

Enamel remineralisation: the future of dentistry?

Could a new technology see 'traditional' dentistry techniques consigned to the past, with the promise of pain-free restorations on the horizon? The team from **JEFF WRIGHT** of start-up Reminova certainly thinks so, as *The Probe* discovers...

DRILLING and filling could be consigned to the medical history books with the recent launch by a British firm, based in Perth, Scotland, of a world-first crowdfunding campaign in July. King's College, London, spin-out Reminova wants £1M from European and US individuals to take its revolutionary tooth-rebuilding invention to market in a bid to transform global dental health.

Reminova was co-founded in 2014 by Scotland-based dentists-academics, Prof Nigel Pitts and Dr Chris Longbottom, both of whom went on to take their research to King's College London. Explains the company's CEO, Dr Jeff Wright, a chemist by training who has the entrepreneurial role in the company, "Initially, Reminova's technology grew out Nigel and Chris's sense of frustration. They both have decades of dentistry experience – Chris has also been a children's dentist for years – and despite the wholly preventable nature of dental decay, it's clear that patients just aren't doing enough to prevent it – tooth decay affects some seven billion people at some point in their lives. They felt there had to be another approach to tackling it."

How it works

Demineralisation and remineralisation are, as every dentist knows, natural processes where mineral content is either lost from, or added back into, tooth enamel. Because demineralisation makes tooth enamel weaker and more porous, it is associated with the onset of dental caries. Remineralisation is the process whereby the mineral enters the porous enamel structure and makes it stronger and more dense. The remineralised material hardens into enamel. Minerals can be present in saliva or from food – for example, while drinking milk, high levels of calcium mineral will be present in the mouth. Reminova claims it has invented a way to greatly accelerate this natural remineralisation process in enamel. "We call it Electrically Assisted Enhanced Remineralisation [EAER]," explains Jeff Wright. "This uses a tiny electrical current of a few micro Amps that is too small to cause any physical sensation in the patient, to help accelerate mineral ions back into the tooth enamel, rebuilding the mineral levels to normal healthy levels."

Utilising nature

"With this simple adaption of nature's own process, and a proprietary conditioning process that we apply to the decayed tooth enamel prior to EAER, we can both reverse early signs of tooth decay, and repair the affected lesions back to normal, healthy enamel in about the same time as

it currently takes to perform a conventional filling."

A conditioning process gently cleans and separates all the decayed tissue and any organic material that has built-up around or in the caries lesion. The cleansed, healthy enamel tissue is now ready and receptive for EAER, which introduces natural minerals back into the clean lesion. The mineral ions are pushed by the electrical field to the deepest parts of the lesion, creating the right conditions for the minerals to precipitate and become part of the solid enamel structure, and causing the lesion to fill from the deepest part upwards.

Exciting times

Says Jeff Wright, "One of the things that excites me about the treatment is that it benefits everyone in the value chain: no healthy tooth tissue is removed in this treatment, and consequently there is no need for anaesthetic injections and no drill involved, making for a much less invasive and a safer experience for patients. The simplicity and pain-free nature of the treatment should mean more patients for dental practices, and the process can be carried out by a nurse or hygienist after the dentist's diagnosis, which can be very good news for practice profitability. Tooth decay strikes vulnerable groups hard: children, the elderly, those living in developing countries, but we believe remineralisation – which, realistically, is most likely to be rolled out within the private sector – should prove no more expensive than having a filling. Moreover, in developing countries, it could lead to more people being treated, as less specialist people can carry out the treatment. The current need for provision of anaesthetics and needles plus the resultant blood-infection risk in hot dirty places currently creates huge limitations on the availability of dentistry – one that remineralisation would overcome. Finally, in developed countries, the treatment is good news for insurance companies as it means fewer payout for them."

The company's ultimate aim is to see remineralisation used as part of a regular dental check-up and treatment plan to arrest and reverse dental caries, ensuring caries never progresses to a more advanced stage that would require a filling.

"Our treatment does not replace or reduce the need for regular tooth brushing and cleaning, which remains the best way to limit the onset of dental caries, and restriction of sugar intake. Our treatment provides a new way to treat caries that can substantially reduce both the cost and environmental impact of this most prevalent of human diseases."



The Reminova team, from left to right: Dr Jeff Wright, Dr Chris Longbottom and Prof Nigel Pitts

Dr Wright adds: "The beauty of equity crowdfunding is we get shareholders who, like us, want to take the fear, stress and pain out of trips to the dentist. As well as being motivated by the potential financial returns.

"With their help and investment, our tooth rebuilding treatment could be available to patients within three years. Patients want a painless solution that maintains and repairs their natural teeth, one that helps them keep their own teeth for life. We know that our technology can lead to the type of preventative dentistry that dentists passionately want to practice and support."

Target to reach

Reminova's crowdfunding 'stretch target' for its 60-day campaign is £1m, with an initial goal of £500,000. Dr Wright isn't saying just how much has been raised as September's *Probe* goes to press, but information will be forthcoming in the near future. "Interest from the US has been particularly high – the profession over there is keen to invest in anything that might bring medical insurance costs down."

And how does Reminova plan to use any investment raised? Says Jeff Wright, "Our priority is to develop a regulatory

and clinical plan and initial studies, to bring caries remineralisation and teeth-whitening – another application of the technology – products to market. It has additional uses, too, as a treatment to fight tooth sensitivity for instance. We also need to engineer more advanced prototype EAER instruments, while strengthening the company's commercial operations and management team – it's a continual process."

Dr Wright adds that, with Reminova very much at its inception stage, the team is actively looking to explore strategic partnerships, either with companies that already supply dental products or those with strong global sales and marketing skills – or both. "As far as we're concerned, partnering with the right companies can only be good news, as it could well enable us to speed up our manufacturing and clinical trials and would provide an established sales channel for Reminova's products to professional dentists." ■

To find out more about Reminova, see www.reminova.com

6 With help and investment, our tooth rebuilding treatment could be available to patients within three years 9