



## Current Concepts in Physiatric Pain Management

**Nonpharmacologic Options for Treating Acute and Chronic Pain**

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**Abstract**

This article provides a broad overview of the clinical nonpharmacologic treatment options for managing acute and chronic pain. Physical therapy and modalities, interventional techniques, emerging regenerative medicine, and cognitive behavioral paradigms of treatment are presented. Recommendations are evidence-based and are a practical resource for the musculoskeletal pain and sports medicine practitioner.

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**Introduction**

Treatment of acute and chronic musculoskeletal pain is complex; therefore, multiple strategies and resources are needed. Pain is ubiquitous and affects almost all areas of clinical medicine. As the population ages, the prevalence of osteoarthritis (OA), low back pain (LBP), and regional and widespread musculoskeletal pain increases [1].

Pharmacologic treatment often is effective; however, it has significant limitations, including risks and side-effects. For example, nephrotoxicity, gastrointestinal toxicity, hepatotoxicity, and cardiac risk are noted with nonsteroidal anti-inflammatory drugs [2]. Hypotension, constipation, and other anticholinergic side-effects may be experienced with antidepressants [3]. Cognitive impairment, weight gain, and mood alteration are side-effects of antiepileptic medications [4]. In addition, medications are a passive treatment that does not empower the patient with independence in self-management.

The purpose of this review is to present a practical overview of nonpharmacologic pain management strategies, including (1) physical therapy (PT) and modalities; (2) needle-based interventions for spinal and myofascial pain; (3) regenerative injection therapies for chronic musculoskeletal pain, sports injuries, and OA; and (4) behavioral medicine techniques [5,6]. An overview of several different techniques and categories of treatment is provided. Although many of these

approaches and interventions are conventional practice in rehabilitation medicine, others are emerging techniques that remain controversial to use because of the lack of high-quality evidence to validate their efficacy and recommend their use. This lack of literature support invites large-scale investigations and further basic science research to establish evidence-based guidelines for practice.

**PT and Modalities**

Because acute pain from recent injury is better understood from a traditional injury model than is persistent chronic pain, effective care can be more readily structured for acute pain from its onset. For instance, early referral to the care of a physical therapist has been shown to decrease the likelihood of acute LBP becoming a chronic condition [7-10]. Psychosocial barriers to normal physiologic recovery must still be recognized and addressed early to help prevent acute pain from progressing to persistent pain [11,12].

The goal of an initial assessment by a physical therapist should be to identify the level of irritability of the affected tissue and the need to support or protect it. Patients also should be assessed for their ability to return to movement and activity after an appropriate period of rest and protection even if pain persists [13-15]. Furthermore, when tissue injury is minimal, it is counterproductive to assign prolonged, if any, rest to individuals. For such conditions, a more active therapy

approach should be used. Patients with such cases should be educated that early mobility enables optimal recovery, and it is safe and necessary to return to modified activities even if there is mild associated pain. Indeed, if there is no significant tissue damage to protect, to suggest otherwise and advocate avoidance of activity is to engage in placebo messaging and possible “thought virus” production by supporting the notion that there is something to be afraid of in activity. This may engender “fear avoidance” (discussed in the Behavioral Medicine Techniques section), slow recovery, and increase the risk of progressing to persistent symptoms [13-16].

The concept of “thought viruses” describes thoughts and cognitive processes that are powerful enough to perpetuate pain [13-15,17], such as a patient’s belief that pain always equates to harm, resulting in reluctance to engage in activity or therapy. And, it has been shown that the most important predictors of leaving a normal course of recovery for one with persistent symptoms are psychosocial [9,11,12,18]. Therefore, it is incumbent on the treating therapist to identify, monitor, and address any thought viruses that may be present and any psychosocial factors that may inhibit recovery. It is within the initial interview that these influences are understood and a course for correction is established [13-15]. For recently injured patients, it should be more straightforward to foster the proper mindset and set clear expectations toward recovery.

An individualized therapy program for both acute and chronic pain conditions should be developed by first identifying problem areas (ie, problematic actions, comparable signs) to address. The functional health of affected musculoskeletal tissues is established by targeted physical examination to assess their tolerance to stress, such as direct pressure on injured tissue, loading of a reactive joint, or active ranging of an extremity. Any stress intolerances would represent a comparable sign for intervention and a therapeutic target for improvement. Therapies are then designed on the basis of a scientific approach that iteratively applies physical examination and treatment to identify interventions that effectively normalize significant comparable signs [19,20]. Immediately after an intervention, the comparable sign is reassessed to identify any cause and effect relationship between the intervention and changes in the comparable sign. Effective interventions are thereby incorporated. Although this process does little to illuminate mechanisms of response, it has been shown that “within-session changes” mediated by effective interventions are significantly associated with “between session changes” and lead to optimal outcomes [21-23].

In early recovery, the therapist might use modalities like heat, ice, electricity, and supportive wrapping to complement specific therapy. In today’s practice of PT, prediction rules are used widely to guide clinical decision-making for applying interventions known to

benefit specific presentations. Prediction rules for the use of lumbar spine thrust manipulation for LBP have been validated by a randomized controlled trial (RCT) [8,24]. Flynn et al [24] described 5 factors (symptom duration <15 days, low pain avoidance beliefs, lumbar hypomobility, hip internal rotation range of motion, and no symptoms distal to the knee) that accurately identified patients with LBP who would likely respond to lumbar spine thrust manipulation. For patients with 4 or more of these factors, the odds of a successful outcome were 60.8 for those who received manipulation and exercise, compared with 1.0 for those who received exercise alone [8,24-26].

Similar to clinical prediction rules for the use of lumbar spine thrust manipulation, the assessment of a patient’s directional preference in the setting of LBP may be used to guide treatment. The McKenzie method (or Mechanical Diagnosis and Treatment) is a management approach for spinal pain based on classifying a patient’s patterns of pain response to movement and mechanical forces to guide selection of treatments that are tailored to the patient’s clinical presentation. This technique has been used commonly by physical therapists and is supported by some evidence of its efficacy for acute LBP compared with other treatments [27-29].

Persistent pain (ie, lasting beyond tissue healing; greater than 3 months) is remarkably different from acute pain, requiring a broader perspective and different approach to care. Presuming that diagnostic evaluation has appropriately ruled out structural damage, the problem at this point no longer relates to injured tissues but the sensation of pain [13,14,30]. For this reason, teaching the patient about the nature of pain is likely more important than teaching them about disrupted anatomy or biomechanics. This method has been called Therapeutic Neuroscience Education, Pain Science, or Pain Science with a Biopsychosocial approach [13-15], which emphasizes understanding the pain experience and de-emphasizes the anatomic and biomechanical pathology to reduce thought viruses that may perpetuate the condition. Thus, when treating patients with chronic pain, therapists emphasize function and activity while addressing fears of movement or harm or thinking that catastrophizes normal and healthy activities that may block recovery [13,14,16,31].

Evidence from the PT and associated literature indicates that optimal care of patients, whether they have pain from acute injury, acute pain without injury, or persistent pain with or without injury at its origins, involves a multi-modal approach. This approach can be thought of as a “Three-Legged Stool” consisting of manual therapies, education, and exercise to get patients moving and restore normal functional tolerance [8,9,32-36]. Of these 3 elements, patient education is a requisite. By having the most accurate understanding of their pain experience, patients are able to derive the most benefit from

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