

## REVIEW

# Popular Complementary and Alternative Therapy Methods in Different Conditions

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### Abstract

Complementary and alternative therapies (CAM) are methods for the prevention, diagnosis and treatment of diseases based on various cultural beliefs and experiences that are not currently considered part of modern medicine. In recent years, the integration of CAM applications into healthcare systems all over the world has led to an increase in their use and frequency, and it has also increased the necessity and expectation of evidence-based practices. In this review, it was aimed to examine the alternative treatment methods that are frequently used in different conditions, their mechanisms of action, and their application within the framework of scientific evidence. For this purpose, popularly used complementary and alternative therapies for musculoskeletal conditions (dry needling, instrument-assisted soft tissue mobilization, dry cupping), neurological conditions (acupuncture, reflexology), and other conditions such as cancer and metabolic diseases (yoga) were examined.

**Keywords:** Dry Needling, Instrument-Assisted Soft Tissue Mobilization, Dry Cupping, Acupuncture, Reflexology

### INTRODUCTION

Complementary and alternative therapies (CAM) are methods based on cultural beliefs and experiences that involve preventing, identifying, and treating diseases to protect physical and mental health. Complementary therapies refer to treatments that complement traditional western medicine, while alternative therapies refer to treatments that are used instead of others<sup>1,2</sup>. Although CAM and western medicine are considered separate from each other, the boundary between them is not always sharp or fixed. CAM encompasses current health system practices and accompanying theories and beliefs. Therefore, the definition of treatment as a CAM application depends not only on scientific but also on social and cultural evidence<sup>3,4</sup>. CAM has been applied in Turkey for centuries as in the rest of the world, but the legal process regarding the implementation is quite new. The most comprehensive regulation regarding CAM applications is the Regulation on Traditional and Complementary Medicine Practices issued in 2014 and in this way, CAM is included in the legal medicine system<sup>5</sup>.

In recent years, the number of people who think that the use of CAM applications is appropriate in Turkey has increased, and those who think that they should not be used have decreased. This may be because preferred CAM practices have changed

over time, especially for social reasons, and changes in health policy may have made practices more accessible<sup>6</sup>. In recent years, the increase in interest in CAM applications all over the world has increased the necessity and expectation that applications should be evidence-based. However, it is not easy to conduct and implement evidence-based research on CAM applications. The obstacles faced by such studies are compliance with the norms and values of society, physical and mental dimensions of CAM applications, access difficulties, inadequacies in the competency of the practitioners, prejudices in the society, the duration of the applications, and insufficient incentives<sup>7</sup>. Despite these difficulties, there are different studies in the literature. In addition, the integration of CAM modalities into the healthcare systems has led to an increase in usage areas and frequency. In this review, it was aimed to examine the alternative treatment methods that are frequently used in different conditions, their mechanisms of action, and their application within the framework of scientific evidence.

### Complementary and alternative therapies for musculoskeletal conditions

Musculoskeletal system diseases are characterized by chronic joint pain/damage, muscle pain/tenderness, and inflammation. This may be

accompanied by cardiovascular diseases and/or depression<sup>8</sup>. In the management of the disease, it is aimed to maximize the individual's physical, functional, psychological, and social<sup>9</sup>. For this purpose, alternative treatments are integrated into medical treatments, especially in pain relief<sup>10</sup>. Dry needling, dry cupping, and instrument-assisted soft tissue mobilization are frequently used in chronic low back and neck pain, tension-type headache, tendinitis, and widespread muscle pain<sup>11-16</sup>.

### **Dry needling**

Dry needling is a skilled alternative treatment method that uses a thin filiform needle to penetrate the skin, with the intent to mechanically disrupt tissue without the use of an anesthetic<sup>17</sup>. The origin of the term "dry needling" is attributed to Janet Travell, M.D<sup>18</sup>. The solid filiform needle used in dry needling is regulated by the FDA as a Class II medical device described in the code titled "Sec. 880.5580 Acupuncture needle, an acupuncture needle is a device intended to pierce the skin in the practice of acupuncture"<sup>19</sup>.

In myofascial trigger point therapy, the neural processes of acupuncture and dry needling treatments and the localization of trigger points and classical acupuncture points are highly compatible. However, the difference between dry needling and traditional acupuncture is that acupuncture does not use all the theories of Traditional Chinese Medicine<sup>20-22</sup>. Presence of needle phobia, a history of an abnormal reaction to needling or injection, the use of anticoagulants, and lymphedema dry needling is an absolute contraindication of dry needling. Bleeding disorders, immune system diseases, vascular diseases, diabetes, pregnancy, cachexia, epilepsy, and metal and latex allergy are relative contraindications<sup>23</sup>.

Dry needling is often used to treat myofascial trigger points, which are defined as discrete, focal, hypersensitive spots located in a palpable taut muscle band. These extremely irritable points are classified as active trigger points that produce spontaneous or severe pain when palpated, and hidden trigger points that do not produce spontaneous pain and only produce pain on palpation. Trigger points can occur in a muscle anywhere in the body in response to sudden or overuse injury. It is hypothesized that the damaged muscle fibers shorten (form taut bands) either in response to an excess of calcium ions released from the damaged fibers or in response to the respective motor endplate releasing an excess of acetylcholine. Prolonged release of acetylcholine, when combined

with chronic shortening and sarcomere contractures, may lead to hypoxia and local ischemia with decreased circulation<sup>24,25</sup>. Local tenderness and referred pain occur in response to low oxygen levels and increased inflammatory chemicals (prostaglandins, bradykinins, cytokines, and histamine) at the injury site. Moreover, bombardment of nociceptors by endogenous chemicals often produces an increase in central sensitivity in dorsal horn neurons. All these predispose to the development of chronic muscle hypertonus and trigger points<sup>25</sup>.

Although myofascial trigger points are a common cause of pain, they can sometimes be overlooked. Trigger point pain has a significant impact on a person's life and causes a social burden and its management is important. Dry needling is an effective method of reducing pain and is also inexpensive and easy to access. Local twitch responses are expected to occur because of the rapid depolarization of muscle fibers with needling. When muscle twitching ends, spontaneous electrical activity decreases, and pain and dysfunction may disappear<sup>26-29</sup>.

Dry needling techniques are mostly divided into superficial and deep techniques. Superficial needles are inserted superficially (approximately 5-10 mm) into the tissue above the underlying trigger points. After holding it for a short time (about 30 seconds to 3 minutes), the needle is removed, and the pain is expected to be greatly reduced. If the pain persists, the procedure can be repeated two or three more times<sup>17</sup>. Deep needles are placed deeper directly over the trigger points and the needles can be left in place for 10 to 30 minutes. There is no standardization in the frequency of treatment sessions and the number of needles used<sup>28</sup>.

Dry needling at trigger points can reduce short-term low back pain intensity (level of evidence: moderate). However, the long-term effects and clinical superiority of dry needling in improving functionality are unclear. Dry needling is not recommended in the short and midterm for the relief of trigger point pain in the neck and shoulders. However, wet needling with lidocaine was found to be more effective in the midterm<sup>11, 12</sup>. Dry needling to trigger points in the head and neck in chronic tension-type headache may be effective in reducing headache intensity, frequency and duration, and improving health-related quality of life<sup>13</sup>. In temporomandibular joint dysfunction, its application to the masseter, pterygoid, sternocleidomastoidus, and trapezius muscles can

be an effective method for short-term relief of pain (level of evidence: low)<sup>14</sup>. Tendon and peritendinous dry needling can be applied in tendinopathies such as lateral epicondylitis, rotator cuff tendinopathy, Achilles tendinopathy, patellar tendinopathy, great trochanteric pain syndrome<sup>30</sup>. Electric dry needling can reduce pain and improve function in plantar fasciitis<sup>31</sup>. It can be applied to lower extremity muscles to reduce pain, increase joint range and functionality in knee osteoarthritis<sup>15,32</sup>. It is also known that dry needle application to the lower extremity muscles reduces pain in patellofemoral pain syndrome<sup>33,34</sup>. Further comparative studies are needed in musculoskeletal conditions<sup>30</sup>.

### **Instrument-assisted soft tissue mobilization**

Instrument-assisted soft tissue mobilization is a skilled method that involves the use of special assistive instruments for soft-tissue treatment. Soft tissue manipulation increases the activity and number of fibroblasts and facilitates collagen synthesis and collagen realignment<sup>35</sup>. Instrument-assisted soft tissue mobilization can be an alternative treatment method that accelerates recovery after sports injuries and provides return to sports or daily activities<sup>36,37</sup>.

Instrument-assisted soft tissue mobilization has its origins in the small metallic tool known as the "strigil" used for therapeutic purposes in baths in Ancient Greece and Rome, and a traditional Chinese therapy known as "gua sha". The word "gua sha" refers to the formation of red dots on the skin by pushing the skin by tools and providing blood and oxygen flow to the soft tissues<sup>38,39</sup>. The technique is known by different names such as enhanced soft tissue mobilization (astym technique), fascial abrasion technique, Graston technique, and sound-assisted soft tissue mobilization<sup>40,41</sup>. While rocks, wooden sticks, and animal bones were used in the past, various tools made of stainless steel are used today. It is a simple and practical technique. The surface of the instrument maximizes the force transmitted to the tissues while minimizing the force exerted by the therapist. In this way, adhesions in deep areas can be stimulated<sup>35,42,43</sup>. The major goal of instrument-assisted soft tissue mobilization is to remove scar tissue and promote a return to normal function following soft tissue regeneration. Scar tissue mobilization can provide functional normalization around soft tissue<sup>44</sup>. Localized inflammation and microvascular and capillary bleeding occur with the application of appropriate pressure and shear force

to the soft tissue. Inflammation releases adhesions and stimulate the healing process. Furthermore, nutrition of the injured area increase. The migration of fibroblasts accelerates, and eventually, new collagen is synthesized and aligned<sup>45</sup>. Bruising and pain are prominent among the side effects, and these effects can be controlled with cryotherapy<sup>46</sup>.

The literature describes instrument-assisted soft tissue mobilization as a time-saving technique for both patients and practitioners. It is particularly effective in early rehabilitation. However, there is no consensus on the treatment intensity and its use requires certification. Instrument-assisted soft tissue mobilization can provide significant improvement in pain intensity, function, and range of motion (level of evidence: low and moderate)<sup>47</sup>. It is as effective as scraping massage in improving pain and function in patients with upper trapezius trigger points<sup>48</sup>. There is no strong evidence for its use to improve pain, function, and range of motion in people with and/or without extremity or spinal pathologies<sup>16</sup>. It may be effective in increasing range of motion in the uninjured individuals, while reducing pain and/or increasing patient-reported function in the injured ones. There is low evidence that it enhances short term joint range of motion<sup>49</sup>. Its effectiveness is not fully known due to the lack of evidence and heterogeneity. There is no consensus on the optimal schedule, instrument type, dose duration, and outcome measures. Higher-quality randomized controlled studies with larger sample size and product diversity are needed<sup>50</sup>.

### **Dry cupping**

Cupping is an alternative treatment method applied by placing cups on the skin surface with subatmospheric (negative) pressure created by heat or suction. It is applied as a complementary therapy to coping with chronic diseases for which conventional medicine offers no cure but only management<sup>51</sup>. The earliest recorded references to cupping therapy are found in the Ebers Papyrus, written by the Ancient Egyptians around 1550 BC<sup>52</sup>. Cupping therapy is handled in six categories according to the classification updated in 2016. The first category is technical types that include dry, wet, massage, and flash methods. The second category is associated with vacuum power types, including mild, moderate, severe, and pulsatile methods. The third category is associated with the vacuum method types, which include fire, manual vacuum, and automatic vacuum methods. The fourth category is associated with additional treatment types including needle, moxa, herbal,

magnetic, laser, electrical stimulation, and aquatic methods. The fifth category is associated with the treated area types: face, abdomen, female, male, and orthopedic types. The sixth category is other types including sports and cosmetics<sup>53</sup>. Cupping therapy is used for health promotion, disease prevention, and therapeutic purposes. It is often used in the treatment of pain and spasms. It is not recommended for use in patients with bleeding disorders such as hemophilia or on anticoagulant therapy, children, elderly and pregnant or menstrual women. It is also contraindicated for use on skin areas with active inflammation, burns, infections, and open wounds. Hematoma, burn, abscess and irritation are local adverse effects, while dizziness, insomnia, headache and nausea are systemic effects<sup>53,54</sup>. Each cupping therapy session takes approximately twenty minutes. The first step involves the vacuum. At this stage, the practitioner identifies specific spots or areas for cupping and disinfects these areas. Massage oil can be used to slide the cup over the skin in the treatment. A cup of suitable size is placed on the selected area and the air in the cup is sucked by fire, electric or manual vacuum and left on the skin for 3-5 minutes. Then it moves on to another skin region<sup>53,54</sup>.

Many hypotheses have been proposed regarding the mechanisms of action of cupping therapy. The main ones of these hypotheses are neural, immunological, metabolic, and psychological hypotheses<sup>55</sup>. According to the neural hypothesis, it is thought that cupping therapy is effective in chronic pain by changing the signaling process at the nociceptor, spinal cord, and cortex levels, and affects pain perception by stimulating A $\delta$  (delta) and C fibers in the spinothalamocortical pain pathways. In addition, it inhibits pain transmission by increasing the release of opioids such as endorphins and enkephalin at the level of the spinal cord and cerebral cortex, resulting in an analgesic effect<sup>55,56</sup>. Immunological theory argues that inflammation occurs in the cupping area and there is an increase in inflammatory markers such as TNF and interferon, substance P, and other inflammatory mediators. This inflammatory process can create an immunomodulatory effect<sup>57</sup>. The metabolic hypothesis emphasizes that cupping therapy decreases the increased muscle activity and muscle tone and increases the microcirculation of the region by creating local vasodilation. Thus, an analgesic effect may occur<sup>58</sup>. The decrease in the perception of pain with the effect of physical touch on the limbic system is based on psychological

theory<sup>59</sup>.

Dry cupping may be effective in reducing pain in chronic neck pain and nonspecific low back pain (level of evidence: high). However, there are no definitive conclusions regarding the effectiveness and safety of dry cupping for musculoskeletal pain and range of motion (level of evidence: low and moderate)<sup>60</sup>. Dry cupping can improve pain and joint stiffness in knee osteoarthritis, but its effect on physical function is insufficient (level of evidence: low)<sup>61</sup>. Combined application with acupuncture in migraine may be more effective than acupuncture alone (level of evidence: low)<sup>62</sup>. Dry cupping therapy can be as effective as electrical stimulation on pain and function in plantar fasciitis<sup>63</sup>. In the first-line treatment of carpal tunnel syndrome, cupping therapy as an adjunct to medical management can reduce pain and tightness (level of evidence: low)<sup>64</sup>. There is a need for studies with a high level of evidence regarding the effectiveness of dry cupping in musculoskeletal system conditions.

#### **Complementary and alternative therapies for neurological conditions**

The fact that neurological diseases are usually chronic, and the treatment process is long and difficult, affects patients and caregivers negatively<sup>65</sup>. Medical therapy is recommended for the initial treatment but side effects of drugs, concerns about substance abuse, and high treatment costs increase the interest in alternative treatment methods<sup>66</sup>. The fact that these treatments are more compatible with values, beliefs, and philosophical orientations related to life and health and offer a holistic approach also affects patient preferences<sup>67</sup>. Alternative therapy is often both easy and inexpensive to administer<sup>68</sup>. Acupuncture and reflexology applications are frequently used in the treatment of symptoms of many neurological diseases such as pain, spasticity, emotional and urinary dysfunction<sup>69</sup>.

#### **Acupuncture**

Acupuncture is a therapeutic treatment that involves inserting solid filiform needles into specific areas of the body. The acupuncture has been practiced in China for over 3000 years. Scientific research began in the 18th century and the possible properties of acupuncture points and meridians, the physiological and biological mechanisms underlying acupuncture, and its use in clinical practice were examined<sup>70</sup>. Acupuncture stimulation includes sensory-discriminative and affective-social touch dimensions rather than needle stimulation alone. The sensory-discriminative dimension is a

combination of sensations associated with needling, such as pain and numbness. The affective-social touch dimension includes gentle manual touch stimulation by activating C tactile afferent fibers and can induce a limbic touch response resulting in hormonal reactions<sup>71</sup>. The areas stimulated by the needle in acupuncture are the points on the meridians where chi energy is thought to flow. Acupuncture theory believes that the irregularity or obstruction of the flow in the meridians causes diseases and that the flow is restored with the application of acupuncture<sup>72</sup>. Needle acupuncture is the most widely used method since ancient times, but acupressure (pressure stimulation) and electroacupuncture are also frequently used. Techniques such as stimulating the acupuncture points with the effect of heat (moxibustion), using laser diode devices (laser acupuncture) and injecting sterile water-soluble substances into the acupuncture points (aqua acupuncture) are also used<sup>73</sup>.

Gently manipulating the needle may be the mechanism underlying the immediate relief of pain in patients with acupuncture treatment. However, different mechanisms have been proposed to explain the immediate effects of acupuncture. The possible mechanism to explain the immediate suppression of pain by stimulation is diffuse noxious inhibitory controls. According to this theory, a noxious stimulus applied to any part of the body can immediately suppress pain transmission in trigeminal caudal and/or spinal dorsal horn neurons<sup>74</sup>. Electroacupuncture analgesia has been hypothesized to generate an increased release of endogenous opioids in plasma or cerebrospinal fluid, and the type of secreted peptide changes according to the available frequencies<sup>75,76</sup>.

Acupuncture points are considered essential components of acupuncture practice for diagnosis and treatment. Although there is no conclusive evidence for the existence of these points, the sensitivity of acupuncture points, the firmness felt by palpation, the sensitization of nociceptors, and their effector (visceral organs) functions are partially accepted. The pathophysiological mechanisms underlying the formation of tender points are not clear, but the possible mechanism may be the presence of sensitized nociceptors at these points<sup>77</sup>. In addition, under these points (active trigger points), there are regions rich in bradykinin, inflammatory cytokines (IL-6, TNF-alpha), substance P, and calcitonin gene-related peptide (CGRP). Acupuncture application to these points

creates a healing reaction with a similar mechanism of action of dry needling<sup>78</sup>. Moreover, disorders in the visceral organs may cause pain and tenderness at areas or points on the skin through the viscerocutaneous reflex, and it is emphasized that acupuncture applied to these points can regulate organ dysfunction through the cutaneous-visceral reflex<sup>79</sup>.

Acupuncture treatment in Parkinson's patients showed positive improvements in the Unified Parkinson's Disease Rating Scale (UPDRS) scores. An increase in neural responses was also found in many brain regions after treatment<sup>80</sup>. Laser acupuncture can reduce spasticity in children with spastic cerebral palsy. The action mechanism of laser acupuncture in spasticity may be as follows: stimulation of acupuncture points 1) may also cause activity changes in parts related to the sensorimotor area 2) can increase parasympathetic activity by inhibiting sympathetic nerve fibers. The increase in the secreted inhibitory neurotransmitters may lead to inhibition of alpha motor neuron and spasticity may be alleviated<sup>81</sup>. Acupuncture is also widely used in symptom management of patients with Multiple Sclerosis (MS). Traditional Chinese acupuncture and scalp acupuncture can improve MS symptoms (fatigue, neural functional disorders, pain, gait disturbances, and bladder dysfunctions) and reduce attacks (level of evidence: moderate)<sup>82</sup>. Experimental studies on ischemic stroke explain the action mechanism of acupuncture in five different ways: promotion of cell proliferation in the central nervous system, regulation of cerebral blood flow through modulation of angiogenesis and vasoactive mediators, anti-apoptosis, regulation of neurochemicals, and strengthening and recovery of memory and learning processes<sup>83</sup>. The outcomes of ongoing randomized controlled prospective studies in stroke patients are eagerly awaited<sup>84,85</sup>.

### **Reflexology**

Reflexology is a CAM method that involves applying pressure to any certain areas in the feet, hands, and ears and aims to increase blood and energy circulation, give a feeling of relaxation, and maintain homeostasis<sup>86</sup>. The feet, hands and ears are a mini map and a mirror of the body, and all organs and glands are associated with reflective points in these areas. Applied pressure to these areas provides relief and healing to the corresponding part of the body<sup>87,88</sup>. There is evidence that some form of reflexology was practiced in Egypt around 2000 BC. The development of modern reflexology was initiated in the late 19th century with the definition

of the concept of Zone Therapy by Dr. Fitzgerald. Eunice Ingham (physical therapist) also discovered reflex zones (mirror reflections) of organs and glands in the feet in the 1930s and began to develop a map of the whole body<sup>89</sup>.

The exact mechanism of action of reflexology has not yet been confirmed, but the possible mechanism is that it re-establishes a state of balance by making the autonomic nervous system more regular. The downregulation in the nervous system has been adversely affected by the modern lifestyle that has profoundly changed human resting habits. The lack of adequate regulation may create stress in the body and especially affects the hormonal balance<sup>90</sup>. Especially in women, hormonal imbalance can cause menstrual irregularities and cortisol secretion can lead to syndromes such as polycystic ovary. Based on the evidence showing that reflexology can have a positive effect on menstrual irregularities<sup>91,92</sup>, it can be said that it has the potential to restore hormonal balance through a mechanism such as mindfulness and exercise. The therapeutic approach (communication between the patient and the clinician) and the therapeutic touch during the reflexology session also have positive effects on the patient. The mechanism underlying reflexology to provide relaxation and improve sleep patterns may be the properties of reflex points as well as the effect of the ambient features (lighting, temperature, scent, sound etc.) or placebo. Besides, improvement in the musculoskeletal system can be explained by applying pressure to specific reflexology points that match the fascial planes (such as the reduction of pain with the sensory and emotional effects of touch, reorganization of fibroblasts, and spread of the mechanical effect to neighboring tissues). The effect on organs can be attributed to the spread of mechanical forces in the fascia<sup>93</sup>. The action mechanism of reflexology is also explained by the theory of energy channels, which is believed to eliminate the irregularity in energy channels such as acupuncture<sup>94</sup>. The lactic acid theory<sup>95</sup> is based on the accumulation of lactic acid below the reflex points and that they are broken down (detoxification) by reflexology.

Foot reflexology practice may have positive effects on central pain, fatigue, and sleep disorders in patients with stroke<sup>96,97</sup>, and it can also significantly reduce the mean systolic and diastolic blood pressures of these patients<sup>98</sup>. Although the application of reflexology in patients with Parkinson's varies according to the patient profile (the severity of the disease, attitude towards

reflexology etc.), it may increase the well-being of the patients in general<sup>99</sup>. In MS patients, it may have positive effects in symptom relief such as spasticity, pain, decreased quality of life, fatigue, sleep disorders, bladder-intestinal dysfunctions, anxiety, and depression (level of evidence: low)<sup>100-104</sup>. It may also have positive effects on motor performance and constipation in children with cerebral palsy<sup>105</sup>.

#### **Complementary and alternative therapies for other conditions**

In the treatment of metabolic diseases such as cancers with a long and difficult treatment process or diabetes that require chronic care, drug therapy is integrated with other treatment methods. Healthy behavioral profiles such as regular physical activity, healthy eating, and stress management should be established in the treatment process and disease management. Yoga includes relaxation, meditation and deep breathing and is an alternative therapy that can provide stress management for both cancer patients and diabetics. It also helps them perform self-care tasks more easily<sup>106,107</sup>.

Yoga is a mind-body exercise based on mindfulness which originated in ancient India that use postures (asana), breath regulation (pranayama), withdrawal of the senses (pratyahara), concentration (dharana), meditation (dhyana) and absorption into the supreme (samadhi). Relaxation, meditation and breathing exercises make the person aware of his body and the moment<sup>108</sup>. It is known that mindfulness-based approaches increase one's ability to recognize emotional stress, respond skillfully, and develop responses to cope with stress effectively<sup>109</sup>. Yoga, one of the mindfulness-based approaches, can reduce stress by decreasing sympathetic activation and increasing parasympathetic activity<sup>110</sup>, and by providing stress control, body cortisol levels decrease, or the increase becomes controllable. Yoga also prevents stress-induced responses (such as increased inflammatory responses, telomere shortening, and decreased cell-mediated immunity) and bad food choices (unhealthy foods high in sugar, fat, and salt) are also prevented<sup>111-113</sup>. Considering these effects, it is a strong candidate to be included in the treatment programs of both cancer and diabetes patients.

Yoga can be a safe and interesting method to help improve the mental health, fatigue, sleep quality, and quality of life of cancer patients. However, apart from the theoretical elements of yoga, with its broad philosophy and approach, the patient can create a wholly healthy life profile (such as the

healthy food choices, exercise, definition of life purpose, and right relationships)<sup>114</sup>. The latest scientific evidence reveals the potential role of the yoga approach in the management of type 2 diabetes and associated risk factors. It is thought that yoga has effects on diabetes control with psychological, neural, endocrine, and immunologic mechanism. Decreased sympathetic system activation, increased parasympathetic activation, and related anti-stress mechanisms improve both the metabolic and psychological profiles of patients. Thus, it increases insulin sensitivity and improves carbohydrate and fat metabolism. Yoga practices can lead to significant positive clinical outcomes as they help manage diabetes-related comorbidities by reducing blood glucose levels<sup>115</sup>.

### CONCLUSION

As a result of examining the complementary and alternative treatments that are popularly used in

different conditions: dry needling, instrument-assisted soft tissue mobilization, dry cupping in musculoskeletal conditions; acupuncture and reflexology are used in neurological conditions, and yoga is used in other conditions such as cancer and metabolic diseases. The limited number of studies in the literature are insufficient to establish clinical practice guidelines. The effectiveness of complementary and alternative treatment methods in the different conditions needs to be supported by studies with high levels of evidence.

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