Electrotherapy

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Fsc PT_I

PHYSIOLOGICAL EFFECTS OF INFRARED

- When IR are absorbed by the tissue, heat is produced at the point of absorbtion
- The shorter IR rays(7700-12000A) penetrate to deeper parts of dermis, or to subcutaneous tissue
- longer IR rays(> 12000A)absorbed to superficial epidermis
- Nonluminous generators__ IR 40000A___less penetrating
- Luminous generators___ IR 10000A___ more penetrating
- Irradiation produce heat to superficial tissue, conveyed to deeper tissue by conduction and by circulating fluids
- Irritating effects of Luminous generator is due to visible and UR(produce chemical effects)

1. INCREASED METABOLISM

- Van't Hoff's law
- Increase in metabolism is greatest in the region where most heat is produced ie in superficial tissues.
- Increased Metabolism ___ increased demands of oxygen and food stuff____ increased out put of waste products and metabolites

2. VASODILATATION

- Dilatation of capillaries and arterioles in superficial tissue, reason is

1. Direct effect of heat
2. Action of metabolites

- Irritate the nerve endings causes reflex vasodilatation
- So inc.. Blood flow__ inc. O2__ inc foodstuff_ removal of waste products
- **Erythema** of skin
- Erythema of IR____UV
- Mottled erythema

3. PIGMENTATION

- Caused by repeated exposure to IR
- Mottled in appearance
- Legs on people who are habitual of sitting near the fire

4. EFFECTS ON SENSORY NERVES

- Mild heating, sedative effects
- More intense heating, irritating effects
- Luminous vs nonluminous generators

5. EFFECTS ON MUSCLE TISSUE

- Relaxation
- Increased efficienty
- Relaxation of antagonistic muscles allows a free action of the prime movers.

6. DESTRUCTION OF TISSUE

7. GENERAL RISE IN TEMPERATURE

- extensive and prolonged heating
- Blood in superficial vessels is heated
- Passed to other parts of body, general rise in temperature
- There may be general vasodilatation__ decrease BP

continued

8. FALL IN BLOOD PRESSURE

- Generalised vasodilatation, reduced peripheral resistance, fall in BP(reduced viscosity of blood)

9. INCREASED ACTIVITY OF SWEAT GLANDS

- Reflex stimulation of sweat glands
- As

1. Effect of heating on sensory nerve endings
2. Circulation of heated blood

- Increase activity of sweat glands leads to increased removal of waste product

continued

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2. VASODILATATION
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THERAPEUIC EFFECTS AND USES

1. **RELEIF OF PAIN**

- An effective mean of pain relief
- mild heating_ sedative effects on the superficial sensory nerves
- Stronger heating___ counter irritation
- Pain may be due to accumulation of waste products _ removal of waste product due to increase blood flow_ relieves pain
- Pain relieves by muscle relaxation.
- **Acute inflammation**__ mild heating
- Intense heating on acute injury may cause an increase in the exudation of fluid into the tissue and so increase pain.
- **Chronic conditions**___ intense heating__ treatment for 30 min

2. MUSCLE RELAXATION

- Relax more readily when tissues are warmth
- Relief of pain also facilitates muscle relaxation
- By achieving muscle relaxation Relief of muscle spasm is obtained.
- Preliminary to PT
- Following irradiation movement can frequently be carried through a greater range than before,
- And relief of pain makes it possible to perform exercises more effieciently

3. INCREASED BLOOD SUPPLY

- Marked in superficial tissue an d may be used in the treatment of superficial wounds and infections.
- Good blood supply, essential for healing
- Remove infection by increasing number of WBC and removing exudate
- Warm the cold limbs(lower motor neuron lesions)by soaking in warm water
- Arthritis of joints, especially of hands(relief pain and muscle spasm)

4. ELIMINATION OF WASTE PRODUCT

- Excessive treatment _ increrased activity of sweat glands____ increased elimination of waste products.

CHOICE OF APPARATUS

- Effects required:
- sedative or counter irritation??
- Type of injury:
- acute or chronic??
- Luminous or nonluminous
- Area to be treated:
- smaller or larger??
- Check working of lamp
- Localiser and filter attached
- Preheating time

PREPARATION OF PATIENT

- Clothing
- Sensation of skin
- Comfortable and supported position
- Patient education about comfortable warmth
- Immediately report about excessive or undue heating

ARRANGEMENT OF LAMP AND PATIENT

- Rays at right angle to the skin: max absorption
- Distance of pt from lamp: 50 – 75 cm
- Tunnel bath, ends open, air circulation
- Protection of face, localiser or paper shade
- Protection of eyes: damp cotton wool

APPLICATION OF TREATMENT

- At the start of treatment: intensity must be low
- After 5 to 10 min; it can be increased(as vasodilatation and increased blood flow is established)
- Adjust Intensity
- By dec. pt lamp distance
- by adding bulb in tunnel bath etc
- PT should be at hand through out the treatment
- Drinking water
- Pt should not rise immediately from lying position, not also go to cold

DURATION AND FREQUENCY OF TREATMENT

- Acute inflammation, recent injury, wound and infection: 10 to 15 min/ several times per day

- Chronic condition: 30 min/ OD or alternate days

DANGERS OF IR

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1. Burns

- IR superficial heat burns
- Red patch on skin subsequently lead to blister(during or after treatment)
- Reasons are
- Too great intensities
- Patient fails to report overheating
- Moves nearer to the lamp
- Fall asleep during treatment
- Defective skin sensations
- Inadequate preheating time…
- Application of liniments_ skin hypersensitivity
- Impaired blood flow
- Touching the lamp when it is too hot
- Explosion of bulb

CONTINUED

2. **Electric shock**
3. **Precipitation of Gangrene**
4. **Headache:** (no sweating, too hot environment, give plenty of water, irradiation at the back of head)
5. **Faintness:** (fall in blood pressure, anemia of brain, try to rise suddenly from recumbent position
6. **Injury to eye:** may predispose to cataract. So protect during treatment

CONTRAINDICATIONS

1. Areas of defective arterial blood supply
2. Danger of haemorrage
3. Where skin sensation is defective
4. Liniments has recently been used


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