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Impacts of acupuncture on migraine management: a systematic review

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Introduction
Acupuncture, a cornerstone of Traditional Chinese Medicine for over 4,500 years, has gained global prominence due to its therapeutic benefits and favorable safety profile. It has emerged as a key intervention for migraine patients who show poor tolerance to conventional pharmacological treatments. Given this shifting perspective, the last decade of clinical research has been instrumental in clarifying its role in modern neurology.

Objective
To evaluate the efficacy, safety, and neurophysiological mechanisms of acupuncture in both prophylactic and acute migraine management, specifically focusing on patients with limited tolerance to standard drug therapies.

Methods
This systematic review followed the PRISMA protocol. A comprehensive search was conducted across PubMed, Embase, and LILACS databases for studies published between 2014 and 2024. Mesh terms and keywords included "Acupuncture," "Migraine Disorders," "Prevention," and "Therapeutics." Inclusion criteria prioritized randomized controlled trials (RCTs), systematic reviews, and functional neuroimaging studies assessing acupuncture's impact on adult migraine management in English and Portuguese. Evidence quality was appraised based on seizure frequency reduction and symptomatic improvement.

Results
The evidence indicates that acupuncture outperforms both sham acupuncture and standard care in reducing monthly migraine frequency. Notably, Xu et al. (2020) demonstrated a sustained decrease in attack frequency between weeks 13 and 20 post-treatment in a cohort of 150 patients, with no serious adverse events reported. Functional neuroimaging (PET-CT and fMRI) revealed that acupuncture modulates glucose metabolism and functional connectivity within the "pain matrix," specifically targeting the middle frontal gyrus, cerebellum, and middle cingulate cortex. Biologically, these effects are linked to the mechanical stimulation of acupoints, which triggers mast cell degranulation and modulates electrical signaling at the neuroimmune interface, thereby mitigating peripheral and central sensitization. Regarding safety, the technique showed excellent tolerability; adverse effects were rare and self-limiting (e.g., localized pain or minor bruising), establishing acupuncture as a viable alternative for patients with contraindications to conventional prophylaxis.

Conclusion
Acupuncture is a safe, evidence-based therapeutic modality for migraine control, effectively reducing both pain intensity and attack frequency. Its integration into clinical practice is recommended as a prophylactic and adjuvant strategy, helping to decrease disease burden and enhance patient quality of life.

Keywords:
Migraine
Headache
Neuroimaging
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Adjuvant therapeutics

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