Integrating Naturopathic Medicine into Pain Management

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Pain management is a crisis within the American medical system. Chronic pain is an increasingly prevalent health problem in our aging population, and current standards of care, which rely heavily on drugs with dangerous to lethal adverse side effects, have contributed to the heavy burden pain imposes on patients, healthcare, and society.[1]

In the face of this crisis, naturopathic medicine has much to offer: Many naturopathic modalities have the potential to alleviate pain and could be integrated into a wider pain management strategy focused on relieving pain while improving general health and reducing risks of further harm. This paper presents some of the most promising naturopathic modalities for pain care, as well as several novel medical approaches that should be considered for scope of practice updates for licensed naturopathic doctors.

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Physical Modalities

Prolotherapy

Prolotherapy involves the injection of high-concentration dextrose into and around joints to promote a healing response. It is used to treat chronic pain conditions such as osteoarthritis, tendonopathies, ligament dysfunction, and epicondylitis.[2,3] Prolotherapy is sometimes used in conjunction with platelet-rich plasma, mesenchymal stem cell, cold laser, and ozone therapies.[2,4]

Ozone Therapy

The administration of ozone-oxygen mixtures stimulates endogenous antioxidant production, reduces inflammation, and induces analgesia.[5] Ozone injection therapy has been shown to relieve pain and reduce analgesic medication use in patients with chronic pain conditions such as low back pain—one of the most common reasons for opioid prescribing—as well as osteoarthritis and other musculoskeletal problems.[6-8] Neuropathic pain has also been found to respond to ozone therapy.[5,9] In a controlled clinical trial, topical ozone effectively relieved pain from herpes zoster (shingles).[10] Case reports suggests intravenous ozone therapy may be helpful in complex regional pain syndrome and fibromyalgia.[11,12]

Platelet-Rich Plasma

Platelet-rich plasma (PRP) injection therapy stimulates tissue repair and regeneration, and has been found to reduce pain and stimulate long-term healing in conditions including low back pain, osteoarthritis, and other musculoskeletal problems.[13-15] In one randomized controlled trial, a single PRP injection performed better than daily non-steroidal anti-inflammatory medication after one year in people with osteoarthritis of the knee.[16] Case reports indicate it can be helpful in reducing the need for opioid analgesia.[17]

Low-Level Laser

Low-level (also called cold) laser therapy has long been recognized for its ability to safely and effectively relieve dental and orofacial pain.[18,19] It has been found to reduce the use of non-steroidal anti-inflammatory medications in people with osteoarthritis of the knee,[20] and multiple clinical trials indicate its usefulness in treatment of a range of musculoskeletal pain disorders.[21-23] As a result, the American College of Physicians has recommended low-level laser therapy as an option for first-line treatment of chronic low back pain.[24]

Other Physical Modalities

Acupuncture, massage, manipulation techniques, and electrotherapies are modalities that are well established and long recognized for their beneficial effects on acute and chronic pain.[1,25-28] These modalities are practiced by many naturopathic doctors as well as other practitioners who provide pain care.

Novel Drug Therapies

Low-Dose Naltrexone

Naltrexone, at standard doses, acts as an opioid receptor antagonist, and is approved for use in opioid and alcohol addiction treatment programs. In recent years, low-dose naltrexone (LDN) has been shown to have effects distinct from standard doses, such as reducing neuroinflammation and increasing endogenous opioid signaling.[29,30]

Although research is still at an early stage, clinical trials and case reports indicate LDN may be beneficial for treating chronic pain conditions such as fibromyalgia,[31] complex regional pain syndrome,[32,33] and diabetic neuropathy.[34] Low doses of naltrexone administered intravenously during surgery have shown some efficacy in reducing post-operative pain and the need for opioids analgesics.[29] In addition, patients for whom LDN is prescribed use fewer opioids and other analgesics.[35] Due to its anti-inflammatory effects, LDN has further been proposed as a therapy to improve stress resilience, mood, and quality of life.[36]

Ketamine

Ketamine has complex effects on the nervous system that are still not fully understood, however, it is known to readily cross the blood-brain barrier and induce analgesia or anesthesia, depending on dose. One of its known actions is reducing neuron excitability.[37]

Low-dose intravenous (IV) ketamine has been found to be equally as effective as morphine for controlling acute pain in emergency settings.[38,39] The use of low-dose IV ketamine during or immediately following surgery has been shown to reduce the post-surgical need for, and negative side effects from, opioid analgesics, including after knee replacement and other orthopedic surgeries.[37,40-42] It has shown efficacy in some cases of chronic intractable neuropathic pain; however, regular intravenous injections are required for sustained pain relief.[37] More practical intranasal and inhaled forms of ketamine are now available and have begun to show promise in treating chronic pain.[37,43] Preliminary evidence even suggests topical ketamine may be an effective alternative for treating painful lesions, reducing the need for opioids in such cases.[44] Although clinical trials are limited, long-term ketamine therapy may be particularly helpful in patients with opioid tolerance and heightened pain sensitivity due to opioid use.[45]

Dextromethorphan

Dextropethorphan is best known as an anti-tussive agent in over-the-counter cough medicines. Like ketamine, dextromethorphan reduces neuronal excitability, and a number of clinical trials have investigated its usefulness as an analgesic. When used in conjunction with methadone, dextromethorphan has been found to improve treatment outcomes in patients with opioid dependence.[46] In clinical trials and case reports, dextropethorphan has been found to provide some pain relief in subjects with diabetic neuropathy, phantom limb pain, and fibromyalgia.[47-50] A meta-analysis of the research

found the use of dextromethorphan, either orally or as an intramuscular injection, before or immediately following surgery can reduce post-surgical pain and opioid use.[51]

Botulinum Toxin A

Botlinum toxin A (commonly referred to as botox) is a bacteria-derived paralytic agent. Small doses can be used to relax musculature, such as in its well-known cosmetic application.[52] It also appears to reduce pain signaling, independent of its effect on muscle tone.[53] One advantage of botulinum toxin A for chronic pain sufferers is its long action, lasting as long as five months.[52] Botulim toxin A injection therapy has been reported to relieve post-herpetic pain,[54,55] and one report suggests its usefulness in fibromyalgia patients.[56] Furthermore, although findings are somewhat mixed, multiple clinical trials indicate it may relieve pain in some people with chronic low back pain and other types of musculoskeletal and myofascial pain.[53,57-61] It is approved for use in treatment of migraine headaches and is being investigated as a novel therapy for other intractable headaches.[62]

Botanicals

Cannabis

Medical cannabis and cannabis extracts are among the most promising modalities in non-opioid pain management. Emerging research indicates cannabis use for various chronic pain conditions may reduce symptoms, reliance on opioid analgesics, and healthcare costs, and improve quality of life.[63-66] Evidence further suggests cannabis derivatives may be helpful in treating patients with opioid use disorder.[67]

Capsaicin

Capsaicin is an anesthetic compound from chili pepper (*Capsicum annuum*). Capsaicin patches are used as topical treatment for peripheral neuropathies, such as diabetic neuropathy and post-herpetic neuralgia (persistent nerve pain following shingles).[68-70] A single 30–60-minute application of a capsaicin patch may reduce neuropathic pain for as long as three months.[70] There is also limited evidence showing topical capsaicin's potential benefit in treating fibromyalgia pain.[71]

Essential Oils

Essential oils from various plants have been used historically as topical agents for reducing pain and inflammation. Essential oil components such as linalool and menthol have well described analgesic actions and a long history of use in pain treatment.[72,73] Preliminary clinical data examining the effects of topical essential oil applications for pain conditions has indicated the benefits of this type of therapy for pain reduction, as well as for improving mood and sense of well-being. Essential oil-rich plants used in studies include bergamot, eucalyptus, lavender, ginger, peppermint, and rosemary.[74-76]

Nutrients

Vitamin D

Back pain is the most common musculoskeletal pain condition and one of the most frequent reasons for opioid prescriptions.[77] Low and deficient vitamin D levels have been correlated with increased low back pain incidence, severity, and related disability.[78-80] In clinical trials and case reports, vitamin D supplementation has been found to improve vitamin D status, reduce back and neck pain, and increase function.[78,81] Raising low vitamin D levels prior to back surgery has also been shown to reduce post-operative pain.[82]

Vitamin C

In addition to its well-known antioxidant and anti-inflammatory effects, vitamin C (ascorbic acid) is needed for connective tissue repair and wound healing.[83] It is important in neurotransmitter production and may even participate in synthesis of endogenous opioids.[84] Vitamin C has been shown to reduce the use of opioid analgesics in several pain conditions.[84] Evidence from clinical trials indicates pre-operative oral vitamin C reduces the risk of a chronic post-operative pain complication known as complex regional pain syndrome, and may reduce post-surgical opioid use.[85] Reports from trials in humans suggest vitamin C, particularly intravenous vitamin C, may prevent or relieve neuralgic pain during and after herpes zoster (shingles).[86-89] In addition, intravenous vitamin C therapy has long been used to mitigate cancer pain and reduce analgesic use in cancer patients.[84]

Vitamin B12

Vitamin B12 has been shown in clinical trials to be effective in treatment of pain conditions including low back pain, diabetic neuropathy, and post-herpetic neuralgia. The mechanisms behind its pain-relieving action are thought to include anti-inflammatory effects, modulation of neurotransmitter synthesis, and direct impacts on nerve function. In patients being treated with opioids, the combination of vitamins B1, B6, and B12 was found to reduce the risk of opioid dependence.[90]

Magnesium

Magnesium is well known for its ability to ease muscle spasms. It has demonstrated efficacy, both orally and intravenously, in treating migraine headaches, neuropathic pain, and other types of chronic pain.[1,91] Magnesium appears to increase the analgesic effect of opioids while reducing some of their side effects,[1] and may be helpful in reducing opioid use in patients with pain disorders.[91]

Hyaluronic Acid

Hyaluronic acid is a component of connective tissue. Clinical trials demonstrate that, when injected into arthritic joints, hyaluronic acid can reduce joint pain and stiffness and improve function.[92-94] Oral hyaluronic acid supplements have also been shown to be effective for relieving pain and improving joint health in people with arthritis.[95-97] In

observational research, hyaluronic acid injection therapy for arthritis was associated with less use of analgesic medications, including non-steroidal anti-inflammatory medications, steroids, and opioids.[98] It has been shown to activate certain opioid receptors, an effect that may contribute to joint analgesia.[99]

Glucosamine and Chondroitin

The use of glucosamine and chondroitin sulfates, individually and in combination, have been found to improve joint structure and reduce pain in arthritic joints, particularly knees.[100] These agents act slowly, such that subjective and objective results can take six to 12 months. Their efficacy is comparable to celecoxib (a COX2-inhibitor) and more favorable than acetaminophen.[101,102] Some, but not all, evidence suggests treatment with these compounds reduces the use of other analgesics.[103,104] Recent findings from an animal study indicate glucosamine may reduce the risk of opioid dependence.[105]

Mind-Body Approaches

Mindfulness

Mindfulness training can create a positive emotional state that may alter neural pathways in ways that benefit those with chronic pain and addiction.[106] In multiple clinical studies, mindfulness-based approaches have been associated with pain reduction and improvements in function and well-being, as well as reductions in opioid use and misuse, in individuals with chronic pain.[107-109]

Hypnosis

A wealth of clinical evidence supports the use of hypnosis in treatment of chronic pain conditions. The ability of hypnosis to reduce pain and increase quality of life have been clearly demonstrated.[110,111] Hypnosis may have an especially important role in palliative care.[112]

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