Evidence-based caries reversal using ozone

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Question: I read the recent ‘Ask the Experts’ article on ozone (J Esthet Restor Dent 2007;19:303–5). Can you provide more information and clarify the question about whether ozone is a useful means of caries treatment?

Answer: Thank you for the opportunity to comment briefly on the recent report published in the journal on research with the HealOzone (KaVo, Biberach, Germany). Ozone cannot do everything and certainly should not be a treatment isolated from our individualised preventive oral health care. To be effective, ozone must be prescribed in sufficient concentration for an adequate time and must be delivered into the lesions.

Antimicrobial effectiveness of ozone

Ozone is one of the most powerful antimicrobial agents we could use in dentistry and clearly, there are enormous advantages to kill pathogens. The recent piece in the Journal of Esthetic and Restorative Dentistry (JERD) correctly mentioned a few of the papers that have proven the antimicrobial effectiveness of ozone but does not discuss the limitations of the biofilm studies.

Less than one log reduction of bacteria was measured after using ozone gas above biofilms in the culture media, which was a similar reduction to that achieved by using 0.2% chlorhexidine or photoactivated disinfection. However, ozone will react immediately with the reductants in the culture media, and the authors did not bubble the ozone into the biofilm. It is recommended that ozone be delivered under pressure into a lesion by pressing the delivery tube onto the carious surface so that it can penetrate the lesion. In vivo lesions (unlike artificial biofilms) contain many molecules (such as iron) that increase the antimicrobial effectiveness of ozone in caries.

Ozone, even at a very low dose and a short time of application, achieved a 57% reduction in biofilm and a 65% reduction in viable bacteria in model dental unit water lines. Also, a high level of biocompatibility of aqueous ozone on human oral epithelial cells, gingival fibroblast cells, and periodontal cells has been found.

Management of root caries

Ozone reverses shallow non-cavitated root caries lesions as part of a full preventive care regimen, which includes reducing the frequency of consumption of fermentable carbohydrates, increased use of fluoride-containing products, and improved oral hygiene.

It was stated incorrectly that the large antimicrobial reduction in root caries after HealOzone treatment was because of the control samples of caries being ‘consistently larger than the posttreatment sample’, which...
Risk over a 3-month period.18 It did not mention the con-
sequent factors that could be swung in the
direction of caries intervention and prevention by the active role of the dentist and his/her auxi-
liary staff and that ozone has a key part to play in this process.

Ozone’s place is for us to use its proven powerful antimicro-
bial efficacy and undoubted potent oxidant ability, to reduce car-
ogenic microorganisms, and provide beneficial effects against organic acids in lesions, in con-
junction with our existing man-
agement strategies for dental caries to tip the ‘caries balance’. 20

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