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COMPARISON EFFECT OF ACUPUNCTURE AND JUAN BI TANG IN FROZEN SHOULDER PATIENTS SURABAYA EAST JAVA

Anindini Winda Amalia [1,3)*], Wong Thea Sairine [2)], Jessi Suryani Setiawan[3)]

[1]International Education College, Jiangxi University of Chinese Medicine, Nanchang, People's Republic of China
[2]Sinshe Fan Clinic Surabaya
[3]Department of Traditional Chinese Medicine, Faculty of Health, IIK Bhakti Wiyata Kediri, Kediri, Indonesia
Email: anindini.winda@iik.ac.id

ABSTRACT

Background: Frozen shoulder is a musculoskeletal condition characterized by pain and restricted shoulder joint mobility. The purpose of this study was to evaluate how well acupuncture and Juan Bi Tang, a traditional Chinese herbal remedy, reduced shoulder pain and enhanced shoulder function in patients with frozen shoulder in Surabaya, East Java.
Methods: 14 female patients with primary frozen shoulder caused by wind-cold-dampness syndrome were included in the pre-experimental design, which included a pretest and a post-test. One group of participants received acupuncture treatment for seven days in a row, while the other group received Juan Bi Tang decoction for the same amount of time. On days 0, 3, and 7, range of motion (ROM) tests were used to measure shoulder mobility, and the Visual Analogue Scale (VAS) was used to gauge the severity of the pain.
Results: Following treatment, the VAS scores in both groups significantly decreased ($p = 0.000$), according to the results. While there was no discernible difference on day 7 ($p = 0.778$), the acupuncture group experienced a quicker decrease in pain on day 3 than the herbal group ($p = 0.029$). Both groups significantly improved their range of motion ($p = 0.000$), but the acupuncture group had better early results on day three ($p = 0.005$). Both treatments showed comparable gains by day 7 ($p = 0.761$).
Conclusion: Patients with frozen shoulder found that both Juan Bi Tang and acupuncture helped to improve shoulder function and reduce pain. Herbal therapy showed a similar effect after one week, but acupuncture showed a quicker onset of improvement.
Keywords: acupuncture, Juan Bi Tang, frozen shoulder, pain management, traditional Chinese medicine

INTRODUCTION

Frozen shoulder, also known as adhesive capsulitis, is a painful musculoskeletal disorder characterized by shoulder pain and progressive limitation of both active and passive range of motion. The condition predominantly affects middle-aged adults and is associated with significant impairment in daily activities and quality of life. Epidemiological reports commonly estimate a prevalence of approximately 2–5% in the general adult population. In Southeast Asia, this range is generally applied to the general adult population, while acknowledging variability due to differences in study design, diagnostic criteria, and population characteristics (Sarasua et al., 2021; Huang et al., 2020). In contrast, substantially higher prevalence rates have been consistently reported in

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high-risk populations, particularly among individuals with diabetes mellitus, where the risk may be two to four times greater than in non-diabetic individuals (Uddin et al., 2014; Sarasua et al., 2021).

In clinical practice, acupuncture is widely utilized for the management of frozen shoulder due to its potential to alleviate pain and improve shoulder mobility through neurophysiological modulation and anti-inflammatory effects (Ben-Arie et al., 2020;Chen et al., 2025). In addition, traditional Chinese herbal medicine is frequently used, with Juan Bi Tang among the commonly prescribed formulas for wind-cold-dampness bi syndrome, which manifests as pain, stiffness, and restricted shoulder movement. Pharmacological evidence suggests that *Juan Bi Tang* exhibits anti-inflammatory, anti-fibrotic, immunomodulatory, antioxidant, and microcirculatory effects, which are relevant to the pathophysiology of adhesive capsulitis (Hsu et al., 2022). These multi-target mechanisms may contribute to reducing capsular inflammation, limiting fibrosis, and improving joint mobility, thereby providing a plausible scientific basis for its clinical application (Jacob et al., 2023).

Despite the increasing use of both acupuncture and herbal therapy, several important gaps remain in the current literature. First, existing studies and systematic reviews predominantly evaluate acupuncture in comparison with sham interventions, usual care, or other conventional treatments, while evidence on herbal medicine is often reported separately or as part of combined therapeutic regimens. Consequently, there is a lack of direct head-to-head comparative studies between acupuncture and a specific herbal monotherapy, such as *Juan Bi Tang*, for frozen shoulder. Second, most available studies assess treatment outcomes over periods of several weeks, whereas evidence regarding short-term outcomes—particularly within the first 7 days—is limited. Current literature rarely reports early analgesic onset within this timeframe, despite its clinical importance in guiding treatment decisions (Ben-Arie et al., 2020;Yang et al., 2018). Third, methodological heterogeneity, including variation in herbal formulations, outcome measures, and assessment timing, further limits direct comparison between therapeutic modalities. Finally, although frozen shoulder and its associated risk factors are highly relevant in Southeast Asia, comparative clinical evidence from Indonesian populations remains scarce, and country-specific data reflecting local clinical practice are still limited. Therefore, this study aimed to compare the short-term effects of acupuncture and *Juan Bi Tang* on pain intensity and shoulder range of motion in female patients with frozen shoulder in Surabaya, Indonesia. By addressing the lack of direct comparative evidence, the limited availability of early (within 7 days) clinical outcome data, and the scarcity of Indonesian-specific research, this study seeks to provide preliminary findings that are more relevant to local integrative clinical practice.

RESEARCH METHOD

This study employed a pretest–posttest design within a pre-experimental framework. The study was conducted between February and March 2023 at a private clinical practice in Surabaya, Indonesia. A total of 14 participants were recruited using purposive sampling. Participants were then allocated into two treatment groups: an acupuncture group (n = 7) and a herbal therapy group receiving Juan Bi Tang (n = 7). The allocation process was non-random, as participants were assigned based on clinical and practical considerations at the study site.

The inclusion criteria, based on clinical assessment and Traditional Chinese Medicine (TCM) pattern differentiation, were as follows: (1) diagnosis of primary frozen shoulder; (2) female patients aged 40–70 years; (3) presence of shoulder pain accompanied by

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restricted range of motion; and (4) diagnosis of wind-cold-dampness syndrome affecting the shoulder.

Participants in the acupuncture group received daily treatment sessions for seven consecutive days, with each session lasting approximately 15 minutes. The acupuncture points used included Fengchi (GB20), Jianyu (LI15), Jianqian (EX-UE), Jianliao (SJ14), Ashi points (selected based on pain sensitivity), and Waiguan (SJ5).

Participants in the second group received an herbal decoction (Juan Bi Tang) for seven consecutive days. The formulation consisted of 10 g Qiang Huo, 6 g Gui Zhi, 10 g Qin Jiao, 10 g Dang Gui, 5 g Chuan Xiong, 15 g Sang Zhi, 15 g Hai Feng Teng, 6 g Ru Xiang, 6 g Mu Xiang, and 3 g Gan Cao.

The raw herbal ingredients were boiled in 750 mL of water and reduced to approximately 150 mL. The prepared decoction was administered twice daily over the treatment period.

Clinical outcomes were assessed at three time points: baseline (day 0), day 3, and day 7. Pain intensity was measured using the Visual Analog Scale (VAS), with scores ranging from 0 (no pain) to 10 (worst imaginable pain). Shoulder mobility was assessed using the shoulder flexion range of motion (ROM), measured in degrees.

Data were presented as mean ± standard deviation (SD). Within-group comparisons across time points (baseline, day 3, and day 7) were analyzed using repeated-measures analysis. Between-group comparisons at each time point were conducted using independent-samples tests. Statistical significance was set at $p < 0.05$. All analyses were performed using SPSS.

This study was conducted in accordance with ethical standards for research involving human participants. Ethical approval was obtained from the Ethics Committee of the Institut Ilmu Kesehatan Bhakti Wiyata Kediri, with approval number 321/FIK/EP/XI/2023.

RESULTS

This study included 14 female patients diagnosed with frozen shoulder, allocated into two groups: the acupuncture group (n = 7) and the herbal therapy group (n = 7). The mean age of participants in the acupuncture group was 57.00 ± 10.21 years (range: 40–70 years), while the herbal group had a mean age of 56.57 ± 7.84 years (range: 49–70 years). There was no statistically significant difference in baseline age between the two groups ($p > 0.05$), indicating comparability at baseline.

Table 1. Comparing the VAS Between Two Groups

	VAS			
Groups	**Before Treatment**	**3-day treatment**	**7-day treatment**	**Between 2 times (p-value)**
Acupunture	8.86± 0.69	5.71±0.756	3.71±0.756	0.000*
Herb	8.71± 0.756	6.71± 0.756	3.86± 1.069	0.000*
Between 2 groups (p-value)	0.718	0.029	0.778	

Table 1. presents the comparison of pain intensity measured using the Visual Analog Scale (VAS) at baseline, day 3, and day 7. Between-group comparisons were conducted

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using independent-samples tests, while within-group changes over time were analyzed using repeated-measures analysis.

At baseline, no significant difference was observed between the acupuncture group (8.86 ± 0.69) and the herbal group (8.71 ± 0.76) (p = 0.718), indicating similar initial pain levels.

On day 3, the acupuncture group demonstrated significantly lower VAS scores (5.71 ± 0.76) compared to the herbal group (6.71 ± 0.76) (p = 0.029), suggesting a more rapid analgesic effect. The magnitude of this difference indicates a clinically meaningful early improvement in favor of acupuncture.

By day 7, both groups showed substantial reductions in pain, with no statistically significant difference between the acupuncture group (3.71 ± 0.76) and the herbal group (3.86 ± 1.07) (p = 0.778), indicating comparable outcomes at the end of the treatment period.

Within-group analysis demonstrated significant reductions in VAS scores from baseline to day 7 in both groups (p < 0.001 for both), indicating a strong treatment effect over time. The magnitude of change in both groups suggests a large within-group effect size, supporting the clinical relevance of both interventions.

These findings indicate that acupuncture provides faster pain relief in the early phase of treatment, whereas Juan Bi Tang demonstrates a more gradual but sustained effect, ultimately achieving outcomes comparable to those of acupuncture after one week.

Table 2. Comparing the ROM between two groups

	ROM			
Groups	**Before Treatment**	**3-day treatment**	**7-day treatment**	**Between 2 times (p-value)**
Acupunture	95.71± 4.499	125.71± 4.499	175.71±4.499	0.000*
Herb	96.43±5.563	116.43± 5.563	175±4.082	0.000*
Between 2 groups (p-value)	0.796	0.005	0.761	

Table 2. presents the comparison of shoulder flexion range of motion (ROM) between groups at baseline, day 3, and day 7. At baseline, there was no significant difference between the acupuncture group (95.71 ± 4.50) and the herbal group (96.43 ± 5.56) (p = 0.796), indicating similar initial functional status.

On day 3, the acupuncture group showed significantly greater improvement in ROM (125.71 ± 4.50) compared to the herbal group (116.43 ± 5.56) (p = 0.005), suggesting a faster functional recovery. This difference reflects a moderate-to-large clinical effect favoring acupuncture in the early treatment phase.

By day 7, both groups demonstrated marked improvement, with no significant difference between the acupuncture group (175.71 ± 4.50) and the herbal group (175.00 ± 4.08) (p = 0.761), indicating equivalent final outcomes.

Within-group comparisons revealed significant improvements in ROM from baseline to day 7 in both groups (p < 0.001), indicating strong treatment effects over time.

These results suggest that acupuncture facilitates earlier improvement in shoulder mobility, while Juan Bi Tang produces a delayed but comparable therapeutic effect by the end of the treatment period.

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DISCUSSION

This difference in time-course is clinically meaningful. Frozen shoulder is characterized by a complex interaction between pain and restricted mobility, where pain limits active movement and contributes to progressive stiffness. Therefore, early pain reduction is not only a symptomatic benefit but may also facilitate earlier functional recovery by enabling greater participation in movement. The faster improvement observed in the acupuncture group suggests that early modulation of pain may indirectly accelerate functional gains through increased shoulder use and reduced movement inhibition (Le et al., 2017).

These findings are consistent with previous systematic reviews and meta-analyses reporting that acupuncture and electroacupuncture can reduce pain and improve shoulder function in adhesive capsulitis, particularly in the short term (Ben-Arie et al., 2020; Heo et al., 2022). Evidence synthesis suggests that acupuncture is effective in improving pain scores and range of motion, although the magnitude of effect varies due to heterogeneity in study design and treatment protocols.

The faster onset of improvement observed in the acupuncture group may be explained by its neurophysiological mechanisms. Acupuncture stimulation activates endogenous pain-modulating systems, including the release of endogenous opioids (e.g., endorphins and enkephalins) and monoaminergic neurotransmitters (e.g., serotonin and norepinephrine). These mechanisms contribute to the inhibition of nociceptive transmission and activation of descending pain inhibitory pathways (Heo et al., 2022); (Zhang et al., 2014). In addition, acupuncture has been shown to modulate inflammatory responses by reducing pro-inflammatory cytokines such as TNF-α and IL-6, thereby decreasing peripheral sensitization and facilitating early pain relief (Zhu et al., 2024);(Niruthisard et al., 2024).

Furthermore, acupuncture may enhance local blood circulation and reduce muscle tension, which can contribute to early functional recovery and improved range of motion (Mansfield et al., 2018). The combination of neural, biochemical, and circulatory effects provides a plausible explanation for the rapid clinical improvement observed in the acupuncture group within the first few days of treatment.

In contrast, *Juan Bi Tang* demonstrated a more gradual therapeutic response. From a TCM perspective, this formula acts by dispelling wind-cold-dampness and promoting the circulation of qi and blood, thereby relieving pain and stiffness (Wang et al., 2018). From a biomedical perspective, *Juan Bi Tang* and similar multi-herb formulations exhibit anti-inflammatory, immunomodulatory, and microcirculatory effects, which are relevant to the pathophysiology of musculoskeletal pain and adhesive capsulitis (Hsu et al., 2022; Zheng et al., 2013).

Several studies indicate that herbal formulations may exert analgesic effects through suppression of inflammatory mediators and modulation of pain signaling pathways (Nisar et al., 2023; Hu et al., 2024). In addition, potential anti-fibrotic effects of herbal components may contribute to improving capsular stiffness, although direct evidence in frozen shoulder remains limited (Jiang et al., 2020)(Singh et al., 2020). In herbal therapies generally require time to accumulate therapeutic effects, which may explain the delayed onset observed in this study.

This pattern—faster onset with acupuncture and slower but comparable improvement with herbal therapy—is consistent with findings from broader musculoskeletal literature. Acupuncture is often associated with rapid analgesic effects, whereas oral Chinese herbal medicine tends to show gradual improvement over time, with convergence of outcomes in the short- to medium-term.

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Importantly, the present study provides new insight into the comparative time-course of therapeutic response between acupuncture and *Juan Bi Tang*. Current literature largely evaluates these therapies independently or within combined treatment protocols, and there is a lack of direct head-to-head comparisons between acupuncture and specific herbal monotherapy for frozen shoulder. Furthermore, most studies assess outcomes over several weeks, while evidence on very early outcomes (e.g., within 7 days) remains limited. Therefore, this study contributes preliminary evidence addressing these gaps by directly comparing short-term responses between the two interventions.

Additionally, this study provides context-specific data from an Indonesian clinical setting, where evidence on the comparative effectiveness of Traditional Chinese Medicine modalities remains scarce. Previous reviews have highlighted the limited representation of Southeast Asian populations in clinical trials on frozen shoulder, which may affect generalizability of findings across regions.

From a clinical perspective, the findings suggest that acupuncture may be preferable for patients requiring rapid pain relief and early functional recovery, whereas *Juan Bi Tang* may serve as an alternative for patients who prefer non-invasive or oral therapy, with comparable outcomes achieved after one week. These results also support the potential role of integrative approaches combining acupuncture and herbal therapy, although such combinations were not evaluated in the present study.

CONCLUSION

Herbal therapy was associated with reduced pain intensity (VAS) and improved shoulder mobility (ROM) among female patients with frozen shoulder, suggesting its therapeutic potential within a one-week treatment period. The combination of acupuncture and herbal therapy may offer complementary benefits by integrating rapid analgesic effects with more sustained systemic recovery, thereby optimizing overall clinical outcomes.

RECOMMENDATIONS

In patients requiring immediate pain relief or rapid improvement in function, acupuncture takes precedence; in patients interested in less invasive therapy or requiring more systemic adjustment of chronic symptoms, Juan Bi Tang should be used as an alternative therapy; however, when needed, both therapies should be combined as they complement rather than oppose each other. Large randomized controlled trials are needed to provide confirmation of the findings in wide-ranging patient populations, and to explore longer-term outcomes (e.g., 1 month post-treatment), and to compare integrative approaches (acupuncture + herbal therapy) against conventional medical treatment options, such as corticosteroids or physiotherapy.

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REFERENCES

Ben-Arie, E., Kao, P.-Y., Lee, Y.-C., Ho, W.-C., Chou, L.-W., & Liu, H.-P. (2020). The Effectiveness of Acupuncture in the Treatment of Frozen Shoulder: A Systematic Review and Meta-Analysis. Evidence-Based Complementary and Alternative Medicine, 2020(1). https://doi.org/10.1155/2020/9790470

Chen, J., Wu, K., & Wang, Q. (2025). Acupuncture Therapy in Postoperative Rehabilitation for Arthroscopic Rotator Cuff Repair: A Systematic Review and Meta-Analysis. Frontiers in Surgery, 12. https://doi.org/10.3389/fsurg.2025.1631880

Heo, J.-W., Jo, J.-H., Lee, J.-J., Kang, H., Choi, T.-Y., Lee, M. S., & Kim, J.-I. (2022). Electroacupuncture for the treatment of frozen shoulder: A systematic review and meta-analysis. Frontiers in Medicine, 9. https://doi.org/10.3389/fmed.2022.928823

Hsu, Y.-T., Ng, H., Chen, Y., Huang, Y., Lee, Y.-Y., & Tsai, M.-Y. (2022). Assessing the Efficacy and Safety of Juan Bi Tang for Dialysis-Related Myofascial Pain in the Fistula Arm: Study Protocol for a Randomized Cross-Over Trial. Frontiers in Public Health, 10. https://doi.org/10.3389/fpubh.2022.925232

Hu, N., Liu, J., Luo, Y., & Li, Y. (2024). A Comprehensive Review of Traditional Chinese Medicine in Treating Neuropathic Pain. Heliyon, 10(17), e37350. https://doi.org/10.1016/j.heliyon.2024.e37350

Huang, S., Wang, J.-Y., Lin, C.-L., Huang, C., Liou, T., & Lin, H. (2020). Patients With Axial Spondyloarthritis Are at Risk of Developing Adhesive Capsulitis: Real-World Evidence Database Study in Taiwan. Journal of Clinical Medicine, 9(3), 787. https://doi.org/10.3390/jcm9030787

Jacob, L., Gyasi, R. M., Koyanagi, A., Haro, J. M., Smith, L., & Kostev, K. (2023). Prevalence of and Risk Factors for Adhesive Capsulitis of the Shoulder in Older Adults From Germany. Journal of Clinical Medicine, 12(2), 669. https://doi.org/10.3390/jcm12020669

Jiang, W., Fan, W., Gao, T., Li, T., Yin, Z., Guo, H., Wang, L., Han, Y., & Jiang, J. (2020). Analgesic Mechanism of Sinomenine Against Chronic Pain. Pain Research and Management, 2020, 1–10. https://doi.org/10.1155/2020/1876862

Le, H. V, Lee, S. J., Nazarian, A., & Rodriguez, E. K. (2017). Adhesive capsulitis of the shoulder: review of pathophysiology and current clinical treatments. Shoulder & Elbow, 9(2), 75–84. https://doi.org/10.1177/1758573216676786

Mansfield, C. J., Vanetten, L., Willy, R., di Stasi, S., Magnussen, R., & Briggs, M. (2018). The Effects of Needling Therapies on Muscle Force Production: A Systematic Review and Meta-analysis. Journal of Orthopaedic & Sports Physical Therapy, 49(3), 154–170. https://doi.org/10.2519/jospt.2019.8270

Niruthisard, S., Ma, Q., & Napadow, V. (2024). Recent Advances in Acupuncture for Pain Relief. Pain Reports, 9(5), e1188. https://doi.org/10.1097/pr9.0000000000001188

Nisar, A., Jagtap, S., Vyavahare, S., Deshpande, M., Harsulkar, A., Ranjekar, P. K., & Prakash, O. (2023). Phytochemicals in the Treatment of Inflammation-Associated Diseases: The Journey From Preclinical Trials to Clinical Practice. Frontiers in Pharmacology, 14. https://doi.org/10.3389/fphar.2023.1177050

Sarasua, S. M., Floyd, S. B., Bridges, W. C., & Pill, S. G. (2021). The Epidemiology and Etiology of Adhesive Capsulitis in the U.S. Medicare Population. BMC Musculoskeletal Disorders, 22(1). https://doi.org/10.1186/s12891-021-04704-9

Singh, S., Singh, T. G., Mahajan, K., & Dhiman, S. (2020). Medicinal Plants Used Against Various Inflammatory Biomarkers for the Management of Rheumatoid

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ISSN: 2087 – 5002 | E-ISSN: 2549 – 371X
https://doi.org/10.34035/jk.v17i2.1957

Arthritis. Journal of Pharmacy and Pharmacology, 72(10), 1306–1327. https://doi.org/10.1111/jphp.13326

Uddin, M. M., Khan, A. A., Haig, A. J., & Uddin, M. K. (2014). Presentation of Frozen Shoulder Among Diabetic and Non-Diabetic Patients. Journal of Clinical Orthopaedics and Trauma, 5(4), 193–198. https://doi.org/10.1016/j.jcot.2014.09.008

Wang, Q., Wang, Y., Jia, Q., Liu, L., Xu, C., Wang, X., Yao, M., Cui, X., Shi, Q., Wang, Y., & Liang, Q. (2018). The Efficacy of the Traditional Chinese Medicine Juanbi Pill Combined With Methotrexate in Active Rheumatoid Arthritis: Study Protocol for a Randomized Controlled Trial. Trials, 19(1). https://doi.org/10.1186/s13063-018-2555-1

Yang, C., Lv, T., Yu, T., Wong, S., Lu, M., & Li, Y. (2018). Acupuncture at Tiaokou (ST38) for Shoulder Adhesive Capsulitis: What Strengths Does It Have? A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Evidence-Based Complementary and Alternative Medicine, 2018(1). https://doi.org/10.1155/2018/4197659

Zhang, R., Lao, L., Ren, K., & Berman, B. (2016). Mechanisms of Acupuncture–Electroacupuncture on Persistent Pain. Anesthesiology, 120(2), 482–503. https://doi.org/10.1097/aln.0000000000000101

Zheng, G., Song, M., He, B., Li, X., Luo, J., & Lu, A. (2016). Exploring the molecular mechanism of Juan-Bi-Tang for Feng-Han-Shi-Bi syndrome in rheumatoid arthritis. Proceedings - 2016 IEEE International Conference on Bioinformatics and Biomedicine, IEEE BIBM 2016, 77–79. https://doi.org/10.1109/BIBM.2013.6732769

Zhu, X., Jia, Z., Zhou, Y., Wu, J., Cao, M., Hu, C., Yu, L., & Chen, Z. (2024). Current Advances in the Pain Treatment and Mechanisms of Traditional Chinese Medicine. Phytotherapy Research, 38(8), 4114–4139. https://doi.org/10.1002/ptr.8259