Vagus nerve stimulation enhances the effects of compassion meditation training

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Stimulating the vagus nerve with a device attached to the outer ear can help make compassion meditation training more effective at boosting people's capacity for self-kindness and mindfulness, finds a new study led by University College London (UCL) researchers.

The study, published in *Psychological Medicine*, adds to evidence of the potential benefits of stimulating this key nerve that connects the brain with major organs in the chest and abdomen.

The vagus nerve plays a crucial role in the 'rest-and-digest' (parasympathetic) system, counteracting the 'fight-or-flight' (sympathetic) stress response, and allows the brain to communicate with all major organs in the body. By transmitting signals from the body up to the brain, the vagus nerve can also regulate a range of psychological processes, including some involved in social interactions and emotional control.

The researchers stimulated study participants' vagus nerve by delivering a painless electric pulse to the tragus, the small cartilaginous flap located in front of the ear canal on the outer ear. This electronic pulse was designed to activate nerve fibres that pass close to the skin surface.

The academics tested 120 healthy participants who either received vagus nerve stimulation through the skin on their tragus, or a placebo stimulation to another part of the ear. This was combined either with self-compassion meditation training or another form of training not designed to promote compassion.

The participants who received the vagus nerve stimulation alongside the self-compassion training experienced a larger and more immediate increase in self-compassion than those in the other three groups. The participants' level of mindfulness (awareness of the present moment and calm acknowledgement of one's thoughts and feelings) was also measured, and the benefits to mindfulness accumulated across multiple training sessions, suggesting that while some effects of stimulation and training are immediate, others build over time.

> *We found that delivering a small shock to the ear, to stimulate the vagus nerve, can amplify the benefits of certain meditation techniques, particularly those involved in cultivating self-compassion.*
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> *Our findings reveal how neuroscience technology may have a meaningful impact on how we feel about ourselves. Neurostimulation alone had limited benefits, but it may have an important role to play in supporting meditation therapies, which are increasingly used to help people with mental and physical health problems. Meditation can be hard work, requiring persistence and dedication, so a way to boost and accelerate its impacts could be a welcome development for therapists and patients alike."*
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> *Professor Sunjeev Kamboj, Lead author, UCL Psychology & Language Sciences*

The researchers say that further research is needed to refine the technique and to see how long the effects last. Additionally, as this study only investigated healthy participants without a diagnosed psychological disorder, further research is needed to see if this approach could benefit people with conditions such as anxiety, depression or trauma.

In a separate study published last week, a separate team co-led by a UCL researcher also found that vagus nerve stimulation could help to improve fitness and exercise tolerance.

Source:

University College London

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Kamboj, S. K., *et al*. (2025) Electroceutical enhancement of self-compassion training using transcutaneous vagus nerve stimulation: results from a preregistered fully factorial randomized controlled trial. *Psychological Medicine.* doi.org/10.1017/S0033291725101013.