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RESEARCH ARTICLE

NATUROPATHIC APPROACHES IN THE MANAGEMENT OF FROZEN SHOULDER: A NARRATIVE REVIEW OF THERAPEUTIC POTENTIAL AND CLINICAL EVIDENCE

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ABSTRACT

Frozen shoulder, also known as adhesive capsulitis, is a musculoskeletal condition characterized by shoulder pain, progressive stiffness, and restricted active and passive range of motion, which can significantly affect daily activities and quality of life. Diabetes mellitus and thyroid disorders are recognized risk factors associated with its development. This literature review aims to examine the potential role of naturopathic interventions in the management of frozen shoulder, focusing on their benefits, limitations, and integration with conventional rehabilitation.Relevant literature was reviewed concerning therapeutic exercise, gentle mobilization, hydrotherapy, thermotherapy, acupuncture, massage and manual therapy, yoga, relaxation techniques, and nutritional and lifestyle approaches. The findings suggest that therapeutic exercise and individualized physiotherapy remain essential components of conservative management. Gentle mobilization and progressive stretching may help improve shoulder mobility, while thermotherapy, massage, hydrotherapy, and acupuncture may provide supportive benefits for pain relief and movement tolerance. Yoga, mindfulness, and relaxation techniques may contribute to psychological well-being and coping with persistent pain. Nutritional support and appropriate management of coexisting conditions, particularly diabetes mellitus, are also important for maintaining general health.The quality and strength of evidence vary considerably across interventions. Evidence specifically supporting hydrotherapy, yoga, relaxation techniques, and nutritional supplementation for adhesive capsulitis remains limited. No specific diet, herbal preparation, or nutritional supplement has been established as a reliable method for reversing capsular fibrosis. Therefore, naturopathic interventions should be considered complementary approaches rather than replacements for evidence-based medical care and physiotherapy.

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INTRODUCTION

Frozen shoulder, or adhesive capsulitis, commonly affects middle-aged adults and may significantly interfere with dressing, grooming, reaching overhead, and other daily activities. Diabetes mellitus and thyroid disorders are recognized risk factors associated with the condition (Kingston *et al*., 2018).The pathological process involves inflammation, capsular thickening, and fibrosis of the glenohumeral joint capsule. Patients typically experience progressive pain followed by substantial stiffness, although the clinical course varies between individuals. The natural history of frozen shoulder is not always characterized by complete spontaneous recovery, and some patients continue to experience functional limitations over an extended period (Wong *et al*., 2017).

Conventional management focuses on pain reduction, restoration of movement, and improvement in function. Physiotherapy, therapeutic exercise, and selected medical interventions are commonly used, although treatment effectiveness may differ according to disease stage and individual characteristics. Systematic reviews have demonstrated that the evidence supporting individual nonsurgical interventions varies in quality and consistency (Page *et al*., 2014).Naturopathy emphasizes supportive approaches to health, including physical therapies, lifestyle modification, nutrition, and mind–body practices. These approaches may be incorporated into an individualized management programme for frozen shoulder. However, their clinical effectiveness must be evaluated using scientific evidence rather than traditional use alone.

This review therefore examines the potential benefits, limitations, and clinical relevance of selected naturopathic interventions for adhesive capsulitis.

Objectives: The primary objective of this review is to examine the available evidence concerning naturopathic approaches to frozen shoulder. The specific objectives are to describe the pathophysiology of adhesive capsulitis, evaluate the potential role of complementary interventions in pain management and functional recovery, identify limitations in the existing literature, and suggest priorities for future research.

REVIEW METHODOLOGY

The present literature review examines the role of naturopathic interventions in the management of frozen shoulder, also known as adhesive capsulitis. Relevant scientific literature was considered to understand the effectiveness of complementary therapies in reducing pain, improving shoulder mobility, and enhancing functional recovery. The review focuses on therapeutic exercise, acupuncture, hydrotherapy, thermotherapy, massage, relaxation techniques, and nutritional approaches. Research articles, review papers, and clinical studies related to frozen shoulder and conservative treatment were considered to explore the potential benefits and limitations of these interventions. Particular attention was given to the clinical application of naturopathic therapies, their possible mechanisms of action, and their role alongside conventional physiotherapy and medical management. The available literature was examined to identify promising treatment approaches and areas where further research is needed. This review aims to provide an overview of current knowledge and support the informed integration of appropriate naturopathic interventions into the comprehensive management of frozen shoulder.

Pathophysiology of Frozen Shoulder: Adhesive capsulitis, commonly known as frozen shoulder, is characterized by pain, inflammation, thickening, and fibrosis of the shoulder joint capsule, resulting in progressive restriction of shoulder movement. External rotation is usually the most affected movement, followed by abduction and internal rotation. The condition is commonly described in three phases: freezing, frozen, and thawing. The freezing phase involves increasing pain, especially during movement and at night. During the frozen phase, stiffness becomes more prominent and interferes with daily activities. The thawing phase is characterized by a gradual improvement in shoulder mobility and range of motion; however, some patients may not regain complete shoulder function(Neviaser & Hannafin, 2010).Diabetes mellitus and thyroid disorders are important risk factors for adhesive capsulitis. These conditions may contribute to connective tissue changes and increase susceptibility to shoulder stiffness (Zreik *et al*., 2016). Patients may experience difficulty dressing, grooming, reaching overhead, and performing routine activities. Diagnosis is primarily based on clinical history and physical examination, particularly the restriction of both active and passive shoulder movements. Early assessment and appropriate rehabilitation may help manage pain, improve mobility, and restore functional independence.

Naturopathic Interventions

Therapeutic Exercise and Gentle Mobilization: Adhesive capsulitis, commonly known as frozen shoulder, is characterized by pain, inflammation, thickening, and fibrosis of the shoulder joint capsule, resulting in progressive restriction of shoulder movement. External rotation is usually the most affected movement, followed by abduction and internal rotation. The condition is commonly described in three phases: freezing, frozen, and thawing. The freezing phase involves increasing pain, especially during movement and at night. During the frozen phase, stiffness becomes more prominent and interferes with daily activities. (Neviaser & Hannafin, 2010). Common interventions include pendulum exercises, active-assisted shoulder flexion, gentle external rotation, and progressive stretching. These exercises help maintain available range of motion, improve joint flexibility, and facilitate daily activities. Exercise selection should be based on the patient's symptoms, disease stage, and functional capacity. The effectiveness of rehabilitation depends on appropriate exercise dosage, frequency, and intensity. Page *et al*. (2014) reviewed evidence concerning manual therapy and exercise for adhesive capsulitis, emphasizing the need to consider treatment outcomes when selecting rehabilitation interventions. Gentle movements are generally more appropriate during highly painful stages, whereas progressive stretching and mobilization may be introduced as pain and irritability decrease. Excessive stretching that significantly aggravates symptoms should be avoided.Kelley *et al*. (2009) emphasized that rehabilitation should be adapted to the patient's stage of the condition, pain severity, and tissue irritability. Diagnosis is primarily based on clinical history and physical examination, particularly the restriction of both active and passive shoulder movements. Early assessment and appropriate rehabilitation may help manage pain, improve mobility, and restore functional independence.

Vermeulen *et al*. (2006) investigated high-grade and low-grade joint mobilization techniques, highlighting the importance of selecting an appropriate mobilization intensity. Griggs *et al*. (2000) also examined nonoperative treatment and reported improvements in shoulder function following a structured rehabilitation programme. Active-assisted exercises, progressive stretching, and functional movements can therefore be incorporated according to the patient's response. Patient education, adherence to home exercise programmes, and regular reassessment of pain, range of motion, and functional ability are important for guiding treatment progression. Individualized therapeutic exercise may improve shoulder mobility and reduce disability, although recovery varies between patients.

Hydrotherapy: Hydrotherapy, also known as aquatic therapy, involves the therapeutic use of water to facilitate movement, reduce discomfort, and improve physical function. Warm-water exercise may help patients with adhesive capsulitis perform shoulder movements more comfortably by promoting relaxation and reducing the effects of gravity on the affected arm. Hall *et al*. (2008) reported that aquatic exercise may provide benefits for pain management in people with musculoskeletal and neurological conditions, although its effectiveness varies across conditions. The buoyancy of water can support the upper limb during gentle shoulder flexion, abduction, and external rotation exercises, potentially facilitating movement in patients experiencing pain and stiffness. Hydrotherapy may be incorporated into a comprehensive rehabilitation programme to encourage gradual improvements in shoulder mobility and functional ability. Srinivasan and Kumar (2024) investigated hydrotherapy in individuals with shoulder disorders following intra-articular

injections and reported improvements in pain and shoulder function. Findings should be interpreted cautiously because they do not establish the independent effectiveness of hydrotherapy specifically for adhesive capsulitis. Evidence from other musculoskeletal conditions, such as knee and hip osteoarthritis, also suggests that aquatic exercise may produce modest short-term improvements in pain and disability (Bartels *et al*., 2016). These results cannot be directly generalized to frozen shoulder. Therefore, hydrotherapy should be considered a supportive intervention alongside conventional therapeutic exercises rather than a definitive stand-alone treatment. Further, high-quality randomized controlled trials are required to determine its specific effectiveness, optimal treatment dosage, and long-term benefits in patients with adhesive capsulitis.

Thermotherapy: Thermotherapy refers to the therapeutic application of heat to reduce discomfort, promote relaxation, and facilitate movement during rehabilitation. In patients with adhesive capsulitis, superficial heat may be applied using warm packs or other controlled heating methods before therapeutic exercise. The primary aim is to improve comfort and prepare the shoulder for gentle stretching, joint mobilization, and range-of-motion exercises. Heat may help reduce muscle tension and temporarily modify pain perception, allowing patients to participate more comfortably in rehabilitation (Cameron, 2018). The application of heat before exercise may be particularly useful in patients who experience stiffness and discomfort during shoulder movements. Following heat application, exercises such as pendulum movements, active-assisted shoulder flexion, external rotation, and gentle stretching may be performed according to the patient's tolerance. Kelley *et al*. (2009) emphasized that rehabilitation for frozen shoulder should be adapted to the stage of the condition, particularly the severity of pain and tissue irritability. Therefore, thermotherapy should be used as a supportive intervention rather than as an isolated treatment.The benefits of thermotherapy should be interpreted cautiously. Temporary pain relief does not necessarily indicate reversal of capsular thickening, fibrosis, or contracture. Page *et al*. (2014) reviewed manual therapy and exercise for adhesive capsulitis and highlighted the importance of evaluating treatment outcomes rather than assuming that individual interventions produce sustained improvements. Consequently, the effectiveness of heat should be assessed in relation to functional outcomes, shoulder range of motion, and exercise tolerance.

Thermotherapy should be administered with appropriate precautions to prevent skin irritation and thermal injury. The temperature, duration, and method of heat application should be adjusted according to individual needs. Particular caution is necessary for patients with impaired sensation, reduced circulation, or difficulty recognizing excessive heat. Heat should not be applied directly to damaged skin, and the skin should be monitored throughout treatment. Cameron (2018) discusses the clinical application of physical agents in rehabilitation, including the appropriate use and precautions associated with thermal modalities. Thermotherapy is best incorporated into an individualized rehabilitation programme that includes therapeutic exercise, patient education, and regular reassessment of pain and mobility. Further clinical research is required to establish the optimal temperature, application duration, and timing of heat therapy specifically for adhesive capsulitis.

Acupuncture: Acupuncture is a complementary therapeutic intervention that involves inserting fine, sterile needles into specific anatomical points to help manage pain and improve physical function. It has been investigated as a potential treatment for frozen shoulder, also known as adhesive capsulitis, a condition characterized by shoulder pain, stiffness, and progressive restriction of active and passive range of motion. These symptoms may interfere with daily activities such as dressing, grooming, reaching overhead, and performing household tasks. The primary objectives of acupuncture in frozen shoulder management are to reduce pain, improve shoulder mobility, and facilitate participation in rehabilitation exercise (Sun *et al*., 2001; Wong *et al*., 2017). Acupuncture may help relieve symptoms through several proposed physiological mechanisms, including modulation of pain-processing pathways, stimulation of endogenous opioid release, and changes in nervous system activity. These mechanisms may contribute to reduced pain perception and improved tolerance of shoulder movements (Zhao, 2008). The extent to which these effects translate into meaningful improvements in shoulder function among patients with frozen shoulder remains uncertain. The effectiveness of acupuncture may vary according to symptom duration, disease severity, the acupuncture technique used, treatment frequency, and individual patient characteristics (Wong *et al*., 2017).

Acupuncture combined with physical therapy has been investigated as a multimodal approach to managing a frozen shoulder. Physical therapy commonly includes range of motion exercises, stretching, joint mobilization, and progressive functional exercises designed to restore shoulder movement. When used alongside these interventions, acupuncture may help reduce discomfort and improve patient tolerance of therapeutic exercises. However, further research is needed to establish the effectiveness of acupuncture as an adjunct to conventional rehabilitation and to determine the optimal treatment approach (Sun *et al*., 2001; Wong *et al*., 2017). Heo *et al*. (2022), in a systematic review and meta-analysis of electroacupuncture, reported improvements in pain and shoulder function among patients with frozen shoulder. Substantial variation in some outcomes highlights the need for caution when interpreting the findings.Ben-Arie *et al*. (2020) conducted a systematic review and meta-analysis to evaluate the effectiveness of acupuncture for frozen shoulder. Their review included 13 publications and examined pain intensity, shoulder function, and range of motion. The findings suggest that acupuncture may reduce pain and improve shoulder function and forward flexion in the short and medium term. The authors reported that the overall quality of evidence was very low, indicating that the results should not be interpreted as definitive proof of effectiveness. They emphasized the need for further high-quality studies with longer follow-up periods to establish the sustained benefits of acupuncture for frozen shoulder.

Lee *et al*. (2024) evaluated pharmacoacupuncture for frozen shoulder through a systematic review and meta-analysis of randomized controlled trials. Their review included 13 randomized controlled trials involving 1,034 participants. The findings suggested potential improvements in pain, shoulder mobility, and selected functional outcomes, although the quality of evidence varied across outcomes. The authors also identified a reported adverse reaction involving bee venom, emphasizing the importance of considering treatment-specific risks and patient safety. These findings provide additional

context for understanding acupuncture-related interventions, although pharmacoacupuncture involves injections and should not be considered identical to conventional needle acupuncture. Ji *et al*. (2025) examined the comparative effectiveness of acupuncture-related therapies for frozen shoulder using a systematic review and meta-analysis. This type of analysis compares multiple interventions using both direct and indirect evidence, potentially helping clinicians understand how different acupuncture-related treatments compare with one another. Rankings of treatments should be interpreted in light of the quality of the included trials, differences in treatment protocols, and the certainty of the evidence. The findings should complement, rather than replace, clinical judgment and individualized rehabilitation planning.Acupuncture should therefore be considered a complementary option rather than a replacement for appropriate physical therapy or medically indicated treatment.

Massage and Manual Therapy: Massage and manual therapy are important interventions that may be incorporated into the physiotherapy management of frozen shoulder, also known as adhesive capsulitis. The condition is characterized by shoulder pain, progressive stiffness, and restriction of both active and passive movements, particularly external rotation, abduction, and flexion.Manual therapy aims to reduce pain, improve joint mobility, decrease soft-tissue tightness, and facilitate functional movement. Techniques may include gentle soft-tissue massage, passive stretching, therapist-assisted rangeofmotion exercises, and graded glenohumeral joint mobilization.Treatment should be individualized according to the patient symptoms, stage of the condition, and response to therapy (Kelley *et al*., 2009; Page *et al*., 2014).

Soft-tissue massage may be used to address muscular tension and discomfort in the shoulder and surrounding regions, including the upper trapezius, deltoid, and pectoral muscles. In patients with frozen shoulder, pain may lead to a protective muscle guard and reduced willingness to move the affected arm. Gentle massage may help improve comfort and allow the patient to participate more effectively in stretching and therapeutic exercises. Massage should not be considered a treatment that independently reverses the capsular fibrosis associated with adhesive capsulitis. Its primary role is to support symptom management and facilitate other rehabilitation interventions. The intensity and duration of treatment should be adjusted according to patient tolerance, and techniques that produce substantial or persistent increases in pain should be modified (Kelley *et al*., 2009; Page *et al*., 2014). Joint mobilization is another manual therapy technique used to address restrictions in shoulder movement. It involves the application of controlled passive forces to the glenohumeral joint to improve mobility and reduce movement-related discomfort. Low-grade mobilization techniques may be more appropriate when pain and irritability are high, whereas more intensive mobilization may be considered when stiffness predominates and the patient can tolerate greater movement. Vermeulen *et al*. (2006) investigated the effects of intensive stretching and mobilization techniques in patients with adhesive capsulitis and reported improvements in shoulder function and mobility over time. The choice of mobilization technique should be based on clinical assessment rather than a standardized approach for all patients. Excessively forceful mobilization may aggravate symptoms, particularly during the painful phase of the condition.

Exercise therapy is essential for maintaining and improving the mobility gained through manual treatment. Active-assisted exercises, pendulum exercises, gentle stretching, and progressive shoulder movements can help patients gradually regain a functional range of motion. The intensity of exercise should be adjusted according to pain and tissue irritability, as excessive stretching may increase discomfort and discourage participation. Chan *et al*. (2017) emphasized the importance of physiotherapy and appropriate exercise in the management of frozen shoulder, with treatment tailored to the stage of the condition. Similarly, Kelley *et al*. (2013) provided clinical practice recommendations for assessing and managing adhesive capsulitis, highlighting the importance of evaluating pain, mobility deficits, and functional limitations when planning rehabilitation. Therefore, manual therapy should be integrated with a structured exercise programme and patient education to promote recovery and improve functional outcomes. The effectiveness of manual therapy should be interpreted in light of the available research evidence. Page *et al*. (2014) reviewed 32 trials involving 1,836 participants and concluded that the evidence regarding manual therapy and exercise for adhesive capsulitis was limited and varied according to the intervention and comparison treatment. Their review indicated that manual therapy combined with exercise may produce less short-term improvement in pain.

A systematic review and meta-analysis conducted by Kirker *et al*. (2023)examined manual therapy and exercise for adhesive capsulitis and identified the need for clearer evidence regarding treatment dosage and the effectiveness of different intervention approaches. These findings suggest that manual therapy should not be considered universally effective or used as the sole treatment. Instead, it should form part of an individualized rehabilitation programme that considers the patient's symptoms, goals, and response to treatment.

Yoga and Relaxation Techniques: Yoga, controlled breathing, mindfulness, and progressive muscle relaxation may be used as complementary approaches to support the overall well-being of individuals experiencing persistent musculoskeletal pain. These practices may help reduce stress, promote relaxation, improve awareness of bodily sensations, and support coping with the emotional and functional challenges associated with chronic pain. Persistent shoulder pain can affect sleep quality, mood, concentration, and participation in daily activities, relaxation-based approaches may be useful as part of a comprehensive rehabilitation programme. Their benefits should be considered supportive rather than a replacement for appropriate physiotherapy and active rehabilitation (Cardle *et al*., 2023).

Yoga incorporates gentle physical postures, breathing exercises, and relaxation techniques that may help maintain general flexibility and physical activity. In patients with frozen shoulder, modified yoga movements may be considered when they can be performed comfortably without placing excessive stress on the affected shoulder. Cardle *et al*. (2023), in an umbrella review of mindfulness-based interventions for chronic musculoskeletal pain, reported mixed findings across pain intensity, sleep quality, psychological well-being, and physical functioning. The authors also highlighted limitations in the quality and consistency of the available evidence. Therefore, mindfulness considered a supportive strategy for pain management, but its independent effectiveness in restoring shoulder mobility remains uncertain.

Controlled breathing and progressive muscle relaxation may also be incorporated into rehabilitation to promote relaxation and manage stress. Controlled breathing encourages slow, comfortable breathing, while progressive muscle relaxation involves systematically tensing and relaxing selected muscle groups. These practices may help patients manage emotional tension and become more comfortable during gentle shoulder movements. They should be performed without forceful contraction of the painful shoulder muscles or movements that aggravate symptoms. Although these approaches may support general pain coping and relaxation, their specific effectiveness in treating the joint capsule restrictions associated with adhesive capsulitis has not been firmly established. The use of yoga and mindfulness should be individualized according to the patient's symptoms, physical abilities, and treatment goals. During periods of substantial pain, gentle breathing exercises, relaxation, and comfortable movements may be more appropriate than demanding yoga postures or intensive stretching. As shoulder mobility improves, modified movements may be gradually incorporated alongside prescribed range-of-motion exercises, strengthening, and other physiotherapy interventions.

Nutritional and Lifestyle Approaches: Nutritional support is an important component of general health and may contribute to the overall management of adhesive capsulitis, commonly known as frozen shoulder. A balanced diet containing adequate protein, vegetables, fruits, whole grains, and appropriate sources of dietary fat supports normal physiological functioning, tissue maintenance, and recovery.Maintaining a well-balanced diet is essential for meeting the body's nutritional requirements, minimizing the likelihood of nutrient deficiencies, and promoting overall health and well-being (World Health Organization [WHO], 2020; Cena & Calder, 2020). Diabetes mellitus is an important systemic condition associated with adhesive capsulitis. Individuals with diabetes have a greater risk of developing a frozen shoulder, and the condition may be more persistent in this population. Dyer *et al*. (2023), in a systematic review and meta-analysis, identified diabetes as a significant risk factor for frozen shoulder. Similarly, Zreik *et al*. (2016) reported a strong association between diabetes mellitus and adhesive capsulitis in their systematic review and meta-analysis. These findings highlight the importance of considering systemic health factors when managing patients with restricted shoulder movement. Appropriate glycaemic control, regular monitoring of blood glucose levels, and adherence to prescribed diabetes treatment are important components of comprehensive care.

Protein is essential for maintaining skeletal muscle mass and supporting normal tissue repair. Suitable dietary sources include eggs, fish, lean meat, milk, curd, pulses, beans, lentils, soy products, and nuts. Adequate protein intake is important for preserving muscle function, particularly in individuals whose physical activity is reduced because of persistent shoulder pain. Wolfe (2017) discussed the importance of dietary protein in supporting muscle health and the maintenance of muscle mass. Similarly, Morton *et al*. (2018) reported that protein supplementation, particularly when combined with resistance exercise, can support gains in muscle mass and strength in healthy adults. Fruits and vegetables provide vitamins, minerals, fiber, and other bioactive compounds that contribute to normal physiological processes. Vitamin C participates in collagen synthesis, while vitamin D and calcium contribute to normal bone and muscle function. Calder (2020) discussed the relationship between nutrition, immune function, and health, emphasizing the importance of adequate nutrient intake in maintaining normal physiological processes. Cena and Calder (2020) also described the role of healthy dietary patterns in supporting overall health and reducing the risk of chronic diseases. Dietary fats play an important role in maintaining overall health and supporting normal metabolic processes. Incorporating unsaturated fat sources, such as nuts, seeds, plant-based oils, and oily fish, into the diet can help promote a balanced and nutritious eating pattern.Cena and Calder (2020) reviewed evidence concerning dietary patterns and health, emphasizing the importance of food quality and overall dietary composition. Calder *et al*. (2020) also discussed the importance of adequate nutritional status in supporting normal immune function. For individuals with diabetes, dietary choices should additionally support individualized blood glucose management and cardiovascular health. The use of herbal preparations, antioxidants, and nutritional supplements requires careful consideration. Calder *et al*. (2020) emphasized the importance of adequate micronutrient status for normal physiological and immune functions. Evidence-based rehabilitation remains central to the management of adhesive capsulitis. Kelley *et al*. (2013) provided clinical practice guidelines for the diagnosis and treatment of adhesive capsulitis, including recommendations concerning assessment and physical therapy management. Challoumas *et al*. (2020), in a systematic review and network meta-analysis, evaluated nonsurgical treatment options and provided evidence to guide clinical decision-making. In patients with diabetes, treatment planning should also consider metabolic health and the possibility of differences in clinical outcomes. Zreik *et al*. (2016) and Dyer *et al*. (2023) support the association between diabetes and frozen shoulder, while Tang and Tan (2024) reviewed treatment outcomes in patients with and without diabetes.

DISCUSSION

The present literature review examined the potential role of naturopathic interventions in managing frozen shoulder, also known as adhesive capsulitis, with particular emphasis on therapeutic exercise, hydrotherapy, thermotherapy, acupuncture, massage, manual therapy, yoga, relaxation, and nutritional approaches. The available literature suggests that these interventions may support pain management, improve movement tolerance, and facilitate rehabilitation. However, their effectiveness varies according to the quality of evidence, disease stage, and individual patient characteristics. Adhesive capsulitis is characterized by shoulder pain, progressive restriction of active and passive movement, and inflammation, capsular thickening, and fibrosis. Neviaser and Hannafin (2010) discussed its pathological mechanisms and clinical progression. These findings highlight the importance of individualized treatment addressing pain, mobility, and daily functioning. Therapeutic exercise and gentle mobilization remain important components of conservative management. Griggs *et al*. (2000), Vermeulen *et al*. (2006), and Kelley *et al*. (2013) emphasized structured rehabilitation and appropriate mobilization techniques. Hydrotherapy may facilitate shoulder movement through water buoyancy and the comforting effects of warm water. Hall *et al*. (2008) discussed aquatic exercise for musculoskeletal conditions, while Bartels *et al*. (2016) reported benefits in people with hip and knee osteoarthritis. However, these findings cannot be directly generalized to

frozen shoulder. Hydrotherapy may complement rehabilitation, although its specific effects on capsular fibrosis and long-term shoulder mobility require further investigation. Thermotherapy may temporarily reduce discomfort and improve tolerance of therapeutic exercise. Cameron (2018) discussed the application of physical agents in rehabilitation, including their benefits and precautions. Nevertheless, pain relief does not necessarily indicate reversal of capsular fibrosis. Heat therapy should therefore be used as a supportive modality, with appropriate precautions for individuals with impaired sensation or circulation. Acupuncture and electroacupuncture may offer additional benefits for pain and shoulder function. Ben-Arie *et al*. (2020) and Heo *et al*. (2022) reported potential improvements in selected clinical outcomes, although methodological limitations and variations in treatment protocols reduce certainty. Acupuncture may complement physical therapy, but it should not replace established rehabilitation. Appropriate practitioner qualifications, sterile techniques, and potential adverse effects must also be considered. Massage and manual therapy may improve movement tolerance and reduce muscular discomfort. Vermeulen *et al*. (2006) examined different joint mobilization intensities, while Page *et al*. (2014) identified limitations in the evidence supporting manual therapy and exercise. These interventions should be individualized and combined with therapeutic exercises rather than used as isolated treatments.

Yoga, mindfulness, and relaxation techniques may help patients cope with persistent pain and associated psychological distress. Cardle *et al*. (2023) reviewed mindfulness-based interventions for chronic musculoskeletal pain. However, evidence specific to adhesive capsulitis remains limited. Modified movements and relaxation practices may support well-being but should not aggravate shoulder symptoms. Nutritional and lifestyle approaches are particularly relevant because diabetes is associated with an increased risk of frozen shoulder. Dyer *et al*. (2023) and Zreik *et al*. (2016) reported this association. A diverse and nutritionally balanced eating pattern provides essential nutrients required for normal body functions and helps promote long-term health and well-being (Cena & Calder, 2020; World Health Organization [WHO], 2020). Nevertheless, evidence does not establish that specific diets, herbal preparations, antioxidants, or supplements reverse capsular fibrosis.

CONCLUSION

The present literature review suggests that naturopathic interventions may be beneficial as complementary approaches in the management of frozen shoulder. Therapeutic exercise, gentle mobilization, hydrotherapy, thermotherapy, acupuncture, massage, yoga, relaxation techniques, and appropriate nutritional support may help reduce discomfort, improve movement tolerance, promote relaxation, and support functional recovery. Among these approaches, therapeutic exercise and individualized physiotherapy remain essential for restoring shoulder mobility and improving daily activities. Complementary interventions may further support rehabilitation when selected according to the patient's symptoms, preferences, and clinical needs.Naturopathic interventions may be particularly valuable as part of a holistic management programme that addresses physical symptoms, psychological well-being, lifestyle, and general health. Gentle and progressive exercises can help maintain shoulder movement, while heat therapy, massage, and selected acupuncture techniques may provide additional symptom relief for some patients. Appropriate nutrition and effective management of coexisting conditions, especially diabetes mellitus, may also support overall health during recovery.Naturopathy may have a supportive role in improving pain management, movement, and quality of life in patients with frozen shoulder when integrated safely with conventional treatment.

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