REVIEW ARTICLE

CONTENTS

Acupuncture: ancient remedy or modern placebo?

Iwona Morawik[1], Karolina Turżańska[2], Mirosław Jabłoński[3]

[1]DEPARTMENT OF ANAESTHESIOLOGICAL NURSING AND INTENSIVE MEDICAL CARE, MEDICAL UNIVERSITY OF LUBLIN, LUBLIN, POLAND

[2]DEPARTMENT OF REHABILITATION AND ORTHOPEDICS, MEDICAL UNIVERSITY OF LUBLIN, POLAND

[3]LABORATORY OF MUSCULOSKELETAL ORGAN RESEARCH, MEDICAL UNIVERSITY OF LUBLIN, LUBLIN, POLAND

ABSTRACT

Acupuncture as an alternative method of pain treatment was created in China 3000 years ago. It still has many supporters. For years, it has been used in many countries to relieve labor pains, postoperative pains, pains caused by osteoarthritis, toothaches, and headaches. The World Health Organization (WHO) has significantly expanded the indications for the use of acupuncture. The primary aim of this article is to critically evaluate whether acupuncture is a scientifically validated therapeutic intervention or primarily a placebo effect?

Material and methods: The material and methods section of this article involves a comprehensive review of existing literature, including systematic reviews, randomized controlled trials (RCTs), and meta-analyses on acupuncture. The review also includes observational data on patient outcomes, potential risks, and reported complications. The effectiveness of acupuncture has been extensively studied, with varying levels of scientific support for different conditions. According to the National Institutes of Health (NIH), the strongest evidence supports acupuncture's effectiveness in dental pain, postoperative nausea and vomiting, chemotherapy-induced nausea, and pregnancy-related nausea. Studies on lower back pain, headaches, and knee osteoarthritis have shown moderate benefits, leading some physicians to recommend acupuncture as a complementary therapy. An analysis of studies has shown the effectiveness of acupuncture in the treatment of nausea and headaches. The results also showed the benefits of using this method in relieving back pain. Acupuncture has been shown to be one option for pain relief, but it needs more research.

KEY WORDS: acupuncture, pain relief, alternative therapies

Wiad Lek. 2025;78(3):595-601. doi: 10.36740/WLek/202550 DOI

INTRODUCTION

Although acupuncture is the most well-known alternative treatment for various ailments, its fundamental nature remains enigmatic. Originating approximately 3,000 years ago in China, it has been practiced not only there but also in other parts of the world, including Japan, Korea, Taiwan, and Germany [1-3]. Acupuncture involves inserting thin needles (32 to 36 gauge) into specific areas of the patient's skin, known as acupuncture points. Classical texts describe 365 such locations, systematically arranged along so-called meridians or "energy flow channels" mapped across the body. Traditional Chinese Medicine (TCM) is based on the concept of health as a balance between yin and yang. In this dualistic philosophy, yin represents the feminine principle – associated with nourishment, soothing, deficiency, introspection, receptivity, protection, softness, the lower part of the body, and passivity. Yang, on the other hand, embodies its masculine counterpart – hardness, dominance, energy, the upper body, heat, excess, external action, and creativity. The movement between these opposing forces, referred to as Qi, is considered by TCM practitioners as a fundamental factor in healing. Qi is regarded as a vital energy that continuously flows through meridians, the body's energy channels [4-6]. When the balance of Qi flow between meridians is disrupted, illness is believed to occur. Restoring harmony by regulating factors such as heat, cold, moisture, and dryness – both externally and internally – is a key role of TCM practitioners and acupuncturists. This is achieved by inserting needles into specific trigger points along the meridians. Other complementary techniques include dietary therapy, herbal medicine, cupping therapy, moxibustion, Tui Na massage, Tai Chi exercises, and meditation [4-6].

UNDERSTANDING THE ACTION OF ACUPUNCTURE

Difficult to understand from the perspective of modern medicine, the observed and demonstrated phenomena of biologically active acupuncture points, which resist

Table 1. World Health Organization Indications for Acupuncture [14]

Respiratory Tract
• Acute tonsillitis
• Acute sinusitis
• Acute rhinitis
• Common cold
Gastrointestinal Disorders
• Chronic duodenal ulcer disease (pain relief)
• Esophageal and cardiac spasm
• Acute and chronic gastritis
• Acute bacterial dysentery
• Acute and chronic colitis
• Gastric hyperacidity
• Paralytic ileus
• Gastroptosis
• Constipation
• Diarrhea
• Hiccups
Bronchopulmonary Disorders
• Bronchial asthma (most effective in children and patients without complications)
• Acute bronchitis
Neurological Disorders
• Sequelae of poliomyelitis (early stage, i.e., within 6 months)
• Facial paralysis (early stage, i.e., within 3–6 months)
• Sequelae of poliomyelitis
• Neurogenic bladder dysfunction
• Peripheral neuropathies
• Peripheral neuropathies
• Trigeminal neuralgia
• Intercostal neuralgia
• Paralysis after stroke
• Nocturnal enuresis
• Meniere's disease
• Headache
• Migraine
Ophthalmic Disorders
• Cataract (without complications)
• Myopia (in children)
• Acute conjunctivitis
• Central retinitis
Musculoskeletal Disorders
• Cervical syndrome
• Frozen shoulder
• Low back pain
• Osteoarthritis
• Tennis elbow
• Sciatica
Oral Disorders
• Acute and chronic pharyngitis
• Toothache, post-extraction pain
• Gingivitis

conventional explanation, do not conform to classical interpretation. However, it has been shown that a radioactive tracer moves significantly faster when administered at an acupuncture point compared to a sham puncture site [8]. The influence of needling a point on the shin on visual cortex activity [7] is also difficult to interpret, as demonstrated convincingly using functional magnetic resonance imaging (fMRI) [9].

Clinical observations of patients undergoing surgery with acupuncture while being opioid-dependent have led to the hypothesis that its analgesic effectiveness depends on stimulating the release of endogenous endorphins. It has been demonstrated that the use of needles increases endorphin and enkephalin levels in the cerebrospinal fluid, and this mechanism is reversed by naloxone. Studies on the levels of ACTH and endogenous corticosteroids have shown an increase in the concentration of these substances following acupuncture treatment. Ultimately, the pathophysiological principles underlying acupuncture have not been definitively established [10-12].

CLINICAL PERSPECTIVE

The NIH (National Institutes of Health, Bethesda, Maryland, USA) established a "consensus panel" on the validity of acupuncture use [13]. Clinically valuable applications have only been demonstrated for dental pain and nausea of various origins, such as pregnancy-related nausea, chemotherapy-induced nausea, and postoperative nausea. Potential additional applications of acupuncture include addiction treatment, asthma, carpal tunnel syndrome, epicondylitis, fibromyalgia, headaches, lower back pain, menstrual cramps, and rehabilitation after strokes.

However, the World Health Organization (WHO) has significantly expanded the indications for acupuncture use (Table 1.) [14].

The NIH has indicated the need for research to determine the scope of acupuncture applications. These studies should focus on degenerative changes in the knee joint, assessing whether acupuncture helps in combating chronic pain and inflammation, evaluating its impact on central nervous system function using functional MRI, examining its effect on hypertension, its influence on symptoms of advanced colorectal cancer, and, most importantly, investigating the safety and efficacy of acupuncture. The very fact that a prestigious organization such as the NIH has seriously addressed acupuncture speaks in favor of its use [15].

In the United States, the application of acupuncture in chronic musculoskeletal conditions has gained widespread approval from patients (Table 2) [16]. However,

Table 2. Conditions for Which Acupuncture May Be Indicated (American Academy of Medical Acupuncture) [16]

• Management of acute and chronic pain
• In fractures, aiding in pain control, swelling reduction, and accelerating the healing process
• Post-traumatic and post-operative intestinal obstruction
• Temporomandibular joint disorders, bruxism
• Muscle cramps, tremors, tics, contractures
• Dysmenorrhea, pelvic pain
• Paresthesias
• Insomnia
• Anxiety, fear, panic
• Anorexia
• Drug detoxification
• Atypical chest pain (negative effect)
• Neuralgias (trigeminal, shingles, postherpetic, others)
• Idiopathic palpitations, sinus tachycardia
• Seventh nerve palsy following a cardiovascular incident (aphasia, hemiplegia)
• Allergic sinusitis
• Some functional gastrointestinal disorders (nausea and vomiting, esophageal spasm, hyperacidity, irritable bowel syndrome, etc.)
• Persistent hiccups
• Headache, dizziness (Ménière's disease), tinnitus
• Selected dermatoses (urticaria, pruritus, eczema, psoriasis)
• Phantom pain
• Constipation, diarrhea
• Frozen shoulder
• Urinary incontinence, urinary retention (neurogenic, spastic, drug-induced)
• Cervical and lumbar spine syndromes
• Abdominal bloating
• Plantar fasciitis
• Severe hyperthermia
• Arthritis/osteoarthritis
• Cough with contraindications to narcotics
• Bursitis, tendinitis, carpal tunnel syndrome
• Acupuncture anesthesia for high-risk patients
• Sprains and contusions

limited expectations and caution suggest skepticism regarding its use in pathologies such as traumatic spinal cord injuries, vascular-related cerebrovascular events, neurodegenerative diseases, thalamic pain, and in cases of severe inflammatory and immunologically conditioned diseases—especially those requiring steroid therapy. Additionally, acupuncture should not be considered a primary approach for conditions such as HIV, cancer, or chronic fatigue syndromes. Nevertheless, it may serve as a complementary treatment in all these conditions by improving quality of life, reducing pain, and potentially enhancing immune function [15].

AIM

The primary aim of this article is to critically evaluate whether acupuncture is a scientifically validated therapeutic intervention or primarily a placebo effect. To achieve this, the article first explores the mechanisms of action attributed to acupuncture, considering both the traditional Chinese medicine (TCM) perspective and modern scientific explanations. This includes analyzing biological evidence related to neurophysiological and biochemical mechanisms, such as endorphin release, neurotransmitter modulation, and findings from functional MRI (fMRI) studies. Additionally, the article examines whether acupuncture points possess distinct biological properties compared to non-acupuncture sites, providing insight into whether their effects can be objectively measured. Another key goal is to assess the clinical evidence supporting acupuncture's effectiveness. By reviewing systematic reviews, randomized controlled trials (RCTs), and meta-analyses, the article determines the strongest areas of medical application, such as pain management, nausea relief, and neurological conditions. A critical comparison between genuine acupuncture and sham acupuncture studies helps evaluate the extent to which placebo effects contribute to its reported benefits. Furthermore, the article analyzes acupuncture's current role in modern medicine by reviewing global health organizations' recommendations, particularly those from the World Health Organization (WHO) and the National Institutes of Health (NIH). It investigates acupuncture's integration into different healthcare systems and identifies the patient populations most likely to benefit from treatment. By examining the range of conditions for which acupuncture is used, the article highlights both its established and potential applications. Beyond effectiveness, the article also addresses risks, safety concerns, and contraindications associated with acupuncture. It identifies potential complications, side effects, and contraindications, ensuring a balanced discussion of its benefits and risks. This includes exploring whether acupuncture is a safe complementary treatment when performed by trained professionals and assessing its limitations. Ethical concerns, such as the possibility of misleading patients into choosing acupuncture over more evidence-based treatments, are also considered. Ultimately, the article aims to determine acupuncture's place in modern medicine. It evaluates whether acu-

puncture should be regarded as a primary treatment, a complementary therapy, or a practice largely dependent on placebo effects. Recognizing the challenges of scientifically validating acupuncture within a Western medical framework, the article underscores the need for further high-quality research and well-structured studies to establish clearer clinical guidelines. By addressing these aspects, the article provides a balanced, evidence-based perspective on acupuncture, clarifying its legitimacy and medical relevance.

MATERIALS AND METHODS

The Material and Methods section of this article involves a comprehensive review of existing literature, including systematic reviews, randomized controlled trials (RCTs), and meta-analyses on acupuncture. It examines studies on the biological mechanisms of acupuncture, such as functional MRI (fMRI) research, neurotransmitter modulation, and biochemical changes associated with needling. Additionally, official guidelines and reports from the World Health Organization (WHO) and the National Institutes of Health (NIH) are analyzed to assess recognized applications and safety considerations. The review also includes observational data on patient outcomes, potential risks, and reported complications. By synthesizing scientific evidence and clinical findings, this section aims to provide an objective foundation for evaluating acupuncture's effectiveness and safety.

REVIEW

The effectiveness of acupuncture has been extensively studied, with varying levels of scientific support for different conditions. While some medical organizations acknowledge its therapeutic value for specific ailments, others remain skeptical due to inconsistent study results and the potential influence of placebo effects. The National Institutes of Health (NIH) and the World Health Organization (WHO) have reviewed clinical evidence and identified several conditions where acupuncture may have therapeutic benefits. According to the NIH, the strongest evidence supports acupuncture's effectiveness in dental pain, postoperative nausea and vomiting, chemotherapy-induced nausea, and pregnancy-related nausea. These conditions have been studied in randomized controlled trials (RCTs), where acupuncture consistently outperforms placebo or standard treatments. Beyond these well-documented applications, acupuncture has been explored for a range of other conditions, including chronic pain, migraines, fibromyalgia, osteoarthritis, and addiction treatment. Clinical trials suggest that acupuncture may provide relief for these conditions, though results are sometimes conflicting. Studies on lower back pain, headaches, and knee osteoarthritis have shown moderate benefits, leading some physicians to recommend acupuncture as a complementary therapy.

PRACTICAL INDICATIONS FOR USE

Statistically, the most common application of acupuncture is for chronic pain that does not respond to standard therapies. Unfortunately, this group of patients has often exhausted previously available therapeutic options, making them the most challenging to treat. Therefore, it seems more rational to initiate acupuncture therapy earlier, before resorting to more potentially aggressive treatments [17].

Thus, the first step in this direction should be introducing general practitioners to the fundamental rationale of acupuncture therapy. If a patient is referred to an acupuncturist, periodic examinations and assessments should be diligently recorded. If the patient does not respond positively within the first 4 or 10 sessions, further treatment should not be recommended. General practitioners have a relatively narrow range of referrals, primarily for chronic musculoskeletal pain, lower back pain, and headaches.

SAFETY AND SIDE EFFECTS

Like any invasive technique, acupuncture carries certain risks, such as puncturing internal organs, potentially leading to pneumothorax, cardiac tamponade, nerve or vascular damage, infection, allergic reactions to metal, localized pain, bruising, bleeding, or hematoma formation. However, considering the millions of acupuncture procedures performed worldwide, severe complications are rare [18]. A well-trained acupuncturist can effectively prevent such incidents.

The most frequently observed alarming event is likely the "needle shock reaction," which involves fainting or a pre-fainting state after needle insertion. Removing the needles and administering smelling salts effectively reverses this unpleasant reaction [19, 20].

CONTRAINDICATIONS

Some patients do not tolerate needling and may panic. Others are unable to maintain the required position for a specified period. Patients who are uncooperative due to mental health conditions should also not undergo acupuncture. Local skin conditions (e.g. inflammatory signs, scars) should not be needled either. Electroacupuncture should not be applied to the heart or brain area. Bleeding disorders are an obvious contraindication [21].

RELATIVE CONTRAINDICATIONS

Pregnancy requires special knowledge on the part of the acupuncturist but is not an absolute contraindication; however, improper application may induce uterine contractions. Acupuncture should be avoided during menstruation due to its lack of efficacy in this period. Patients taking steroids or psychotropic medications may respond poorly to acupuncture.

RECOGNIZED APPLICATIONS OF ACUPUNCTURE

Besides its recognized effectiveness in treating various types of nausea and headaches, acupuncture appears to be useful in reducing the intensity of commonly occurring lower back pain [22].

The pathophysiology of these conditions remains poorly defined and multifactorial. Observations and clinical studies suggest that anatomical abnormalities in the lumbosacral spine, such as foraminal stenosis, deforming changes in the facet joints, and discopathies, may be linked to pain complaints. However, the same studies also reveal the presence of such advanced changes in patients without symptoms. Recent findings using functional MRI indicate changes in the central nervous system of patients with chronic lumbar spine pain syndrome [23- 29].

DISCUSSION

The effectiveness of acupuncture has been extensively studied, yielding varying degrees of scientific support for different conditions. While some studies provide strong evidence of therapeutic benefits, others highlight the challenges in distinguishing acupuncture's physiological effects from placebo responses [30].

The National Institutes of Health (NIH) and the World Health Organization (WHO) have recognized acupuncture as an effective treatment for specific conditions. According to an NIH consensus panel, the strongest evidence supports its effectiveness in dental pain, postoperative nausea and vomiting, chemotherapy-induced nausea, and pregnancy-related nausea, as demonstrated in multiple randomized controlled trials (RCTs) [31]. A systematic review confirmed that acupuncture significantly reduces nausea and vomiting, often outperforming conventional anti-nausea medications [32].

Beyond these well-established applications, acupuncture has been studied for chronic pain conditions, migraines, fibromyalgia, osteoarthritis, and addiction treatment. A meta-analysis concluded that acupuncture provides moderate pain relief for musculoskeletal conditions, osteoarthritis, and chronic headaches, particularly in cases where standard therapies are insufficient [33]. Another study on lower back pain and knee osteoarthritis found that acupuncture offered a small but statistically significant improvement in pain and function compared to sham treatments [34].

The WHO has expanded the list of conditions for which acupuncture may be beneficial, including respiratory disorders (sinusitis, asthma, bronchitis), gastrointestinal issues (gastritis, irritable bowel syndrome), neurological disorders (stroke rehabilitation, trigeminal neuralgia), and musculoskeletal problems (frozen shoulder, tennis elbow, sciatica, and osteoarthritis) [35]. However, the scientific rigor supporting these applications varies, with some conditions being endorsed based on traditional practice rather than high-quality clinical trials.

One of the primary challenges in acupuncture research is distinguishing between true physiological effects and placebo responses. Many studies have compared traditional acupuncture with sham acupuncture, where needles are inserted at non-acupuncture points or superficially without full penetration. The results have been mixed – while some studies demonstrate a significant difference between real and sham acupuncture, others suggest that both interventions produce similar outcomes, raising the possibility that patient expectations and psychological factors play a substantial role in the perceived benefits [36]. A comprehensive review found that while acupuncture is more effective than no treatment for chronic pain conditions, the difference between real and sham acupuncture was modest, further supporting the hypothesis that placebo effects contribute to the observed benefits [37]. However, in conditions such as chemotherapy-induced nausea and postoperative pain, real acupuncture consistently outperformed sham acupuncture, indicating that specific needling techniques may induce physiological effects beyond placebo [38].

Acupuncture has increasingly been integrated into conventional healthcare systems in various countries. In the United States and Europe, it is primarily used for pain management and complementary therapy in chronic conditions, particularly when standard medical treatments fail to provide relief. In contrast, China, Japan, and Korea incorporate acupuncture more broadly into mainstream hospital care, often as part of an integrative medical approach (39). Despite its growing acceptance, skepticism remains among medical professionals due to the lack of a clearly defined mechanism of action and the variability in study outcomes. Some experts argue that acupuncture's benefits are largely context-dependent, influenced by patient expectations, provider interactions, and cultural beliefs [40].

Recognizing the need for further scientific validation, both the NIH and WHO have called for more high-quality research to define acupuncture's precise role in modern medicine. Ongoing studies are focusing on using functional MRI (fMRI) and biochemical markers to determine whether acupuncture produces reproducible changes in brain activity and neurotransmitter levels [41]. Additionally, research is exploring acupuncture's potential effects on chronic inflammatory

diseases, neurological disorders, and hypertension, aiming to clarify the extent of its therapeutic impact [42]. Establishing standardized treatment protocols is another research priority, as inconsistencies in study designs and acupuncture techniques have contributed to the mixed results observed in clinical trials [43].

In summary, acupuncture has demonstrated clinically significant benefits in nausea management and pain relief, with potential applications in a range of conditions. However, the mixed results from sham acupuncture trials and the difficulty in explaining its effects through Western medical frameworks highlight the need for further rigorous, high-quality research. Future investigations should focus on defining acupuncture's biological mechanisms, optimizing treatment protocols, and establishing clear clinical guidelines to determine its true place in evidence-based medicine.

CONCLUSIONS

Acupuncture has demonstrated clinical benefits in nausea management and pain relief, with potential applications in a range of conditions. However, mixed results from sham acupuncture trials highlight the need for more rigorous, high-quality research to establish its true efficacy. Future studies should focus on determining precise biological mechanisms, optimizing treatment protocols, and defining acupuncture's role within evidence-based medicine.

REFERENCES

1. Ernst E. The Desktop Guide to Complementary and Alternative Medicine: An Evidence Base Approach. New York, NY, Mosby, 2001.
2. Lewis K, Abdi S. Acupuncture for lower back pain: a review. Clin J Pain 2010;26:60-69
3. White A, Ernst E. A brief history of acupuncture. Rheumatology (Oxford) 2004;43:662-663.
4. Eisenberg D, Wright TL, Benson H. Encounters with Qi: Exploring Chinese Medicine. New York, NY, WW Norton & Company, 1995.
5. Kaptchuk T. The Web That Has No Weaver: Understanding Chinese Medicine. New York, NY, Congdon and Weed, 1983.
6. Sierpina V. Alternative Systems of Care. Integrative Health Care: Complementary and Alternative Therapies for the Whole Person. Philadelphia, PA, FA Davis, 2001, pp 96–103.
7. Kong J, Kaptchuk TJ, Webb JM, et al. Functional neuroanatomical investigation of vision-related acupuncture point specificity – a multisession fMRI study. Hum Brain Mapp. 2009, Jan;30(1):38-46.
8. Darras JC, Albaréde P, deVeernejoul P. Nuclear medicine investigation of transmission of acupuncture information. Acupunct Med. 1993;11:22-28.
9. Helms J. Acupuncture Energetics. Berkeley, CA, Medical Acupuncture Publishers, 1996.
10. Han JS. Acupuncture: neuropeptide release produced by electrical stimulation of different frequencies. Trends Neurosci. 2003;26:17-22.
11. Stux G, Pomeranz G. Scientific Basis of Acupuncture: Acupuncture Textbook and Atlas. New York, NY, Springer Verlag, 1987.
12. Pomeranz B. Scientific research into acupuncture for the relief of pain. J Altern Complement Med. 1996;2:53-60.
13. NIH Consensus Statement: Acupuncture 1997;15:1-34. http://consensus.nih.gov/cons/107/107_intro.htm [Access: October 2024].
14. World Health Organization list of common conditions treatable by Chinese Medicine and Acupuncture. http://tcm.health-info.org/WHO-treatment-list.htm. [Access: October 2024].
15. Helms J. An overview of medical acupuncture. Altern Ther Health Med 1998;4:35-45.
16. American Academy of Medical Acupuncture. http://www.medicalacupuncture.org [Access: October 2024].
17. Vickers AJ. Linde acupuncture for chronic pain. JAMA. 2014 Mar 5;311(9):955-6.
18. White A, Hayhoe S, Hart A, et al. Adverse events following acupuncture: prospective survey of 32,000 consultations with doctors and physiotherapists. BMJ. 2001;232:467-468.
19. Ernst E. Life threatening adverse reactions after acupuncture? A systematic review. Pain1997;71:123-126.
20. Peuker E, White A, Ernst E, et al. Traumatic complications of acupuncture: therapists need to know human anatomy. Arch Fam Med. 1999;8:553-558.
21. Furlan AD, van Tulder MW, Cherkin DC, et al. Acupuncture and dry-needling for low back pain. The Cochrane database of systematic reviews. 2005;(1):CD001351.
22. Berman BM, Langevin HM, Witt CM, Dubner R. Acupuncture for chronic low back pain

July 29, 2010 N Engl J Med 2010;363:454-461.

23. Langevin HM, Stevens-Tuttle D, Fox JR, Badger GJ, Bouffard NA, Krag MH. Ultrasound evidence of altered lumbar connective tissue structure in human subjects with chronic low back pain. BMC Musculoskelet Disord. 2009;10:151-151
24. Demoulin C, Crielaard JM, Vanderthommen M. Spinal muscle evaluation in healthy individuals and low-back-pain patients: a literature review. Joint Bone Spine 2007;74:9-13
25. Jarvik JG, Hollingworth W, Heagerty PJ, Haynor DR, Boyko EJ, Deyo RA. Three-year incidence of low back pain in an initially asymptomatic cohort: clinical and imaging risk factors. Spine 2005;30:1541-1548

26. Carragee EJ, Alamin TF, Miller JL, Carragee JM. Discographic, MRI and psychosocial determinants of low back pain disability and remission: a prospective study in subjects with benign persistent back pain. Spine J. 2005;5:24-35
27. Jensen MC, Brant-Zawadzki MN, Obuchowski, N, Modic, MT, Malkasian, D, Ross, JS. Magnetic resonance imaging of the lumbar spine in people without back pain. N Engl J Med 1994;331:69-73
28. Jarvik JJ, Hollingworth W, Heagerty P, Haynor DR, Deyo RA. The Longitudinal Assessment of Imaging and Disability of the Back (LAIDBack) Study: baseline data. Spine 2001;26:1158-1166
29. Deyo RA, Weinstein JN. Low back pain. N Engl J Med 2001;344:363-370
30. Yuan J, Purepong N, Kerr DP, Park J, Bradbury I, McDonough S. Effectiveness of acupuncture for low back pain: a systematic review. Spine 2008;33:E887-E900)
31. NIH Consensus Conference. Acupuncture. JAMA. 1998;280(17):1518-1524.
32. Ezzo J, Streitberger K, Schneider A. Acupuncture for chemotherapy-induced nausea and vomiting: A systematic review of randomized clinical trials. Support Care Cancer. 2006;14(8):757-764.
33. Vickers AJ, Cronin AM, Maschino AC, et al. Acupuncture for chronic pain: Individual patient data meta-analysis. Arch Intern Med. 2012;172(19):1444-1453.
34. MacPherson H, Vertosick EA, Foster NE, et al. The persistence of the effects of acupuncture after a course of treatment: A meta-analysis of patients with chronic pain. Pain. 2017;158(5):784-793.
35. World Health Organization. Acupuncture: Review and Analysis of Reports on Controlled Clinical Trials. 2002. https://chiro.org/acupuncture/FULL/Acupuncture_WHO_2003.pdf [Access: October 2024]
36. Lund I, Lundeberg T. Are minimal, superficial or sham acupuncture procedures acceptable as inert placebo controls? Acupunct Med. 2009;27(3):112-116.
37. Vickers AJ, Vertosick EA, Lewith G, et al. Acupuncture for chronic pain: Update of an individual patient data meta-analysis. J Pain. 2018;19(5):455-474.
38. Lee A, Fan LTY. Stimulation of the wrist acupuncture point PC6 for preventing postoperative nausea and vomiting. Cochrane Database Syst Rev. 2009;(2):CD003281.
39. Birch S, Hesselink JK, Jonkman FA, Hekker TA, Bos A. Clinical research on acupuncture: Part 1. What have reviews of the efficacy and safety of acupuncture told us so far? J Altern Complement Med. 2004;10(3):468-480.
40. Ernst E. Acupuncture – a critical analysis. J Intern Med. 2011;269(1):79-97.
41. Han JS. Acupuncture and endorphins. Neurosci Lett. 2004;361(1-3):258-261.
42. Zhao ZQ. Neural mechanism underlying acupuncture analgesia. Prog Neurobiol. 2013;112:92-110.
43. White A, Foster NE, Cummings TM, Barlas P. Acupuncture treatment for chronic knee pain: A systematic review. Rheumatology. 2008;47(9):1292-1296.

CONFLICT OF INTEREST

The Authors declare no conflict of interest.

CORRESPONDING AUTHOR

Iwona Morawik
Department of Anaesthesiological Nursing and Intensive Medical Care,
Medical University of Lublin,
Lublin, Poland;
e-mail: iwona.morawik@umlub.pl

ORCID AND CONTRIBUTIONSHIP

Iwona Morawik: 0000-0001-6998-3349 A B D
Karolina Turżańska: 0000-0001-7359-9622 A B D
Mirosław Jabłoński: 0000-0002-7490-4745 D E F

A – Work concept and design, B – Data collection and analysis, C – Responsibility for statistical analysis, D – Writing the article, E – Critical review, F – Final approval of the article

RECEIVED: 20.11.2024
ACCEPTED: 21.02.2025