

Original Article

Combined trigger point acupuncture knife and traditional Chinese medicine split-tendon massage for shoulder periarthrititis: improved function and quality of life

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Abstract: Objectives: To compare the effectiveness of combining trigger point acupuncture knife (TPAK) with Traditional Chinese Medicine (TCM) split-tendon massage therapy versus TPAK alone. Methods: A retrospective study included 237 patients diagnosed with shoulder periarthrititis. Of these, 114 patients received only TPAK therapy (TPAK Group), while 123 patients underwent a combination of TPAK and TCM split-tendon massage therapy (TPAK + TCM Group). Shoulder function was assessed using the Constant-Murley Score (CMS) and shoulder range of motion (ROM). Pain levels were evaluated using the Short-Form McGill Pain Questionnaire (SF-MPQ). Psychological status, sleep quality, and overall quality of life were measured using the WHOQOL-BREF questionnaire, both before and 3 months after treatment. Results: Both groups showed improvements across all outcomes, with the TPAK + TCM group showing significantly better results than the TPAK group. CMS scores revealed greater improvement in shoulder function and pain relief in the TPAK + TCM group, particularly in affective pain dimensions ($P < 0.001$). Additionally, the TPAK + TCM group exhibited greater reductions in anxiety and depression, as well as improvements in sleep quality and overall physical and psychological health (all $P < 0.05$), compared to the TPAK group. Conclusion: Combining TPAK with TCM split-tendon massage proved more effective than TPAK alone in treating shoulder periarthrititis, improving function, reducing pain, enhancing psychological well-being, and improving sleep quality.

Keywords: Periarthritis of the shoulder, adhesive capsulitis, trigger point acupuncture knife, traditional Chinese medicine, shoulder function, pain management

Introduction

Shoulder periarthrititis, also known as adhesive capsulitis or frozen shoulder, is characterized by stiffness and pain in the shoulder joint. This condition severely limits the patient's range of motion and negatively impacts their quality of life. The progression typically occurs in several stages: initial pain, followed by shoulder stiffness, and eventually a gradual recovery phase. This process can span from several months to a few years [1-3]. The long duration and functional limitations associated with shoulder periarthrititis make its management a critical focus in orthopedics, physical therapy, and the integration of traditional Chinese and Western medicine [4]. Standard treatments include phy-

sical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroid injections, and, in some cases, surgery. However, these treatments do not always provide relief, may not address all symptoms, and cannot guarantee lasting benefits for all patients [5, 6].

Recently, complementary and alternative medicine has gained popularity as a potential treatment for musculoskeletal issues, including periarticular inflammation [7, 8]. One such approach is microincision therapy, commonly known as trigger point acupuncture knife (TPAK) therapy. This technique uses a specialized blade to precisely target and release myofascial trigger points [9]. It is minimally invasive, aiming to reduce muscle tension, improve blood circula-

tion, and promote tissue healing, thereby alleviating pain and restoring mobility in the affected areas [10-12]. TPAK has shown promise in treating refractory myofascial pain syndrome and chronic joint conditions; however, its effectiveness in shoulder periarthritis requires further investigation.

In addition to TPAK, traditional Chinese medicine (TCM) methods, such as tendon rupture massage (also called meridian massage), have been used for centuries to enhance musculoskeletal health. TCM theory attributes shoulder periarthritis to blockages in the body's qi (life energy) and blood flow, leading to stagnation and pain [13-15]. Specific massage techniques are applied to key points along the meridians associated with shoulder function to promote circulation, relax muscles, and restore balance. This approach not only reduces pain but also enhances joint mobility [16].

The combination of TPAK and TCM offers the potential for synergistic benefits. While TPAK directly targets blockages in the body, TCM massage improves overall qi and blood flow, addressing underlying factors contributing to shoulder periarthritis. Although some small-scale studies and reports suggest the effectiveness of TPAK and TCM massage when used individually, systematic research on their combined use is limited. This study aims to examine the clinical effects of combining TPAK with TCM massage therapy for patients with shoulder periarthritis.

Materials and methods

Case selection

This retrospective study analyzed treatment data from 237 patients with shoulder periarthritis who received care at Putuo District People's Hospital from December 2021 to December 2024. Of these, 114 patients received only TPAK therapy, designated as the TPAK Group, while 123 patients underwent a combination of TPAK therapy and TCM meridian massage, designated as the TPAK + TCM Group. The study was approved by the Ethics Committee and Institutional Review Board of Putuo District People's Hospital, in accordance with the Helsinki Declaration. Due to the use of anonymized patient data, informed consent was waived by the Institutional Review Board

and Ethics Committee, as the study posed no risk to patient welfare.

Inclusion and exclusion criteria

Inclusion criteria: (1) Diagnosed with periarthritis of the shoulder; (2) Experiencing shoulder pain for more than one month but less than 12 months; (3) Demonstrating limitations in shoulder abduction, flexion, and external rotation; (4) Unable to lie flat on the affected side and experiencing night pain; (5) Male and female participants aged 40 to 65 years; (6) Treatment for the condition in the past four weeks; (7) Complete data available.

Exclusion criteria: (1) Severe shoulder joint injuries or a history of shoulder surgery; (2) Cervical radiculopathy; (3) Hemiplegia or other neurological changes affecting the involved limb; (4) Potential inflammatory arthritis related to fractures; (5) Known kidney or liver diseases; (6) Hematological disorders; (7) Malignancies; (8) Psychological disorders or current use of psychiatric medications; (9) Uncontrolled diagnosed neurological conditions; (10) Immune deficiencies; (11) Bleeding disorders; (12) Allergies; (13) Pregnant or breastfeeding women.

Treatment methods

TPAK group: Patients in this group were treated either sitting or in a prone position, with the shoulder area fully exposed. Trigger points were identified and marked, and a 5 mm × 50 mm acupuncture knife was used for treatment (**Figure 1A**). After routine disinfection, the knife was swiftly inserted in the direction of the tendon, avoiding blood vessels and nerves, and stopping at a depth of 3 mm subcutaneously (**Figure 1B**). Adhesions in the surrounding fascia were released until muscle tension was reduced. After the needle was withdrawn, the area was immediately compressed with a sterile cotton ball. A sterile dressing was then applied, and patients were instructed to avoid bathing or applying hot water to the treated area for 24 hours. Treatments were conducted once every seven days, with the number of sessions tailored to the patient's condition.

TPAK + TCM group: This group received TPAK treatment combined with Peng's "Meridian Massage" therapy (**Figure 1C**). The affected shoulder area was fully exposed, and herbal oil



Figure 1. Treatment methods. A, B: Trigger point acupuncture knife treatment; C: Peng's "Meridian Massage" therapy.

was applied evenly. A palm kneading technique was used to relax the shoulder, neck, and arm muscles for about two minutes. Unidirectional finger pressure was applied along the arm from the shoulder's deltoid insertion point upward, stimulating points such as Jianyu, Jianjing, Naoshu, Tianzong, and Yunmen, gradually increasing pressure to the patient's tolerance until mild redness appeared on the skin, for approximately three minutes.

Following this, a Zen-style single-finger pressure technique was applied along the deltoid and infraspinatus muscles, progressing from shallow to deep along muscle seams, adjusted to the patient's tolerance over about two minutes. Tender points or nodules along the affected shoulder's meridian pathways (Hand Taiyin, Hand Yangming, Hand Shaoyang, and Hand Taiyang) were located and pressed until the patient felt a significant yet tolerable sensation, for about five minutes. Next, the patient's shoulder was guided through abduction, elevation, and internal rotation movements, with the range gradually increasing to the patient's limit over approximately five minutes. Finally, the thenar kneading technique was applied to relax the trapezius and deltoid muscles on the affected side for around two minutes, followed by moderate tapping of the shoulder, arm, and back with the palm for about one minute.

Data collection

Primary outcome measures included the Constant-Murley Score (CMS) to assess shoulder function, range of motion (ROM) of the shoulder, and the total score of the Short-Form McGill

Pain Questionnaire (SF-MPQ) to measure pain. Secondary outcomes encompassed the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) for psychological status, the Pittsburgh Sleep Quality Index (PSQI) for sleep quality, and the World Health Organization Quality of Life-BREF (WHOQOL-BREF) for overall quality of life. These tools were used to compare the effectiveness of combining TPAK with traditional Chinese massage versus TPAK therapy alone in patients with shoulder periarthritis. Assessments were conducted at the 3-month follow-up.

Shoulder joint function: The CMS was used to evaluate shoulder joint function, consisting of four subscales: Pain (scored out of 15), Activities of Daily Living (scored out of 20), Range of Motion (scored out of 40), and Strength (scored out of 25). The total score ranges from 0 to 100, with higher scores indicating better shoulder function. The CMS reliability is supported by a Cronbach's alpha coefficient of 0.739 [17].

ROM was measured with a goniometer for accuracy and consistency. Patients were seated with their spine against the chair back, feet flat on the floor, and arms hanging naturally. For abduction, the goniometer's axis was placed on the acromion, the stationary arm aligned with the trunk, and the moving arm aligned with the forearm. Patients were instructed to slowly abduct their arm to the maximum comfortable range, and the angle was recorded. For flexion, the procedure was similar, but the moving arm was aligned with the upper arm, and patients lifted their arm forward to the maximum com-

fortable range before recording the angle. For internal rotation, patients placed their hand behind their back with the elbow bent at 90 degrees. The goniometer's axis was placed at the elbow, with the fixed arm aligned with the humerus and the moving arm aligned with the forearm. Patients were then guided to raise their hand as high as possible, and the angles were recorded. These measurements were taken before treatment and three months after treatment to assess the treatment's effectiveness.

Pain assessment: The SF-MPQ was used to evaluate pain intensity before and after treatment [18]. The questionnaire showed good reliability, with Cronbach's alpha coefficients ranging from 0.73 to 0.79 [19]. It consists of three dimensions: the sensory dimension (scored from 0 to 33), the affective dimension (scored from 0 to 12), and present pain intensity (scored from 0 to 100). Higher scores indicate more severe pain.

Psychological status assessment: The SAS and SDS were used to assess psychological status. Both scales have a maximum score of 100, with higher scores indicating more severe anxiety or depression. The SAS has a Cronbach's alpha coefficient of 0.860 [20], and the SDS has a Cronbach's alpha coefficient of 0.880 [21], demonstrating good consistency in measuring these conditions.

Sleep quality assessment: The PSQI was used to evaluate patients' sleep quality. This questionnaire consists of 19 self-reported items, grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component is scored on a scale from 0 to 3, with equal weight assigned to all components. The total PSQI score is the sum of the seven component scores, ranging from 0 to 21. A score of 5 or lower indicates good sleep quality. The PSQI has demonstrated acceptable reliability, with a Cronbach's alpha coefficient of 0.757 [22].

Quality of life assessment: Patients completed the WHOQOL-BREF questionnaire both before and after treatment, which demonstrated high reliability with a Cronbach's alpha coefficient of 0.90 [23]. The WHOQOL-BREF is derived from

the WHOQOL-100 and includes one item from each of the 24 facets, covering various aspects of perceived quality of life, such as energy, fatigue, sleep, rest, body image, self-esteem, personal relationships, social support, economic resources, healthcare, social care, and the home environment. Additionally, it includes two items related to overall quality of life and general health. Responses were captured on a 5-point Likert scale, where "1" represents "very poor" and "5" represents "very good". The answers were summarized and standardized into four domains: physical health, psychological health, social relationships, and environment, with higher scores indicating better perceived quality within each domain.

Statistical methods

Statistical evaluations were performed using SPSS software (version 29.0; SPSS Inc., Chicago, IL, USA). Categorical variables were presented as frequencies and percentages [n (%)]. The chi-square (χ^2) test was used when expected cell counts exceeded 5. Fisher's exact test was used when expected frequencies were less than 5. Continuous variables were first tested for normal distribution using the Shapiro-Wilk test. Normally distributed data were reported as means and standard deviations ($\bar{X} \pm SD$) and analyzed using t-tests. A *p*-value of less than 0.05 was considered statistically significant.

Results

Comparison of demographic characteristics

This study compared the demographic characteristics of patients with shoulder periarthritis in two treatment groups (**Table 1**). No significant difference was observed in mean age between the groups (*P* = 0.287). Ethnic distribution was similar (*P* = 0.848), and gender distribution was balanced (*P* = 0.911). Body mass index (BMI) was comparable between the groups (*P* = 0.358). There were no significant differences in smoking and drinking histories, or in the prevalence of hypertension and diabetes (all *P* > 0.05). Educational levels, marital status, years of employment, and weekly working hours were similarly distributed (all *P* > 0.05). Although the TPAK group had a marginally longer duration of illness (*P* = 0.052), this difference was not statistically significant.

Table 1. Comparison of demographic characteristics between the two groups

Parameters	TPAK group (n = 114)	TPAK + TCM group (n = 123)	t/ χ^2	P
Age (years)	52.56 $\pm$ 8.24	53.66 $\pm$ 7.65	1.068	0.287
Ethnicity			0.037	0.848
Han	84 (73.68%)	93 (75.61%)		
Other	30 (26.32%)	30 (24.39%)		
Gender			0.013	0.911
Female	52 (45.61%)	57 (46.34%)		
Male	62 (54.39%)	66 (53.66%)		
Body Mass Index (kg/m ²)	23.34 $\pm$ 2.59	23.65 $\pm$ 2.61	0.922	0.358
Smoking history (Yes)	30 (26.32%)	31 (25.20%)	0.002	0.962
Drinking history (Yes)	16 (14.04%)	19 (15.45%)	0.015	0.902
Hypertension (Yes)	38 (33.33%)	44 (35.77%)	0.066	0.797
Diabetes (Yes)	17 (14.91%)	18 (14.63%)	0.004	0.952
Educational level			0.045	0.832
Junior college graduate	60 (52.63%)	62 (50.41%)		
College graduate or higher	54 (47.37%)	61 (49.59%)		
Marital Status			0.055	0.815
Married	74 (64.91%)	77 (62.60%)		
Unmarried	40 (35.09%)	46 (37.40%)		
Years of employment			0.045	0.831
≤ 10	47 (41.23%)	48 (39.02%)		
> 10	67 (58.77%)	75 (60.98%)		
Work Hours/Week			0.107	0.743
≤ 40	59 (51.75%)	60 (48.78%)		
> 40	55 (48.25%)	63 (51.22%)		
Duration of Illness (years)	3.47 $\pm$ 1.11	3.17 $\pm$ 1.22	1.954	0.052
Poor Working Posture (Yes)	36 (31.58%)	36 (29.27%)	0.060	0.806
Repetitive Labor (Yes)	71 (62.28%)	79 (64.23%)	0.031	0.860

Furthermore, the incidence of poor working posture and repetitive labor conditions were similarly reported between both groups ($P = 0.860$). Overall, the demographic characteristics of the two groups were comparable, confirming baseline homogeneity for subsequent analysis of treatment outcomes.

Comparison of CMS and ROM

The comparison of CMS between the groups showed no significant difference in scores before treatment ($P = 0.774$) (**Figure 2**). After treatment, the TPAK + TCM group exhibited a significantly higher CMS score compared to the TPAK group ($P = 0.016$).

Before treatment, no significant differences were found in shoulder ROM parameters between the TPAK and TPAK + TCM groups (abduction: $P = 0.473$, flexion: $P = 0.781$, inter-

nal rotation: $P = 0.493$) (**Table 2**). However, after treatment, the TPAK + TCM group showed significantly greater improvement in shoulder abduction ($P = 0.002$), indicating better restoration of movement in this plane. Similarly, the TPAK + TCM group demonstrated significantly greater improvement in shoulder flexion ($P = 0.006$), reflecting enhanced forward lifting ability. Additionally, the TPAK + TCM group exhibited significantly greater improvement in internal rotation ($P = 0.013$), suggesting better rotational mobility of the shoulder joint.

Comparison of SF-MPQ scores

Prior to treatment, both groups showed similar scores in the sensory dimension, affective dimension, and present pain intensity scores (all $P > 0.05$) (**Table 3**). After treatment, there was no significant difference in sensory dimension scores between the groups ($P = 0.127$).

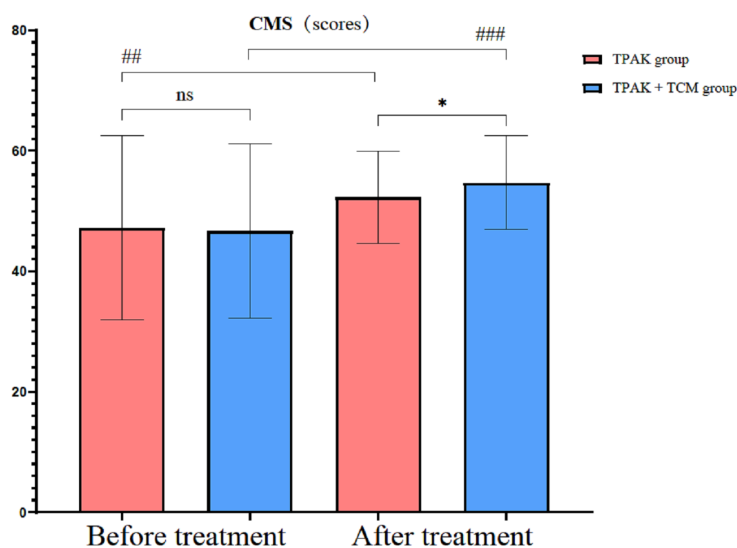


Figure 2. Comparison of CMS between two groups. CMS: Constant-Murley Score; Ns: No significant difference; *: $P < 0.05$. ##: $P < 0.01$; ###: $P < 0.001$.

However, the TPAK + TCM group exhibited significantly lower affective dimension and present pain intensity scores compared to the TPAK group (both $P < 0.05$).

Comparison of psychological states

Before treatment, the SAS and SDS scores were nearly identical between the two groups, with no statistically significant difference (both $P > 0.05$) (Figure 3). After treatment, the TPAK + TCM group showed significantly lower SAS and SDS scores compared to the TPAK group (both $P < 0.05$).

Comparison of sleep quality scores

Prior to treatment, in the TPAK group, 47 patients had a PSQI score of 5 or lower, indicating better sleep quality, while 67 patients had a score above 5, suggesting poor sleep quality (Table 4). In the TPAK + TCM group, 65 patients scored 5 or lower, and 58 patients scored above 5. The difference in sleep quality distribution between the two groups was not statistically significant ($P = 0.097$), indicating comparable baseline sleep quality.

After treatment, a significantly higher proportion of patients in the TPAK + TCM group achieved a PSQI score of 5 or lower compared to the TPAK group ($P = 0.002$). More patients in the TPAK + TCM group reported improved

sleep quality post-treatment, demonstrating the superior effectiveness of the combined therapy in improving sleep outcomes.

Comparison of WHOQOL-BREF scores

Before treatment, patients' quality of life was assessed using the WHOQOL-BREF, and there was no statistically significant difference between the two groups in the physical health domain, psychological domain, social relationships domain, or environmental domain (all $P > 0.05$) (Table 5).

After treatment, the TPAK + TCM group showed significantly higher scores compared to the TPAK group in both the physical health domain ($P = 0.012$) and the psychological domain ($P = 0.008$). In the psychological domain, the TPAK + TCM group also showed significantly higher scores compared to the TPAK group. However, there were no significant differences between the groups in the social relationships domain ($P = 0.855$), or environmental domain scores ($P = 0.773$).

Discussion

This study investigated the effects of combining TPAK with TCM Split-tendon massage therapy (TPAK + TCM Group) compared to using TPAK therapy (TPAK Group) alone, on symptoms, shoulder mobility, and quality of life in patients with shoulder periarthritis. The improvement in shoulder function observed in the TPAK + TCM group, particularly through higher CMS scores, can be attributed to the synergistic effects of integrating acupotomy and meridian massage [14, 24]. Acupotomy alleviates localized trigger points and adhesions in the fascia, reducing muscle tension and pain [1, 25, 26]. When combined with meridian massage, which includes techniques such as palm kneading and Zen-style single-finger pressure, this approach not only addresses underlying musculoskeletal issues but also promotes blood circulation, lymphatic drainage, and overall joint mobility [10, 27]. According to TCM, meridian massage works on acupoints, facili-

Table 2. Comparison of shoulder range of motion (ROM) before and after treatment

Parameters	TPAK group (n = 114)	TPAK + TCM group (n = 123)	t/ χ^2	P
Before Treatment				
Abduction	45.28 ± 8.79	46.12 ± 9.21	0.718	0.473
Flexion	58.32 ± 10.17	57.96 ± 9.82	0.278	0.781
Internal Rotation	28.65 ± 7.36	29.29 ± 6.84	0.687	0.493
After Treatment				
Abduction	72.18 ± 9.36	75.82 ± 8.57	3.125	0.002
Flexion	84.14 ± 11.49	88.08 ± 10.28	2.788	0.006
Internal Rotation	45.78 ± 8.97	48.47 ± 7.66	2.496	0.013

Table 3. Comparison of short-form McGill pain questionnaire (SF-MPQ) score between the two groups

Parameters	TPAK group (n = 114)	TPAK + TCM group (n = 123)	t/ χ^2	P
Before Treatment				
Sensory Dimension	25.26 ± 3.47	25.23 ± 3.22	0.083	0.934
Affective Dimension	10.31 ± 1.09	10.45 ± 1.53	0.806	0.421
Present Pain Intensity	76.26 ± 2.77	75.87 ± 3.25	1.000	0.318
After Treatment				
Sensory Dimension	19.24 ± 2.35	18.66 ± 3.46	1.533	0.127
Affective Dimension	9.24 ± 2.22	8.14 ± 2.19	3.819	< 0.001
Present Pain Intensity	33.57 ± 2.63	32.81 ± 3.21	1.976	0.049

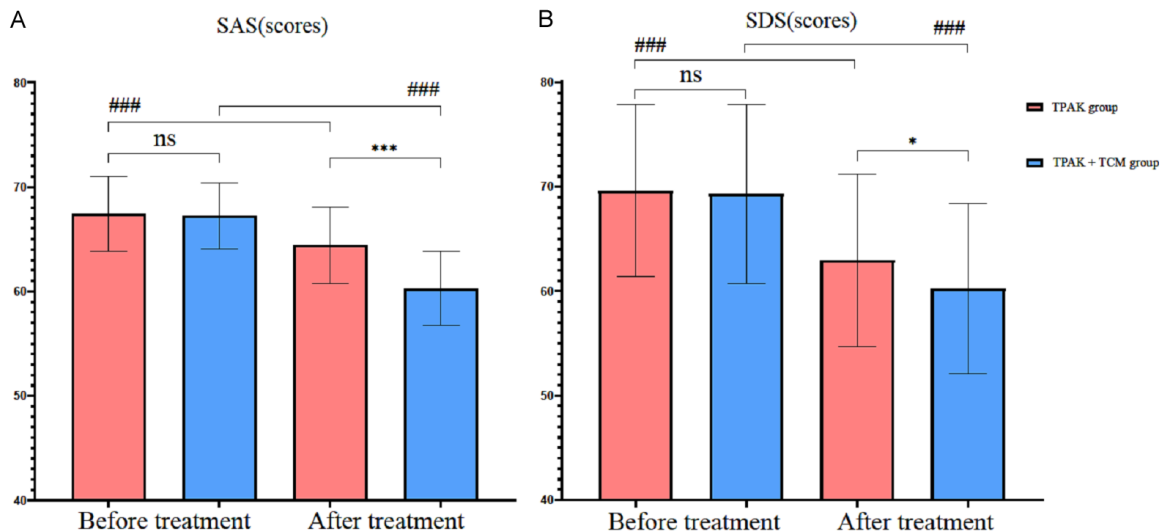


Figure 3. Comparison of psychological states before and after treatment between the two groups. A: SAS; B: SDS. SAS: Self-Rating Anxiety Scale; SDS: Self-Rating Depression Scale; Ns: No significant difference; *: P < 0.05; ***: P < 0.001. ####: P < 0.001.

tating the flow of “Qi” (energy) and blood, thereby improving functional mobility and reducing caused by stagnation [28, 29].

This study found that combined therapy improved abduction, flexion, and internal rotation. From both anatomical and neurophysio-

logical perspectives, the precise release of local trigger points by microacupotomy, along with massage along the hand Yangming meridians, led to broader relief across multiple joints [30]. The Zen pressure technique applied to the infraspinatus and teres minor areas directly relieved posterior capsule adhesions

Table 4. Comparison of sleep quality scores before and after treatment between the two groups of patients

Parameters	TPAK group (n = 114)	TPAK + TCM group (n = 123)	χ^2	P
Before treatment				
PSQI $\leq$ 5	47 (41.23%)	65 (52.85%)	2.755	0.097
PSQI > 5	67 (58.77%)	58 (47.15%)		
After treatment			9.849	0.002
PSQI $\leq$ 5	59 (51.75%)	89 (72.36%)		
PSQI > 5	55 (48.25%)	34 (27.64%)		

Note: PSQI = Pittsburgh Sleep Quality Index.

Table 5. Comparison of WHOQOL-BREF scores before and after treatment between the two groups

Parameters	TPAK group (n = 114)	TPAK + TCM group (n = 123)	t	P
Before treatment				
Physical health	15.71 $\pm$ 3.89	16.24 $\pm$ 3.67	1.072	0.285
Psychological	14.16 $\pm$ 2.35	14.68 $\pm$ 2.45	1.672	0.096
Social relationships	18.25 $\pm$ 4.08	18.17 $\pm$ 4.69	0.145	0.885
Environment	17.62 $\pm$ 3.91	17.65 $\pm$ 3.22	0.054	0.957
After treatment				
Physical health	18.59 $\pm$ 4.79	20.22 $\pm$ 5.11	2.530	0.012
Psychological	15.38 $\pm$ 3.46	16.62 $\pm$ 3.66	2.687	0.008
Social relationships	18.32 $\pm$ 3.57	18.41 $\pm$ 3.41	0.183	0.855
Environment	18.18 $\pm$ 3.78	18.32 $\pm$ 3.64	0.289	0.773

that restrict internal rotation. Passive joint movements during the massage stimulated Type III joint mechanoreceptors, helping to reset the scapulohumeral rhythm. Meanwhile, microacupotomy reduces myofascial tension and lowers the excitability of gamma motor neurons, breaking the pain-spasm-limitation cycle [31].

The reduction in pain, particularly in the sensory and affective dimensions in the TPAK + TCM group, highlights the complex relationship between physical therapy techniques and pain modulation pathways. Trigger point acupotomy likely induces a neurophysiological response that raises the pain threshold and reduces hyperalgesia, while massage therapy provides additional sensory input, which may override existing nociceptive signals through the gate control theory of pain [32, 33]. The combined effects of these therapies emphasize the importance of a holistic treatment approach that considers the multifaceted nature of pain in patients with shoulder periarthritis.

Furthermore, the enhanced psychological and sleep outcomes in the TPAK + TCM group sug-

gest systemic effects beyond localized shoulder therapy. The improvements in anxiety and depression scores underscore the connection between physical symptom relief and mental health, a well-documented correlation where chronic pain often exacerbates psychological distress, and vice versa [34, 35]. By addressing the physical source of discomfort more effectively, the combined treatment approach reduces the cognitive-emotional burden of chronic pain, promoting a healthier psychological state. Similarly, enhanced sleep quality outcomes may be attributed to both the direct effects of pain reduction and the relaxation achieved through comprehensive bodywork, which stabilizes autonomic nervous system function, reduces hyperarousal, and potentially enhances serotonin metabolic pathways, contributing to improved sleep and recovery [36].

Discussing the physiological mechanisms underlying these observations, it is essential to consider the role of microcirculation enhancement and anti-inflammatory effects likely reinforced by the TPAK combined with TCM approach. Acupotomy itself improves local blood supply and nutrient delivery to the affected tis-

sues by breaking down adhesions and increasing tissue flexibility [37, 38]. When supplemented with meridian massage therapy, these effects are likely amplified through the mobilization and redistribution of body fluids, which contributes to improved joint lubrication, reduced synovial fluid stasis, and alleviation of inflammatory responses [39]. These interactions could be further explored through molecular studies examining inflammatory biomarkers and their modulation via integrated therapy.

The observed improvements in quality of life, particularly in physical and psychological health, as measured by WHOQOL-BREF scores, highlight the significant impact these therapies have on daily functioning and patient resilience. Enhanced physical health scores reflect improved joint functionality and reduced pain, facilitating greater engagement in physical activities and occupational tasks, and reducing disability-related stress and frustration [10, 40]. Psychological well-being improvements, along with reductions in depression and anxiety, may also result from enhanced social participation and restored self-efficacy, as patients often feel empowered by regaining physical capability [41].

Interestingly, while the TPAK + TCM approach showed superior outcomes in physical and psychological domains, similar improvements were not observed in the social relationships and environmental domains after treatment. This suggests that while physical and psychological improvements enhance personal health and perceptions, they may not directly influence social life and environmental factors at this intervention stage. This finding highlights a potential area for further intervention, focusing on social integration and environmental adjustments to support long-term rehabilitation.

This study emphasizes the value of an integrative approach in managing shoulder periarthritis, combining the principles of both Western and Eastern medicine. Acupotomy provides a direct physical method to break down muscle adhesions, while traditional Chinese massage takes a more holistic approach, improving overall bodily function through time-tested techniques. The combination of these methods appears promising in addressing complex conditions, enhancing quality of life, and promoting health.

Despite the promising results, several limitations should be considered. The small sample size may limit the generalizability of the findings to a larger population. As a retrospective study, there could be biases in how results were reported and evaluated. The short follow-up period makes it difficult to determine whether the observed benefits will persist long-term. Additionally, the study did not account for other factors that may influence outcomes, such as prior treatments or concurrent therapies used by patients. Many assessments relied on self-reported data, which could introduce response bias and affect the results. Future research addressing these limitations would improve the reliability of the conclusions and provide a clearer understanding of the effectiveness of these treatments.

In conclusion, combining TPAK with TCM split-tendon massage therapy for treating shoulder periarthritis showed superior outcomes compared to acupuncture alone. This integrated approach addressed both physical symptoms and broader health issues, facilitating comprehensive recovery and enhancing the quality of life in patients with shoulder periarthritis.

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Disclosure of conflict of interest

None.

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References

- [1] Duc Nguyen M, Van Tran T, Vinh Nguyen Q, Doan Ha C and Vu Phuong Dang L. Effectiveness of bee venom acupuncture for patients suffering from periarthritis humeroscapularis. *J Tradit Chin Med* 2023; 43: 795-800.
- [2] Tian Y, Qiu D, Song R, Cheng X, Chen F, Sun D, Zhou Y, Cai S, Wang Z and Zhang W. Pathogenic factor analysis of shoulder periarthritis and de-

- sign of virtual reality exercise intervention system. *Appl Bionics Biomech* 2024; 2024: 6543337.
- [3] Yu L, Li Y, Wang XF and Zhang ZQ. Analysis of the value of artificial intelligence combined with musculoskeletal ultrasound in the differential diagnosis of pain rehabilitation of scapulohumeral periarthritis. *Medicine (Baltimore)* 2023; 102: e33125.
- [4] Gupta GK, Shekhar S, Haque ZU, Halder S, Manjhi AK and Rai A. Comparison of the efficacy of platelet-rich plasma (PRP) and local corticosteroid injection in periarthritis shoulder: a prospective, randomized, open, blinded end-Point (PROBE) study. *Cureus* 2022; 14: e29253.
- [5] Lee JH, Park HS, Park SH, Song YK, Keum DH and Park SH. Pharmacopuncture for the treatment of frozen shoulder: a systematic review and meta-analysis of randomized controlled trials. *Curr Pain Headache Rep* 2024; 28: 1365-1386.
- [6] Tang L, Chen K, Ma Y, Huang L, Liang J and Ma Y. Scapular stabilization exercise based on the type of scapular dyskinesis versus traditional rehabilitation training in the treatment of periarthritis of the shoulder: study protocol for a randomized controlled trial. *Trials* 2021; 22: 713.
- [7] Chen YL, Liang YD, Guo KF, Huang Z and Feng WQ. Application of acupuncture for shoulder pain over the past 22 years: a bibliometric analysis. *J Pain Res* 2023; 16: 893-909.
- [8] Lee JH, Park HS, Park SH, Keum DH and Park SH. Pharmacopuncture for the treatment of frozen shoulder: protocol for a systematic review and meta-analysis. *J Pharmacopuncture* 2024; 27: 14-20.
- [9] Yi S and Zhou J. Retrospective study of therapeutic effect of Tongbi paste vs Fufangzhuifeng paste for shoulder periarthritis. *J Pak Med Assoc* 2022; 72: 53-56.
- [10] Yuan M, Wang X, Yan X, Ding H, Yi J, Xia H and Yu X. Effects of heat-sensitive moxibustion combined with naprapathy and warming needle moxibustion combined with naprapathy in patients with periarthritis of shoulder. *Am J Transl Res* 2021; 13: 7804-7811.
- [11] Lu SW, Lang BX, Liu JN, Ma XX, Li TT, Du X and Zhang ML. Comparative efficacy of micro-needle-knife therapy and acupuncture in acute ankle sprains: a randomized controlled trial. *Med Sci Monit* 2024; 30: e944157.
- [12] Xu CC, Li XH and Li JL. Comparative study on curative effect and recurrence rate of chronic scapulohumeral periarthritis treated with different acupuncture techniques. *Zhen Ci Yan Jiu* 2024; 49: 164-170.
- [13] Tang K, Sun J, Dong Y, Zheng Z, Wang R, Lin N and Chen W. Topical Chinese patent medicines for chronic musculoskeletal pain: systematic review and trial sequential analysis. *BMC Musculoskelet Disord* 2023; 24: 985.
- [14] Zhou TY, Han Q, Wang F, Gao PF, Zhu J and Li J. Pricking and cupping at Jianbo area combined with conventional acupuncture for scapulohumeral periarthritis of frozen stage: a randomized controlled trial. *Zhongguo Zhen Jiu* 2023; 43: 911-915.
- [15] Ding R, Jiao H, Piao Y and Tian W. International performance of acupuncture for shoulder pain over more than four decades: a bibliometric study. *Am J Transl Res* 2023; 15: 6897-6904.
- [16] Zhang R, Zhang H, Rui M, Yang Z and Sun T. Impact of needle warming moxibustion combined with trigger point massage on shoulder function and stress responses in elderly patients with frozen shoulder. *Am J Transl Res* 2024; 16: 4671-4679.
- [17] Yao M, Yang L, Cao ZY, Cheng SD, Tian SL, Sun YL, Wang J, Xu BP, Hu XC, Wang YJ, Zhang Y and Cui XJ. Chinese version of the Constant-Murley questionnaire for shoulder pain and disability: a reliability and validation study. *Health Qual Life Outcomes* 2017; 15: 178.
- [18] Melzack R. The short-form McGill pain questionnaire. *Pain* 1987; 30: 191-197.
- [19] Sharif A, Amjad F, Arslan SA and Ahmad A. Translation and validation of urdu version short form-mcgill pain questionnaire-2. *BMC Sports Sci Med Rehabil* 2023; 15: 102.
- [20] Kim J, Kambari Y, Taggar A, Quilty LC, Selby P, Caravaggio F, Ueno F, Torres E, Song J, Pollock BG, Graff-Guerrero A and Gerretsen P. A measure of subjective substance use disorder awareness - substance use awareness and insight scale (SAS). *Drug Alcohol Depend* 2022; 231: 109129.
- [21] Zhao X, Hu T, Qiao G, Li C, Wu M, Yang F and Zhou J. Psychometric properties of the smartphone distraction scale in Chinese college students: validity, reliability and influencing factors. *Front Psychiatry* 2022; 13: 859640.
- [22] Wu J, Zhuang W, Xu H, Tang Y, Li S, Xu W, Sun X, Li X and Qiao G. Investigation on sleep quality and psychological distress in patients with pulmonary nodules. *BMC Psychol* 2023; 11: 258.
- [23] Rondung E, Oliveira S and Esteves F. Validity and reliability of the WHOQOL-BREF in a pregnant population. *Health Qual Life Outcomes* 2023; 21: 96.
- [24] Ai J, Dong Y, Tian Q, Wang C and Fang M. Tuina for periarthritis of shoulder: a systematic review protocol. *Medicine (Baltimore)* 2020; 99: e19332.

- [25] Wang JM, Mi SS, Zheng LJ, Qiao YJ, Zhang WL, Xue K and Li HD. Efficacy and safety of Tuina and intermediate frequency electrotherapy for frozen shoulder: MRI-based observation evidence. *Am J Transl Res* 2023; 15: 1766-1778.
- [26] Zeng X, Ding ZH, Fu LQ and Liu SY. Progress of researches in acupotomy visualization under ultrasound. *Zhen Ci Yan Jiu* 2021; 46: 546-548.
- [27] Xiong SB, Tian LX, Yu NT and Luo ZX. Observation on tuina plus needling the distal acupoints along the pathway of meridians for shoulder periarthritis. *J Acupunct Tuina Sci* 2021; 19: 462-468.
- [28] Tanaka OM, Cavassin LD, Gasparello GG, Meira TM, Miyoshi CS and Hartmann GC. The esthetics of the nasolabial fold and age in the elderly via eye-tracking. *Contemp Clin Dent* 2023; 14: 18-24.
- [29] Geng SH, Liu L, Lin ZM, Zhang H, Mei RG, Liu X, Liu JC, Huang GR and Zhang WC. A review of novel research technology to explore the mystery of traditional Chinese medicine: Terahertz. *Medicine (Baltimore)* 2023; 102: e35870.
- [30] Zhu X, Qiu Z, Liu Z, Shen Y, Zhou Q, Jia Y, Sun X and Li S. CT-guided percutaneous lumbar ligamentum flavum release by needle knife for treatment of lumbar spinal stenosis: a case report and literature review. *J Pain Res* 2020; 13: 2073-2081.
- [31] Wang Z, Wang Y, Wang C, Li X, Zhou Z, Zhang L, Li M, Pan Y, Jiao T, Shi X and Liu Q. Systematic review and network meta-analysis of acupuncture combined with massage in treating knee osteoarthritis. *Biomed Res Int* 2022; 2022: 4048550.
- [32] Chen SC, Ruan JY, Zhang B, Pang LY, Zhong L, Lin SL, Wong KP, Ouyang HX, Yeung WF, Fu QW and Chen BQ. Traditional Chinese medicine interventions based on meridian theory for pain relief in patients with primary dysmenorrhea: a systematic review and network meta-analysis. *Front Med (Lausanne)* 2024; 11: 1453609.
- [33] Liu ZF, Wang HR, Yu TY, Zhang YQ, Jiao Y and Wang XY. Tuina for peripherally-induced neuropathic pain: a review of analgesic mechanism. *Front Neurosci* 2022; 16: 1096734.
- [34] Tao WW, Jiang H, Tao XM, Jiang P, Sha LY and Sun XC. Effects of acupuncture, Tuina, Tai Chi, Qigong, and traditional Chinese medicine five-element music therapy on symptom management and quality of life for cancer patients: a meta-analysis. *J Pain Symptom Manage* 2016; 51: 728-747.
- [35] Cates C, Jordan K, Munk N, Farrand R, Kennedy AB and Groninger H. Massage therapy in palliative care populations: a narrative review of literature from 2012 to 2022. *Ann Palliat Med* 2023; 12: 963-975.
- [36] Samuel SR, Gururaj R, Kumar KV, Vira P, Saxena PUP and Keogh JWL. Randomized control trial evidence for the benefits of massage and relaxation therapy on sleep in cancer survivors-a systematic review. *J Cancer Surviv* 2021; 15: 799-810.
- [37] Chae H, Chu H, Lee J, Kim H, Kim D, Park S, Lim K, Jeong M, Kang K, Kim G, Lee JH, Jung S, Kim J, Kim Y and Ryu M; Korean Medical Society of Acupotomology KM Doctors Group. Effectiveness and safety of acupotomy treatment on shoulder pain: 25 multicenter retrospective study. *J Pain Res* 2023; 16: 1367-1380.
- [38] Liu S, Liu JT, Chen L, Fan TY, Cui XJ, Cheng SD, Chen YJ, Shi Q, Xue CC and Li XF. Efficacy of five-step shoulder manipulation for rotator cuff-related shoulder pain: protocol for a multicenter randomized controlled trial. *Trials* 2023; 24: 498.
- [39] Zhao Y, Yang T, Feng C, Li L, Pang L and Zhao S. Arthroscopic capsular release versus manipulation under anesthesia for refractory frozen shoulder: a systematic review with meta-analysis. *Orthop Surg* 2024; 16: 1517-1529.
- [40] Bhuiyan MK. The co-relation between disease activity and quality of life among patients with peripheral spondyloarthropathy. *Saudi J Med* 2022; 7: 455-462.
- [41] Ma J, Zhang H, Wang J, Gao J, Fan D, Qian Y, Chen Z, Bao R, Yin L and Xiong G. Summary of outpatient visits for characteristic nursing in traditional Chinese medicine. *Holist Nurs Pract* 2024; 38: 164-171.