**Paper Physical agent and Electrotherapy**

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**Q no 1**

**A)** **What is the difference between 1 g of ice at 0°C and 1 g of water at 37°C?**

**Ans.** One gram of ice is energy which we used to apply on patient body part. And 37C is energy of our body. As we know that energy is travel from high concentration to lower concentration. Similarly when we go 0 to 37 we need more energy (491j)

**B). Explain why the rate of conduction of nerve fibers in a mixed (motor and sensory) peripheral nerve is reduced by cooling?**

**Ans.** Our skin contain receptors that is cold and thermal receptor. The number of cold receptor are more then warm receptor. When we applying ice therapy its function is to slow down the nerve conduction. On the other hand when we repeatidly apply ice therapy it burst the neural circuit due to which nerve conduction decreases and can also cause motor nerve paralysis.

**C). Why is Cryotherapy contraindicated in cardiac patients?**

**Ans.** Cryotherapy is contraindicated in cardiac patient because when we apply ice therapy to a patient it produce vasoconstriction and vasodilation repeatidly starts. Due to which blood pressure increases. It may lead to heart failure or cardiac complication.

**D).** **Write in detail the uses of ice cube massage?**

**Ans.**

* Cleanses skin pores
* Cures acne
* Reduces dark circles
* Works as a pre-primer applicant
* Reduces puffiness under eyes
* Improves blood circulation
* Improves blood circulation
* Reduces wrinkles
* Reduce oiliness
* Eliminate puffiness
* Reduce swelling
* Reduce inflammation
* Remove wrinkles
* Beautifies the skin
* Provide relief from sunburns
* Reduce ice strain

**Q2. Explain how Cryotherapy reduces:**

1. **Pain**

The application of ice or cold packs to injuries it cause blood vessels to contract which decreases blood flow and relieve pain, swelling and inflammation. Can beapplied to specific part of the body or immersed the whole body. This involves the exposure of the whole body to low temperatures (below 200 degrees Fahrenheit) for about 2 to 3 minutes. And 2 minutes out of the water. Repeat 5 times. If patient is brave then take 5 minutes in water. The participant stands in a form of closed, wearing less clothing while being bathed in refrigerated air or liquid nitrogen.

Cold packs reduce pain thereby increase pain thresholds. Can be used in both chronic and acute pain. Decrease muscle spasms. Cold therapy reduces sensitivity of the muscle spindles and reduces pain.

1. **Spasticity**

It is the pathological condition which represents hyperactivity of the stretch reflex in response to movement. When we apply cryotherapy on spastic muscle then hypothermia of local muscle occurs due to which body loses heat faster than it can produce heat. It will provide effect to reduce muscle spasticity. And resulting from a central nervous system dysfunc­tion.

Reducing the sensitivity of muscle spindle to stretch.

Cryotherapy will be applied for 20 minutes.

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|  **Luminous Generators*** Electrically heated filament

e.g quartz lamp, carbon filament lamp, tungsten lamp.* Wavelength is 350-4000
* Emission; 70% near IRR, 24% far IRR, 15 UV and 5% visible light.
* Penetration; subcutaneous tissue (5-10mm), epidermis and dermis.
* Use for chronic inflammation.
* Physiological effect is to reduce pain via counter irritant effect.
* Treatment time is 15-20 minutes.
* Distance should be 40-60cm from treated area.
* Luminous generator are produced by incandescent lamps.
* Human skin absorbs 95% of energy if it is perpendicular to surface.
* The radiation extends from FAR IR to UVR.
 |  **Non Luminous Generators*** Electrically heated resistance wire coiled. Emit their maximum intensity and it takes about 5-15 minutes to be heated.

e.g hot packs * Wavelength is 1500-12000
* Emission; 105 near IR and 90%far IRR
* Penetration; superficial dermis and epidermis.
* Use for acute condition
* Physiological effect is to reduce pain via sedative effect.
* Treatment time is 20-30 minutes.
* Distance should be 75-90cm from treated area.
* Electric current passes through wire and produce heat.
* It produce IRR and some visible rays.
* IRR emitted by hot wire.
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**Q3. A) Differentiate between luminous and non-luminous generators. (At least ten differences)**

1. **Are infra-red rays more effective in relieving the pain than Ultraviolet (UV) light or not? Give evidence to support you answer.**

**Ans.**

Infra-red rays is a type of electromagnetic radiation which wavelength ranges from 760 nm to 100,000 nm**.** Photobiomodulation is a therapy generally have red light and its wavelength is near to infra-red wavelength (600–100 nm) to do a biological activity. therapeutic effect of IR depends upon treatment timing and repetition, pulsing, and wavelength. It can treat nerve stimulation wound healing and also cancer treatment. it does not require an external power source.

Infact it has the ability to heat up the body alone.

Photobiomodulation are determined by the absorption of energy by photoacceptor molecules in the body. Photon absorption converts light into signals that can stimulate biological processes in the body.

**Evidence.**

**https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5505738/**