

Laser therapy is most effective treatment for tinnitus, study finds

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LLLTP prototype device applying red laser with a wavelength of 660 nm developed at the Technological Support Laboratory of IFSC-USP for laser auriculotherapy. Credit: *Journal of Personalized Medicine* (2023). DOI: 10.3390/jpm13040581

Low-level laser therapy and associated photobiomodulation is the most effective of the known treatments for tinnitus, according to a study comparing the main therapies in current use, conducted by Brazilian scientists affiliated with the Optics and Photonics Research Center (CEPOF). The study is reported in an article published in the *Journal of*

Personalized Medicine.

Some 750 million people suffer from [tinnitus](#) worldwide, according to a European study that analyzed five decades of patient data. Often described as ringing or hissing in the ears, it is considered a symptom rather than a disease, but is unpleasant and in some cases incapacitating. Its known causes can range from a buildup of earwax and insufficient peripheral irrigation in the inner ear to brain damage and bruxism. There are no standard treatments or drugs approved by the United States Food and Drug Administration (FDA).

"Tinnitus is a very widespread symptom throughout the general population. It's treated with a vast number of methods, from ear lavage to local anesthetics, anti-depressants, antihistamines, anti-psychotics and sedatives, with different results," said Vitor Hugo Panhóca, a researcher at CEPOF. "After finding articles in the scientific literature that presented consistent [laser therapy](#) outcomes, we decided to compare the main treatments and pursue more responses to the problem."

During a four-week period, Panhóca and his team tested alternative and complementary treatments for idiopathic (with no apparent cause) and refractory tinnitus on more than 100 men and women aged 18-65, divided randomly into ten groups. The treatments tested were laser acupuncture, flunarizine dihydrochloride, Ginkgo biloba (a [medicinal plant](#)), and low-level laser stimulation of the internal auditory canal or meatus (transmeatal stimulation), on its own and combined with vacuum therapy, ultrasound, G. biloba or flunarizine dihydrochloride.

The patients were submitted to eight twice-per-week treatment sessions. They were clinically assessed before treatment began, after the eighth session and two weeks later, using a "tinnitus handicap inventory questionnaire" with a total of 25 questions. A functional subscale comprised 11 questions on mental, social, occupational and physical

limitations due to tinnitus.

The best outcomes were observed in patients treated with laser acupuncture alone and transmeatal low-power laser stimulation alone. In the latter case, they improved even more when irradiation time was increased from 6 minutes to 15 minutes. Combinations of laser therapy with vacuum therapy or *G. biloba*, laser acupuncture alone, and flunarizine dihydrochloride alone also had lasting therapeutic effects.

"The positive effects include anti-inflammatory action and relaxation. We believe laser therapy can increase peripheral irrigation, which may be the main cause of the problem in many cases, as well as stimulating inner ear cell proliferation and collagen production," Panhóca said.

New protocols

While the CEPOF study is not the only one to show that laser therapy can improve the condition of tinnitus patients, it paves the way to creation of a protocol for use by dentists, ear, nose and throat specialists, speech therapists and other medical practitioners who have such patients, as the number of sessions and intensity of the treatment vary greatly in the literature.

"Understanding how successful therapies work will help us focus on the most productive approaches in forthcoming studies. This is part of the learning curve when you innovate in health treatments like this," Panhóca said, adding that it is also necessary to investigate the long-term effects of laser therapy.

The study was conducted in collaboration with researchers at Irmandade Santa Casa de Misericórdia Hospital in São Carlos, University of Central São Paulo (UNICEP), and Integrated Therapy Center in Londrina (Paraná state), Brazil, as well as Tyndall National Institute at University

College Cork (UCC) in Ireland.

More information: Vitor Hugo Panhóca et al, Effects of Red and Infrared Laser Therapy in Patients with Tinnitus: A Double-Blind, Clinical, Randomized Controlled Study Combining Light with Ultrasound, Drugs and Vacuum Therapy, *Journal of Personalized Medicine* (2023). [DOI: 10.3390/jpm13040581](https://doi.org/10.3390/jpm13040581)

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