

Personal Statement, Tooth Decay – HealOzone, Edwina Kidd

Thank you for the opportunity to comment on the use of HealOzone in the management of fissure and root caries. I have been impressed by the marketing of this device by the Kavvo Company, the enthusiastic promotion of the concept by its developer, Professor Edward Lynch and by the multiple publications of his team's research. The concept has been vigorously promoted and sold worldwide.

I have serious misgivings about the approach. I think the concept is biologically questionable, the evidence-base incomplete and the financial implications very worrying.

Dental Caries

Dental caries may develop on any surface in the oral cavity where a microbial biofilm (dental plaque) is allowed to develop and remain for a period of time. The presence of the biofilm does not necessarily result in a caries lesion but it is a necessary factor. Metabolic activity takes place constantly within the biofilm resulting in numerous minute fluctuations in pH. These may cause loss of mineral from the tooth surface where the pH is dropping or a gain of mineral where the pH is increasing. The cumulative result may be a net loss of mineral leading to dissolution of the dental hard tissues and possibly a caries lesion. Thus, at the tooth surface level, caries may be considered as a process that reflects the metabolic activity taking place in the plaque.

The process can be modified extensively. For instance, if the biofilm is regularly removed, partially or totally, the mineral loss may be stopped or reversed towards mineral gain. The fluoride ion reduces the rate of demineralisation and encourages remineralization. This is why the most effective way of controlling dental caries is the twice-daily disturbance of the biofilm (tooth brushing) with a fluoride toothpaste. This approach has been used successfully in the management of both fissure and root caries. Reducing the frequency of sugar intake is also very beneficial but more difficult to achieve on a population basis. A low salivary flow increases caries risk because saliva is a remineralizing fluid, a buffer and is antibacterial. Unfortunately many older people are likely to be taking medications that have the side effect of reducing salivary flow. This older population may have gingival recession and therefore be at risk to root caries.

HealOzone is designed to kill the microbial biofilm (commensal microorganisms). There is no suggestion that the mouth could or should be rendered sterile but what will happen if the plaque over a lesion is destroyed? The plaque will reform, a mature community being re-established in something over two weeks. The bacterial metabolism that caused the original lesion will re-establish and the lesion will progress again, unless the patient has improved their plaque control.

Professional plaque control (the removal of plaque with rotating cups and brushes by a dentist or hygienist) has been used effectively in the management of caries (the Karlstad Programme, developed by Axelsson and Lindhe in 1974). Initial experiments were based on 2 weekly professional plaque removal, but the caries controlling effect was largely retained with intervals up to 3 months between appointments in well motivated individuals. Maybe HealOzone, applied 2 weekly to

3 monthly may also be an effective means of caries control but whether the approach is more effective than professional plaque control is unknown.

The Evidence Base

The Cochrane Oral Health Group published a systematic review on ozone therapy for the treatment of dental caries in July 2004. At that time they concluded that there was no good evidence that ozone application was effective in arresting or reversing the progression of dental caries and no good evidence to support its use in a primary care setting. Since that time one further randomised controlled clinical trial on the effective use of HealOzone in primary root caries has been published by Julian Holmes and is referred to in the draft NICE report.

Financial implications

This worries me greatly. I find the approach of attempting to control caries by patients paying to have the commensal microbial biofilm selectively killed, very dubious. I do not see that NICE can possibly evaluate the financial consequences to the NHS of this approach. An attempt has been made to do this on figures produced by the Kavo Company. However, the paper produced by Julian Holmes in *Independent Dentistry* (April 2003) is an interesting alternative approach advocated by a practitioner who has done practice-based research on the technology.. He works out an Ozone treatment costing comparison, as profit for the dentist per hour, as follows:

Single surface traditional filling £108

Single surface ozone treatment £596

Full mouth ozone treatment £860

I would be very concerned if colleagues were to charge patients such fees for a largely unproven, dentist centred technology, when twice-daily tooth brushing with a fluoride containing toothpaste combined with a sensible, but not draconian diet, can be so effective.