

DENS THERAPY WITH COMPLEX TREATMENT OF DISEASES AND TRAUMATIC INJURIES OF MUSCULOSKELETAL SYSTEM AND PERIPHERAL NERVOUS SYSTEM

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All musculoskeletal and peripheral nervous system diseases and traumatic injuries are characterized by acute pain, edema, soft tissues hemorrhage, extravasations and infusions into joint cavities, with inflammatory reaction and dysfunction. Analgesics use doesn't always resolve the problem.

The low-frequency electro therapy method – dynamic electroneurostimulation has clearly defined analgesic, antiedema, anti-inflammatory, and vasoactive influence.

DENS is a method of impact on coverlet receptor systems, biologically active points, and on sensitive conductors in pain zones by very short-termed (400 mcs) neuron-like (bipolar) electrical impulses of low frequency (10 to 200 Hz) and with low intensity (on average 200 to 400 mcA).

The duration and frequency of electrical pulses used in DENS are comparable with frequencies and duration of pulses in thick myelinated afferent fibers having a high velocity of pulsation. Thanks to the flow of rhythm regulated afferent electric pulsation created during the procedure, neurons of substantia gelatinosa are stimulated, and their perception of nocigenic (pain) information coming from pathology centres through non-myelinated nervous fibers with low pulse velocity, are blocked.

Analgetic neuron activation is accompanied with supraspinal system stimulation and discharge of endorphins by putamen, by digestive apparatus and endocrine glands. The result is pain pulsation inhibition, acute pain weakening and, to a lesser degree, chronic pain weakening during the procedure and is maintained 1 to 2 hours after the procedure.

Appearing as an answer on rhythmic stimulation, the coverlet muscles and skin arteriole unstriated muscle fibrillation, activates a destruction process of algogenic substances (bradykinin) and mediators (acetylcholine, histamine) in pain centers. Besides the analgesic effect from DENS the effect also relates to local blood-flow enforcement, and trophy activation that remove perineural edema and thus has a pathogenetic influence of the pain syndrome.

Besides the analgesia appearing during the procedure, blood circulation in ischemic tissues intensifies, metabolic and trophic processes in impact zone connected with corresponding skin areas. Because of local, segmental and general organism reactions, its regulatory systems synchronization is reached. Stimulating impulses have a regulative influence on the organism, mobilize reserve functional tissue elements and recover disturbed functions. Further there is rapidity in the humoral and immune mechanism, removal of energy and information block, and restores lost links between pathologic zones and all control systems of the organism.

Pronounced analgesic effect appears after the DENS application for treatment of musculoskeletal and nervous system diseases and injuries for 2 to 4 hours.

Repeated application of 3-4 procedures a day during several days may completely remove acute pain syndrome or, as a last resort, effectively reinforce analgesic and anti-inflammatory influence and contribute to lost function recovery.

Repeated application during 24 hours of the DENS method is allowed because of low intensity of impulse electric current. The treatment is easily accepted by children as well as elderly patients having injuries of different severity. The method of application is not contra-indicated when there is Ilisarov's apparatus on fracture, intraosteal or on-bone osteosynthesis. D

“DENAS” and “DiaDENS” apparatus are made in several modifications, and widely used in clinics and at home. The apparatuses are portable and electrically safe.

In the apparatus where frequency range is from 1 Hz to 200 Hz, this allows DENS use in case of acute pain (140 and 200 Hz frequencies), chronic pain syndrome (60 and 77 Hz frequencies) and has a regulative effect on the tone of blood vessels, internal and lymphatic (10 Hz frequency).

During the period from 2003 to 2006, 287 patients aged from 28 to 68 with musculoskeletal and nervous system diseases and traumatic injuries were under our observation.

There were 27 cases of contusion, sprain, and rupture of joint-ligament and joint meniscus injuries. After intensive DENS therapy during 10-14 days hemorrhage dissolved, soft tissues edema and joint coats irritation (synovitis) disappeared, pain syndrome significantly regressed, and joint and extremity function was restored. There was pain syndrome regress, hemorrhage dissolving, and function restoration began 5-7 days faster than similar traumatic injuries in persons who didn't get DENS and other physiotherapeutic methods.

In the 47 cases of open and simple long bones fractures DENS was combined with exercise therapy. Rehabilitation period reduced on average for 5 days in comparison with patients of similar group who didn't get DENS within complex treatment. Good results were got in 87% of patients, satisfactory in 13% and there were not negative results.

A group of 58 patients was formed of people with deforming arthrosis of big joints, with gout and psoriatic arthritis (58 persons). Good DENS efficiency was got in 76% of patients, satisfactory – in 24% and no negative results of the DENS application were not marked.

129 patients with spinal degenerative injuries were treated. After the DENS treatment in this case using the “DiaDENS-PC”, in 75% of the patients with dorsopatia there was a good therapeutic effect, appearing in acute pain syndrome regression, muscle-tone syndrome liquidation, spine and injured nerve function improvement and blood circulation in vertebral arteries improvement. In 19.1% of cases there was satisfactory result, when pain and muscle-tone syndrome intensity significantly reduced, but didn't disappear. In treatment of patients where other physiotherapeutic methods were included. 5,3% of patients had no noticeable effect.

This group included patients with spinal discogenic injuries when herniations of intervertebral disks in the neck zone were, according to MRT, 4 mm, and in lumbosacral zone – 8-12 mm.

The rest of the group included patients with traumatic compressive-ischemic plexopatia of upper and lower extremity (12 persons.), traumatic vertebrogenic neuropathy of median nerve (8 persons) and polyneuropathy of viral aetiology (shingles) (6 persons) In all cases good clinical effect was got that exceeded treatment results of patients who didn't get DENS.

Summary:

1. DENS application for treatment musculoskeletal and peripheral nervous systems diseases is highly effective physiotherapeutic method.
2. “DiaDENS-PC” model is a multifunctional device allowing conducting an assessment of organism systems functional state and therapy in different medicine areas. The device has good design; it is electrically safe, simple and comfortable in use.
3. DENS may be recommended for application in wide clinical practice by doctors of different specialties as effective method of analgesia by urgent indication, and for use DENS method by patients at home after consultation with physiotherapist.