COMMENT

Letters to the editor

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Top tips

Unscientific statements

Sir, I read with interest the recent 'Top tips for managing implant complications in primary care' article (*Br Dent J* 2023; **235:** 299–301). This is an important topic which is why it was disappointing to find so many statements that are unscientific, not evidence-based or inaccurate. I have highlighted the most important below:

1. Alveolar ridge preservation (ARP) does not promote retention of alveolar bone or influence the bone remodelling process. Post-extraction remodelling is a natural process driven by haemostasis, inflammation, migration/proliferation of osteocompetent cells and remodelling. It is not promoted/influenced by ARP (or implant placement). What ARP provides, compared to natural healing alone, is a purely physical dimension advantage. The latest Cochrane systematic review identified the mean dimensional advantage as 1.18 mm horizontally and 1.35 mm vertically. Histomorphometry showed that most grafted sites demonstrated less new bone formation than non-grafted sites and many sites had high levels of residual graft and granulation tissue present[1]
2. There is no evidence to support the concept of occlusal overload increasing the potential for marginal bone loss.[2] Various systematic reviews have failed to identify occlusal overload as a cause of marginal bone loss in subjects that maintain good oral hygiene[2,3,4]
3. Chronic sinusitis due to perforation of the Schneiderian membrane during implant placement is extremely rare. There are only a handful of case reports/case series from the global population of implantology. Most of these case reports, of chronic sinusitis are associated with implants where sinus lift procedures have been undertaken in combination with implant placement rather than implant placement alone
4. The 2017 World Workshop on the classification of periodontal and peri-implant diseases characterised peri-implantitis as inflammation in the peri-implant mucosa and progressive loss of the supportive bone.[5] Clinically, this means BOP and any further bone loss after remodelling following abutment/restoration connection. This is why a baseline radiograph, after abutment connection, is so important. It is only on subsequent follow-up (if no baseline radiograph is available) that the diagnostic criteria become a combination of bleeding and/or suppuration on gentle probing, probing depths ≥6 mm and bone loss ≥3 mm apical to the most coronal portion of the intra-osseous part of the implant[5]
5. The authors describe treatment of peri-implantitis as 'nonsurgical therapy', with surgical treatment described as 'pocket elimination, bone recontouring, implantoplasty and regenerative techniques'. Studies have shown that nonsurgical management of peri-implantitis is ineffective in the long-term.[6] The purpose of a surgical approach in the management of peri-implantitis is to provide access to the implant to facilitate surface decontamination.[7] There is low-level evidence to support surgical debridement over nonsurgical management.[7] Systematic reviews have failed to show any benefit of chemical or physical adjunctive therapy (air-abrasion, laser or photodynamic therapy) or reconstruction of peri-implantitis defects over mechanical debridement alone.[7,8,9]

R. Adams, Cardiff, UK

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See the response to this letter at https://doi.org/10.1038/s41415-023-6618-7.

https://doi.org/10.1038/s41415-023-6609-8

Missing the point

Editor-in-Chief's note: We asked the authors if they wished to respond to R. Adam's letter, 'Unscientific statements'. They do so below, pointing out that the context of their article was not a compendium of the evidence, but now including comprehensive references to back their case, which we publish in full in this particular circumstance.

Sir, thank you for the opportunity to respond to the feedback from R. Adams. Unfortunately, R. Adams has completely missed the point of this series of very

short articles which are experiential tips, rather than a compendium of the evidence. The authors are fully cognisant of basing opinion on evidence and interestingly R. Adams uses one of the author's systematic reviews in his own self-citation, highlighting the importance of utilising quality evidence in clinical decision making.[1]

It is stated that ARP has been developed to promote retention of the bone and soft tissue topographical contour, not preservation of the original bone.

ARP includes a range of different techniques, including different surgical approaches, guided bone regeneration (GBR) and socket seal (SS) techniques with various membrane or bone grafting materials. Histologically, socket healing is influenced by the procedural risks and the healing times of examination.[2,3,4,5,6,7] Both GBR and SS encourage the induction of new bone formation[8] promoting the availability and cellular activity of osteogenic cells,[9,10] with different ARP materials having a unique effect on healing.[11,12,13,14,15]

There are limitations in the evidence base, regarding the direct causality of occlusal overload and implant marginal bone loss, but researchers acknowledge an association.[16,17,18,19,20,21] The articles raising an objection to this statement do not present a conflicting view. The review by Naert *et al.*[22] was inconclusive, with Afrashtefar[23] and Bertolini[24] only reporting on animal studies and Afrashtefar indicating bias and heterogeneity. The EFP World Workshop[25] summarises that the effects of occlusal overloading on stable implants are limited and conflicting.

Whilst intrusion of dental implants into the sinus cavity during maxillary implant placement is common, researchers agree that the survival rate of these implants is high (95.6%). Clinical and radiological complications are reported at 3.4% and 14.8%, respectively.[26] To compensate for the lack of maxillary bone height, several bone augmentation or sinus lift techniques have been proposed. Membrane perforations represent the most common complication among these procedures,[27,28,29] with sinus infection a known risk outcome. The authors were highlighting this as something general dentists should have some awareness of as a cautionary measure.

Peri-implantitis is a plaque-associated disease characterised by inflammation in the peri-implant mucosa and progressive loss of supporting bone, following initial implant healing.

The definition of peri-implant disease is taken directly from the EFP peri-implantitis classification[25,30] and case example. The statement agrees with the definition outlined by the respondent.

The EFP S3 clinical treatment priorities for peri-implantitis patients[31] indicate: 'peri-implantitis therapy starts with a non-surgical step, followed by re-evaluation and, depending on the outcomes, progress to the surgical step or to SPIC'.

Successful treatment of the site requires concurrent plaque control and biofilm disruption, with the BSP and EFP suggesting that both non-surgical and surgical techniques can be beneficial.[32]

The EFP S3 treatment guidelines outline that surgical pocket elimination, bone recontouring, implantoplasty and regenerative techniques are recommended.[33,34,35,36]

Evidence suggests the effectiveness of the regenerative treatment approaches is influenced by the configuration of the defect, implant surface characteristics, as well as surface decontamination.[33,34]

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https://doi.org/10.1038/s41415-023-6618-7

Referral pathways

Dental screening: pre-cardiac surgery

Sir, we were interested to read the letter by Lin, describing the development of a pre-cardiac surgery screening *pro forma* by our colleagues in Oral and Maxillofacial Surgery, Plymouth, for dental assessment.[1] This had been devised following on from a similar pilot *pro forma* outlined in the paper by G. Allen and A. Brooke,[2] arguably bringing a more consistent screening for dental pathology prior to invasive cardiac procedures, specifically those at risk of infective endocarditis (IE).

We have also developed a patient referral pathway as we noted in our recent paper.[3] The literature remains poorly defined as to the exact benefit of dental intervention prior to cardiac valve surgery,[4] with some suggesting that a higher incidence of IE was noted in those patients receiving dental treatment pre-surgery compared with those who did not.[5]

In our recent paper, we debated the value of one-off, time-limited 'treatment bursts' for these patients, in the absence of addressing chronic, long-term dental disease.

What we think can be agreed is that these patients deserve tailored, preventative advice as part of their cardiac surgery preparation and a period of follow-up after dental treatment,[2,4] as chronic lesions cannot be considered fully resolved.[4]

Who provides this treatment, when and in what environment is open for debate, but we should strive for it to be timely, safe, effective and efficient in its delivery.

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https://doi.org/10.1038/s41415-023-6619-6

Artificial intelligence

Cloud intelligence in diagnosis?

Sir, we have recently read the insightful paper by Dolan *et al.*, which discusses clinical decision-making for individuals with hypodontia, specifically those with peg and missing lateral incisor teeth.[1] Patients with hypodontia often experience the absence or abnormal peg-shape of lateral incisor teeth, affecting both their appearance and overall dental health. Achieving a successful treatment outcome can be challenging. Collaborating with various specialists, including orthodontists and restorative dentists, is essential to create customised treatment plans that address long-term care and resource considerations. Healthcare organisations are progressively adopting AI to streamline time-consuming, repetitive tasks.

Beta versions of AI software are demonstrating growing potential in handling these tasks and are moving towards increased efficiency. Furthermore, AI has shown significant progress in diagnostics, becoming a valuable asset in the dental field. Some cloud-based AI software solutions like Dental Monitoring[2] (https://dentalmonitoring.com/) and Diagnocat[3] (www.diagnocat.com) can significantly enhance the management of hypodontia and related dental conditions. To learn more, readers can visit https://dentalmonitoring.com/contactus/ and https://diagnocat.com/ for a demonstration of the software's capabilities. Diagnocat's pioneering technology is built upon a deep learning approach that transforms 3D Dicom files into segmented STL files, thus revolutionising digital dentistry. This automated process extracts image features, substantially improving treatment outcomes by seamlessly integrating with images. Diagnocat offers clinical support by identifying anatomical areas, common findings, and the treatment history for each tooth, allowing it to detect over 65 different conditions. Furthermore, it generates AI reports for quality control and immediate patient presentations, accessible anytime from any device.

The deep learning algorithms employed by cloud-based AI software streamlines and enhances the treatment planning process, ensuring that patients receive the most effective and personalised care possible. Beyond diagnostics and treatment, deep learning is advancing dental education and research by extracting valuable insights from vast amounts of data, promoting evidence-based practices and standardisation of care. Moreover, improving dental appearance is a significant motivator but it demands a complex treatment process for stable outcomes. A collaborative effort by a multidisciplinary team, working closely with the patient, takes into account individual, overall health, and clinical aspects to determine the optimal course of action.

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