EDITORIAL ASIAN JOURNAL OF MEDICAL SCIENCES

Acoustic therapy: New paradigms

Submission: 01-03-2025 Revision: 07-03-2025 Publication: 01-04-2025

Access this article online

Website:
https://ajmsjournal.info/index.php/AJMS/index

DOI: 10.71152/ajms.v16i4.4489

E-ISSN: 2091-0576

P-ISSN: 2467-9100

The medical field seldom considers sound prescriptions as effective healing methods. Nevertheless, the awareness of this technology and its potential to address certain ailments has existed for many years.[1] Sound-based medical therapy encompasses diverse therapeutic approaches that utilize acoustic waves and vibrations to treat various conditions.[2] Here is an overview of this fascinating field. The current sound-based medical therapies include the following:

1. Ultrasound therapy
    a. High-intensity focused ultrasound for non-invasive tumor ablation
    b. Low-intensity pulsed ultrasound for bone fracture healing
    c. Ultrasound-assisted drug delivery systems that enhance medication penetration
    d. Sonothrombolysis for dissolving blood clots in stroke treatment.
2. Infrasound and low-frequency therapies
    a. Vibration therapy for improving bone density and muscle strength
    b. Whole-body vibration platforms for neurological rehabilitation
    c. Infrasonic stimulation for specific pain management protocols.
3. Music therapy
    a. Neurologic music therapy for stroke, Parkinson's, and traumatic brain injury rehabilitation
    b. Receptive music therapy for anxiety, depression, and pain management
    c. Active music engagement is needed for cognitive and motor skill development
    d. Rhythmic auditory stimulation for gait training.
4. Sound wave therapies
    a. Extracorporeal shock wave therapy for musculoskeletal disorders
    b. Pressure wave therapy for chronic pain conditions
    c. Acoustic wave therapy for erectile dysfunction and wound healing.

The mechanisms behind sound-based therapies include mechanical effects (tissue mobilization, cellular stimulation), thermal effects (controlled heating of tissues), and neurological effects (stimulation of neural pathways and neurotransmitter release).[3-5] Despite growing clinical evidence for many applications, research continues to elucidate the precise mechanisms and optimize protocols for various conditions.

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Source of Support: Nil, **Conflicts of Interest:** None declared.