dental pain. The team was based in a temporary building in Samos Camp which is home to about 1,000 men of many different nationalities. Most of them have complex dental needs and have been living in pain for many months. Several are on liquid diets and can't eat because their pain is so severe.

'The need was huge and they all needed teeth to be extracted,' said Jane. 'Most needed to have several teeth removed and will require more treatment. We saw people from Syria, Iraq, Iran, Algeria, Afghanistan, Morocco and Pakistan and they had escaped



the most brutal and terrible situations. It was awful hearing their stories and seeing people who had suffered so much violence. However, the clinics had a very calm atmosphere and the refugees were friendly, kind to each other and incredibly grateful. Despite being in this desperate situation they volunteered to translate and were very keen to thank us. It means so much to them that people volunteer in the camps and want to help.'

To equip the clinic Dentaid sent portable dental equipment donated by practices in the UK and disposable treatment packs supplied

by Single Use Dental Instruments. The trip was the first of many that Dentaid will run to Samos and the nearby island of Lesbos over the coming months.

Dentaid's first volunteering team on Lesbos was due to arrive on 19 March. Those volunteers will work in Moira Camp where about 3,000 people are living in tents and Kara Tepe which is home to about 800 women and children.

Dentaid has spaces for dental professionals with a minimum of three years' post qualification experience on its volunteering trips to Lesbos departing on 23 April and 7, 14 and 21 May. The charity has opportunities for volunteers in Samos on 7, 14 and 21 May.

Each trip is a week long and flights depart from London. All participants raise between £700 and £750 to fund their flights, accommodation, some meals and to contribute toward medicines and materials. Volunteers have a rest day in Athens and there are opportunities to explore Lesbos and Samos which are both beautiful islands.

To find out more or apply online visit www.dentaid.org or call 01794 324249.

Teeth Team receives £137k to further its good work

Simplyhealth Professionals (formerly Denplan) has announced that it is investing £137,000 into Teeth Team, a nationally-recognised, award-winning child oral health improvement programme.

Teeth Team, which was set up in 2010 in Hull, works to improve the oral health of children in socially deprived communities. The investment from Simplyhealth will enable Teeth Team to continue its work and roll out its programme to an additional 50 schools in 2017. In addition, Simplyhealth Professionals and its member dentists will be proactively involved in delivering the programme as it expands.

In the last two years, Teeth Team has recorded a reduction of 19.8% in local children experiencing dental extractions under general anaesthetic. The oral health survey for five-year-old children 2014-15 in Hull, carried out by Public Health England Survey (DPH), recorded an improvement from 43.4% to 37.8%.

Chris Groombridge, Chair of Trustees for Teeth Team, said: 'We are absolutely delighted to receive this momentous support and investment from Simplyhealth to our charity. To be working in partnership on this level means that moving forward we can expand the programme into scores of new schools in other areas of need and continue to make a real difference in child oral health'.

Earlier this year Teeth Team won the Outstanding Innovation Award 2017 from the British Society of Paediatric Dentistry (BSPD). The programme was described as 'excellent' and a 'clear winner' by the BSPD Executive judges and as the prize the charity will present to the Annual Conference and Scientific meeting to be held in Manchester in September.





What is gagging?

Gagging and retching are terms used synonymously to describe similar occurrences despite having different meanings.

Retching is the initial process of expelling substances from the stomach, whereas gagging stops unwanted entry into the mouth or oropharynx.¹ Gagging is a normal reaction and protective reflex to stimulus such as dental instruments and clinician fingers within the oral cavity. Gagging can be absent, reduced or pronounced in the dental environment.¹ Patients presenting with a gag reflex may display the disruptive characteristics outlined in Table 1.

There are five regions within the oral cavity considered areas of maximum sensitivity which can trigger the gag reflex; these areas are the fauces, base of the tongue, palate, uvula and posterior pharyngeal wall.²

Common iatrogenic causes of triggering these regions include over loaded impression trays, poor clinical technique and aspirator positioning.³ Additionally, gagging can be induced without physical contact and worsened by auditory, olfactory or psychic stimuli.⁴

Almost half of dental patients report gagging at least once during dental visits and 7.5% report always gagging.⁵ Whilst these numbers may not seem significant, there can be detrimental consequences for patients with a pronounced gag reflex as well as for the dental team. Patients who suffer with gagging

Exploring alternative methods of gag reflex control

Part 1: Acupressure

By L. Cox¹ and J. Brindley²

This article is the first of two covering the management of patients with a sensitive gag reflex. Part 1 will focus on the technique of acupressure which a less invasive variant of the traditional Chinese therapy of acupuncture.

Dental patients with a sensitive gag reflex can be difficult and problematic for registrants to manage as not only can a sensitive gag reflex cause complications in the delivery of dental care, it can also be a distressing event for the patient which can impact on their future care. This article aims to raise awareness of what a gag reflex is, how the severity can be assessed and ways in which to manage patients with a prominent gag reflex.

¹ Laura Cox BSc(Hons), RDH, RDT.

Laura qualified as a dental hygienist and therapist from the University of Portsmouth Dental Academy in 2016. Prior to this Laura had several years of dental nurse experience in general practice, where she worked alongside a dentist who provided acupuncture. It was the outstanding results that Laura witnessed during her time in practice that sparked her interest in alternative therapies, which was the focus of her final year undergraduate research project. Joanne Brindley supervised Laura in her undergraduate research study and has supported Laura in the production of this article. Laura is currently working as a dental therapist on the Oxford Deanery Scheme. In the future Laura hopes to secure a therapist position within the NHS or Civil Services.
² Joanne Brindley MA, SFHEA, PgCLTHE, RDH, RDT. Joanne is a Senior Dental Care Professional Teaching Fellow at the University of Portsmouth

are more likely to be anxious of dental visits, fear dental pain and have negative opinions of dental professionals.⁵ Patients may anticipate gagging or become distressed at the thought of dental care, thus resulting in dental avoidance, pain and neglected dentition.³

How can we assess gagging?

Several researchers have developed ways in which to classify and assess gagging severity; the most prominently used indices are the Gagging Severity Index (GSI) (Table 2)⁶ and the Gagging Prevention Index (Table 3), developed by Dickinson and Fiske.¹

Other systems and scales have been put into place, however the replicability of the GSI and GPI in particular reinforces their reliability.⁷

What is the role of the dental care professional (DCP)?

It is clear that anxiety can be a result of gagging, and the impacts of dental anxiety are well recognised within the profession.⁸ Managing dental anxiety and its contributing factors is therefore of key importance within the dental environment in order to ensure

Table 1 Signs and characteristics of gagging³

Oral signs	Other signs
Palatal or circumoral muscle spasm	Panic attack
Pharyngeal spasms	Lacrimation
Vomiting	Sweating
Excessive salivation	Fainting
	Uncoordinated and reversed peristalsis

effective delivery of care. The GDC's *Preparing for practice* document includes the learning outcome 'assess patients' levels of anxiety, experience and expectations in respect of dental care'⁹ which reinforces the role of DCPs in assessing and managing patients. Dental hygiene and therapy students are also expected to cover alternative therapies as part of their programmes as stated by learning outcome 1.1.8 which says 'describe the properties of relevant medicines and therapeutic agents and discuss their application to patient management' and learning outcome 1.5.2 which is 'describe

the range of orthodox complementary and alternative therapies that may impact on patient management'. Dental care and oral science has developed and evolved in a way that encourages a multi-disciplinary dental team approach to dentistry which is holistic, multifaceted, and patient-centred and complements general healthcare provision.¹⁰

It has been accepted that suitable treatments for the gagging patient include desensitisation, relaxation and distraction in addition to local anaesthesia, general anaesthesia and various sedation techniques.¹¹ These approaches may incur extra time

Table 2 Gag Severity Index (GSI)⁶

Severity Grading	Description
Grade I <i>Normal gagging reflex</i>	Very occasional gagging occurs during high-risk dental procedures such as maxillary impression taking or restoration to the distal, palatal or lingual surfaces of molar teeth. This is basically a 'normal' gag reflex under difficult treatment circumstances. Generally controlled by the patient.
Grade II <i>Mild gagging</i>	Gagging occurs occasionally during routine dental procedures such as fillings, scaling and impressions. Control can usually be regained by the patient, but may need assistance and reassurance from members of the dental team, and treatment can be continued. No special measures are generally needed to facilitate routine treatment but may be required for more difficult procedures.
Grade III <i>Moderate gagging</i>	Gagging occurs routinely during normal dental procedures. This may include simple physical examination of high-risk areas, such as the lingual aspect of lower molars. Once instigated, control is difficult to regain without cessation of the procedure. Re-commencement may be difficult. Gagging prevention measures are usually required. The gag may influence treatment planning and may limit treatment options.
Grade IV <i>Severe gagging</i>	Gagging occurs with all forms of dental treatment including simple visual examination. Routine treatment is impossible without some form of special measure to attempt to control the gag reflex. Treatment options may be limited and the gagging problem will be a major factor in treatment planning.
Grade V <i>Very severe gagging</i>	Gagging occurs easily and may not necessarily require physical intervention to trigger the reflex. The patient's behaviour and dental attendance may be governed by the gagging problem and it will be one of the prime factors when planning treatment. Treatment options may be severely limited. Dental treatment will be impossible to carry out without specific, special treatment for control of the gagging problem.

Table 3 Gag Prevention Index (GPI)⁶

Severity Grading	Description
Grade I <i>Gagging reflex obtunded</i>	Treatment and management methods employed totally obtund the gag reflex. Proposed treatment completely successful.
Grade II <i>Partial control</i>	Partial control of the gag reflex. Proposed treatment possible but occasional gagging occurs.
Grade III <i>Partial control</i>	Partial control of the gag reflex. Proposed treatment part completed or alternative treatment carried out. Involvement of simpler procedures at lower risk of producing gagging. Gagging occurs frequently.
Grade IV <i>Inadequate control</i>	Inadequate control of the gag reflex. Proposed treatment not possible. Some treatment can be carried out but only very simple procedures. Gagging occurs regularly
Grade V <i>No control</i>	Failure to control the gag reflex. Gag reflex so severe that even simple treatment not possible. No treatment provided or possible using gagging control methods.

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and inconvenience and can be met with varying degrees of success. Although Chinese medicine can seem an unlikely therapy in the dental environment, it does offer an additional method and can be considered a complementary therapy.¹²

What is acupressure?

It is believed that energy known as ch’i runs through 14 various pathways in the body and that 361 acupoints can rebalance Yin and Yang.^{12,13} Yin and Yang are a balance which define health and are complementary representations of dynamic equilibrium; Yin provides qualities such as tranquillity and rest whereas Yang is responsible for activation and transformation.¹⁴ If applying this theory to heightened gag reflex (GR) it is reasonable to presume that Yin is insufficient thus making the patient gag yet stimulation to acupoints will restore balance consequently relieving gagging. Acupressure involves applying constant pressure to acupoints;² this could be with thumb or finger pressure or devices such

as travel sickness bands. The acupoints that are associated with the relief of gagging are outlined in Table 4.

What is the evidence?

Point P-6 which is located on the wrist (Table 4) has been investigated by Lu *et al.*² who implemented test and control groups. Substantial differences in acupressure at P-6 compared to a dummy site were discovered. The operating team evaluated acupressure via a device and found a significant difference ($p = 0.002$); patient evaluation also showed differences between the sites ($p = 0.001$). Acupressure was also applied by thumb pressure and travel sickness bands in order to assess the differences in pressure variables. It was observed that conscious sedation achieved no notable differences in scores, demonstrating that sedation does not reduce gagging.² Limitations of this study were that a variety of dental treatments were performed and the participants were not reported to have previous gagging issues, therefore individual

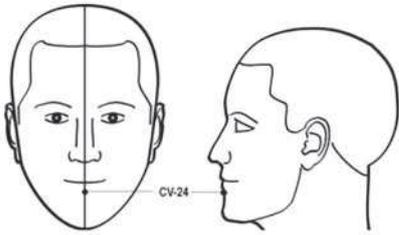
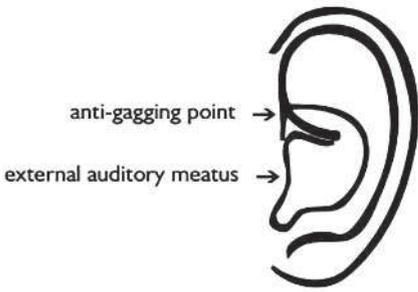
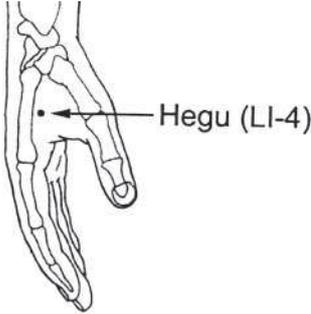
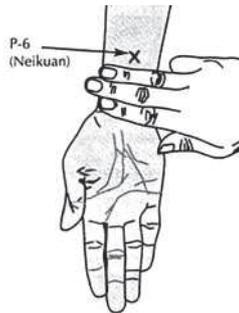
tolerance to particular treatments may skew results.

Point Hegu situated on the hand (Table 4) has been investigated by Scarborough *et al.*⁴ Clinical trials and a series of baseline, sham and treatment GR tests were used on 36 participants in either a hypersensitive or expected sensitivity group. Different areas of the mouth were stimulated in order to elicit a GR and acupressure was applied to either the left or right hand. Statistical analysis demonstrated that acupressure to P-8 moved the gag trigger point more posteriorly according to the GTPI in both groups ($p < 0.05$), thus increasing the participants’ tolerance to stimulation. Despite the robust methodology and promising results of this trial it is apparent that additional research and RCTs are required to further investigate this acupoint.

Studies investigating LI-4 could not be located; however, several reviews have discussed the success of acupressure to this acupoint and advocate it in relieving gagging.^{15,17,18} Xianyun¹⁹ states that Hegu can be pressed by the patient themselves, the dental nurse or the dentist – therefore offering flexibility. This acupoint offers a minimally invasive method of controlling the GR.¹⁵

There is also some evidence of synergy between the points, especially when a combination of acupressure and acupuncture is used. The success of CV-24 and P-6 used together has been documented in the relief of gagging.^{20,21} Sari and Sari²⁰ investigated

Table 4 Glossary of Acupoints

Name	Point	Location and Diagram	Source
Cheng jiang	CV-24	Labio-mental fold 	Rosted <i>et al.</i> ¹²
Er men	TB-21	Above tragus 	Fiske & Dickinson ⁶
Hegu	LI-4	Dorsum of hand, between first and second metacarpal bones 	Vachiramam & Wang ¹⁵
Lao gong	P-8 / PC-8	Centre of ventrum of hand, between second and third metacarpal bones 	Acupuncture, 2015 ¹⁶
Nei guan / Nei kuan	P-6 / PC-6	Ventral surface of wrist, 2 inches above crease of wrist 	Lu <i>et al.</i> ²

acupressure to P-6 alongside laser stimulation to CV-24. Together these points achieved a difference of 58.9% ($p = 0.001$) between GSI and GPI scores with 93.3% patients able to tolerate impressions. There was more success with CV-24 and P-6 combined compared to CV-24 alone evidencing a synergistic effect.

Acupressure offers a non-invasive, painless and cost free management technique when implemented by using finger pressure.^{4,20}

How can we develop and access these skills?

At present there are no known courses specifically for the use of acupressure. However, no additional training or qualifications are required to utilise this technique. It is therefore suggested that registrants practise identification of the

The use of alternative therapies within a healthcare setting is growing in popularity but is an area that should be further explored to promote its efficacy and use. Incorporating these techniques into personal daily practice has been an invaluable tool which has been easy to learn and implement. Some patients have adopted this technique themselves which has enabled them to control gagging at home, for example whilst brushing their teeth, which has had a positive impact on their oral health and well-being.

1. Dickinson C M, Fiske J. A review of gagging problems in dentistry: 1. Aetiology and classification. *Dent Update* 2005; **32**: 26-32.
2. Lu D P, Lu G P, Reed 3rd J F. Acupuncture/acupressure to treat gagging dental

Dent J 2016; **220**: 515-520.

9. General Dental Council. *Preparing for practice. Dental team learning outcomes for registration*. 1st ed. pp 16, 17, 27. London: General Dental Council, 2015.
10. Gallagher J E, Wilson N H F. The future dental workforce? *Br Dent J* 2009; **206**: 195-199.
11. Rosted P, Bundgaard M, Fiske J, Pedersen A M L. The use of acupuncture in controlling the gag reflex in patients requiring an upper alginate impression: an audit. *Br Dent J* 2006; **201**: 721-725.
12. Thayer T. Understanding the use of acupuncture in dentistry. *Dental Nurs* 2013; **9**: 80.
13. Haghghat A, Kaviani N, Jokar S, Soltani P, Ahmadi A. Evaluation of the effects of acupuncture on P6 and anti-gagging acupoints on the gag reflex. *Dent Hypotheses* 2015; **6**: 19-22.
14. MacPherson H P D. *Acupuncture research: strategies for establishing an evidence base*. New York: Churchill Livingstone Elsevier, 2008.
15. Vachiramam A, Wang W C. Technical Note - Control of gagging reflex during dental impression procedure in children using acupressure techniques. *J Maxillofac Prosthetics Tech* 2003; **6**: 25-27.
16. Internal Arts International. 20 Acupuncture Points Every Martial Artist Should Know: Part 2 Internal Arts International. 27 February 2015. Available at: <http://www.internalartsinternational.com/free/20-acupuncture-points-every-martial-artist-know-part-2/> (accessed March 2017).
17. Farrier S, Pretty I A, Lynch C D, Addy L D. Gagging during impression making: techniques for reduction. *Dent Update* 2011; **38**: 171-172, 174-176.
18. Shriprasad S, Shilpashree S H. Gag reflex: No more a gag to a dentist the behavioral techniques, pharmacological techniques, acupressure and acupuncture in controlling the gag reflex - a review. *Bangladesh J Med Sci* 2012; **11**: 12-17.
19. Xianyun R. Making an impression of a maxillary edentulous patient with gag reflex by pressing caves. *J Prosthet Dent* 1997; **78**: 533.
20. Sari E, Sari T. The role of acupuncture in the treatment of orthodontic patients with a gagging reflex: a pilot study. *Br Dent J* 2010; **208**: E19.
21. Bilello G, Fregapane A. Gag reflex control through acupuncture: a case series. *Acupunct Med* 2014; **32**: 24-27.

bdjteam201759

'BY IMPROVING KNOWLEDGE YOU CAN

SUPPORT YOUR PATIENTS TO IDENTIFY THEIR

OWN TRIGGER POINTS AND IMPROVE

THE PATIENT EXPERIENCE BY CONSCIOUSLY

AVOIDING AREAS THAT ELICIT GAGGING'

acupoints on themselves or with colleagues which can help with quick location of points and experimenting with various pressures to ensure comfort. Once confidence has developed the technique can then be tried on patients who struggle with gagging.

By improving knowledge in this area you can support your patients to identify their own trigger points and improve the patient experience by consciously avoiding areas that elicit gagging. Gagging sometimes occurs in nervous patients who have a tendency to hold their breath during treatment which results in them panicking and losing the element of control. During treatment it is valuable to make nervous or gagging patients aware of the sensations they can expect to feel and encourage deep controlled breathing through their nose, taking regular breaks to allow time to relax and instructing them to raise their hand when they feel they need to stop. It is possible to achieve notable success by utilising these approaches coupled with firm, prolonged pressure to acupoint CV-24 on patients who experience exaggerated gag reflexes and nervousness.

patients: a clinical study of anti-gagging effects. *Gen Dent* 2000; **48**: 446-452.

3. Bassi G S, Humphris G M, Longman L P. Review article: The etiology and management of gagging: A review of the literature. *J Prosthet Dent* 2004; **91**: 459-467.
4. Scarborough D, Van Kuren M B, Hughes M. Hand pressure device to diminish gag reflex response. *J Am Dent Assoc* 2014; **139**: 1365-1373.
5. Randall C L, Shulman G P, Crout R J, McNeil D W. Gagging and its associations with dental care-related fear, fear of pain and beliefs about treatment. *J Am Dent Assoc* 2014; **145**: 452-458.
6. Fiske J, Dickinson C. The role of acupuncture in controlling the gagging reflex using a review of ten cases. *Br Dent J* 2001; **190**: 611-613.
7. Bell J. *Doing your research project*. Maidenhead: McGraw-Hill Open University Press, 2010.
8. Porritt J, Jones K, Marshman Z. Service evaluation of a nurse-led dental anxiety management service for adult patients. *Br*

'I enjoy the fast pace of my job'



What's it like being Dental Nurse Team Leader for Manchester Community Dental Service? Meet **Nicola Sherlock**.

I'm up at around 6.30 am and have Bran Flakes, coffee and a multi-vitamin drink for breakfast. My husband and I have an 8-year-old and 4-year-old twins. We car-share so my husband drops me off at work then takes the children to school.

I work full time Monday to Friday. My days are usually spent managing staff issues, managing the appointment system, dealing with impertinent computers, ordering stock, assisting clinicians and students, giving oral health advice to patients, parents and support workers and trying to squeeze in my own admin - all fuelled by plenty of cups of tea and the promise of a G&T at the weekend.

I originally wanted to be a marine biologist and dive with sharks somewhere tropical, but someone in the know told me that I was more likely to end up studying squid off the coast of Scotland and it didn't seem quite as romantic as I once thought! So dentistry was my plan B. My sister-in-law also works in dentistry - and also has twins!

My qualifications include the National Certificate in Dental Nursing, Making Prevention Work in Practice Certificate, Certificate in Special Care Dental Nursing, Certificate in First Line Management - Level 3, (ILM), and Certificate in Dental Sedation Nursing.

I enjoy the fast pace of my job and the variety that comes with student teaching, although it can be hard fitting everything into one day.

At Manchester Community Dental Services the team includes a Specialist in Special Care Dentistry, an SDO who also tutors 4th year dental students in paediatric outreach, a

restorative outreach tutor, a dental therapist who can also administer IHS, four dental nurses and a receptionist. We see a wide variety of patients such as adults and children with additional needs, paediatrics and adults with the dental students, GDP referrals for sedation, Looked After Children and children from families in need, so there's never really a dull moment in the CDS.

Our management team supports us as much as possible in gaining our core CPD then it's up to the individual to find the rest but we're quite good at sharing websites, articles and dentistry publications around the staff.

on special occasions we all bring something in for a buffet lunch together.

I get home around 5.15 pm, whizz round clearing up from the morning madness, unload and reload the dishwasher - the same with the washing machine - start the evening meal and, if I'm really lucky, jump in the shower before the rest of the family get home and the madness begins again with tea-bath-story-bedtime routines x3!

We've been thinking about our sugar intake at home recently as it's such a hot topic at the moment. I've been trying to encourage the children to choose healthier breakfast cereals (much to their disgust) and they have only ever been allowed juice/cordial at mealtimes and a 'treat' after their evening meal at weekends; it doesn't stop them from asking at breakfast and lunch too though!

Outside work I love camping and anything creative, getting out into the countryside or National Trust sites, and I'm a bit of a

'I ORIGINALLY WANTED TO BE A MARINE BIOLOGIST

AND DIVE WITH SHARKS SOMEWHERE TROPICAL,

BUT SOMEONE TOLD ME I WAS MORE LIKELY TO

END UP STUDYING SQUID IN SCOTLAND'

Completing the Making Prevention Work in Practice certificate last year has made it possible for me to work alongside the dentist applying topical fluoride at school screenings and giving oral health advice as and when it's required. I am also planning on starting a nurse-led clinical session where I see patients for OHE, topical fluoride and acclimatisation/building trust and confidence in the dental team.

I usually bring my own lunch to work, but

bookworm. I'd love to be a writer but I'm not sure I have the self-discipline to work from home.

The time I go to bed depends on how spent I am at the end of the day. Some days I'm pushed to stay awake much after the children have gone to bed. Other days I find it hard to switch off so stay up later chatting or watching TV with the hubby.

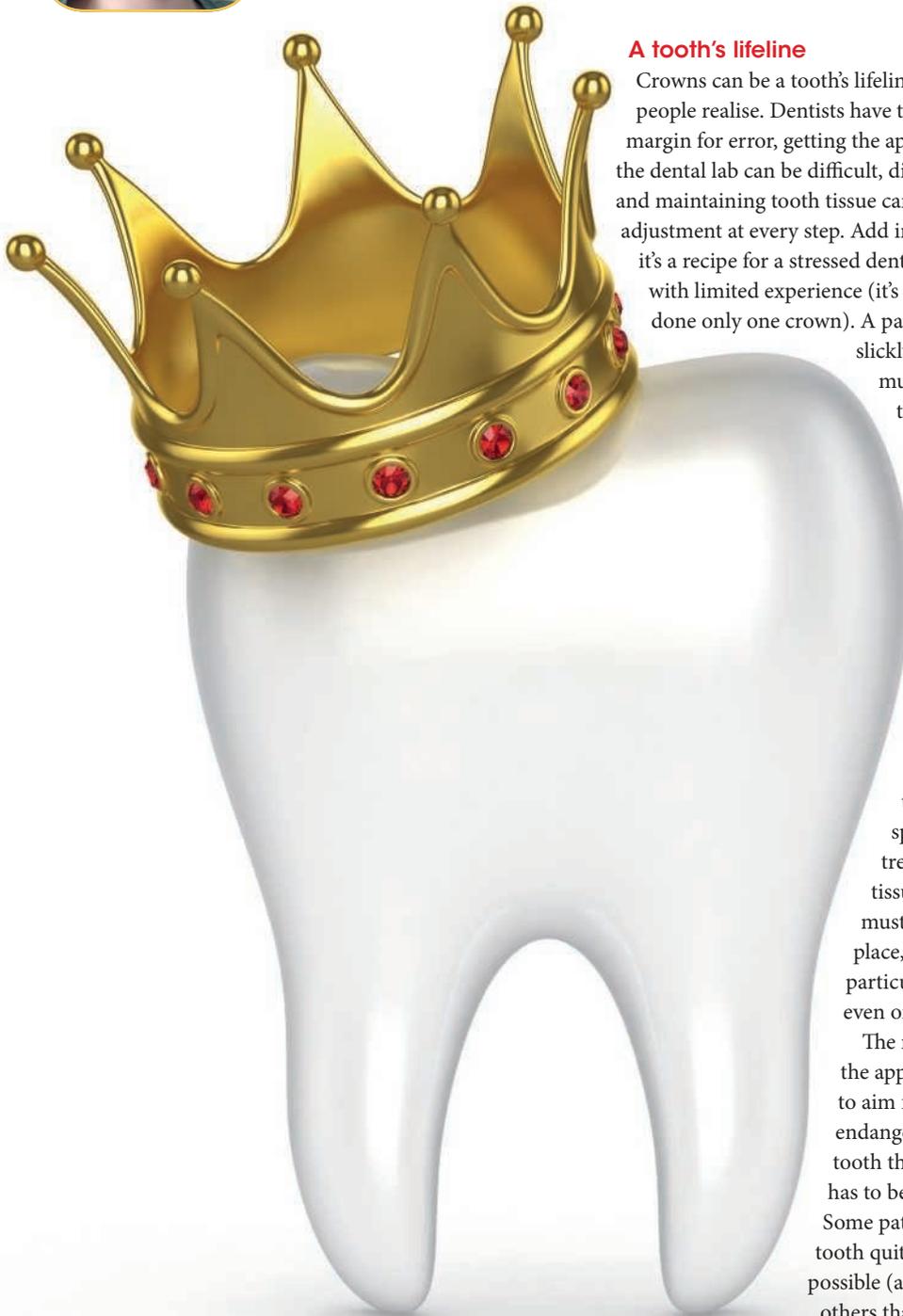
bdjteam201760

An introduction to

CROWNS



In the first of a new series of articles focusing on specific areas of dentistry, freelance dental journalist **Jess Standley** takes a look at crowns.



A tooth's lifeline

Crowns can be a tooth's lifeline, but are a far more complex procedure than most people realise. Dentists have to work in tenths of a millimetre, there's very little margin for error, getting the appearance right and communicating accurately with the dental lab can be difficult, discussions about the balance between appearance and maintaining tooth tissue can be tricky, and it can take a lot of painstaking adjustment at every step. Add in time pressure and any other added difficulties and it's a recipe for a stressed dentist, particularly if the dentist is recently graduated with limited experience (it's possible to graduate from dental school having done only one crown). A patient dental nurse who is supportive and can work slickly with the dentist makes the whole procedure so much easier. The roles of the dental nurse and lab technician are vital to the success of crowns.

Planning

The first stage is planning the treatment, and deciding whether or not to place a crown. A decision has to be made about whether a filling is sufficient, whether a crown is most appropriate, or whether the tooth has become unrestorable and an extraction has become necessary. Crowns can be quite destructive due to the amount of tooth tissue removed, but the advantage of them is that they can be protective to the tooth and can help to hold the tooth together (like a cap, preventing the tooth splitting outwards), particularly after a root canal treatment. No filling or crown material replaces tooth tissue like-for-like so unnecessary tooth destruction must be avoided, so although they certainly have their place, crowns should not be placed without good reason, particularly given their cost (which is upwards of £200, even on the NHS).

The next big question is whether the patient's priority is the appearance or saving tooth tissue. Sometimes choosing to aim for the optimum appearance can be done without endangering the pulp of the tooth (the nerve inside the tooth that keeps it alive), but at other times a compromise has to be made in order to keep the tooth alive and healthy. Some patients will be willing to accept a metal-coloured tooth quite happily to keep as much of their own tooth as possible (as metal crowns can be made much thinner), but for others that will not be an acceptable option. In most cases, compromises are agreed on, such as accepting a metal band

around the gingival margin of the tooth, or just having the outside/most visible part of the crown tooth-coloured and the rest metal-coloured. Discussing the priorities with the patient, and making sure they know what to expect at the end of treatment is a very important part of the process, to ensure they will be happy with the end result.

Another important part of the preparation is checking whether the tooth is alive and healthy. Often crowns are placed following root canal treatment, and it's important to check that any infection under the tooth is improving. If it is not root canal treated, then vitality tests and radiographs are normally done to check the health of the tooth.

Crown prep

The first stage of the crown preparation appointment (when the tooth is drilled to the right shape for the crown) is normally taking an impression for making a temporary crown while the permanent crown is being made. The impression can be done using alginate or putty. Alginate needs to be mixed smoothly and the impression needs to be accurate with no big air blows in the relevant area. Putty needs to be used if the impression may be needed at a later date, as alginate impressions soon lose their shape.

lab form will communicate a lot of the information about the crown to be made, the work done on the actual tooth can give a lot of information about what the dentist is intending for the tooth and how they want the lab to make the crown. The margin needs to be clear in order for it to be picked up clearly in the impression so that the lab has something useful to work with and so that the end result is good.

Choosing shades

After the crown prep is completed, the shade(s) for the crown needs to be decided on, in the case of porcelain. A shade guide is used and the dentist will look at different shades compared with the surrounding teeth. If the crown is full porcelain, rather than part porcelain with metal underneath, the dentist may also record the colour of the tooth underneath that is being crowned; this can then be communicated to the lab, to give them a greater idea of what they are working with (as the underlying colour can shine through and affect the colour of the crown needed). Any little details wanted, eg stains or slight cracks on the tooth, can also be recorded and communicated.

Before the patient leaves, the tooth needs to be 'temporised' - this is where the tooth is

The dental laboratory will then make the crown. This is also a very complex process, but largely falls outside what I will cover in this article. The dental technician will fill the impression with dental stone to create a model/die of the tooth to work on. The lab will work to the instruction of the dentist, creating what has been asked for. The process will vary depending on whether it is a full metal, a porcelain fused to metal or a full porcelain crown.

Once the crown returns back from the lab, the dentist will check that it is as they expected. They will check it goes on and off the model okay.

Crown placement

The temporary crown will be removed, the temporary cement will be cleaned off the underlying tooth and a cement will be decided upon. The crown will be tried in and out so that the dentist is certain about the placement of the crown. Cement will then be mixed and put into the crown, the tooth will be dried, and the crown will be placed. Excess cement will be cleared away using floss and dental instruments. Pressure will be maintained on the crown so that the cement sets with the crown fully seated/in the correct position.

The patient will then be asked how it feels to bite on. Often it will be slightly 'high', so the dentist will mark the teeth using articulating paper, so that the heavy contacts show up. Adjustments will then be made so that the crown is comfortable and doesn't interfere with the patient's bite.

Crowns can be a fabulous restoration, helping to save teeth that would otherwise have to be extracted. They can also be a very aesthetic option, particularly those made of/with porcelain. Crowns can be a very complex and involved procedure, but really demonstrate the important roles that different members of the dental team play in producing an end result that really meets the needs of/pleases the patient.

Summary of stages:

1. Deciding whether a crown is the most appropriate restoration
2. Planning the material(s) of the crown
3. Taking an impression to allow a temporary crown to be made
4. Shaping the tooth ready for the crown
5. Temporising the tooth
6. The crown is made by the lab
7. The temporary crown is replaced with the permanent crown
8. Any necessary adjustments are made.

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'A PATIENT DENTAL NURSE WHO IS SUPPORTIVE

AND CAN WORK SLICKLY WITH THE DENTIST

MAKES THE WHOLE PROCEDURE SO MUCH

EASIER. THE DENTAL NURSE AND LAB TECHNICIAN

ARE VITAL TO THE SUCCESS OF CROWNS.'

Then comes the actual 'crown prep' stage. Local anaesthetic is normally used to numb around the tooth being drilled. Trimming down the tooth for the crown is where the dentist's real skill is called upon. The amount of tooth tissue removed/space needed for the crown depends on the material used for each part of the crown. A greater thickness is needed for porcelain whereas metal can be thinner. In all cases, the difference between too little tooth tissue removed and too much is fairly tiny. The dentist will try to create a clear margin, ideally finishing on natural tooth rather than filling material, for the dental lab to work to. While a written

covered in order to keep it safe and healthy while the crown is made by the lab, and it also helps to prevent movement or further eruption of the tooth that could prevent the crown fitting. The impression taken earlier in the process is used; temporary crown material is put into the impression and the impression is put back over the tooth. A small blob of the material is often put somewhere to give an indication of when the material is set. Once the material has gone hard, the impression and temporary crown is removed. The edges are smoothed off using polishing discs. Temporary cement is then used for sticking the temporary crown in place.

*‘There is **so much** that we can do as dental nurses!’*



A day in the life of **Jessica Moss**, 26, from Weston-super-Mare, who is Head Dental Nurse at Nigel Newton’s Dental Care.

I usually get up at 6.45 am. I live with my boyfriend; we bought our first house in 2013. I have porridge and a cup of tea (with no sugar of course!) for breakfast while watching BBC News.

I drive to work - it’s a ten minute drive if the traffic is good. I work full time Monday to Saturday. On Mondays and Saturdays I carry out practice manager duties, mainly compliance. From Tuesday to Friday I am chairside with our foundation dentist, Dhathri. I still have an active role in decontaminating dental instruments too and making sure everything is running okay on reception.

What I enjoy most about my job is the ability to learn new things and improve my skills as a dental nurse. As we are a small practice I have a great rapport with most of the patients so I enjoy finding out what

they’ve been up to since we saw them six months ago. I am also enjoying seeing the trainee nurses progress towards their qualification.

The more challenging element to my role is keeping up to date with compliance as there is a lot to do and it seems to be always changing.

There are two dentists in our team: Nigel, who has been qualified since 1980, and Dhathri who is currently doing her foundation training after passing her Overseas Registration Exam (ORE). Our two trainee dental nurses are Jenni, who will be sitting her exams in the next couple of months, and Hayley, who is just about to start her eRoE [record of achievement]. We also



‘AS WE ARE A SMALL PRACTICE I HAVE A GREAT RAPPORT WITH

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'I MAKE SURE MY SISTER IS GEARED UP WITH THE CORRECT

ORAL HEALTH KNOWLEDGE FOR KEEPING MY NIECE AND

NEPHEW'S TEETH NICE AND HEALTHY - NO CAVITIES SO FAR!'



have two receptionists: Trudy and Patsy. We make a great team and we all get on really well. It's great that we all help each other out no matter what and I am proud of our small team.

We see a wide variety of patients: children, adolescents, adults, the elderly - both private and NHS. We also have a lot of patients on payment plans such as Denplan.

When I was at school I wanted to be a clinical psychologist, but I think I would have ended up in dentistry one way or another.

I completed by NEBDN National Diploma in Dental Nursing in 2013, a Certificate of Competence in Topical Fluoride Application in 2014, a Certificate of Competence in Impression Taking in 2015 and a Level 4 Professional Diploma in Dental Practice Management in 2016. I am currently studying towards my oral health education (OHE) training and plan to sit the NEBDN exam in March 2018.

I witness the eRoE portfolios for the trainee dental nurses, usually on an evening or a weekend.

At lunchtime in the practice I sort out the instruments for cleaning after a busy morning if they haven't already been done and then eat my lunch in the staff room. When our receptionist Patsy is in, we sometimes go round to the little local shop to get a supply of goodies for the staff room!

Sometimes I do CPD during my lunch break, or I do it in my spare time. We do get days off to

attend core CPD courses that the practice pays for. It's nice to have an excuse for an outing with all of the team! I already have my trainees thinking about what they want to study once they pass their Dental Nursing Diploma. There is so much that we can do as dental nurses, especially a lot of hands-on patient care.

I am currently studying part-time with the Open University for a degree in Classical Studies. I loved history in school and the subject still really interests me. This year I also need to complete my Record of Competence for my OHE course and possibly do a competence course for placement of rubber dam. That's in addition to helping my trainees get through their dental nursing exams... and cruising the Caribbean with my boyfriend, best friend and her boyfriend!

The time that I get home varies every day. The latest will be about 7 pm on a Tuesday. On a Monday and Saturday we only work half a day so I get home around 1.30 pm which is nice.

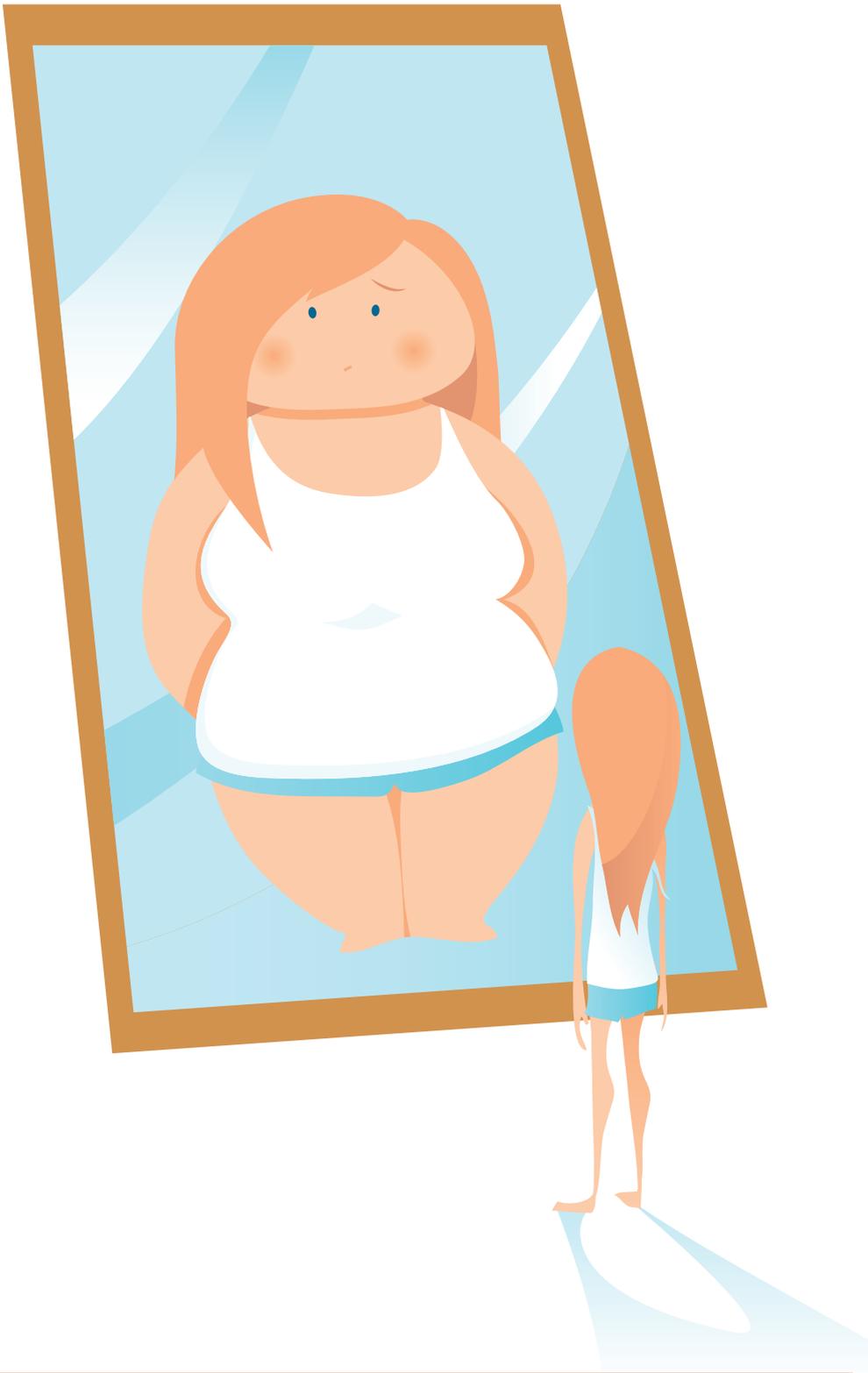
I watch what I eat and have recently lost 3½ stone. I make sure my sister is geared up with the correct oral health knowledge for keeping my niece and nephew's teeth nice and healthy - so far no cavities! I am the only one of my siblings that has no fillings which I think is quite an achievement.

My best friend is currently buying her first house so when I'm not working, studying or cruising (!) we seem to have made a habit of going to show homes for fun!

I go to bed at 10 pm.

Would you like to write or be interviewed about your daily life, your career, your future plans or something entirely different? We'd love to hear from you!
Email bdjteam@nature.com

bdjteam201762



The effect of *bulimia*

on the dentition

During this year's Eating Disorders Awareness Week, **Andrew Eder**¹ explores the effects of bulimia on oral health, most specifically in terms of erosion as a result of self-induced vomiting, and how patients may be helped.

Eating Disorders Awareness Week took place between 27 February and 5 March 2017, focusing, in part, on early intervention. A leading charity in this area, BEAT (www.b-eat.co.uk) is looking to educate both healthcare professionals and the wider public about eating disorders, so that they are equipped to help if a patient or someone they know may be suffering.

Dental professionals are no exception, and with 'The Costs of Eating Disorders - Social, Health and Economic Impacts'¹ report estimating that more than 725,000 people in the UK are affected by an eating disorder, there is a very good chance that more than a few of your patients may need help in this area.

The eating disorder that tends to have the greatest effect on oral health is bulimia nervosa, which involves the sufferer caught in a cycle of eating large quantities of food and then vomiting (known as purging), in order to prevent weight gain. This can result in severe damage to the teeth in the form of erosion, so it is certainly something that we, as dental professionals, should be keeping an eye out for.

Indeed, the extended periods of intentional vomiting suffered by bulimics can have

¹ Professor Andrew Eder is a Specialist in Restorative Dentistry and Prosthodontics and Clinical Director of the London Tooth Wear Centre, a specialist referral practice in central London. He is also Professor/Honorary Consultant at the UCL Eastman Dental Institute and Pro-Vice-Provost and Director of Life Learning at UCL.

considerable impact on the dentition and result in substantial oral health complications, including:

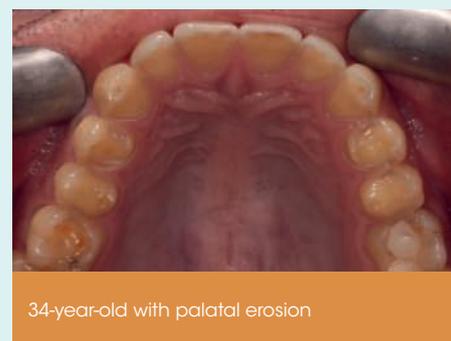
- The teeth can become rounded, smooth and shiny and lose their surface characteristics
- Incisal edges appear translucent
- Cupping forms in the dentine
- Cervical lesions are shallow and rounded
- Restorations tend to be unaffected by erosion and will therefore stand proud of the surrounding tooth tissue.

Advice is the first step

This can, of course, be a challenging issue to raise with a patient, as shame and denial are common features of an eating disorder. To try and overcome such barriers, it is essential that we do our very best to make the patient feel comfortable and not intimidated. Assure them you have time to talk things through and ask questions in a non-judgemental way aimed at encouraging the patient to identify the origin of their oral health problems. One way that can help in this endeavour is to share your examination findings with the patient and explain how their symptoms may be linked.



34-year-old with erosion and incisal thinning



34-year-old with palatal erosion

bulimia includes:

- Issuing a fluoride rinse or gel and prescribing a highly-fluoridated toothpaste and a soft toothbrush for daily use
- Not brushing immediately after vomiting or consuming acidic foodstuffs, but rinsing with a fluoridated mouthwash and chewing sugar-free, xylitol-sweetened gum afterwards.

Extra protection can be provided via calcium and phosphate ions, such as those found in GC Tooth Mousse, helping to restore the mineral balance, neutralise acidic challenges and stimulate salivary flow.

protective gels and when acids are present in the mouth to avoid these acids being held in direct contact with the teeth.

Once any treatment has been completed, it is imperative that the patient attends for very regular check-ups so that the rate of wear can be monitored, further guidance provided, adjustments to lifestyle made, and motivation provided.

As an aside, if you believe from a patient or their dentition that they may be bulimic, it may be prudent (with the patient's permission) to make contact with their GP or other healthcare professional overseeing their care before beginning any course of treatment, as a team approach will normally help facilitate a course of action that will offer the best possible outcomes in the given circumstances.

'ULTIMATELY, PREVENTIVE ORAL CARE

MAY NOT BE ENOUGH TO SAVE THE DENTITION.

ACTION BEYOND PREVENTIVE ADVICE ALONE

MAY NEED TO BE TAKEN...'

Advice rather than treatment features heavily during the initial stage of helping a patient suffering with bulimia. Diet analysis and general guidance on how to reduce the effect of acidic food and drinks should be given, such as:

- Drinking water or low fat milk in preference to other liquids
- Using a straw positioned toward the back of the mouth when drinking acidic beverages
- Avoiding swishing acidic drinks around the mouth
- Rinsing the mouth with water or fluoridated mouthwash after consuming acidic foodstuffs.

In addition, oral health advice for a patient whose dentition is compromised by

Extra protection

It will come as no surprise to dental professionals that patients with bulimia can find it extremely hard to overcome the disorder, which may mean that, ultimately, preventive oral care may not be enough to save the dentition.

In such a situation, action beyond preventive advice alone may need to be taken to protect the remaining tooth structure. This may include the direct application of composite resin if at least an enamel halo exists or glass ionomer to sensitive areas, an occlusal guard to protect the teeth during purging, and an alkali or fluoride gel placed within the fitting surface of the guard to neutralise any acid pooling. Such mouthguards should not be worn for prolonged periods without any such

1. beat. The Costs of Eating Disorders - Social, Health and Economic Impacts. 25 February 2015. Available at: https://www.b-eat.co.uk/assets/000/000/302/The_costs_of_eating_disorders_Final_original.pdf?1424694814 (accessed March 2017).

The London Tooth Wear Centre offers an evidence-based and comprehensive approach to managing tooth wear, using the latest clinical techniques and a holistic approach in a professional and friendly environment. If you have any concerns about your patient's tooth wear, visit www.toothwear.co.uk, email info@toothwear.co.uk or call 020 7486 7180.

bdjteam201763

Managing patients with rheumatoid arthritis

By S. de Souza,¹ R. K. Bansal² and J. Galloway³

Rheumatoid arthritis (RA) is a common chronic inflammatory autoimmune disorder which significantly impacts patients' lives and can lead to permanent disability. Inflammation in RA not only affects joints; it can affect organs including the heart and lungs. Early diagnosis, initiation of intensive drug therapy, and a multidisciplinary care approach have vastly improved the long-term prognosis for those living with the condition. However, RA patients often present with co-morbidities which add to the complexity of clinical management. Orofacial conditions associated with RA which dental professionals need to be aware of include periodontal disease, temporomandibular dysfunction and salivary gland dysfunction. In this article, we provide information on RA, oral health in RA and guidance on how

best to manage patients with RA in general dental practice.

Background

Rheumatoid arthritis (RA) is a common chronic inflammatory autoimmune condition which affects an estimated 400,000 UK adults.¹ Onset is commonly between 40–50 years old, though can occur at any age, with women three times more likely affected than men.¹ RA is a common cause of disability; work disability increases with age and disease duration.² RA results in increased healthcare costs and use of social security provision, as well as significantly reducing a patient's quality of life.^{3,4}

Pathophysiology

RA is characterised by the production of rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPAs) against autoantigens commonly expressed within and outside of synovial joints.⁵ RF is produced by B cells in the synovial membrane and is associated with more aggressive joint destruction.⁶ Traditionally, RF was the classic autoantibody in RA; however, ACPAs are now seen as being of increased importance as they are more specific and sensitive for RA diagnosis and predict a poorer disease course with progressive joint damage.⁷ RF, ACPA or both are present in 50–80% of people with RA.⁷

RA has several distinct disease subsets with several inflammatory cascades all resulting

in persistent synovial inflammation with damage to articular cartilage and underlying bone.⁷ Key inflammatory cytokines in its pathogenesis are tumour necrosis factor alpha (TNF- α) and interleukins 1 and 6 (IL-1, IL-6), which result in the production of proteolytic enzymes and activation of osteoclasts.^{6–8}

Aetiology

It is thought RA occurs in response to environmental triggers in genetically susceptible individuals.⁵ The most recognised environmental trigger is smoking, which increases levels of the peptidyl arginine deiminase (PAD) enzyme responsible for protein citrullination (the conversion of arginine to citrulline).⁹ A recent study identified a clear dose-response relationship between smoking and the risk of developing RA.¹⁰ The periodontal pathogen *Porphyromonas gingivalis* has been implicated in the aetiology of RA as has, most recently, the gut microbiome.^{11,12} Other suggested environmental risk factors include region of birth, birthweight, breastfeeding and socioeconomic status.¹³ Genetic factors account for 50% of the risk of RA development, with more than 100 loci for genetic susceptibility identified to date.^{14,15} ACPA presence is associated with alleles containing a shared epitope (common protein-binding motif) in the HLA-DRB1 locus, and can be detected up to 15 years before RA onset.^{16,17}

¹ Honorary Patient Expert, Academic Rheumatology, King's College London, London; ² General Dental Practitioner, Springfield Dental Practice, Chelmsford and MSc Student, Dental Institute, King's College London, London; ³ Senior Clinical Lecturer, Academic Rheumatology, King's College London, London and Honorary Consultant Rheumatologist, Rheumatology, King's College Hospital NHS Foundation Trust, London

Signs and symptoms

Common clinical features of RA include a symmetric polyarthritis with joint swelling (particularly in the hands and feet).¹⁸ Persistent joint inflammation (synovitis) results in bone and cartilage destruction which can ultimately lead to deformity, chronic pain and a loss of function.⁹ Patients can experience stiffness upon waking or after prolonged periods of rest.^{18,19} Systemic inflammation in RA can affect the brain (fatigue, reduced cognitive function and cerebrovascular events), liver (elevated acute-phase response and anaemia), heart (myocardial infarction and cardiac failure), lungs (inflammatory and fibrotic diseases), exocrine glands (secondary Sjögren's syndrome), bone (osteoporosis) and muscles (sarcopenia).²⁰ In severe RA, subcutaneous nodules and other extra-articular manifestations (such as vasculitis) can develop.¹⁸

Diagnosis

In 2010, the European League Against Rheumatism (EULAR) and the American College of Rheumatology (ACR) jointly released new classification criteria for RA to assist rheumatologists with the diagnosis of newly-presenting patients.²¹ This assesses joint involvement, autoantibody status, acute-phase reactants and symptom duration.⁷ Early diagnosis and initiation of intensive treatment prevents joint damage, and greatly improves functional outcome and morbidity for patients.¹⁸

Clinical assessment

Disease activity is often assessed using combined indices such as the Disease Activity Score, based on the 28 joint count (DAS-28) which assesses joints in the hands, arms and knees for swelling and tenderness; measures the erythrocyte sedimentation rate (an inflammatory marker), and the patient's global assessment (a visual analogue scale-based score the patient gives for how RA is affecting them overall at that time).⁶ The Simplified Disease Activity index (SDAI) or the Clinical Disease Activity index (CDAI) are alternatives.⁶ X-rays, ultrasound and magnetic resonance imaging are all used to assess structural changes in the joints.⁶

Medical management

The aim of drug therapy is to reduce symptoms and suppress inflammation, thereby limiting joint damage and disability.²² Currently, it is recommended to follow a 'treat-to-target' strategy which involves initiating intensive drug therapy

immediately after diagnosis and escalating this, guided by disease activity assessment, until clinical remission or low disease activity is achieved.^{20,22} Disease-modifying anti-rheumatic drugs (DMARDs) are the primary treatment used as they reduce pain and swelling of the joints, lower levels of acute-phase inflammatory markers, limit progressive joint damage and improve function.⁷ The first DMARD usually prescribed is methotrexate (sulfasalazine or leflunomide can be given if methotrexate is contraindicated).⁷ DMARDs can be used in combination to be more effective.²³

serious infection (for example, tuberculosis) over conventional DMARD use, with this risk at its highest during the first six months of therapy.^{27,28} Other infection risks are bacterial (for example, sepsis, abscesses and cellulitis), fungal (for example, candidosis) and viral (for example, shingles).^{7,29} Although there has been speculation about an increased risk of developing cancer with biologics use, a recent systematic review has shown this to be little or none.³⁰ In future, it may be possible to taper biologic DMARDs in select patients whose RA is in remission.³¹

Improved management of RA over the past

'SYSTEMIC INFLAMMATION IN RHEUMATOID

ARTHRITIS CAN AFFECT THE BRAIN,

LIVER, HEART, LUNGS, EXOCRINE

GLANDS, BONE AND MUSCLES'

Conventional DMARDs modify the whole immune system, whereas biologic DMARDs target specific components within the inflammatory pathway.⁶ Biologic DMARDs are given to patients with persistently active disease, and are highly effective.²² They are usually prescribed for use in combination with methotrexate, as it is thought that this both reduces antibody formation to the biologic agent and increases its efficacy.⁷ Smoking reduces the efficacy of conventional DMARDs and smokers are more likely to fail on biologic therapies.²⁴

In RA, the pain response appears to be heightened; analgesics and non-steroidal anti-inflammatory drugs (NSAIDs) can be used for additional symptom control.^{7,25} Due to unfavourable side-effects, corticosteroid use is restricted to bridging therapy during acute flares of symptoms ('flare-ups') whilst awaiting DMARDs to reach full efficacy.⁷ Intra-articular injections are highly effective for disease suppression in individual active joints.⁷ New biologic DMARDs are currently in development, whilst biosimilar drugs and novel small molecule agents have come onto the market.^{6,22,26} The long-term effect of these drugs in clinical practice is yet to be determined. See Table 1 for a list of the most common drugs currently used to manage RA.

Having RA increases the risk of infections and this is raised further with the use of biologics.⁶ Biologic DMARDs have approximately a 30% increased chance of

two decades has resulted in a decline in its severity with less inflammatory biomarkers, extra-articular manifestations, hospital admissions and joint replacements.⁷ As better therapies have resulted in the reduction or absence of deformities, RA patients can appear quite 'normal'.³² For effective RA management, adjunct non-pharmacologic interventions are also advised (such as patient education, physiotherapy, occupational therapy, foot care and psychological support) which are delivered by a multidisciplinary team of healthcare professionals.³³

Co-morbidities

Co-morbid conditions can be coincidental (with some already present at RA diagnosis), reflective of RA or its treatment.³⁴ RA patients have excess mortality from cardiovascular disease (CVD), but it remains unclear whether cardiovascular events are caused by inflammation associated with RA rather than traditional cardiac risk factors (such as hypertension, dyslipidemia and cigarette smoking).^{35,36} DMARDs are associated with a decreased risk of all cardiovascular events but this is increased with use of NSAIDs and corticosteroids.³⁷

After CVD, the second most common cause of mortality in RA is from cancer, particularly lymphoma and lung cancer.^{38,39} Patients with RA are more likely to develop skin cancer (non-melanoma and possibly melanoma) than the general population, and this risk

may be increased by DMARD use.^{40–42} RA patients have an increased risk of osteoporosis and resultant bone fractures linked to age, disease duration and steroid therapy.³⁸ Other co-morbidities include anaemia, depression, fibromyalgia, interstitial lung disease, Sjögren's syndrome, periodontal disease, diabetes mellitus and obesity.^{7,34,38,39,43–46}

It was previously reported that RA patients die prematurely from one or more comorbid diseases.⁴⁷ However, a recent study found that people who had RA onset after 2000 no longer have an increased risk of mortality compared to the general population.⁴⁸ This is likely due to improved treatments and tighter disease control over the last two decades. Overall, comorbidities increase disability levels, reduce a patient's quality of life, make patient management more complex and increase the economic burden of disease.^{34,38}

Oral health

Oral health complications due to RA and its treatments can cause additional problems for patients. A recent study found that approximately 30% of RA patients were taking additional analgesics specifically for oral pain.⁴⁹ Due to their immunosuppressive effects, RA medications can promote periodontitis, candidosis and oral ulceration aided by a lack of saliva.⁵⁰ The three main oral conditions associated with RA are discussed below.

Periodontal disease

Periodontal disease (PD) is a chronic inflammatory condition which leads to destruction of the periodontal ligament and alveolar bone, and can result in tooth loss.⁵¹ PD is caused by the presence of pathogenic gram-negative anaerobic bacteria within the biofilm attached to the sub-gingival tooth surface.⁹ *Porphyromonas gingivalis* (Pg) is the main pathogen in PD.⁹ Its virulence combined with an intense host immune response is thought to contribute to the severity of the disease.⁹

People with RA are almost twice as likely to have PD than those without.⁵² RA patients with severe PD have significantly higher DAS-28 scores than those with moderate or no periodontitis, and PD is associated with increased radiographic joint damage.^{53,54} These data strongly suggest an association between RA and PD/tooth loss. This association is independent of common risk factors such as smoking, alcohol intake, socioeconomic background and poor oral hygiene.⁵⁵

RA and PD are both chronic inflammatory diseases. Both conditions feature excessive

Table 1 Drugs commonly used in RA management^{6,22}

Drug class	Generic names
Analgesics	Paracetamol
	Co-codamol
	Co-dydramol
	Tramadol
NSAIDs	Ibuprofen
	Naproxen
	Diclofenac
Corticosteroids	Prednisolone
	Methylprednisolone
Conventional DMARDs	Methotrexate
	Leflunomide
	Sulfasalazine
	Hydroxychloroquine
Biologic DMARDs	Adalimumab
	Etanercept
	Infliximab
	Certolizumab pegol
	Golimumab
	Rituximab – B-cell depletor
	Abatacept – T-cell costimulation inhibitor
	Tocilizumab – IL-6 inhibitor
Small molecule agents	Tofacitinib – JAK inhibitor
	[More to be licensed]

NSAIDs = Non-steroidal anti-inflammatory drugs; DMARDs = Disease-modifying anti-rheumatic drugs; TNF = Tumour necrosis factor; IL-6 = Interleukin-6; JAK = Janus kinase.

destruction of collagen-rich tissues: in RA these are bone, cartilage and other periarticular tissues; in PD these are alveolar bone, periodontal ligament and gingiva.⁵⁶ Alveolar bone loss in PD results from the activation of osteoclasts and is very similar to bone erosion in RA, which is caused by cytokine-driven osteoclast activation.⁹

PD may be involved in the initiation and/or maintenance of systemic inflammation in RA.⁹ The level of Pg antibodies has been found to positively correlate with levels of ACPA in circulation in RA.⁵⁷ Pg is the only bacterium known to express a PAD enzyme, which can cause the citrullination of bacterial and host proteins.⁵⁸ This is thought to cause the body to produce ACPA, which drives the autoimmune response in RA.⁵⁸ PAD enzymes, citrullinated proteins and ACPA have all been found in inflamed gingiva.^{59,60} Antibodies to the periodontal pathogens Pg and *Prevotella intermedia* have been found in the serum

and synovial fluid of patients whose RA is active.^{61,62}

Effective control of PD for RA patients is important to reduce both local and systemic inflammation, and the likelihood of bacteraemia.⁶³ Persistent periodontitis can also reduce the effectiveness of TNF inhibitors.⁶⁴ Short-term clinical trials have demonstrated that non-surgical periodontal therapy in RA patients with PD can decrease RA disease activity and systemic inflammation.^{65–67} Reduction in disease activity may be due to less inflammatory products, bacteria and endotoxins in the bloodstream after periodontal treatment, thereby reducing the exposure of joints to these products.^{68,69} Longer-term clinical trials are currently in progress to find out whether non-surgical periodontal treatment can lead to an improvement in clinical outcomes and quality of life for patients with active RA.⁷⁰ A recent systematic review also highlighted

Table 2 Oral signs and symptoms of Sjögren's Syndrome^{75,88,90,91}

Signs	Symptoms
Enlarged parotid glands	Soreness
Absence of saliva pooling in floor of mouth	Burning
Dry/cracked oral mucosa and lips	Loss of/altered taste sensation
Mouth sores	Difficulty with eating
Increased caries incidence (especially cervical)	Difficulty with swallowing
Increased dental erosion	Difficulty with speaking
Erythematous cobblestoned/fissured tongue	Pain from denture-induced irritation
Atrophy of filiform papillae	
Coated tongue ('black hairy tongue')	
Candidosis	
Halitosis	
Difficulty with denture retention	

Table 3 Suggestions to make dental visits more comfortable for RA patients^{93,94}

Before treatment	Organise appointments at times more suitable for the patient's condition; for example, if they experience morning stiffness, schedule visits for the afternoon.
	Make shorter, more frequent appointments rather than lengthy visits where patients can experience stiffness in the dental chair.
	Book a treatment room with step-free access.
During treatment	Adjust the dental chair and headrest to a comfortable position, as RA patients can get considerable neck pain and stiffness during treatment.
	Offer the patient a small pillow or allow them to bring their own.
	Allow the patient to rest and move their jaw periodically during treatment to prevent pain, fatigue and stiffness from keeping their jaw open for prolonged periods.
	Reassure the patient that they can ask to take a break at any time.
	Ask the patient if they require any other adjustments.

the importance of smoking cessation, which results in improved outcomes for non-surgical periodontal therapy.⁷¹

Temporomandibular dysfunction

The temporomandibular joint (TMJ) is used up to 2,000 times a day for chewing and speaking, making it one of the most frequently used synovial joints in the body.⁷² People with RA have a higher frequency and greater severity of temporomandibular dysfunction (TMD) than the normal population.⁷³ The estimated prevalence of TMJ symptoms in adults with RA is between

5–86% (depending on diagnostic criteria, assessment methods and the population studied) with clinical involvement of the TMJ seen in about 50% of cases.^{73,74} In a 2013 survey of RA outpatients at a tertiary centre, 45.8% had problems with chewing (with 40.3% having to adjust their diet accordingly), 30.6% felt discomfort when eating and 36.1% took medication to relieve oral pain.⁴⁹

RA patients with TMD may present with pain, difficulty with opening the mouth, 'locking' of the jaw, tenderness of the TMJ/masticatory muscles, and joint sounds.^{73,75} The most frequent joint sound is clicking,

followed by crepitus (which indicates TMJ degeneration but may be seen less often due to improved RA medication).⁷⁶ It is thought that pain in TMD is associated with RA disease activity, and impairment in the range of motion and function of the TMJ are more likely due to degeneration of the joint.⁷³ Patients may also report associated symptoms such as ear pain/stuffiness, tinnitus, dizziness, headache and neck pain.⁷⁷ *It is important to note that the TMJ may already be affected by RA in patients who do not yet report TMD symptoms.*⁷⁸

Clinical signs of TMJ involvement include swelling, reduced range of motion and/or deviation of the mandible to the affected side.⁷⁵ Imaging shows condylar resorption with a resultant shortening of the mandibular ramus-condyle unit and possibly a reduced joint space.⁷⁷ Cone-beam computed tomography (CBCT) imaging is best for showing the extent of condylar damage from RA, particularly in the early stages, and involves a lower radiation dose than conventional CT scans.⁷⁹ There is a positive correlation between the duration and severity of RA, and the degree of TMJ involvement.⁷⁸ Ankylosis of the TMJ is uncommon and occurs late in the disease course.⁷⁴ If ankylosis or collapse of the TMJ occurs, joint replacement may become necessary.⁷⁴ This has been shown to have good long-term outcomes for patients with inflammatory arthritis.⁸⁰ *TMD management in RA needs to involve the patient's rheumatologist and an oral and maxillofacial surgeon with an interest in TMJ diseases.*⁷⁴

Juvenile idiopathic arthritis (JIA), also known as juvenile rheumatoid arthritis, affects around 12,000 children in the UK.⁸¹ The reported prevalence of TMJ arthritis in JIA ranges from 17 to 87%.⁸² Restricted mouth opening is the most frequent clinical finding (28% of patients) followed by masticatory muscle tenderness, deviation of the mandible on opening, TMJ tenderness and joint sounds.⁸² TMJ arthritis in children can cause a disturbance of mandibular growth and evident alterations in craniofacial morphology and occlusion; features typically seen include an increased profile convexity, a steeper mandibular plane angle, mandibular micrognathia and retrognathia.⁸³

Inflammation occurs during the active phase of JIA, which ultimately causes resorption of the condyles.⁸² Damage to the condyles may be present early on in JIA and progress, even when clinical symptoms and signs are absent.⁸² The current gold standard method of imaging in JIA to detect early arthritic changes in the TMJ is magnetic

resonance imaging (MRI) with contrast.⁸⁴ Patients with JIA should have regular imaging of the TMJ and evaluation by an orthodontist, even in the absence of TMD signs and symptoms.⁸²

Lastly, it is important to note that some patients with RA/JIA will have TMD that is unrelated to their inflammatory arthritis.

Salivary gland dysfunction

Sjögren’s syndrome (SS) is a chronic autoimmune condition that is characterised by the sicca symptoms xerophthalmia and xerostomia, caused by inflammation leading to dysfunction of the lacrimal and salivary glands.⁸⁵ It can occur alone (primary form) or secondary to other systemic autoimmune diseases such as RA.⁸⁶ The estimated prevalence of sicca symptoms in RA patients ranges between 30–50%.⁸⁶

RA patients with SS have reduced salivary flow and altered saliva composition (due to destruction and dysfunction of the salivary glands).⁸⁷ This reduces the buffering and antimicrobial properties of saliva causing an increased likelihood of caries.⁸⁸ The subjective experience of xerostomia in SS is not dependent on the total quantity of saliva (salivary flow) but rather the quantity and quality of specific components within it (called mucins) which affect its ability to retain water.⁸⁷ Up to 70% of salivary mucins are produced by the minor salivary glands and overall they produce 10% of saliva.⁸⁹ Therefore, currently available treatments aimed solely at increasing salivary flow may not be sufficient to provide relief for SS patients.

Xerostomia can affect the oral cavity in many ways (see Table 2). Besides SS, a dry mouth can also be caused by medications taken by RA patients (see Table 1). It is important to note that xerostomia may be reported by patients before obvious signs of hyposalivation are visible in the mouth.⁸⁷ *If a patient presents with a dry mouth and also complains of dry eyes, it is worth writing to their general medical practitioner (GP), or rheumatologist if they have a known rheumatic disorder, for further investigation.*

Dental management

General considerations

Most RA patients can be successfully managed at the dental practice with some minor adjustments – see Table 3 for suggestions. Chronic inflammation of the cervical spine in RA can result in neck instability, which can cause neurological symptoms and in rare cases be fatal.⁹² *It is therefore important that a patient’s head and neck are well supported*

Dental problem	Management
Periodontal disease	More frequent dental/hygiene visits
	Regular scaling and root planing (no adjuncts necessary)
	Oral hygiene instruction – recommend electric toothbrushes and interdental cleaning aids with wider handles
	Smoking cessation advice and support
	Refer to a periodontist if necessary
Temporomandibular dysfunction	Jaw rest
	Warm compress application
	Physiotherapy
	Soft food diet
	Short-term NSAID use (topical or systemic)
	Occlusal splint (soft or hard) wear at night time
	Biobehavioural therapy
	Elimination of unhelpful habits for example, nail biting, wide yawning
	Discuss with patient’s rheumatologist/GP if TMJ arthritis suspected
	Refer to oral & maxillofacial surgery and orthodontics (for children) if necessary
Salivary gland dysfunction	More frequent dental visits
	Medication review
	Advise to keep hydrated with regular sipping of water
	Smoking cessation advice
	Chew sugar-free gum or lozenges regularly (if no TMJ problems)
	Oral hygiene instruction
	Pit and fissure seal teeth
	Fluoride varnish, prescription-strength toothpaste or mouthwash
	Use of non-fluoride remineralising agents for example, calcium phosphate rinse
	Chlorhexidine varnish, gel or mouth rinse
	Advise to reduce sugar/acid intake and frequency
	Salivary replacement (gels, mouth rinses, toothpastes, lozenges)
	Advise patient to use a humidifier, particularly when sleeping
	Discuss with patient’s rheumatologist/GP
	Prescribe salivary stimulants for example, pilocarpine
Refer to oral medicine if necessary	
Refer to GP/rheumatologist if an undiagnosed underlying rheumatic disease is suspected	
Oral candidosis/ angular cheilitis	Prescribe topical or systemic antifungals
	Discourage denture wear at night
	Encourage good denture hygiene
Oral ulceration	Check patient is taking medication (especially methotrexate) at the prescribed dose and interval
	Prescribe benzydamine mouthwash/oromucosal spray
	Urgent referral to oral medicine if ulcers are longstanding (>3 weeks) or suspicious

NSAID = Non-steroidal anti-inflammatory drug; GP = General medical practitioner; TMJ = Temporomandibular joint.

during dental treatment. Suspected cervical instability should also be discussed with the patient's rheumatologist.

Due to pain, impaired hand function and fatigue, RA patients may find it difficult and lack the motivation to follow a good oral hygiene regime (leading to further unfavourable outcomes).^{54,55,95,96} Good oral hygiene is the cornerstone for dental management of these patients, and aids should be recommended to making brushing and interdental cleaning easier for this population with poor grip and dexterity. Resources on suitable aids and adaptations are available.^{93,95} See Table 4 for a summary of management of common RA-associated dental problems. *If a patient is having recurrent problems due to their RA or medication, please discuss this with their rheumatologist or GP.*

Concurrent medications

As for any patient, it is important to take and keep updated a thorough medical/surgical history with a full medication list. Be aware of drug interactions when prescribing (particularly antibiotics); if in doubt consult the British National Formulary.¹⁰¹ If prescribing NSAIDs, check what the patient is already taking and assess toxicity risk.⁹⁴ Some RA patients take oral bisphosphonates for the prevention or treatment of osteoporosis; therefore, there is a small risk (estimated at 0.5%) of osteonecrosis of the jaw following dentoalveolar surgery.¹⁰² This risk can be increased with concomitant use of corticosteroids, and in some cases bisphosphonates may need to be stopped at least two months prior to surgery.¹⁰² Biologic DMARDs should be stopped much before major surgical procedures (according to the half-life of drug) so as not to increase infection risk.⁶ Conventional DMARDs may need to be stopped prior to procedures which last over an hour and it is recommended corticosteroid exposure be minimised prior to surgery.¹⁰³ *Therefore it is important to consult with the patient's rheumatologist well in advance of any planned invasive procedures and to follow up the patient postoperatively.*

Antibiotic and steroid cover

The National Institute for Health and Care Excellence's recently updated guidance is that patients considered at high risk of infective endocarditis do not routinely require antibiotic prophylaxis for dental procedures, though this may be appropriate in individual cases.¹⁰⁴ *If in doubt, consult with the patient's cardiologist.*

Latest guidelines from the British Society

of Rheumatology state that pre-operative increase in steroid dose, for adrenal crisis prevention, is no longer routinely required.¹⁰³ However, if a patient shows signs of adrenal crisis (vomiting, abdominal pain, syncope, low blood pressure, hypoglycaemia, confusion) during a procedure, *seek immediate emergency medical attention.*⁹⁴

Co-morbidity detection

Dental professionals should be aware of the potential co-morbidities with RA and *refer patients on to an appropriate medical professional for further investigation (copying in the patient's rheumatologist and GP) if they detect anything of concern.*

IT IS IMPORTANT TO NOTE THAT

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HYPOSALIVATION ARE VISIBLE IN THE MOUTH.'

Conclusion

RA is a multi-faceted disease which can be complex to manage as co-morbid conditions are frequently present. Dental complications can arise associated with RA or its treatment. It is important that the dental team are aware of them so these patients can be successfully managed in general dental practice, with early intervention to prevent a further decline in their quality of life. Simple adjustments can be made to make dental visits more comfortable for patients with this long-term condition.

The authors would like to thank Tina Alvand, Rajvi Haria, Hiten Joshi, Heidi Lempp, Lydia Pink, Miranda Steeples and Ruth Williams for their manuscript feedback.

1. NHS Choices. Rheumatoid arthritis. 2014. Online information available at <http://www.nhs.uk/conditions/Rheumatoid-arthritis/Pages/Introduction.aspx> (accessed May 2016).
2. de Croon E M, Sluiter J K, Nijssen T F, Dijkmans B A, Lankhorst G J, Frings-Dresen M H. Predictive factors of work disability in rheumatoid arthritis: a systematic literature review. *Ann Rheum Dis* 2004; **63**: 1362–1367.
3. Boonen A, Severens J L. The burden of illness of rheumatoid arthritis. *Clin Rheumatol* 2011; **30**: 3–8.
4. Lempp H, Scott D, Kingsley G. The personal impact of rheumatoid arthritis on patients' identity: a qualitative study. *Chronic Illn* 2006; **2**: 109–120.
5. Boissier M C, Semerano L, Challal S, Saidenberg-Kermanac'h N, Falgarone G. Rheumatoid

- arthritis: from autoimmunity to synovitis and joint destruction. *J Autoimmun* 2012; **39**: 222–228.
6. Scott D L. Biologics-based therapy for the treatment of rheumatoid arthritis. *Clin Pharmacol Ther* 2012; **91**: 30–43.
7. Scott D L, Wolfe F, Huizinga T W. Rheumatoid arthritis. *Lancet* 2010; **376**: 1094–1098.
8. Rengel Y, Ospelt C, Gay S. Proteinases in the joint: clinical relevance of proteinases in joint destruction. *Arthritis Res Ther* 2007; **9**: 221.
9. Leech M T, Bartold P M. The association between rheumatoid arthritis and periodontitis. *Best Pract Res Clin Rheumatol* 2015; **29**: 189–201.
10. Di Giuseppe D, Discacciati A, Orsini N, Wolk A. Cigarette smoking and risk of rheumatoid arthritis: a dose-response meta-analysis. *Arthritis Res Ther* 2014; **16**: R61.
11. Kaur S, White S, Bartold P M. Periodontal disease and rheumatoid arthritis a systematic review. *J Dent Res* 2013; **92**: 399–408.

12. Scher J U, Abramson S B. The microbiome and rheumatoid arthritis. *Nat Rev Rheumatol* 2011; **7**: 569–578.
13. Liao K P, Alfredsson L, Karlson E W. Environmental influences on risk for rheumatoid arthritis. *Curr Opin Rheumatol* 2009; **21**: 279.
14. van der Woude D, Houwing-Duistermaat J J, Toes R E *et al.* Quantitative heritability of anti-citrullinated protein antibody-positive and anti-citrullinated protein antibody-negative rheumatoid arthritis. *Arthritis Rheum* 2009; **60**: 916–923.
15. Yarwood A, Huizinga T W, Worthington J. The genetics of rheumatoid arthritis: risk and protection in different stages of the evolution of RA. *Rheumatology (Oxford)* 2016; **55**: 199–209.
16. Huizinga T W, Amos C I, van der Helm-van Mil A *et al.* Refining the complex rheumatoid arthritis phenotype based on specificity of the HLA-DRB1 shared epitope for antibodies to citrullinated proteins. *Arthritis Rheum* 2005; **52**: 3433–3438.
17. van de Stadt L A, de Koning M H, van de Stadt R J *et al.* Development of the anti-citrullinated protein antibody repertoire prior to the onset of rheumatoid arthritis. *Arthritis Rheum* 2011; **63**: 3226–3233.
18. Davis J M, Matteson E L. My treatment approach to rheumatoid arthritis. *Mayo Clin Proc* 2012; **87**: 659–673.
19. Centers for Disease Control and Prevention. Rheumatoid Arthritis (RA). 2015. Online information available at <http://www.cdc.gov/arthritis/basics/rheumatoid.htm> (accessed March 2016).
20. McInnes I B, Schett G. The pathogenesis of rheumatoid arthritis. *N Engl J Med* 2011; **365**: 2205–2219.
21. Aletaha D, Neogi T, Silman A J *et al.* 2010 rheumatoid arthritis classification criteria: an

- American College of Rheumatology/European League Against Rheumatism collaborative initiative. *Ann Rheum Dis* 2010; **69**: 1580–1588. Erratum in: *Ann Rheum Dis* 2010; **69**: 1892.
22. Gullick N J, Scott D L. Drug therapy of inflammatory arthritis. *Clin Med (Lond)* 2012; **12**: 357–363.
 23. Ma M H, Scott I C, Kingsley G H, Scott D L. Remission in early rheumatoid arthritis. *J Rheumatol* 2010; **37**: 1444–1453.
 24. Daïen C I, Morel J. Predictive factors of response to biological disease modifying antirheumatic drugs: towards personalized medicine. *Mediators Inflamm* 2014; **2014**: 386148.
 25. Edwards R R, Wasan A D, Bingham III C O *et al*. Enhanced reactivity to pain in patients with rheumatoid arthritis. *Arthritis Res Ther* 2009; **11**: R61.
 26. Galloway J. Biosimilars: Out of the laboratory and into practice. *Rheumatology (Oxford)* 2015; **54**(suppl 1): i21.
 27. Singh J A, Cameron C, Noorbaloochi S *et al*. Risk of serious infection in biological treatment of patients with rheumatoid arthritis: a systematic review and meta-analysis. *Lancet* 2015; **386**: 258–265.
 28. Galloway J B, Hyrich K L, Mercer L K *et al*. Anti-TNF therapy is associated with an increased risk of serious infections in patients with rheumatoid arthritis especially in the first 6 months of treatment: updated results from the British Society for Rheumatology Biologics Register with special emphasis on risks in the elderly. *Rheumatology (Oxford)* 2011; **50**: 124–131.
 - interventions for patients with rheumatoid arthritis: an overview of systematic reviews. *Phys Ther* 2007; **87**: 1697–1715.
 34. Norton S, Koduri G, Nikiphorou E, Dixey J, Williams P, Young A. A study of baseline prevalence and cumulative incidence of co-morbidity and extra-articular manifestations in RA and their impact on outcome. *Rheumatology (Oxford)* 2013; **52**: 99–110.
 35. Klareskog L, Catrina A I, Paget S. Rheumatoid arthritis. *Lancet* 2009; **373**: 659–672.
 36. Liao K P, Solomon D H. Traditional cardiovascular risk factors, inflammation and cardiovascular risk in rheumatoid arthritis. *Rheumatology (Oxford)* 2013; **52**: 45–52.
 37. Roubille C, Richer V, Starnino T *et al*. The effects of tumour necrosis factor inhibitors, methotrexate, non-steroidal anti-inflammatory drugs and corticosteroids on cardiovascular events in rheumatoid arthritis, psoriasis and psoriatic arthritis: a systematic review and meta-analysis. *Ann Rheum Dis* 2015; **74**: 480–489.
 38. Gullick N J, Scott D L. Co-morbidities in established rheumatoid arthritis. *Best Pract Res Clin Rheumatol* 2011; **25**: 469–483.
 39. Simon T A, Thompson A, Gandhi K K, Hochberg M C, Suissa S. Incidence of malignancy in adult patients with rheumatoid arthritis: a meta-analysis. *Arthritis Res Ther* 2015; **17**: 1–10.
 40. Lange E, Blizzard L, Venn A, Francis H, Jones G. Disease-modifying anti-rheumatic drugs and non-melanoma skin cancer in inflammatory arthritis patients: a retrospective cohort study. *C S et al*. The widening mortality gap between rheumatoid arthritis patients and the general population. *Arthritis Rheum* 2007; **56**: 3583–3587.
 48. Lacaïlle D, Sayre E C, Abrahamowicz M. Improvement in mortality in RA compared to the general population – closing the mortality gap. *Arthritis Rheumatol* 2015; **67**(suppl 10).
 49. Blaizot A, Monsarrat P, Constantin A *et al*. Oral health-related quality of life among outpatients with rheumatoid arthritis. *Int Dent J* 2013; **63**: 145–153.
 50. Araújo V M, Melo I M, Lima V. Relationship between periodontitis and rheumatoid arthritis: review of the literature. *Mediators Inflamm* 2015; **2015**: 259074.
 51. Eke P I, Dye B A, Wei L *et al*. Update on prevalence of periodontitis in adults in the United States: NHANES 2009 to 2012. *J Periodontol* 2015; **86**: 611–622.
 52. de Pablo P, Dietrich T, McAlindon T E. Association of periodontal disease and tooth loss with rheumatoid arthritis in the US population. *J Rheumatol* 2008; **35**: 70–76.
 53. de Smit M, Westra J, Vissink A, Doornbos-van der Meer B, Brouwer E, van Winkelhoff A J. Periodontitis in established rheumatoid arthritis patients: a cross-sectional clinical, microbiological and serological study. *Arthritis Res Ther* 2012; **14**: R222.
 54. Monsarrat P, Vergnes J N, Blaizot A *et al*. Oral health status in outpatients with rheumatoid arthritis: the OSARA study. *Oral Health Dent Manag* 2014; **13**: 113–119.
 55. Pischon N, Pischon T, Kröger J *et al*. Association among rheumatoid arthritis, oral hygiene, and periodontitis. *J Periodontol* 2008; **79**: 979–986.
 56. Payne J B, Golub L M, Thiele G M, Mikuls T R. The link between periodontitis and rheumatoid arthritis: a periodontist's perspective. *Curr Oral Health Rep* 2015; **2**: 20–29.
 57. Mayer Y, Balbir-Gurman A, Machtei E E. Anti-tumor necrosis factor-alpha therapy and periodontal parameters in patients with rheumatoid arthritis. *J Periodontol* 2009; **80**: 1414–1420.
 58. Wegner N, Wait R, Sroka A, Eick S *et al*. Peptidylarginine deiminase from *Porphyromonas gingivalis* citrullinates human fibrinogen and α -enolase: Implications for autoimmunity in rheumatoid arthritis. *Arthritis Rheum* 2010; **62**: 2662–2672.
 59. Nesse W, Westra J, Wal J E *et al*. The periodontium of periodontitis patients contains citrullinated proteins which may play a role in ACPA (anti-citrullinated protein antibody) formation. *J Clin Periodontol* 2012; **39**: 599–607.
 60. Harvey G P, Fitzsimmons T R, Dhamarpatni A A, Marchant C, Haynes D R, Bartold P M. Expression of peptidylarginine deiminase-2 and -4, citrullinated proteins and anti-citrullinated protein antibodies in human gingiva. *J Periodontol Res* 2013; **48**: 252–261.
 61. Moen K, Brun J G, Valen M *et al*. Synovial inflammation in active rheumatoid arthritis and psoriatic arthritis facilitates trapping of a variety of oral bacterial DNAs. *Clin Exp Rheumatol* 2006; **24**: 656–663.
 62. Martinez-Martinez R E, Abud-Mendoza C, Patiño-Marin N, Rizo-Rodríguez J C, Little J W, Loyola-Rodríguez J P. Detection of periodontal bacterial DNA in serum and synovial fluid in refractory rheumatoid arthritis patients. *J Clin Periodontol* 2009; **36**: 1004–1010.
 63. Otomo-Corgel J, Pucher J J, Rethman M P, Reynolds M A. State of the science: chronic
- Rheumatology (Oxford)* 2016; **55**: 1594–1600.
29. Galloway J B, Mercer L K, Moseley A *et al*. Risk of skin and soft tissue infections (including shingles) in patients exposed to anti-tumour necrosis factor therapy: results from the British Society for Rheumatology Biologics Register. *Ann Rheum Dis* 2013; **72**: 229–234.
 30. Solomon D H, Mercer E, Kavanaugh A. Observational studies on the risk of cancer associated with tumor necrosis factor inhibitors in rheumatoid arthritis: a review of their methodologies and results. *Arthritis Rheum* 2012; **64**: 21–32.
 31. Galloway J B, Kingsley G, Ma M *et al*. Optimising treatment with TNF Inhibitors in rheumatoid arthritis with different dose tapering strategies: The OPTTIRA trial. *Ann Rheum Dis* 2015; **74**(suppl 2): 706.
 32. Prothero L, Georgopoulou S, de Souza S, Bearne L, Bosworth A, Lempp H. Patient involvement in the development of a handbook for moderate rheumatoid arthritis. *Health Expect*. 2016; DOI: 10.1111/hex.12457 [Epub ahead of print].
 33. Christie A, Jamtvedt G, Dahm K T, Moe R H, Haavardsholm E A, Hagen K B. Effectiveness of nonpharmacological and nonsurgical
 41. Assasi S. Rheumatoid arthritis, TNF inhibitors, and non-melanoma skin cancer. *BMJ* 2016; **352**: i472.
 42. Olsen C M, Hyrich K L, Knight L L, Green A C. Melanoma risk in patients with rheumatoid arthritis treated with tumour necrosis factor alpha inhibitors: a systematic review and meta-analysis. *Melanoma Res* 2016; **26**: 517–523.
 43. Gabriel S E, Michaud K. Epidemiological studies in incidence, prevalence, mortality, and comorbidity of the rheumatic diseases. *Arthritis Res Ther* 2009; **11**: 229.
 44. Wolfe F, Michaud K. Anemia and renal function in patients with rheumatoid arthritis. *J Rheumatol* 2006; **33**: 1516–1522.
 45. Lempp H, Ibrahim F, Shaw T *et al*. Comparative quality of life in patients with depression and rheumatoid arthritis. *Int Rev Psychiatry* 2011; **23**: 118–124.
 46. Whittaker M, Gullick N, Steer S *et al*. The association between obesity and disease activity in rheumatoid arthritis. *Rheumatology (Oxford)* 2015; **54**(suppl 1): i65.
 47. Gonzalez A, Maradit Kremers H, Crowson

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- periodontitis and systemic health. *J Evid Based Dent Pract* 2012; **12**: 20–28.
64. Savioli C, Ribeiro A C, Fabri G M *et al*. Persistent periodontal disease hampers anti-tumor necrosis factor treatment response in rheumatoid arthritis. *J Clin Rheumatol* 2012; **18**: 180–184.
65. Ribeiro J, Leão A, Novaes A B. Periodontal infection as a possible severity factor for rheumatoid arthritis. *J Clin Periodontol* 2005; **32**: 412–416.
66. Al-Katma M K, Bissada N F, Bordeaux J M, Sue J, Askari A D. Control of periodontal infection reduces the severity of active rheumatoid arthritis. *J Clin Rheumatol* 2007; **13**: 134–137.
67. Ortiz P, Bissada N F, Palomo L *et al*. Periodontal therapy reduces the severity of active rheumatoid arthritis in patients treated with or without tumor necrosis factor inhibitors. *J Periodontol* 2009; **80**: 535–540.
68. D'Aiuto F, Nibali L, Parkar M, Suvan J, Tonetti M S. Short-term effects of intensive periodontal therapy on serum inflammatory markers and cholesterol. *J Dent Res* 2005; **84**: 269–273.
69. Šimelyte E, Rimpiläinen M, Lehtonen L, Zhang X, Toivanen P. Bacterial cell wall-induced arthritis: chemical composition and tissue distribution of four *Lactobacillus* strains. *Infect Immun* 2000; **68**: 3535–3540.
70. Vergnes J N, Monsarrat P, Blaizot A *et al*. Interventions for periodontal disease in people with rheumatoid arthritis (Protocol). *Cochrane Database Syst Rev* 2012; **9**: CD010040.
71. Chambrone L, Preshaw P M, Rosa E F *et al*. Effects of smoking cessation on the outcomes of non-surgical periodontal therapy: a systematic review and individual patient data meta-analysis. *J Clin Periodontol* 2013; **40**: 607–615.
72. Ringold S, Cron R Q. The temporomandibular joint in juvenile idiopathic arthritis: frequently used and frequently arthritic. *Pediatr Rheumatol Online J* 2009; **7**: 11.
73. Moen K, Bertelsen L T, Hellem S, Jonsson R, Brun J G. Salivary gland and temporomandibular joint involvement in rheumatoid arthritis: relation to disease activity. *Oral Dis* 2005; **11**: 27–34.
74. Sidebottom A J, Salha R. Management of the temporomandibular joint in rheumatoid disorders. *Br J Oral Maxillofac Surg* 2013; **51**: 191–198.
75. Mays J W, Sarmadi M, Moutsopoulos N M. Oral manifestations of systemic autoimmune and inflammatory diseases: diagnosis and clinical management. *J Evid Based Dent Pract* 2012; **12**: 265–282.
76. Aliko A, Ciancaglini R, Alushi A, Tafaj A, Ruci D. Temporomandibular joint involvement in rheumatoid arthritis, systemic lupus erythematosus and systemic sclerosis. *Int J Oral Maxillofac Surg* 2011; **40**: 704–709.
77. Scrivani S J, Keith D A, Kaban L B. Temporomandibular disorders. *N Engl J Med* 2008; **359**: 2693–2705.
78. Celiker R, Gökçe-Kutsal Y, Eryilmaz M. Temporomandibular joint involvement in rheumatoid arthritis: relationship with disease activity. *Scand J Rheumatol* 1995; **24**: 22–25.
79. Dawood A, Patel S, Brown J. Cone beam CT in dental practice. *Br Dent J* 2009; **207**: 23–28.
80. O'Connor R C, Saleem S, Sidebottom A J. Prospective outcome analysis of total replacement of the temporomandibular joint with the TMJ Concepts system in patients with inflammatory arthritic diseases. *Br J Oral Maxillofac Surg* 2016; **54**: 604–609.
81. University of Manchester Centre for Musculoskeletal Research. Juvenile idiopathic arthritis. Online information available at <http://www.inflammation-repair.manchester.ac.uk/Musculoskeletal/research/CFGG/juvenilearthritis/> (accessed May 2016).
82. Billiau A D, Hu Y, Verdonck A, Carels C, Wouters C. Temporomandibular joint arthritis in juvenile idiopathic arthritis: prevalence, clinical and radiological signs, and relation to dentofacial morphology. *J Rheumatol* 2007; **34**: 1925–1933.
83. Kjellberg H. Juvenile chronic arthritis. Dentofacial morphology, growth, mandibular function and orthodontic treatment. See comment in PubMed Commons below. *Swed Dent J Suppl* 1995; **109**: 1–56.
84. Vaid Y N, Dunnavant F D, Royal S A, Beukelman T, Stoll M L, Cron R Q. Imaging of the temporomandibular joint in juvenile idiopathic arthritis. *Arthritis Care Res (Hoboken)* 2014; **66**: 47–54.
85. He J, Ding Y, Feng M, Guo J *et al*. Characteristics of Sjögren's syndrome in rheumatoid arthritis. *Rheumatology (Oxford)* 2013; **52**: 1084–1089.
86. Ramos-Casals M, Brito-Zerón P, Font J. The overlap of Sjögren's syndrome with other systemic autoimmune diseases. *Semin Arthritis Rheum* 2007; **36**: 246–255.
87. Zalewska A, Knaś M, Waszkiewicz N, Waszkiel D, Sierakowski S, Zwierz K. Rheumatoid arthritis patients with xerostomia have reduced production of key salivary constituents. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2013; **115**: 483–490.
88. Zero D T, Brennan M T, Daniels T E *et al*. Clinical practice guidelines for oral management of Sjögren disease: Dental caries prevention. *J Am Dent Assoc* 2016; **147**: 295–305.
89. Milne R W, Dawes C. The relative contributions of different salivary glands to the blood group activity of whole saliva in humans. *Vox Sang* 1973; **25**: 298–307.
90. Guggenheimer J, Moore P A. Xerostomia: etiology, recognition and treatment. *J Am Dent Assoc* 2003; **134**: 61–69.
91. Carr A J, Ng W F, Figueiredo F, Macleod R I, Greenwood M, Staines K. Sjögren's syndrome—an update for dental practitioners. *Br Dent J* 2012; **213**: 353–357.
92. Gillick J L, Wainwright J, Das K. Rheumatoid arthritis and the cervical spine: a review on the role of surgery. *Int J Rheumatol*. 2015; DOI: 10.1155/2015/252456.
93. Bansal R K, Steeples M, de Souza S. Oral Health. National Rheumatoid Arthritis Society. 2015. Online information available at <http://www.nras.org.uk/oral-health> (accessed March 2016).
94. Patton L L, Glick M (eds). *The ADA practical guide to patients with medical conditions*. 2nd ed. New Jersey: Wiley-Blackwell, 2015.
95. Caesley J. Interdental cleaning in rheumatoid arthritis. *Dental Nursing* 2014; **10**: 452–457.
96. Horsten N C, Ursum J, Roorda L D, van Schaardenburg D, Dekker J, Hoeksma A F. Prevalence of hand symptoms, impairments and activity limitations in rheumatoid arthritis in relation to disease duration. *J Rehabil Med* 2010; **42**: 916–921.
97. Scottish Dental Clinical Effectiveness Programme. Prevention and treatment of periodontal diseases in primary care dental clinical guidance. 2015. Online information available at <http://www.sdcep.org.uk/wp-content/uploads/2015/01/SDCEP+Periodontal+Disease+Full+Guidance.pdf> (accessed May 2016).
98. Fox R I. Sjögren's syndrome. *Lancet* 2005; **366**: 321–331.
99. Donaldson M, Epstein J, Villines D. Managing the care of patients with Sjögren syndrome and dry mouth: comorbidities, medication use and dental care considerations. *J Am Dent Assoc* 2014; **145**: 1240–1247.
100. Gispen J G, Alarcon G S, Johnson J J, Acton R T, Barger B O, Koopman W J. Toxicity of methotrexate in rheumatoid arthritis. *J Rheumatol* 1987; **14**: 74–79.
101. National Institute for Health and Care Excellence. British National Formulary. 2016. Online information available at <https://www.evidence.nhs.uk/formulary/bnf/current> (accessed May 2016).
102. Ruggiero S L, Dodson T B. American Association of Oral and Maxillofacial Surgeons position Paper on Medication-Related Osteonecrosis of the Jaws 2014 Update. *J Oral Maxillofac Surg* 2014; **72**: 2381–2382.
103. British Society of Rheumatology. BSR/BHPR non-biologic DMARD guidelines. 2016. Online information available at http://www.rheumatology.org.uk/includes/documents/cm_docs/2016/f/full_dmards_guideline_and_the_executive_summary.pdf (accessed November 2016).
104. National Institute for Health and Care Excellence. Prophylaxis against infective endocarditis: antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures. NICE Clinical Guideline No. 64. Updated 2016. Online information available at <https://www.nice.org.uk/guidance/cg64/chapter/Recommendations> (accessed August 2016).

'DENTAL PROFESSIONALS SHOULD BE

AWARE OF THE POTENTIAL CO-MORBIDITIES

WITH RA AND REFER PATIENTS ON IF THEY

DETECT ANYTHING OF CONCERN.'

This article was originally published in the BDJ as Rheumatoid arthritis – an update for general dental practitioners (2016; 222: 667-673).

bdjteam201764

Product news

Product news is provided as a service to readers using text and images from the manufacturer, supplier or distributor and does not imply endorsement by *BDJ Team*. Normal and prudent research should be exercised before purchase or use of any product mentioned.

THE LATEST IN ULTRASONIC SCALING



Are you looking for the very latest in Cavitron ultrasonic scaling systems? Now there's no need to buy straight away. Instead, why not spread the cost and rent a brand new Cavitron Select SPS, Cavitron Touch or Cavitron Jet Plus unit from Dentsply Sirona from just £65.00 + VAT per month?

This economical rental solution enables you to use the latest dental technology for an affordable monthly fee [the unit can be purchased at the end of the rental agreement]. The agreement is spread over

three years, with an extended warranty from two to three years, and includes one free on-site Cavitron Health Check and maintenance update per year, giving you complete peace of mind throughout the rental period.

You can choose from the following rental options:

- Cavitron Select SPS Ultrasonic Scaler £65.00 + VAT per month
- Cavitron Touch Ultrasonic Scaling System £75.00 + VAT per month
- Cavitron Jet Plus Air Polishing and Scaler unit with new Tap-On Technology £100.00 + VAT per month.

To find out more about Cavitron Rental contact Dentsply Sirona on 0800 072 3313 or read more at dentsply.com/en-uk/news.html

Earn DENTSPLY Rewards £s on all your preventive solution purchases at dentsplyrewards.co.uk and access free CPD webinars and product demonstrations at dentsplyacademy.co.uk.

THE SAFER SOLUTION FOR BABIES

Malocclusion amongst babies that use soothers has always been a concern for the profession, but the latest research suggests that posterior crossbite and anterior open bite is less prevalent when orthodontic soothers are used instead of conventional designs.

The Curaprox soother designed by Curaden and expert Dr Herbert Pick has a flat tip to prevent malocclusion and the development of an abnormally high arch.

The use of side wings helps with this too, as they guide the suction pressure to the jaw rather than to the palate.

There are three sizes available: size 0 for 0-7 months, size 1 for 7-18 months and size 2 for 18-36 months.

So if you are looking for a safe alternative to conventional soothers to offer parents in your practice, consider the Curaprox soother – winner of the 2016 Red Dot Award. For more information visit www.curaprox.co.uk.



AUTOMATED PRODUCTION OF PRECISION RESTORATIONS

Roland DG Corporation has released its first dental 3D printer, the DWP-80S, to assist in the production of dentures. Launched simultaneously, the DWX-52DC is the newest addition to the DWX series dental mills and includes several new automated functions for the unattended production of precision dental restorations. Roland DG now offers the dental industry both additive (3D printing) and subtractive (milling) manufacturing processes to improve the workflow of dental technicians.

Since 2010, Roland DG's DWX series dental mills have gained industry recognition for their desktop size, user-friendliness, robust reliability and open architectures. The DWX-52DC adds exciting new features to further automate and expand the process.



With a newly developed Automatic Disc Changer capable of storing up to six discs, the DWX-52DC is fully equipped to mill a variety of precision dental restorations overnight to increase lab productivity. The included pin-type material adapter enables the setting up and milling of seven pin-type blocks consecutively. With the DWX-52DC's expanded production capacity, a variety of dental restorations can

be produced. The 15-station Automatic Tool Changer automatically replaces milling burs without interruption for the efficient milling of a wide range of materials.

The DWP-80S uses a proprietary projector lens to cure resin materials with UV-LED light. Bundled with the DWP-80S, new Quick Denta software provides a remarkably simple solution for the 3D printing of custom trays, base plates and frameworks. Using the workflow wizard with pre-configured parameters, applications required for dentures can be printed in three simple steps. The DWP-80S analyses the precision and fit required to choose the ideal number and layout of support points while adjusting for material shrinkage factors.

www.rolanddg.com/www.rolanddg.co.uk

A DAILY ORAL DEODORANT AND ENHANCED HYGIENE



Volatile sulphur compounds (VSCs) account for approximately 90% of the total sulphur content of mouth air and are the main culprits of halitosis. Not only that, recent research has suggested that VSCs may play an important role in periodontal aetiology and could be one of the contributing factors of carcinogenesis.

So, how can you help your patients tackle

them? It's simple – recommend CB12 mouthwash.

CB12 has a unique patented formula containing zinc, that helps restore mucosa to a healthy state, combined with chlorhexidine diacetate, which can effectively convert offensive smelling VSCs to odourless, insoluble sulphides with long-lasting effects.

Available in two refreshing flavours, mint menthol and mild mint menthol, your patients can use CB12 as a daily oral deodorant to enhance oral hygiene levels and prevent oral malodour for up to 12 hours.

CB12 offers the vital combination of active ingredients, clinically proven to target and neutralise VSCs and help patients to achieve a fresh and healthy mouth.

For more information about CB12, visit www.cb12.co.uk.

A SOOTHING, MOISTURISING MOUTHWASH FOR DRY MOUTH

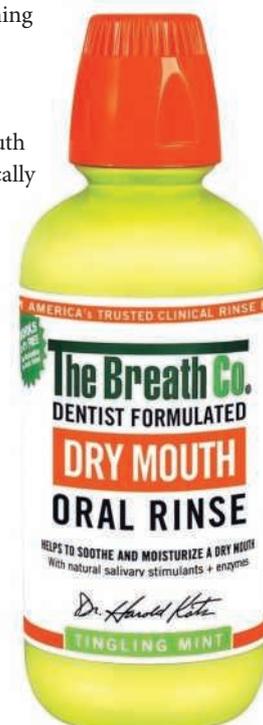
The Breath Company has launched a revolutionary dry mouth rinse that contains natural flower derivatives and moisturisers. The Breath Company Dry Mouth Rinse is clinically proven to be naturally effective at controlling and soothing dry mouth conditions without drying alcohol or staining compounds.

In clinical tests 95.4% of users said that the Dry Mouth Rinse helped reduce dryness and soothed their mouth, 97.1% strongly agreed it was very refreshing, 96.2% said it moisturised their mouth and 75% of users said they would switch from their previous mouthwash.

Combining natural moisturisers, salivary enzymes and a salivary stimulant, The Breath Company Dry Mouth Rinse works to reverse the signs of xerostomia and help reduce the frequency of recurring dry mouth symptoms by stimulating, lubricating, moisturising, soothing and refreshing the mouth for hours.

The Breath Company Dry Mouth Rinse was scientifically developed in the US by Dr Harold Katz, the founder of the California Breath Clinics, and internationally acclaimed dentist/bacteriologist.

The Breath Company Dry Mouth Rinse is available in Boots stores nationwide and online at www.boots.com, priced at £14.00.



FULLY EQUIPPED



If patients are motivated enough to clean their teeth for two minutes, twice a day, they're going to want to be rewarded with good oral health, particularly good gingival health. As well as the right technique, they also need to be using the right products. Just as you want your washing machine and detergent to work in harmony, so too do you want a toothbrush and toothpaste to give the best possible outcome.

Oral-B's Genius toothbrush works in synergy with Oral-B's Pro-Expert toothpaste. The Genius brush will almost certainly improve a patient's technique ensuring the

user brushes for the right length of time, does not apply too much pressure and, most importantly, never misses a zone! There is no excuse for non-uniform brushing as real-time guidance is given to improve their technique.

Using the washing machine analogy, Oral-B's Pro-Expert is the 'Ariel' to its Genius power toothbrush. It's the inclusion of stabilised stannous fluoride that makes the difference. This powerful ingredient gives Oral-B's Pro-Expert toothpaste a long-

lasting antimicrobial action as it inhibits antimicrobial growth as well as reducing the ability of bacteria to 'stick' to tooth and gum surfaces.

The inclusion of sodium hexametaphosphate is also beneficial as it protects against calculus formation, as well as staining, thereby reducing a further cause of plaque retention on the roughened surface of the calculus. The combined force of these two plaque reducing agents, alongside the mechanical action of the Oral-B Genius help protect against gum problems.

If you would like to promote your products or services direct to the dental industry in *BDJ Team*, call Andy May on 020 7843 4785 or email a.may@nature.com.

BDJ Team CPD

CPD questions: April 2017



An introduction to crowns

- Select the **incorrect** statement:
 - crowns can help hold a tooth together, preventing it from splitting
 - crowns are an economical treatment option
 - crowns must only be placed on a tooth that is alive and healthy
 - discussing priorities and expectations with the patient is essential
- During the crown prep stage, which is **true**?
 - the amount of tooth tissue removed is the same regardless of crown material
 - more tooth tissue must be removed for metal crowns
 - more tooth tissue must be removed for porcelain crowns
 - in all cases, the difference between too little tooth tissue removed and too much is huge

- Why does a tooth that has been prepared for a crown need to be temporised?
 - to keep it safe and healthy while the crown is made
 - to help prevent movement
 - to prevent further eruption of the tooth that could prevent the crown fitting
 - all of the above
- Which of the following statements is **not** made in this article?
 - all dentists must have extensive experience of placing crowns to graduate from dental school
 - placing a crown can be a complex, involved procedure
 - porcelain crowns can be a particularly aesthetic option
 - crowns can save teeth that would otherwise have to be extracted



BDJ Team is offering all readers 10 hours of free CPD a year on the BDA CPD hub! Simply visit <http://bit.ly/2e3G0sv> to take part!

How to take part in BDJ Team CPD

BDJ Team CPD can be found on the BDA CPD hub. This site is user-friendly and easy to use. There are now **ten hours of free BDJ Team CPD a year** on the CPD hub, and currently there are ten hours from 2016 and four hours from 2017!

To take part, just go to <http://bit.ly/2e3G0sv>
To send feedback, email bdjteam@nature.com.

