A REVIEW ARTICLE ON INJURY AND MODALITIES USED FOR REHABILISATION OF BRACHIAL PLEXUS

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Abstract

Transcutaneous electrical nerve stimulation (TENS) is not therapeutic cure that works by activating complex neural network and engaging inhibitory descending processes in the central nervous system to diminish hyperalgesia. Neuromuscular electrical stimulation (NMES) have recommended as supplement for other treatments, such as workout, or as a stand-alone treatment to increase muscle power, decrease knee discomfort, and improve function. NMES may be an alternate treatment for people who are unable or unable to engage in full-body exercise to strengthen upper limb muscles. Patients appear to like NMES programmer, which have resulted with advancement in muscle work, physical exercise strength, and wholesomeness. The widespread utilisation of [TENS] Transcutaneous Electrical Nerve Stimulation to alleviate injury is based on pain suppression by extra somatosensory information. High-frequency [50-100 Hz] and of less-intensity ‘traditional’ TENS, and less-frequency [2-4 Hz] and more-intensity ‘acupuncture-like’ TENS, both cause analgesia in animal models.

Keywords: Functional electrical stimulation; human pain; Spastic reflexes; Spasticity; NMES; [TENS] transcutaneous electrical nerve stimulation.

INTRODUCTION

TENS is charge activating therapy that results on providing palliative treatment by activating afferent nerves and triggering the strain gate device and/or the narcotic system. The drawings depict a two-channel TENS device with four lead wires (two for each channel) and electrode pads attached(1). Brachial plexus injuries (BPI) have increased dramatically in the last 50 years as a result of technical improvements in transportation, particularly in the field of motor vehicles, in the twentieth and twenty-first centuries. Microsurgery advancements have given us new options for improving the scientific result for the brachial plexus injuries. Over since 30 years ago, the outcomes of brachial plexus injuries have considerably improved. In addition to non-operative (conservative) management, where we can achieve reasonable mobility with the help of rehabilitation and physiotherapy, we now have new operational options, such as neurosis, nerve healing, use of nerve grafts and nerve transfer, and palliative surgical procedures, such as tendon transfer or arthrodesis, and functioning free muscle transplantation(2).

Electrical stimulation can enhance muscle power, extension, edema reduction, waste reduction, tissue repair, and injury reduction. TENS is a charge stimulation machine that was previously used to treat pain with more frequencies but is now used to treat pain with very low frequencies. TENS is an electrical stimulation machine that used to use more frequencies but now uses ultra-low frequencies to treat pain. TENS is a sort of electrical application which was once used to treat pain with high frequencies but is now used to treat pain with extremely low frequencies. TENS is a type of charged sensation that once applied high frequencies but now uses extremely low frequencies to treat pain. Electrical stimulation (ES), also known as neuromuscular charged sensation (NMES), is particularly delivered at more frequencies (20-50 Hz) to induce muscle bulk, whereas TENS is a different type of charged sensation that used to use high frequencies but now uses very less frequencies to relieve pain (sensation level TENS, 2-10 Hz). By spreading through little afferent sensory fibres, TENS stops pain impulses. TENS targets sensory nerve fibres only when used at very less frequencies, and in activate the motor nerve fibres resulting in no discernible muscle contraction (3). In terms of preventing ICUAW, combining NMES therapy with standard care is more successful than standard care alone NMES. Despite this, there is no solid evidence that NMES is useful in preserving muscle mass in ICU patients. Because patients were not stratified by major diagnosis or disease severity, we discovered that the impacts of NMES
were likely underestimated. More study is required to assess the long time result of NMES treatment in the ICU on physical activities and wholesomeness in ICU survivors, as well as to describe the feasibility, keeps & budget friendly of NMES in various very ill patient subpopulations (4). EMS is used in medicine for rehabilitation, such as physical therapy to avoid muscle atrophy caused by inactivity or neuromuscular imbalance caused by brachial plexus injury. This isn't to be confused with TENS, which employs an electric current to relieve pain. TENS uses a sub-threshold current, which means no muscle contraction occurs. EMS is used to address muscle weakness in persons with progressive conditions like cancer or chronic obstructive pulmonary disease who are not able or unwilling to engage in full body exercise. Although EMS can result in a revelent data increase in quadriceps muscular power, more research is required because the proof is of less certainty (5).

Review:

Transcutaneous electrical nerve stimulation (TENS) is a modality to treat painful disorders which involves passing pulsed charged currents through the inner layer of the skin to activate peripheral nerves. TENS be a less-cost, non-dangerous, and easy-to-use therapy. For some people, TENS can be a useful addition to help them participate in exercise and daily activities by reducing pain during movement (6). ES is a sort of assistive device that can aid in the healing of upper-limb function following a hit. It operates by triggering muscular contractions with electrical current via electrodes, allowing a weak or paralyzed limb to move. It's been around from the mid-1960s, largely for help with mobility by treating injured-foot, but it's also being looked into as a prospective upper-limb healing therapy. ES has also used to treat higher motor neuron disability in people having brain Palsy, Parkinson's disease, Many Sclerosis, with central nervous system injury (7-18).

CONTRAINDICATION AND PREACAUTIONS FOR TENS AND NMES:

If there is an odd tactile sensation, the electrodes must be moved to a different location to ensure that the stimulation is efficient. Electrodes should never be used to cover the eyes. Patients who react to the electrodes, gel, or tape because they are allergic to them Electrode placement over dermatitis, eczema, and other dermatological lesions. Application to the front of the neck or the carotid sinus. "TENS is an charged sensation therapy which focus to provide representative wound healing through activating sensory nerves and triggering the injury gate mechanism and/or the narcotic system." These diverse physiological systems correspond to the various TENS application methods. The effectiveness of TENS varies depending on the type of clinical pain being treated, but evidence suggests that when used correctly, it provides significantly more pain relief than a placebo. While this summary does not provide a thorough appraisal of the literature, it does reference the main studies. TENS has a wide research base in both clinical and laboratory settings. It's worth noting that TENS can refer to any sort of electrical stimulation that stimulates neurons using skin-surface electrodes. It is most commonly thought of in a therapeutic context to refer to the application of electrical sensation with the express objective of symptomatic injury relief. You'll undoubtedly come across many of 'alternative' types of encouragement if you search the literature on TENS.

Traumatic brachial plexus injury (BPI) is among the biggest common upper-extremity wound, necessitating specialized treatment & a protracted healing period (8). Injuries to the peripheral nerves and brachial plexus usually result in substantial disability in affected limb. Neuropathic pain is common, within till 95% of suffers experiencing it, necessarily if a cervical root avulsion has done. Neuropathic injury is caused by injury to the somatosensory system, and it progresses to chronicity as a result of both peripheral and central nervous system disruptions. Starting with first-line pharmaceutical treatments including tricyclic antidepressants and calcium channel ligands, mixed physical and occupational therapy, TENS, & mental support, managing these painful conditions requires the collaboration of a multidisciplinary team.

Neurosurgical procedures such as nerve decompression or repair, as well as ablative/modulatory approaches, are available for people who do not respond to first-line therapy (19-30). Muscle strengthening, muscle bulk and power maintenance over long time of paralysis, specific muscle re-strengthening, & edema power have all been used with neuromuscular electrical stimulation (NMES) in sports medicine. These findings were achieved using the burst-modulated differentiating current Russian stimulator, twin-spiked monophasic pulsed current stimulators, & biphasic pulsed current stimulators (10). The Dorsal Root Entry Zone (DREZ) treatment can be used to treat recurring pain. The procedure's purpose is to prevent nerve signals from reaching the secondary central sensory center. Similar to TENS, the Spinal Cord Stimulator (SCS) masks pain signals before they reach the brain. It uses a small device and cables that are implanted under the skin. Cervical SCS may be a helpful therapy option for people suffering from neuropathic pain as a result of abrasion of the brachial plexus (11). Peripheral nociception sensitization, peripheral ectopic discharges, central sensitization with alterations in the dorsal horn of the spinal
cord, and cortical remodeling are all causes of neuropathic pain. Interdisciplinary treatment should include both pharmacological (TCA, calcium channel inhibitors) and non-pharmacological (TENS, topical medications, and physiotherapy, among other things) methods. Surgical procedures are accessible in a variety of forms. The most extensively used and acknowledged therapy are primary nerve repair, DREZ lesioning for avulsion pain, non-avulsion neuropathic pain, and spinal cord stimulation for non-avulsion neuropathic pain. (31-43).

**SUMMARY AND FUTURE PERSPECTIVE:**

NMES (Neuromuscular Electrical Stimulation) is a treatment that includes sending electrical impulses to nerves. Muscles contract as outcome of the stimulation. Charged stimulation can help with strength and range of motion development while also combating the effects of inactivity. It's regularly utilized to "re-train" or "re-educate" a muscle to perform properly & increase power following operation or inactivity. Because of lack of neurons innervation induced by brain disability, muscles are at loss to produce power. Researchers have employed electrical stimulation to try to restore movement and the ability to do daily activities. Electrical stimulation (ES), neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), and functional electrical stimulation are all electrical current-based methods of influencing neuromuscular activity (FES). This overview covers the aspects of electrical stimulation used for rehabilitative and functional goals. Frequency, pulse width/duration, duty cycle, intensity/amplitude, ramp time, pulse pattern, programme duration, programme frequency, and muscle group activated are all explored in relation to exhaustion in the stimulated muscle. Electrical impulses given to the muscles via electrodes implanted on the skin generate muscular spasms in NMES. NMES is commonly utilized in healthy adults and athletes for strength training. NMES has been used to boost muscle bulk and activation in animal models and human investigations. NMES has been shown to help adults with heart failure, long term obstructive pulmonary disease (COPD), central nervous system injury, critically ill patients with septicemia, and inactive elderly people (13).

Adult volunteers with persistent neck pain (average age 31.7 to 55.5 years) received TENS alone or in combination with another intervention. The majority of studies employed traditional TENS with a frequency of 60-100 Hz, a pulse beat with 40-250 seconds, & a comfortable frequency, followed by burst TENS and acupuncture like TENS. The subjects got daily TENS sessions ranging from 20 minute to 1 hour long, for all over of one upto sixty sittings. The maximum period of follow-up (intermediate term) was six months. The most bothersome area of the neck, including the upper trapezius muscle, was treated with electrodes. In most circumstances, TENS settings and dosages are used that are in line with current practice, such as a frequency of less than 200 Hz, a pulse width of 50 to 250 seconds, and an intensity of 50 to 250 seconds (14).

**REFERENCES**

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