

This is a 'live' on-line discussion that I had last week with a North American Patient as part of an on-line round-table discussion. It is reproduced here as it raises important questions, and I hope my answers put the use of ozone into it's proper context in modern dental practice. The patient questions are in ordinary type, and my responses in bold italics.

Prior to a woman from Canada mentioning it, I had never even heard of healozone. I had taken my son to Boston Children's Hospital for a dental consultation and was basically told that there's no other option besides extraction. My son (he's almost 2) was given topical fluoride and we were given an appointment for extractions. I was not content with this; there is no nerve involvement as of now and I prefer not to just extract his teeth as a precaution. Once Healozone was mentioned, I began to look into it.

>Not every dentist in the USA or Canada has heard about the ozone technologies and its use in dentistry. This also applies to other countries in the world. Sadly it also applies to some dentists in Europe where the HealOzone has been available for the last 5 years, but because not all dentists read the research papers and go to the post-graduate meeting, these dentists still practice 18th Century dental care by unnecessary tissue amputation. Once patients are sucked into this destructive cycle, they can never break out of it.

>In the first years of a young persons life, oral hygiene is part of the key to decay prevention, as is diet and the control of sugars in the form of fermentable carbohydrates, so I do hope that you were given more than lots of encouragement just to get inside his mouth and scrub. He may not like it, but that is all you need to do a use a soft brush, and a small amount of adult tooth paste.

Any info on its use in the US would be appreciated. I've heard there are going to be clinical trials beginning in 2006, but I am concerned that that will be too long a wait. I have a list of dentists from eastern Canada that use Dental Ozone and I will begin contacting them this week.

> it is currently illegal to use Dental Ozone in the USA before the trials are reported and the FDA has approved the product devices. It now looks as if Dental Ozone will not be available in the US until 2007/8. However, there are dental practitioners in the USA who have moved into the 21st Century, and please contact me for their names and addresses. If you are concerned for your sons teeth, then please go to www.the-o-zone.cc and search in the 'Availability' page for practitioners in the USA and Canada. By entering 'Other' or 'USA' or 'Canada' in the search box, a list of those practitioners I

know about will be displayed. The persons I would recommend would be Chris Kammer, Jim Schoenberg and Gene Cervini. All are personal friends who I have trained a number of years ago.

Some of the info I am looking for -

I am not familiar with exactly how the Diagnodent bases the degree of cavitation. I've seen the Diagnodent used, but no dentist has been forthcoming on explaining it.

>The DIAGNodent shines a laser beam into the tooth surface - you cannot feel it. In laser light, bacterial products and areas of mineral loss that are associated with the first stage of decay reflect the light differently to areas that are sound. This difference is picked up by the diagnodent, and compared it its internal data base. The values and sounds it makes are well researched, and Professor Adrian Lussi from Bern University, Switzerland, has done a great deal of work on this topic.

>The instrument is exceptionally sensitive, and can detect early mineral loss long before it can be seen on x-ray, and before it can be visually seen. That is why in our new book, we state that dentists who still use the mirror and probe can only find their, or some one else's, failures, and it is impossible to diagnose with this old systems. There is no upper limit to what you can find with the Diagnodent, or treat with Dental Ozone!

How "bad" can a cavity be before **Dental Ozone** is not helpful? I've read articles that state even in literally black teeth, **Dental Ozone** can be of some use, just that the color cannot be changed and a crown or filling may be used for aesthetic purposes.

>Very large lesions just need to be treated with more than 60 seconds of ozone. Small lesions from 20 seconds, and intermediate cavities about 40 seconds. If a tooth has died, no amount of ozone will resurrect it.

>The treatment of large cavities has a more specialised protocol associated with it. You cannot just use 20 seconds and seal it up and then forget about it! Not yet! In these more severe cases, the really soft material must be removed, so in a sense, you cannot avoid the loss of tooth tissue. The real benefit is that less tooth material needs to be amputated, as once the soft outer layers have been cleaned away - often without the need for local anaesthetics - the slightly harder or leathery layers below can be treated with ozone very effectively. Ozone acts by sterilising this deep tissue. Once sterilised, a mineral wash can be applied to begin the process of remineralisation or hardening. It is a complete change in the treatment of these lesions, as now it will 'heal' or harden faster if it is left uncovered without a filling.

But surely this tooth will be painful?

>No! Ozone has some very special properties. The effect of the gas is to reduce the sensation of pain. Work by Professor Bocci in Italy has shown that traumatised nerve tissue that causes pain can be treated with ozone gas and the painful stimuli are reduced to such a level, that the patient can be taken out of pain. This is just one pathway. The other is that once treated with ozone, the tubular structure of dentine - the inner living dental tissue of a tooth - is opened, and the minerals will flood these tubular pathways. As the minerals are laid down and deposited in the tubules, the movement of fluid through them ceases, so halting the production of pain. The longer the treated surface can be left uncovered, the quicker this surface will harden. Some reports suggest that just 10 days is all that is required. This treatment - ozone treatment then use of a high-mineral concentration wash and leaving the cavity open is contrary to the teaching and understanding that has prevailed for the last 200 years. However, as our understanding of the biological processes change with new research, it is hardly surprising that the dental professions, and that of the general public, current concepts of dental care will evolve and change. We have seen this already in the form of the use of new super glues used as part of the restorative process.

>My original research was looking at ozone as a tooth whitening product. I can tell you it works very well, with no side effects. You can change the internal colours of teeth - both with ozone and the traditional agents such as hydrogen peroxide. It just depends on the level of knowledge of the dentist, their skill, and of course their investment in modern dental equipment that was not from the 18th Century.

I've read that immediately after the treatment is done and you touch the surface of the treated area, it is re-infected. Another article stated that it takes approx. 14 - 16 weeks for the possibility of re-infection to occur because it takes that long for the bacteria colony to regroup. If this is the case, what is the likelihood that decay is going to occur again?

>Let me paint a picture; your house is a cavity, the kitchen is full of food, and you are the bugs. If you move out, the food remains. So it will take you of all a few hours to move back in, get the kettle on, and start living there again. But if after you leave, all the food is cleared out, the power is switched off, and the water too, then it is going to take you a little longer to move back into 'normal' living.

>Bacteria are no different. If you clean a tooth surface, the bugs from the rest of your mouth will re-infect the tooth surface. If you remove the bugs from a decayed hole, it takes about 5-6 weeks to get a complete set of bacteria - all 455 species of them in a mature decayed or carious lesion - that make up a mature functional community in an area of decay. If you remove the bugs AND their food, then it takes 14-16 weeks to re-establish the community.

>In a 'normal' mouth - if such a thing exists!- there is a balance. The mouth is a very complex area to work within. Your teeth are constantly losing mineral into saliva, and absorbing minerals from the saliva. This is totally dependant on the acidity of the saliva. Neutral saliva allows minerals to pass from the tooth to the saliva, and in reverse, so there is this constant exchange of minerals in your teeth. After you eat, your saliva becomes more acidic to allow you to start the process of breaking up the food you have just eaten. But this also swings the balance towards mineral loss from your teeth. Over time, your saliva changes to basic again, so minerals flow into the tooth surface. Problems arise when the balance is tipped into the acidic bit all the time - such as diet (Pepsi, Coke), sugars (sweets, food, confectionary, drinks) and habits (sucking bottles of sweetened juice). In these conditions, the mineral balance is out, so minerals are lost in preference to gained, the surface becomes rough, bugs set up their communities, and once access into the surface has been made, they are very difficult to get rid of. This balance is also changeable by the bacteria that produce acids leading to mineral loss on a tooth surface, and bacteria that produce alkali conditions, that allow mineral uptake by the tooth surface. If poor oral hygiene allows acid-producing bacteria to accumulate, then there is a net loss of minerals. Thankfully, there is only so much mineral uptake by the tooth surface, otherwise in really good oral conditions, people's teeth would keep on growing! There are natural controls that make sure this cannot happen!

>The essential difference here is that ozone kills the bacteria AND removes all the food they have left behind in the various chemicals we call biomolecules. Ozone works by breaking up the acids biomolecules, altering the acidity of the tooth back to being basic, so minerals can now flow into the tooth structure. With the 14-16 week window of opportunity, and better hygiene or controlled parental hygiene, and a mineral wash, the tooth can only do one thing - take up minerals. Once the lesion has arrested and reversed, the research shows it is never involved in the decay process again.

A woman in my group says that her husband has used **Dental Ozone** to kill bacteria in his mouth when he has a cold. She stated that he puts the output in his mouth, fills it up and then releases his breath. She said it's completely safe and just tastes unpleasant. Is that true? If it's really 100% safe to totally ozonate your mouth, couldn't you kill ALL the bacteria and literally "start from scratch"?

> Dental Ozone devices are not sold to the general public. There is only a few manufacturers – O3, South Africa and KaVo Germany, and they can only be bought by qualified Medical or Dental Practitioner. This individual must be using a different ozone generator. The research from the 1940's and onwards shows this could be highly dangerous, as ozone, even at low concentrations, attacks and destroys lung tissue.

>However new research from 2005 and 2006 suggests that short timed

exposures – known as ‘pre-conditioning’ are beneficial, and are not dangerous.

>Current research is looking at a way to ozone treat a whole arch of teeth, but that is a little way off, as no-one know the effect of long-time and long-term ozone on tooth surfaces. I am guiding a PhD student who is doing this research at the moment.

In the South African website, I read that **Dental Ozone** treatment can be used to prevent caries in primary teeth. However, in another **Dental Ozone** site, I read that it should NOT be used as a preventative measure and it's only beneficial in areas of at least demineralization. I had thought about the idea of using ozone as a measure just to keep the bacteria population under control but there are two different opinions on that.

>The are no published studies to show that it is effective yet. As one of the original researchers, I and others are looking at this very question. By definition, it must have a beneficial effect, as by eliminating the bacteria on the surfaces of teeth, changing the acid-balance, and forcing mineral uptake by the tooth surface you will get reversal of any early lesions. In a study I and others published two years ago, we routinely ozone treated the biting surfaces of back teeth, and then sealed them with a new mineral-releasing glass type filling. After 4 years, we saw no caries, and no new lesions developing. So I think I can say that it does have a part to play in prevention, but at the moment we just do not know where yet.

Have you heard of using Betadine as a method of controlling the bacteria in the mouth? Someone mentioned that supposedly Betadine once every 2 months is as effective as **Dental Ozone**, although it cannot penetrate the tooth the same way.

>Yes, but like fluoride and chlorhexadine, these are surface agents, and do not penetrate into the tooth surface to any real depth. These pharmaceutical products are great adjuncts to oral health in the form of mouth washes. Where there is established decay and carious lesions already, these products will not arrest and reverse the decay process. In some of the studies we have seen ozone penetrations of 4-5 mm in the very large lesions - something that up to now has been impossible with historical treatment modalities of tooth decay.

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