
A REVIEW OF LITERATURE ON THE EFFECTIVENESS OF DRY CUPPING THERAPY ON MUSCULOSKELETAL PAIN

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ABSTRACT

BACKGROUND: Musculoskeletal disorders account for 17% of all years that young adults worldwide have lived with a disability and are one of the main global causes of disability, making them the most common source of severe long-term pain and physical impairment. Even though these conditions are complex, 30–40% of musculoskeletal complaints among employed individuals have a work-related component. On the other hand, it has been found that musculoskeletal discomfort is the main cause of occupational incapacity.

OBJECTIVE: To find out the efficacy of dry CT on musculoskeletal pain.

METHOD: The articles were chosen from authentic platforms like PubMed and Google Scholar. The articles were selected from the years 2011-2023, a total number of 57 articles were identified, out of which 20 were selected for review.

RESULTS: dry cupping therapy has a significant impact on reducing musculoskeletal pain.

CONCLUSION: This study focuses on the conclusion that dry CT is often used to treat various musculoskeletal conditions. The conclusion of this investigation indicates that dry CT is efficient in reducing pain with no adverse effects. The second conclusion indicates that a minimum of five sessions are necessary to observe significant changes in dry CT intervention. The cups are typically held in place for 15 to 20 minutes, and interval periods between sessions are crucial for tissue re-establishment.

Keywords: dry cupping therapy, musculoskeletal pain, blood flow.

INTRODUCTION

Cupping is an ancient method used in treating pain and various disorders. Cupping is a basic technique that involves using quick, vigorous, and rhythmic strokes to activate muscles. It is very useful in treating aches and pains linked to a variety of illnesses. Cupping, then, has the potential to improve life quality.¹ A cupping session lasts approximately 20 minutes. During the procedure, the therapist designates particular locations or places for cupping and cleans the area. The therapist places a cup of the appropriate size in the chosen location and uses a flame, electrical suction, or manual suction to remove the air from the cup. After that, the cup is put to the skin and left there for three to five minutes.¹

Effects of cupping therapy: There is growing evidence that cupping can promote comfort and relaxation throughout the body, which boosts the brain's natural production of opioids and enhances pain management. According to other research, cupping therapy works primarily to improve blood circulation and eliminate waste and toxins from the body¹. Improving microcirculation, encouraging capillary endothelial cell repair, and speeding up granulation and angiogenesis in the local tissues—all of which would contribute to the patient's functional state returning to normal and progressive muscular relaxation. Additionally, cupping helps the patient by removing harmful substances from the interstitial compartment and skin microcirculation.¹ Cupping therapy increases blood supply to injured areas by rupturing capillaries in the skin surface, aiding in healing and bringing oxygenated blood and nutrients to damaged tissue, and also providing pain relief.²

Application of cupping: Cupping therapy involves applying small round cups made of glass, bamboo, ceramic, or plastic to the pain area, ensuring tight contact with skin and maintaining negative pressure through heat or vacuums.³ Negative pressure holds a cupping cup onto the skin, creating suction and pulling it upwards. Therapists use lubricants for wider coverage. Application areas that are commonly used are back, abdomen, chest, buttocks³.

Categorization of cupping intervention: A new categorization of cupping, comprising technical categories, suction power, method, materials, area treated, and other adjustments in cupping therapy, was introduced by Al-Bedah et al. in 2016. Dry cupping, known by other names as static or retained cupping, is a traditional CT used for a range of excruciating ailments and chronic diseases, increasing blood circulation and activating the immune system.⁴ Wet cupping also referred to as full cupping, bleeding cupping, and bloodletting cupping, is a traditional medicine method used to reduce pain. However, it has been linked to increased infection risk, vasovagal attacks, and scar formation, making it less significant in medical science. Flash

cupping, or empty cupping, is a short, moderate to low force application technique used to excite particular areas, particularly among adolescents and women, and may be made using one or four cups of moderate size. Massage cupping involves applying oil on skin surface and moving the cups using weak suction, suitable for both young and elderly individuals, using oils like olive, peppermint, and lavender.

Suction power in Cupping Therapy: Cupping is categorized according to the negative pressure level created within the cups, using light, medium, strong, or pulsatile pressure levels

Light cupping pressure: Light cupping pressure, a pressure level between 100-300 millibar, is used for children, elderly patients, and sensitive body parts. It might be combined with massage, dry, and flash techniques, leaving most patients without cupping marks.³

Medium cupping pressure: Medium cupping pressure, created by 3-4 manual pump suction, is common for common cupping but can leave marks and is not recommended for sensitive body areas.³

Strong cupping pressure: Strong cupping pressure, generated using a hand pump suction, is not recommended for children or elderly individuals due to potential health risks including inflammation, dermatitis, skin burns, and pain.³

Pulsatile cupping: Pulsatile cupping uses mechanical devices to generate variable pressure pulses every 2 seconds, typically 100-200 mb, for pain alleviation in knee osteoarthritis patients

Mechanisms of action¹:

There are three primary ideas and theory that could explain the mechanisms involved. Among these are "Reflex Zone Theory" (RZT), "Diffuse Noxious Inhibitory Controls (DNICs)," and "Pain-Gate Theory" (PGT). In the subsections that follow, each hypothesis will be briefly described

1. **Pain-Gate Theory:** the hypothesis presented suggests a mechanism through which pain stimulates to the brain, where it is processed and potentially alleviated. Cupping therapy, along with other reflex therapies, is posited to activate pain receptors, leading to changes in signals are processing at the brain and spinal cord levels. The Pain Gate Theory, proposed by Melzack and Wall in 1965, forms the foundation of this hypothesis, suggesting that increased activity in large fiber nerves can inhibit the transmission of pain signals.

The systematic evaluation of randomized controlled trials supports the therapeutic benefit of cupping for pain management, indicating its potential as a viable treatment option. However, the specific mechanisms through which cupping exerts its effects remain to be fully elucidated. It is hypothesized that cupping activates pain receptors, increasing impulse frequency and ultimately causing pain gates to close, thereby reducing pain perception.

2. **Diffuse Noxious Inhibitory:** Diffuse Noxious Inhibitory Controls (DNIC) is a concept that explains how CT may decrease pain. The idea behind this mechanism is that one pain can suppress another, known as "one pain masks another." In experimental settings, this pain-inhibitory mechanism can be easily triggered. The term "noxious inhibitory controls" or "DNIC-like" effects have been replaced with "conditioned pain modulation" (CPM). Experts recommend using "CPM" to describe the human behavioral aspect and "diffuse noxious inhibitory controls" to characterize the lower brainstem-mediated inhibitory mechanism seen in animal studies.

Study on this idea has mostly concentrated on idiopathic pain syndromes that respond well to CT, such as fibromyalgia, tension headaches, temporomandibular disorders, and irritable bowel syndrome. CT may induce localized injury to the epidermis and capillary vessels, triggering a nociceptive signal that activates DNICs. This mechanism requires a strong conditioning stimulus to attenuate pain, which may involve distraction effects. Additionally, CT has the potential to work by inducing a DNIC or by reducing oxidative stress and eliminating oxidants. The analgesic impacts of cupping technique may also be mediated through mechanically stimulated nerves, particularly A δ and C nerve fibers connected to the DNIC system. This mechanism is related to acupuncture, as both involve the modulation of pain through the "pain inhibits pain" phenomenon.

3. **Reflex Zone Theory:** In European traditional medicine, cupping therapy has historically been utilized to address carpal tunnel syndrome by targeting specific zones or segments of the shoulder triangle that are segmentally connected to the median nerve. This practice has garnered support from numerous investigations. The technique involves applying suction stimulation to the affected site to simplify the migration of red blood cells from the circulatory system to the surrounding tissue areas, promoting healing without damaging capillary vessels. This process, known as dry diapedesis, allows the connective tissue to either absorb or eliminate extravasations. According to traditional medicine principles, symptoms manifesting externally to an internal disease process often appear in regions not directly adjacent to the afflicted organ. The interaction of nerve,

muscle, and chemical pathways is responsible for the idea of a connection between two body components. Reflex zone therapy (RZT) is based on the premise that alterations in nearby dermatomes may reflect indications and symptoms of disease connected to a particular dermatome. Response indicators of sickness include skin flushing due to vasodilation and pallor, coldness, and clamminess resulting from vasoconstriction. Subcutaneous tissue may become swollen, thickened, and edematous, while muscle contraction may decrease. Degenerative changes in ligaments, cartilage, and joint capsules, coupled with reduced synovial fluid, contribute to painful and restricted movement. Impaired blood and tissue fluid circulation further compromises organ function. Changes in skin tone, texture, and perspiration often manifest early on during illness. Research by Sato and colleagues (1997) suggests that stimulating somatic structures, such as skin and peripheral joints, in experimental animals can significantly influence bladder, gastrointestinal, and cardiovascular functions. These reflexes operate through spinal, supra-spinal, and cortical pathways, exerting both excitatory and inhibitory effects on visceral function. In cupping therapy, the skin may become tender, uncomfortable, and swollen when the affected organ transmits signals to the skin via autonomic nerves. Application of cups activates skin receptors, fostering neurological connections that enhance blood flow and circulation to both the skin and internal organs.

Further elucidation of reflex treatment mechanisms will enhance clinical evidence and advance our comprehension of the neurobiology of complementary medicine, including cupping therapy.

METHODOLOGY

Literature search methodology

The search engines on the internet that are utilized to collect journals are Google Scholar and PubMed. The authors identified articles according to specific keywords. The articles were collected in full text. A total number of 57 articles collected and identified, out of which 20 articles were selected for review.

Study selection

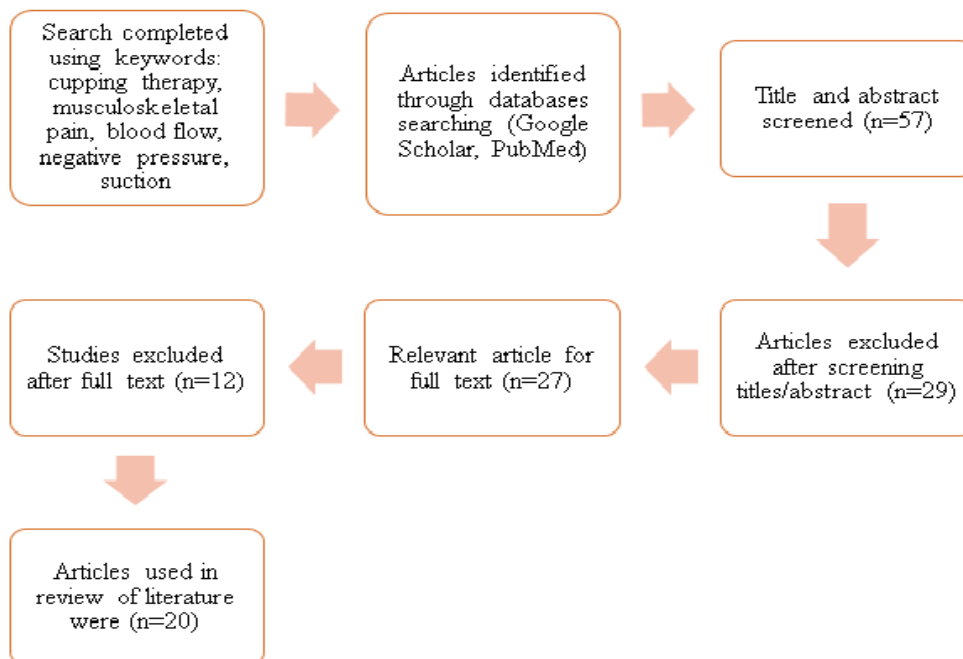
Inclusion criteria:

- Articles discussing about the impact of CT were included
- The article was exclusively published in English.
- Articles with full text from 2011-2023 have been included

Exclusion criteria:

- The articles published in other languages were excluded.
- Post-2011 articles were not included.
- Articles not containing information about cupping therapy.

FLOW CHART:



REVIEW OF LITERATURE:

- **Ayman A Mohamed, Xueyan Zhang, Yih-Kuen (2023)⁵** conducted a study to evaluate Evidence level of the impact of CT in musculoskeletal and sports rehabilitation. This study examines cupping therapy's evidence in musculoskeletal and sports rehabilitation, finding low to moderate evidence for pain reduction, improved blood flow, and low adverse effects. However cupping has low to moderate evidence in musculoskeletal and sports rehabilitation and might be used as a useful treatment.
- **S. Andrew Cage & Laurel Trail et al. (2023)⁶** did a research to evaluate the efficacy of CT on Muscle Tenderness in collegiate baseball players. 20 players aged from 22+- 2 years were randomly assigned in two groups. A treatment and sham treatment group. A 15-minute of CT procedure can reduce muscle tenderness in the triceps surae, according to a research that accounted for the placebo effect and bias during statistical analysis.
- **Dave Hammons & Molly McCullough (2021)⁷** Conducted a study on effects of cupping therapy on muscle stiffness, active Dorsiflexion and perceived pain of the medial gastrocnemius muscle following a cupping therapy treatment, Twenty participants were included, 10 Women 10 Men completed an exercise protocol. 5-minute dry cupping was performed on dominant leg medial gastrocnemius and Five minutes of rest for the non-dominant control leg. Muscle stiffness, active dorsiflexion and perceived pain were measured at baseline, pre-treatment, post-treatment and 5 minutes post-treatment in the medial gastrocnemius muscle. A single cupping treatment significantly improved active Dorsiflexion and decreased pain was observed in treatment group. No significant differences in Muscle stiffness was observed following the treatment.
- **Sweetie Malik, Pooja Anand, PoojaBhati, M. Ejaz Hussain (2022)⁸** did a study on pain, dynamic balance and functional performance in young female with recreational runners chronic plantar fasciitis. 30 female were included from outpatient department of SGT hospital. They were assigned into 2 groups dry cupping group (Experimental group n=15) and conventional group (control group n=15). They received 4 weeks of intervention (3days/day). The study suggests that dry cupping therapy can be an additional treatment method for young female runners suffering from chronic plantar fasciitis.
- **John Smith, Amy Morrison & Myra Villarreal (2021)⁹** Conducted research to analyze the effect of CT on muscle soreness of the gastrocnemius muscle and ROM in the ankle. 36 sample were divided into 3 groups, A group (no exercise) B group (bilateral heel drops to exhaustion) C group (right unilateral heel drops to exhaustion). Dorsiflexion range of motion was assessed bilaterally for all groups. All participants receive the cupping protocol on the right gastrocnemius but C also received it on the left gastrocnemius. Dry cupping was applied for 90 seconds and soreness was measured using a 10- point VAS scale at 24 & 48 hours. The study concluded that the 90 second of dry cupping on the gastrocnemius may reduce 24 hour muscle soreness but has no effect on range of motion.
- **Marianna de MeloSalemi and Vanessa Maria da Silva Alves Gomes et al(2021)¹⁰** did research on Dry CT on Pain and Functional Disability from Persistent Non-Specific Low Back Pain. The participants were allocated to a cupping therapy (n=19), or sham (n=18) group, the intervention session ranges from 5 to 10 minute, twice a week for 3 week. It was discovered that dry cupping was more successful in lowering all symptoms compared to sham.
- **Sarah Wood, Gary Fryer, Liana Lei Fon Tan & Caroline Cleary (2020)¹¹** conducted a systematic review and meta-analysis of 21 randomized controlled trials (RCTs) involving 1049 participants assessed the efficacy and safety of western dry cupping methods for treating musculoskeletal pain and reduced range of motion. Dry cupping significantly reduces pain in chronic neck pain, improves functional status, and significantly improves range of motion compared to no treatment.

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- **Bailey David (2020)¹²** conducted a research on pre-post study design to see the effects of dry CT on planter fascia pain and function. Subjects were taken from Sacramento State University. 12 subjects were randomly assigned to the cupping therapy or the sham cupping therapy, for two sessions through the week. The study found that dry cupping therapy is effective to alleviate pain and enhance functional performance in patients suffering from plantar fasciitis.
 - **Yen-Chun Chiu and IoannisManousakas et al (2020)¹³** did Experimental research that aimed to develop a quantified dry cupping on soft tissue compliance in athletes with myofascial pain syndrome. The study used a dry cupping system to treat elite baseball players with myofascial pain syndrome. Results showed that 89% of patients could not identify MTrP after 4 weeks of cupping, and soft tissue improvements were observed.
 - **Nazar Alkhadhrawi & Ali Alshami (2019)¹⁴** Conducted a study on calf muscle myofascial trigger point on pain and function in patient. 71 patients were assigned and divided into 2 groups an Intervention group (Dry CT) & Control group(stretching exercises), both group performs stretching exercise for calf muscle & plantar fascia and ankle Dorsiflexion exercise. A pre and post measurement of Ankle dorsiflexor ROM & Ankle plantar flexor strength were taken. In Intervention group Patients with planter heel pain experienced significant improvements in pain.
 - **Hugo Jário de Almeida Silva & Bruno T Saragiotto et al (2019)¹⁵** conducted research on individuals with non-specific chronic low back pain to examine the impact of dry CT: A protocol for a placebocontrolled, randomised, doubleblind study. 90 individuals, aged from 18-59 years will be assigned randomly into 2 group Dry cupping group and placebo dry cupping group. The intervention was given for once in a week for 8 weeks. A pre-test measurement was taken, immediately after the first treatment session, after 4 weeks of intervention, and after 8 weeks of intervention. This study evaluates dry cupping therapy's effectiveness in reducing discomfort and symptom-related to individuals.
 - **Jae-Eun Kim & Ji-Eun Cho et al (2017)¹⁶** did research on flexibility, Pain Threshold, and Muscle Activity of the Hamstring Muscle Compared to Passive Stretching in healthy individuals to measure the effect of CT. 30 healthy individuals were assigned randomly to CT and passive stretching. 1 weeks of intervention proves that CT has as much positive impact as passive stretching.
 - **S Anjum & A Anjum et al. (2016)¹⁷** conducted a study in relieving non-specific neck pain and its potential role in improving the health-related quality of life. 46 subjects of neck pain were recruited for the study, of which 31 subjects were diagnosed as having non-specific neck pain and were assigned in the study and from this 1 subject werelost to follow up and only 30 subjects were given 6 sessions of dry CT for 2 weeks. Dry cupping procedure is an excellent method for lowering generalized neck pain and raising overall health-related quality of life.
 - **Michael Teut, & Stefan Kaiser et al (2012)¹⁸** Conducted research the study aims to evaluate the efficacy of cupping in reducing the symptoms of knee osteoarthritis. 40 subjects were randomized to either 8 sessions of treatment within 4 weeks or no intervention. After 4 weeks it's noticed that Dry cupping with a pulsatile device relieves knee osteoarthritis symptoms, potentially useful in ambulatory healthcare services.
 - **Romy Lauche & Holger Cramer et al. (2011)¹⁹** did research, a randomized controlled pilot study investigated that the impact of dry cupping treatments on pain and mechanical thresholds in chronic non-specific neck pain patients. 50 patients were randomised to a treatment group or a control group. Subjects in the TG received a series of 5 CT and control group with no treatment over a period of 2 weeks. Five sessions of dry CTs provide good relieve from chronic neck pain, improving subjective measures and affecting mechanical pain sensitivity, suggesting cupping influences functional pain processing.
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DISCUSSION

The objective was to evaluate the impact of CT on musculoskeletal discomfort. CT is commonly used to treat musculoskeletal discomfort, including shoulder and lower back pain, neck pain, osteoarthritis, gastrocnemius muscle soreness, plantar fasciitis, etc. The clinical evidence of CT is minimal. The study's findings indicate that CT is a useful way to relieve discomfort without any adverse effects. Aboushanab et al's²⁰ review highlights CT as a reliable and ancient treatment for neck and back pain, reducing inflammation, enhancing blood flow, and facilitating deep-tissue massage. The mechanism of action underlying dry cupping therapy, the negative pressure to the skin surface, which promotes increased blood circulation, tissue oxygenation, and nutrient delivery to injured or affected areas. This process aids in tissue healing, reduces inflammation, and alleviates pain symptoms. Furthermore, articles delineate different types of CT including dry cupping, wet cupping, flash cupping, and massage cupping, each offering distinct therapeutic approaches tailored to specific patient populations and clinical presentations. Several studies have suggested that Wet cupping also promotes nociceptive stimulation, activating pain regulation pathways, making it beneficial for musculoskeletal disorders. However, it may lead to infection risk, scar formation, and vasovagal attacks. Dry cupping, also known as cupping massage, possesses more analgesic effect. The studies utilized variable suction strength while adhering to standardized protocols for light suction of 100-300 millibars with two pumping by hand and medium suction of 500 millibars with 5 or more pumping or pulsatile pressures between 100 to 200 millibars every 2 seconds. A cupping session was applied for 5 sessions around 20 minutes for 3-4 days. Researchers suggest that CT intervention requires a minimum of five sessions to observe significant changes, with interval periods crucial for tissue re-establishment. Most studies show low-quality evidence and high heterogeneity, with a significant decrease in pain connected with cupping therapy. Clinical trials have investigated cupping's role in neurological and infectious diseases.

Overall, the findings of this literature review underscore the growing body of evidence supporting the impact and harmlessness of dry CT as a complementary treatment modality for MSK pain management. However, further research including larger-scale clinical trials and long-term follow-up studies is warranted to elucidate optimal treatment protocols, patient selection criteria, and potential adverse effects associated with dry cupping therapy.

CONCLUSION

With this study, we came to the first conclusion CT is often utilized to treat a range of musculoskeletal pain such as low back and shoulder pain, non-specific neck ache, osteoarthritis, gastrocnemius muscle soreness, plantar fasciitis, etc. The study's findings indicate that CT is a useful method to relieve of ache without any adverse effects. Another conclusion indicates that a minimum of five sessions are necessary to observe significant changes in cupping therapy intervention, the cups are typically held in place for 15 to 20 minutes, and interval periods between sessions are crucial for tissue re-establishment.

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