

NON-DRUG APPROACHES TO CHRONIC PAIN

WHAT IS THE DIFFERENCE BETWEEN ACUTE AND CHRONIC PAIN?

Acute pain is signaled through peripheral pain receptors at an anatomic site. As the site undergoes healing, the nociceptive receptors receive less stimulation, and activity decreases back to preinjury levels. Chronic pain often begins with the same nociceptive signals, but prolonged signaling results in changes to the nervous system. Neurons become hyperexcitable, and signals to the thalamus and cerebral cortex (where pain processing occurs) become amplified.[1] In addition, emotional and psychological changes that take place also color the pain experience.[1] The brain receives continued pain signals, even when there is no further tissue damage. This concept is at the core of what differentiates acute and chronic pain: when chronic, pain does not mean ongoing tissue damage.

HOW IS PAIN TYPICALLY TREATED?

Conventional treatments of pain include ice, medications, interventional treatments, and sometimes surgery. Analgesic medications include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), tramadol, and opioids. Adjunctive medications include tricyclic antidepressants and anticonvulsants. Collectively, these medications certainly have a role in treatment, but are limited in therapeutic success and have plentiful side effects.

WHAT ARE SOME NON-DRUG TREATMENTS OF CHRONIC PAIN?

There are several classes of treatments other than pharmaceuticals that have the potential to help in pain. Exercise, nutrition, supplements, mind-body techniques, and modalities such as acupuncture and spinal manipulation all have evidence of benefit in pain disorders.

DOES EXERCISE HELP CHRONIC PAIN?

Exercise can affect pain on multiple physiologic levels, making it an ideal treatment modality. Exercise can improve aerobic capacity, strength, and flexibility. This combination can lead to increased functional capacity over time. Exercise itself can alter pain perception, inducing hypoalgesia to new pain stimuli following both aerobic and strength training.[2] In individuals with chronic pain, this is best demonstrated at low- to moderate-intensity training.[2] Exercise is also known to have effects centrally, improving sleep and depressive symptoms.[3] These symptoms commonly coexist with chronic pain and impact pain perception, making them excellent targets for treatment. Overall, physical activity has been shown to have “few adverse events” and to “improve pain severity and physical function, and consequently quality of life”.[35]

ARE SOME EXERCISES PARTICULARLY GOOD FOR PEOPLE WITH CHRONIC PAIN?

Overall, there is no “best” exercise program for patients with chronic pain. There is no evidence that one exercise program is superior to another. Because of this, it is most important to consider a patient’s current functional status and interests when making recommendations. Physical activity recommendations should be individualized.[36] In addition, physical activity that is practiced long-term and consistently has been shown to yield the greatest improvement in chronic pain.[37]

Yoga and tai chi are excellent exercises to consider for patients with chronic pain. Both can be done in a gentle manner and include important mind-body aspects, which can have added benefits. There are research studies showing positive outcomes with yoga as a treatment for chronic low back pain, rheumatoid arthritis, and chronic headaches.[4] Tai Chi and Qigong have been found to improve function in people with pain secondary to knee osteoarthritis,[38] improve the Fibromyalgia Impact Questionnaire in people with pain secondary to fibromyalgia,[39] improve pain associated with Parkinson’s Disease,[40] improve disability and quality of life in those diagnosed with rheumatoid arthritis,[41] decrease low back pain, and minimally improved pain associated with the neuropathic pain of multiple sclerosis.[42]

Of note, there is evidence to suggest that VA-hosted telemedicine facilitation of complementary and integrative health related movement therapies such as tai chi and yoga are effective for chronic pain as well.[43]

CAN NUTRITION HELP WITH PAIN?

Nutritional choices can influence pain directly or indirectly. Some foods have known anti-inflammatory properties, which may affect pain through altering cytokine and oxidant production.[5] Indirectly, food can affect pain through improving mood, energy level, and sleep, as well as by helping a person achieve a healthy weight. The Mediterranean diet offers many of the anti-inflammatory components offered above in addition to having research supporting cardiovascular health benefits. This diet emphasizes fruits, vegetables, whole grains, olive oil, and nuts while limiting the intake of meat and dairy products. A trial of a Mediterranean-style diet, provided a person can tolerate the grains included, is reasonable for most chronic pain patients as a means of attempting to improve multiple health measures, including pain. A 2022 systematic review of 24 studies revealed that a diet modified to a hypocaloric, Mediterranean or a healthier profile in general can significantly improve chronic non-cancer pain.[44] Processed foods should be minimized, and whole foods should be emphasized, regardless of the specific diet a person chooses to follow. A 2021 review showed an association between incorporating foods containing anti-inflammatory nutrients such as fruits, vegetables, long chain and monounsaturated fats, antioxidants and fiber and a reduction in pain severity and interference.[45]

WHAT SUPPLEMENTS CAN HELP WITH CHRONIC PAIN?

Note: Please see the [Passport to Whole Health](#), Chapter 15 on Dietary Supplements for more information about how to determine whether or not a specific supplement is appropriate for a given individual. Supplements are not regulated with the same degree of oversight as medications, and it is important that clinicians keep this in mind. Products vary greatly in terms of accuracy of labeling, presence of adulterants, and the legitimacy of claims made by the manufacturer.

OMEGA-3 SUPPLEMENTATION

There is more research supporting the use of omega-3 fatty acids with overt inflammatory conditions. For instance, omega-3 supplementation has been found to improve joint tenderness and morning stiffness in rheumatoid arthritis.[6,46] Doses should be standardized based on the amount of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) present in the supplement; it should exceed 2 gms per day of EPA plus DHA to get the desired benefit. Omega-3 supplements are quite safe and may improve other aspects of health, such as lipid profiles.

VITAMIN D

There is a high correlation between vitamin D deficiency and chronic pain, based on epidemiologic data.[7] It is not clear, however, if there is a causal relationship. A 2022 systematic review of 14 studies showed a correlation between vitamin D deficiency and chronic pain. In addition, 6 studies showed improved pain with Vitamin D supplementation in people with vitamin D deficiency. Eight studies showed that there may be pain reduction, regardless of vitamin D deficiency. Of note, a 2013 study specific to Veterans found that vitamin D improved pain, sleep, and quality-of-life measure in patients with chronic pain.[9] At this time, supplementation seems reasonable in those patients with low vitamin D levels, and empirical vitamin D supplementation for pain alone is supported by some evidence.[47]

MAGNESIUM

Magnesium deficiency appears to be more common in patients with fibromyalgia, and deficiency is correlated with fibromyalgia symptoms. Supplementation with magnesium citrate has been shown to reduce the intensity of fibromyalgia symptoms.[10] Several clinical studies have found that Mg has beneficial effects in patients suffering from neuropathic pain, dysmenorrhea, tension headache, acute migraine attack, and others. These effects are considered to be due to blockade of the NMDA receptor, attenuation of central sensitization, and muscle relaxing effects.[48] Magnesium supplements can be calming for some patients, so it can be useful to take them before bed. A dose of 400-800 mgs of a magnesium supplement is often recommended. Magnesium oxide should be

avoided as a supplement due to its laxative effects. Dietary sources of magnesium include whole grains, spinach, almonds, soybeans, and avocados.

OTHERS TO CONSIDER

Research has suggested that several other dietary supplements may also have benefits in the setting of chronic pain. While further study is necessary, the strongest evidence for these supplements are as follows:[48-51]

Supplements	Role	Indications	Suggested Dose When Treating Pain
Vitamin B complex	vitamin supplementation	Neuropathic pain, knee osteoarthritis, diabetic neuropathy	use Reference Daily Intake (RDI)
Alpha Lipoic Acid	antioxidant, anti-inflammatory	Diabetic neuropathy, headache, carpal tunnel syndrome, burning mouth syndrome, rheumatoid arthritis, chronic pain	600-1000mg daily
Acetyl L Carnitine	antioxidant, modulates brain neurotransmitters including dopamine and serotonin	diabetic neuropathy, carpal tunnel syndrome	500mg twice daily
Coenzyme Q10 (ubiquinone)	anti-inflammatory, antioxidant	fibromyalgia, rheumatoid arthritis, migraines	30-100mg daily

A number of botanical supplements are also important for clinicians to be aware of.

DEVIL’S CLAW (HARPAGOPHYTUM PROCUMBENS)

A 2007 “meta-review” included five systematic reviews on devil’s claw with strong evidence of effectiveness for low back pain and osteoarthritis (OA) pain of the knee and

hip.[11] This effect was *not* inferior to NSAIDs. The review concluded by stating, “Since there is strong evidence for devil’s claw...the possible place in the treatment schedule before NSAIDs should be considered.”[11] Doses should be at least 50 mgs of the harpagoside, which equates to 2.6 gms/day of the root. Effects are dose dependent. It is generally well tolerated.

WILLOW BARK (SALIX ALBA)

Willow bark is an herb containing salicin, which is related to aspirin. It has been used for centuries to relieve pain.[12] The mechanism of action is thought to be COX-2 inhibition similar to aspirin, without the effects on prostaglandins or coagulation. There is evidence of efficacy in chronic low back similar to that seen in rofecoxib 12.5 mgs.[12] Evidence in osteoarthritis is mixed.[12] The effect is dose dependent, and the willow bark dosage used in studies was standardized to 240 mgs of salicin.

TOPICAL CAPSAICIN

Capsaicin is widely available a cream in various doses. It is useful as a short-term analgesic, and a review has shown this superior to placebo for acute episodes of chronic low back pain.[13] A 2016 Cochrane review confirmed *Capsicum frutescens* as superior to placebo in the treatment of pain.[52]

TURMERIC (CURCUMIN)

Curcuma longa L. is a plant of the Zingiberaceae family, native to south-eastern Asia, rich in bioactive molecules with numerous health and therapeutic benefits. Its anti-inflammatory effects seem to play a role in the mitigation of pain. Curcumin, which is the most represented component in turmeric extracts, also has antioxidant activity comparable to that of vitamin C and vitamin E. Studies have shown analgesic effects in the setting of osteoarthritis, chronic postsurgical pain, and active rheumatoid arthritis.[48,53] Turmeric is most often used at doses of 1500mg daily and has been studied at this dose for up to three months. Extracts typically include piperine, an active constituent of pepper, to improve turmeric bioavailability. This botanical medicine is generally well tolerated with most common side effects being Constipation, dyspepsia, diarrhea, distension, gastroesophageal reflux, nausea, and vomiting.[54]

BOSWELLA

Boswellia serrata or incense tree is an arboreal plant prevalent in the Maghreb region, in Southeast Asia, and in India.[48] The most convincing evidence for *Boswellia*’s use in chronic pain at this point in time is for osteoarthritis. A 2020 meta-analysis of small, low-quality randomized controlled trial concluded that *Boswellia serrata* extract 100-250mg daily for 1-3 months moderately reduces pain and improves function when compared with placebo.[55] *Boswellia* is generally well tolerated, with most common side effects including abdominal pain, diarrhea, heartburn, itching, nausea.[56]

ARE MIND-BODY APPROACHES USEFUL IN PAIN?

The link between mind-body interventions and chronic pain is important to consider, given the adaptive changes of the central nervous system that occur in chronic pain. Using mind-body interventions directly addresses this component of central-mediated pain.[14] Mind-body interventions not only improve pain, but also mood-related symptoms, stress management, and illness-related coping skills.

Mind-body interventions have been evaluated for their use in OA, rheumatoid arthritis, chronic low back pain, chronic headache, fibromyalgia, and post-surgical pain, among many others.[15] A Cochrane review on behavioral therapies in chronic low back pain concluded that strong evidence exists for a moderate effect on pain relief and mild improvement in functional status and behavioral outcomes with behavioral therapies.[16] Similar results were found for RA in a meta-analysis of studies that focused on psychological-behavioral interventions and their ability to improve pain, disability, psychological status, and coping.[15] The current evidence in fibromyalgia is currently less robust, with limited evidence of benefit when behavioral treatments are used in isolation.[17] However, there is moderate evidence of effectiveness when they are combined with aerobic exercise.[15] More general chronic pain (not linked to another diagnosis) also seems to be effectively treated with mind-body therapies.[57] A meta-analysis found cognitive behavioral therapy in chronic pain to be effective for improving pain intensity, coping skills, activity level, and social function.[18] In 2022, systematic reviews of clinical hypnosis,[58,59] neurobiofeedback,[60] and heart rate variability biofeedback[61] have demonstrated the positive effect of these practices in chronic musculoskeletal and neuropathic pain.

Broadly speaking, mind-body therapies have shown promise in decreasing pain and improving function with many diagnoses.[15] What is not known, however, is which specific interventions provide the most benefit. Most mind-body interventions seem effective. The best choice for individual patients will depend on what is available in their VA facility or in their local area, as well as which therapies resonate most with a given patient. For more information about mind-body approaches and specific tools that might be of use, refer to the [“Power of the Mind”](#) overview and related tools.

WHAT ARE SOME HANDS-ON MODALITIES THAT MAY BE USEFUL IN TREATING CHRONIC PAIN?

Manual therapies such as osteopathic manipulation, chiropractic manipulation, massage therapy, and acupuncture are examples of adjunctive modalities that are useful in different types of chronic pain.

IS MANIPULATION HELPFUL?

Osteopathic and chiropractic manipulation treatments are readily available and commonly used modalities in treating musculoskeletal pain. Spinal manipulative therapy has been evaluated by multiple clinical trials and several systematic reviews. Manipulation

treatments appear to be most helpful in the treatment of low back pain. A 2005 systematic review and a 2011 Cochrane review both found evidence of improved pain control in patients with chronic low back pain who received spinal manipulation.[19,20] The National Institute for Health and Care Excellence (NICE) guidelines on treatment of persistent low back pain also include manipulation as one of the initial modalities of choice.[21] A 2022 meta-analysis on spinal manipulation in adults between 65 and 91 suggested that manipulation should be considered an effective treatment for chronic low back pain in this population.[62]

Spinal manipulation is commonly used for pain conditions other than chronic low back pain, although the evidence supporting its use is less conclusive. Preliminary results from a 2019 systematic review of spinal manipulation for migraine pain and disability suggest that manipulation may be an effective therapeutic intervention.[63] There is inconclusive evidence for manipulation in the treatment of temporomandibular joint dysfunction. [22] Currently, systematic reviews do not support the use of spinal manipulation for the treatment of chronic neck pain or fibromyalgia.[23,24] For additional information, refer to the section on Osteopathy in Chapter 16 of the [Passport to Whole Health](#).

IS MASSAGE HELPFUL?

Massage therapy is commonly used for both relaxation purposes and as a therapeutic modality for pain. A 2008 review concluded that strong evidence exists that massage is effective for nonspecific chronic low back pain.[25] Interestingly, effects of massage can be long-lasting, with improvements shown at 1-year follow-up.[25] There is also evidence of benefit of massage therapy in patients with fibromyalgia.[26] A 2019 review confirmed that massage is effective in chronic pain conditions to improve pain and function, specifically for chronic low back pain and fibromyalgia.[64] A 2021 review assessed that manual therapy may also benefit people suffering from chronic tension-type headaches.[65] A 2022 review demonstrated that manual soft tissue therapy is effective at alleviating chronic neck pain. Massage therapy is safe, although care needs to be taken in patients with a trauma history or hypersensitivity to not cause a flare of pain with more aggressive soft tissue treatments. For more information, refer to the section on Massage in Chapter 16 of the [Passport to Whole Health](#).

WHAT IS ACUPUNCTURE? IS IT EFFECTIVE FOR PAIN?

Acupuncture is one of several elements of traditional Chinese medicine (TCM), and it has a history of more than 2,000 years of use. TCM is a holistic system encompassing acupuncture, herbal medicine, nutrition, meditative practices (qi gong), and movement (tai chi). TCM is based on the belief that health is maintained by balancing two opposing forces, yin and yang. Yin is the cold, slow, or passive force, and yang represents the hot, excited, or active force.[27] Yin and yang balance is managed by qi, the body's vital energy source, believed to flow in channels throughout the body. Disease results from an imbalance of yin and yang with resultant blockages in the free flow of qi. The goal of TCM modalities is to

restore and maintain the balance of yin and yang. Acupuncture stimulates points on the body, usually with needles, altering the flow of qi attempting to achieve this balance. Even though acupuncture represents one piece of TCM, it is often practiced as an independent therapy. For additional information, refer to the section on Chinese Medicine and Acupuncture in Chapter 18 of the [Passport to Whole Health](#).

While the World Health Organization lists over 40 disorders effectively treated with acupuncture, pain is the common reason acupuncture is used.[28] There is a growing literature base and multiple reviews in support of using acupuncture for these multiple indications. From 1991 to 2009 nearly 4,000 acupuncture research studies were published, and pain was the focus of 41% of them.[28] Cochrane reviews showing the effectiveness of acupuncture have been published for neck pain, low back pain, headaches, and osteoarthritis.[29] Several other literature reviews support the use of acupuncture in the treatment of chronic low back pain.[67] The NICE low back pain treatment guidelines list acupuncture as a primary therapeutic option.[30-32] The Cochrane summary on the use of acupuncture in migraines concludes that “acupuncture is at least as effective, and possibly more effective, than prophylactic drug treatment and has fewer adverse effects.”[33] And there is a growing literature base that supports the use of acupuncture in fibromyalgia treatment.[67]

Overall, acupuncture is an appealing therapeutic modality for the treatment of chronic pain. It has evidence of benefit in several common pain syndromes and can also help address some of the common coexisting symptoms, such as sleep problems.[34] Acupuncture is quite safe and normally well tolerated. With the growing use of the protocolized auricular Battlefield Acupuncture (BFA) to treat pain in the VA, it is important to mention that at this point reviews of some low-quality studies have shown an association between BFA treatment and improved pain. More study is warranted.[68,69]

RESOURCE LINKS

- [Passport to Whole Health](#): <https://www.va.gov/WHOLEHEALTHLIBRARY/passport/index.asp>
- [Power of the Mind](#): <https://www.va.gov/WHOLEHEALTHLIBRARY/self-care/power-of-the-mind.asp>

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