

Basic hydrotherapy procedures and their characteristics

Hydrotherapy involves exercising in water or submerging either the whole body or a single limb into a pool or whirlpool. Whirlpools can also have a massaging effect with strong bubbles and water jets. The effect of hydrotherapy is both by pressure and temperature. Colder water should be used in the end as a general rule if we alternate between hot and cold water.

Hydrotherapy is used in the treatment of a wide range of conditions to enhance cardiovascular fitness, to mobilise, to strengthen, to coordinate movement and to regain function of the neuro-musculoskeletal system. Floats can be placed around the neck and waist to support the patient, allowing the patient to exercise freely. Floats may also be placed around the limbs.

It is particularly indicated in patients with rheumatoid arthritis, ankylosing spondylitis and neurological conditions.

Contraindications are excessive fear of water, incontinence,

Buoyancy is the result of relative density of the body, or body part, and higher density of water. Buoyancy results in an apparent weight loss of object when placed in water, and this can assist or resist movements. Buoyancy will be an especially good aid to reduce the effect of gravity, particularly on load-bearing joints such as lower back, hips, and knees. Buoyancy can also be used in strengthening exercises by adding floats and boards to push against under water.

Hydrokineziotherapy or aquatherapy – effects of hydrokineziotherapy is according the velocity of the movement – Water resists against fast movement, and on the opposite, water makes it easier to move in case of slow movement.

Balneotherapy is the use of mineral baths/and or mud to give a healing effect on skin and joints.

Electrogymanastics- using electrotherapy treatments, fundamental differences, indication and contraindication

Electrogymanastic is the use of stimulation with rectangular impulses for weakened muscles.

It is involuntary muscular contraction of transversal striated fibres by electrical impulses. Aim is strengthening of muscle or integrate muscle to correct timing. Non-professional name is myostimulation. It is necessary to know why the muscle is weak before starting electrogymanastic.

Indications are when voluntary contraction is not possible, post operating condition, after long immobilization and to provide better timing during sports performance. Contraindication is muscles with trigger points.

Accommodation is adaptation of healthy efferent nervous fibres for stimulation of oblique impulses. If we want to induce muscle contraction in healthy muscles, we have to rise intensity many times more than intensity of rectangular impulses.

Denervated muscles are not under influence of efferent fibres and they have no adaptation. In these muscles we are able to provoke contraction with the same intensity for oblique or rectangular impulses.

Variants of electricity we use are low-frequency currents, in form of diadynamic, faradic or trüberts current. Medium-frequency currents by Kotz currents or Russian stimulation. TENS surge and NMES electricity got trapezoid shape of impulse with length of 0,1 to 0,5 ms.

Time of stimulation is very individual. We have to stop procedure in the moment when the quality of muscle contraction has changed. It is signal about energetic exhaustion of muscle.

It is better to stimulate only 1-3 min (5-15 contractions) in one motor point and then change to other one and continue all over again. A motor point is a nerve innervation point which controls a muscles bundle.

Intensity should always be over motoric treshold, and there is a difference between phasic and tonic muscles. Phasic muscles should have contraction time of 3-6 s and pause between 1-2 s, while tonic muscle should have contraction between 10-40 s and pause between one third, or equal time of application.

Ultrasound- basic characteristics including physical parameters

Ultrasound is longitudinal waves with frequency higher than 20 000 Hz.

Therapeutic ultrasound is in the frequency range of about 0.8-3.0 MHz

The higher the frequency of the sound waves emitted from a sound source, the less sound will diverge and a more focused beam will occur. Lower frequency reach greater depth in tissue.

Therapeutic ultrasound is generated by vibration of piezoelectric crystal or ceramic plate.

It is important to keep moving the applicator in therapeutic ultrasound, because so caaled «hot-spots» can occur, which is an area where two tissue types meet, leading to reflection of the ultrasound, which in turns meet the new beams if the applicator moves, so the energy and temperature increase too much.

Indications are tissue relaxation, local blood flow, scar tissue breakdown, help to reduce local swelling and chronic inflammation, promote bone fracture healing and neural application can reduce pain.

Absolute contraindications are use on epiphysis, gonads, eyes, post laminectomy and in acute bleeding. Relative contraindications are brain, heart and parenchymatic organs, peripheral superficial nerves, bony prominens, emphysema and menstruation.

The two effects are micromassage as mechanotherapy and thermal effect by transforming the mechanical energy to heat. Vibration can cause a deep heating locally though usually no sensation of heat will be felt by the patient. It can be pulsed rather than continuous if there is inflammation and we therefore want no further heating. The so-called duty cycle can be 100 % 50, 25 or 20.

The thermal effect will lead to better hemocirculation, better permeability of capillaries, muscle relaxation and decrease of pain originated by ischemia.

Beam Non-uniformity Ratio is how much higher the peak intensity is than the set intensity on the machine. Applicator with good quality has no more BNR than 6.

Effective Radiating Area is always smaller than real size of applicator.

There should be 1-10 sessions. 3-5 times per week with duration between 3 and 10 minutes.

It can also be allied underwater, but only with peripheral effect.