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Trevor Burke

Treating tooth wear in primary dental care

If general dental practitioner readers can remember back to the halcyon (even if we did not think that it was thus at the time!) pre-pandemic times, they will be aware that the incidence of tooth wear (TW) in their patients was increasing, the volume of the problem being confirmed by a 2018 review in which indicated a global prevalence of 20–45%, and erosion in permanent teeth in the UK being between 12% and 100% depending upon which study was cited.¹ It may therefore be considered essential that practitioners are equipped with the knowledge and expertise to treat patients whose dentitions are so affected. Why? Because, in the main, secondary care services were already working at full capacity before the pandemic, and the situation has not, to date, improved because of reduced capacity as a result of aerosol-generating procedures (AGPs) and the need to treat a backlog of emergency dental care, plus other factors, such as staff redeployment since services recommenced. Secondly, another reason – referral of a patient to another clinic might mean that the patient does not return to the practitioner's care.

So, what is the current situation? Several recent papers help provide an answer. In one,² a postal questionnaire, designed to help understand how general dentists managed complex TW cases, was sent to all general dentists with a Leeds post code ($n=289$). A reply was received by 51%, and, when asked to respond to the scenario of how to treat a 45-year-old patient who requested treatment for his worn-down teeth, the most commonly selected answer (40% of respondents) was re-organization using direct composite, indicating that these dentists were aligned to contemporary teaching, with 4% indicating that they would treat the example case using crowns (not contemporary teaching!). However, few (21%) reported that they were prepared to treat the patient under the current NHS Contract (which, for non-England based readers, means that the clinician is paid the same for one composite restoration as for multiple restorations), while 66% reported that they would be prepared to treat if the patient was willing to pay privately. Twenty per cent of respondents stated that they would refer the patient to the hospital service and 6% would refer privately. Reported confidence in treating the case was 4.65 out of 10. Of particular relevance, perhaps, to those with less than optimal confidence is that 62% of respondents had difficulty with their referral to secondary care. Nevertheless, it was reassuring to note that only a small proportion of the responding dentists opted to take a subtractionist approach.

Other recent work³ has examined if and how general dentists monitor TW. The sample was small ($n=20$), but found that the most commonly used method to assess TW progression was by study models and photographs. The Basic Erosive Wear Examination (BEWE) was used by 10%, and 15% did not use any method to measure changes, perhaps something that might not, today, stand up to a legal challenge. What was interesting about this study was how readily the participants were able to monitor TW on photographs, 'doctored' study models and on BEWE scores where the results suggested a large margin of error. In this regard, study models are expensive and require storage space, which is why orthodontists now scan their patients and store their 'models' digitally. Perhaps it is time to let the computer take over in more ways, by taking a digital impression and allowing specially designed software to highlight changes in the dentition, by way of a colour-coded dental version of a contour map. I first saw this in Minnesota

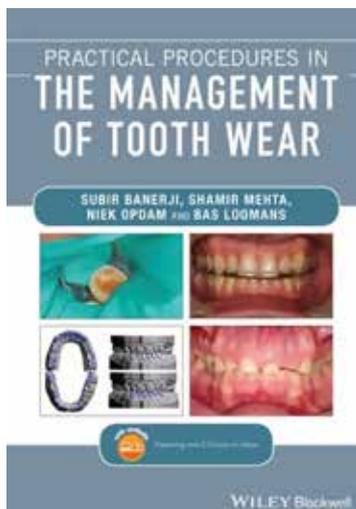


Figure 1.

over 20 years ago:⁴ even then, I thought that this was the way forward. In that regard, a recent study from Denmark⁵ has confirmed the promise of an intra-oral scanner in detecting and monitoring tooth wear, with a further study⁶ from London and Nijmegen confirming the value of monitoring scans of specific tooth surfaces.

Results have been presented by Mehta and colleagues.⁷ They conducted a questionnaire-based project in order to investigate the habits (in respect of their risk assessment and use of TW

indices) of a convenience sample of dentists, the majority of whom were studying for a postgraduate qualification. They achieved a 66% response from 461 questionnaires, with the results indicating that a high proportion of respondents (59%) stated that they undertook a risk assessment for new patients with severe TW, with no difference between dentists of differing levels of experience or post-graduate qualification. Surprisingly, 14% reported using a clinical index for grading TW, perhaps surprising, given the difficulties experienced by the present author when using this! A higher proportion of those were specialists or dentists with higher qualification(s), but only 5% reported using BEWE, also surprising, perhaps? The authors concluded that the 'raising of the profile of a simple TW index with higher clinical utility (such as BEWE) may also help protect the dental profession from future litigation.'

So, what have we learned from this? It like seems a good idea to record TW. It also seems a good idea to learn to treat it, for those who have not already started, because referral elsewhere may be fraught with difficulty and patients like to continue to see a clinician who they have got to know and trust. How does one go about this? First, as has recently been pointed out by Kelleher and Blum,⁸ thought should be given to minimizing further tooth destruction (in dentitions already damaged by TW), preserving the remaining sound tooth structure using additive techniques with minimal or no tooth preparation. There is excellent evidence, over almost 20 years, that the so-called 'Dahl technique' (which is what Kelleher and Blum were writing about) works, with examples having been published from many different UK centres⁹⁻¹³ and in the Netherlands,¹⁴ the latter being particularly appropriate for those who wish to view how extreme cases may be treated. There are also two systematic reviews backing this up.^{15,16}

The *Dental Update* website is replete with well over a dozen papers describing how to do it (just type 'tooth wear' on the website's search engine), but, unfortunately hands-on courses on the technique, which would provide experience in addition to reading about it, have dried up due to the current situation. For those who wish to go into the subject in depth, there is a superb book by Subir Banerji (*Dental Update* Editorial Board member) and colleagues (Figure 1) for you to read and refer to.



Figure 2. (a) Pre-op labial view of 28-year-old male with high consumption of carbonated beverages who was complaining of anterior tooth sensitivity. (b) Palatal view of patient in (a). (c) Composite additions placed on the palatal surfaces of patients upper anterior teeth: view after 1 week when occlusal adjustments and restoration polishing was carried out.

However, as with all dental treatment, managing the patient's expectation is central to success. For TW being treated with additive composite at an increased occlusal vertical dimension, the patient's dentition and associated structures will feel different, very different, after placement of the restorations. My 2014 publication¹⁷ describes this and presents a patient information leaflet (PIL) to advise and consent patients who are about to undertake treatment. It is also available on my web site (www.fjtburke.com) as a Word document for those who might like to customize it with their own practice logo (that is, if you agree with what it states!)

Having prepared the patient with regard to what to expect from treatment (a composite 'bandage' to cover your worn and wearing tooth surfaces is a useful line that I have used on many occasions), and consented him/her by confirming that they have read the PIL, choosing the correct choice of material, in particular the bonding agent that will hold the composite restorations in place, is important. Most clinicians will have a favourite resin composite material, but, when it comes to the bonding agent, the recently developed universal bonding agents containing the resin 10-MDP hold great promise, in my view, and there



Figure 3. (a) 30 year-old patient complaining of chipped incisal edges of maxillary central incisor teeth: view shows erosion on labial surfaces of the central incisor teeth and chipped incisal edges. (b) Palatal view showing erosion on maxillary palatal surface of the central incisor teeth, with the lateral incisors mildly affected. (c) Composite additions to palatal surface of maxillary incisor teeth. (d) Incisal edges restored. (e) Posterior teeth mildly dyscluded on left side following placement of composite restorations (right side similar – not shown).



Figure 4. Description of a novel treatment of tooth wear.

is recent evidence to confirm their effectiveness, especially when used in conjunction with selective enamel etching.¹⁸ Next is the choice of case. All readers and clinicians will know that it makes sense to start a new treatment modality with a relatively straightforward case. Figure 2 presents such a case – my first ‘Dahl’ TW case in 1998, in which there was no aesthetic component, merely the need to cover the worn and wearing palatal surfaces of the patient’s maxillary incisor teeth. Would

I do anything different today? No, other than perhaps also spreading the loading over the two first premolar teeth, even though they did not present with TW.

Figure 3 presents another ‘starter’ case, which involved a couple of class IV composite restorations and coverage of palatal surfaces. Again, the only thing that I would do differently today is to also cover an additional two occluding surfaces, in this case, the palatal surfaces of the upper canine teeth with composite.

To summarize, therefore: TW is an increasing problem and it makes sense to treat affected patients in primary dental care. The additive techniques that are now the ‘gold standard’ are appropriate to treatment of mild and moderate cases, and, with experience, to patients with more severe wear. Patients will, of course, have received a full examination and diagnosis as with any treatment, and will be advised with regard to how strange their dentition will feel after treatment. This Comment is not intended to provide a full exposition of all the nuances of TW treatment, but is intended to stimulate readers to add additive treatment of TW to their armamentarium. Patient appreciation of treatment is rated as high in the studies that have assessed it,^{9-11,15} so adding this could be considered a practice builder.

A question for which I don’t have an answer, when I have presented hands-on TW courses, is how to make treatment of TW financially viable



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in England and Wales under the UDA system. Therefore, there needs to be a debate with the funders of treatment on how to encourage NHS practitioners to undertake resin composite bonding additive techniques in their practices, because it may be considered certain that treating patients in primary dental care practices will be more cost effective than referral and treatment in secondary care. There would need to be a fee for diagnosis and planning (including study casts where necessary) plus a fee for treating each affected tooth and the necessary follow up. When enamel is lost and dentine exposed in TW cases, the progression of wear increases unless preventive action is undertaken, so, hopefully, the debate will start soon, before too much more enamel and dentine is lost to tooth wear.

Finally, readers may be interested to note that the first UK publication on this subject was in *Dental Update*, in 1997 (Figure 4).¹⁹ One of the co-authors, Ken Hemmings, is a *Dental Update* Editorial Board member.

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