

PHYSIOTHERAPY

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- **PHYSIOTHERAPY:**

Treatment of diseases by physical method.

- **REHABILITATION:**

Restoration of the functional utility of the affected part.

▶ Physiotherapy & Rehabilitation accelerate tissue healing by galvanizing normal physiological process so that the functional normalcy of an affected part is restored faster.

AIMS OF PHYSIOTHERAPY

- Correcting deformities.
- Making the joint movement more supple.
- Preventing deforming tendencies.
- Developing paralyzed muscles.
- Faster healing.
- Restoring the functional ability.

PRINCIPLES OF PHYSIOTHERAPY

- Decrease pain & facilitates healing of inflammed & injured neurological & musculoskeletal tissues.
- Maintain normal range of motion in affected joints, i.e. hind & fore limb.
- Prevent soft tissue contracture & fibrosis in weak or paralyzed limbs.
- Prevent further disuse atrophy of affected musculature of hind limb/fore limb during the healing process.
- Improve strength & function of weak or paralyzed limbs.
- Maximize post-surgical recovery & function of the patient.
- Provide +ve psychological effects for the patient & owner.

CLASSIFICATION/METHODS

- COLD THERAPY
- HYDROTHERAPY
- MASSAGE
- EXERCISE
- HEAT APPLICATION
- INFRARED RAYS
- ELECTROSTIMULATION
- PULSING
- ELECTROMAGNETIC FIELD
- ULTRAVIOLET RAYS
- ELECTRICITY
- DIATHERMY
- CRYOTHERAPY
- ACCUPUNTURE
- ULTRASONIC THERAPY
- LASER THERAPY
- MAGNETIC THERAPY

COLD THERAPY

- **INDICATION:** it is advised in acute & hyperacute injuries, particularly effective during the first 24-48hrs. after injury.
- **TECHNIQUE:** can be done by ice water immersions, ice packs, blowing cold air, applications of volatile liquids & running cold water.
- **MECHANISM:** cold therapy decreases local circulation results in constriction of blood vessels. Reduced blood flow helps to reduce odema, heamorrhage & extravasation of inflammatory cells. Reduced tissue metabolism may inhibit effect of inflammatory mediators, pain, muscle spasm & enzyme system.



- Therapeutic effects of cold occur at tissue temp. between 15-19 deg. Cent.
- Each application should last 15 to 20 minutes and there should be at least 1-2 hrs. interval between the applications.
- Cold application is generally combined with compression bandage.

HYDROTHERAPY

- **INDICATION:** Downers cow syndrome (if muscle damage has not occurred), conditions involving limb problems.
- **TECHNIQUES:-**
 - (a) **Buoyance of water:** this is used to relieve pressure on affected parts. The method is used in the form of an aqua lift system to treat Downers cow syndrome if muscle damage has not occurred.
 - (b) **Whirlpool hydrotherapy:** in this extremity or the entire body is submerged in either warm or cold swirling water. The water is kept in constant agitation & mixed with air by the action of turbine thus producing a gentle massaging effect.
 - (c) **Irrigation:** irrigating the affected part with a stream of water through a hose pipe or by submerging part or body in warm/cold water.
 - (d) **Swimming:** it is another method of hydrotherapy.

1) Picture showing constant agitation of water for hydrotherapy.

2) Picture showing hydrotherapy treatment for limb problem.



- **MECHANISM:** Hydrotherapy is the treatment of disease with water. Water absorbs more heat per unit of weight than any other substance. The solvent properties of water help checking infection & accelerate wound healing by removing dirt & necrosed tissue. A treatment time of 10-30 min. is sufficient for this effect.
- **Contra-indication:**
 1. Animal with recent skin grafts
 2. Acute edema
 3. Fever
 4. Marked circulatory disturbances.

SWIMMING

- **INDICATION:** Conditions involving limb problems, helpful in recovering from injury or operation, Downers cow syndrome (if muscles damage has not occurred).
- **MECHANISM:**
 - a) Swimming helps to improve general fitness & stamina, improves muscle tone & is helpful in recovering from injury or operation.
 - b) Horse are usually swum in cold water to dissipate the enormous amount of heat they generate under exertion.
 - c) Swimming is an excellent form of exercise because most of the muscles normally used in movement are involved. Swimming results increased resistance to movement & strengthens the muscles.

Pictures showing swimming technique & pools specially designed for specific animal.



HOT WATER APPLICATION

- **INDICATIONS:**

- i. Sub acute & chronic inflammations.
- ii. Recent inflammation after the acute stage has passed.
- iii. Septic lesions in which the vitality of tissues lowered & they are threatened with deaths.

- **TECHNIQUES:** Hot water, Hydro-thermoregulators.

- **EFFECTS/MECHANISM:**

- i. Analgesia by softening & relaxing the tissue.
- ii. Hyperemia results leucocytosis & phagocytosis in septic wounds.
- iii. Reabsorption of exudates.

HOW TO MAINTAIN CONSTANT TEMPERATURE ?:

1) Hot water application is done to increase the temperature gradually to 113 deg. For 122 deg. F without scalding. The temp. of water is maintained by adding hot water as per need.

2) With Hydro-thermorugulator a temperature of 107-113 deg. F may be maintained for 12-24 hrs. with excellent effect.



**Canine
Hot
Tub
Therapy**



HEAT THERAPY

- **INDICATIONS:**

- Best applied after acute inflammation has subsided.
- Useful in reducing muscle spasm & pain due to musculoskeletal injuries.
- Used to increase joint & tendon mobility.
- Accelerating the healing response of localized soft tissue injuries.

- **TECHNIQUES:**

- Superficial heat may be applied with hot packs, hydrotherapy, paraffin baths or moist air (penetration upto 1cm deep).
- Deep heat may be applied using radiant heat (heat lamp), microwave or shortwave diathermy & therapeutic ultrasound.
- Warm water, the most accessible method of heat therapy (wet towel, water immersion, turbulator boot).



- **MECHANISM:**

- Heat therapy increases local circulation, decrease pain, reduce muscle spasm & increase tissue extensibility.
- Local heat applications dilate blood vessels & stimulate local circulation. Increased local blood flow help to mobilize tissue metabolites, increase tissue oxygenation & increase metabolic rate of cells & enzyme system.
- As a rule, metabolic rate increases 2-3 times for an increase in tissue temp. of 10 deg. C.
- Increased blood flow & vascular permeability promotes resorption of oedema.

ULTRASOUND THERAPY

- **INDICATION:**

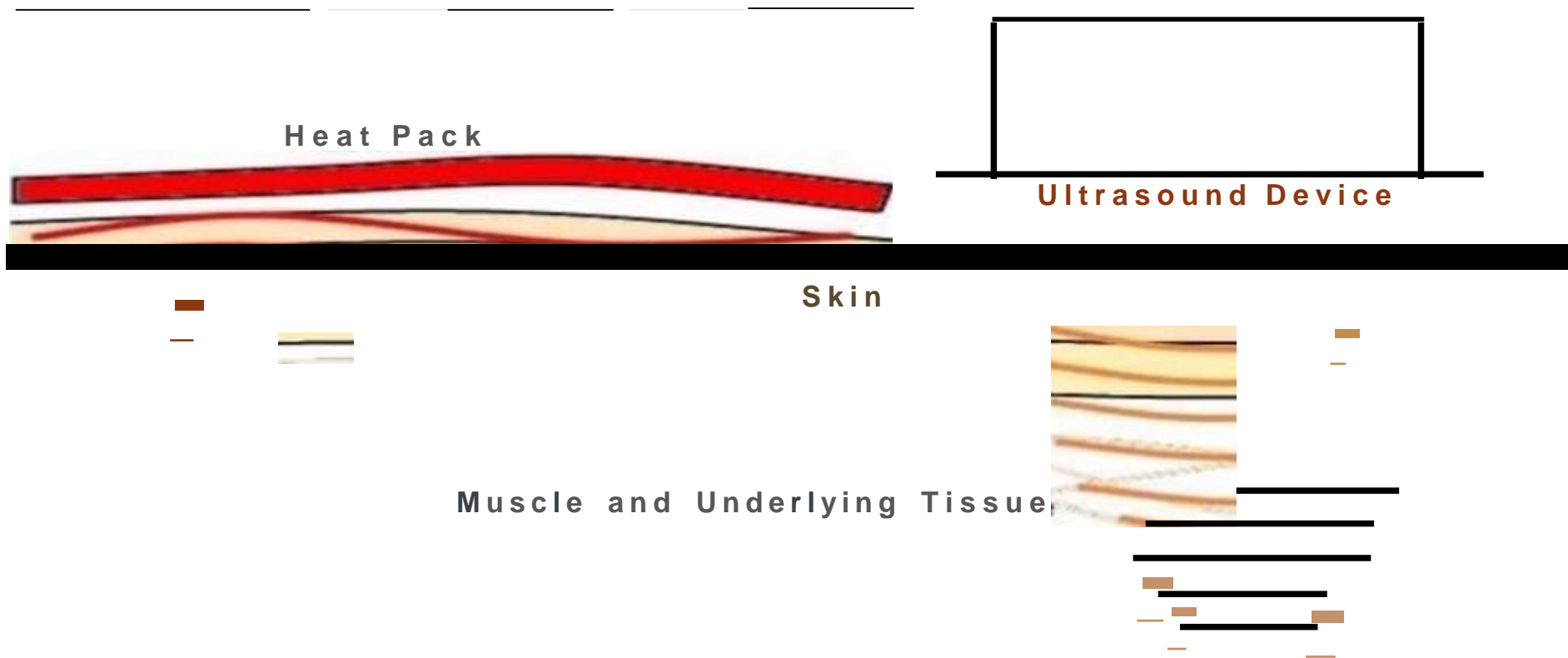
- 1) Useful to get rid of stiffness & decrease in flexibility of skeletal muscle.
- 2) It improves range of motion of the joints.
- 3) Improves circulation to the scar tissue.
- 4) Decreases pain & muscle spasm.
- 5) Stimulates the resorption of calcium deposits e.g. splints, spondylosis.
- 6) Stimulates tissue repair by acoustic streaming & promoting the healing of pressure sores by increasing the rate of protein synthesis by fibroblasts & increased lysosomal activity.

- **TECHNIQUE:** The area to be treated should be clipped/shaved & cleaned. Ultrasound gel is applied liberally & sound head is placed over the skin. After setting required frequency & time, sound head must keep on moving slowly over the target area.
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MECHANISM/EFFECTS:

!)PHYSICAL PROPERTIES:

- a) Therapeutic frequencies of 1 MHz penetrates as deep as 4-6 cm into the tissues.
- b) Tissues with a high fluid content (blood, muscles) will absorb sound waves better than less hydrated tissues.
- c) Nerve tissue has high coefficient of ultrasound absorption. Thus, use of ultrasound in treating peripheral nervous system is encouraged.



2) THERMAL EFFECTS:

a) Skin and subcutaneous fat can not absorb US well, absorption takes place on the molecular level & protien molecules are the major absorbers. So the skin surface may remain cool while underlying structures are heated. This unique characteristic is ideal therapeutic option for treating nerves, ligaments, tendons, joint capsule & muscles.

CONTRA-INDICATION:

Blood vessels in the path of interacting US waves could suffer thermal damages. And when periosteum is overheated, pain results.



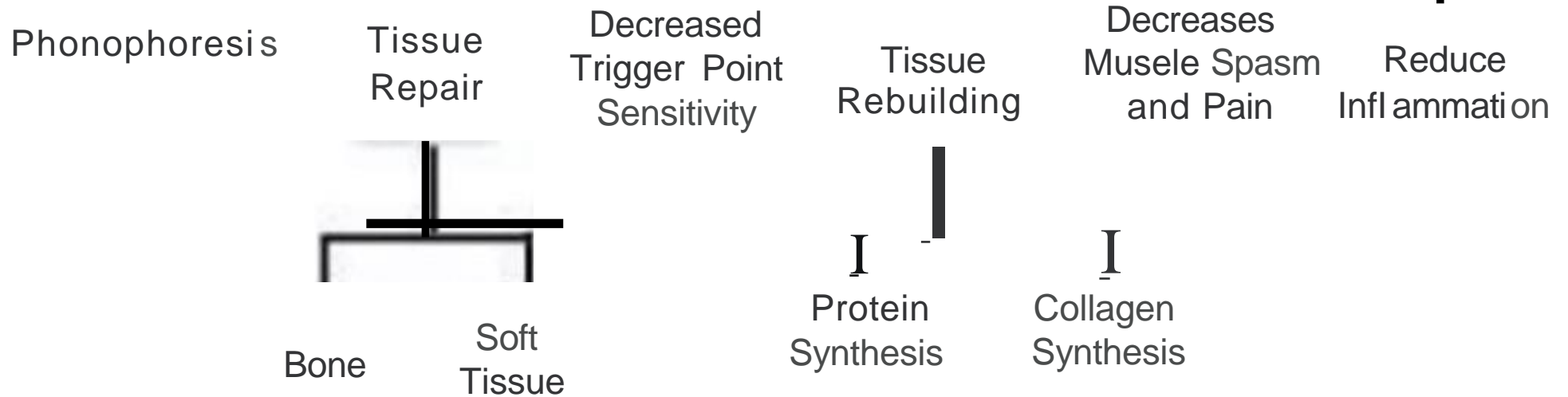
3) CHEMICAL EFFECTS:

- a) US waves result alternating cycles of compression (area of increased density & pressure) & rarefaction (area of decreased density & pressure) in the area through which it passes.
- b) Rarefaction forms air bubbles in the blood or tissue fluids & expand because of the decrease in pressure. During expansion, gas enters into the bubbles.
- c) In compression phase gas is flown out of the bubbles.
- d) Rarefaction & compression phase results in the gaseous exchange, which exerts mechanical stress on the surrounding called cavitation.
- e) Multifactorial benefits of cavitation:- increases cell permeability, it has electrolytic effect, useful in the breaking up of calcified deposits, increasing in the extensibility of fibrous capsule.

Acoustic streaming/ Micro streaming/ Micro massage:-

- Ultrasound when passes through, liquid flow along the cell membranes pushed by the pressure of the sound wave. Thus, diffusion of ions & metabolites across the membrane improves. Change in membrane permeability to sodium ions could be involved in the altered electrical activity in nerves, resulting in pain relief. Exchange of sodium & calcium probably helps in reduction of muscle spasm.

Non-Thermal Effects Of Ultrasound



INFRARED THERAPY

- **INDICATION:**

- Sub acute & chronic traumatic & inflammatory conditions.
- Traumatic synovitis, tenosynovitis & sprain.
- Neuralgia, arthritis & rheumatic conditions.
- Acute, sub-acute & chronic catarrhal conditions of mucous membranes & sinusitis.
- Infection of the skin, folliculate & furunculous.

- **TECHNIQUE/SOURCE:**

- Natural- Sunlight {60%}
- Low temp./Non-luminous/IR radial
- High temp./Luminous/Heat lamps

(distance- 2-3 feet, duration- 10-15 min)

What is Infrared Rays?

- Infrared rays are electromagnetic waves (radiant energy) of 770-1,00,000 $m\mu$.

Long
wave
infrared

- 1500-12,000 $m\mu$
- It is emitted by low temp. bodies like hot water bottles, electric heating pads etc.

Short
wave
infrared

- 770-1500 $m\mu$
- It is emitted by sun, incandescent lamps & high temp. infraradiators.



- **MECHANISM:**

- The infrared stimulates local circulation. Radiant heating causes vasoconstriction of the capillaries & subsequent release of vasodilator substances which again absorbed thus more capillaries become active, hence the blood circulation is increased.
 - Infrared exposure for a short time cause mild heating, result in relief of pain. While strong heat works as a counter irritant stimulating the nerve endings.
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- **CONTRA-INDICATIONS:**

Erythematous response

Electric shock

Injury to eyes

Faintness

Hypersensitivity followed by erythema, wheal formation, local edema & blistering

ULTRAVIOLET THERAPY

- **INDICATION:**

- General tonic effects
- Chronic ulcers
- Tuberculosis
- Psoriasis, Acne
- **DIAGNOSTIC USE:** In dermatological cases with the aid of woods lamp to detect fungal infection.

- **TECHNIQUES:**

- Natural- sunlight
- Mercury Vapour lamp
- Fluorescent sun lamp
- R.S. type suit lamp

EFFECTS:

- UV rays penetrate to a limited extent through body surface.
- UV rays cause erythematous production, pigmentation & bactericidal effects.
- Spectral band at 265.2 m μ produces maximum bactericidal effects.
- UV rays produce local/regional analgesia when it hits nerve endings.
- Usually 20 exposures are required for complete cure of local infections.

ELECTRICAL STIMULATION

- **INDICATION:**

- Paralysis
- Muscular atrophy

- **TECHNIQUES:**

- Continuous currents (DC) Galvanization
 - Induced currents (AC) Faradisation
 - High frequent currents- Dorsogavalisation
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ELECTRIC STIMULATION DEVICE:

- Electric stimulation is the application of an electrical current to tissue to promote healing. NMES devices generally are pulsed current stimulators that may use alternating or direct current waves. These devices may be set for **waveform, amplitude** (magnitude of one electrical wave), **pulse duration** (time during which the charge flows in both directions), **phase duration** (time current flows from baseline in one direction and back), **pulse rate** (number of pulses delivered per second), **duty cycle** (ratio of on time to total cycle time), **ramp** (allows gradual increase or decrease in amplitude), **and polarity.**
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MECHANISM:

- *Clip and prepare the skin over the motor point with alcohol. Apply gel to the skin, and place the electrode. Locate the approximate motor point (area where the motor nerve enters the muscle) for the targeted muscle. With the current on, move the electrode to identify the precise motor point. Select the parameters for electrical stimulation. First select a wavelength. Set the pulse duration, which is directly proportional to the duration of the contraction. Set the frequency (which defines the number of pulses of electricity per second) to determine the rate at which the muscle fibers are stimulated. Set the duty cycle to 1 : 1 to enhance endurance or at 1 : 3 or 1 : 5 for muscle strengthening. Set the ramp to control patient comfort.*
- Generally NMES is applied for 15 to 20 minutes, one to five times per week.

EFFECTS:

- Increasing muscle strength.
- Improving muscle tone.
- Decreasing edema and enhancing circulation.
- Decreasing muscle spasms and pain.
- Improves muscle strength by increasing muscle contractile proteins.
- Improves muscle endurance by increasing vascularity, aerobic capacity & mitochondrial size.
- Electrical muscle stimulation may be used to reeducate denervated muscle.

- **CONTRA-INDICATION:**
- Over a gravid uterus.
- Over the heart.
- Over carotid sinus.
- In animals with pacemakers or seizures.
- Over tumors or infected areas.

MASSAGE

- MASSAGE MAY BE DEFINED AS MANIPULATION OF SOFT TISSUES WITH HAND & FINGERS.
- **INDICATIONS:** (with liniments) Sub-acute & chronic inflammatory conditions.
- **TECHNIQUES/METHODS:**
- **Slight Friction:** Fingers of the hand is used in centripetal direction. It gives feeling of warmth & has a numbing effect.
- **Methodical pressure:** It is applied by firm pressure on to tissue with the pulp of the thumb or with fingers or the hell of the palm or with closed fist.
- **Individual compression of muscles:** A portion of the muscles is hold between the fingers & thumb & uniform pressure is applied from its insertion towards its origin.



- **Percussion:** consist of superficial or deep percussion of the tissue by striking the part perpendicularly with the fingers or closed hand.
 - **EFFECTS:**
 - Sensory nerve endings stimulated.
 - Liberation of histamine substances with local hyperemia results in dilatation of blood vessels.
 - Improves venous & lymphatic return by mechanical assistances due to alternative pressure & relaxation.
 - Mechanical movement causes stretching & softening of fibrous connective tissue.
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- **CONTRA-INDICATION:**

- Acute inflammatory conditions with a threat of pretend haemorrhage.
 - Presence of foreign bodies.
 - Existence of neoplasm.
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EXERCISE

- **INDICATIONS:**

- Joint stiffness
- Abnormal posture
- Spastic paralysis
- Orthopaedic problems

- **TECHNIQUES/METHODS:**

- **Passive exercise:** the affected joint is grasped & its flexion & extension is done for 10-15 times.
- **Active exercise:** this includes walking, grazing & slow running up.



- **EFFECTS:**

- Mechanical movement of joint & muscles improves venous & lymphatic return.
- Sensory stimulation by keeping cortical pathways open.
- Mobility & range of movement of joints can be increased.
- Balance & coordination can be improved.
- Improves cardiovascular & respiratory capabilities.