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Irish engineers create medical device to treat tinnitus

Irish medical device company Neuromod Devices is set to launch a new multisensory neuromodulation tinnitus treatment. The technology has been designed to offer a new non-invasive standard of care for subjective tinnitus sufferers

Ross O'Neill of Neuromod Devices

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Irish general practitioners and audiologists will soon have access to a new treatment option for chronic subjective tinnitus patients, in the form of 'mutebutton'. A new neuromodulation treatment from Irish medical devices company Neuromod Devices Ltd, the mutebutton is expected for release in Ireland in December 2014.

Founded in 2010 by biomedical engineer Dr Ross O'Neill, Neuromod Devices has developed a self-administered, non-invasive, multi-sensory tinnitus treatment. The product combines synchronous audio and lingual (tongue) stimulation to promote neuroplasticity amongst patients. The signals are co-ordinated through the mutebutton control device, which plays relaxing music and audio tracks through the recommended Bluetooth headphones while sending corresponding signals through the tonguetip™ intra-oral device.

The aptly named 'tonguetip' rests on the tip of the patient's tongue, delivering stimulation to lingual nerves. This synchronous stimulation promotes neuroplasticity to reduce the symptoms of tinnitus.

The mutebutton system has been shown to gradually reduce the illusory sounds of tinnitus in independent clinic studies conducted by NUI Maynooth and the Hermitage Medical Centre in Lucan, Co Dublin. Over the course of 10 weeks of treatment, the participants' mean minimum masking levels were reduced by 8.6dB (42% decrease in loudness). One clinical trial participant reported, "With the reduction in the noise I was much more energised throughout the day... that was a massive improvement in my quality of life."

The technology

The mutebutton system uses an innovative platform technology that has been developed by Neuromod Devices for the treatment of tinnitus but which offers much wider future applications. O'Neill is optimistic about both the immediate and future applications of this multi-sensory platform technology. "The global study of neuromodulation continues to unlock new and exciting surgical and non-surgical treatments for patients," he said.

A biomedical engineer and medtech entrepreneur, O'Neill has researched, developed and evaluated medical technology concepts for academic institutions and multinational corporations including Massachusetts Institute of Technology, INTEL, University College Dublin, Trinity College Dublin and National University of Ireland Maynooth over the last 15 years. "In Neuromod Devices, we're committed to developing non-invasive, self-administered neuromodulation treatments for previously untreatable chronic conditions, like subjective tinnitus," he added.

Tinnitus affects 10% of the UK population, according to the British Tinnitus Association. At present, there are limited avenues of treatment for subjective tinnitus. Once diagnosed with subjective tinnitus, most people may find themselves referred to an audiologist for standard hearing aids.

"The problem with hearing aids, however, is that they amplify the sounds around you," O'Neill explained. "They don't directly address the tinnitus symptoms. Noise maskers can offer some temporary relief by distracting the mind from the illusory sound; however, this is only temporarily masking the symptoms, not addressing the cause and providing lasting relief. That's why we developed mutebutton."

Neuromod Devices will launch a clinic in Ireland in December and will be launching in the UK in early 2015, working in partnership with a UK network of qualified audiologists. Once the product has launched, patients will be able to purchase the device through the website and attend one of the clinics to have their mutebutton system configured to their tinnitus.

As the clinical manager at Neuromod Devices, Caroline Hamilton has been integral to the advancement of the mutebutton treatment, "Subjective tinnitus is commonly associated with hearing loss, but it can impact young and old patients alike," she said. "Many patients are worried that their symptoms will only increase with time. Having worked with tinnitus patients for over 10 years, I'm genuinely excited about being able to provide a new standard of care to these patients."

Controllable device

The mutebutton system has been designed to give an overall relaxing experience to the patient. Once configured, they simply use the treatment for 30 minutes a day. The control device enables the patient to adjust the level of stimulation and the loudness of the relaxing audio during the treatment, to their personal preference. The device is sold with Bluetooth headphones that have been carefully selected for comfort, safety and efficacy and the company's own tonguetip, which is a small intra-oral device with a biocompatible polymer and small surface stimulators.

The tonguetip has been designed for 90 hours of use, therefore it needs to be replaced twice a year. The device, the consumable element and the clinical consultancy will be available for purchase through the company's website www.mutebutton.ie.
From concept to market

The mutebutton system is the culmination of co-ordinated investment by the Irish State through supporting agencies such as the Science Foundation Ireland, the Higher Education Authority and Enterprise Ireland, which have incubated innovative research in universities including NUI Maynooth.

"Our company is evidence of the effectiveness of the National Strategy in supporting research from 'blue sky' thinking, through applied research and right through to product commercialisation," said O'Neill. "As we hope to expand over the coming years, we look forward to demonstrating the value of that investment, which continues to help to establish Irish Innovation on the world stage."

The company plans to launch across Europe in 2015 in partnership with local distributors and partnering clinical networks following CE Mark approval, which is expected later this year. Neuromod Devices will progress a Section 510(k) approval from the US Food & Drugs Administration in 2015, ahead of an anticipated US launch in 2016.

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