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Review Article

Is Tui Na a Promising Approach for Autoimmune Diseases? A Review of Clinical Studies and Mechanisms

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ABSTRACT

Autoimmune diseases, characterized by immune system dysfunction targeting healthy tissues, affect millions worldwide. While conventional treatments have advanced, unmet needs persist. Tui Na, a traditional Chinese massage therapy, has gained attention as a potential complementary treatment. This review explores Tui Na's role in managing autoimmune conditions. A comprehensive literature search was conducted to identify studies investigating the use of Tui Na for autoimmune diseases in several databases. The available evidence suggests that Tui Na may offer potential benefits for individuals with autoimmune diseases. Studies have reported improvements in pain, fatigue, and overall well-being. Combining Tui Na with conventional treatments has often yielded enhanced outcomes. However, the evidence base is limited by a paucity of high-quality randomized controlled trials. Tui Na's potential as a complementary therapy for autoimmune diseases is promising. Its ease of application and reported benefits warrant further exploration. However, the underlying mechanisms remain unclear, and the evidence base is insufficient to establish definitive recommendations. Future research should focus on rigorous study designs, larger sample sizes, and mechanistic investigations. Integrating Tui Na into comprehensive care plans requires careful consideration of patient-specific needs and potential interactions with conventional treatments. In conclusion, Tui Na shows promise as a complementary therapy for autoimmune diseases, offering potential benefits in symptom management and quality of life. While preliminary findings are encouraging, robust research is needed to establish its efficacy and safety

KEYWORDS Tui Na, traditional Chinese massage, autoimmune diseases, rheumatoid arthritis, multiple sclerosis, amyotrophic lateral sclerosis, ankylosing spondylitis

INTRODUCTION

Autoimmune diseases arise from a dysregulation of the adaptive immune system, leading to a pathological response where autoantibodies erroneously target and bind to the body's own healthy tissues, triggering an immune response against these self-antigens (1).

Over 80 autoimmune diseases have been identified, with recent scientific evidence suggesting a number potentially exceeding 100 distinct autoimmune conditions (2-5). It is estimated that it affects around 10% of the population, ranking as the third most common disease category after cancer and cardiovascular disease (2, 6). Recent

research [7] suggests a marked increase in the incidence of autoimmune diseases, resulting in a growing burden on individuals, society, and healthcare systems.

Pathogenesis seems to be related to an interplay between genetic predisposition (such as gender, ethnicity, and family history) and environmental factors (such as pollution, stress, and diet quality) [3, 6, 8, 9].

Furthermore, the incidence of specific autoimmune diseases varies according to geodemographics [10]. For example, the incidence of type 1 diabetes is 10 to 20 times higher in Europe and the United States of America compared to the Middle East and Asia. Grave's disease incidence is almost four times higher in the Middle East/Asia compared to Europe/United States of America. Additionally, the female/male incidence ratio also varies with the specific autoimmune disease. For instance, primary biliary cirrhosis has a ratio of 10/1, Grave's disease has a ratio of 5/1, Coeliac disease has a ratio of 1/1, and Crohn's disease has a ratio of 1/1.2 [10, 11] .

Despite recent advances in the treatment of autoimmune diseases, some barriers persist [12-15]. Continued exploration of complementary therapeutic strategies is warranted to ensure equitable access to affordable and effective care for patients worldwide.

Tui Na, or Chinese massage, is a technique of Traditional Chinese Medicine. It is mentioned in several medical classics such as the Huangdi Neijing (Inner Canon of the Yellow Emperor) [16].

This form of therapeutic massage involves several soft-tissue and bone adjustment manipulations [17] and is often used in conjunction with other techniques such as acupuncture, moxibustion, cupping, Guasha, and herbal therapy.

Traditionally, Tui Na harmonizes the Yin and Yang, promotes, invigorates and regulates the flow of Qi and blood, expels, clears, dissipates and dredges pathogenic factors, releases and relaxes the sinew channels, and lubricates and improves the movement of joints [18].

These therapeutic indications based on traditional Chinese medicine theories are better understood when we treat them as a logical model of a system's biology with a structural mathematical language [19, 20]. In summary, by equating 'yin' to 0 and 'yang' to 1, we can map these binary concepts onto human physiological regulation, pro-viding a framework for understanding vegetative functional tendencies [19].

This review aims to elucidate the role of Tui Na in managing autoimmune diseases by exploring its potential therapeutic applications, its underlying mechanisms, and the methodological approaches of current research.

METHODS

This narrative review synthesizes the current literature on Tui Na for the management of autoimmune diseases. The information presented was primarily sourced from a search of major biomedical databases, including PubMed, Scopus, Web of Science, and CNKI. The search strategy employed a combination of keywords and Medical Subject Headings (MeSH) terms related to the key concepts, e.g., "Tui Na", "Chinese Massage", "autoimmune diseases", "rheumatoid arthritis", "ankylosing spondylitis", "multiple sclerosis", "systemic lupus erythematosus", and "amyotrophic lateral sclerosis".

Studies were included if they were peer-reviewed clinical articles published in English, Portuguese, Spanish, French, or Chinese. Articles were excluded if they were not relevant to the specified topic or were not available in a peer-reviewed format. Identified articles were screened based on title and abstract, with relevant full-text articles being retrieved for a comprehensive narrative synthesis.

TUI NA FOR AUTOIMMUNE DISORDERS

The increasing prevalence and complex nature of autoimmune diseases necessitate a comprehensive exploration of complementary therapeutic approaches. The present study focuses on discussion of the scientific evidence assessing Tui Na as a potential treatment for various autoimmune conditions such as rheumatoid arthritis, multiple sclerosis and amyotrophic lateral sclerosis, and ankylosing spondylitis. The included studies are summarized in Table 1.

Rheumatoid arthritis

Rheumatoid arthritis is a chronic, systemic disease primarily affecting the synovial joints, particularly those in the hands and feet. Pathologically, it is characterized by synovial hyperplasia, pannus formation, and subsequent cartilage and

Table 1. Characteristics of included studies

References	Wang, Yang (21)	Hong and Xiao-xiang (22)	Chen (23)	Cai (24)
Condition	Rheumatoid arthritis	Rheumatoid arthritis	Rheumatoid arthritis	Rheumatoid arthritis
Type of study	Randomized controlled trial	Clinical observational study	Randomized controlled trial	Randomized controlled trial
Number of participants	n = 60 (30 in the treatment group/30 in the control group)	n = 48	n = 80 (40 in the study group/40 in the control group)	n = 60 (20 in the experimental group/20 each in control groups 1 and 2)
Intervention	Massage "leading Yang into Yin" combined with a breath guided method	Warm Needle acupuncture and Chinese massage	Drug bamboo pot therapy combined with acupoint massage	Long's bone setting massage combined with acupuncture and traditional Chinese medicine
Control	Placebo (vitamin C)	No control group	Drug bamboo pot therapy	Control 1: conventional Western medicine; Control 2: acupuncture and traditional Chinese medicine.
Main results	The group that received combined massage and breath-guided therapy experienced a significantly greater reduction in anxiety scores (HAMA scores) compared to the control group ($p < 0.05$). The total effectiveness rate of the treatment group was 86.67%, which was significantly higher than the 23.33% effectiveness rate of the control group ($p < 0.05$).	Clinical Recovery: 6 cases (symptoms and signs eliminated, normal work resumed). Remarkable effectiveness: 14 cases (most symptoms and signs abated, light work possible). Improvement: 24 cases (symptoms and signs improved slightly). Ineffectiveness: 4 cases (no change in symptoms and signs).	The study group had lower pain scores (VAS) compared to the control group ($p < 0.05$). The study group had better disease activity scores (SDAI) compared to the control group ($p < 0.05$). The total effectiveness rate of the study group was higher than that of the control group ($p < 0.05$).	The experimental group total clinical effective rate was higher than that of both control group 1 and control group 2 ($p < 0.05$) and its incidence and recurrence rate of adverse reactions were lower than that of both control group 1 and control group 2 ($p < 0.05$).
Main limitations	The study did not explore long-term effects or follow-up outcomes. High risk of performance bias due to the difficulty in blinding manual therapy interventions. The sample size was relatively small.	No control group. Subjective criteria for outcomes. The sample size was relatively small. Combined-modality treatment.	The sample size and study duration was relatively small.	The sample size and study duration was relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Combined-modality treatment.

Table 1. Characteristics of included studies (continued)

References	Qin, Li (25)	Wang, Rong (26)	Wang (27)	Nie, Han (28)
Condition	Rheumatoid arthritis	Rheumatoid arthritis	Rheumatoid arthritis	Rheumatoid arthritis
Type of study	Randomized controlled trial	Randomized controlled trial	Randomized controlled trial	Randomized controlled trial
Number of participants	n = 82 (41 in the study group/41 in the control group)	n = 80 (40 in the study group/40 in the control group)	n = 60 (30 in the treatment group/30 in the control group)	n = 84 (42 in the study group/42 in the control group)
Intervention	External application of Traditional Chinese Medicine powder combined with massage	Tiebaojin massage cream in addition to conventional Western medicine treatment	Herbal fumigation therapy combined with massage	Traditional Chinese medicine, herbal fumigation and massage
Control	Massage only	Conventional Western medicine treatment	Conventional Western medicine treatment	Routine treatment and a local hot compress
Main results	The study found that the combined therapy was significantly more effective than massage alone. The scores for TCM syndromes (joint swelling, adverse joint activity, and muscle soreness) were lower in the treatment group compared to the control group ($p < 0.05$). Knee joint function (Lysholm score) was better in the treatment group ($p < 0.05$). Pain scores (NRS) were lower in the treatment group ($p < 0.05$).	The effectiveness rate was 90.0% in the treatment group, significantly higher than the 72.5% in the control group. The treatment group showed greater improvements than the control group in the number of joint pains, morning stiffness, grip strength, C-reactive protein, erythrocyte sedimentation rate, and rheumatoid factor ($p < 0.05$).	The total efficacy in the treatment group was 93.33%, significantly higher than the 73.33% of the control group ($p < 0.05$). Symptom scores improved in both groups, but the improvement was significantly greater in the treatment group ($p < 0.05$).	The experimental group total effectiveness rate was 90.5%, significantly higher than the 71.4% in the control group ($p < 0.05$). The erythrocyte sedimentation rate and C-reactive protein, and pain scores were significantly lower in the observation group at 3 weeks, 3 months, and 6 months post-treatment ($p < 0.05$). Knee function scores were significantly higher in the observation group at 3 weeks, 3 months, and 6 months ($p < 0.05$). Synovial thickness was significantly less in the observation group at all follow-up times ($p < 0.01$).
Main limitations	The sample size and study duration were relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control.	The sample size and study duration were relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control.	The sample size was relatively small. The study duration was very short. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control. Combined-modality treatment.	The sample size was relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control. Combined-modality treatment.

Table 1. Characteristics of included studies (continued)

References	Li (29)	An and Liu (30)	Salarvand, Heidari (31)	Ozdelikara and Alkan (32)
Condition	Rheumatoid arthritis	Rheumatoid arthritis	Multiple sclerosis	Multiple sclerosis
Type of study	Randomized controlled trial	Randomized controlled trial	Systematic review and meta-analysis	Quasi-experimental, pretest-posttest design
Number of participants	n = 78 (39 in the study group/39 in the control group)	n = 60 (30 in the treatment group/30 in the control group)	n = 10 RCTs with a total of 421 participants	n = 15
Intervention	Oral Chinese herbal medicine combined with fumigation and therapeutic massage	Modified Taohecheng-qi decoction combined with acupuncture and massage	Slow stroke back massage, Swedish massage, reflexology effleurage massage	Reflexology
Control	Conventional Western medicine treatment	Conventional Western medicine treatment	Usual care, relaxation therapy, sham reflexology, other massages	No control group
Main results	The total effective rate for the treatment group was 94.87%. Post-treatment pain scores were significantly lower in the treatment group (3.05 ± 0.45) compared to the control group (5.82 ± 1.24), with a statistically significant difference ($p < 0.05$). The duration of morning stiffness was statistically significantly shorter in the treatment group (30.12 ± 10.42 min) compared to the control group (43.52 ± 16.59 min) ($p < 0.05$).	The incidence of DVT and skin infection was not significantly different between the two groups ($p < 0.05$). The incidence of subcutaneous ecchymosis was significantly lower in the observation group ($p < 0.05$). ROM, HSS, and VAS scores were all significantly better in the observation group ($p < 0.05$). TCM syndrome scores were significantly lower in the observation group ($p < 0.05$). Hemoglobin was higher and D-dimer was lower in the observation group ($p < 0.05$).	Fatigue: Measured using the Fatigue Severity Scale (FSS) in 6 studies. The meta-analysis showed a statistically significant reduction in fatigue (SMD = -1.62, 95% CI -2.40 to -0.83, $p < 0.0001$). Pain: Measured using Visual Analogue Scale (VAS), Pain Effects Scale (PES), and Numeric Rating Scale (NRS) in 4 studies. Significant reduction in pain severity was observed in 3 studies ($p < 0.05$).	The average FSS score decreased significantly from 40.06 ± 19.27 at baseline to 27.66 ± 21.23 post-intervention ($p = 0.045$). State Anxiety (STAI-S): Scores decreased from 50.33 ± 9.48 to 37.53 ± 10.11 ($p = 0.008$). Trait Anxiety (STAI-T): Scores decreased from 43.33 ± 9.48 to 31.86 ± 10.27 ($p = 0.003$).
Main limitations	The sample size was relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control. Combined-modality treatment.	The sample size was relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Lack of placebo control. Combined-modality treatment.	Significant heterogeneity in study designs, including variations in massage duration, frequency, and outcome measures. Small number of studies included in the analysis, limiting generalizability. Lack of long-term follow-up data. Publication bias was detected.	The study had a small sample size. The absence of a control group limits the ability to compare results with untreated participants.

Table 1. Characteristics of included studies (continued)

References	Zhang, Yan (33)	Marinova, Angelcheva (34)	Siev-Ner, Gamus (35)
Condition	Multiple sclerosis	Multiple sclerosis	Multiple sclerosis
Type of study	Systematic review and meta-analysis of randomized controlled trials	Controlled trial	Randomized controlled trial
Number of participants	n = 10 RCTs with a total of 631 participants	n = 50 (25 experimental group/25 control group)	n = 71 (53 finished the intervention)
Intervention	Manual intervention such as traditional Chinese massage, Swedish massage, and Thai massage	Tui Na therapy	Reflexology
Control	Sham interventions (e.g., sham massage, sham reflexology), usual care, relaxation techniques	No intervention (usual care)	Sham reflexology
Main results	Massage therapy significantly reduced fatigue (SMD: -0.78; p = 0.001). Reflexology showed no significant effect on fatigue. Manual therapy (both massage and reflexology) significantly reduced pain (SMD: -0.59; p = 0.0252). Reflexology alone was effective in relieving pain (SMD: -0.40; p = 0.02). Manual therapy did not significantly alleviate spasticity (SMD: -0.71; p = 0.0567). Reflexology did not improve physical function (SMD: -0.08; p = 0.68). Reflexology did not improve psychological disorders (SMD: -0.21; p = 0.94).	Pain Reduction: The experimental group showed significant improvement in pain intensity compared to the control group. At the end of the study, 15 patients in the experimental group reported no pain, compared to only 2 in the control group. Impact on Daily Work: Pain interference with normal work was significantly reduced in the EG compared to the control group. Quality of life: The experimental group reported better functional abilities, reduced fatigue, and improved psychological and social well-being.	Significant improvement was noted for paresthesia in the reflexology group, and this benefit was sustained at the three-month follow-up. Urinary Symptoms & Spasticity showed significant improvement in the reflexology group. An improvement was observed in muscle strength, though it was of borderline significance.
Main limitations	Studies varied in disease duration, treatment regimens, and evaluation scales, leading to high heterogeneity. High risk of performance bias due to the difficulty in blinding manual therapy interventions. Potential reporting bias as studies with negative results may not have been published. Some studies had small sample sizes, limiting generalizability.	The study excluded patients with contraindications for physical therapy, heart diseases, or advanced multiple sclerosis, which may limit the generalizability of the findings. The study relied on self-reported measures which are subjective and may introduce bias. The sample size was relatively small, and the study was conducted in a single geographic location, which may affect the broader applicability of the results. The long-term effects of Tiuna therapy were not assessed.	The sample size was relatively small. High risk of performance bias due to the difficulty in blinding manual therapy interventions.

Table 1. Characteristics of included studies (continued)

References	Li, Liu (36)	Li, Liu (36)	Gui-yi, Jian-hui (38)	Zou, Wang (39)
Condition	Amyotrophic lateral sclerosis	Ankylosing spondylitis	Ankylosing spondylitis	Chronic neck pain and stiffness during an acute flare-up of ankylosing spondylitis
Type of study	Case report	Clinical observation study	Clinical study	Case report
Number of participants	n = 1	n = 49 (42 finished the intervention)	n = 128 (64 observation group/64 control group (finished the intervention)	n = 1
Intervention	Western medicine (oral riluzole tablets) and Tuina therapy	Fire-needle therapy combined with tuina manipulations	Conventional medication (sulfasalazine and meloxicam) combined with acupuncture and spinal manipulations	Tui Na therapy
Control	No control group	No control group	Conventional medication (sulfasalazine and meloxicam)	No control group
Main results	The patient showed initial improvement in pulmonary function (e.g., forced vital capacity, vital capacity, and maximal voluntary ventilation) after treatment, though some measures decreased slightly by the third test but remained higher than baseline. Limb circumferences increased, except for the left forearm. The patient reported slight improvements in slurred speech, choking while drinking water, and left upper limb weakness. Tongue stirring speed and strength also improved. Skeletal muscle mass decreased slightly, while body fat and body mass percentages increased.	Therapeutic Results Clinical recovery: 16 cases, remarkable effect; 13 cases, some effect; 7 cases, and failure: 6 cases. Total effectiveness rate: 85.7%. Improvement in Symptoms and Signs: Spine mobility: Remarkable improvement in 30 cases, some effect in 7 cases, failure in 4 cases. Morning stiffness: Clinical recovery in 25 cases, remarkable effect in 10 cases, some effect in 3 cases, failure in 3 cases. Other symptoms like anemia, low-grade fever, neck and shoulder pain, fatigue, lumbosacral pain, and joint tumefaction showed varying degrees of improvement.	Symptom Improvement: Both groups showed decreased TCM symptom scores, but the observation group had significantly lower scores. Pain and Physical Functioning: The observation group showed greater reductions in VAS (pain severity), BASFI (functional index), and BASDAI (disease activity index) scores compared to the control group. Biochemical Indicators: Levels of ALP, ESR, CRP, and OPG decreased in both groups, with greater reductions in the observation group. Efficacy Rate: Total efficacy rate was 92.2% in the observation group versus 78.1% in the control group.	The patient suffered catastrophic results, including quadriplegia due to cervical fracture dislocation (C4–C5) and died 7 days after admission due to respiratory failure and cardiovascular dysfunction.
Main limitations	As a case report, the findings are based on a single patient and cannot be generalized. There is no comparison group. The study relied on self-reported measures, which are subjective and may introduce bias.	Lack of a control group or randomized design. Small sample size and single-center study. Results are based on subjective assessments and self-stipulated criteria. Combined-modality treatment.	The study did not explore long-term effects or follow-up outcomes. The sample size was relatively small. The study was conducted in a single hospital, which may have introduced location bias. No placebo group. Combined-modality treatment.	As a case report, the findings are based on a single patient and cannot be generalized. There is no comparison group.

bone destruction (40, 41).

As an autoimmune disease, it is driven by a complex interplay of genetic and environmental factors that activate immune cells, such as T cells and macrophages, to release pro-inflammatory cytokines (e.g., TNF-α and IL-6), leading to chronic synovial inflammation and the enzymatic destruction of cartilage and bone through the activity of enzymes like matrix metalloproteinases and peptidylarginine deiminase (42, 43).

This debilitating disease imposes a substantial burden on both individuals and society (44, 45). At the individual level, the condition leads to significant musculoskeletal impairments, resulting in diminished physical function, reduced quality of life, and increased risk of comorbidities (46, 47). On a societal level, rheumatoid arthritis contributes to a substantial economic burden due to direct medical costs, lost productivity resulting from impaired work capacity, and decreased social participation (48, 49).

Conventional treatment has been growing in efficacy in the last decades (50). However, it still has its limitations and adverse side effects (50, 51).

Regarding Tui Na for rheumatoid arthritis, research is scarce. However, some studies suggest potential benefits.

A study by Wang, Yang (21) investigated the impact of a specific massage technique combined with breathing exercises on anxiety in rheumatoid arthritis patients. The results showed that patients who received this combined treatment experienced a significantly greater reduction in anxiety symptoms compared to those who received a placebo. This suggests that the massage and breathing technique could be a beneficial addition to the treatment plan for rheumatoid arthritis patients.

A preliminary research study (22) investigated the use of Tui Na combined with warm needling acupuncture technique for rheumatoid arthritis. 91.66% of patients showed clinically relevant improvements. Specifically, 12.50% of patients experienced a near-complete elimination of both local and general symptoms, allowing them to resume a normal life routine, while 29.17% of patients experienced a significant reduction in symptoms and signs after treatment ended, allowing them to undertake light work activities and 50.00% of patients experienced a slight improvement in

symptoms and signs following treatment. The remaining 8.33% of patients experienced no change in symptoms or signs after the treatment ended. However, to determine the specific added effect of Tui na, it is necessary to compare the combined therapy with warm needling acupuncture monotherapy.

Chen (23) conducted a clinical trial combining the use of acupuncture point hand stimulation (acupressure or acupoint massage) with herbal cupping for rheumatoid arthritis. The experimental group (combined treatment) showed significantly superior improvements in pain levels (Visual Analogue Scale) and disease activity (Simplified Disease Activity Index) compared to the control group (herbal cupping only).

The 3-arm clinical trial of Cai (24) showed that a specific Tui Na model combined with acupuncture and Chinese herbal medicine was statistically superior in clinical efficacy, adverse reactions and recurrence of symptoms compared to both conventional medicine and acupuncture plus Chinese herbal medicine.

Another study (25) explored the influence of an external application of a traditional Chinese medicine powder combined with Tui Na on the knee joint function of rheumatoid arthritis patients with knee joint damage. Results showed that the experimental group was statistically superior in reducing joint swelling, adverse joint activity, muscle soreness and joint pain compared to the control group (massage only). In addition, the Lysholm Knee Scoring Scale and Numerical Rating Scale for pain showed significant improvement and superior benefits in the experimental group compared to the control group.

Not specifically investigating the effect of Tui Na, Wang, Rong (26) investigated the efficacy of Tiebaojin massage cream in treating rheumatoid arthritis. The roots or stems of the plant Tiebaojin or *Berchemia lineata* are used in traditional Chinese medicine (52), providing anti-inflammatory action (53) and are also indicated for rheumatoid arthritis (54). In that study, the experimental group (conventional medicine combined with Tiebaojin cream) showed a significantly higher efficacy rate compared to the control group (conventional medicine). Benefits were observed in improved symptoms, grip strength, and reduced levels of inflammation markers (Erythrocyte

Sedimentation Rate, C-reactive protein, and rheumatoid factor). This suggests that Tiebaojin cream may be a good addition to Tui Na massage to improve clinical symptoms and reduce inflammation in rheumatoid arthritis patients.

A study by Wang (27) compared the effectiveness of combined moxibustion and Tui Na versus traditional medication (diclofenac and methotrexate) in treating rheumatoid arthritis. The study found that the combination therapy was more effective in reducing symptoms and improving overall condition compared to the traditional medication group. The therapy was also reported to have no adverse side effects.

Additionally, Nie, Han (28) assessed the efficacy of moxibustion combined with Tui Na in treating knee rheumatoid arthritis. Results showed that moxibustion plus Tui Na was significantly superior to the active control (standard care plus hot compress). Benefits were observed in improved levels of inflammation markers (erythrocyte sedimentation rate and C-reactive protein), pain, knee function, and joint swelling (measured by MRI and ultrasound). Neither intervention showed significant adverse effects.

Li (29) went further and compared a combined treatment of oral Chinese herbal medicine, moxibustion, and Tui Na to conventional Western medicine in rheumatoid arthritis patients. The results showed that the combined Chinese medicine approach was more effective in reducing pain, improving overall condition, and shortening the duration of morning stiffness compared to the Western medicine treatment.

An and Liu (30) conducted a study exploring the combination of Taohe Chengqi decoction and acupoint massage in preventing deep vein thrombosis after knee arthroplasty in rheumatoid arthritis. In that study, *Taohe Chengqi* decoction, a traditional Chinese herbal medicine, showed potential cardiovascular benefits (55). Overall, the combination of techniques is suggested to effectively reduce the incidence of deep vein thrombosis after knee arthroplasty in patients with rheumatoid arthritis, promoting postoperative recovery.

To the best of our knowledge, there is a lack specific research on the mechanisms of Tui Na in rheumatoid arthritis. However, the study by Wang, Jun (56) suggests some mechanisms that may explain the apparent benefits of Tui Na for rheumatoid arthritis. In their study performed on rabbits, the results showed that Tui Na could significantly reduce the pain threshold and improve β-endorphin and cholecystokinin-8 levels. β-endorphins are endogenous opioids that play an important role in pain management (57, 58), while cholecystokinin-8 may elicit nociceptive activation (59). Moreover, the anti-inflammatory actions of β-endorphins are well-established (60), while the anti-inflammatory effect of cholecystokinin-8 has been suggested (61, 62), but requires further investigation.

Multiple sclerosis and amyotrophic lateral sclerosis

Multiple sclerosis is a chronic inflammatory and neurodegenerative disease affecting both white and grey matter within the central nervous system (63). At the cellular level, multiple sclerosis is a cell-mediated autoimmune disease directed against central nervous system myelin antigens, driven by pathogenic Th17- and Th1-type T cells and CD8+ myelin autoreactive T cells, with autoantibodies potentially playing a secondary or enhancing role (64).

Independent of the form of the disease (relapsing or progressive), multiple sclerosis significantly compromises patients' quality of life (65) with common neurological manifestations including optic neuritis, diplopia, sensory loss, limb weakness, gait ataxia, loss of bladder control, and cognitive dysfunction (66).

Despite advancements in treatment, early and accurate diagnosis remains a significant challenge in managing multiple sclerosis (67). Early diagnosis and treatment are essential for optimizing outcomes, as they can significantly delay disease progression and reduce disability (68).

The study by Marinova and Angelcheva (34) assessed the influence of Tui Na therapy on pain regarding the quality of life of patients suffering from multiple sclerosis. In this study, the authors observed that Tui Na was significantly beneficial for reducing the intensity of pain and improving the functional state and quality of life compared to patients not receiving Tui Na intervention. Furthermore, the authors state that Tui Na therapy also demonstrated positive effects on patients' psychological, social, and physical well-being.

Participants not only reported significant reductions in pain but also increased energy levels and improved self-confidence and self-esteem. These findings suggest that Tui Na not only alleviates subjective pain but also empowers patients to adapt to chronic neurological deficits by influencing their behaviour and overall quality of life.

The systematic review and meta-analysis conducted by Zhang and Yan (33) studied the efficacy and safety of several manual therapies for multiple sclerosis symptoms. Results regarding Tui Narelated techniques such as acupressure and reflexology showed significant benefits in reducing pain. These techniques were considered safe and worth combining with conventional treatment of patients with multiple sclerosis.

A previous study, the systematic review and meta-analysis by Salarvand, Heidari (31), reported that reflexology can reduce pain levels, while a study by Ozdelikara and Alkan (32) suggested that reflexology is an effective method for reducing fatigue and anxiety in patients with multiple sclerosis. Finally, a randomized controlled study (35) showed that reflexology can benefit multiple sclerosis patients by alleviating motor, sensory and urinary symptoms.

Amyotrophic lateral sclerosis, also known as Lou Gehrig's disease, however, is a progressive neurodegenerative condition affecting motor neurons. These nerve cells control voluntary muscle movement, and their degeneration leads to muscle weakness, atrophy, and eventually paralysis. Amyotrophic lateral sclerosis ultimately impacts the ability to perform essential functions such as walking, talking, and breathing (69).

The key molecular mechanisms involve the misfolding, aggregation, and cytoplasmic sequestration of RNA-binding proteins such as TDP-43 and mutated SOD1, which leads to cellular toxicity, impaired axonal transport, mitochondrial dysfunction, and ultimately, programmed apoptosis of motor neurons (70, 71). Similar to multiple sclerosis, available treatments may prolong survival, reduce the rate of decline, or help manage symptoms. However, there is currently no known treatment that halts or reverses its progression (69). Literature on the therapeutic management of amyotrophic lateral sclerosis across various modalities remains limited.

Concerning Tui Na, only a single case report

combining this Chinese massage technique with conventional medicine was identified. The results of the study performed by Li and Liu (36) suggest that the combination of Tui Na and conventional care may offer potential benefits in improving speech, swallowing, and upper limb function in amyotrophic lateral sclerosis patients. However, given the limited number of case reports, further rigorous research, including randomized controlled trials, is imperative to establish the efficacy and safety of Tui Na as a complementary therapy for these patients.

The mechanisms of Tui Na and overall massage therapy are still being explored.

The benefits in terms of improving these conditions may be related to the capacity to increase blood flow, loosen stiff and tense muscles, and soothe and calm the mind, thus promoting relaxation, treating painful muscular conditions, and reducing anxiety (72). The improvements in mood and overall well-being may be due to changes in parasympathetic activity (measured by heart rate, blood pressure and heart rate variability) and hormonal levels (measured by cortisol levels) resulting from massage therapy (73). On the other hand, massage techniques can stimulate lymphatic drainage, potentially modulating serum enzyme levels associated with acute skeletal muscle cell damage and inflammation (74, 75).

Finally, and although more research is needed, massage therapy may also have a positive impact on nerve conduction and plasticity (76-78).

Ankylosing spondylitis

Ankylosing spondylitis is a chronic inflammatory disease primarily affecting the axial skeleton, including the spine and sacroiliac joints. The inflammatory process leads to progressive fibrosis, calcification, and eventual fusion of the affected joints (79). Extra-articular manifestations such as uveitis and inflammatory bowel disease may also occur (80, 81).

Ankylosing spondylitis is driven by genetic factors, particularly the HLA-B27 allele, which, in conjunction with environmental triggers like the gut microbiome, activates the IL-17/IL-23 axis and releases pro-inflammatory cytokines such as IL-17 and TNF-α, leading to chronic inflammation, bone destruction, and new bone formation (79, 82, 83).

The challenges in diagnosing and treating an-

kylosing spondylitis are significantly impacted by the incomplete understanding of its pathogenesis. While advancements in therapeutics have been made, the complex interplay of genetic, immunological, and environmental factors underlying the disease has hindered the development of more targeted and effective treatments (79).

Zhao (37) observed the clinical effect of fire-needle therapy plus Tui Na manipulations for the treatment of ankylosing spondylitis in a clinical case series. The combination of both therapies produced benefits in more than 80% of patients for spine mobility, number of painful joints, thoracic mobility, the occiput-wall distance test, the Gaenslen test (a provocation test that can be used to detect musculoskeletal abnormalities and primary-chronic inflammation of the lumbar vertebrae and sacroiliac joint), and the Schober test (a test used to determine if there is a decrease in lumbar spine range of motion). In that study, more than 60.00% of patients showed benefits in morning stiffness, anaemia, low-grade fever, neck & shoulder pain, fatigue and lethargy, lumbosacral pain, and joint inflammation and swelling.

A study by Guiyi and Jianhui (38) aimed to observe the effects of acupuncture plus spinal manipulations on the physical functioning and biochemical indicators in patients with ankylosing spondylitis. The randomized controlled trial compared the use of conventional medication (sulfasalazine and meloxicam) with conventional medication plus acupuncture and spinal manipulations. The study found that combining conventional medication with acupuncture and spinal manipulations significantly improved symptoms and overall health in patients. This treatment approach led to reduced pain, fatigue, and inflammation, as indicated by lower levels of alkaline phosphatase, erythrocyte sedimentation rate, C-reactive protein, and osteoprotegerin. These biomarkers are often used as indicators of inflammation, bone metabolism, and overall health status (84-87). Patients who received this combined treatment had a higher overall success rate compared to those receiving only conventional medication.

However, to ascertain the specific added benefit of Tui Na in these two studies, it is necessary to compare the combined therapy with either fire-needle or classic acupuncture monotherapy.

In addition, a case study underscores the importance of specialized training and knowledge in applying Tui Na to patients with specific conditions like ankylosing spondylitis (39). The report highlights that compression above the thoracic spine should be avoided in these patients, particularly in cases involving the cervical spine.

The study highlights that avoiding compression above the thoracic spine is essential to prevent potential exacerbation of symptoms. By carefully considering the patient's condition and avoiding potentially harmful techniques, practitioners can maximize the benefits of Tui Na while minimizing risks.

The mechanisms explaining the benefits of Tui Na for ankylosing spondylitis are still unknown. However, Tui Na and acupuncture pain reduction may be explained by the ability to stimulate the release of endorphins (88-90), providing muscle relaxation and alleviating pain by modulating immune response and reducing inflammation (60, 91, 92). This may also improve joint mobility by loosening tight muscles and connective tissue.

Final remarks

Tui Na therapy offers several advantages in managing autoimmune conditions. Its ease of application and affordability contribute to its feasibility in various healthcare settings.

Its application often involves full-body treatment on an unclothed patient in a supine position (72). However, Tui Na and massage therapies can be adapted to suit specific settings. For instance, treatments can be focused on specific areas like the head, hands, feet, or back, and performed on a clothed patient in a seated position, maintaining patient comfort and privacy (72).

Tui Na seems to be a cost-effective complementary approach (93) as suggested by evidence that it provides relief in patients suffering from autoimmune diseases such as rheumatoid arthritis, multiple sclerosis, amyotrophic lateral sclerosis, and ankylosing spondylitis.

According to the results of this review, the effective management of autoimmune diseases necessitates a multidisciplinary approach involving healthcare professionals with specialized knowledge and skills. Therapists and practitioners trained in complementary therapies like Tui Na play a crucial role in tailoring treatment plans by

understanding the specific needs of each patient and developing individualized complementary treatment regimens.

These therapists may play a crucial role in improving functional abilities by helping patients maintain independence and quality of life. However, it is important to note that adjunct therapies such as Tui Na should be used in an integrative medicine setting along with other healthcare professionals and never as a replacement for conventional medical care.

This review identified several methodological limitations. Firstly, the quality of included studies was variable, suggesting the need for improvements in research design and reporting.

Secondly, a significant methodological limitation across the reviewed studies is the multicomponent nature of the interventions. Because Tui Na is nearly always combined with other therapies, such as acupuncture, herbal medicine, or moxibustion, it is difficult to isolate the true therapeutic effects of Tui Na alone, limiting the interpretation of many studies' results. Furthermore, it limits the identification and study of the precise mechanisms underlying the effects of Tui Na.

Another challenge in Tui Na research is the lack of detailed reporting on specific techniques and treatment protocols. Unlike pharmacological trials where the dosage and administration of a drug can be precisely controlled and documented, Tui Na is a complex, practitioner-dependent intervention. Without a clear and detailed description of the manipulations used (e.g., frequency, duration, pressure, specific points or areas targeted), it is difficult for other researchers to replicate a study's methodology or for clinicians to reproduce the treatment in practice. This methodological ambiguity leads to inconsistent and often inconclusive findings, which hinders the accumulation of evidence. Therefore, future research must prioritize the rigorous, step-by-step documentation of treatment conduct, including the operator's skill level, to improve the quality, transparency, and clinical applicability of Tui Na studies, ultimately strengthening its position within evidence-based medicine.

A key limitation of this review is that many of the included studies were conducted exclusively in Chinese populations, which may affect the generalizability of the findings to other ethnic and demographic groups.

CONCLUSIONS

Tui Na therapy emerges as a potential complementary treatment for autoimmune diseases such as rheumatoid arthritis, multiple sclerosis, and ankylosing spondylitis. While research is limited, available studies suggest benefits in reducing pain, improving function, and enhancing overall well-being. The combination of Tui Na with conventional medical treatments appears to yield synergistic effects.

However, the evidence base for Tui Na in these conditions remains relatively small, with most studies involving Tui Na as a standalone intervention and being observational or involving small sample sizes. Furthermore, the precise mechanisms underlying its therapeutic effects are not fully understood. Future research should focus on high-quality randomized controlled trials to establish definitive evidence and elucidate the underlying mechanisms.

Despite these limitations, Tui Na's ease of application, potential cost-effectiveness, and minimal adverse effects make it an attractive complementary therapy. Its integration into comprehensive care plans for autoimmune diseases warrants further exploration.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

H.S.: conceptualization, formal analysis, project administration, resources, visualization, writing—original draft; A.S.: conceptualization, formal analysis, project administration, resources, writing—review and editing; A.M.: conceptualization, formal analysis, resources, writing—review and editing; I.R.S.: conceptualization, formal analysis, resources, writing—review and editing; J.M.R.: methodology, supervision, validation, visu-

alization, formal analysis, project administration, resources, writing—original draft, writing—review and editing.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article.

INSTITUTIONAL REVIEW BOARD STATEMENT

This review does not require ethical approval.

INFORMED CONSENT STATEMENT

Not applicable

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