

Wyman Chan: 'Technically, I have been doing my job illegally for the past 20 years'

Please send any ideas for feature articles for consideration to:
Ruth Doherty,
Managing Editor,
British Dental Journal,
The Macmillan Building,
4-6 Crinan Street,
London,
N1 9XW
Email: r.doherty@nature.com

Wyman Chan talks to the *BDJ* about his mission to deliver pain-free whitening treatments and his views on the recent tooth-whitening legislation.

Who or what inspired you to become a dentist?

I was lucky as I never really had tooth-ache as a child growing up in Malaysia. However, I do remember one occasion when some of my baby teeth needed to be taken out. All my friends were scared of dentists and so I was terrified about going to the appointment. However, when I came out I thought: 'Oh, that was fun'. The dentist was really attentive so I wasn't scared anymore. I had no swelling, no pain, no nothing! I wondered what all the scaremongering had been about. I became a dentist because I wanted to learn a skill and to be able to treat patients painlessly as had been my experience as a young child.

The law relating to tooth whitening changed on 31 October 2012 – what are your views on those changes?

It's excellent news and we should celebrate. In the past legally we were only allowed to use 0.1% hydrogen peroxide for any take-home treatment. Now we're given 6% hydrogen peroxide, which is amazing. Technically, because I was supplying more than 0.1% to my patients, I have been doing my job illegally every day for the past 20 years. This made me unhappy and scared. I was worried about that unlucky day when someone was going to knock on the door. In fact, Trading Standards did come knocking in 2008! Their representative came to investigate my practice but was happy for me to continue supplying home whitening



Dr Wyman Chan is both a clinician and researcher in the field of tooth whitening, based in his own practice on Shaftesbury Avenue in London. Dr Chan has extensively researched the texture of teeth and the mechanism of whitening processes in order to devise new methods and materials to improve the safety and efficacy of teeth whitening. His research on this topic during a PhD programme at the Institute for Materials Research and Innovation, University of Bolton, has already led to seven UK and US granted patents. Dr Chan is a founding member of the British Dental Bleaching Society and the proprietor of The Smile Studio Tooth Whitening Academy. At the 2008 International Association for Dental Research meeting he was awarded the prestigious Procter & Gamble Investigator Award. Dr Chan lectures internationally and has published many articles in dental journals.

once he realised that I was a dentist.

So this legislation was necessary as without this clarification everyone in the UK and Europe was technically practising tooth whitening illegally. If someone wanted to take us to court then we could have been prosecuted. The prosecution may not have been successful but it was a concern that hung over my head everyday. A prosecution would have had a huge impact on my work and personal life. Thank God not a single dentist has been taken to court over this issue. I think that Trading Standards have been very sensible.

Do you think the new legislation makes tooth whitening safer for patients?

It is a good step as there have been lots of non-dental professionals, for example beauticians and even car mechanics, who decided it was an excellent way to make money. They use high concentrations such as 22% carbamide peroxide, which is very strong. Their illegal business is not regulated and they are

not appropriately trained so it really is dangerous. It causes a lot of damage to members of the public and results in receding gums and also tissue burn. I have treated a lot of people with teeth whitened in the 'shopping mall' who didn't have the desired result and had to come and see me afterwards. The enamel damage in these cases was minimal but I could see demineralisation due to the acidity of the products used to treat these patients. Most of the products used by these outlets are very acidic, which particularly affects the enamel.

Do you think the limit of 6% hydrogen peroxide on home whitening is appropriate?

I think it's sensible to limit the concentration of home kits to 6% – we don't need anything more than this. I agree with the EU and the UK Government that concentrations higher than this are not safe for home-whitening or to be used by untrained people. We used to get excellent results from 3% and now we're allowed double. We should be laughing!

You whiten teeth safely and painlessly, so what's the key?

Research. That's why I did my PhD. My thesis topic was the efficacy and safety of teeth whitening processes. I was a newcomer to whitening 20 years ago. I went to a seminar, learnt how to do it and then went back to my practice to try it out like all dentists with any treatment. I think we have a bad habit, as dental professionals, of trying to learn too many techniques. We should just be experts in one or two fields rather than trying to be experts in everything and master of none.

With tooth whitening, I found I wasn't getting results and that I was hurting my patients. It's embarrassing as a dental professional to carry out a treatment that does not work. You've spent a lot of time and effort but if the patient is not happy they ask for the money back and it's been a waste of everyone's time. This led me to research tooth whitening processes. I wanted to find a non-invasive way of making teeth white painlessly. I felt treatment should be painless as in my childhood days. There is no pain with an extraction, so why should there be with tooth whitening? I tested all the products and protocols on myself and I found it really hurt. Sometimes it was ineffective too. On the whole it was unpredictable. As a dental professional one should not do anything that is not predictable.

What is the key to effective whitening processes?

Firstly it is the materials, which is why we looked into the chemistry of the products. We used a spectrophotometer to see how effective the existing products were and we found that it varies a lot. We then looked at claims by the manufacturers, and researched initiators and activators. We found that the reason the hydrogen peroxide in the products was not effective was because they were too stable. The manufacturers put a lot of stabilisers in their products which meant the active ingredients, ie oxygen radicals, weren't being released. The oxygen radicals are the component of the chemical that removes the stains by breaking the carbon chains in the stain molecules. So we looked into all the chemistry and

tried to find a mechanism that would release the radicals faster to reduce the treatment time.

Tooth whitening is dependant on three known factors: (1) contact time, (2) concentration and (3) temperature (the temperature of the mouth, at about 37/38 °C, actually activates the peroxide and helps with diffusion). Most of the gels we found were too stable and we needed to find a chemical to initiate the bleaching effect. Firstly, we looked to transition metal initiators developed by the textile industry for bleaching. However, most of the available initiators only worked in very high acidic or alkaline conditions that were not safe for the oral environment. So we started looking to organic chemicals (amino alcohols) to release the free radicals. We came up with a few, looked at the safety and patented them. It was very difficult but we did it.

We also created a double barrelled device where you push the hydrogen peroxide upwards to mix into the initiator at the tip. So the unmixed product is stable for storage purposes and you only mix it when you want it to be activated. This was the breakthrough that we had.

How did ineffective whitening products reach the market?

Not enough research was done. Home whitening products were fine because there was enough contact time to make them work. However, the chair-side treatments just did not work in one or two hours. They may have worked in ten hours but ten hours in the chair is too long. That's why we did all our research to improve the efficacy.

Then we looked into the safety and why it was hurting. We started looking into the causes of the pain and found that there was a problem with the protocol for whitening trays. We used to load the tray up with product and push it in to the mouth. However, that way you introduce a lot of excess whitening agent onto the soft tissues and the pockets. In the pockets there's a lot of exposed dentine and if you introduce the bleach into these soft tissues it can cause tissue burn. So we needed to invent a device for whitening trays without the gel getting onto areas with nerve endings. This

was a mechanical solution. Enamel is the only tissue in our whole body that's non-vital (there are no nerves) and if only the enamel is targeted with the whitening agent there shouldn't be any pain. So we invented a tray that didn't leak past the enamel and now I can do home whitening without hurting my patient. I'm really happy with that. I've shared my invention with my colleagues and over 2,000 of my colleagues are now using my design.

If you had a colleague who wanted to patent a product how would you advise them to go about it?

It's very complicated. Firstly, I would ask them why they are doing it. For fun? For a commercial reason? Or because they want to change something that is not working? I want to solve problems and that's why I went into research. I would advise them that they should find a problem to solve which they encounter all the time and then go into research to help the public and the profession, not only themselves. They should look on the internet and find out if the problem definitely still exists or whether someone else has solved it. If someone else has solved it and you started applying for a patent, it would be a waste of time. Always do research to find out whether it's already been done. A patent must be novel. You must use patent lawyers to write down the wording carefully. They also do the patent searches for you, which takes time and that's why it's expensive. If you find something similar you have to justify to the patent examiners why your invention is different from what has already been found.

What are your views on the ethics of aesthetic dentistry?

I think we should be ethical; we should not think of profit all the time. Unfortunately a lot of colleagues think about the profit and not the wellbeing of the patient. We should have a holistic approach because anything that is damaged cannot be replaced. If you cut the enamel away or push gums away they will not grow back.

However, on the other hand, the difficulty can be dealing with patient

demand. I find some patients are quite aggressive in their demands for treatment. Often if I don't do the whitening someone else will, which has implications for business. We won't change the trend until we can educate the patient.

I do lose patients when they come in here and want to have veneers done. I try and persuade them otherwise if it is not appropriate and too destructive. I would say I'm 90% successful at persuading the patients not to have them but I lose 10% of them who insist they should have veneers done.

If you hadn't become a dentist what you have liked to do?

Two things, I would be either a chemist or an event organiser.

I love chemistry and that's why I enjoy my work so much. There's a lot of

chemistry in dentistry, for example in developing bonding agents, composite, etc. I always loved chemistry as a child so I find it easy. A lot of dentists don't study chemistry at A level and so they find it difficult at university. However, I think chemistry and physics are essential for dentistry, whereas biology is not essential at all. You can always learn biology but by the time you reach university it can be too late to completely grasp chemistry and physics.

Event organisation is something I have done for the past 25 years voluntarily in my spare time. It is my passion. Event organisation is similar to research: you have to be logical and creative for both. I organise a lot of shows, mainly for the Chinese community in London, for example London's annual Chinese New Year celebrations. I

am responsible for producing the entertainment events at this annual celebration which is a big job. We have over 500 entertainers with lots coming from overseas and I have a group of about 20 volunteers helping me. Last year we had half a million people at the event in Chinatown!

Interview by Ruth Doherty,
BDJ Managing Editor

Dr Wyman Chan will be giving a day-long seminar in Central London on the 1 March 2013 entitled 'Modern teeth whitening: A comprehensive update on legislation, techniques and treatment planning'. The seminar meets the educational criteria set by the GDC for verifiable CPD (6 hours) and is certified by the British Dental Association. A discounted fee is available for BDA members. For further information or to book a spot, go to the event webpage: <http://www.bda.org/events/1270-bda-seminar-modern-teeth-whitening1-march-2013london.aspx> or call 020 7563 4590.