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PHOTOBIOMODULATION, LASER AND TINNITUS: AN INNOVATIVE APPROACH TO TREATING TINNITUS

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INTRODUCTION

Tinnitus, or tinnitus, is the perception of sounds without an external source, often described as buzzing, whistling or hissing[1,2]. This symptom affects millions of people around the world and can have a significant impact on quality of life[1,2]. Despite several existing therapeutic approaches, many patients continue to seek relief[3,4]. Photobiomodulation (FBM), using low-intensity lasers, emerges as an innovative approach to the treatment of tinnitus, offering new perspectives and hope for those affected by this condition[3-5].

WHAT IS PHOTOBIOMODULATION?

Photobiomodulation is a form of therapy that uses light, often in the form of a laser or LED, to promote beneficial biological effects in cells and tissues[6,7]. Light penetrates the skin and underlying tissues, being absorbed by specific cellular structures, such as mitochondria, which are stimulated to improve cellular metabolism and promote tissue repair[6-8].

HOW DOES PHOTOBIOMODULATION WORK?

The mechanisms of action of photobiomodulation include[9-12]:

1. Increased ATP production: Laser light can stimulate mitochondria to produce more ATP (adenosine triphosphate), the main source of cellular energy.

2. Reduction of oxidative stress: FBM can reduce the production of free radicals and increase antioxidant levels, helping to protect cells from damage.

3. Modulation of inflammation: Light therapy can reduce inflammatory markers and promote tissue regeneration.

4. Neuroprotection: Photobiomodulation can protect nerve cells and promote neuronal regeneration, which is particularly relevant for neurological conditions such as tinnitus.

PHOTOBIOMODULATION AND TINNITUS

The application of FBM in the treatment of tinnitus involves the use of low-intensity lasers directed at the inner ear or adjacent areas[10,13,14]. The therapeutic effects of FBM in treating tinnitus may include:

1. Improved cellular function: Stimulating ATP production and reducing oxidative stress can improve the health of auditory cells and reduce tinnitus symptoms.

2. Reduction of inflammation: By decreasing inflammation in the inner ear, FBM can alleviate discomfort associated with tinnitus.

3. Tissue regeneration: FBM's ability to promote tissue regeneration may help repair inner ear damage that contributes to tinnitus.

CLINICAL EVIDENCE

Clinical studies on the effectiveness of photobiomodulation in the treatment of tinnitus are still at an early stage, but preliminary results are promising[10,13-16]:

1. Reduction in tinnitus intensity: Some studies report a significant decrease in tinnitus intensity after FBM sessions.

2. Improved quality of life: Patients undergoing FBM often report an improvement in quality of life, including reduced anxiety and improved sleep.

3. Safety and tolerability: FBM is generally well tolerated, with few reported side effects, and is considered a safe approach to treating tinnitus.

TREATMENT PROCEDURE

Photobiomodulation treatment for tinnitus generally follows these steps[13-16]:

1. Initial assessment: The patient is evaluated by a specialist to determine the suitability of FBM as a treatment.

2. Application of laser light: A low-intensity laser device is used to direct light to the inner ear or surrounding area. Each session can last from a few minutes to half an hour, depending on the protocol used.

3. Repeated sessions: Treatment usually involves several sessions over weeks or months to maximize therapeutic benefits.

4. Monitoring and adjustment: The patient's progress is monitored, and the treatment protocol can be adjusted as needed.

CONSIDERATIONS AND FUTURE PERSPECTIVES

Photobiomodulation represents an innovative and promising approach to the treatment of tinnitus, especially for patients who have not achieved relief with conventional therapies. However, the need for further research is evident to fully understand the mechanisms of action and to optimize treatment protocols.

Future studies must focus on large-scale, long-term clinical trials to validate the efficacy of FBM and establish standardized treatment guidelines. Collaboration between researchers, clinicians and patients will be essential to exploit the full potential of this technology and provide relief to a greater number of individuals affected by tinnitus.

CONCLUSION

Photobiomodulation, using low-intensity lasers, is an innovative and promising approach for treating tinnitus. Based on preliminary evidence, this technique offers new hope for patients suffering from this debilitating condition. Continued research and technological advances will be crucial to consolidate FBM as an established and widely accessible therapeutic option.

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