Ema P, Fabrizio G, Ignazio G, Thilo H, Roberto R. Practical guidance on the use of heat therapy for musculoskeletal pain in pharmacy practice. Pharmacy Practice 2026 Apr-Jun;24(2): 3525.
https://doi.org/10.18549/PharmPract.2026.2.3525

Original Research

Practical guidance on the use of heat therapy for musculoskeletal pain in pharmacy practice

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Received (first version): 29-Oct-2025 Accepted: 04-Mar-2026 Published online: 22-May-2026

Abstract

Objective: Musculoskeletal pain (MSKP) is a leading cause of disability worldwide and a frequent concern for community pharmacy consultations. While superficial heat therapy (HT) is commonly recommended in clinical guidelines, practical pharmacy-specific guidance remains limited. This paper provides condition-specific recommendations and practical decision-making algorithms for the use of HT in MSKP within pharmacy practice. **Methods:** Recommendations were developed through two international multidisciplinary meetings that synthesized published evidence and real-world clinical experience. A structured consensus approach was used to identify patient profiles, red-flag indicators for referral, and appropriate use of HT as monotherapy or in combination with pharmacological and non-pharmacological interventions. **Results:** Practical algorithms tailored to pharmacy settings are presented for common MSKP scenarios including neck pain, low back pain, knee pain, and osteoarthritis. Guidance emphasizes a symptom-driven model, outlining when HT is appropriate, when combination strategies are needed, and when referral is required. **Conclusions:** This paper provides pharmacists with actionable, evidence-informed tools to support safe, patient-centered care in MSKP. While further research is warranted to validate these recommendations in prospective studies, these algorithms address an urgent need for practical pharmacy-based guidance in non-pharmacological pain management.

Keywords: pharmacy, musculoskeletal pain, heat therapy, guidance, non-pharmacological management.

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INTRODUCTION

Musculoskeletal pain (MSKP) affects more than 1.5 billion individuals globally and encompasses over 150 conditions that impair movement and mobility[1]. It is estimated that more than half of the world's population has experienced MSKP at some point, and approximately 20% suffer from chronic forms of this pain[1]. MSKP is the leading cause of years lived with disability (YLDs), accounting for nearly 149 million YLDs worldwide — equivalent to 17% of the global burden of disability[2].

Beyond its clinical implications, MSKP imposes substantial socioeconomic burdens, impacting both patients and caregivers. Factors such as age, sex, obesity, and history of injury are strongly associated with the development and persistence of MSKP. Importantly, the progression of MSKP over time can result in central sensitization, reduced pain thresholds, and expansion of pain receptive fields, thereby amplifying the intensity and chronicity of symptoms[3]. MSKP is also associated with significant impairments in physical performance, mobility, sleep quality, and mental health, contributing to increased frailty and depression.

Joint-related MSKP is typically characterized by movement-induced or weight-bearing pain, stiffness, muscle twitching, and fatigue. Physicians and pharmacists must also be vigilant for red flags — such as late-onset symptoms, night pain, fever, neurological deficits, or a history of malignancy — which may require urgent referral for further investigation[3].

Current best practice in MSKP management aligns with the biopsychosocial model, incorporating both pharmacological and non-pharmacological interventions tailored to the individual, a multimodal approach[4]. Goals include not only the reduction of pain and restoration of function but also minimization of unnecessary medication use[1,5].

Community pharmacists are among the most accessible healthcare professionals and often serve as the first point of contact for patients with MSKP. They provide crucial educational support and guide self-care practices that can significantly improve patients' quality of life[6,7]. In this context, non-pharmacological interventions are increasingly recommended as first-line strategies — with superficial heat therapy (HT) being a widely utilized and endorsed option[5].

HT offers multiple therapeutic effects: it increases blood flow

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

https://doi.org/10.18549/PharmPract.2026.2.3525

through vasodilation, accelerates metabolic and tissue repair processes, enhances tissue elasticity, and promotes muscle relaxation, thereby reducing stiffness and discomfort in chronic MSKP[8]. Conversely, cryotherapy — with opposing physiological effects — is typically indicated in acute inflammatory states[8].

Although HT has demonstrated efficacy in a range of non-specific MSKP presentations, including neck, low back, and knee pain, guidance on its optimal use in terms of duration, modality, and integration with other treatments remains limited[9]. Recognizing this gap, the International Pharmaceutical Federation (FIP) has acknowledged both the therapeutic value of HT and the need for greater pharmacist engagement and training in this area[7,10].

METHODS

This article presents an expert opinion derived from two international, multidisciplinary meetings involving physicians, pharmacists, and academic experts in musculoskeletal pain (MSKP) and heat therapy (HT). The objective of these meetings was to review the available clinical evidence and share real-world experiences in order to develop practical algorithms for managing MSKP with superficial heat therapy, specifically within the context of community pharmacy practice.

Through structured discussion, the expert group aimed to identify typical patient profiles frequently encountered in the pharmacy setting and to define criteria for recommending HT appropriately. Key therapeutic scenarios, including neck pain, low back pain, knee pain, and osteoarthritis, were examined in depth to formulate patient-centred recommendations that can assist pharmacists in making safe and effective care decisions.

This initiative responds to a recognized need for clearer, more actionable guidance on HT use in community pharmacy, particularly given its widespread endorsement in clinical guidelines and the relative scarcity of specific evidence regarding its optimal application. While this process did not involve a systematic literature review or formal consensus methodology such as the Delphi technique, the proposed algorithms reflect the consensus of experienced practitioners and are grounded in both evidence-informed practice and clinical pragmatism.

RESULTS

Neck Pain or Cervicalgia

General considerations

Neck pain (or cervicalgia) is a common symptom, affecting between 10% and 20% of adults[11]. It is more frequent in women and increases with age. Generally, it affects women and men of middle age or older, particularly those with comorbidities, a history of chronic trauma, or undergoing multiple therapies. However, it may also occur in younger individuals, such as athletes, pregnant women, or those with previous spinal injuries.

Neck pain is typically described as persistent, stabbing, burning, or shooting, often radiating to the shoulders or arms. Associated symptoms include headache, stiffness in the neck, shoulders and upper back, difficulty turning the neck or tilting the head, and paraesthesia (pins and needles sensation) in the shoulders or arms. The main underlying causes are vertical cervical spine disorders, often due to trapezius muscle contraction, lack of physical activity, psychological stress, post-traumatic conditions (e.g., car accidents), radiculopathy, paravertebral instability, or degenerative diseases. Accurate diagnosis is crucial to determine whether HT is appropriate or if specialist referral is required.

Some comorbidities (e.g., diabetes, malocclusion, dental pathologies) or lifestyle factors (e.g., sedentary behaviour, excessive workload, lack of physical activity) may contribute to the onset or persistence of cervicalgia and can help in clinical assessment[11].

Pharmacists should ask targeted questions to localise the pain, determine its duration and intensity (both at rest and during movement), assess any radiation of symptoms, and identify signs such as muscle weakness, tingling, or numbness. A history of trauma should also be evaluated. Importantly, pharmacists must screen for red flags that indicate the need for physician referral. These include age above 50 with new-onset symptoms, associated neurological deficits, unexplained weight loss, fever, or recent trauma.

Practical considerations for the use of HT in neck pain

Physical activity, including motion therapy and stretching exercises, is generally beneficial for individuals with neck pain and should be recommended in the absence of red flags[12,13]. The therapeutic strategy must be tailored to the intensity and duration of the pain, patient comorbidities, and individual preferences.

Superficial heat therapy (HT) can be used as monotherapy in cases of mild pain, particularly in patients with comorbidities or those undergoing polypharmacy, where the use of anti-inflammatory agents might not be appropriate. Alternatively, HT may be combined with local or systemic anti-inflammatory or analgesic medications, as well as with physical exercise. However, if there is any clinical suspicion of complications, imaging (e.g., X-ray or MRI) should be performed before initiating physical therapies.

There are currently no standardised guidelines on the specific modalities of HT application for MSKP. Decisions are therefore largely symptom-driven and based on individual patient characteristics. HT should not be used in children due to the ongoing development of their musculoskeletal structures, particularly cartilage.

Treatment duration should be guided by symptoms. Clinical improvement is expected within 1 to 4 days of HT initiation. If no improvement is seen after six weeks, referral for medical

evaluation is strongly advised[14]. It is also important to note that in many cases, the cause of neck pain may remain unclear. When neurological symptoms such as weakness or sensory deficits in the upper limbs are present, further diagnostic assessment (e.g., imaging) is required, and HT should be avoided until a diagnosis is established.

In community pharmacy practice, specific phenotypes of neck pain can be identified and treated with HT (as summarised in Table 1 and Figure 1). These include chronic or persistent muscular spasm, chronic contracture, myofascial pain or trigger points, and functional disorders. In such cases, HT can be applied every 8 hours for 3 consecutive days, in combination with analgesic or anti-inflammatory therapy. The patient's clinical response should be reassessed after 3 days. If positive, HT may be continued until symptom resolution. If no improvement is observed after 8 days, referral to a physician is warranted.

Conversely, acute muscle contracture following trauma should initially be treated with cryotherapy for 2 to 3 days. If symptoms persist or worsen, a medical consultation should be recommended[15].

Low Back Pain

General considerations

Low back pain is one of the most frequent types of musculoskeletal pain and can be either acute or chronic in nature. It often manifests as muscle contracture but may also be described as myofascial pain, paraspinal tenderness, trigger point pain, or deep muscular discomfort. Other reported symptoms include radiating pain toward the kidneys, reduced strength or sensation in the lower limbs, numbness, tingling, electric shock-like sensations, burning, cold sensations, or a "pushing" feeling. In many cases, the cause of low back pain is considered non-specific; in fact, a definitive diagnosis is not possible in up to 85% of cases[16].

Common contributing factors include heavy load-bearing, physical inactivity, incorrect posture, and discopathies. Pharmacists should evaluate pain characteristics, such as onset, duration, intensity (both at rest and during movement), and any radiation. They should also investigate recent trauma, occupational or physical activity history, and whether the patient regularly lifts heavy objects.

Importantly, the pharmacist must screen for red flags, which require prompt medical referral. These include abdominal pain (which may indicate underlying visceral conditions such as aortic aneurysm, bladder, or gastrointestinal disease), bladder or bowel dysfunction, unexplained weight loss, fever, or neurological symptoms.

Practical considerations for the use of HT in low back pain

A multimodal treatment approach is typically recommended for low back pain, combining HT with physical exercise and, when appropriate, pharmacological agents[17–19]. Although no universally accepted protocols exist for HT application, treatment decisions should be based on pain severity and patient preference — the so-called "symptom-driven indication" model[22].

HT may be recommended alone in patients who are unable to tolerate anti-inflammatory medications or who prefer non-pharmacological strategies. In moderate to severe cases, it can be used in combination with systemic or topical analgesics and NSAIDs[20,21]. In certain scenarios — such as during pregnancy or in acute flares — the temporary use of a spinal brace may be considered as an adjunct[23].

Clinical improvement is generally expected within 1 to 4 days of initiating HT. If the pain persists beyond 4–6 weeks, advanced diagnostic imaging such as MRI is advised[16]. Importantly, prolonged bed rest should be avoided. Recovery plans should include education on post-resolution exercise, given the high risk of recurrence — with more than 70% of patients experiencing a relapse within one year.

HT is not recommended for children due to the immature state of their cartilage and musculoskeletal development.

Several low back pain phenotypes may be managed effectively with HT in the pharmacy setting (see Table 2 and Figure 2). These include chronic or persistent muscular spasm, fibromyalgia, chronic contracture, myofascial pain, trigger point pain, and functional disorders. In such cases, HT can be applied every 8 hours for 3 days alongside analgesic or anti-inflammatory medications. After 3 days, the patient's response should be evaluated. If symptoms improve, HT may be continued; if not, medical referral is recommended.

For acute muscular contracture following trauma, cryotherapy is preferred as a first-line treatment for 2–3 days. If no clinical response is observed, further medical assessment is warranted[15].

Cluneal neuralgia, a less common cause of low back pain, may benefit from HT applied every 8 hours for 7–10 days. This should be combined with systemic analgesics or NSAIDs, local therapies, manual treatments, and neurotrophic agents. If no improvement is seen after 10 days, medical referral is necessary[15].

Knee Pain

General considerations

Knee pain is frequently associated with osteoarthritis or tendinopathy, particularly in individuals exposed to repetitive stress on the patellar tendon, where decreased vascularisation at the inferior pole of the patella may occur[24]. Other causes include cartilage defects or joint instability, both of which

Table 1. Treatment plan and proposed follow-up for specific and frequent neck pain in the pharmacy setting (adapted from: Ventriglia G et al.[15])

Pain type/phenotype	Suggested management	Duration/reassessment
Chronic or Persistent Spasm (a group of muscles)	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral
Chronic Contracture (only a portion of muscle)	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral
Acute Contracture after trauma	Cold therapy for 48/72 hours	After 72 hour KO medical referral
Myofascial pain/trigger point	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral
Functional disorders (after sport, muscle imbalances, functional blockages)	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral

Table 2. Treatment plan and proposed follow-up for specific and frequent of low back pain in the pharmacy setting (adapted from: Ventriglia G et al.[15])

Pain type/phenotype	Suggested management	Duration/reassessment
Chronic or Persistent Spasm (a group of muscles)/ Fibromyalgia	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue to 8; after 8 days KO medical referral
Chronic Contracture (only a portion of muscle)	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral
Acute Contracture after trauma	Cold therapy for 48/72 hours	After 72 hour KO medical referral
Myofascial pain/trigger point	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue; after 8 days KO medical referral
Functional disorders (after sport, muscle imbalances, functional blockages)	HT for 8h/3days + analgesic/NSAIDs	After 3 days Ok continue to 8; after 8 days KO medical referral
Cluneal Nerve Pain	HT for 8h/7-10 days + analgesic/NSAIDs + local therapy + manual treatment + neurotrophic treatment	After 10 days KO medical referral

Table 3. Treatment plan and proposed follow-up for specific and frequent of knee pain in the pharmacy setting (adapted from: Ventriglia G et al.[15])

Pain type/phenotype	Suggested management	Duration/reassessment	Note
Tendon related conditions/ chronic tendinopathies	HT for 8h/4-5 weeks + analgesic + exercises/stretching + physical therapy	After 4-5 weeks KO medical referral, before if the pain worsens	With preference not during night, better during activity
Chronic Contracture (only a portion of muscle)	HT for 8h/3days + analgesic/ NSAIDs	After 3 days Ok continue; after 8 days KO medical referral	
Acute Contracture after trauma	Cold therapy for 48/72 hours	After 72 hour KO medical referral	
Functional disorders (after sport, muscle imbalances, functional blockages)	HT for 8h/3days + analgesic/ NSAIDs	After 3 days Ok continue to 8; after 8 days KO medical referral	
DOMS	30' Before sport - HT for 8h/3days + analgesic/NSAIDs	After 4 days KO medical referral	

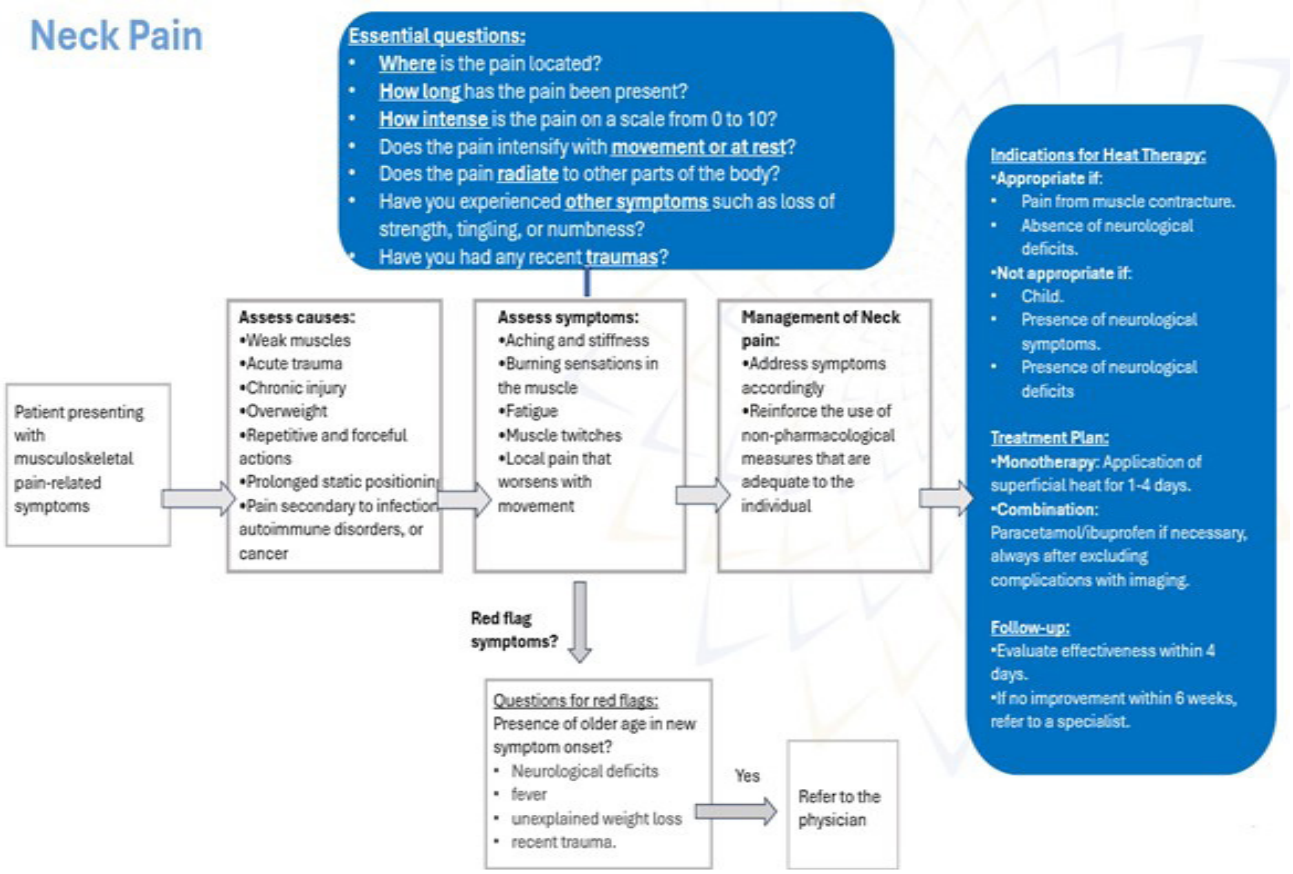

Figure 1. Algorithm for the management of neck pain in the pharmacy setting.

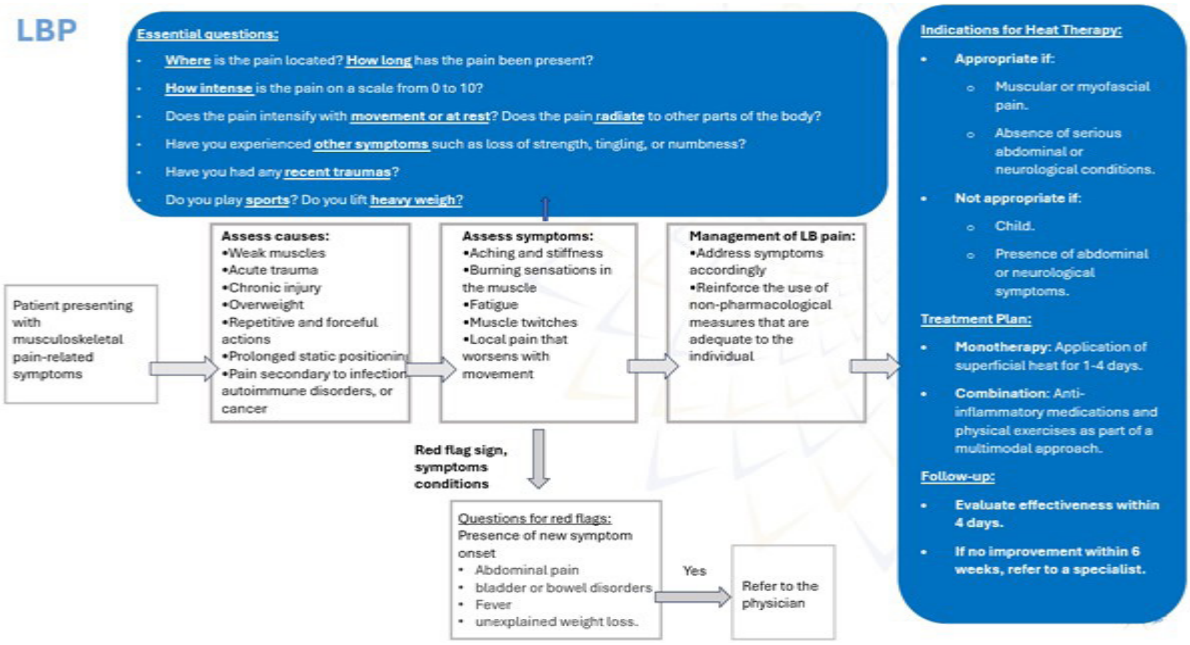

Figure 2. Algorithm for the management of low back pain in the pharmacy setting.

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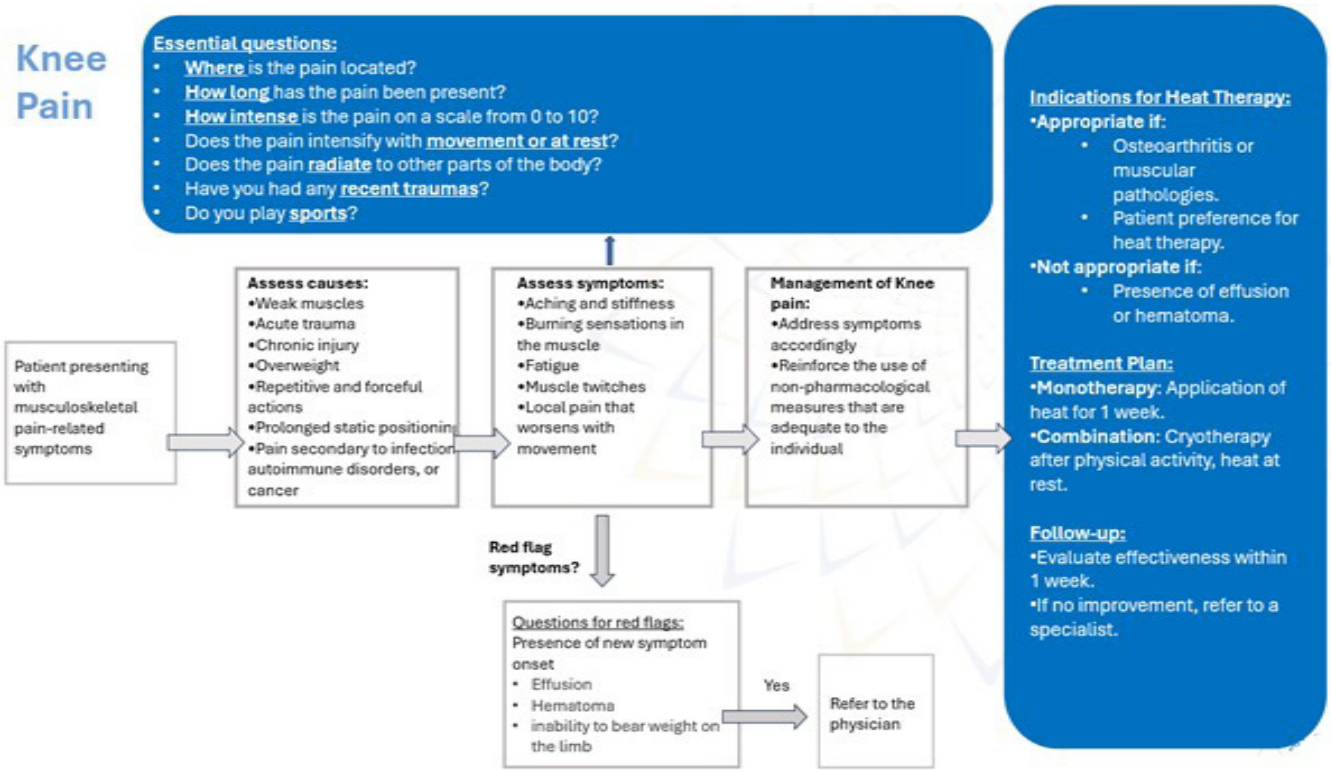

Figure 3. Algorithm for the management of knee pain in the pharmacy setting.

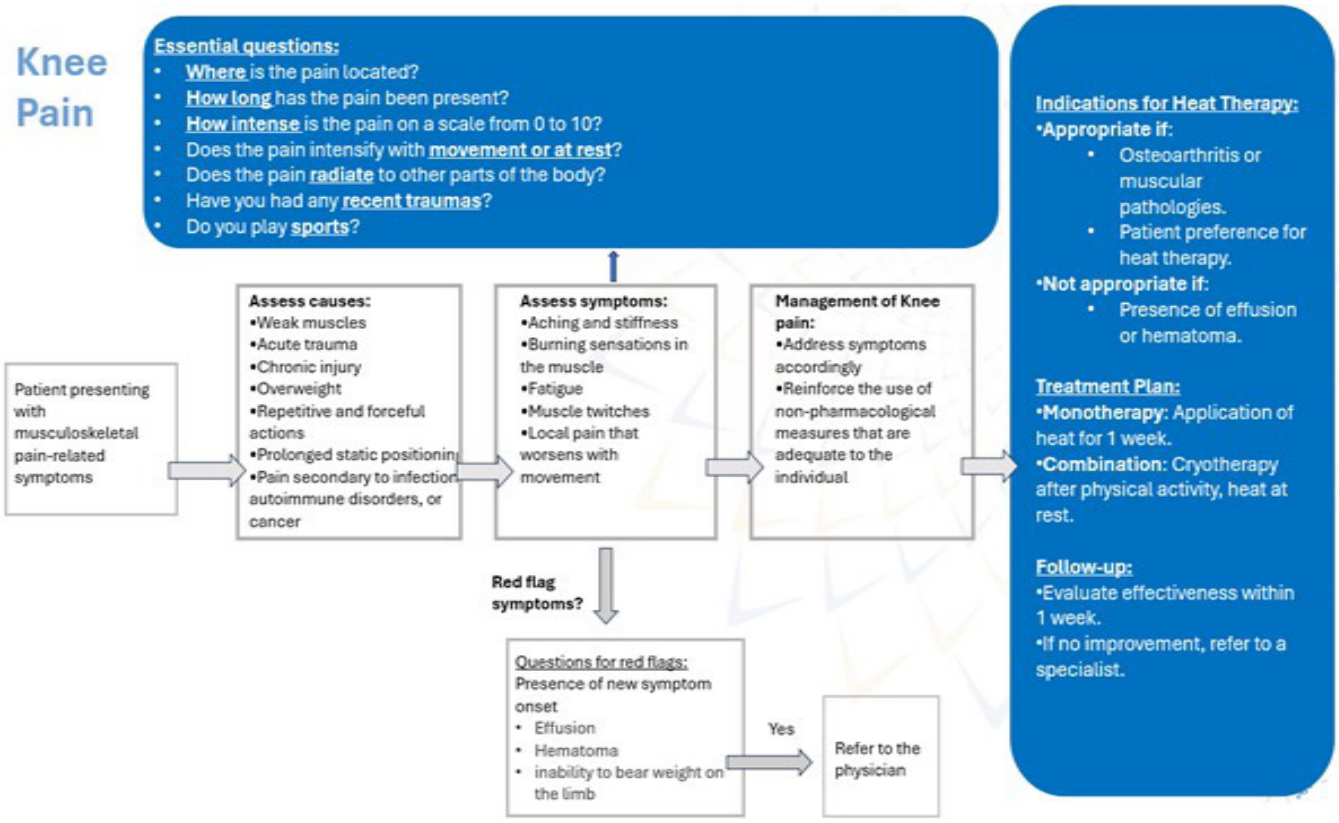

Figure 4. Algorithm for the management of osteoarthritis pain in the pharmacy setting.

contribute to sensations of discomfort and insecurity while walking.

Knee pain is typically chronic and most noticeable during or after physical activity. It often arises during weight-bearing movements, especially when going up or down stairs. Pharmacists should ask patients whether the pain worsens during specific movements (e.g., descending stairs), and assess for signs of mechanical issues such as joint instability.

Key red flags include effusion, hematoma, and inability to bear weight on the affected limb. These findings warrant immediate referral to a physician[25–27]. Pharmacists should also assess pain location, duration, radiation, history of trauma, and the patient's physical activity level or sports involvement.

Practical considerations for the use of HT in knee pain

There are no standardised recommendations for the use of HT in knee pain; decisions are therefore guided by symptom severity and patient preference[28–33]. HT may serve as a supportive therapy for certain presentations, particularly knee osteoarthritis and delayed-onset muscle soreness (DOMS).

Patient preference plays a central role, as some individuals benefit from heat while others prefer cold therapy. For instance, ice is recommended immediately after physical activity, whereas HT is more appropriate during rest or chronic stages. In some cases, alternating HT and cryotherapy can support tendon healing and serve as a conservative management option[34.]

If there is no improvement after one week of HT use, referral to a physician is advised. In cases where conservative therapies (including HT and structured exercise) fail after three months, further evaluation — including imaging or surgical consultation — may be necessary.

Pharmacists can also help identify pain phenotypes likely to respond to HT (see Table 3 and Figure 3). These include chronic contracture and functional disorders, where HT may be applied every 8 hours for 3 consecutive days alongside analgesic or anti-inflammatory medications. Response should be reassessed after 3 days. If effective, treatment can continue; if not, medical referral is appropriate.

For acute post-traumatic contracture, cryotherapy is the preferred first-line treatment for 2–3 days. If symptoms persist or worsen, the patient should be referred[15].

Tendinopathies, such as patellar or quadriceps tendon overload, may require HT every 8 hours for 4 to 5 weeks, ideally during the day while the patient remains active. This should be combined with analgesics, stretching exercises, and physical therapy. If there is no improvement — or if symptoms worsen — the patient should be referred before the 5-week mark.

Finally, DOMS is a form of ultrastructural muscle injury caused by eccentric or unfamiliar exercise. It results in increased protein degradation, apoptosis, and local inflammation, with pain typically emerging 2 to 3 days after exertion[35,36]. HT may be used both preventively (30 minutes before exercise) and therapeutically (every 8 hours for 3 days) to reduce post-exercise soreness.[30,34,37] If there is no relief after 4 days, referral is recommended[15].

Osteoarthritis Pain

General considerations

Osteoarthritis (OA) is a leading cause of chronic pain in older adults, typically affecting individuals over 70 years of age. Both men and women are affected, especially those who are overweight and lead sedentary lifestyles[38–40]. OA most commonly involves large, weight-bearing joints such as the knees and hips, though any synovial joint may be involved.

Pain associated with OA has a gradual onset and is typically activity-related, worsening with movement and improving with rest. Morning stiffness or stiffness after inactivity is common but usually short in duration. Patients may also report joint weakness, swelling, crepitus, and reduced range of motion.

Pharmacists should assess pain characteristics, the presence of morning or post-rest stiffness, the duration and location of symptoms, and any history of joint trauma. Importantly, red flags should be identified and prompt referral: these include acute joint swelling, suspected infectious or autoimmune arthritis, and signs of active inflammation (e.g., warmth, redness, or gout attacks).

Practical considerations for the use of HT in osteoarthritis pain

HT is considered a supportive therapy in OA management, particularly when integrated into a multimodal approach including exercise, weight management, and patient education[5,41,42]. HT can help reduce pain, stiffness, and tenderness, and may improve joint mobility. However, it is not recommended during acute inflammatory phases, where cold therapy may be more appropriate.

Although no specific guidelines define optimal HT combinations in OA, patient-reported benefit is a valid indication for continued use. If the patient feels relief and improved function, HT may be continued on a symptom-driven basis[42].

Evidence supporting HT includes clinical trials showing benefits in pain reduction, function, and quality of life when combined with exercises and conservative measures[28–33]. Conversely, commonly used nutraceuticals such as glucosamine and chondroitin have not consistently demonstrated meaningful benefit in controlled studies[5].

In chronic OA with fluctuating symptoms, short-term evaluation (e.g., over a few days) may be insufficient to judge efficacy. In these cases, the pharmacist should recommend continued HT

use with reassessment after 3 to 4 weeks. If symptoms persist beyond that period — or worsen — referral is warranted[15].

The pharmacist can use the practical algorithm illustrated in Figure 4 to guide the recommendation of HT in OA, including when to escalate care.

CONCLUSION

Musculoskeletal pain (MSKP) is a highly prevalent condition that significantly impacts patients' quality of life, functional capacity, and healthcare systems. In community pharmacy settings, pharmacists play a pivotal role in the early recognition, counselling, and management of MSKP, especially in supporting non-pharmacological strategies such as superficial heat therapy (HT).

Despite HT being widely recommended in national and international clinical guidelines, specific practical guidance on its application, timing, and integration into multimodal care remains limited. This article provides expert-derived recommendations and practical algorithms to guide pharmacists in identifying common MSKP phenotypes and determining when HT is appropriate, either alone or in combination with pharmacological interventions.

While not based on a systematic review or formal consensus methodology, these recommendations reflect current clinical practice and the shared expertise of multidisciplinary professionals experienced in HT and MSKP management. Pharmacists can use these tools to deliver safe, patient-centred care and support evidence-informed decision-making for the most frequent MSKP scenarios encountered in daily practice.

Future research should aim to generate robust clinical data on HT use, including comparative studies and real-world evaluations, to strengthen the evidence base and further refine pharmacy-based interventions in MSKP management.

AUTHOR CONTRIBUTIONS

All authors contributed equally to the conception of the article, review of available evidence, development of practical algorithms, drafting of the manuscript, and final approval. All authors take full responsibility for the content and agree to be accountable for all aspects of the work.

CONFLICTS OF INTEREST

EP and TH declare consulting or honorarium fees from Angelini Pharma; FG reports teaching, editorial, dissemination, and/or clinical research activities in collaboration with: Angelini Pharma S.p.A., Abiogen Pharma, GlaxoSmithKline Consumer Healthcare Srl Unipersonale, Saluber MD srl, Gruppo Humantech, Pharmanutra, IBSA, Italfarmaco, Guna, I-TECH Medical Division, Podartis, Laborest, Kyowa Kirin S.r.l., Ortopedia Castagna, Società Aziende Chimiche Riunite Angelini Francesco A.C.R.A.F. S.p.A, Chiesi Italia S.p.A., Exphy Srl (PHEX), Haleon; IG and RR report no conflicts of interest.

All authors received financial support from Angelini Pharma related to their participation in the expert meetings and manuscript preparation. The sponsor had no influence over the content, recommendations, or conclusions of the article. The authors declare no additional conflicts of interest.

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www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)