Dynamic Chiropractic

LASERS & TENS

Laser Therapy in Rehabilitation

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Effective rehabilitation protocols require a strategic and comprehensive approach integrating soft-tissue techniques, fascial manipulation, joint manipulation, and functional movement patterning. Restoring optimal range of motion and reducing pain by transitioning the patient from passive to active care should be the primary goal. Decreasing the time they spend in the passive phase of care and teaching painless, functional, active rehab of the kinetic chain will help improve compliance.

Using therapeutic modalities to significantly increase recovery times and heal chemically damaged cells while strengthening surrounding tissue can decrease passive therapy and accelerate the natural regeneration process of injured areas. Laser therapy can be the modality you have been searching for to enhance clinical outcomes and patient satisfaction. Understanding the therapeutic mechanisms of action involved with laser therapy and treatment protocols is essential. Successful use of any modality in clinical practice ultimately depends on the expertise and skill of the practitioner. Let's take an in-depth look at the physiological benefits of laser therapy and how it can be integrated into rehabilitation programs.

The U.S. Food and Drug Administration (FDA) approved the first low-level class III laser (LLLT) in 2002 and the first class IV therapy laser in 2003. The most significant clinical and therapeutic difference between class III and class IV lasers is the class IV laser's higher power output may produce a primary biostimulative effect on deeper tissues. Reaching deep-tissue structures is critical to rehabilitation and recovery. If you cannot reach the intended target tissue with adequate therapeutic laser dosages, your overall clinical results will diminish.

LLLT excites the kinetic energy within cells by transmitting healing energy known as photons. The skin absorbs these photons via a photochemical effect, not a photothermal one; therefore, it does not cause heat damage to tissues. As such, laser can be safely used on patients who have metal joint replacements without the risk of injury.

Laser light does not excite or interact with the molecules in metal or plastic. Once photons reach the cells of the body, they promote a cascade of cellular activities, including igniting the production of enzymes, stimulating mitochondria, increasing vasodilation and lymphatic drainage, ATP synthesis, and elevating collagen formation substances to prevent the formation of scar tissues. This is a critical step in reducing long-term, disabling myofascial pain syndromes and joint restrictions.

Photobiomodulation, otherwise known as *laser biostimulation*, is the medical term for exposure to laser light that enhances tissue growth and healing. Here is a partial list of the positive effects of photobiomodulation in the body, all of which are crucial components of long-term healing:

- Increased leukocyte activity (acceleration of tissue repair and decrease of pain)
- Increased neovascularization (new vessel growth and increased oxygenation)
- Increased fibroblast production (speeds tissue repair)
- Increased tensile strength (helps prevent reinjury)
- Stabilization of cellular membrane of damaged cells
- Enhancement of ATP production and synthesis

- Decreased C-reactive protein and neopterin; acceleration of leukocytic activity
- Enhanced lymphocyte response with reduction of interleukin 1 (IL-1)
- Increased prostaglandin synthesis
- Enhanced superoxide dismutase (SOD) levels
- Stimulation of vasodilation with increased angiogenesis (new blood vessels)

Principle factors of success with laser therapy for fascial restrictions and joint rehabilitation include optimal dosage, power, wavelength, and accurate clinical diagnoses.

Maintaining or restoring movement of specific segments is the key to preventing or correcting musculoskeletal pain. Fundamentally, rehabilitation is about movement – and lots of it. The foundation of functional movement is proper joint mobility and stability. Without adequate mobility and stability of joints in the kinetic chain, you end up with dysfunctional movement.

Activities of daily living are then built on dysfunctional movement patterns, resulting in compensation and injury. Microtrauma results from small amounts of stress imposed on the body over time caused by poor biomechanics; the body compensates with suboptimal joint alignment, muscle coordination, and posture. Joints begin approximating in an effort to gain stability lost from muscular weakness and compensation. This process, known as "joint centration," is an inherent protective mechanism of the body. If left uncorrected, it may cause osteoarthritis, degeneration and decreased mobility.

As I've said previously, the central nervous system (CNS) learns postural movement patterns early in life. Overactivation of abnormal joint reflexes may alter spinal cord memory, and the brain comes to rely on this faulty information. Neurogenic muscle activation patterning by combining laser therapy and functional movement rehabilitation can help "reprogram" the CNS to improve function and reverse abnormal patterning.

Laser affects areas prior to active movement patterning to accelerate the metabolic rate of deep-tissue structures. Laser therapy on muscle attachment sites can increase a cascade of neurological input to the CNS enhancing proprioceptive awareness. In my experience, most rehabilitation cases require 6-10 laser therapy sessions for maximum benefit, depending on the individual and class of laser used for treatment. Laser affects joints and surrounding tissue with a therapeutic dose following current research of (4-12 J/cm2) depending on depth of tissue. (Joules is the measurement of photon energy, represented in J/cm2.)

Each therapy program is different depending on the unique circumstances of each movement pattern dysfunction. There is no baseline laser therapy program for pain syndromes. The history of each patient determines the laser therapy protocols you implement. The above dosage range is a benchmark foundation for treatment. Reassess after the fourth laser therapy session to document progress and the possible need for change in therapy protocols.

Resources

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