Scientific Research Publishing

Journal of Biosciences and Medicines, 2025, 13(11), 483-499
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Complementary and Alternative Medicine (CAM) Approaches in Osteoarthritis: A Brief Academic Review

Ege Islatince

Department of Trauma and Orthopaedics, Salisbury District Hospital, Salisbury, UK
Email: egeislatince@gmail.com

How to cite this paper: Islatince, E. (2025) Complementary and Alternative Medicine (CAM) Approaches in Osteoarthritis: A Brief Academic Review. *Journal of Biosciences and Medicines*, **13**, 483-499.
https://doi.org/10.4236/jbm.2025.1311035

Received: October 27, 2025
Accepted: November 25, 2025
Published: November 28, 2025

Abstract

Aim: This study aims to summarize the clinical efficacy and safety profiles of complementary and alternative medicine (CAM) approaches (acupuncture, electroacupuncture, pharmacopuncture, laser acupuncture, low-level laser therapy—LLLT/PBMT, moxibustion, TENS, and massage therapy) in the management of osteoarthritis (OA), and to discuss the strengths and weaknesses of current evidence. **Methods**: A narrative synthesis was conducted using current clinical research, systematic reviews, and meta-analyses regarding relevant methods. Key outcomes included pain intensity, functional capacity, patient satisfaction, and adverse events. **Results**: Most CAM approaches report positive outcomes in terms of pain reduction and functional improvement, especially in the short-to-medium term. Laser acupuncture and LLLT/PBMT demonstrated significant effects on pain and function; acupuncture showed supportive benefits in OA; TENS contributed short-term analgesic effects with specific parameters and proper electrode placement; massage therapy positively affected pain and quality of life. Pharmacopuncture presented promising results with selected agents, while bee venom acupuncture (BVA) indicated signals of efficacy alongside risks for adverse events. **Limitations**: Many studies suffered from small sample sizes, heterogeneous protocols, lack of blinding, and short follow-up durations, limiting the strength of the evidence. Standardization of parameters (dose, frequency, number of sessions) and long-term outcomes remain insufficient. **Conclusion**: CAM approaches provide safe and viable options that complement pharmacological and rehabilitative methods in OA treatment. Nevertheless, high-quality, parameter-standardized, long-term randomized studies are needed to enhance clinical practice. Multidisciplinary and personalized integration has the potential to improve patient outcomes.

Keywords

Osteoarthritis Treatment, Alternative Medicine, Acupuncture, Moxibustion, Transcutaneous Electrical Nerve Stimulation (TENS)

1. Introduction

Healthcare costs in countries worldwide are on a continual upward trend. This situation has led both patients and healthcare professionals to seek solutions for severe pain and forced the exploration of alternative methods outside conventional medical practices to improve pain management. Such practices are generally grouped under the umbrella of "complementary and alternative medicine" (CAM). Although "alternative medicine" is widely used in many countries, in Western societies it is seen as practices outside the modern medical system; when these methods are adopted alongside conventional treatments, they are referred to as "complementary medicine". Practices in this field are highly diverse and constantly evolving. Thus, the definition of CAM cannot be provided clearly, and the boundaries between conventional and alternative medicine have become increasingly transparent.

CAM practices are widely accepted and are considered potential options in treating various illnesses and health conditions. The focus of this research is the use of CAM methods in managing osteoarthritis (OA) symptoms. The effectiveness and intensive use of CAM in OA treatment have been confirmed by community-based research. These studies and their results are detailed in the literature review. CAM practices are widespread, and this trend is recognized among different cultural and ethnic groups. However, the need for high-quality, evidence-based studies supporting the effectiveness of different CAM techniques used in chronic diseases such as OA remains. The reason for focusing on acupuncture, moxibustion, TENS, low-level laser therapy and stimulation (LLLT), and massage therapy as CAM methods in this research is that these practices are thought to provide potential benefits both in symptom alleviation and in improving patient quality of life. Furthermore, these approaches are generally non-invasive, have low side effects, and are acceptable to patients. They can be used together with conventional treatments or, at times, in place of them, especially for common problems such as chronic OA, back and neck pain, and muscle tension. There are numerous clinical studies in the literature proving the effectiveness of these methods, making them scientifically worthy of scrutiny. Thus, evaluating their individual and comparative effectiveness is considered potentially useful for clinical practices and health policies. This research aims to contribute to the literature by focusing on CAM practices preferred in the treatment of OA.

2. Osteoarthritis (OA)

Osteoarthritis (OA) is the most common degenerative joint disease, characterized

by progressive cartilage destruction, changes in subchondral bone, osteophyte formation, and inflammation in the synovium [1]. OA is a common musculoskeletal system disease marked by chronic pain and physical dysfunction. Typically affecting the knees, hips, hands, and spine, the disease is a significant source of morbidity in elderly individuals, causing movement restriction and reduced quality of life. Risk factors include age, obesity, female gender, joint injuries, genetic predisposition, and occupational strain [2]. Obesity contributes to knee OA via both increased mechanical load and systemic inflammatory processes [3]. The diagnosis of OA is made by evaluating both clinical symptoms and radiological findings. Typical findings include joint pain, stiffness, movement restriction, and crepitus. Radiologically, joint space narrowing, osteophyte formation, and subchondral sclerosis are observed [4]. Currently, there is no curative therapy for OA; treatment approaches aim to control symptoms and increase functional capacity. A stepwise approach is typically followed: lifestyle modifications (weight control, exercise), pharmacological agents (paracetamol, NSAIDs, intra-articular injections), physical therapy, and surgical interventions (e.g., total knee arthroplasty) in advanced cases [5]. Many patients experience inadequate pain relief with standard treatments and turn to CAM methods. CAM encompasses a wide range of practices used to manage pain, improve function, or enhance quality of life [6]. Particularly popular among OA patients are TENS, acupuncture, Tai Chi, yoga, and some herbal supplements. TENS may be effective by modulating pain transmission via neural pathways and has shown significant short-term pain reduction in clinical trials [7]. Exercise practices like Tai Chi and yoga improve not just pain, but also balance, flexibility, and psychological well-being [8]. The glucosamine-chondroitin combination is the most widely used supplement; however, evidence for its benefits is mixed, and the American College of Rheumatology does not recommend its routine use [9]. Studies report that 70% - 90% of osteoarthritis patients have tried at least one CAM method, with use widespread across ethnic and socioeconomic groups [6].

3. Treatments under Review

3.1. Acupuncture

Acupuncture, one of the modern complementary medicine methods, is probably the most recognized and widely used alternative treatment method and is a fundamental part of traditional Chinese medicine. Acupuncture is a treatment method based on traditional Chinese medicine, applied by placing fine needles at certain anatomical points on the body. In traditional Chinese medicine, the human body is divided into 365 points and 12 meridians. Acupuncture is performed by inserting and manipulating needles into specific points along these 12 meridians, depending on the condition being treated. With about 2,500 years of history, acupuncture was originally widely practiced in Asian countries such as China, Korea, and Japan; today, it is widely used as part of complementary and alternative medicine (CAM) in many Western countries [10]. The World Health Organization

(WHO) recognized the effectiveness of acupuncture for various diseases in 1979 and issued a statement supporting it [11]. The basic principle of acupuncture is based on the belief that the life energy called "Qi" flows along the body's meridians, and imbalances in this flow lead to disease. Acupuncture aims to rebalance this energy flow. Modern medical perspectives explain the effect of acupuncture through the central and peripheral nervous systems. It is suggested that, upon needle application, neurotransmitters such as endorphin, serotonin, and adenosine are released, raising the pain threshold and providing analgesia [12]. Clinically, acupuncture is used in a wide range of conditions: osteoarthritis, back pain, migraine, fibromyalgia, nausea-vomiting, and the management of treatment-related symptoms in cancer patients [13]. Especially in osteoarthritis, randomized controlled studies support acupuncture's effectiveness. A meta-analysis in patients with knee OA showed that acupuncture was significantly more effective than placebo in reducing pain and improving function [14]. However, there is heterogeneity in study results on acupuncture's efficacy and mechanisms. In some studies, distinguishing it from placebo has been difficult; outcomes have varied with practitioner experience, patient expectation, and application protocol [15]. Therefore, for the clinical adoption of acupuncture, more standardized, double-blind, long-term studies are needed. Nonetheless, acupuncture stands out as a supportive method for various diseases in both traditional and modern medicine and is considered especially valuable in pain management, with its effect partially explained by neurophysiological mechanisms.

3.2. Electroacupuncture (EA)

Electroacupuncture emerges as a promising, scientifically based complementary treatment method in OA management. It involves applying a low-frequency (typically 2 - 100 Hz) electrical current via acupuncture needles placed at specific body points. The mechanism is neurophysiological. This stimulation activates nerve endings, increasing the release of neurotransmitters such as β-endorphin, enkephalin, and serotonin, and provides stronger and more consistent stimulation than traditional acupuncture. These neurochemical substances can inhibit pain transmission and provide anti-inflammatory effects [12]. Electroacupuncture's effect on OA proceeds via both central and peripheral mechanisms. Electrical stimulation blocks pain pathways at the spinal cord and peripherally may reduce the release of inflammatory mediators. Clinical studies indicate that EA is effective in reducing OA symptoms. For instance, Wang and colleagues (2020) found in a randomized controlled trial of 250 knee OA patients that EA significantly improved pain and joint function. A meta-analysis also showed EA surpassed both placebo and traditional acupuncture [16]. EA may also help prevent muscle atrophy in the long term by increasing activity levels. Generally, it is considered safe; when performed with proper sterilization by trained practitioners, the risk of serious side effects is low. Mild side effects may include redness at the application site, temporary pain, or muscle twitching [17].

3.3. Pharmacopuncture and Laser Acupuncture

Pharmacopuncture is a method that combines pharmacological and neurophysiological effects, involving the injection of low-dose pharmacological agents into traditional acupuncture points. The goal is to achieve both local and systemic therapeutic effects through substances injected at specific points. Clinical research shows pharmacopuncture has delivered promising results, especially in pain management and musculoskeletal diseases [17]. Its efficacy varies with the choice of injection point, drug type/dose, and application frequency. Anti-inflammatory agents, vitamin B12, lidocaine, and herbal extracts have shown particular effects on pain scores and functional improvement [18]. Vitamin B12, commonly used for musculoskeletal pain, helps reduce neuropathic and myofascial pain by supporting nerve conduction; lidocaine provides fast analgesia by creating temporary peripheral nerve block. In some clinical applications, bee venom extract is used for its anti-inflammatory and anti-nociceptive effects. One advantage of pharmacopuncture is the minimal systemic side effects due to direct low-dose application at the target tissue. More randomized controlled studies are needed for the widespread clinical use of this method. Laser acupuncture is a treatment in which low-intensity laser light is applied to acupuncture points instead of needles. Through photobiomodulation, it increases cellular metabolism and microcirculation, helping reduce pain, regress inflammation, and accelerate tissue healing [19] [20]. Recent studies evaluating the efficacy of laser acupuncture for OA, especially knee OA, report significant reductions in pain scores and increased functional capacity [18]. The selection of laser parameters—wavelength, energy density, duration—is critical for therapy efficacy. Evidence also suggests that laser acupuncture can enhance clinical outcomes when combined with traditional needling [21]. Due to its painless, safe, and repeatable application, laser acupuncture is now an important component of complementary medicine for OA management.

3.4. Bee Venom Acupuncture (BVA)

Bee venom acupuncture (BVA) is a treatment method involving the injection of diluted bee venom into specific acupuncture points. This technique combines the pharmacological effects of bee venom with traditional acupuncture. Some authors suggest that injections are more effective when applied not only to anatomical acupuncture points, but also to points where the patient actively feels the acupuncture effect. BVA is particularly used for musculoskeletal pain conditions such as back, neck, and joint pain, as well as rheumatic diseases [22].

Studies—including those by Lee, M. S. and colleagues—report that when BVA is used together with classical acupuncture, pain measured on the Visual Analogue Scale (VAS) was significantly lower compared to saline injections (mean difference 14.0 mm; 95% CI: 9.5 - 18.6 mm; $P < 0.001$; $n = 112$). Jeong *et al.* (2024) reviewed 23 clinical studies focused on shoulder pain, with findings suggesting BVA may provide positive effects on pain and function, albeit with a low evidence level and adverse effects infrequently reported. Data from 14 clinical studies on

ankle pain suggest BVA produces positive results in pain reduction and functional improvement. However, the limited number of high-quality randomized controlled trials in this field is notable.

The safety of bee venom therapy is important. Systematic reviews have indicated adverse events are frequently reported with BVA. One meta-analysis estimated that BVA use carries a relative risk 261% higher than saline injection (relative risk 3.61; 95% CI: 2.10 - 6.20). Adverse reactions range from mild skin changes—itching and redness—to serious immunological reactions, only rarely resulting in anaphylaxis [23]. Therefore, practitioners must have bee venom expertise, conduct allergy testing, and be prepared for emergency intervention. Most existing studies are small-sample and have methodological limitations [22]. Differences in dosage, number of sessions, bee venom concentration, blinding, control group selection, and lack of long-term follow-up are also limiting factors [24].

3.5. Low-Level Laser Acupuncture (LLLA)

Low-level laser acupuncture (LLLA) is a needle-free technique applying low-energy laser light to traditional acupuncture points, aiming to combine acupuncture's stimulatory effects with the therapeutic benefits of low-level laser therapy for pain control, tissue repair, and functional improvement [20] [21]. The general definition involves applying light energy to acupuncture points, studied under the term "laser acupuncture". Laser light produces biophysical reactions within these tissues—affecting nerves, connective tissue, and local circulation. The effect relies on photobiomodulation, with laser light boosting mitochondrial cytochrome C oxidase activity and increasing cellular ATP production, as well as stimulating molecules (e.g., nitric oxide) for improved local circulation. The correct selection of dose (energy density), wavelength, application duration, and frequency is critical; for example, 0.5 J/cm^2 of laser light can create a photobiological impact [25]. Another study in this field on osteoarthritis cases has determined that low-level laser acupuncture reduces postoperative pain levels and morphine consumption [26]. In another study, 71 patients with knee osteoarthritis (KOA) were retrospectively examined in two groups according to whether low-level laser therapy at acupuncture points was added to standard therapies—TENS, superficial infrared (IR) with heat lamps, ultrasound (US), and exercise—over 15 sessions. When the post-treatment values of the groups were compared, no significant difference was found in Lysholm Knee Scoring Scale (LKSS) scores, but activity pain Visual Analog Scale (VAS) and walking and stair climbing test results showed a significant decrease in favor of the LLLT (+) group, which received laser therapy at acupuncture points. It was stated that TENS, IR, US, and exercise methods used in routine KOA treatment are effective, but these methods do not prevent symptom recurrence. As a result, the effect of adding LLLT to routine therapy was examined, and better results were obtained in the LLLT (+) group compared to the group receiving only physiotherapy. It was concluded that LLLT can be used as an easy-to-apply method with a very low side effect profile in appropriate patients as an ad-

dition to physiotherapy [27]. Another study on low-level laser acupuncture has shown that acupuncture is beneficial in the short term for reducing pain severity in muscle-origin temporomandibular joint disorder (TMD). According to meta-analysis results, the acupuncture group and the laser acupuncture group had a higher efficacy rate compared to the placebo control group. This demonstrates that acupuncture and laser acupuncture applications have high effectiveness in TMD treatment. The result of the study shows that the evidence for the efficacy of acupuncture in symptomatic treatment of TMD is limited, and laser acupuncture is reported to be highly effective in the treatment of temporomandibular joint disorders [28]. In summary, studies on the efficacy of laser acupuncture demonstrate it is a promising method, but certain limitations should be noted. In particular, differences in dose parameters used in research, laser device characteristics, and patient selection standards make it difficult to compare results [19].

3.6. Moxibustion

This treatment method is accepted and widely used in traditional Chinese medicine. It generally involves applying the heat and thermal effects obtained by burning the *Artemisia vulgaris* plant, commonly known as "moxa," to acupuncture points or specific regions of the body. This technique is explained through concepts in traditional Chinese medicine such as "heat stimulation," "regulating the flow of qi," and "opening meridians." Modern approaches attempt to explain the biophysical effects of moxibustion; for example, local heat may increase microcirculation, affect nerve stimulation, and alter the levels of inflammatory molecules [29]. Moxibustion is applied in various clinical areas such as pain management, osteoarthritis, dysmenorrhea, lower back pain, chronic fatigue, and irritable bowel syndrome (IBS). For example, You *et al.* (2021) conducted a systematic review based on randomized controlled trials examining moxibustion therapy for chronic fatigue syndrome, reporting positive effects on symptom improvement. However, the studies were found to be limited in methodological quality, suggesting the need for higher-quality research in the future [30]. Another study in a specific field such as knee osteoarthritis (348 patients, WMD = 4.36; 95% CI = 2.27 - 6.44; $p < 0.0001$) reported that moxibustion produced significant improvement in the "bodily pain" subcategory compared to the control group [31]. Findings in the literature indicate that moxibustion may be a potentially effective and generally safe complementary therapy for various clinical conditions. In the systematic review by You *et al.* (2021), randomized controlled trials conducted especially for chronic fatigue syndrome were analyzed, concluding that moxibustion contributed to symptom improvement. However, some researchers stated that methodological limitations in these studies restrict the generalizability of these findings. Furthermore, as the practice of moxibustion becomes more widespread, increased attention should be paid to possible side effects. In a review published by Zhang, Yue, and Liu (2014), a total of 64 adverse event reports from six different countries were examined. This evaluation identified side effects such as allergic reactions, thermal burns,

infection, cough, nausea, vomiting, fetal distress, premature birth, basal cell carcinoma, ectropion, hyperpigmentation, and very rarely, death. Based on these findings, the importance of practitioner education level, technique used, duration of application, and patient safety protocols can be emphasized. Important limitations of the method are also highlighted in the literature [32]. In the systematic study by Xu, Zhang, and Liang (2017), it is stated that most randomized controlled trials face common methodological problems, including lack of blinding, inadequate randomization, and absence of a standardized application protocol. Differences in the type of intervention (direct/indirect moxibustion), dose, session duration, and follow-up intervals decrease comparability between studies [33]. Lastly, the limited data on long-term outcomes and mechanisms of action increase the need for further research. In this context, it is recommended to conduct high-quality, large-sample, placebo-controlled studies with long follow-up periods [29]. The method has been examined as a heat-stimulation intervention based on traditional Chinese medicine for many clinical applications, and research has presented some positive findings. However, based on the literature, it can be said that research methodologies must be improved for moxibustion to be accepted as "definitely effective". For moxibustion to be evaluated as a "complementary" therapy in clinical practice, it is advised to prioritize patient safety and monitor treatments with appropriate dosage.

3.7. Transcutaneous Electrical Nerve Stimulation (TENS)

TENS is a non-invasive pain management technique that stimulates peripheral nerves and modulates pain signals by delivering low-level alternating current through electrodes placed on the skin. The treatment parameters of TENS may vary depending on current intensity, frequency, pulse width, and duration of application [34]. Numerous studies on this treatment method have been conducted in the literature. Although the main topic of this research is complementary and alternative medicine (CAM) approaches used in the management of osteoarthritis, it is considered useful to examine various findings related to the efficacy of preferred methods. Accordingly, the findings of relevant clinical studies are summarized below.

Systematic reviews on chronic low back pain (CLBP) in recent years have yielded differing results. A 2023 meta-analysis reported that TENS provided short-term and clinically modest pain reduction compared to placebo, with no significant difference observed in secondary outcomes such as functional improvement [35]. Another pain physiology–focused study published in 2024 found that TENS did not significantly differ from active or passive controls in terms of pain or disability improvement in CLBP, emphasizing that the lack of standardization in current types and parameters weakened the evidence. Therefore, while TENS may provide temporary analgesia in some patients with CLBP, evidence for long-term and functional improvement remains at a moderate-to-weak level [35] [36]. A 2024 meta-analysis on fibromyalgia (FM) found that TENS produced significant im-

provements in pain, disability, and quality of life, with the effectiveness possibly related to session number, frequency, and intensity [37]. Another recent study also suggested that TENS is a promising treatment option for FM [38]. A comprehensive 2024 study on primary dysmenorrhea reported that both low-frequency and high-frequency TENS significantly reduced pain in women with primary dysmenorrhea in the short term [39]. Another review highlighted that high-frequency TENS was superior to placebo [40]. For knee osteoarthritis (KOA), recent findings indicate that electrode placement can influence clinical outcomes, with placement over high nerve density areas yielding greater pain relief [41]. In addition, wearable TENS solutions have been clinically observed to provide early pain reduction and decreased mild activity duration when combined with exercise [42]. Studies on postoperative pain have yielded interesting results. For example, a 2024 systematic review of randomized controlled trials found that TENS reduced both pain intensity and opioid consumption, with a favorable safety profile [43]. Another large-scale systematic review including 24,532 participants across 381 randomized controlled trials concluded that TENS significantly reduced pain intensity compared to placebo (SMD = −0.96; 95% CI [−1.14, −0.78]) [44]**.** Similarly, postoperative pain studies also confirmed that TENS significantly decreased pain intensity and opioid requirements [45]. Meta-analyses by Bjordal *et al.* (2007) and Johnson *et al.* (2022) on CLBP reported variable results depending on treatment parameters. For instance, high-frequency TENS was found to be more effective than placebo for short-term pain control [44]-[46]. However, most studies exhibit variations in methodological quality (e.g., blinding and protocol heterogeneity), limiting firm conclusions regarding the efficacy of this therapy [47]. It has also been shown that electrode placement over regions of high nerve density increases analgesic efficacy in knee osteoarthritis [48]. A meta-analysis investigating the benefits and risks of TENS for individuals with knee osteoarthritis found that electrostimulation produced a large effect in pain reduction and a moderate improvement in function, with no evidence of safety concerns. However, this large effect was questioned due to the small sample sizes and significant methodological flaws present in all included studies. To address these issues, the analyses were repeated with methodological corrections. The new analyses concluded that transcutaneous electrical stimulation was not more effective than sham stimulation in reducing pain. Therefore, the current evidence does not provide a reliable estimate of the effects of this common treatment method for knee osteoarthritis. Overall, due to its low rate of adverse effects, ease of application, and compatibility with multimodal therapy, TENS continues to be a valuable adjunctive treatment option in musculoskeletal pain management [49].

3.8. Laser Therapy (Low-Level Laser Therapy—LLLT or Photobiomodulation Therapy—PBMT)

Photobiomodulation Therapy (PBMT) represents the modern and more comprehensive form of what was long referred to in the literature as Low-Level Laser Therapy (LLLT). PBMT includes not only laser light but also low-intensity LED

light sources; therefore, in contemporary research, the term PBMT is used to describe all low-intensity light therapies aimed at modulating cellular biological processes through light energy. In this context, the terms LLLT and PBMT are often used interchangeably in clinical studies, with PBMT considered the broader and more updated terminology. This therapy aims to promote tissue healing, pain control, and inflammation reduction by stimulating cellular biological processes with low-intensity light energy. Laser light is absorbed by the mitochondrial enzyme cytochrome c oxidase in cells, increasing adenosine triphosphate (ATP) production. This process enhances cellular metabolism, microcirculation, and oxygenation [50]. These biostimulatory effects provide the rationale for the use of laser therapy not only in musculoskeletal disorders but also in neurological, dermatological, and dental indications. Clinical studies have shown that LLLT produces beneficial effects on pain and dysfunction, particularly in musculoskeletal disorders and degenerative diseases such as osteoarthritis [51]. In a randomized controlled trial involving patients with knee osteoarthritis, LLLT significantly improved pain scores, functional capacity, and total scores on the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Similarly, a meta-analysis by Stausholm *et al.* (2019) demonstrated that LLLT was significantly more effective than placebo in alleviating musculoskeletal pain [52]. The cellular effects of photobiomodulation are not limited to analgesic mechanisms. LLLT promotes tissue regeneration by stimulating vascular endothelial growth factor (VEGF) expression and fibroblast proliferation [20]. In addition, it modulates inflammation by increasing the production of anti-inflammatory cytokines and reducing proinflammatory mediators. These effects also support the use of laser therapy in clinical applications such as wound healing and peripheral nerve regeneration. Laser therapy has also shown promising results in the field of neurological rehabilitation [53]. Pioneering studies by Naeser and Hamblin (2011) suggested that transcranial laser therapy might have positive effects on cognitive recovery following traumatic brain injury and stroke. These effects are attributed to enhanced neuronal plasticity and mitochondrial energy metabolism induced by laser light [54]. However, certain methodological limitations in the literature should be noted. There is considerable heterogeneity across studies in terms of wavelength (630 - 904 nm), energy density, treatment duration, and frequency. Many studies also involve small sample sizes and lack adequate blinding standards [55]. These issues highlight the need for high-quality, multicentre randomized controlled trials to strengthen the evidence base for laser therapy. Overall, the biological effects of LLLT are well defined, and it can be stated that the therapy offers clinically meaningful contributions in pain management, tissue repair, and functional recovery.

3.9. Massage Therapy (MT)

Massage therapy (MT) is a complementary approach that seeks to promote physiological, psychological, and neurological well-being through manual techniques targeting the musculoskeletal system. It primarily aims to ease muscle tension,

enhance blood flow, facilitate lymphatic drainage, and reduce stress. The therapeutic effects of massage arise not only from mechanical pressure but also from neurohormonal mechanisms such as vagal nerve activation, endorphin release, and decreases in cortisol levels [56]. Through mechanical pressure, massage therapy enhances tissue perfusion and muscle elasticity. Studies in the literature have shown that regular massage increases intramuscular oxygenation and reduces lactic acid accumulation [57]. Furthermore, an increase in parasympathetic nervous system activity following massage has been associated with decreases in heart rate and blood pressure [58]. These physiological responses support the efficacy of massage in managing both acute and chronic pain. Clinically, massage therapy is widely used for musculoskeletal disorders, stress-related conditions, fibromyalgia, and chronic pain syndromes. According to Cochrane systematic reviews, massage therapy has been found effective in the short term for reducing pain and improving function in patients with low back pain, neck pain, and osteoarthritis [59]. In particular, studies on chronic low back pain have reported significantly greater pain reduction in groups receiving massage therapy compared to placebo or standard physiotherapy [60]. Massage therapy not only promotes physical recovery but also exerts positive effects on psychological conditions such as anxiety, depression, and sleep disorders. In a study by Field *et al.* (2005), a 31% reduction in cortisol levels and a 28% increase in serotonin and dopamine levels were observed following massage. These findings suggest that massage exerts a regulatory effect on neurotransmitter balance via the nervous system [61]. Although massage therapy generally appears beneficial in pain management, systematic reviews highlight important limitations such as methodological quality, small sample sizes, and protocol heterogeneity [62] [63]. In this context, massage therapy presents a holistic treatment approach through its combined biological and psychological effects, showing favorable outcomes in studies on pain control, stress reduction, and quality of life improvement.

4. Discussion

Complementary and alternative medicine (CAM) practices aim not only to control symptoms in chronic degenerative diseases such as osteoarthritis but also to support biopsychosocial well-being. Acupuncture and laser acupuncture exert analgesic effects by enhancing the release of endorphins and serotonin, whereas moxibustion increases regional blood flow and cellular oxygenation. Transcutaneous Electrical Nerve Stimulation (TENS) acts by blocking neural pain transmission, while massage therapy improves mobility by regulating muscle tone. However, evidence regarding the efficacy of these therapies remains heterogeneous. Some meta-analyses have demonstrated significant improvements in pain reduction and functional outcomes, whereas others have yielded results comparable to those of a placebo. Therefore, integrating complementary modalities into osteoarthritis management within the framework of evidence-based medicine is of great importance.

Future research should aim to clarify long-term effects, determine optimal treatment parameters, and assess patient adherence. In clinical settings, adopting a multidisciplinary approach that combines conventional therapies with CAM modalities in a balanced and patient-centered manner is likely to yield the best outcomes. The CAM modalities reviewed in this study differ in their mechanisms of action and levels of supporting evidence. Current scientific findings indicate that acupuncture and TENS demonstrate comparatively stronger and more reproducible evidence of effectiveness in managing osteoarthritis-related pain.

Laser acupuncture and photobiomodulation (LLLT/PBMT) have shown promising results in recent clinical studies, particularly in terms of tissue healing and pain modulation; however, due to heterogeneity in wavelength, energy density, and application protocols, their level of evidence remains moderate. Moxibustion and massage therapy, though widely applied in clinical practice, possess relatively lower evidence strength due to small sample sizes and methodological limitations within existing studies.

Accordingly, treatment selection should consider not only the biological mechanisms of action but also patient-specific factors such as disease stage, symptom profile, comorbidities, expectations, and practitioner experience. The use of CAM in osteoarthritis management may be structured according to different stages of therapy. For instance, TENS and acupuncture can be utilized for short-term symptom control during acute pain flares, whereas laser acupuncture and photobiomodulation may be more beneficial during the subacute phase, focusing on tissue repair and microcirculatory enhancement. Massage therapy may serve as an effective adjunct in patients experiencing significant muscle spasm or functional movement limitation, while moxibustion may be particularly useful in cases requiring improved circulation and localized thermal stimulation.

Clinicians are advised to integrate CAM approaches not as primary interventions but as complementary adjuncts to evidence-based physiotherapy and exercise programs. Such integration aligns with the dual objectives of achieving symptomatic relief and promoting long-term functional improvement. Furthermore, patient education and the encouragement of active participation in treatment are essential to enhance both the sustainability and clinical success of these therapeutic interventions.

5. Conclusions

This study comprehensively evaluated the effectiveness of complementary and alternative medicine (CAM) practices in the treatment of osteoarthritis. The findings indicate that methods such as acupuncture, laser acupuncture, moxibustion, TENS, and massage therapy contribute to reductions in pain intensity and improvements in functional capacity. Pharmacopuncture and laser acupuncture, which combine pharmacological and neurophysiological mechanisms, are regarded as complementary approaches capable of producing therapeutic effects at both local and systemic levels, thereby supporting disease management and recovery

processes.

TENS and massage therapies promote pain control by facilitating muscle relaxation and improving circulation. Most of these methods have a low incidence of adverse effects, highlighting their favorable safety profiles. However, due to methodological limitations present in many existing studies—such as small sample sizes, lack of blinding, and short follow-up durations, there remains a need for high-quality clinical research to further substantiate the efficacy of CAM interventions in osteoarthritis treatment.

In conclusion, complementary medicine practices should be considered effective, non-invasive therapeutic options that support pharmacological treatments and enhance patient quality of life in the management of osteoarthritis.

Funding

No external funding was received for this study.

Ethical Approval

As this study is a narrative review that does not involve human or animal subjects, ethical committee approval was not required.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

References

[1] Hunter, D.J. and Bierma-Zeinstra, S. (2019) Osteoarthritis. *The Lancet*, **393**, 1745-1759. https://doi.org/10.1016/s0140-6736(19)30417-9

[2] Loeser, R.F., Goldring, S.R., Scanzello, C.R. and Goldring, M.B. (2012) Osteoarthritis: A Disease of the Joint as an Organ. *Arthritis & Rheumatism*, **64**, 1697-1707. https://doi.org/10.1002/art.34453

[3] Bliddal, H., Leeds, A.R. and Christensen, R. (2014) Osteoarthritis, Obesity and Weight Loss: Evidence, Hypotheses and Horizons—A Scoping Review. *Obesity Reviews*, **15**, 578-586. https://doi.org/10.1111/obr.12173

[4] Kellgren, J.H. and Lawrence, J.S. (1957) Radiological Assessment of Osteo-arthrosis. *Annals of the Rheumatic Diseases*, **16**, 494-502. https://doi.org/10.1136/ard.16.4.494

[5] McAlindon, T.E., Bannuru, R.R., Sullivan, M.C., Arden, N.K., Berenbaum, F., Bierma-Zeinstra, S.M., *et al.* (2014) OARSI Guidelines for the Non-Surgical Management of Knee Osteoarthritis. *Osteoarthritis and Cartilage*, **22**, 363-388. https://doi.org/10.1016/j.joca.2014.01.003

[6] Callahan, L.F., Wiley-Exley, E.K., Mielenz, T.J., *et al.* (2005) Use of Complementary and Alternative Medicine among Primary Care and Specialty Clinic Patients with Arthritis. *Arthritis & Rheumatism*, **53**, 749-755.

[7] Chen, W., Hsu, W., Lin, Y. and Hsieh, L. (2013) Comparison of Intra-Articular Hyaluronic Acid Injections with Transcutaneous Electric Nerve Stimulation for the Management of Knee Osteoarthritis: A Randomized Controlled Trial. *Archives of Physical Medicine and Rehabilitation*, **94**, 1482-1489.

https://doi.org/10.1016/j.apmr.2013.04.009

[8] Wang, C., Schmid, C.H., Rones, R., Kalish, R., Yinh, J., Goldenberg, D.L., *et al.* (2010) A Randomized Trial of Tai Chi for Fibromyalgia. *New England Journal of Medicine*, **363**, 743-754. https://doi.org/10.1056/nejmoa0912611

[9] Hochberg, M.C., Altman, R.D., April, K.T., Benkhalti, M., Guyatt, G., McGowan, J., *et al.* (2012) American College of Rheumatology 2012 Recommendations for the Use of Nonpharmacologic and Pharmacologic Therapies in Osteoarthritis of the Hand, Hip, and Knee. *Arthritis Care & Research*, **64**, 465-474. https://doi.org/10.1002/acr.21596

[10] White, A., Cummings, M., Barlas, P., Cardini, F., Filshie, J., Foster, N.E., *et al.* (2008) Defining an Adequate Dose of Acupuncture Using a Neurophysiological Approach—A Narrative Review of the Literature. *Acupuncture in Medicine*, **26**, 111-120. https://doi.org/10.1136/aim.26.2.111

[11] World Health Organization (2002) Acupuncture: Review and Analysis of Reports on Controlled Clinical Trials. World Health Organization. http://whqlibdoc.who.int/publications/2002/9241545437.pdf

[12] Zhao, Z. (2008) Neural Mechanism Underlying Acupuncture Analgesia. *Progress in Neurobiology*, **85**, 355-375. https://doi.org/10.1016/j.pneurobio.2008.05.004

[13] Vickers, A.J., Cronin, A.M., Maschino, A.C., Lewith, G., MacPherson, H., Foster, N.E., *et al.* (2012) Acupuncture for Chronic Pain: Individual Patient Data Meta Analysis. *Archives of Internal Medicine*, **172**, 1444-1453. https://doi.org/10.1001/archinternmed.2012.3654

[14] Manheimer, E., Linde, K., Lao, L., Bouter, L.M. and Berman, B.M. (2010) Meta-Analysis: Acupuncture for Osteoarthritis of the Knee. *Annals of Internal Medicine*, **146**, 868-877. https://doi.org/10.7326/0003-4819-146-12-200706190-00008

[15] Linde, K., Niemann, K., Schneider, A. and Meissner, K. (2009) How Large Are the Nonspecific Effects of Acupuncture? A Meta-Analysis of Randomized Controlled Trials. *BMC Medicine*, **8**, Article No. 75. https://doi.org/10.1186/1741-7015-8-75

[16] Li, H., Zhang, D., Zheng, C., Li, Y. and Wang, Y. (2022) Efficacy of Electroacupuncture for Knee Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Pain Physician*, **25**, 221-233.

[17] Kim, S.Y., Lee, J.H. and Park, H.J. (2016) Clinical Applications of Pharmacopuncture in Integrative Medicine: A Review. *Integrative Medicine Research*, **5**, 92-98.

[18] Zeng, D., Yuan, D., Zhou, Q., Liu, Y., Ma, W. and Lan, L. (2025) Laser Acupuncture for the Pain of Knee Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Journal of Pain Research*, **18**, 3833-3841. https://doi.org/10.2147/jpr.s517994

[19] Chon, T.Y., Mallory, M.J., Yang, J., Bublitz, S.E., Do, A. and Dorsher, P.T. (2019) Laser Acupuncture: A Concise Review. *Medical Acupuncture*, **31**, 164-168. https://doi.org/10.1089/acu.2019.1343

[20] Chung, H., Dai, T., Sharma, S.K., Huang, Y., Carroll, J.D. and Hamblin, M.R. (2012) The Nuts and Bolts of Low-Level Laser (Light) Therapy. *Annals of Biomedical Engineering*, **40**, 516-533. https://doi.org/10.1007/s10439-011-0454-7

[21] Chon, J. and Park, S. (2019) Laser Acupuncture for Pain Management: Clinical Review and Practical Guidelines. *Complementary Therapies in Medicine*, **47**, Article 102201.

[22] Lee, M.S., Pittler, M.H., Shin, B., Kong, J.C. and Ernst, E. (2008) Bee Venom Acupuncture for Musculoskeletal Pain: A Review. *The Journal of Pain*, **9**, 289-297.

https://doi.org/10.1016/j.jpain.2007.11.012

[23] Park, J.H., Yim, B.K., Lee, J., Lee, S. and Kim, T. (2015) Risk Associated with Bee Venom Therapy: A Systematic Review and Meta-Analysis. *PLOS ONE*, **10**, e0126971. https://doi.org/10.1371/journal.pone.0126971

[24] Sung, S., Jang, S., Lee, G., Park, J., Lee, S. and Shin, B. (2025) Bee Venom Acupuncture for Musculoskeletal Pain Conditions: An Updated Systematic Review and Meta-Analysis. *BMC Complementary Medicine and Therapies*, **25**, Article No. 161. https://doi.org/10.1186/s12906-025-04891-1

[25] Boyraz, İ. and Yıldız, A. (2016) Lazer çeşitleri ve yüksek yoğunluklu lazer kullanımı doz parametreleri. *GOP Tıp Dergisi*, **1**, 1-8. https://dergipark.org.tr/tr/pub/gopctd/issue/27331/287703

[26] Huang, C.-H., Yeh, M.-L., Chen, F.-P. and Wu, D. (2022) Low-Level Laser Acupuncture Reduces Postoperative Pain and Morphine Consumption in Older Patients with Total Knee Arthroplasty: A Randomized Placebo-Controlled Trial. *Journal of Integrative Medicine*, **23**, 150-160.

[27] Yetişir, A. and Öztürk, G.Y. (2024) Effects of Low-Level Laser Therapy on Acupuncture Points on Knee Pain and Function in Knee Osteoarthritis. *Revista da Associação Médica Brasileira*, **70**, e20230264. https://doi.org/10.1590/1806-9282.20230264

[28] Di Francesco, F., Minervini, G., Siurkel, Y., Cicciù, M. and Lanza, A. (2024) Efficacy of Acupuncture and Laser Acupuncture in Temporomandibular Disorders: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *BMC Oral Health*, **24**, 3806-3815. https://doi.org/10.1186/s12903-023-03806-1

[29] He, T., Hu, H. and Liu, J. (2013) The Mechanism of Moxibustion: Ancient Theory and Modern Research. *Journal of Acupuncture and Moxibustion*, **33**, 342-348.

[30] You, J., Liu, S., Li, J., Li, Y. and Huang, H. (2021) Moxibustion for Chronic Fatigue Syndrome: A Systematic Review and Meta-Analysis. *Evidence-Based Complementary and Alternative Medicine*, **2021**, Article ID: 6418217. https://doi.org/10.1155/2021/6418217

[31] Li, A., Wei, Z., Liu, Y., Li, B., Guo, X. and Feng, S. (2016) Moxibustion Treatment for Knee Osteoarthritis: A Systematic Review and Meta-Analysis. *Medicine*, **95**, e3244. https://doi.org/10.1097/md.0000000000003244

[32] Zhang, Q.-H., Yue, J.-H. and Liu, M. (2014) Adverse Events Associated with Moxibustion: A Systematic Review of Case Reports. *Evidence-Based Complementary and Alternative Medicine*, Article ID 783704.

[33] Xu, F., Zhang, Y. and Liang, H. (2017) Moxibustion Treatment for Primary Osteoporosis: A Systematic Review of Randomized Controlled Trials. *PLOS ONE*, **12**, e0178688. https://doi.org/10.1371/journal.pone.0178688

[34] StatPearls (2023) Transcutaneous Electrical Nerve Stimulation. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK537188/

[35] Verville, L., Chen, Y., Marette, A., Léonard, G. and Descarreaux, M. (2023) Benefits and Harms of Transcutaneous Electrical Nerve Stimulation (TENS) for Chronic Primary Low Back Pain: Systematic Review and Meta-Analysis. *Pain*, **164**, 2608-2621. https://doi.org/10.1007/s10926-023-10121-7

[36] Wolfe, D., Rosenstein, B. and Fortin, M. (2024) The Effect of EMS, IFC, and TENS on Patient-Reported Outcome Measures for Chronic Low Back Pain: A Systematic Review and Meta-Analysis. *Frontiers in Pain Research*, **5**, Article ID: 1346694. https://doi.org/10.3389/fpain.2024.1346694

[37] Garcia-López, H., Calle-Ortega, F., García-Robles, P., *et al.* (2024) Effectiveness of

Transcutaneous Electrical Nerve Stimulation on Pain, Disability and Quality of Life in Fibromyalgia: A Meta-Analysis. *Clinical Rheumatology*, **46**, 6323-6333. https://pubmed.ncbi.nlm.nih.gov/38511391/

[38] Patel, P., Green, M., Tram, J., Wang, E., Murphy, M., Abd-Elsayed, A.A., *et al.* (2025) Latest Advancements in Transcutaneous Electrical Nerve Stimulation (TENS) and Electronic Muscle Stimulation (EMS): Revisiting an Established Therapy with New Possibilities. *Journal of Pain Research*, **18**, 137-153. https://doi.org/10.2147/jpr.s493162

[39] Han, S., Park, K.S., Lee, H., Kim, E., Zhu, X., Lee, J.M., *et al.* (2024) Transcutaneous Electrical Nerve Stimulation (TENS) for Pain Control in Women with Primary Dysmenorrhoea. *Cochrane Database of Systematic Reviews*, No. 7, CD013778. https://doi.org/10.1002/14651858.cd013331.pub2

[40] Lauro, C., McGarry, B.J. and Amico, J. (2024) Does TENS (Transcutaneous Electrical Nerve Stimulation) Reduce Pain from Primary Dysmenorrhea? *Evidence-Based Practice*, **27**, 30-31. https://doi.org/10.1097/ebp.0000000000002234

[41] Xu, Y., Bai, Y., Deng, M., Hu, X., Lian, M., Huang, Z., *et al.* (2025) Electrode Placement Affects Clinical Outcome in Transcutaneous Electrical Nerve Stimulation for Knee Osteoarthritis: A Combined Cadaver Study and Randomized Controlled Trial. *Pain and Therapy*, **14**, 1363-1377. https://doi.org/10.1007/s40122-025-00750-6

[42] Yamada, K., Shimizu, H., Doi, N., Harada, K., Ishizuka-Inoue, M., Yamashita, R., *et al.* (2025) Usefulness and Safety of a Wearable Transcutaneous Electrical Nerve Stimulation Device for Promoting Exercise Therapy in Patients with Chronic Knee Pain: A Randomized Controlled Trial. *Archives of Physical Medicine and Rehabilitation*, **106**, 167-176. https://doi.org/10.1016/j.apmr.2024.08.021

[43] Viderman, D., Nabidollayeva, F., Aubakirova, M., Sadir, N., Tapinova, K., Tankacheyev, R., *et al.* (2024) The Impact of Transcutaneous Electrical Nerve Stimulation (TENS) on Acute Pain and Other Postoperative Outcomes: A Systematic Review with Meta-Analysis. *Journal of Clinical Medicine*, **13**, Article 427. https://doi.org/10.3390/jcm13020427

[44] Johnson, M.I., Paley, C.A., Jones, G., Mulvey, M.R. and Wittkopf, P.G. (2022) Efficacy and Safety of Transcutaneous Electrical Nerve Stimulation (TENS) for Acute and Chronic Pain in Adults: A Systematic Review and Meta-Analysis of 381 Studies (the Meta-Tens Study). *BMJ Open*, **12**, e051073. https://doi.org/10.1136/bmjopen-2021-051073

[45] Johnson, M.I. and Martinson, M. (2017) Efficacy and Safety of TENS for Pain Control. Cochrane Database of Systematic Reviews.

[46] Bjordal, J.M., Johnson, M.I., Lopes-Martins, R.A., Bogen, B., Chow, R. and Ljunggren, A.E. (2007) Short-Term Efficacy of Physical Interventions in Osteoarthritic Knee Pain. A Systematic Review and Meta-Analysis of Randomised Placebo-Controlled Trials. *BMC Musculoskeletal Disorders*, **8**, Article No. 51. https://doi.org/10.1186/1471-2474-8-51

[47] Dailey, D.L., Rakel, B.A., Vance, C.G., *et al.* (2020) Transcutaneous Electrical Nerve Stimulation Reduces Movement-Evoked Pain and Fatigue in People with fibromyalgia. *Journal of Pain*, **21**, 901-915.

[48] Nunes, G.S., *et al.* (2022) Electrode Placement Influences TENS Outcomes in Knee Osteoarthritis: A Randomized Trial. *Clinical Rehabilitation*, **36**, 567-578.

[49] Rutjes, A.W.S., Nüesch, E., Sterchi, R., Kalichman, L., Hendriks, E., Osiri, M., Brosseau, L., Reichenbach, S. and Jüni, P. (2010) Transcutaneous Electrostimulation for Osteoarthritis of the Knee. *Cochrane Database of Systematic Reviews*, **2010**,

Article CD002823. https://doi.org/10.1002/14651858.CD002823.pub2

[50] Hamblin, M.R. and Demidova, T.N. (2006) Mechanisms of Low Level Light Therapy. *SPIE Proceedings*, **6140**, Article 614001. https://doi.org/10.1117/12.646294

[51] Rayegani, S.M., Raeissadat, S.A., Sedighipour, L., Bahrami, M.H., Eliaspour, D. and Kargozar, E. (2017) Effect of Low-Level Laser Therapy on Pain, Disability, and Range of Motion in Patients with Knee Osteoarthritis: A Randomized Double-Blind Clinical trial. *Lasers in Medical Science*, **32**, 493-501.

[52] Stausholm, M.B., Naterstad, I.F., Joensen, J., Lopes-Martins, R.Á.B., Sæbø, H., Lund, H., *et al.* (2019) Efficacy of Low-Level Laser Therapy on Pain and Disability in Knee Osteoarthritis: Systematic Review and Meta-Analysis of Randomised Placebo-Controlled Trials. *BMJ Open*, **9**, e031142. https://doi.org/10.1136/bmjopen-2019-031142

[53] Posten, W., Wrone, D.A., Dover, J.S., Arndt, K.A., Silapunt, S. and Alam, M. (2005) Low-Level Laser Therapy for Wound Healing. *Dermatologic Surgery*, **31**, 334-340. https://doi.org/10.1097/00042728-200503000-00016

[54] Naeser, M.A. and Hamblin, M.R. (2011) Potential for Transcranial Laser or LED Therapy to Treat Stroke, Traumatic Brain Injury, and Neurodegenerative Disease. *Photomedicine and Laser Surgery*, **29**, 443-446. https://doi.org/10.1089/pho.2011.9908

[55] Bjordal, J.M., Johnson, M.I., Iversen, V., Aimbire, F. and Lopes-Martins, R.Á.B. (2010) Low-Level Laser Therapy in Acute Pain: A Systematic Review of Possible Mechanisms of Action and Clinical Effects in Randomized Placebo-Controlled Trials. *Photomedicine and Laser Surgery*, **28**, 337-354.

[56] Moraska, A. and Chandler, C. (2009) Changes in Psychological and Physiological Parameters Following Massage Therapy: A Review of the Literature. *Evidence-Based Complementary and Alternative Medicine*, **6**, 367-381.

[57] Weerapong, P., Hume, P.A. and Kolt, G.S. (2005) The Mechanisms of Massage and Effects on Performance, Muscle Recovery and Injury Prevention. *Sports Medicine*, **35**, 235-256. https://doi.org/10.2165/00007256-200535030-00004

[58] Diego, M.A. and Field, T. (2009) Moderate Pressure Massage Elicits a Parasympathetic Nervous System Response. *International Journal of Neuroscience*, **119**, 630-638. https://doi.org/10.1080/00207450802329605

[59] Furlan, A.D., Giraldo, M., Baskwill, A., Irvin, E. and Imamura, M. (2015) Massage for Low-Back Pain. *Cochrane Database of Systematic Reviews*, No. 9, CD001929. https://doi.org/10.1002/14651858.cd001929.pub3

[60] Cherkin, D.C., Sherman, K.J., Kahn, J., Wellman, R., Cook, A.J., Johnson, E., *et al.* (2011) A Comparison of the Effects of 2 Types of Massage and Usual Care on Chronic Low Back Pain. *Annals of Internal Medicine*, **155**, 1-9. https://doi.org/10.7326/0003-4819-155-1-201107050-00002

[61] Field, T. (2016) Massage Therapy Research Review. *Complementary Therapies in Clinical Practice*, **24**, 19-31. https://doi.org/10.1016/j.ctcp.2016.04.005

[62] Mak, S., Allen, J., Begashaw, M., Miake-Lye, I., Beroes-Severin, J., De Vries, G., *et al.* (2024) Use of Massage Therapy for Pain, 2018-2023: A Systematic Review of Systematic Reviews. *JAMA Network Open*, **7**, e2422259. https://doi.org/10.1001/jamanetworkopen.2024.22259

[63] Whole Health Library, U.S. Department of Veterans Affairs (2024) Massage Therapy and Chronic Pain—Overview. https://www.va.gov/wholehealthlibrary