Application of Therapeutic Modalities

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Introduction:

Therapeutic means something that promotes healing and injury repair. Modality means the method of application of any therapeutic agent. The treatment of physical dysfunction or injury by the use of therapeutic exercise and the application of modalities, intended to restore or facilitate normal function or development that also called physiotherapy. Therapeutic modalities are used to create optimum environment for injury repair by limiting the inflammatory process and by breaking the pain spasm cycle. The main objective of this topic is going to focus about the Application of Therapeutic Modalities and also an attempt to inform to the student of Physical education as well as those are involves in Sports field.

Types of Modalities:

1. Cryotherapy, 2. Thermotherapy, 3. Electrotherapy, 4. Massage etc.

1. CRYOTHERAPY:

An application of cold modality to the human body is known as cryotherapy. During the treatment heat is removed from the body and absorbed by the cold modality. Cold is relative state characterized by decreased molecular motion.

In this application of therapeutic modalities, the cold modalities range from 32^0F to 65^0F (0^0c–18.3^0 c)

- **Benefits of Cryotherapy:**
  1. Reduce oedema
  2. Decrease tissue damage
  3. Reduce pain
  4. Reduce muscle spasm
  5. Stimulate vasodilatation
  6. Musculoskeletal trauma
  7. haemorrhage control & analgesia
  8. Pain control
  9. Inflammation
  10. Reduce spasticity

- **Contraindication of cryotherapy:**
  1. Asthama
  2. Raynouds disease
  3. Open wounds
  4. C.V.N (cerebro vascular accident)
  5. Allergies to cold
  6. Skin rash or skin disease
  7. Rheumatoid Arthritis
  8. Sensory impairment
  9. Aversion to cold
  10. Cardiac Conditions
  11. Psychological:
  12. Peripheral Nerve Injuries
  13. Peripheral Vascular Disease
  14. Cold Sensitivity

- **Types of cryotherapy:**
  A. Ice Towels
  B. Ice-pack
  C. Ice massage
  D. Ice immersion
  E. Cryo-kinetics

A. Ice Towels:

A terry towel is put into a mixture of flaked ice & water & then wrung out; much of the clipped ice will be found to adhere to the cloth. This can be placed over a large area to give immediate surface cooling. The ice towel will need to be replaced by another one after 2 – 3 min. It is particularly useful method for the treatment of muscles & allows movement or exercise to be performed while cold therapy is being applied. Towels thoroughly soaked in water & ice mixture, Towel wrung out & applied to part; Procedure repeated every few min (10-15 min.)

Ice Towel

B. Ice-Pack:

A bag or other container filled with frozen material (such as crushed ice) and applied to a body part to relieve pain or reduce swelling. Ice packs are found in 3 forms (i) Ice Bag- this are the most commonly used modality. They are easily available and safe to use. The requirements are only the plastic bag and Flaked and cubed ice. (ii) Reusable cold gel packs (iii) Chemical cold packs.

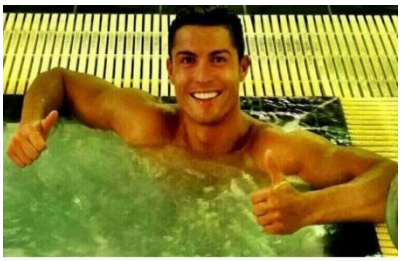
Ice-Pack

C. Ice massage:

An ice massage is the local application of ice to a portion of the body. During ice massage, blood flow to the body part is greatly decreased at first but then greatly increased. Exercise afterward may further heighten blood flow. Hold the ice block firmly with the mitt on one hand and apply the ice gently and massage in a circular motion (10-15 cm diameters) for 5-10 minutes.

D. Ice immersion:

In sports therapy, an ice bath, or sometimes cold-water immersion or cold therapy, is a training regimen usually following a period of intense exercise in which a substantial part of a human body is immersed in a bath of ice or ice-water for a limited duration. A technique for administering therapeutic cold treatments to the distal extremities (e.g., the ankle or hand) with a mixture of water and crushed, flaked, or cubed ice with a temperature range of 50° to 60°F (10°–15°C). The liquid medium allows for equal cooling of irregularly shaped body parts. To reduce the amount of discomfort initially experienced during this treatment, the fingers or toes can be covered with an insulating material.



Ice immersion

E. Cryokinetics:

Cryokinetics is used for rehabilitation and reconditioning of an affected area and consists of applying cold, followed by a full range of motion. Cryokinetics is a rehabilitation technique involving ice application followed by progressive active exercises. Cold should be applied for a maximum of twenty minutes which should be sufficient to produce the numbed response which is required. The process can be repeated for 5 minutes to re-numb the area if necessary. Swelling in reduced dramatically through the combination of cooling and exercise.

Cryokinetics

2. THERMOTHERAPY:

Therapeutic heating modalities (Superficial and Deep) heating agents increase the skin temperature within the therapeutic range of 104°F to 113°F to induce physiological effects for therapeutic benefits. The external application of heat is thermotherapy. Heat can be transferred into the body by conduction, convection, and radiation.

➢ Benefits of Thermotherapy:

1. Alleviates pain by reducing endorphins when applied.
2. Increases white blood cells, stimulating an immune system response.
3. Soothes, comforts, and sedates as long as inflammation is not present.
4. Reduces muscle spasms.
5. Increases blood volume, oxygenation, and nutrition.
6. Distends and softens superficial fascia.

➢ Contraindications of Thermotherapy:

1. Tumour or malignancy
2. Never apply heat directly to eyes or the genitals.
3. Recent injury
4. Recent contusion
5. Phlebitis
6. Diabetes
7. Hypertension
8. Mental retard patients.
9. Cardiac impairment
10. Recent burn or sunburn
11. Oedema
12. Directly over eyes or external genitalia
13. Cerebrovascular accident
14. Fever
15. Open wounds or skin infections
16. Sensory impairment
17. Pregnancy

➢ Physiological Effects:

1. Decrease muscle spasm
2. Decrease pain perception
3. Increased blood flow-vasodilation
4. Increase metabolic rate
5. Decreased joint stiffness
6. Increase range of motion
7. Increased general relaxation

➢ Thermotherapy Applications:

Heat therapy or thermotherapy applications include, but are not limited to, the following:

- **A.** Whirlpool baths
- **B.** Paraffin baths
- **C.** Sauna baths
- **D.** Steam baths
- **E.** Hot packs
- **F.** Spinal packs
- **G.** SPA
- **H.** Infrared
- **I.** Hydrotherapy tubs
- **J.** Shortwave diathermy (SWD)
- **K.** Microwave diathermy (MWD)
- **L.** Ultrasound Therapy (UST)
- **M.** Laser

A. Whirlpool Bath:


Whirlpool Bath

Whirlpool baths is tubs for soaking or contain jets of water. It is kept at 105 – 110^{o} Fahrenheit. Whirlpool baths in spa treatments are also known as hydro massage treatments since the jets push tepid water toward the sides of the tank and not on the affected areas. It is a Combination of massage and water immersion. It Provides conduction and convection, It is for Swelling, muscle spasm and pain. Maximum treatment time for acute injuries should not exceed 20 minutes.

B. Paraffin bath:


Paraffin baths

Paraffin baths provide heat to contoured bony areas of the body (e.g., feet, hands, or wrists). They are used to treat sub-acute or chronic rheumatoid arthritis associated with joint stiffness and decreased ROM, as well as other common chronic injuries. A paraffin and mineral oil mixture (6:1 or 7:1 ratio) is heated in a unit at 48^{o} to 52^{o} C (118^{o} to 126^{o} F).

C. Sauna Bath:


Sauna Bath

A sauna bath is a hot-air bath with a temperature between 160 – 180o Fahrenheit in six to eight percent humidity. The client can remain in the sauna for twenty to thirty minutes once per week. Instruct the client to refrain from eating one hour prior to treatment and to take a cool shower after treatment. A dry sauna induces sweating and is used for insomnia, tension, and removal of toxins.

D. Steam Baths:


Steam Baths

Steam baths or wet saunas are hot vapour baths given in specially designed chambers at 105 - 130o Fahrenheit and 100% humidity. If the head is exposed from the steam unit, it is referred to as a Russian bath. Steam baths may be given once or twice a week and the client remains in the bath fifteen to twenty minutes. The steam baths enhance the removal of toxins from the body.

E. Hot Packs:


Hot Pack

Hot packs provide superficial heat, transferring energy to the individual's skin by way of conduction. The pack consists of a canvas or nylon case filled with a hydrophilic silicate or other hydrophilic substance, or with sand. The packs are stored in a hot water unit at a temperature ranging from 70^{o} to 75^{o} C (158^{o} to 170^{o} F)

F. Spinal Pack:


Spinal Pack

A spinal pack is used to soothe and relax clients during the massage session. It is a long, narrow fomentation pack applied directly on the spine, and insulated with a towel. The spinal pack may be left on for approximately ten minutes.

G. SPA:

A town where water comes out of the ground and people come to drink it or lie in it because they think it will improve their health. A commercial establishment with exercise rooms, sauna baths, etc. a large whirlpool bath, with ledges for seating several people. A mineral spring considered to have health-giving properties.

H. Infrared


Infrared

Infrared (IR) radiation is a type of electromagnetic radiation (a wave with electricity). The wave is longer than light which humans can see and shorter than microwaves. The word infrared means below red. It comes from the Latin word infra (meaning below) and the English word red. (Infrared light has a frequency below the frequency of red light.) Red light has the longest wavelength that human eyes can see. Infrared waves cannot be seen by the eye. The infrared wave is between 800 nm and 1 mm. People sense infrared as heat.

I. Laser


Laser Therapy

Laser therapies are medical treatments that use focused light. Unlike most light sources, light from a laser (which stands for light amplification by stimulated emission of radiation) is tuned to specific wavelengths. This allows it to be focused into powerful beams. Laser light is so intense that it can be used to shape diamonds or cut steel. Relieve symptoms of cancer, remove kidney stones, repair a detached retina, improve vision and treat hair loss resulting from alopecia or aging. Lasers are more precise than traditional surgical instruments, and cuts can be made shorter and shallower. This causes less damage to tissue.

J. Ultrasound:


Ultrasound Therapy

Superficial heating agents were discussed in the previous section. These agents produce temperature elevations in skin and underlying subcutaneous tissues to a depth of 1 to 2 cm. Ultrasound uses high-frequency acoustic (sound) waves, rather than electromagnetic energy, to elicit thermal and nonthermal effects in deep tissue to depths of 3 cm or more. The actual mechanism of ultrasound, produced via the reverse piezoelectric effect, converts electrical current to mechanical energy as it passes through a piezoelectric crystal (e.g., quartz, barium titanate, and lead zirconate titanate) housed in the transducer head. Thermal effects increase collagen tissue extensibility, blood flow, sensory and motor neuron velocity, and enzymatic activity, and decrease muscle spasm, joint stiffness, inflammation, and pain.

3. ELECTRICAL STIMULATION / ELECTROTHERAPY:


Electrotherapy

Electrical stimulation is a type of physical therapy modality used to accomplish various tasks in physical therapy. If you have an injury or illness that causes pain or limited functional mobility, your PT may use electrical stimulation, or Esteem, as one part of your rehabilitation program. Electrical stimulation has most commonly been used for the modulation of pain through stimulation of cutaneous sensory nerves and the following analgesic mechanisms.

- **Benefits of Electrical stimulation:**
  1. The main benefit of electrical muscle stimulation therapy is pain relief.
  2. The electrical currents allow the muscles to release tension and stress relieving muscle soreness, tightness and body aches.
  3. It prevents and reverses muscle atrophy
  4. It offers fast muscle recovery for various injuries
  5. It improves the range of motion
  6. It offers stress relief
  7. It generates energy for muscle activities

- **Contraindications of Electrical stimulation:**

1. Haemorrhagic conditions
2. Pregnancy
3. Eyes, anterior neck, carotid sinus, head, reproductive organs
4. Impaired cognition or communication
5. Regenerating nerves
6. Cardiac failure (local)
7. Damaged or at-risk skin (local)
8. Infection or tuberculosis (local)
9. Malignancy (local)
10. Recently radiated tissue (local)
11. Electronic device (local)
12. Impaired sensation (local)

- **Types of electrical stimulation:**

Your physical therapist will use different types of electrical stimulation to accomplish different tasks. These may include:

A. TENS: Transcutaneus electrical neuromuscular stimulation (TENS) is a physical therapy modality used to manage acute and chronic pain in physical therapy. The intensity of the electricity will be adjusted to block the painful signals traveling from your body to your brain.

B. Iontophoresis: Iontophoresis is a type of electrical stimulation that is used to help administer medication to you in physical therapy. The electrical current pushes various medications in through your skin and into your body. It is uses to decrease inflammation or muscle spasm.

C. Neuromuscular electrical stimulation (NMES): NMES uses an electrical current to cause a single muscle or a group of muscles to contract. By placing electrodes on the skin in various locations the physical therapist can recruit the appropriate muscle fibers. Contracting the muscle via electrical stimulation helps improve the way your affected muscle contracts.

4. MASSAGE:

Massage is one of the oldest forms of treatment for human ills. It has been derived from the Hebrew word 'sascheasal' that means "to knead", and it is also think that the word massage originates from the French word 'Masser' that means "to rubs". Many mechanical massaging devices have been developed, but none can function as well as skilled human hand in manipulating the soft tissue of the body.

Massage

- **Definition of massage:-**

- **William Murrell, Edinburg and London (1853-1912):** "The scientific mode of treating, certain forms of disease by systematic manipulations".
- **Albert Hoffa, Germany (1859-1907):** "Mechanical procedure that can cure illness"
- **John S. Coulter (1932):** "Massage includes a great number of manipulations of the tissue or the organs of the body for therapeutic purpose".

- **Contraindication of massage:**

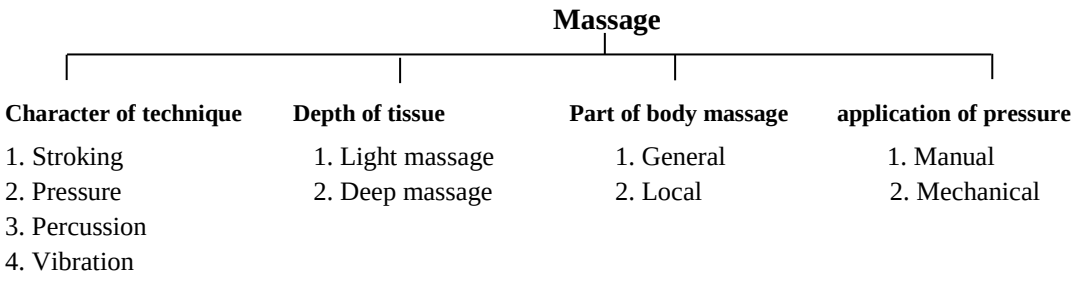
1. Haemorrhage or tumour
2. Never put direct pressure on the spine.
3. A person affected by virus.
4. Do not massage the areas that are infected or have a rash.
5. Not massage in and around open sores.
6. Do not massage fracture.
7. A person in pain due to infection.
8. A person with unstable cardiac condition.
9. A person having a feeling of vomiting.
10. Do not massage the person with high fever of uncontrolled high blood pressure.
11. An acute stage of injury.
12. Do not use the deep massage technique for a person having osteoporosis.
13. Generally massage is contraindication for pregnant and breast feeding women, but there may be alternative massage technique.

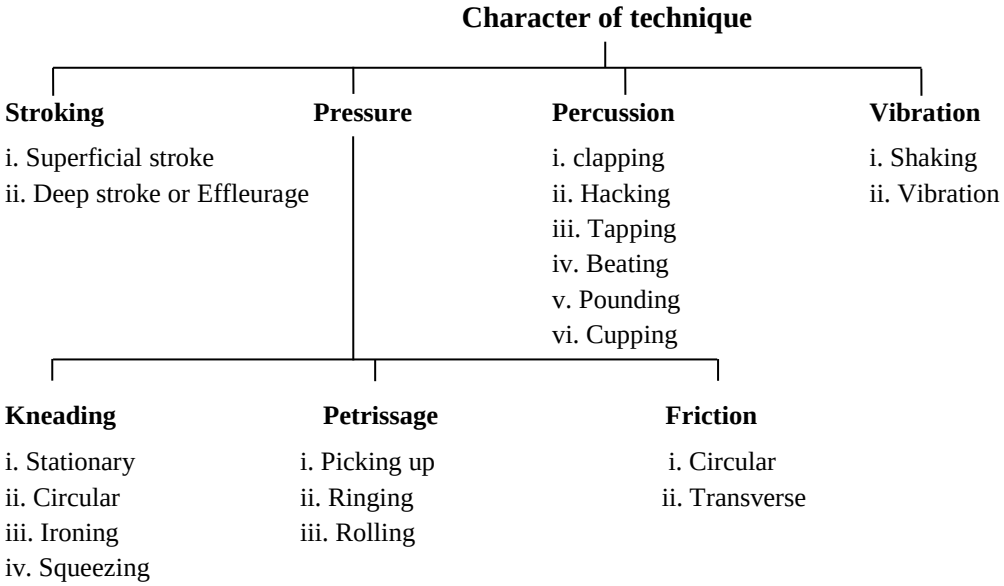
- **Principles of massage:**

The principles of massage are guidelines that promote safely and effectiveness. The principles of massage are as follow-

1. Massage should be given general to specific then general.
2. Massage should be given superficial to deep to superficial
3. Massage should be given to the periphery to centre to periphery.
4. Massage should be given to distal to proximal.
5. The duration of massage treatment will depend upon (a) the area to be treated, (b) the rate of movement (c) the age and the size of the individual, (d) changes in symptoms.
6. The massage should not be limited to the disease or injured area only.
7. Massage should be rhythmic, slow and gentle.
8. Breathing should be deep and slow at the time of massage.
9. A definite uniform rate should be established for the time of massage.
10. The frequency of the application will depend upon pathological condition that is to be treated.
11. The type of massage movement will depend upon the pathology of the tissue.
12. It is essential that the therapist must have a good scientific knowledge of massage and its physiological effects and should be able to observe carefully.

- **CLASSIFICATION OF MASSAGE:**





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