

King Saudi University
Collage of Applied Medical Science
Rehabilitation Health Science Department

**LAB ACTIVITY 3- SUPERFICIAL HEATING MODALITIES-
INFRARED RADIATION (IR)**

Course name: therapeutic modalities -1-

Course code: RHS321

Student nameStudent number.....

I-Objectives:

To demonstrate an understanding relative effectiveness of superficial heat modalities (IR) on increasing skin temperature (skin condition), tissue extensibility, and relief of pain

2-Description

Infrared radiations (IR) are electromagnetic radiation with Wavelength of 750nm-1mm. IR is superficial Heating modality (penetration depth < 2cm,) and transfers energy by radiation.

3-Physiological Effects:

- Increase Local temperature superficially
- Increase Local metabolism
- Increase Cutaneous vasodilatation
- Increase blood flow
- Decrease pain perception

4-Contraindications

- Acute inflammatory conditions
- Impaired cutaneous thermal sensation and circulation
- Over tumors

Advantages

Disadvantages

- | | |
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| <ul style="list-style-type: none">❖ Reduces the risk of infection due to non-contact with patients❖ The area being treated can be observed throughout the intervention❖ Ease of application❖ Very inexpensive | <ul style="list-style-type: none">❖ Infrared radiation is not easily localized to a specific treatment area❖ Not effective as hot packs and paraffin baths❖ Inconsistent heating in all treatment areas❖ Easy to cause burn |
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Demonstrate Steps for Practical and Clinical Application

| INFRARED LAMPS | | | |
|---|------------|---|---|
| PROCEDURES | EVALUATION | | |
| | 0 | 1 | 2 |
| I-Preparation of equipment | | | |
| Equipment Required <ul style="list-style-type: none"> ❖ IR lamp ❖ IR opaque goggles ❖ Tape measure to measure distance of treatment area from IR source ❖ Towels | | | |
| <p>For luminous generator – a red light/radiation will be an indicating of good working condition.</p> <p>For non-luminous generator – there will not be any red light seen. So gradually place your dorsal aspect of forearm between the parabolic reflector & the floor to feel a warmth sensation in the forearm.</p> | | | |
| II-Preparation of the patient | | | |
| 1-Place the patient in a well-supported and comfortable position (How) | | | |
| 2-Identify the ID of patients <ol style="list-style-type: none"> a. Name – Identification of the patient b. Age – Modulation of treatment (Adult/Old) c. Sex – Provide privacy (Male/Female) d. Occupation – Correlate the symptoms/signs of the patient e. Chief Complaints – Generation of problem list & Setting goals (Short & long term) for the treatment f. Side – Right or Left side of the involvement. g. Site – Specific area/region to be treated h. Duration of the condition – Acute/Sub-acute/Chronic i. Diagnosis – Condition of the patient | | | |
| 3-Remove clothing and jewelry from the area to be treated and inspect the area. Drape the patient for modesty, leaving the area to be treated uncovered. | | | |
| 4-Verify the absence of contraindications (local & general) | | | |
| 5-Ask about previous thermotherapy, radiation, chemotherapy | | | |
| 6-Inspect body part to be treated <ol style="list-style-type: none"> 1. Check for light touch perception 2. Check for thermal sensation (hot & cold test tubes) 3. Check circulatory conditions (Pulses, capillary refill, pallor) 4. Check skin conditions (open wound, eczema, dermatitis) | | | |
| 7-Assess function of body part to be treated (e.g. ROM, Pain) | | | |
| 9-Instruct the patient <ol style="list-style-type: none"> 1. Not to touch the apparatus 2. Not to move nearer to the device 3. Not to sleep | | | |
| III- Techniques/Method of Application of IR for treatment | | | |
| ❖ Put IR opaque goggles on the patient and the therapist if there is a possibility of IR irradiation of the eyes. | | | |
| ❖ Position the patient with the surface of the area to be treated perpendicular to the IR beam and about 45 to 60 cm away from the source. Remember that the intensity of the IR radiation reaching the skin decreases, with an inverse square relationship, as the distance from the source increases, and in proportion to the cosine of the angle of incidence of the beam. Adjust the distance from the source and wattage of the lamp output, so that the patient feels a comfortable level of warmth. Measure and record the distance of the lamp from the target tissue. | | | |

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| ❖ Allow the IR lamp to warm up for 5 to 10 minutes so it will reach a stable level of output. | | | |
| ❖ Provide the patient with a means to call for assistance, and instruct the patient to call if discomfort occurs. | | | |
| ❖ Set the lamp to treat for 15 to 30 minutes. Generally, treatment times of about 15 minutes are used for subacute conditions and up to 30 minutes for chronic conditions. Most lamps have a timer that automatically shuts off the lamp when the treatment time has elapsed. | | | |
| ❖ Monitor the patient's response during treatment. It may be necessary to move the lamp farther away if the patient becomes too warm. Be cautious in moving the lamp closer if the patient reports not feeling warm enough because the patient may have accommodated to the sensation and may not judge the heat level accurately once warm. | | | |
| ❖ When the intervention is completed, turn off the lamp and dry any perspiration from the treated area. 1. Inspect the treatment area for any adverse reactions like blisters/burns/rashes/etc. 2. Assess function of body part to be treated (e.g. ROM, Pain) 3. Ask the patient to maintain the same position for minutes (In order to avoid postural hypotension – if you are choosing supine/prone position) & then to sit/stand. | | | |
| IV- Documentation and Recording | | | |
| a. Record the side, site, duration & condition of the patient. b. IR generator used. c. Distance between the patient skin & the parabolic reflector. d. Treatment time (15-30minutes) and frequency (3/week). e. Any adverse reactions if any. f. Ask the patient response/feeling towards the treatment area through performing functional test as indicated. | | | |

Notes

N-1: For all acute conditions – thermotherapy is contraindicated (Use pulse mode if available)

N-2: Moist thermotherapy (hot packs, paraffin wax) is better than dry heat (infrared)

N-3: infrared used usually prior to other therapeutic modalities (exercises, mobilization, and electrical stimulation), so it can not consider as real therapy as it just provide relaxation

N-4: Never ever apply infrared directly to the eye, IF necessary cover eye with cotton, or wearing glass.

Therapeutic Effects of Near-infrared Radiation on Chronic Neck Pain

Medical conditions (definitions/stages)

1-Definition: Neck pain defined as pain located in the anatomical region of the neck with or without radiation to the head, trunk, and upper limbs

2-Stage: Chronic neck pain has a duration of 3 months or more.

3-Area of Body affected and Tissue affected: Posterior neck muscles and both shoulder with associated Pain and muscles spasm

Types of Infrared

near-infrared radiation

A 650-W infrared halogen lamp (Infra-Care HP 3643; Philips Electronics Industries Ltd, Taipei, Taiwan)

The lamp covered 60 cm - 40 cm area over the upper back and neck regions.



Treatment parameters including

| Temperature or power of agent (IR) | 650-W |
|------------------------------------|---|
| 1. Distance of (IR) form patients | <u>NA</u> , but suggested distance between 40-60cm from treated area |
| 2. Patient position | <u>NA</u> , but suggested positions 1. Prone lying position 2. Setting on chair and forehead supported on pillow/plinth |
| 3. Treatment duration/ frequency | Every day for 1 week and no intervention in the following week. |
| 4. Response to intervention | Near-infrared therapy reduces pain on VAS scale and partially increases pressure pain threshold (PPT) |

Infrared therapy for chronic low back pain:

Medical conditions (definitions/stages)

1-Definition: Low back pain is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without leg pain.

2-Stage: Chronic neck pain has a duration of 3 months or more.

Area of Body affected and Tissue affected: Low back muscles, and ligament with associated pain and muscles spasm

Types of Infrared

- **Wavelength of 800 nm to 1200 nm.**
- **Non-luminous**
- **It is powered by a small, rechargeable battery and is claimed to be 99% efficient in converting electricity to IR energy.**

Treatment parameters including

| Temperature or power of agent (IR) | 650-W |
|---|---|
| 1. Distance of (IR) form patients | <u>NA, but suggested distance between 40-60cm from treated area</u> |
| 2. Patient position | NA, but suggested positions Prone lying position |
| 3. Treatment duration/ frequency | Seven weekly session |
| 4. Response to intervention | The IR therapy unit used was demonstrated to be effective in reducing chronic low back pain, as measured by numerical rating pain scale during rest side bending and rotation and no adverse effects were observed |