

PERSPECTIVES

Review of Literature on Low-level Laser Therapy Benefits for Nonpharmacological Pain Control in Chronic Pain and Osteoarthritis

Robert Dima, BMSc; Vinicius Tieppo Francio, DC, MS, MD, PhD(c); Chris Towery, PA-C, MD, PhD(c); Saied Davani, RPh, MD, PhD(c)

ABSTRACT

Introduction • Low-level laser therapy (LLLT) is a form of light therapy that triggers biochemical changes within cells. Photons are absorbed by cellular photoreceptors, triggering chemical alterations and potential biochemical benefits to the human body. LLLT has been used in pain management for years and is also known as cold laser therapy, which uses low-frequency continuous laser of typically 600 to 1000 nm wavelength for pain reduction and healing stimulation. Many studies have demonstrated analgesic and anti-inflammatory effects provided by photobiomodulation in both experimental and clinical trials.

Objective • The purpose of this research article was to present a summary of the possible pain management benefits of LLLT.

Results • In cold laser therapy, coherent light of wavelength 600 to 1000 nm is applied to an area of concern with hope for photo-stimulating the tissues in a way that promotes and accelerates healing. This is evidenced by the similarity

in absorption spectra between oxidized cytochrome c oxidase and action spectra from biological responses to light. LLLT, using the properties of coherent light, has been seen to produce pain relief and fibroblastic regeneration in clinical trials and laboratory experiments. LLLT has also been seen to significantly reduce pain in the acute setting; it is proposed that LLLT is able to reduce pain by lowering the level of biochemical markers and oxidative stress, and the formation of edema and hemorrhage. Many studies have demonstrated analgesic and anti-inflammatory effects provided by photobiomodulation in both experimental and clinical trials.

Conclusion • Based on current research, the utilization of LLLT for pain management and osteoarthritic conditions may be a complementary strategy used in clinical practice to provide symptom management for patients suffering from osteoarthritis and chronic pain. (*Altern Ther Health Med.* 2018;24(5):8-10.)

Robert Dima, BMSc; is an undergraduate student in the Medical Radiation Sciences program at McMaster University/ Mohawk College in Hamilton Ontario, Canada; Vinicius Tieppo Francio, DC, MS, MD, PhD(c); Chris Towery, PA-C, MD, PhD(c), and Saied Davani, RPh, MD, PhD(c), are doctoral candidates at University of Science, Arts and Technology-USAT College of Medicine in Olveston, Montserrat.

Corresponding authors: Robert Dima, BMSc
E-mail address: dimars@mcmaster.ca

Nearly 50 million American adults have significant chronic pain, most often due to musculoskeletal injuries and osteoarthritis (OA). Currently, treatment for chronic pain due to OA includes NSAIDs and over-the-counter analgesics; however, due to the comprehensive pathophysiology of OA and the wide manifestation of symptoms in the population (most commonly chronic pain), the most widely used intervention for chronic pain due to OA is opioid therapy.¹ It is estimated that approximately 3% to 4% of the adult US population is prescribed long-term opioid therapy. Evidence supports short-term efficacy of opioids in randomized clinical trials lasting primarily 12 weeks or less; however, few studies have been conducted to rigorously assess the long-term benefits of opioids for chronic pain.² Furthermore, opioid pain medication use presents serious risks, such as opioid induced overdose death. It is estimated that for the