

BDJ Team

NOVEMBER 2016



DENTURE
CLEANLINESS

BDA
British Dental Association

November 2016

CPD:
ONE HOUR

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Ed's letter



Did you know that our most popular post on Facebook this year reached over 90,000 people? That's more people than there are DCPs on the GDC register! The story that captured your imagination the most was the story of Jo, the dental hygienist 'trailblazer' visiting patients in their homes in her Sparkle Fairy van (<http://www.nature.com/articles/bdjteam2016143>).

This was closely followed by posts linking to our articles on dental nurse wages, and why they're so low (<http://www.nature.com/articles/bdjteam2016152>). We have never had so many comments on our articles before, and would like to thank all of our readers for engaging and interacting with us through social media this year.

If you didn't see the furore - where have you been?! Make sure you have liked *BDJ Team* on Facebook: www.facebook.com/bdjteam.

This is the final issue of *BDJ Team* for 2016 and therefore contains the TENTH hour of verifiable CPD this year. All ten hours of CPD are now available on the BDA CPD hub, but don't wait too long to take part - in 2017 CPD questions will only be available for **six months at a time!** <http://bit.ly/2e3G0sv>

This November we meet an inspirational individual, Yasmin Aydin, who at just 24 has already completed a degree in dental hygiene and therapy and is now studying to become a dentist while also chairing her local section of the BDA.

In an opinion piece Joanne Brindley says that those who are dedicated to learning and developing themselves may be fatally flawed: 'What stands out for me most is the way that we criticise ourselves when things are not what we consider to be perfect.'

We also present ten top tips for handling the teeth of older patients and include some interesting research from the *BDJ*. If you are a DCP involved in research I'd love to hear from you.

I hope you have enjoyed reading *BDJ Team* this year and look forward to bringing you lots more exciting content in 2017!

Kate

Kate Quinlan
Editor
k.quinlan@nature.com



Give yourself a hug p25

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CPD:
ONE HOUR



Denture cleanliness p19



Top Facebook post!



Super student p17



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THE TEAM

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Letters

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The profession does not acknowledge the progress dental nurses have made

Dear Editor,
I read your article in the October issue of *BDJ Team* on dental nurse salaries with interest (*Why are dental nurse*

salaries so low? <http://www.nature.com/articles/bdjteam2016152>).

Low pay is always a topic of conversation with dental nurses and it has been enhanced by registration due to having to pay for their courses and indemnity as well. Some lucky dental nurses have forward thinking employers who embrace team working and lifelong learning but in my experience most do not.

As you know prior to registration a dental nurse's salary did not need to be amazing because they held fewer responsibilities. When I was in practice in the 80s and 90s, before registration, and looking back, I felt I was viewed as the 'lady with the sucker' and the 'hand holder' by the profession and patients. Dental nurses did not need a qualification and perhaps for this reason they did not gain the due recognition by the profession or patients. Despite my dental nurse training at King's College Hospital in the 80s, when I entered general practice my salary was less than the receptionist's!

This is a bit of a sweeping statement, but perhaps the mindset of the profession has not changed from the pre-registration days and this is still why salaries are low? Plus I feel that our current economic climate (times of austerity) is perhaps feeding reasons to save money.

Dentistry is unlike medicine, in that registered nurses are subject to a national pay scale, whereas registered dental nurses are not. The profession does not acknowledge the progress dental nurses have made over the last eight years. When I have a classroom of

registered dental nurses studying on one of our courses, I know that the dental nurse students will be on different salaries with different terms and conditions. Most of them will have to forfeit

nurses. The new NHS prevention contract is supposed to influence the use of DCPs but that is not here yet. General nurses raised the profile of their status through the degree



‘WHEN I WAS IN PRACTICE IN THE 80s AND 90s, BEFORE REGISTRATION, I FELT I WAS VIEWED AS THE “LADY WITH THE SUCKER” AND THE “HAND HOLDER” BY THE PROFESSION AND PATIENTS.’

a day's pay to attend the study days or take annual leave, and in addition the majority of the students will have had to pay for the course themselves. The cost of maintaining their registration is also a topic of discussion. The cost of day CPD courses, the cost of indemnity, and travel to courses is not reimbursed. CPD is normally undertaken in their own time for reasons that I mentioned before (most DNs are not paid when they are not in practice).

One way, in my opinion, is for dental nurses to work together, with one voice, through their professional association to raise their profile and to have conversations with relevant bodies to discuss a nationally funded framework for training/national salary scales for dental

programme; perhaps dental nurses should be doing the same?

Jacqui Elsdén, Dental Education Facilitator, London and the South East, Health Education England working across Kent, Surrey and Sussex

Do you have an opinion on something published in *BDJ Team* or on working in the dental industry? Do you need advice from an expert that we might be able to help you with? Just email bdjteam@nature.com.

Letters may be edited for space. Opinions expressed do not necessarily reflect those of the editorial team or the publishers.

bdjteam2016162



Teeth Team is a real success in the North East

It is ten years since Ingrid Perry, a dental practice manager in Bridlington, was inspired to set up Teeth Team, a programme to raise awareness of the importance of children having access to regular dental care.

In 2006 Ms Perry visited a local primary school to deliver an oral health education session and was approached by the head teacher who expressed concerns about the number of children taking time off because of toothache. This inspired Teeth Team, which was set up in 2010.

‘Never give up if you truly believe in what you are trying to achieve ... you can and will make a difference’

Teeth Team currently works with more than 9,000 children across the city of Hull and East Yorkshire and is expanding into Lincolnshire. Working entirely on the efforts of volunteers and the support

of businesses in the dental industry, the programme visits schools and teaches children the importance of healthy diets, effective tooth brushing and regularly attending dental checkups.

In 2012 Teeth Team launched 543junior.co.uk, an oral health education hub aimed at children aged five to 16 with games, lessons and resources for parents and teachers. Later that year they introduced fluoride varnish applications for children undergoing dental assessments as a quick and simple way of reducing the risk of tooth decay.

Since then they have received endorsements from the National Oral Health Promotion Group and the Oral Health Foundation, and have partnered with a number of businesses to take their efforts further, including Colgate, mydentist and Siemens.

Ms Perry would like to see a Teeth Team programme in every town and city in the UK and commented: ‘The advice I would give to anyone who may be faltering on a project is to never give up if you truly believe in what you are trying to achieve. Sometimes it may feel like everything is against you no matter which way you turn, but if you know in your heart you can and will make a difference, then never walk away!’

BADN membership shoots up

The British Association of Dental Nurses (BADN) is delighted that its membership has increased by almost 60% during 2016.

President Jane Dalgarno said: ‘We are delighted that even more dental nurses are realising the benefits of BADN membership, and that BADN offers value for money. Although registered dental nurses have always been required to have adequate indemnity cover, many were not aware of this – and the GDC’s new requirement to confirm adequate cover when re-registering has brought this requirement to the fore. BADN Full Membership is, of course, available with indemnity cover designed specifically for dental nurses, as part of the membership package.

‘BADN also offers many other membership benefits, as well as the opportunity to shape the future of dental nursing.’

BADN membership is open to all dental nurses, both registered and student, from all areas of dentistry. Full membership is open to registered dental nurses and available both with and without indemnity cover, with slightly lower rates for those working part time. Associate membership is open to retired and overseas dental nurses.

Student Associate e-membership is available to student dental nurses.

www.badn.org.uk

Hygienists call on government to take dentistry seriously

Dental hygienists are calling on government health ministers to 'take dentistry seriously' at the news that England looks set to reach 5 million type 2 diabetes diagnoses by 2020 - five years sooner than previously thought.

According to new analysis of the first six months of 2016, the number of prescriptions of type 2 diabetes medications was already up by more than 8% compared to the same period in 2015. At the start of this year, 3.5 million UK adults were diagnosed with type 2 diabetes. If the trend continues, this will increase to five million by 2020.¹

Michaela O'Neill, president of the British Society of Dental Hygiene and Therapy (BSDHT), says that the government must now invest time, money and energy into raising awareness of the importance of dental hygiene. She believes dental teams are well placed to halt this predicted hike in the figures. She said: 'Oral health education is the cornerstone of preventative dentistry and can have a positive impact on not only the health of the British population's teeth and gums, but on their overall health, too.'

Michaela added: 'Regular dental examinations offer the opportunity for dental teams to detect early signs and predictors of systemic disease as well as dental disease and can also open up communication between clinician and patient about lifestyle risks, such as heavy alcohol use, smoking and poor nutrition.'

'By investing time, energy and money into educating the British public on the importance of regularly attending a dental examination – and by empowering them to do so – the government will ensure everyone has an equal chance to both understand and address any poor health choices.'

1. EXASOL. New research by EXASOL discovers that type 2 diabetes prescriptions have risen by one third in five years. 10 October 2016. Available at: <http://www.exasol.com/en/newsroom/press-releases/new-research-exasol-discovers-that-type-2-diabetes-prescriptions-have/> (accessed October 2016).



Nestlé removes smile factory strapline from advertising

Nestlé has taken steps to withdraw its 'The Smile Factory' advertising campaign following an appeal from the British Society of Dental Hygiene and Therapy (BSDHT) mentioned in the September issue of *BDJ Team* (<http://www.nature.com/articles/bdjteam2016131>).

The BSDHT had deep concerns about the Rowntree's advertising campaign, labelling it hugely misleading and irresponsible for its portrayal of sugary sweets being linked to happiness and smiling.

In a letter received by the BSDHT, Nestlé has acknowledged their responsibility in advertising towards children and have reviewed the campaign accordingly. As a result, Nestlé has confirmed that they will not continue to use the strapline 'The Smile Factory' as part of their advertising with immediate effect.

President of the BSDHT, Michaela O'Neill, believes this swift and decisive action should be a catalyst for other sweet manufacturers in reviewing their own advertising

campaigns:

'This is a positive action from Nestlé of which we are highly appreciative; they have listened to our concerns and recognised that real care is needed when advertising sugary foods, especially to children.

'We recognise that 'The Smile Factory' campaign was not intended to directly target children but through its use of bright colours and cartoon-like nature it did undoubtedly appeal to them.

'We urge all food and drink manufacturers to think more carefully about their advertising campaigns in the future and about the wider health implications of their messaging.

'We would again like to extend our gratitude to Nestlé for taking action on this and also call on them to do more to try and change the course of oral health in the UK through further decisive action.'

New radiation safety guidance launched



The British Institute of Radiology (BIR) has produced posters, videos and a book on personal protective equipment (PPE) for staff working with radiation, to help reduce exposure to diagnostic X-rays and develop radiation safety knowledge in and beyond the radiology department. The guidance gives practical advice on how staff should select, wear and store their PPE.

Importantly it gives clear advice on how to comply with regulations, and prepare a risk assessment.

It is crucial that protective aprons, head and eye wear are worn and fitted correctly

to protect the body against dangerous radiation levels. If stored incorrectly, the equipment can become damaged and that immediately reduces its effectiveness.

The book, *Personal protective equipment for diagnostic X-ray use*, is a practical guide to using and caring for PPE and is written by Peter A. Hiles, Helen Hughes, Denise Arthur and Colin J. Martin as part of a BIR Working Party with support from the BIR Radiation Safety Special Interest Group (SIG). Products created in conjunction with the book are two A2 sized posters, *Caring for your PPE* and *Wearing your PPE* and three videos, *Wear and Fit*, *Care and Storage* and *Screening PPE*.

The resources are for radiologists, trainees, radiographers at all levels, radiology managers, radiation protection advisors (RPAs), medical physicists, vets, dentists, nurses and clinical application specialists.

The book and posters are available to purchase from <https://birorgukportal.force.com/BookList> and the videos can be viewed for free on the PPE resources page: <http://www.birpublications.org/ppes>.

Research insights

Orthodontic therapists – has their introduction affected outcomes?



Title of research article

Orthodontic therapists - has their introduction affected outcomes?

Authors

C. Rooney, H. Dhaliwal, T. Hodge, University of Leeds

Structured abstract

Objective

To assess the effect of the introduction of orthodontic therapists (OTs) on the quality of orthodontic treatment outcomes in two specialist orthodontic practices in the UK.

Study design

Retrospective cross sectional observational study.

Setting

Multi-centre evaluation at two specialist orthodontic practices in Yorkshire. Data collection was carried out during 2014.

Materials and methods

The treatment undertaken by three specialist orthodontic clinicians (A, B and C) was evaluated at two time points. The first time point (T1) was before the introduction of OTs when the specialist orthodontic clinicians were solo operators. The second time point (T2) followed the introduction of OTs. Patients at T2 had their treatment planned by a specialist orthodontist and were seen for care by both the orthodontist and an OT who had been qualified for a minimum of three years. A sample size of 30 orthodontic patients per clinician at each time point was chosen. Included participants had completed a course of fixed appliance therapy. They were consecutively selected from cases that had been completed in the specified time frame for each clinician.

Main outcome measures

The quality of treatment was assessed objectively using the quantitative Peer Assessment Rating index (PAR index). Data extracted from the specialist practice databases also allowed conclusions to be drawn about the length of treatment time and number of appointments in each treatment group.

Results and conclusions

There appears to have been no change in orthodontic treatment outcomes following the introduction of supervised OTs at two specialist orthodontic practices.

What difference do orthodontic therapists make to outcomes?

Orthodontic therapists – has their introduction affected Orthodontic Peer Assessment Rating (PAR) outcomes? *Br Dent J* 2016; **221**: 421-424.

In any walk of life, debate about the value of auxiliary or assistant team members surrounds their potential usefulness, their acceptability by fellow team members and the customers or clients they serve, and the cost-effectiveness of their activities. Translating this into the dental surroundings is no different and the major clue to the process are the letters DCP (dental care professionals). A major change in orthodontics over the last decade has been an increase in the workforce with the introduction of orthodontic therapists (OTs) trained at eight centres in the UK. This has led to improved access to specialist-led orthodontic care and to altering the skill mix of the orthodontic team. Utilisation of OTs has also lowered the cost of supply of orthodontic treatment. The aim of this study was to assess the effect that the introduction of the OTs has had on the quality of orthodontic treatment outcomes as assessed by an index (the PAR index) which enables objective measurement of orthodontic treatment outcome by analysing pre- and post-treatment study models, and the duration of treatment. A retrospective, cross-sectional observational study was undertaken at two specialist orthodontic



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practices in Yorkshire where treatment was undertaken by specialist orthodontic clinicians and evaluated at two time points on 168 participants. There was no change in orthodontic treatment outcomes following the introduction of OTs as measured by length of treatment time, number of appointments or PAR index change. The study highlights excellent standards of treatment and

‘Such studies are of great value in the ongoing assessment of DCP roles’

although the results are not universally applicable they suggest the possible value of this group of DCPs in orthodontic practice. Such studies are of great value in the ongoing assessment of DCP roles not only from the viewpoint of dental practices but also from those who fund oral care, be they governments, insurance companies or indeed patients themselves. In straitened economic times such considerations are all the more important.

By Stephen Hancocks OBE,
BDJ Editor-in-Chief

‘THE STUDY HIGHLIGHTS EXCELLENT STANDARDS OF TREATMENT AND ALTHOUGH THE RESULTS ARE NOT UNIVERSALLY APPLICABLE, THEY SUGGEST THE POSSIBLE VALUE OF THIS GROUP OF DCPs’

What is involved in the role of an orthodontic therapist?

Treatments include:

- Carrying out Index of Orthodontic Treatment Need (IOTN) screening either under the direction of a dentist or direct to patients
- Cleaning and preparing tooth surfaces ready for orthodontic treatment
- Placing brackets and bands
- Preparing, inserting, adjusting and removing archwires previously prescribed or, where necessary, activated by a dentist
- Taking impressions and pouring, casting and trimming study models
- Clinical record taking: intra and extra-oral photographs, dental impressions, occlusal records and face bow records where required
- Inserting passive removable appliances (such as space maintainers or retainers) and active removable appliances that have been adjusted previously by a dentist
- This includes headgear and facebows that have been previously adjusted to fit by a dentist
- Taking occlusal records including orthognathic facebow readings
- Placement and removal of fixed appliances
- Identifying, selecting, preparing and placing auxiliaries
- Providing emergency orthodontic care
- Taking intra and extra-oral photographs
- Fitting tooth separators and bonded retainers.

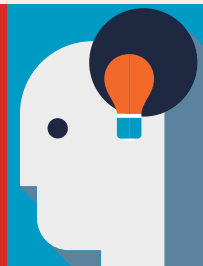
What is not permitted?

- Diagnosis or provision of any form of treatment plan for patients
- Activation of any part of a removable appliance
- Removal of subgingival calculus
- Administration of local anaesthesia
- Re-cementing crowns
- Placing temporary dressings
- Undertaking anything that is irreversible, such as interproximal reduction, which involves removal of enamel.

Expert view

Dirk Bister

Programme Director, Orthodontic Therapy, King's Health Partners, London
 Consultant Orthodontists, Guy's and St Thomas' NHS Foundation Trust
 Honorary Reader King's College London



This cross-sectional retrospective study looks at orthodontic treatment outcomes before and after therapists were introduced to two specialist practices in the North of England. In order to register as an orthodontic therapist (OT), dental nurses need to undertake a one year course approved by the GDC and pass a summative examination by the Royal College of Surgeons of Edinburgh or England. The salaries of therapists are generally below that of dental specialists. The Orthodontic Peer Assessment Rating Score (PAR) was used as an outcome measure. This score measures 'hard data' ie reduction of overjet, overbite, centreline correction etc. The PAR score reductions were similar before and after the introduction of therapists, which leads the authors to conclude that introducing

'The authors stress that the specialists supervised the therapists at every visit; it is therefore not surprising that the outcomes were identical.'

skill-mix results in comparable treatment outcomes. Length of treatment and number of appointments were also unaffected. The GDC's *Scope of practice*¹ defines the areas of training, skills and knowledge for OTs to practise safely. However, this publication is not completely consistent with the guidelines issued by the British Orthodontic Society and the Orthodontic National Group.² The latter document distinguishes between tasks where supervision is recommended and tasks where it is required, thereby questioning if patients need to be seen by a supervising dentist at every single visit, or indeed if the dentist has to be on site when therapists provide treatment.³ The authors of this paper stress

that the specialists supervised the therapists at every visit and it is therefore not surprising that the measured outcomes were identical. One would expect the PAR score to reflect the expertise of the individuals who made and continuously revised the treatment plan which in this case were the supervisors. Additionally the PAR score, however objective, is only one of a number of performance indicators (also known as 'vital signs') that help Primary Care Organisations to monitor orthodontic activity and quality of patient care. It would have been interesting to find out if the introduction of therapists made a difference to other metrics, particularly patient reported outcome and experience measures.⁴ Lastly, the authors quote a paper, published by the same team, which suggests a reduction of practice expenditure when skill mix is used. One wonders, assuming that this statement is correct, why this has not yet led to a reduction of costs to the NHS.

1. GDC. *Scope of practice*. Available online at [http://www.gdc-uk.org/Dentalprofessionals/Standards/Documents/Scope%20of%20Practice%20September%202013%20\(3\).pdf](http://www.gdc-uk.org/Dentalprofessionals/Standards/Documents/Scope%20of%20Practice%20September%202013%20(3).pdf) (accessed 22 September 2016).
2. BOS. Guidelines on supervision of qualified orthodontic therapists. Available online at <http://www.bos.org.uk/portals/0/Public/docs/General%20Guidance/Guidelinesonsupervisionoforthodontictherapists2012.pdf> (accessed 22 September 2016).
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4. NHS Dental Services. Orthodontic vital signs report guidance. Available online at http://www.nhs.uk/Document/DentalServices/Orthodontic_Vital_Signs_Report_Guidance.pdf (accessed 22 September 2016).

Author Q&A

with Claire Rooney
 University of Leeds

*What was the aim of your research?*

The aim of the research was to assess whether the introduction of qualified orthodontic therapists into specialist practice had had an effect on treatment outcome. I wanted to compare and contrast the following treatment outcomes at two time points, pre and post-orthodontic therapist employment:

1. PAR score change
2. Length of time taken to complete treatment
3. Number of appointments required.

What was the most challenging part of this study?

As the study was retrospective and cross-sectional, I found that data collection was the most challenging part. Hundreds of study models were required for the study and retrieval was not always straightforward. A number of models were damaged so required repairs prior to being PAR scored which also led to delays in data collection.

Will this study affect changes to skill-mix in the UK?

The changes to the skills mix has already taken place, so this study - the first investigating the impact the orthodontic therapist has had on treatment outcome - whilst unlikely to have an immediate effect on service provision, does provide evidence for the benefit of task delegation within the dental team. This study, however, which showed excellent treatment outcomes for all concerned, may not be generalisable as the orthodontic therapists investigated worked under direct supervision 100% of the time and this may not be achievable when the responsible orthodontist does not achieve the same level of involvement in patient care as here. Further multi-site, prospective studies would help highlight the benefits of increasing the skills mix in the orthodontic team.



bdjteam2016168

Wrigley's Extra.

Another way to improve your patients' oral health

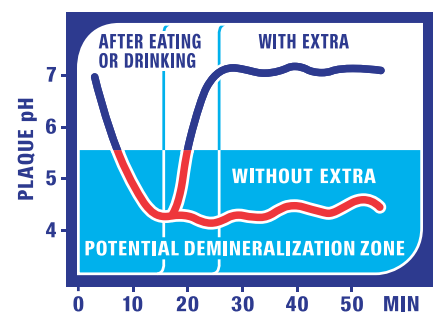


Significant changes in lifestyle mean that traditional eating habits have altered, and people are now eating on the go more than ever before. The more we snack, the more our teeth come under attack.

-  Independent clinical research proves that chewing sugarfree gum for 20 minutes after eating or drinking helps neutralise the plaque acid attacks that can cause tooth decayⁱ and contributes to removing food remainsⁱⁱ
-  Increased flow of saliva also promotes the remineralisation of tooth enamel,ⁱⁱⁱ thus reducing one risk factor for developing tooth decay^{iv, v}

Chewing sugarfree gum after eating and drinking helps neutralise plaque acids, assisting in keeping teeth clean and healthy.^{i,ii,iv,v}

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ⁱAlcantara E, Leveille G, McMahon K, Zibell S. Benefits of Chewing Gum: Oral Health and Beyond. Nutrition Today, Volume 43, Number 2, March/April 2008 ⁱⁱLeach SA, et al. Remineralization of artificial caries-like lesions in human enamel in situ by chewing sorbitol gum. J Dent Res 1989;68:1064-8 ⁱⁱⁱCreanor SL, et al. The effect of chewing gum use on in situ enamel lesion remineralization. J Dent Res. 1992;71:1895-900 ^{iv}Beiswanger BB, et al. The effect of chewing sugar-free gum after meals on clinical caries incidence. J Am Dent Assoc. 1998;129:1623-6 ^vSzoke J, et al. Effect of after-meal sucrose-free gum-chewing on clinical caries. J Dent Res. 2001;80:1725-9

^fExtra® sugarfree gum is beneficial for dental health as it helps neutralise plaque acids.



Remote dental screening

by dental therapists



M. Estai,¹ J. Winters,² Y. Kanagasingam,³ J. Shiikha,¹ H. Checker,¹ E. Kruger¹ and M. Tennant¹ investigate the use of 'mid-level dental practitioners', such as dental therapists, to remotely screen for oral diseases using a 'telehealth' model.

¹International Research Collaborative – Oral Health and Equity, Department of Anatomy, Physiology and Human Biology, University of Western Australia, Australia;

²Dental Department, Princess Margaret Hospital, Australia; ³Australian eHealth Research Centre, CSIRO, Australia

Introduction

Most dental care services in developed countries are funded privately, with much of it provided on a fee-for-service basis.¹ This is coupled with limited dental insurance and a tendency for the uninsured to be those who are underserved and also experience the majority of the dental diseases.² Australia, for example, has one of the healthiest populations in the world but significant healthcare inequalities still exist³ where patients with high needs have less access to dental care, while patients with the least needs are treated using the most expensive resources.⁴ Efficient and effective screening has the potential to reduce oral health inequalities and optimise the use of limited resources.⁵ Unlike many medical disorders, dental caries is relatively easy to detect in clinical settings or epidemiological studies. Early diagnosis, early intervention and preventive treatment can prevent or reduce the progress of many dental diseases. This concept is considered the cornerstone of cost-effective delivery of dental care, with the potential to save hundreds of millions of dollars.⁶ Therefore, there is a need to shift the oral healthcare system from a cure to care culture.⁷

Mid-level dental practitioners

One of the viable solutions to address unmet oral health needs is the use of mid-level dental practitioners (MLDPs), specifically dental therapists, to screen for oral diseases,^{5,8,9} and where only the more complex patients are referred to dentists, while simple cases are treated by MLDPs. Although the practices of dental therapists have been mostly limited to treating under 18-year-olds worldwide,¹⁰ dental therapists' scope of clinical practice in some places has been extended to also treating adults.¹¹ Evidence suggests that dental practitioners with minimal training can successfully screen for oral diseases^{9,12} and perform complex dental procedures under the supervision of an off-site mentorship.¹³ A recent report on the Alaskan workforce model has provided evidence that employing MLDPs using a telehealth system has the potential to address the oral health needs of underserved populations in remote Alaska.¹⁴ This strategy can help in reducing the isolation of local practitioners in remote areas, and allow them to provide treatment under the guidance of a remotely located dental expert.

The clinical oral examination has been the primary technique used for dental screening.

However, this technique is inappropriate in comparative studies where dental examiners remain non-blinded to certain characteristics of participants.¹⁵ Also, conducting clinical examination in large epidemiological surveys is challenging, as this necessitates huge resources. Seeking approaches that can expedite early detection of dental problems, improve patients' referrals and avoid treatment delay without affecting the accuracy of diagnosis is needed. The growing interest in telehealth services using rapidly evolving digital imaging has provided dental providers with alternatives to traditional methods.¹⁶ The use of photographs in dentistry has increased rapidly over recent years and it has become an integral part of routine dental practice.¹⁷ Several studies have examined the use of intraoral photographs in dental epidemiology. Most studies found that telediagnosis of oral diseases based on intraoral photographs can offer a valid and reliable alternative to the traditional oral examination.^{15,18–21} Previous studies were focused on the assessment of the feasibility, validity and reliability of the photographic assessment in comparison to a visual examination as the reference standard. However, research reports on comparing the assessment of intraoral photographs by different members of the dental team are limited. Against this background, this study aimed to compare the validity and reliability of the photographic method in the screening for dental caries, between different levels of dental practitioners.

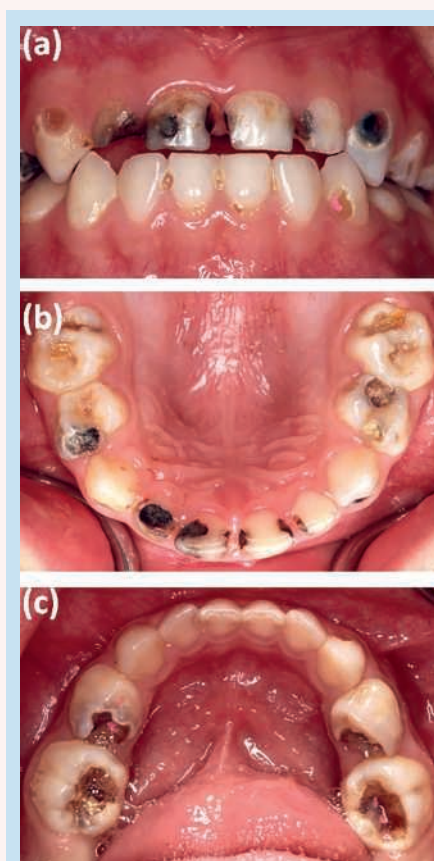


Fig. 1 Intraoral photograph showing three views. (a) Anterior view; (b) Upper occlusal view; (c) Lower occlusal view

Lens, Macro Ring Lite MR14EX) was used to obtain intraoral photographs from all 126

Expert panel review

All intraoral photographs were reviewed by an expert panel to formulate a standard screening baseline, to which the screeners' data could be compared. The panel consisted of three dental practitioners (including authors EK and MT). A dentogram based on the collaborative assessment of the panel was formulated for each patient to reflect the dental status at the time the images were taken. This was at the level of screening, not a comprehensive examination. This was the benchmark against which the other screeners' assessments were tested.

Data assessment

The evaluation of the dental photographs was carried out by two independent, off-site dental practitioners, a MLDP and an internationally-trained dentist (not registrable in the jurisdiction) using a web-based data and image-viewing app built upon the Remotei system. The Remotei is a comprehensive data management server that has been widely used as a telehealth platform in various screening programmes.²² A simple user manual and cover letter were sent to the screeners explaining the study purpose and how to use the system. The system enabled each screener to evaluate photographs independently and insert comments on the predefined oral health assessment form and submit reports or recommendations into the Remotei server. These independent assessments by dental practitioners created the database used to compare with the benchmark panel assessment and between the screeners. We used a method developed by the WHO based on tooth-by-tooth assessment, which is simple and easy to use in large epidemiological surveys.²³ As the photograph only provides two-dimensional views we could not use the International Caries Detection and Assessment System (ICDAS) (which is based on tooth surface) as the unit of analysis.

Statistical analysis

SPSS version 17.0 (IBM Company, Chicago) was used to compute Cohen's kappa to test the inter-examiner reliability by the benchmark panel assessment, and the photographic assessments based on tooth-on-tooth comparisons.²⁴ Fifteen percent of the intraoral photographs were re-graded to test the intra-examiner agreement, at least, four weeks after the initial scoring of the photographs. The sensitivity, specificity, accuracy, positive predictive value (PPV) and negative predictive value (NPV) of the photographic method for each examiner were calculated. For this analysis, all teeth were classified as

'MOST STUDIES FOUND THAT TELEDIAGNOSIS OF ORAL DISEASES BASED ON INTRAORAL PHOTOGRAPHS CAN OFFER A RELIABLE ALTERNATIVE TO THE ORAL EXAM'

Methods

Ethical approval for this study was granted by The University of Western Australia Human Research Ethics Committee. This study was a retrospective descriptive study that examined intraoral photographic records of 126 children (two to 18-years-old), who were patients of one author (JW) between the years 2010 and 2014.

Original photograph collection

A digital single-lens reflex (DSLR) camera (Canon EOS 7D, EF 100 mm f2.8 Macro USM

patients undergoing dental treatment under general anaesthesia. Dental photography was completed pre-operatively by a trainee specialist dental registrar (paediatric dentistry). A standard series of three intraoral photographs per patient was obtained using retractors and intraoral photographic mirrors (anterior, upper occlusal and lower occlusal views), and these were uploaded to a Remotei server at a later time (Fig. 1). The uploaded images were 1,0004,000 KB in size and saved as JPEG format to the Remotei server.

Table 1 Demographic characteristics of participants

Characteristics	N (%)
Age	
25 years	51 (41%)
611 years	56 (44%)
1218 years	19 (15%)
Gender	
Male	58 (46%)
Female	68 (54%)
Total	126

panel assessment and photographic method (assessed by a dentist and MLDP) was almost perfect, with the kappa score ranging from 0.82 to 0.88. The intra-examiner agreement for the photographic assessments for screeners was almost perfect, with the kappa score of 0.82. Across all the screeners and examination methods, the specificity (96% to 97%) was higher than sensitivity (81% to 89%). The level of agreement, sensitivity, specificity, accuracy, positive predictive value and negative predictive value measures for both the benchmark panel and screeners' photographic assessments are presented in Table 2.

The mean DFT/dft score (at the screening level) for the children, as determined by the expert panel was 5.79 (4.30 ± SD), and

as determined by the off-site dentist and MLDP was 5.41 (3.94 ± SD) and 5.71 (4.31 ± SD) respectively. The mean DFT/dft was not significantly different between the three assessment groups (P = 0.746). Approximately 90.5% of the children were classified as having caries experience by the expert panel and 88.9% to 90.6% of the children were classified as having caries experience by the screeners (Table 3). The sample also included eight participants with genetic conditions affecting the teeth, such as dentinogenesis imperfecta and amelogenesis imperfecta. All these cases were identified by the expert panel and the screeners.

Discussion

The assessment of two screeners (dentist and

Table 2 Accuracy and inter-examiner reliability of photographic assessment calculated on the basis of tooth-on-tooth comparisons

	Sensitivity (%)	Specificity (%)	Accuracy	PPV	NPP	Kappa (95% CI)
Benchmark panel vs. MLDP	82%	97%	94%	91%	94%	0.82 (0.79 0.85)
Benchmark panel vs. Dentist	89%	97%	96%	92%	97%	0.88 (0.86 0.90)
Dentist vs. MLDP	81%	96%	93%	88%	94%	0.80 (0.77 0.83)

Positive predictive value (PPV), negative predictive value (NPV)
MLDP = Mid-level dental practitioner

sound or carious. Caries experience, using the DFT/dft (decay, filled teeth) index, were calculated for each case and analysed through descriptive statistics. DFT/dft was used instead of DMFT/dmft, as the reasons for missing teeth (exfoliation, caries, other) could not be assessed. Statistical differences between group means were determined by one-way ANOVA. Using the sample size methods devised by Flahault *et al.* where the prevalence of the disease is less than 0.50.²⁵ With an ideal sensitivity of 95% and a lower 95% confidence limit of 80%, the number of cases with caries required is 50. With dental caries prevalence of 40% (1.5 × 50 = 75), 75 cases are needed without caries. So the total sample size of 125 was required in this study.

Results

The demographic characteristics of the participants are summarised in Table 1. All intraoral photographs were gradable, however, out of 4,032 teeth reviewed, a small proportion of the individual teeth were scored as 'unrated' by the MLDP (142 teeth, 3.5%) and dentist (75 teeth, 1.9%).

Tooth-by-tooth comparisons: The inter-examiner agreement between the benchmark

Table 3 Proportion of children with caries-experienced and mean DFT/dft score at the level of screening

	Caries experience (%)	Mean DFT/dft (±SD)
Benchmark panel	90.5%	5.79 (4.30±SD) *
MLDP	88.9%	5.71 (4.31±SD) *
Dentist	90.6%	5.41 (3.94±SD) *

* The level of significance between dentist, MLDP and the benchmark panel is (P = 0.746).
MLDP = Mid-level dental practitioner

‘OUR FINDINGS DEMONSTRATED A SUBSTANTIAL TO ALMOST PERFECT INTER-EXAMINER AGREEMENT FOR BOTH SCREENERS AGAINST THE EXPERT PANEL’

MLDP) was compared to the benchmark expert panel. Our results indicate that the assessment of intraoral photographs at a distance maintains a good level of the sensitivity and specificity. Across all examination methods and screeners, specificity values were slightly higher than the recommended threshold, falling outside of the 95% confidence interval around the WHO reference standard. In contrast, sensitivity values were slightly lower than the WHO recommended threshold, except for the dentist, whose sensitivity value was high and met the WHO's reference standard of 0.850.90.²³ The higher value for the sensitivity might be explained by the higher likelihood that the dentist scored a tooth as carious when in doubt, in order for it to be subjected to additional investigations.²⁶ Nevertheless, the MLDP was not significantly different to the dentist or benchmark panel assessments. The high values of the NPV are not of concern given that the low numbers of false negatives reported by all screeners are associated with the high level of agreement across the examiners.²⁴

Our findings demonstrated a substantial to almost perfect inter-examiner agreement for both screeners (dentist *versus* MLDP) and against the benchmark expert panel. The intra-examiner reliability for the photographic assessment was also high, suggesting that screeners were consistent in the way they identify caries from photographs. Although the MLDP had a marginally lower level of agreement in comparison to the benchmark panel, the MLDP had a slightly higher mean DFT/dft score compared to the dentist, suggesting that the MLDP has a lower threshold of identifying lesions as carious on photographs. The results of a recent study in which intra-oral photographs were used to screen for caries *in vivo* that compared photographic assessments with a visual oral examination suggests that the photographic method can be a valid and reliable way of screening for caries^{19,20} and it can be used in large epidemiological studies with some degree of confidence.¹⁵ Our findings are also consistent with other studies evaluating the efficacy of dental screening by different members of the dental team *in vivo*, which indicated that MLDPs are capable of screening for caries to a similar standard as dentists.^{8,9,27,28}

The quality of photographs and the capability to grade correctly are important factors when evaluating the feasibility of telediagnosis of oral diseases.²⁹ The DSLR camera used in this study produces images of 18 megapixels and is considered adequate

for producing high-quality images, even in low-light situations, or at high magnification. However, in some cases, there was uncertainty about the loss of detailed diagnostic information due to the presence of saliva, blood or debris, particularly for the posterior permanent teeth. The difficulty in detecting carious lesions and differentiating them from staining or dark artefacts could explain why some teeth were scored as 'unrated' by the screeners. These limitations could contribute to the lower sensitivity in the posterior permanent teeth compared to other parts of the dentition. This reflects previous studies which have found variations in the inter-examiner reliability in detecting caries in posterior teeth largely due to the morphology of the fissures and staining.^{30,31}

that you want strong assurance will be picked up urgently in a screening programme. This study suggests that different members of the dental team, with minimal additional training, have the potential to detect caries from web-based presented photographs with a comparable diagnostic accuracy and reliability to dental experts. This approach offers the potential to free up economic and human resources as well as support the use of MLDPs to screen for oral diseases and increase the capacity to care for those who have no access to oral care because of distance or social exclusion. In the future, pattern recognition and artificial intelligence algorithms could be used to detect caries from the photographs without human intervention. However, at present, this technology is

‘THE USE OF DENTAL PRACTITIONERS WITH LIMITED TRAINING CAN OFFER A PRACTICAL AND POTENTIAL COST-SAVING MEANS TO SCREEN FOR DENTAL DISEASES...’

The use of photographic methods in large-scale epidemiological studies is considered feasible. Photographic assessment utilising store-and-forward telehealth technology has been used widely to screen for diseases.³² The photographic method has the potential to facilitate the archiving of photographic records which can facilitate remote assessment of photographs in research studies that may need blinding.¹⁵ This strategy also has implications for prioritising new patient appointments, and facilitating patient referrals to a dental consultant, thus reducing waiting lists and travel, and delays in diagnosis and associated treatment.³³ Healthcare professionals (nurse) or non-licensed healthcare professionals (teacher) could obtain intra-oral photographs from children for a later assessment by an off-site dentist.^{12,15,34} The use of dental practitioners with limited training like MLDPs can offer a practical and potential cost-saving means to screen for dental diseases using photographic methods, among populations with high levels of need, who have limited access to oral care.³⁵

Conclusion

The sample in this study was enriched with dental caries; these sorts of cases are those

still under development. Further testing of the effectiveness of different oral health professionals to screen for caries and other important oral conditions is needed.

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'I love being involved in dentistry'



Name: Yasmin Aydin

Age: 24

Hometown: Morecambe, Lancashire

Qualifications: BSc Dental Hygiene and Therapy, University of Birmingham

Current study: Graduate-entry BDS Dentistry, University of Central Lancashire

Hobbies: Cycling, arts and crafts

Yasmin Aydin secured a place at dental school by first completing a degree in dental hygiene and therapy. She is now an undergraduate dental student and the first student to Chair a Section of the British Dental Association (BDA).

Early ambitions

From a young age, I wanted to be either a dentist or a mechanic. Although the latter may seem unusual for a young girl's career ambition, it isn't a million miles away from dentistry as manual dexterity plays a large part in both jobs. During school I always preferred practical learning over theory based.

I first worked in a dental practice during my year 10 work experience when I was 14-years-old. This was decision time: I had to choose between a heavy duty Black and Decker drill or a delicate dental hand piece. I decided to go down the dental route and spent my two weeks at a local dental practice in Lancaster. I loved everything about this experience and didn't want it to end there. The practice agreed to let me attend for work experience and observation every Wednesday afternoon during my two years in sixth form. For this I am extremely grateful as I learned a lot about dentistry and how important it is to work together as a team.

In the dental practice I loved the interaction with patients and the feeling of being able to positively make a difference to someone's life. I also liked the fact that I get to use my hands; dentistry is like art: sometimes there's a blank canvas and other times you're given something unpredictable as every patient is different. Either way you have to make it work. Once everything is finished it is great looking at what you've just created and achieved. Every dentist should take pride in their work; the patient will definitely appreciate it.

Although I had always been interested in dentistry, I didn't get the grades at A-level. So, I completed a three-year undergraduate degree in dental hygiene and therapy at the University of Birmingham, and thoroughly enjoyed the practical element of the course.

Applying to dental school

Applying for dental school was stressful as I was also entering my finals on my first degree. I thought by applying it was worth a try and I had nothing to lose; the UCAS application was similar to the previous application process which I completed during sixth form.

I was surprised to receive interview invitations from all the universities I had applied to for dentistry and found securing a place was easier this time round. Although I felt there would be competition from school leavers with higher academic grades, I had the experience from a dental hygiene and therapy degree which included working with and treating patients, therefore I didn't let this put me off.

After attending numerous university open days, I liked the modern facilities and technology provided by the University of Central Lancashire (UCLan); I felt these were important as dentistry is continuously progressing with the help of new technology. Unlike traditional dental schools, UCLan starts practical experience very early (in the first year): patient interaction takes place in Dental Education Centres (DECs) and you are assigned one to work at for the full duration of the course. I was given the Morecambe DEC; as this is my hometown I was delighted and moved back home after four years away. As I am originally from Lancashire I was also familiar with Preston - where the main UCLan campus is - and the surrounding areas.

After graduating as a dental hygienist and therapist, I worked in London for just under a year at three different practices in different areas, as well as doing locum work, before my BDS course started.

Starting dentistry

I was so excited to finally be starting dentistry. The other students had all completed a previous degree therefore we were all of a similar age. Out of a class of almost 30 students, three of us were dental hygienists and therapists, although some other students were qualified dental nurses from either before or after their first degree.

Unlike most dentistry courses, during both my degrees clinical/practical work started in first year which was great for experience. Although dentistry includes much more clinical variety and responsibility than dental hygiene and therapy, during my first degree there was an equal amount of pressure clinically as I was still caring for patients, with their treatment and comfort as priority. Standards were set very high; I believe this was partly to prove the high level of skill required to be a dental hygienist/therapist as this particular role is not as well-known within the team.

For dentistry the academic level of work is higher in some areas such as human health and disease but then very similar in other subjects related more to dentistry. There is a lot of cross-over academically between both subjects.

patients the opportunity to attend for treatment and education in order to improve their oral health. The water is fluoridated in Birmingham therefore the caries rate was relatively low and restorative treatment was less common than periodontal.

Two out of three of the practices where I worked in London were also in deprived areas. The population in these areas consisted greatly of Southern Asians, differing greatly to the ethnic group of Morecambe, which is mainly white British. Cultural habits for Southern Asians such as chewing the betel nut has a great impact on oral health and was commonly presented as black staining on the teeth.

Becoming BDA Section Chair

The BDA section meetings/presentations are advertised in Morecambe DEC and as they are local it is easy for me to attend. My DEC tutor circulated an email stating that the BDA section committee required a student rep. After showing my interest I shared this role with another student. After a year as student rep, the committee elected me for chair and I was delighted and honoured to accept this role.

and discussed by the whole committee.

Students are always present and those living in the area try and attend most section lectures. DCPs are welcome to attend although I haven't met any yet.

I love being involved in dentistry and especially as it is for a local committee, I feel very proud to represent the North West Lancaster and Morecambe section. When I didn't get the grades for dentistry in sixth form it was tough and I would never have thought in a couple of years I would be the first student to become Chair of a BDA section.

Fitting it all in

The meetings and lectures organised by the BDA Section start in October and finish around April so there's a long summer break. Section presentations/lectures are held once a month in the evening therefore it doesn't take up a lot of my time, or interfere too much with my studies. There will be more pressure around exam time but the meetings will be a nice revision break.

My year working in practice as a dental care professional was of course very different to my life as a student; for a start there were no exams! In practice I didn't have a nurse which put pressure on time keeping and made the day seem longer as I was alone, whereas at dental school we all nurse for each other and help each other with difficult clinical situations.

I still haven't decided where I would like to work after graduation, but I would love to specialise. I'm really interested in minor oral surgery and have a hospital placement in a few weeks' time where I'll get to find out more about the subject and get properly stuck in!

Outside of dentistry I make novelty gifts and crafts with a vintage feel which I take to art and craft fairs. Last Christmas I got a really cute mint green bike so I've recently started cycling which is lovely, especially along Morecambe prom.

I would encourage other DCPs to apply to dental school if they were interested, definitely. The DCPs I trained with would be more than capable clinically and academically, although it takes a lot of hard work and determination. To go into a second degree straight after undergraduate graduation is a long time to have continuous exams, but on the other hand going back into education after being in work is also very difficult; being on a full-time course there's little time to have another job.

If I hadn't chosen dentistry, I would have been a mechanic, obviously! On a serious note, I can't imagine not being involved in dentistry, whether that's as a dental hygienist/therapist or as a dentist.

'DENTISTRY IS LIKE ART: SOMETIMES THERE'S

A BLANK CANVAS AND OTHER TIMES

YOU'RE GIVEN SOMETHING UNPREDICTABLE AS

EVERY PATIENT IS DIFFERENT.'

During my first degree I was timetabled to be in university for lectures almost every day as well as attending different clinics and external placements throughout the course, whereas at UCLan lectures are delivered in clusters where we attend a few days every month. Clinics are set on the same two days throughout the year and are always at the Morecambe DEC. There are external placements at local hospitals but these usually take place once or twice and are for a few days at a time.

Lancashire life

I love being back home in Lancashire! I'm a born and bred Morecambe girl therefore I know the area very well and enjoy being by the beach. From a dental point of view, the North-west has the highest caries rate in England and suffers very much from dental neglect. As some areas of Morecambe have a high instance of deprivation, this is reflected in patients' dental health and by having a DEC in Morecambe it gives

Editor's note: Since joining the BDA Section, Yasmin is said to have 'sent a breath of fresh air through the section; her pub quizzes have brought students and local dentists together in a whole new way'. This was mentioned in a letter to the editor of the BDJ from another member of the BDA Lancaster & Morecambe Section, Wendy Thompson.

The section already organised social events such as balls and dinner dances before I arrived! I think Wendy's comment about me bringing a breath of fresh air to the section referred to the fact that I'm so enthusiastic and interested in dentistry. Most of the section members are more experienced dentists who perhaps don't have as much free time as I do to plan social gatherings.

I have arranged a pub quiz and social drinks night and have been involved in the discussion/planning of other activities which will take place over the next year including wine and cheese tasting, a walk across Morecambe Bay, meals and quizzes. Most of the events are organised

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Evaluating denture cleanliness of patients in a regional dental hospital

P. Mylonas,¹ D. C. Attrill² and A. D. Walmsley³ outline the use of the Denture Cleanliness Index in a secondary dental care setting.

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Introduction

In order to achieve optimal oral health it is well documented in the literature that denture wearing patients should be advised to maintain high standards of both oral hygiene and denture hygiene.¹⁻⁶

Dentures can accumulate plaque and develop calculus deposits in a manner similar to natural teeth, and the composition of denture plaque differs when compared with dental plaque. Studies have shown that denture plaque can contain a number of potentially harmful microorganisms including: Methicillin-resistant *Staphylococcus aureus*, *Candida albicans*, and *Streptococcus mutans*.⁷⁻¹¹

Previous studies indicate that inadequate denture hygiene can lead to an increase in accumulation of denture plaque, which can then increase the risk of developing oral and dental diseases such as dental decay, periodontal disease, and denture stomatitis.^{4,10-13}

Unfortunately many patients have been shown to have inadequate denture hygiene and some still wear their dentures at night, despite evidence that nocturnal denture wearing is linked to a decrease in oral health and provides no benefit to patients' quality of sleep.^{5,12,14,15}

A number of different cleaning regimes are available for patients to clean their dentures and they can be classified into either chemical or mechanical methods. According to a number of different studies and surveys evaluating the denture hygiene habits of patients, the most commonly used mechanical method is a toothbrush with soap and water or toothpaste, while the most commonly used chemical method is either sodium hypochlorite-based cleaner or a peroxide-based cleaner.^{1,2,5,14,16,17}

Evidence from studies conducted outside the UK provides evidence of the denture care habits and the quality of denture hygiene of non-UK cohorts. Their results may potentially be used to inform on the denture care advice given to UK denture wearers, however, there likely will be potential differences in the availability of denture care materials and in patient denture care/hygiene attitudes. Few studies and surveys have been conducted in the UK which outline the quality of patients' denture hygiene, their denture cleaning habits, and the quality of clinical record keeping.

The purpose of this article is to outline the results of a clinical audit conducted in the prosthodontics department of a regional dental hospital. It follows on from work conducted within general dental practice and seeks to determine whether denture hygiene differs between a primary care and secondary care cohort; this comparison has yet to be published in the available literature.²

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³Professor and Honorary Consultant in Restorative Dentistry, School of Dentistry, University of Birmingham

Methodology

Sixty consecutive denture wearing patients were selected opportunistically, attending for treatment at the Prosthodontics Department of the Birmingham Dental Hospital.

Acrylic denture wearers only, both complete and partial, were included in the audit to maintain the simplicity of the audit. All patients were examined by one clinician. Informed consent was obtained from each patient before assessment.

Audit standard

Acceptable denture hygiene was defined as Denture Cleanliness Index (DCI) score of 2 or less. For patients observed, 90% or greater should have acceptable denture hygiene. One hundred percent of clinical notes should have evidence of denture hygiene instructions (DHI) recorded.

Patient examination

Quality of patient denture hygiene was assessed using the DCI (Mylonas *et al.* 2014), which grades the severity of denture hygiene according to the amount of staining on the denture fitting surface. A liquid plaque disclosing dye (Plaqsearch, Malmö, Sweden) was applied by the clinician to the fitting surface as this is where denture plaque is most likely to accumulate¹⁸ and therefore the aspect of denture where patients need to clean most effectively. The stained denture was then assessed according to the DCI rubric (Table 1), with scores ranging from 0 (best) to 4 (worst).

Patient assessment

Patients' baseline DCI scores were obtained, their clinical records were evaluated, and tailored denture hygiene instructions were provided. They were then reviewed after one month, and their denture cleanliness was reassessed to obtain second audit cycle results for their DCI scores; patients' clinical records were also reassessed for quality of record keeping.

Table 1 The Denture Cleanliness Index (Mylonas *et al.*, 2014)

0	Clean denture. No plaque is visibly seen, no staining, no plaque detectable
1	Denture is visibly clean. Little staining (<25% staining of fit surface)
2	Denture has visible plaque and/or debris. Moderate staining of fit surface (25-50% staining of the fit surface)
3	Denture has visible plaque and/or debris. Severe staining of fit surface (>50% staining of the fit surface)
4	Denture has visible calculus deposit(s), on any surface
*	Visible defects in denture, in addition to any of the above score (Defects defined as those which are potentially plaque retentive, those which require repair or remake of denture)

A patient information leaflet was written according to principles from Weinman (1990) and Mylonas *et al.* (2014), and given to patients to aid in patient education.^{2,19} The instructional leaflet detailed the importance of cleaning dentures and teeth, the frequency of cleaning, the manual and chemical methods according to the type of material it is made from and whether it has been relined.

For patients requiring a denture care pack (GlaxoSmithKlein, Brentford, Middlesex) these were provided and they contained a denture box and brush, a sample of effervescent tablets, a sample of denture adhesive cream and associated instructional leaflet.

Results

Sixty patients were seen for baseline assessment of their denture hygiene and their clinical records were evaluated for evidence that denture hygiene instructions had been given; 26 (43.3%) were male and 34 (56.7%) were female, ranging in age between 18 to 84 with a mean age of 63.1 years. At one month review 12 patients did not turn up for their review appointment, despite multiple attempts to contact patients and remind them of their review appointments, and 48 patients were seen for review.

Record keeping

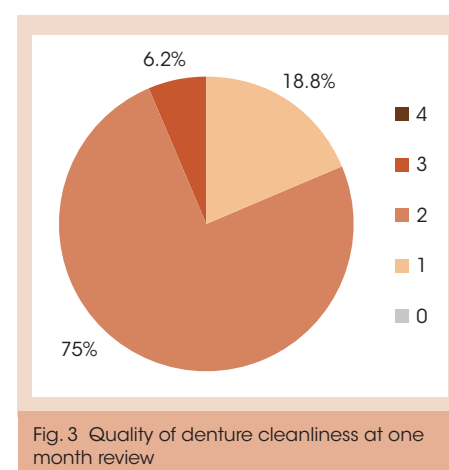
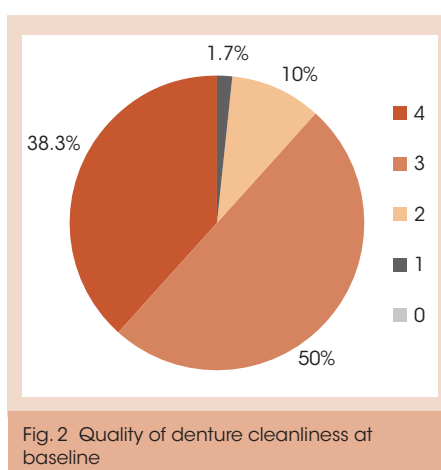
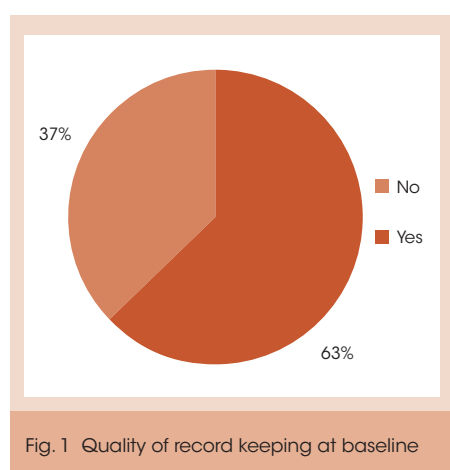
Results for the first cycle/baseline can be seen in Figure 1 and show that 63.3% (n = 38) of patient notes had evidence of denture hygiene instructions being given recorded, while 36.7% did not have any evidence at all. From the 63.3% of patient notes where DHI had been given, there was no evidence of standardisation of denture care instructions provided to patients.

After one month review, 100% of clinical notes had evidence of DHI being given after written instructions to be included in clinical notes was standardised.

Denture hygiene and cleanliness

At baseline 88.3% (n = 53) patients had DCI scores of 3 or greater: 50% (n = 30) with DCI score 3 and 38.3% (n = 23), which is poor when compared to the audit standard set (Fig. 2).

After educational intervention, providing patients with tailored denture hygiene instruction, one month review results can be seen in Figure 3. It can be seen that patients' DCI scores improved, with 93.8% (n = 45) having DCI scores 2 or less which equates to 75% (n = 36) with DCI 2 and 18.8% (n = 9) DCI 1, as can be seen in Figure 3.



Discussion

Patients with removable dentures must be able to look after their prostheses properly and demonstrate good denture hygiene, as well as good oral hygiene, in order to maintain optimal oral health and minimise the risks of developing oral diseases.^{1–6}

The results of this clinical audit show that the quality of patients' denture hygiene at baseline was unfortunately inadequate, which was consistent with another audit conducted on patients within the primary dental care setting and with other studies.^{2,5,14,20} While the baseline results for patients in this audit was slightly better than for those seen in primary dental care, the reasons for the inadequacy of patient denture hygiene were similar: lack of

intervention in another audit conducted in primary care.²

Patients were advised to use both chemical and mechanical cleaning methods to optimise their denture hygiene, in agreement with current literature, following similar advice given by other authors.^{24–26}

The Denture Cleanliness Index provided a simple and quick method for evaluating the quality of denture hygiene within the secondary care setting, and allowed for standardisation of clinical record keeping with regards to denture hygiene assessment and denture hygiene instructions provided to patients. These results are similar to other studies where authors utilised their own methods for evaluating denture plaque.^{5,11,27} Patients could potentially be

hygiene care led to an improvement in their overall denture cleanliness, and must be reinforced at clinical examination.

The Denture Cleanliness Index provides the clinician with an easy tool to assess denture cleanliness, provide tailored denture hygiene instruction, and assess patient compliance.

Denture hygiene instructions and oral hygiene instructions should be provided to all denture wearing patients to reduce the chances of developing oral disease.

'AFTER INTERVENTION, ONE MONTH RESULTS

INDICATED THAT PATIENTS' DENTURE

HYGIENE IMPROVED AND EXCEEDED

THE AUDIT STANDARD.'

standardisation of denture care instructions, and lack of evidence that denture hygiene instructions were previously given to patients.

Patients were provided with tailored educational intervention in the form of denture hygiene instructions and leaflets, and a denture care pack for those that required it. After intervention, one month results indicated that patients' denture hygiene improved and exceeded the audit standard. The effects of educational intervention also mirror those improvements seen within the primary care audit by Mylonas *et al.* and highlights the positive effects of patient education on the subsequent quality of the denture hygiene.^{2,5,14} These results differ from those of Burnett *et al.* in 1993, who found that after six months of educational intervention – written and verbal – there was no change in the denture cleaning habits of their subject group. Conversely, it has been demonstrated that illustrated denture instruction manuals and frequent recall intervals – with denture hygiene and oral hygiene reinforcement – aids in improving denture and oral hygiene habits, and can therefore be recommended.^{21–23}

The quality of clinical record keeping, at baseline, did not meet the clinical audit standards and after standardisation of terminology, improved dramatically at one month review, in accordance with similar

provided with disclosing solution for home-use in order to facilitate denture biofilm, however a study conducted in Brazil concluded that the provision of disclosing solutions for home-use by denture-wearing patients did not improve their ability to remove biofilm.²⁸ However, there is evidence to support that providing patients with disclosing agents for home-use improves their oral plaque control irrespective of whether they are undergoing general dental review,²⁹ active periodontal treatment,³⁰ or orthodontic fixed-appliance treatment.³¹ Further research will be needed to ascertain the effectiveness of denture care instructions with concomitant home-use of disclosing agents in improving denture wearing patients' ability to remove denture biofilm.

As clinicians we are obligated to provide patients with the necessary information and motivation required to look after their dentures as well as assess patients' compliance to said instructions as by doing so this can improve patients' oral and denture plaque control.^{21,22}

Conclusions

Denture wearers treated within a secondary care environment exhibited slightly better levels of denture hygiene compared with those in primary care, but the levels of denture hygiene were deemed to be inadequate overall.

Patient education on appropriate denture

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‘DENTURE HYGIENE AND ORAL HYGIENE

INSTRUCTIONS SHOULD BE PROVIDED TO ALL

DENTURE WEARING PATIENTS...’

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CPD questions

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10 top tips for managing the older dentition

By Dr Antony J. Preston¹

Introduction

The oro-dental management of the older patient can be challenging. There are a variety of social, medical and oro-dental issues affecting the more mature patient in the present day that, arguably, can make their dental treatment more difficult than that of several decades ago. In this paper, ten general tips will be described that might be of help for dental professionals when managing elderly patients.

1 Be realistic when managing the elderly patient *Keep it simple*

Perhaps the principle of 'Keep it simple' should not be exclusively attributed to the dental management of the elderly patient - but for all patients. It is, however, especially true for the more elderly patient. Most of our prevention regimes and dental treatment modalities rely for their long-term success, on the compliance and co-operation of the patient. Oral hygiene and prosthesis hygiene is essential for the maintenance of a healthy mouth. If, however, one advises a more elderly patient to exercise the intricate use of dental floss to clean interdentially or the use of a single-tufted brush to clean the overly-complicated components of a 'busy' partial denture design, then this could be seen as unrealistic - especially if the patient suffers from conditions such as rheumatoid arthritis of the hands. The author is not saying that elderly patients should not clean their

mouths or dentures, but rather that when advising a patient to implement such hygiene procedures, the methods advised should be realistic and 'do-able'. Partial denture designs should be kept as simple as at all possible in order to 'do the job' and intricate ('busy') partial denture designs with a plethora of minor components just serve as dental plaque traps, rather than doing the patient a service.

For the majority of elderly patients, sophisticated restorative dentistry and fixed prosthodontics work is probably not advisable - especially if access to dental care is an issue (if the patient is resident in a residential or nursing home) or if the patient is subject to dementia. For these types of patients, simple extractions, direct restorations and removable prostheses of relatively simple design are 'the way forward'. That is not to say that one should never implement fixed prosthodontic work for an elderly patient - but rather that case selection for this cohort of patients for this type of treatment is crucial.

2 Be aware of the potential of drug-induced xerostomia *The most common cause of xerostomia and difficult to manage*

Approximately a decade ago, if I was writing this article, I would say that there were approximately 300 medications can have the potential side effect of causing drug-induced xerostomia (Fig. 1). This figure is now over 500! Many of our elderly patients are taking medications such as antihypertensives or antidepressants that can have this side effect.

Whether a patient is dentate, partially dentate or edentulous, being xerostomic can have a significant impact in terms of dental caries, root surface caries, toothwear, denture retention problems and oral ulceration and soreness. One must not underestimate the effect of drug-induced xerostomia and warn



Fig. 1 Drug-induced xerostomia

the patient of its significance. The xerostomic (if dentate) is by definition at high risk for dental caries and so vigorous anti-caries prevention regimes should be instituted.

3 Be aware of the cariogenic potential of many elderly individuals' diets

Elderly individuals often have a high-sugar diet and exposed root surfaces

It is true to say that many elderly individuals have a relatively high sugar, cariogenic diet.

Transport problems might present if the patient has to do their own shopping and so they might elect to carry lighter foodstuffs (such as confectionery) home from the supermarket, rather than heavier foodstuffs, such as fruit and vegetables.

The elderly patient might be widowed, depressed and living on their own, and so they might 'comfort eat' their cariogenic diet. This situation, from a dental caries point of view, will be compounded if the patient is taking an antidepressant medication that could cause drug-induced xerostomia. If exposed root surfaces are present in the patient's mouth, then root surface caries can progress at an alarming rate in such conditions.

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Fig. 2 Root surface caries restoration

4 Consider the use of resin-modified glass ionomer cements to restore root surface caries lesions

RMGICs are good material for root surface caries restoration

The main way that restorations fail in the restoration of root surface caries is through secondary dental caries at the restoration margin (Fig. 2). The fluoride release, and more-importantly, so-called fluoride 'recharge' capability of resin-modified glass ionomer cement (RMGIC) restorations can be a theoretical advantage in the prevention of such restorations' marginal secondary caries. The *in vivo* evidence, however, for this claim is not conclusive, at present.

5 Consider the repair, rather than the replacement of defective (large) restorations

Keep it simple

Again, the principle of 'keep it simple' applies to the situation whereby a large restoration in an elderly patient has fractured (Fig. 3). There is contemporaneous evidence to suggest that, in certain cases, the repair of such a restoration, rather than its complete replacement, is the preferable option (as long as any secondary dental caries is addressed).



Fig. 3 Large restoration

6 Consider the use of the shortened dental arch concept in the mandible

...but might the use of the shortened dental arch mean more anterior toothwear?

The concept of the shortened dental arch (SDA) is well known to dental clinicians. Its use - especially in the mandible - is well-documented. Experience shows us that the tolerance of many lower bilateral free-end or distal-extension saddle partial dentures can be poor and so in such cases, the acceptance of a lower SDA might be the preferred option. Some authorities, however, have expressed concern that such an approach might increase the risk of lower anterior toothwear and so this should be monitored.

7 Consider the use of overdentures

An under-used but relatively 'simple' treatment modality

Overdentures were a relatively popular treatment modality a few decades ago, but in recent years, they have fallen away a little in their popularity, perhaps due to the rise of other treatment modalities, such as dental implants. Overdentures, onlay dentures and overlay dentures still have a role to play in the management of many elderly patients as a relatively 'cheap and cheerful' way to manage their prosthodontic requirements.



Fig. 4 Copy complete dentures

8 Consider the use of 'copy' complete dentures

Habituation issues with age

As edentulous patients become older, their ability to accommodate to or habituate to subtle changes in the design of their complete dentures can decrease. In these situations, as long as it has been diagnosed that the tooth position or polished surface is acceptable, then the 'copy' denture or 'duplicate' denture treatment modality comes into its own (Fig. 4). If an elderly patient has many sets of dentures made in a relatively short number of years, each with subtle design differences, it often can be useful to ask the patient which set of dentures was the most comfortable or

successful and then to use these dentures as the template for a copy denture technique.

9 Be systematic at each stage - especially the treatment planning stage of complete denture fabrication

Be methodical when making C/C - minimising errors



Fig. 5 Treatment planning for complete dentures

I often say to undergraduate dental students that the most important or 'clever' stage in complete denture fabrication is the treatment planning stage (Fig. 5). At the treatment planning stage, one should aim to make a 'shopping list' of those features of the existing complete dentures (if there are any) that are acceptable and should be mimicked in the replacement dentures, and those features that should be corrected. Only in this way, through the careful inspection of the occlusal, polished and fitting surfaces extra-orally and the fit, extensions, retention, stability, neutral zone, occlusion, articulation and aesthetics intra-orally, can one make a detailed diagnosis and plan of the patient's complete denture situation. Importantly, one should also make a realistic prognosis of the situation and tell the patient (perhaps repeated at each denture fabrication stage) ... and record it in the patient's record notes.

10 If in doubt - refer

A second opinion or 'fresh pair of eyes' can often be useful

A dental professional may want to be caring and compassionate in their desire to help elderly patients with their dental treatment requirements - but for the more challenging cases, it might be a good idea to have a second opinion to confirm one's treatment planning thoughts. That is not to say that every patient of extended years should be referred, but certainly, if a dental clinician has significant doubts as to the way in which to manage the more 'tricky' case, then a 'fresh pair of eyes' on the matter can often be valuable.

bdjteam2016172

Learning to be *kind* to yourself



Those who are dedicated to learning and developing themselves may be fatally flawed, says **Joanne Brindley**.¹

Reflective practice

For today's General Dental Council (GDC) registrants there is unarguably a requirement for us to demonstrate our commitment to lifelong learning. Without a doubt this is excellent for us, not just as a profession, but ultimately in the best interest of our patients.

I work with a diverse range of dental professionals who, without exception, are dedicated to learning and developing themselves in order to become the best they can be. I am grateful to call these people my colleagues and I am in complete awe of their dedication to continually reviewing and reflecting on their progress. I have no doubt that on reading this you also share a working environment with similar groups of professional colleagues. The downside of all of their continued professional development planning is the fact that they have become almost fatally flawed. Not because they aren't doing all that they should and can do to develop themselves, and not because they don't take the time to reflect on their personal practice. The flaw is that whilst they are compassionate and kind to others it is

beginning to become apparent that, somewhere along the way, they have forgotten to be kind to themselves.

Insight and compassion

On an almost daily basis I hear discussions that demonstrate genuine concern and worries about whether colleagues have 'done the right thing'. It is human nature to see the world from the inside out¹ and it is this egocentric cognitive bias that lends us, in its most raw form, to see the world from our own perspective. Nonetheless over the past ten years I have seen the steady development of insight and compassion that is driven by the need to see the world from another perspective. This can only be a positive thing, following the findings of the Mid-Staffordshire Enquiry led by Robert Francis.² The move towards the use of reflective practice as a requirement to demonstrate reflection throughout a professional's practising career has been integrated into the undergraduate dental curriculum and identified by the GDC for all

registrants, as included in the document *Continuing professional development for dental professionals*.³ The GDC recommends that time

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is made 'to reflect individually or with others on what you have learned following each CPD activity',³ a process which will no doubt become more formalised in the future, with the advent of 'enhanced CPD' on the horizon in 2017.

Barriers to effective practice

Whilst the many perceived virtues of using reflective practice are extolled by our statutory regulatory authority, I have become increasingly aware of the barriers to effective reflective practice. As a DCP I have just completed my doctoral research on the use of reflective practice in educational activities and whilst I am a complete convert to incorporating reflective practices into my professional life, I have also gained insight and understanding of the factors that can potentially hinder reflective processes. What stands out for me most is the way that we criticise ourselves when things are not what we consider to be perfect. Life, by its very nature and form, is messy and complicated.

Yet we seem to
take

you internally berate yourself for not doing something right, in a way that you would never dream of speaking to someone you know and care for? Sometimes we need to take a step back and remember to be warm and understanding to ourselves when things have gone wrong. Take the time to speak to ourselves with the same way we would choose to speak with others. By managing life's little upsets in this way, we are not letting ourselves off, just recognising that everyone makes mistakes; we just need to deal with ourselves in a kinder way. This doesn't mean that we won't reflect or improve; it is just a more mindful and less stressful way of improving ourselves and the habits that we have established.

Habits, by nature, are reflexive and accessible;⁵ we call upon our skills in a dental environment utilising them routinely in a seamless way. This however, does not mean that our habits are not adaptable, should we

confidentiality there is a whole raft of ways to develop professional support networks in which we can support one another. Ultimately, we should make time to remember that the underpinning benefit of reflective practice is the opportunity to recapture experiences in order to become more self-aware of one's own personal practice - not to berate ourselves, becoming embroiled in a cycle of self-pity and loathing - but to enter into a process which is the pivotal element at the heart of a life-long learning journey. We should use reflective practice to provide affirmation, improvement and development for future professional practice.

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'WHAT STANDS OUT FOR ME MOST IS THE WAY THAT

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so choose. What we need to establish is a culture of deliberating and reviewing our own role in what has gone wrong, then take the time to reflect and consider if changing the way we do something would be of greater benefit to ourselves and our patients, giving consideration to what skills we need to develop (would a course help us to learn and cement this new skill or activity?) and then ... congratulate ourselves on taking the time to identify the 'problem' and finding a way to solve it.

Removing the stress

Using our professional colleagues to develop our reflective practices can be an extremely useful way of taking the stress of isolation out of the situation. By sharing our worries and concerns with our professional support network, we allow ourselves to develop, not just professionally but also emotionally. As the old saying goes: a problem shared is a problem halved.

Face to face discussion is no longer a prerequisite for sharing our reflections. Providing we respect anonymity and

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Joanne Brindley also wrote *The benefits of mentorship for the dental team.* This was published in *BDJ Team* in May 2016. Visit <http://www.nature.com/articles/bdjteam201685>

bdjteam2016173

great
delight
in berating
ourselves when
things don't turn
out the way we expect
them too.

Take a step back

It is at this point that I feel that practitioners should take the time to show themselves some self-compassion. Self-compassion⁴ has been described as acting towards yourself in the way that you do towards others when they have got something wrong. For example, how often do

BDJ Team CPD

CPD questions: November 2016



Evaluating denture cleanliness of patients in a regional dental hospital



- Which of the following is **correct**?
 - A) a plaque disclosing liquid was applied to the fitting surface of the metal-based dentures
 - B) DCI 4 refers to calculus on the occlusal surface of the denture
 - C) patients were issued with a liquid plaque disclosing dye
 - D) a plaque disclosing liquid was applied to the occlusal surface of the acrylic dentures
- After tailored denture hygiene instructions were provided, patients were reviewed after:
 - A) two weeks
 - B) one month
 - C) three months
 - D) six months
- Which of the following is **correct**?
 - A) dental and denture plaque have identical compositions
 - B) nocturnal denture wearing can benefit a patient's quality of sleep
 - C) nocturnal denture wear is not associated with a decrease in oral health
 - D) dental plaque can contain Methicillin-resistant *Staphylococcus aureus*
- Which of the following is **incorrect**?
 - A) the baseline DCI score of 2 was 10%
 - B) the review DCI score of 1 was 18.8%
 - C) the baseline DCI score of 4 was 50%
 - D) the review DCI score of 3 was 6.2%

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