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Chapter

The Role of Cupping Therapy in Pain Management: A Literature Review

Asma Al-Shidhani and Abdulaziz Al-Mahrezi

Abstract

Cupping therapy is an ancient method which has been used for centuries for various painful conditions. It is performed by applying cups to selected skin points most commonly in the back aiming to create areas of sub-atmospheric pressure. It has been classified as either dry or wet type of therapy. Its mechanism of action is not well understood but several proposed mechanisms are described in the literature. It is relatively safe with a few reported side effects which include scar formation and skin infection. In this paper, a review of the literature will be presented to determine its potential benefits in pain management particularly in musculoskeletal conditions such as low back and neck pain.

Keywords: cupping therapy, chronic pain, complimentary therapies, low back pain, pain management

1. Introduction

Cupping therapy is one of the oldest methods of complimentary therapies which has been used in early human civilization. Evidence shows that it was first practiced by the Ancient Egyptians more than 5500 years ago and then it was introduced to the Greek, the Romans, and the rest of the world [1]. The main postulated aim of this therapy is the extraction of harmful substances or toxins from the body by creating negative pressure in a cup [2]. Cupping was described by Razi as a process in which blood from superficial small vessels located in muscles is released [3]. It has been traditionally used for the treatment of painful conditions but has also been used to treat chronic diseases such as cardiovascular disorders, skin diseases, inflammatory disorders, and metabolic diseases [4, 5]. Its exact mechanism of action is not well-understood but several theories have been proposed [6].

2. Description of cupping therapy

Cupping therapy is done by applying small round cups which are made of glass, bamboo, ceramic or plastic to the area of pain. The cup has a rolled rim to ensure tight contact with skin to preserve the negative pressure created [7]. The mouth of the cup is placed firmly over the preferred location against the skin. The negative pressure is generated by heat or by other vacuums like manual pumps. This negative pressure fixes the cup onto the skin and creates suction effect which pulls the skin upwards into the

cup. Sometimes, the therapist uses lubricants to facilitate the movement of the cups to cover a wider area [8]. The common application sites are the back, chest, abdomen, buttock, and areas of abundant muscle. Traditionally, the cupping therapy is done in sets of four, six or ten [9]. The cups are usually kept in place for 5 to 20 minutes [6]. The common side-effects of cupping therapy are erythema, edema, and ecchymosis in the area where the cup rim was placed. These effects may take several days to weeks to disappear [4, 10]. The cupping therapy process usually consists of the following five main steps:

1. The therapist assigns and disinfects the designated area for cupping therapy.

2. A suitable sized cup is positioned on the selected area and the therapist uses a method of suction to suck the air inside the cup. The cup will be left on the skin for 3–5 minutes. If it is wet cupping, then superficial incisions are performed on the skin by a scalpel blade (No. 15 to 21) or by puncturing the skin with a needle, or an auto-lancing device or a plum-blossom needle [11].

3. The cup is placed again on the skin for 3–5 minutes.

4. The cup is removed.

5. The treated area is cleaned, disinfected, and a dressing is applied. The dressing is usually kept for 48 hours following the session of therapy [6].

3. Mechanism of action

While the exact mechanism of action of cupping therapy is not well-understood, multiple theories have been proposed. Six mechanisms of action have been suggested to describe the various effects of cupping therapy. Three of these theories are addressing the biological and mechanical basis of pain relief which results from cupping therapy. These theories are as follows: the pain-gate, the conditioned pain modulation, and the reflex zone. The remaining three proposed mechanisms of action are meant to explain the beneficial effects of cupping therapy which include an increase in blood circulation, immunomodulatory effects, and the removal of toxins and wastes [6]. The former three theories which are related to pain relief will only be discussed here.

3.1 Pain-gate theory

This theory proposes that cupping therapy could reduce pain intensity by influencing the communication routes of pain transmission from a stimulated area to the brain and backward [4]. Following a painful stimulus, pain signals are carried by both the small-diameter (A-delta and C) and the large-diameter (A-beta) nociceptive nerve fibers to synapse into a transmission cell in the dorsal horn of the spinal cord [12]. In this area pain modulation takes place through a network of interneurons and presynaptic pain gates [13]. The small fibers have an obstructive effect on the inhibitory cells thus allowing the flow of the transmission signals to the spino-thalamo-cortical pain pathway and then to the brain. While the large fibers stimulate the inhibitory cells and tend to inhibit transmission of pain signals. Thus, pain intensity is expected to be reduced when large nerve fibers are stimulated by touch or pressure or vibration. Based on this theory, both small and large nerve fibers are stimulated during cupping therapy [14]. During the initial stage of cupping therapy, the afferent large nerve fibers will partially close

the presynaptic gate as a result of the application of pressure to the skin [13]. As the stimulus intensity is increased, the number of activated units of nerve fiber increases. The subsequent positive and negative effects of the small and large nerve fibers responses tend to counteract each other. However, prolonged stimulation will lead to adaptation of the large fibers which will eventually result in opening of the presynaptic pain gates [13]. This adaptation can be modulated by employing additional stimuli during cupping therapy such as vibration and scratching to stimulate the large fibers again [15]. This increased activity will lead to the closure of the pain gates and experiencing further pain relief [15]. More research is needed to validate the application of this theory in cupping therapy.

3.2 Conditioned pain modulation

This theory has been also known by the term "Diffuse Noxious Inhibitory Controls (DNICs)." It is based on the assumption that "pain inhibits pain," or one type of pain masks another [16]. DNIC comprises a spinal-medullary-spinal pathway that is activated when two concomitant painful stimuli are applied at the same time [16]. The activation of this pain pathway, which is triggered by a distant noxious stimulus, causes inhibition of the primary pain at the level of the nociceptive spinal neurons [16]. This pain inhibitory system has been successfully demonstrated in animal studies [17]. Furthermore, findings from clinical studies on the idiopathic pain syndromes such as irritable bowel syndrome, temporomandibular disorders, fibromyalgia, and tension-type headache had confirmed the relevance of this theory to chronic pain in humans [16]. According to this theory, local vibration or scratching done during cupping therapy causes a nociceptive stimulus that triggers the activation of DNICs which eventually lead to the relief of the primary pain [6].

3.3 Reflex zone theory

Reflex Zone Theory proposes that there is an existing link between one organ of the body and another one. This link is mediated by interaction between nerves, chemicals, and muscles [18]. Thus, a disturbance in one organ causes external manifestations which can be detected at a site distal to the disturbed organ. The external manifestations are dependent on the organ manifesting them. For example, skin can become cold and pale due to vasoconstriction or it can become warm and red due to vasodilatation. The organ functions are affected due to a reduction in the circulating blood and tissue fluids [19]. Animal studies showed that somatic stimulation of the skin or the peripheral joints could lead to significant effects on the cardiovascular, urinary, and gastrointestinal functions [20]. These reflexes can be either excitatory or inhibitory in terms of organ function. Their main action is attained through spinal pathways, supra-spinal and cortical centers [20]. Therefore, it is hypothesized that the application of the cupping therapy cups over the skin result in the stimulation of the skin receptors which will eventually lead to an improvement in the blood circulation through the neural connections to the affected organ [21].

4. Classification of cupping therapy

Cupping was broadly classified into dry and wet cupping, but in 2016 Al-Bedah *et al* introduced a new classification which consisted of six categories, namely, technical types, power of suction, method of suction, materials inside cups, area treated, and other cupping types [22]. Aboushanab *et al* made additional modifications of these categories to become as follows [23]:

4.1 Technical types

This category of cupping is classified according to the cupping technique which is used. It includes four types; dry cupping, flash cupping, wet cupping and massage cupping [22].

4.1.1 Dry cupping

Dry cupping is also known as static cupping or retained cupping [24]. In dry cupping, negative pressure is generated inside the cups by different ways of suction like fire, manual pump or electrical suction. The cups are usually kept on the skin for up to 15 minutes [22]. When a manual pump is used, the pressure inside the cup is controlled by the number of suctions. As the number increases, the negative pressure inside the cup will increase [2]. Similarly, when fire is used, prolongation of fire exposure will increase the negative pressure inside the cup. This negative pressure leads to protrusion of the skin [22].

4.1.2 Flash cupping

Flash cupping is also known as empty cupping [24]. It involves performing quick suctions of medium to light pressure over the targeted area. The cup is applied for a very short time of less than 30 seconds to stimulate the area. It can be done by using only one cup or four medium-sized cups. This method can be used in situations where dry cupping is not recommended. For example, in young people and females [22].

4.1.3 Wet cupping

Wet cupping is also known as full cupping, bloodletting cupping, and bleeding cupping. It is commonly used in traditional medicine [24]. It involves scraping of the skin by a surgical instrument before applying the cups to suck the blood. The main side-effects of this method include higher risk of infection, vasovagal attacks, and scars development [22].

4.1.4 Massage cupping

Massage cupping is also known as moving cupping, dynamic cupping, and gliding cupping [2]. It is performed by applying oil over the skin and moving the cups over the treated area by using weak suction. Different types of oils are used such as olive oil, peppermint oil, and lavender oil. This type of cupping can be used for both young and elderly people [22]. **Figure 1** contains images of the four technical types.

4.2 Power of suction

This category of cupping is classified according to the negative pressure level created inside the cups. The pressure levels used are light, medium, strong or pulsatile pressure [22].

4.2.1 Light cupping pressure

Light cupping pressure is defined as a pressure level between 100 and less than 300 millibar (mb). The therapist generates weak suctions in the cup using one to two full manual pump suctions [2, 25]. It is mainly used for children, elderly patients, and for sensitive body parts like the face. Light cupping pressure can be used in conjunction with massage, dry, and flash cupping techniques. Its main

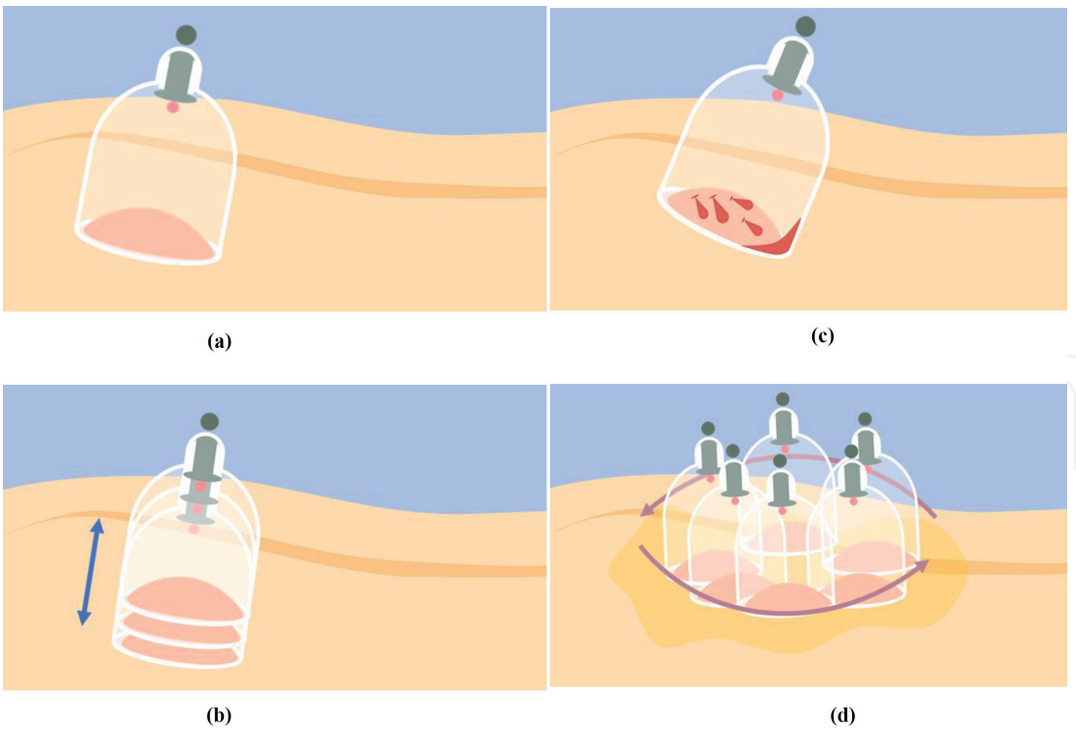


Figure 1.
Images representing the four technical types of cupping; (a) dry cupping, (b) flash cupping, (c) wet cupping, (d) massage cuppin.

advantage that it leaves most patients with no cupping marks. However, because of the light pressure, the cup tends to fall during the therapy session [22].

4.2.2 Medium cupping pressure

Medium cupping pressure is used for common purpose cupping [25]. The pressure level used is between 300 and less than 500 mb. It is created by 3–4 full manual pump suctions. Unlike light cupping, medium cupping can leave cupping marks over the body parts. It is not recommended for use over sensitive body areas such as the face [22].

4.2.3 Strong cupping pressure

Strong cupping pressure involves using a pressure level of above 500 mb [2]. It is usually generated by 5 or more full manual pump suctions. It is not recommended for children and elderly people. It can cause inflammation, dermatitis, skin burns, and pain [22].

4.2.4 Pulsatile cupping

Pulsatile cupping is when variable pulses of pressure are used. It is created by a mechanical device. One pulse is generated every 2 seconds. Therapists might use flexible silicone and plastic cups. The generated pressure level is usually between 100 and 200 mb. Its use has been limited to symptomatic pain relief in patients with knee osteoarthritis [26].

4.3 Methods of suction

The classification here is based on the method used to create the negative pressure inside the cups. These are as follows:

4.3.1 Fire cupping

Fire cupping is used with glass, ceramic, and bamboo cups that have no valves as the valve is used to control the air flow through the cup. Traditionally in China, a piece of paper or cotton is used either alighted and inserted into the cup directly, or soaked with 95% alcohol and attached to the end of a stick and then burned. The burning stick is used to make the cup hot and is removed later. This method is associated with a risk of burn [1, 22].

4.3.2 Manual vacuum cupping

Manual vacuum cupping is also known as vacuum cupping and opening cupping. The pressure is created by using a manual suction pump which is either self-suction cups or squeeze rubber top [1, 27]. Studies showed that manual vacuum cupping is superior to fire cupping in terms of causing greater blood flow to the treated area [1].

4.3.3 Electrical vacuum cupping

Electrical vacuum cupping is an electrical suction pump. It is used where the negative pressure can be easily adjusted and can be connected to several cups at the same time. Moreover, it is also used with pulsatile cupping because of its ability to generate pressure pulses [27].

4.4 Added therapy types:

This classification is done according to the additional material used in combination with the cups. It includes the following types [22, 23]:

4.4.1 Needle cupping

Needle cupping involves the combined use of acupuncture and cupping. Therapists usually apply acupuncture needles first followed by cupping therapy [27]. In this type, it is crucial to use small short needles and avoid specific body areas such as the abdomen and the chest to avoid any risk of organ penetration [22].

4.4.2 Hot cupping or Moxa cupping

Hot cupping or Moxa cupping is cupping combined with heat and a herb called Moxa [28]. Moxa is made up of dried Mugwort leaves. During the cupping process, the therapist will initially warm a needle with Moxa and applies a cup over it. A thin aluminum layer is used as a barrier before putting the hot Moxa to prevent skin burns [22].

4.4.3 Herbal cupping

Herbal cupping is also known as medicinal cupping. In this type, the therapist will boil a herbal solution for about 30 minutes and then bamboo cups will be soaked in the solution for five minutes before applying the cups to the skin [29]. To avoid skin burns, the cups will be left for one minute to cool down before applying them to the treated area [22].

Magnetic cupping is done by using magnetic cupping sets which have magnets inside. It is commonly used to treat joint-related diseases affecting big joints such as

knees and elbows. It is presumed that the electromagnetic stimulation enhances the therapeutic effectiveness of cupping [30].

4.4.4 Laser cupping

Laser cupping is a new cupping device which is used in combination with cupping therapy. An acupuncture laser probe is inserted inside the cups in order to stimulate specific acupuncture points as an additive effect to the cupping. The advantage of this method is that it provides the 'double effect' of both cupping therapy and laser acupuncture [31].

4.4.5 Electric stimulation cupping

Electric stimulation cupping uses transcutaneous electrical nerve stimulation (TENS) with cupping. It has also a dual effect like laser cupping therapy as both electric and cupping stimulate the treated area. It is mainly used for the stimulation of specific points and in cases of muscular pain [30].

4.4.6 Water cupping

Water cupping is done with cups containing warm water. The therapist will fill a third of a cup with warm water and then a burning cotton wool will be inserted into the cup prior to placing the cup over the skin [11].

4.4.7 Aquatic cupping

Aquatic cupping is a combination of cupping therapy with aquatic therapy where the cupping is performed underwater since it is presumed that muscles can be stretched more underwater [32]. It is commonly used for rehabilitation, and musculoskeletal problems [32].

5. Common clinical indications for cupping therapy

5.1 Low back pain

Low back pain (LBP) is a common clinical problem which has an estimated one-year prevalence of 38% in the general population [33]. The current management options include bed rest during the acute phase, analgesia, physiotherapy, traction, alternative treatments, and health education on prevention of future episodes [34]. Cupping therapy has been used for a long time for both acute and chronic low back pain. Studies have shown significant reduction in pain intensity scores and improvement in functional outcome tools with cupping compared to other modalities of treatment like usual care or medications [34, 35]. Wang *et al* conducted a meta-analysis of six randomized controlled trials (RCTs). The total number of participants was 458 (230 received cupping *versus* 228 who received usual care). Five RCTs included patients with non-specific low back pain and a single RCT included post-partum women with low back pain. Different types of cupping were used in these trials (3 dry cupping, 2 wet cupping, 1 moving cupping). Pain was measured by different tools (1 visual analogue scale (VAS), 2 VAS + Oswestry pain disability index (ODI), 2 the McGill pain index (MPPI) + ODI, 1 VAS + MPPI). The meta-analysis concluded that cupping therapy was more effective compared to other modalities on reducing the VAS scores, and ODI scores. However, this positive effect was not captured on the MPPI.

Teut *et al* conducted a three-armed RCT in patients with chronic LBP to investigate the effectiveness of two different forms of cupping (dry pulsatile and minimal) compared to medication (paracetamol) on demand alone. A total of 110 subjects were enrolled in the study. Both forms of cupping were found to be effective compared to the control group after 4 weeks of therapy based on VAS scores. After 12 weeks, subjects who were in the pulsatile cupping group only reported beneficial effects as documented by the VAS scores and the physical component scale of the health quality of life short-form questionnaire (SF-36) [36]. Most of the studies which included patients with LBP investigated the short-term effects of cupping and were conducted for 2 to 12 weeks only [34, 37]. In addition, all of these studies suffered from major limitations which included high heterogeneity, small sample size, different inclusion criteria, different assessment tools, different types of cupping therapy, and different number of treatment sessions. Despite these limitations, the available literature supports the use of cupping therapy in patients with LBP but high-quality randomized clinical trials of longer duration and utilizing standardized assessment tools are needed to confirm these short-term beneficial effects.

5.2 Neck pain

The lifelong prevalence of neck pain varies from 14.2% to 71% and it is more dominant in the high activity age groups, mainly individuals aged 35 to 49 years [38]. It was found to be associated with increased medical costs and adverse effects on personal productivity [39]. The commonly used therapies for neck pain include the use of analgesics and physiotherapy. In addition, surgery might be of help in some specific situations. However, these options are not always effective, and sometimes are associated with serious side-effects. Therefore, people have been always looking for other alternative options which include traditional medicine [40]. Cupping is one of the methods used commonly by people to relieve neck pain especially for the non-specific types. Studies conducted in patients with this condition investigated the effectiveness of cupping by measuring the following outcomes: pain intensity, disability scores, and quality of life [41]. The current available evidence indicates that cupping is effective for patients with chronic non-specific neck pain in terms of reduction in pain scores, improvement in disability scores, and quality of life indices compared to no treatment or active controls (physical therapy, non-steroidal anti-inflammatory drugs (NSAIDs), heat pack therapy, and acupuncture) [41]. Kim *et al* conducted a systematic review and meta-analysis which included 18 studies, out of which 7 studies used wet cupping while 11 studies used dry cupping as an intervention [41]. The number of subjects in each study ranged between 40 to 240 [41]. The subjects in the cupping group were reported to have significant reduction in pain scores, and significant improvement in terms of function and quality of life compared with no intervention or active control groups [41]. Leem *et al* studied the effects of cupping in patients with chronic neck pain for up to 2 years and reported sustainable positive effects on physical function and quality of life for the whole period of time unlike the effects on pain intensity which were not maintained [42]. In conclusion, the current evidence supports the use of cupping therapy to treat neck pain but it is not conclusive because of the low quality of available studies. Future better designed studies are required to confirm the beneficial effects of cupping in this group of patients.

5.3 Arthritis

Arthritis is a commonly seen clinical problem in medical practice. It is a manifestation of many joint disorders like osteoarthritis, gout, rheumatoid arthritis

and others. Cupping therapy has been used to reduce the joint pain associated with osteoarthritis (OA), gout and ankylosing spondylitis. OA is a common chronic degenerative joint disease. The commonly affected joints are knees, hips and shoulders. It may present with pain, stiffness, and decreased mobility due to the effects on joint function and stability [43]. Li J *et al* concluded that the use of a combination of cupping therapy and Western medicine (physical therapy and use of analgesics) is more effective compared to Western medicine alone in patients with knee OA in terms of pain and stiffness reduction and improvement in physical function domains of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) [44]. Yet, the use of cupping therapy alone compared to Western medicine therapy was not superior in decreasing pain intensity [44].

Gout is an inflammatory arthritis which results from deposition of monosodium urate crystals in the joint space. It typically presents with painful joint inflammation, mainly in the first metatarsophalangeal joint [45]. A single study which was conducted in China investigated the combined effects of cupping and herbal medicine in comparison to the use of NSAIDs in acute gouty arthritis. The investigators reported that the therapeutic effects of both cupping and herbal medicine were comparable to NSAIDs but the differences were not statistically significant [46].

Ankylosing spondylitis (AS) is a chronic inflammatory disorder which causes chronic back pain. The common presenting symptoms are back pain and stiffness due to spinal fusion and ankylosis [47]. Ma *et al* conducted a systematic review and meta-analysis which included 5 RCTs, each with a sample size for each trial ranging from 42 to 280. Most of these trials were of low methodological quality [48]. It was concluded that the use of a combination therapy of cupping and Western medicine was more effective compared to Western medicine alone in terms of pain and stiffness reduction, improvement in physical function, disease activity, and serum levels of inflammatory markers (ESR and CRP) [48].

In conclusion, there is a weak evidence which supports the use of cupping therapy for pain management in different types of arthritis. Further research is required with better designed clinical trials to overcome the methodological problems, and the risk of bias with the present studies.

5.4 Post-herpetic neuralgia

Post-Herpetic Neuralgia (PHN) is a persistent neuropathic type of pain which develops as a complication of herpes zoster infection. It may occur in 20% of herpes zoster patients and it can persist for 90 days after the acute phase of the rash [49]. The aim of the treatment of PHN is to control the pain by using topical and systemic drugs like topical lidocaine or capsaicin and oral gabapentin, pregabalin, or tricyclic anti-depressants [50]. Cao *et al* conducted a systematic review of RCTs to evaluate the effects of wet cupping therapy in patients with PHN. Wet cupping therapy was found to be significantly better than medications, on rash healing (RR 2.49, 95%CI 1.91 to 3.24, $p < 0.00001$), pain reduction (RR 1.15, 95%CI 1.05 to 1.26, $p = 0.003$) and reduction in the incidence rate of post-herpetic neuralgia (RR 0.06, 95%CI 0.02 to 0.25, $p = 0.0001$) [51]. Tian *et al* reported that the use of wet cupping was significantly superior to pregabalin in terms of reduction in pain and reduction in peripheral and local serum substance P level [52]. A study by Wu *et al* found that the use of wet cupping was significantly more effective than herbal thermal compressing therapy and vitamin B12 intra-muscular injections in relieving the PHN pain [53]. Findings from these studies should be taken with caution because of the major limitations which included small sample size, methodological issues, and possibility of publication bias since all of the studies were conducted in a single

country [51]. Further research with better designed studies and longer follow-up periods is warranted.

5.5 Carpel tunnel syndrome

Carpal tunnel syndrome (CTS) is a peripheral nerve entrapment due to the compression of the median nerve in the carpal tunnel of the wrist joint. It usually manifests as numbness and burning pain in the palm and the first three fingers (sensory involvement), and reduction in the grip strength (motor involvement) [54]. The beneficial effects of cupping therapy were observed when used in combination with physiotherapy or alone. Mohammadi *et al* studied the effects of cupping in combination with physiotherapy compared to physiotherapy alone on CTS patients. Modified cups were used in this study to accommodate the anatomical shape of the wrist joint. The pressure level used during the treatment sessions was 50 mmHg and the cups were applied for 4 minutes. A total of 10 sessions were done and the effects were assessed after completion of all the sessions. Four CTS-related parameters were measured: symptom severity, functional status, distal sensory latency, and distal motor latency. The study concluded that there was a significant improvement in the symptom severity scale and reduction in the distal sensory latency in the cupping group compared to the control group. In addition, subjects in the cupping group had an improvement in the functional status scale and reduction in the distal motor latency but the differences were not statistically significant. The limitations of the study included the lack of regular time intervals to assess the effects, and the uneven distribution of patients with severe disease between the two arms of the study [55]. Furthermore, two case reports had documented the beneficial effects of cupping in CTS patients [56, 57]. The first case report used wet cupping and reported profound reduction in pain, numbness and paresthesia. These clinical findings were confirmed by significant improvement in the electrophysiological measures as demonstrated by both nerve conduction velocity and electromyography [56]. The second case report used self-applied cupping at least once daily for 3 to 5 minutes for a period of 3 months in a patient with mild CTS symptoms. The patient reported an improvement in the symptoms after 1 week of treatment and complete resolution of all symptoms after 6–8 weeks. The nerve conduction study showed that median distal latency had returned back to the normal range after 3 months [57].

5.6 Fibromyalgia

Fibromyalgia is a disorder characterized by chronic generalized pain, fatigue, cognitive disturbances, sleep disorder, and pronounced somatic and psychological distress [58]. The main aim of treatment for fibromyalgia patients is to relieve pain and to improve the patients' quality of life [59]. Few studies were conducted to investigate the effects of cupping in fibromyalgia. Lauche *at al* reported that cupping therapy was more effective than usual care in patients diagnosed with the fibromyalgia syndrome after 18 days from treatment in terms of reduction in pain intensity and improvement in quality of life [60]. Moreover, the other studies were conducted to evaluate the effectiveness of a combination therapy of cupping and acupuncture together with conventional medications (anti-depressants) compared to medications alone [61, 62]. A total of 242 patients were included in both studies. Significant reduction in pain scores (MD −1.65, 95%CI −2.10 to −1.31, $P < 0.00001$) were reported in the combination group compared to the control group [29]. Further research with better quality studies is needed to determine the effectiveness of cupping in this group of patients.

6. Contraindications

Cupping therapy is a process where suction with or without scarification is done as a treatment for different types of pain and medical problems. Direct application of cupping on specific sites of the body is contraindicated as the negative pressure created during cupping therapy might be harmful [23]. These sites are veins, arteries, nerves, inflamed and injured skin, body orifices, eyes, lymph nodes, varicose veins, bone fractures, and sites of deep vein thrombosis [23]. Ahmedi et *al* classified the contraindications into absolute, relative and with cautions [5]. The contraindications are summarized in **Table 1**.

7. Infection control measures

Prevention of infection by following strict infection control measures is an essential aspect of clinical care. In cupping therapy, such measures are of paramount importance since the therapy necessitates direct contact with the skin and body fluids. Several infection control measures should be considered. These measures include hand hygiene and washing, and wearing personal protective equipment like gloves, masks, protective eyewear and gowns. Disinfection of the patient's skin with approved disinfectants is required before starting the procedure. Also, disinfection of the patient's bed or use of disposable bed covers is needed. It is recommended to use disposable cups, vacuum pumps, and surgical blades to avoid cross-transmission of infection. Lastly, adhering to proper medical waste segregation system is crucial [63, 64].

Absolute contraindication	**Relative contraindication**	**Caution**
Cancer	Acute infection	Active psoriasis
Organ failure (heart, renal, hepatic)	Severe chronic disease (e.g. heart disease)	Keloid scars
Patients using pacemaker	Pregnancy, puerperium	Children
Bleeding disorders like hemophilia	Anti-coagulant therapy	Anti-platelet therapy
Active cellulitis/erysipelas/abscess	Recent wet cupping session or recent blood donation	Peripheral vascular disease
Undiagnosed/suspicious lump	Menstruation	Anemia
Ulcer	Recent wet cupping session or recent blood donation	
Thrombophlebitis	Medical emergencies	
Deep vein thrombosis		
Cauda equina		
Stroke — unstable or evolving		
Fracture site		
Suspected osteomyelitis or septic arthritis		
Life threatening asthma		
Chemotherapy		

Table 1.
Contraindications to cupping therapy (adapted from Ahmedi et al *[5]).*

8. Complications of cupping

Cupping therapy is generally considered as a safe treatment with minor side-effects and complications [23, 65]. However, the safety of cupping therapy is under-reported. Most of the studies which were conducted primarily addressed its efficacy but only a few studies reported its complications. Generally, the complications can be divided into preventable and non-preventable [23]. The commonly recognized side-effects are erythema, edema, and ecchymosis which are directly caused by cupping. Skin burns have also been reported [65]. They may occur because of the following reasons: excessive use of alcohol, prolonged exposure to cupping therapy, sensitive skin especially in elderly people, and the use of fire [23, 65]. Separation of the epidermal layer from the dermal base of the skin may occur due to prolonged exposure of more than 20 minutes to high vacuum pressure during cupping therapy. This complication was specifically reported with pumping cupping therapy [23]. In one case report, application of cupping therapy for about 40 minutes over the lower back resulted in severe pain immediately after removal of the cups and the patient developed bullae and crusting over the application site later [66]. Change in atmospheric pressure has been reported as a risk factor for skin injury as seen in a patient who was traveling in an airplane. This resulted in multiple blisters and shades of redness, petechiae, and ecchymosis [67]. Exposure to blood-borne infections may occur if infection control measures are not followed strictly. For example, cases of factitial panniculitis and herpes simplex virus infection have been reported after cupping therapy [68, 69]. Possible complications of cupping therapy are summarized in **Figure 2**.

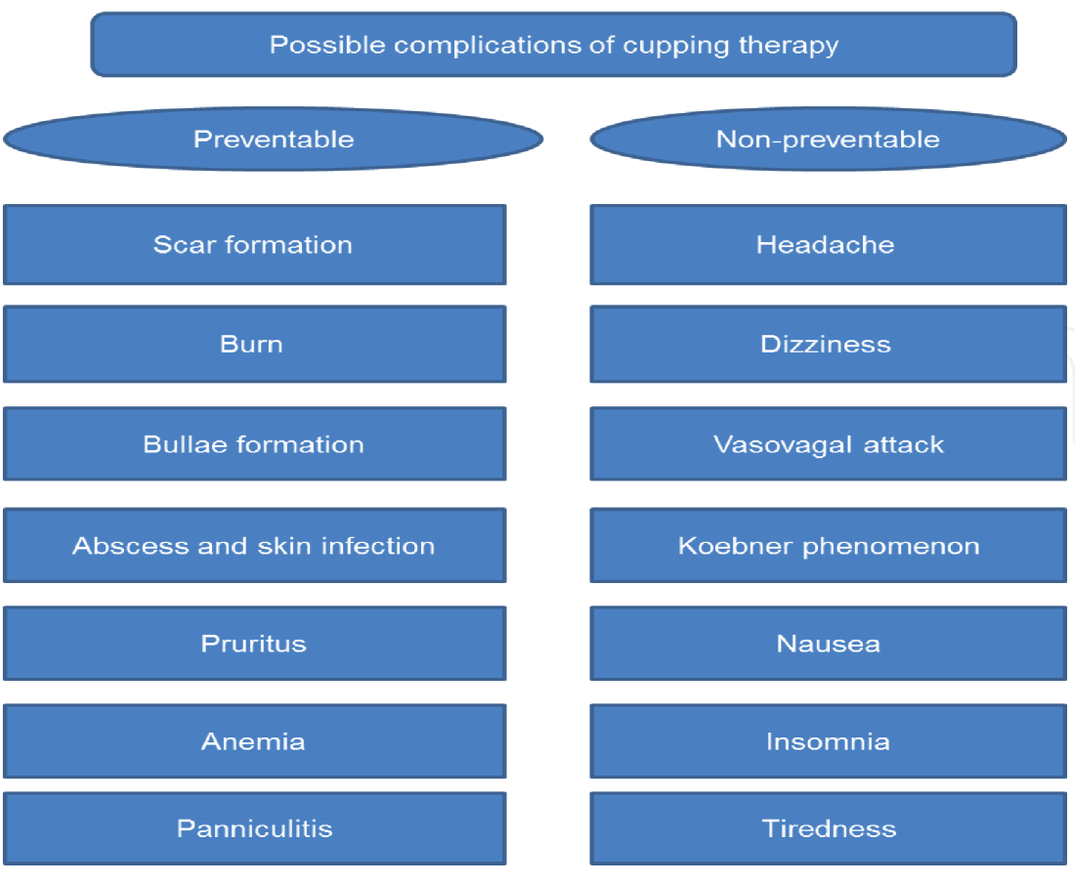


Figure 2.
Possible complications of cupping therapy (adapted from Aboushanab et al *[23]).*

9. Future directions

Cupping therapy is a complimentary type of therapy which is widely used all over the world for the treatment of chronic medical problems, especially for pain-related conditions. Although, there are several proposed theories which attempt to explain its mechanism of action in the management of chronic pain, the exact mechanism is still not clearly understood. Future research could focus on trying to find clear answers for the most likely mechanism of action and to validate the current theories in clinical trials. There is an emerging evidence of the promising benefits of cupping therapy in patients with common chronic painful conditions. However, despite the large number of clinical trials which were conducted, the evidence is still inconclusive due to major limitations. Future clinical trials of good quality are required. Such trials should ideally have a large sample size, better methodology and design, standardized treatment and reporting protocols, standardized assessment tools, and long follow-up periods.

10. Conclusions

Cupping therapy is an ancient complementary medicine practice which has been used for thousands of years for a variety of common medical problems. The current evidence is suggesting that cupping therapy may be effective in treating common chronic painful conditions for a short period. Yet, most of available studies have major limitations like small sample size, and different outcome assessment tools, duration of treatment, and treatment regimens. Publication bias is another important drawback, as most of the available studies were conducted in a single country. Future good quality, multicenter clinical trials utilizing standardized protocols are needed.

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