routine restorative treatment, including aggressive preventive treatment, is not a problem in such cases. However, some busy dentists, based on the scanning of the patient's completed medical questionnaire, may not realize that there is a real potential problem with *oral surgical procedures involving bone* and by doing, for example, an apparently routine surgical extraction, unintentionally cause MRONJ in that patient.

There is a joint Restorative/Oral Surgery Bisphosphonates Clinic at King's College Hospital, London. This clinic is staffed by a joint team with specialist restorative and oral surgery knowledge and skills in managing this patient group. This clinic screens patients who are at more serious risk of osteonecrosis of the jaw from IV bisphosphonate infusions, which are often combined with other drugs, or when alternative drugs to bisphosphonates are likely to be involved, such as RANKL inhibitors Prolia® (denosumab).

The aims of this clinic include giving individual patients neutral balanced information about their potential oral disease problems and to help them to get such problems treated early, thereby avoiding later complications, as well as working out more effective customized preventive strategies for these unfortunate patients. The essential point is that 'risk is individual' and is dependant on many relevant factors. A dogmatic, rather sweeping statement that there is *'no cause for alarm'* is worrying because such a headline is likely to be read as being 'gospel', rather than merely being one opinion. That is particularly the case when it appears in a peer reviewed journal but comes from authors whose interests are clearly more in research about osteoporosis, together with some oral surgeons at King's College Hospital who are not involved in that particular clinic.

Some points and emphasis in that article do **not** represent the rather more cautious and considered views of that King's College Hospital 'Bisphosphonate Clinic'. For many years there has been a dedicated osteonecrosis of the jaw clinic (ONJ) at Guy's Hospital. Neither of these clinics was put in place because there is not a problem of osteonecrosis of the jaw.

Rather simplistically oral surgery is the only thing that is mentioned in that article but there are other things, like decisions on periodontal surgery, or endodontic apical surgery, or prosthodontic planning which can be influenced by the presence, or absence, of a history of intravenous bisphosphonates or other potent anti-resorptive drugs. Individual assessment of patients' specific risks prior to them starting intravenous bisphosphonates should be encouraged rather than being casually dismissed by people with an understandable vested interest in osteoporosis, but who have, perhaps, rather less experience in the complicated dental risk planning aspects of these unfortunate cancer patients.

Interestingly, the article does not elaborate on the dilemma of patients taking very low risk oral alendronic acid, who are considering medical advice to move on to the somewhat higher risks of intravenous zoledronic acid. Curiously, their Table 1 refers to the reduction of over 50% of the spine fractures and about 50% of a hip fracture being achieved with oral alendronic acid with virtually no risk of MRONJ. Superficially, that would appear to be an attractive proposition relative to patients going on to intravenous zoledronic acid, with a reduction in hip fracture of only 41%. The authors do not comment on this apparent anomaly, ie why would patients want to take a greater risk of osteonecrosis of the jaw with an intravenous injection when they could get somewhat better results with less risk from taking oral alendronic acid? One suspects that patient compliance, or perhaps more cynically, the quiet influences of some drug companies' profits are just two of the possible explanations.

General dentists, to whom the article was addressed, might well ask the question 'Whose responsibility is it for MRONJ occurring in patients on intravenous bisphosphonates or in those patients who have had multiple years of oral bisphosphonate as well as steroids, who get osteonecrosis of the jaw after oral surgical procedures? Is it the treating dentist? Is it the prescribing doctor who did not give the patient appropriate warnings or a warning card, or a written note, to show to any future dentists? Is it the haemato-oncologist who, understandably, is probably more concerned with keeping the patient alive than about possible future MRONJ? Is it the rheumatologist, possibly influenced by a drug company anxious to promote its more profitable drugs? Is it the prescribing geriatrician possibly worried about the general frailty and memory of his/her patient? Who do MRONJ patients sue if they were to feel that they were given only some of the facts by a mono-focused specialist clinician, or one possibly influenced by pressures on their particular service, or by convenience issues, or subconsciously by some drug company presentation, when they now have a medicine-related osteonecrosis of the jaw problem that *might have been avoided?'*.

Interestingly, the article, perhaps inadvertently, could be now used as a defence by some dental practitioner by citing just this peer reviewed headline title of '***Bisphosphonate Therapy in Osteoporosis and Cancer - No Cause for Alarm in Dentistry'***. However, some of the views in the paper are in conflict with the advice cited in one of its own references,[1] as well as being at odds with other warnings about the increased likelihood of MRONJ problems developing with different emerging new cancer drugs. Sadly, it largely ignored advising the more careful and caring dentists about what they might be able to do to prevent future problems in these particularly unfortunate patients.[2]

A more balanced view of the real and imagined risks in this rapidly changing field could have been more helpful to the dental profession at large and such an article is now in preparation for *Dental Update*.

References

1. Ruggiero Sl, Dodson TB, Fantasia J *et al*. American Association of Oral and Maxillo-facial surgeons position paper on medication-related osteonecrosis of the jaw. *J Oral Maxillofac Surg* 2014; **72**: 1938–1956: doi: 10.1016/j.joms.2014.04.031. Epub 2014 May 5.
2. Patel V, Kelleher M, Sproat C, Kwok J, McGurk M. New cancer therapies and jaw necrosis. *Br Dent J* 2015; **219**: 203–207.

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Mark McGurk
London

Authors' response

We are writing in response to the letter from Martin Kelleher and Mark McGurk, received 20 June 2016 in response to our article.

On reflection, the title to the paper should not have included the

comment 'no cause for alarm in dentistry'.

The purpose of the paper was to explain to the dental team the main indications for prescription of anti-resorptive bone therapies and understand the potential risk to the patient of not taking medication prescribed. We chose this subject to educate dentists following reports from the Helpline Manager/Senior Osteoporosis Nurse for the National Osteoporosis Society[1] that many dentists are advising their patients to avoid anti-resorptive medication, causing stress and confusion to patients.

Whilst there are many articles, position papers and guidance notes available on the dental treatment of patients prescribed anti-resorptive medications, further analysis of that topic was not the purpose of our article.

Nowhere in the paper was it suggested that there is 'no problem with MRONJ', nor was it implied that MRONJ was not a potentially serious and problematic condition. Oral surgery was listed as one of several important risk factors; a detailed list of risk factors was not the remit of the paper.

We agree that the medicolegal issues are indeed complex and were not intended to be covered by this paper. The question as to 'Whose responsibility is it for MRONJ occurring in patients on intravenous bisphosphonates or in those patients who have had multiple years of oral bisphosphonate as well as steroids, who get osteonecrosis of the jaw after oral surgical procedure?' is important and we would suggest should be covered in a separate article.

Mr Kelleher and Professor McGurk raise important points with regard to the need for dental assessment and necessary preventive treatment, prior to starting and/or changes to anti-resorptive medication. We agree that this is particularly important for cancer patients who will face significantly higher doses of intravenous bisphosphonates and RANK-L inhibitors.

We trust that our article, together with their response, will allow dental teams to understand the treatment of patients prescribed anti-resorptive medications better and welcome further articles addressing these many issues which were not intended to be covered by our paper.

References

1. Presentation 'THE OSTEOPOROSIS PATIENT'S PERSPECTIVE' by Sarah Leyland, Helpline Manager/Senior Osteoporosis Nurse National Osteoporosis Society at the MRONJ master class held at RCS Eng, 23 October 2013 (Joint meeting Faculty Dental Surgery RCS England and British Association Oral Surgeons).

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EDTA – Factual disputes

Sir, I read with great interest the article entitled 'Modern Endodontic Principles Part 4: Irrigation' by Darcey J *et al*, which has been published in your esteemed journal (*Dent Update* 2016; **43**: 20–33). It was a good review article on the basic irrigating agents and devices used in endodontics. I want to share a few of my thoughts regarding this article. The use of ethylenediaminetetraacetic acid (EDTA) mentioned in that article as a root canal irrigant needs to be reconsidered. Even though EDTA is the most frequently used chelator in endodontics, it does not remove the smear layer effectively, especially in the apical third of the root canal system which is the vital area for disinfection.[1,2] In this regard, I would like to mention a novel chelating agent 'maleic acid', which has been studied extensively in endodontic literature. Maleic acid (7%) has been shown to remove the smear layer effectively when compared to 17% EDTA and various other chelators, especially in the apical third of the root canal system.[1,2,3] It is also less cytotoxic when compared to 17% EDTA[4] and has good antimicrobial properties when combined with auxiliary chemicals.[5] It has been shown to improve the bond strength of resin sealers when compared to 17% EDTA.[6,7,8] It has also been shown to produce increased surface roughness of the root canal walls when compared to EDTA, which might help in effective bonding of the resin-based materials to root canal dentine.[9] Hence, considering these drawbacks of EDTA, a clinician should rethink its use as a chelator in endodontic therapy.

References

1. Ballal NV, Kandian S, Mala K, Bhat KS, Acharya S. Comparison of the efficacy of maleic acid and ethylenediaminetetraacetic acid in smear layer removal from instrumented human root canal: a scanning electron microscopic study. *J Endod* 2009; **35**: 1573–1576.
2. Ulusoy I, Gorgul G. Effects of different irrigation solutions on root dentine microhardness, smear layer removal and erosion. *Aust Endod J* 2013; **39**: 66–72.
3. Kuruvilla A, Jaganath BM, Krishnegowda SC, Ramachandra PK, Johns DA, Abraham A. A comparative evaluation of smear layer removal by using EDTA, etidronic acid, and maleic acid as root canal irrigants: an *in vitro* scanning electron microscopic study. *J Cons Dent* 2015; **18**: 247–251.
4. Ballal NV, Kundabala M, Bhat S, Rao N, Rao BS. A comparative *in vitro* evaluation of cytotoxic effects of EDTA and maleic acid: root canal irrigants. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2009; **108**: 633–638.
5. Ferrer-Luque CM, Conde-Ortiz A, Arias-Moliz MT, Valderrama MJ, Baca P. Residual activity of chelating agents and their combinations with cetrimide on root canals infected with *Enterococcus faecalis*. *J Endod* 2012; **38**: 826–828.
6. Shivanna V. The effect of different irrigating solutions on the push out bond strength of endodontic sealer to dentin and assessing the fracture modes: an *in-vitro* study. *J Int Clin Dent Res Org* 2014; **6**: 86–91.
7. Ballal NV, Tweeny A, Baumgartner JC, Ginjupalli K, Saraswathi V. Effect of maleic acid and ethylenediaminetetraacetic acid on the shear bond strength of RealSeal SE sealer to root canal dentin. *Eur J Pros Res Dent* 2013; **21**: 52–156.
8. Neelakantan P, Subbarao C, Subbarao CV, De-Deus G, Zehnder M. The impact of root dentine conditioning on sealing ability and push-out bond strength of an epoxy resin root canal sealer. *Int Endod J* 2011; **44**: 491–498.
9. Ballal NV, Mala K, Bhat KS. Evaluation of the effect of maleic acid and ethylenediaminetetraacetic acid on the microhardness and surface roughness