Tooth wear: Eroding trust in carbonated drinks

In the last of a five-part series, **PROFESSOR ANDREW EDER** describes the effects of carbonated drinks on the dentition and offers guidance on preventive advice...

QUESTION: A 32-year-old male patient of mine has a history of frequently consuming carbonated drinks, such as Coca-Cola. More recently, he switched to diet versions, thinking they would not cause damage to his teeth.

I think the patient is suffering from erosion, attrition and abrasion.

Could you please describe the main indicators of such tooth wear for me and provide advice about the kind of treatment that may be relevant in this case? In addition, what drinks could I recommend to prevent further damage, as the patient dislikes plain water?

Answer: There seems no doubt to me that public awareness of the erosive potential of diet drinks needs to be raised. Although most people are aware of the risk to their teeth that frequently consuming sugar presents, far fewer realise the detrimental effects of a carbonated liquid. Carbonic, citric and phosphoric acids, which are to be found in carbonated drinks, all have a low pH and therefore the potential to cause dental erosion.

The taste and effervescence that distinguish fizzy from non-sparkling drinks provide a sensation enjoyed by many. In addition, an erroneous belief that sugar-free versions are not harmful can result in greater consumption than would be the case with the sugary versions. This creates a challenge because, of course, it is of some benefit to reduce the frequency of refined carbohydrates (eg. sugar) in one's diet.

Clinical considerations

Erosion causes the teeth to take on a rounded appearance as they lose their surface detail and characteristics. In such circumstances, both amalgam and composite restorations will stand proud of the tooth tissue whilst open "eroded" margins can also appear at the edges of veneers or crowns.

If the patient is clenching or grinding their teeth, the incisal edges and cusps will be flattened. If this attrition is present in isolation, the enamel and dentine will generally wear at a reasonably similar rate. However, in the presence of erosion or abrasion (dietary in particular), cupping of the incisal and occlusal surfaces occurs where the overlaying enamel has already been lost and the defect is not usually in occlusion with the opposing tooth.

Abrasion presents as angular cervical lesions and is caused by over-zealous tooth brushing and/or a very rough diet. However, in the presence of erosion, abrasion of the tooth surface may appear as rather more rounded and shallow cervical lesions. Meanwhile, in the presence of attrition and abrasion, restorations will facet.

Taking action

First of all, it is important to monitor the rate of wear objectively by taking clinical photographs and study casts for future reference.

A diet sheet is a helpful tool to ascertain not only the food and drink being consumed by your patient that are capable of causing tooth wear, but also their intake frequency. This should be completed over three days, including a weekend, and record the time, quantity and type of food or drink consumed – irrespective of how small the amount.

It is important to stress to the patient that this is not intended to catch them out or assign blame, but to help diagnose, offer the most appropriate advice and guide treatment planning.

Having gathered this information, realistic targets can be agreed with the patient and regular supportive visits can be scheduled to ensure the changes are long-term, and to adjust any recommendations as may be necessary.

Preventive advice

There is minimal research, and therefore information available on beverages with a pH higher than that found in carbonated drinks that may be suggested as an alternative.

Tea and coffee are safe from an erosive perspective, as are herbal teas that are not fruit-based. Sugar-free squash has erosive potential, but with a pH higher than fruit juice, may be a practical alternative and far less damaging than Coca Cola (which has a pH of 2.5). Milk is safe at around pH 6.5, but perhaps not suitable for drinking throughout the day.

As an alternative to plain, still water, and only recently launched but already widely available in the UK, is coconut water. It has a pH of around 5.4, is hydrating, entirely natural and isotonic, which means it is similar in composition to that of the fluid in the human body. There are several flavours available but because fruit juice has been added to these, advocating the plain version is advisable.

If the patient can't see their way to eliminating carbonated soft drinks from their diet, limiting them to meal times is greatly beneficial.

The patient may suffer with hypersensitivity due to the wear. In such cases, using a fluoridated mouthrinse every day at a different time to toothbrushing is an effective first line of defence. A desensitising toothpaste and/or prescription fluoride toothpaste can be helpful in alleviating sensitivity, while use of a calcium phosphate paste, applied in carriers, is an additional option if the symptoms are severe. Also, placing protective covering, non-preparation, adhesively-retained restorations can reduce or even eliminate sensitivity and minimise further wear.

Further advice includes:
• Guiding the patient in brushing effectively yet gently with a relatively soft toothbrush and a toothpaste low in abrasivity.
• Not swishing drinks around the mouth and waiting an hour after consuming an acidic drink before brushing to avoid damaging the softened enamel.
• Rinsing the mouth with fluoride mouthwash or water before or after acidic drink consumption to help limit their erosive potential.
• Chewing sugar-free, xylitol- or sorbitol-sweetened gum to help neutralise acids in the mouth. ∎

Reader enquiry: 101

About the author

Professor Andrew Eder is a specialist in restorative dentistry and prosthodontics, and clinical director of the London Tooth Wear Centre, a specialist referral practice in central London.

He is also director of education and CPD at the UCL Eastman Dental Institute.