

Application of Traditional Chinese Medicine Hot Compress Package Combined with Kinesio Taping in Postoperative Nursing of Total Knee Arthroplasty

Dan Xiao^{1,2}, Qiujin Hao^{1,2}, Yana He^{1,2}, Ran An^{1,2}, Xiaoqing Zhang^{1,2*}

¹First Teaching Hospital of Tianjin University of Traditional Chinese Medicine, Tianjin 300381, China

²National Clinical Research Center for Acupuncture and Moxibustion of Traditional Chinese Medicine, Tianjin 300381, China

**Author to whom correspondence should be addressed.*

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: *Objective:* To explore the application of external application of Traditional Chinese Medicine (TCM) hot compress package combined with Kinesio Taping in postoperative nursing of total knee arthroplasty. *Methods:* 90 patients with severe knee osteoarthritis who underwent total knee arthroplasty in our department from January to December 2022 were randomly divided into two groups using a random number table method: one group was named the conventional group (n = 45), which received the standard orthopedic nursing process throughout, including basic pain management, incision care, and functional exercise guidance; the other group was defined as the experimental group (n = 45), which, in addition to the conventional nursing framework, incorporated the local transdermal drug delivery technique of TCM hot compress package and the biomechanical correction scheme of Kinesio Taping for collaborative intervention. Finally, the differences in postoperative resting/active pain scores (VAS) of the affected limb and satisfaction with nursing services between the two groups were compared using quantitative assessment tools. *Results:* The satisfaction with nursing care in the conventional group was significantly lower than that in the experimental group ($P < 0.05$); the VAS score after nursing in the conventional group was significantly higher than that in the experimental group ($P < 0.05$). *Conclusion:* The application of external application of TCM hot compress package combined with Kinesio Taping in postoperative nursing of total knee arthroplasty has a definite effect, reducing pain and improving patient satisfaction with nursing services.

Keywords: Acupoint hot compress; Application effect; Kinesio taping; Knee osteoarthritis

Online publication: Nov 7, 2025

1. Introduction

Total Knee Arthroplasty (TKA), as a key technology in the field of orthopedic reconstruction, aims to systematically alleviate pain symptoms and gradually restore joint biomechanical function by removing severely

degenerated anatomical structures of the knee joint and replacing them with biocompatible artificial prosthetic components. From the perspective of clinical practice, optimizing the therapeutic effects of TKA highly relies on three pillars: meticulous preoperative evaluation, precise intraoperative bone cutting and prosthesis positioning, and structured postoperative rehabilitation programs^[1].

Any oversight in these areas may lead to complications such as persistent postoperative pain, periprosthetic infection, or joint stiffness, significantly prolonging the functional recovery period and even raising doubts among patients about the value of surgical treatment. Therefore, the development of evidence-based perioperative care plans has become a core research topic in the modern orthopedics.

Kinesio Taping (KT) provides local support and reduces muscle or joint pressure through the traction of the skin and soft tissues by an elastic cloth, invented by Japanese physician Dr. Kenzo Kase^[2,3]. The mechanism of action of KT is not yet fully understood. Some studies suggest that KT enhances the stability of tissue structures, and the folds formed on the skin surface under tension increase the interstitial space in the subcutaneous tissue, improving circulation. Additionally, the elastic recoil of the KT after application stimulates stretch receptors, increasing sensory input and inhibiting pain signal transmission^[4].

This study found that this postoperative care method has significant clinical effects, providing a reference for clinical nursing practitioners.

2. Materials and methods

2.1. General information

90 patients with severe knee osteoarthritis who underwent TKA in the Orthopedics Department of our hospital from January 2022 to December 2022 were collected and randomly divided into a conventional group and an experimental group using a random number table method, with 45 patients in each group.

In the conventional group, there were 22 males and 23 females; aged between 43 and 73 years, with an average age of (57.79 ± 6.56) years; the affected limb locations were 21 on the left, 20 on the right, and 4 on both sides.

In the experimental group, there were 20 males and 25 females; aged between 45 and 72 years, with an average age of (58.09 ± 6.76) years; the affected limb locations were 18 on the left, 21 on the right, and 6 on both sides. There were no statistically significant differences in the baseline data between the two groups.

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

The inclusion criteria are as follows:

- (1) Meeting the diagnostic criteria for knee osteoarthritis as outlined in the “Guidelines for the Diagnosis and Treatment of Osteoarthritis” formulated in 2018^[5];
- (2) Kellgren-Lawrence Grade III to IV.

2.2.2. Exclusion criteria

The exclusion criteria are as follows:

- (1) Patients with other diseases that may affect the evaluation of nursing effectiveness, such as bone tuberculosis or bone tumors;
- (2) Patients with chronic diseases including cardiovascular and cerebrovascular diseases, liver diseases, severe

- pulmonary and renal diseases;
- (3) Patients with surgical contraindications;
 - (4) Patients who are blind, deaf, mute, or otherwise unable to communicate normally.

2.2.3. Dropout criteria

The dropout criteria are as follows:

- (1) Poor patient compliance;
- (2) Development of other significant diseases during hospitalization;
- (3) Withdrawal from the study due to various subjective or objective reasons.

2.3. Methods

2.3.1. Routine group

The routine perioperative nursing methods in the orthopedics department were employed.

2.3.2. Experimental group

Full-course nursing was provided using a combination of external application of a TCM hot compress package and KT.

A total of 5 grams each of frankincense and myrrh, 9 grams each of peach kernel, safflower, Chuanxiong (*Ligusticum chuanxiong*), and *Cyperus tuber*, and 10 grams each of angelica, scorpion, earthworm, and turmeric were selected and thoroughly mixed. They are then placed in a dense, breathable double-layered pure cotton cloth bag for encapsulation.

Before use, the herbal package was immersed in hot water at approximately 60–70°C for 30 minutes to ensure effective dissolution and penetration of the medicinal properties into the cloth bag fibers, achieving a uniformly damp state. Subsequently, the dampened herbal package was transferred into a constant-temperature wet hot compress device ($70 \pm 2^\circ\text{C}$) for 15–20 minutes to ensure the full activation and stable release of medicinal substances while avoiding skin burns or decomposition of active ingredients due to excessive heat.

After heating, the herbal package was removed and immediately wrapped in a clean, dry, thick cotton bath towel to buffer the heat, maintain humidity, and prevent burns. The wrapped herbal hot compress pack was placed on the selected acupoints with applied moderate pressure, combined with gentle techniques such as pressing, kneading, and vibrating to promote the penetration of the medicinal properties and the circulation of local Qi and blood. Each hot compress session lasted 20–30 minutes and was performed twice daily. During the procedure, the patient's skin reactions were closely observed to prevent burns. The herbal pack can be reused several times, but it is important to keep it clean and dry, replacing it with a new pack promptly when its efficacy diminishes.

Approximately 30 minutes after completing the external application of the TCM hot compress pack, when the skin was fully cooled and returned to normal, KT tape was applied to the swollen and painful areas of the affected limb as a continuation of physical therapy. This aims to further promote lymphatic drainage, reduce edema, alleviate pain, and provide mechanical support.

The specific procedure is as follows:

- (1) Carefully palpate the affected limb to identify 1-2 points of greatest subjective pain reported by the patient. Avoid any areas with rashes, skin breaks, unhealed wounds, or significant scar hyperplasia. Use a “Y”-shaped kinesiology tape. Centering on the pain point, apply the tape radially without tension from the center outward, forming an “X”-shaped cross-fixation. Rely on the elastic recoil force of the tape itself

to exert a slight lifting effect on the pain point and surrounding soft tissues, aiming to reduce local tissue pressure, improve microcirculation, alleviate stimulation of pain receptors, and provide a mechanical foundation for subsequent taping. The edges of the tape should be at least 1 cm away from the edges of the sterile dressing over the incision to ensure the sterile area remains undisturbed.

- (2) For areas with significant swelling around the surgical incision, guide the subcutaneous tissue fluid towards functionally normal lymph node groups using the tape. Use a specially designed “claw-shaped” tape. Apply the base of the tape with zero tension to the center of the nearest, functionally sound lymph node group in the target drainage area. Gently and naturally apply each tail of the “claw-shaped” tape with minimal tension in an arc towards the most swollen and painful area. Each tail should also end naturally on the skin with zero tension. Each taping session should last 24 hours, and continuous taping should be performed for 7 days. After exposure to water, use a towel to blot dry and avoid rubbing. If the edges curl, there is severe contamination, an allergic reaction occurs, or the patient perceives a decrease in effectiveness, the tape should be replaced promptly.

2.4. Observation indicators

2.4.1. VAS score

The doctor used a 10 cm rating scale, where scores ranging from 0 to 10 represent progressively increasing levels of pain. Patients indicated their own pain level by pointing to a score on the scale, with higher scores indicating more severe pain.

2.4.2. Nursing satisfaction

A self-administered nursing satisfaction questionnaire developed by the hospital was used, with three evaluation levels: satisfied, somewhat satisfied, and dissatisfied.

2.5. Statistical methods

Data was processed using R software. A *P*-value of less than 0.05 was considered statistically significant.

3. Results

3.1. VAS score

Before treatment, there was no statistically significant difference in VAS scores between the two groups ($P > 0.05$). After treatment, VAS scores in both groups were lower than before treatment, and the VAS score in the experimental group was lower than that in the control group, with both differences being statistically significant ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of VAS scores before and after nursing between the two groups (mean $\pm$ SD)

Group	n	Before care	After care	t-value	<i>P</i> -value
Routine group	45	6.61 $\pm$ 1.32	2.90 $\pm$ 1.63	11.866	< 0.001
Experimental group	45	6.75 $\pm$ 1.45	2.38 $\pm$ 1.55	13.811	< 0.001
t-value		-0.479	1.551		
<i>P</i> -value		0.633	0.125		

3.2. Nursing satisfaction

Comparing nursing satisfaction between the two groups, the overall satisfaction rate in the experimental group reached 97.78%, while that in the conventional group was 66.67%. The difference was statistically significant ($P < 0.05$), as shown in **Table 2**.

Table 2. Comparison of nursing satisfaction between the two groups [n (%)]

Group	n	Satisfied	Fairly satisfied	Dissatisfied	Overall satisfaction
Routine group	45	19 (42.22)	11 (24.44)	15 (33.33)	30 (66.67)
Experimental group	45	31 (68.89)	12 (26.67)	1 (2.22)	44 (97.78)
χ^2 -value				14.899	
P -value				< 0.001	

4. Discussion

According to statistics, over 300 million people worldwide suffer from knee osteoarthritis (KOA), with a prevalence rate exceeding 22% among individuals over 40 years old ^[6]. In the early stage, conservative treatment should be the main approach, supplemented by non-steroidal anti-inflammatory drugs and analgesics to alleviate symptoms. For patients in the chronic phase, it is essential to actively engage in muscle exercises around the knee joint to enhance its stability. When the pain is severe and conservative treatment proves ineffective, surgical options can be considered, including arthroscopic debridement, reconstruction of the medial patellofemoral ligament, high tibial osteotomy, uni-compartmental knee arthroplasty, etc.

For patients with isolated patellofemoral arthritis, patellofemoral joint arthroplasty may be performed, while severe cases may require total knee arthroplasty. In daily life, it is important to establish reasonable daily activity patterns, such as protecting the affected knee joint, avoiding long-distance fatigue travel, mountain climbing, ascending and descending high-rise stairs, and various poor postures, such as prolonged standing, kneeling, and squatting.

Obese individuals should reduce their body weight, wear elastic braces to protect the joints, such as knee pads, avoid wearing high heels, and opt for soft, elastic “sneakers” with suitable insoles. For patients with medial compartment knee arthritis, wedge-shaped insoles can be used as an adjunctive treatment. During flare-ups, it is advisable to reduce the load on the affected joint and use aids like canes and walkers to assist with movement.

Simultaneously, engaging in joint muscle exercises, such as moderate aerobic activities like walking, swimming, and cycling, can help maintain joint function ^[7]. TKA is an effective intervention for clinically treating severe KOA. In 2018, the total number of knee arthroplasty cases in China was 249,000, while in 2019, over 370,000 patients underwent knee arthroplasty, with total costs exceeding 10 billion yuan ^[8]. However, due to the significant local tissue damage caused by TKA and the potential for postoperative inflammatory factors to induce sensitization of the central and peripheral nervous systems, patients often experience severe postoperative pain ^[9].

According to research on the disease course, 5% of patients even experience worsening pain 6 months after surgery ^[10]. Therefore, studying the mechanisms of postoperative pain and nursing strategies for TKA is of great importance.

The results of this study indicate that after TKA, the application of external herbal compress therapy combined with KT nursing treatment significantly reduced VAS scores compared to conventional nursing, with

statistically significant differences ($P < 0.05$). When comparing nursing satisfaction between the two groups, the experimental group achieved a total nursing satisfaction rate of 97.78%, while the conventional group had a total satisfaction rate of 66.67%, with statistically significant differences ($P < 0.05$).

This study demonstrates that the application of TCM hot compress packs combined with KT for nursing care after TKA effectively alleviates patient pain and enhances patient satisfaction with orthopedic nursing services at our hospital. The TCM hot compress pack used in our hospital contains a blend of medicinal ingredients, including olibanum, myrrh, peach kernel, safflower, *Ligusticum wallichii*, *Cyperus rotundus*, *Angelica sinensis*, scorpion, earthworm, and turmeric. Notably, olibanum and myrrh are often used together in clinical practice for their synergistic effects in promoting blood circulation, dispersing blood stasis, reducing swelling, and relieving pain.

Research has shown that the volatile oils of olibanum and myrrh act as natural amphiphilic penetration enhancers, facilitating the permeation of active ingredients. Meanwhile, curcumin in turmeric exhibits antioxidant, anti-inflammatory, antitumor, and neuroprotective properties. The combined effects of peach kernel and safflower complement each other, yielding a comprehensive action of “invigorating blood circulation, breaking up blood stasis, unblocking meridians, and relieving pain,” thereby enhancing the potency of blood circulation promotion and meridian regulation. Peach kernel is particularly effective in “breaking up blood stasis,” penetrating deeply into the blood to dissolve severe clots, while safflower excels in “unblocking meridians,” clearing obstructed blood flow within the channels. Together, they eliminate stagnant blood and promote smooth circulation, making them suitable for various conditions characterized by blood stasis obstruction and achieving the effect of “relieving pain without leaving stasis.”

The core of the *Ligusticum wallichii*-*Cyperus rotundus* herb pair lies in “simultaneously regulating Qi and promoting blood circulation,” with *Cyperus rotundus* focusing on Qi regulation and *Ligusticum wallichii* emphasizing Qi movement and blood activation. This combination not only addresses the root cause of Qi stagnation but also aids Qi circulation through blood activation, preventing prolonged Qi stagnation from leading to blood stasis.

The *Angelica sinensis*-scorpion-earthworm herb pair is beneficial for promoting blood circulation. Our research team has analyzed the synergistic mechanisms of these multi-component drugs, which manifest in three progressive layers:

- (1) Targeted stimulation of local skin and mucosal capillary networks by active ingredients significantly enhances vascular endothelial dilation function, leading to compensatory expansion of microcirculatory vessel diameters;
- (2) Based on vascular dilation, it elevates the interstitial osmotic pressure gradient, accelerating the transmembrane transport efficiency of drug molecules and achieving directional optimization of bioavailability in the lesion area;
- (3) By regulating local arterial microcirculatory perfusion and lymphatic pump function, it systematically clears inflammatory exudates and metabolic waste, ultimately achieving a gradual resolution of inflammatory swelling and bidirectional inhibition of nociceptive pain transmission pathways.

The core therapeutic value of KT lies in its unique biomechanical rebalancing and fascial regulation mechanisms. Through its special weaving process, KT generates a continuous directional retraction force after application. This mechanical effect exerts a gentle traction on the epidermis and subcutaneous connective tissue. By altering the relative positional relationship between the skin and deep fascia, it effectively reduces the viscous resistance between fascial layers, enhances fascial sliding ability, and increases the permeability of interstitial

spaces. This promotes the circulation of interstitial fluid and the clearance of metabolic waste, significantly reducing the local accumulation and stimulation of pain-inducing substances. The retraction force of the tape creates small interstitial spaces beneath the skin, reducing interstitial pressure and improving the functional status of microvessels and lymphatic vessels, thereby creating a favorable microenvironment for tissue repair in the injured area.

Continuous low-intensity stimulation promotes the release of endogenous analgesic substances, downregulates central sensitization levels, and ultimately raises the local pain threshold at the affected site, achieving long-lasting pain relief. The “wrinkle effect” formed by directional skin traction enlarges the subcutaneous tissue space, accelerates the centripetal reflux of lymphatic fluid, and reduces the compressive stimulation of inflammatory edema on nerve endings. Pain reduction alleviates reflexive muscle spasms and improves local blood flow; concurrently, the resolution of edema reduces tissue metabolic stress, forming a virtuous cycle of “edema reduction-pain cessation” that facilitates the functional recovery of the affected limb. This provides a valuable reference for nursing professionals.

5. Conclusion

In conclusion, the integrated application of TCM hot compress packs and KT demonstrates a definite effect in the postoperative nursing of patients undergoing total knee arthroplasty. This combined intervention effectively reduces postoperative pain and enhances patient satisfaction with nursing services. Therefore, it represents a valuable, non-pharmacological approach worthy of clinical promotion in postoperative TKA care.

Funding

General Project, Scientific Research Project Plan for Traditional Chinese Medicine in Hebei Province (Project No.: T2025117)

Disclosure statement

The authors declare no conflict of interest.

References

- [1] Rusche A, Osterhoff G, Roth A, et al., 2025, Perioperative Complications and Postoperative Outcomes of Primary Total Knee Arthroplasty in Octogenarians: A Systematic Review. *J Orthop*, 2025(67):209–213.
- [2] Cao S, Zhang J, 2010, Postoperative Nursing Care for Patients Undergoing Total Knee Arthroplasty. *Nursing Research*, 24(S1):34.
- [3] Ding F, 2022, Progress in the Application of Kinesio Tape in Knee Osteoarthritis. *Chinese Journal of Convalescent Medicine*, 31(7):687–689.
- [4] Dan Y, Su J, Hu T, et al., 2025, Clinical Observation on the Efficacy of Kinesio Tape Combined with Massage in the Treatment of Cervical Spondylosis of Neck Type. *Traditional Chinese Medicine Rehabilitation*, 2(5):46–49.
- [5] Joint Surgery Group, Orthopedic Branch, Chinese Medical Association, 2018, Guidelines for the Diagnosis and Treatment of Osteoarthritis (2018 edition). *Chinese Journal of Orthopaedics*, 38(12):705.

- [6] Cui X, Xie F, Cui J, et al., 2025, Association Between Physical Activity and Knee Osteoarthritis: A Comprehensive Systematic Review and Meta-Analysis. *J Glob Health*, 2025(15):04173.
- [7] Fari G, Fai A, Donati D, et al., 2025, The Effects of Oxygen-Ozone Therapy in Knee Osteoarthritis: A Systematic Review. *J Back Musculoskelet Rehabil*, 2025: 10538127251341834.
- [8] Xu G, 2024, Clinical Efficacy and Experimental Research on the Treatment of Knee Osteoarthritis with Massage Based on the “Tendon-Bone Balance” Theory, thesis, Guangzhou University of Chinese Medicine.
- [9] Chou R, Gordon D, de Leon-Casasola O, et al., 2016, Management of Postoperative Pain: A Clinical Practice Guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists’ Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *J Pain*, 17(2):131–57.
- [10] Zhang A, Hua H, Cai T, et al., 2026, Pain After Total Knee Arthroplasty: Research Status and Trend Analysis. *Chinese Journal of Tissue Engineering Research*, 30(3): 795–804.

Publisher’s note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.