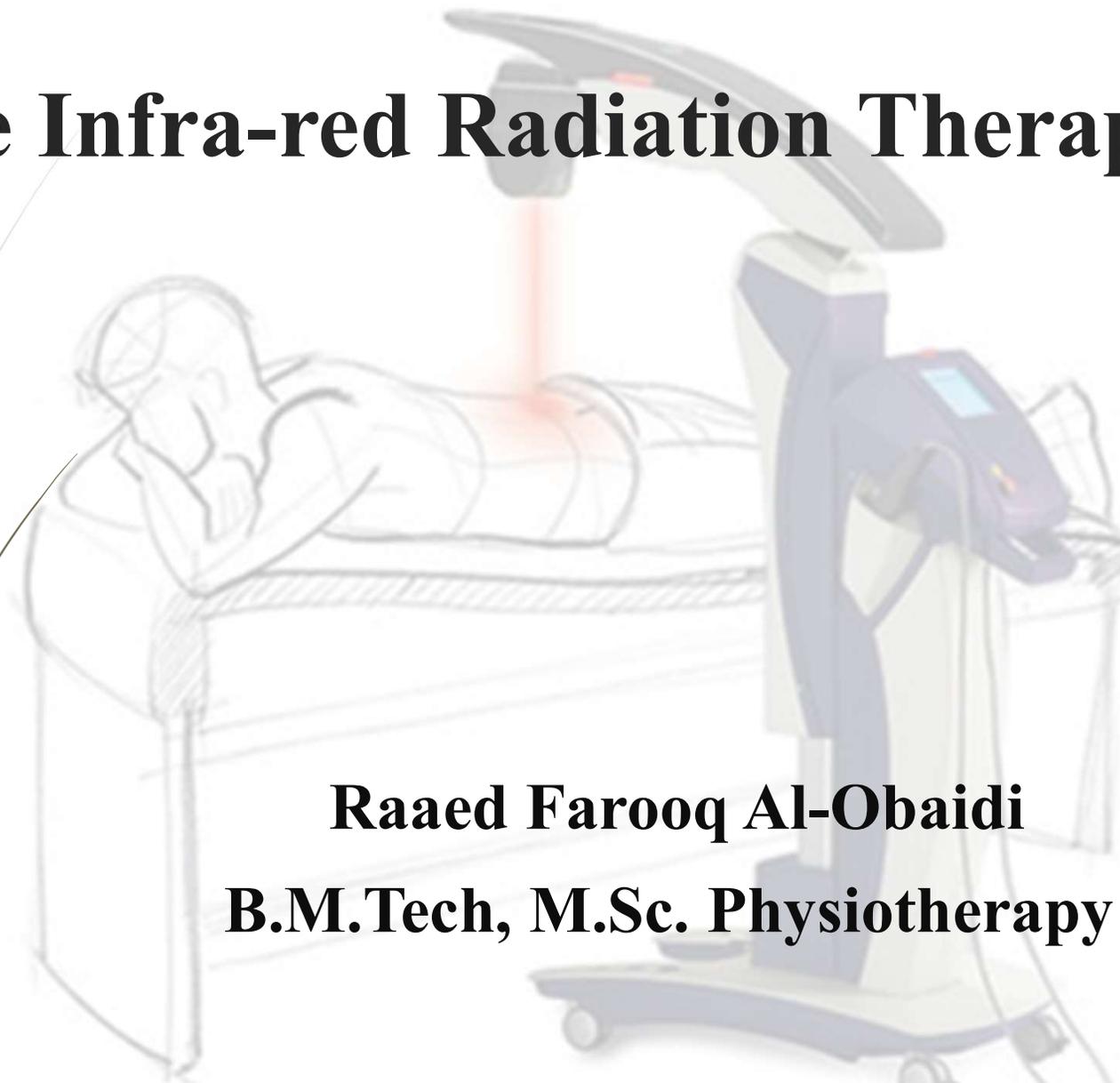




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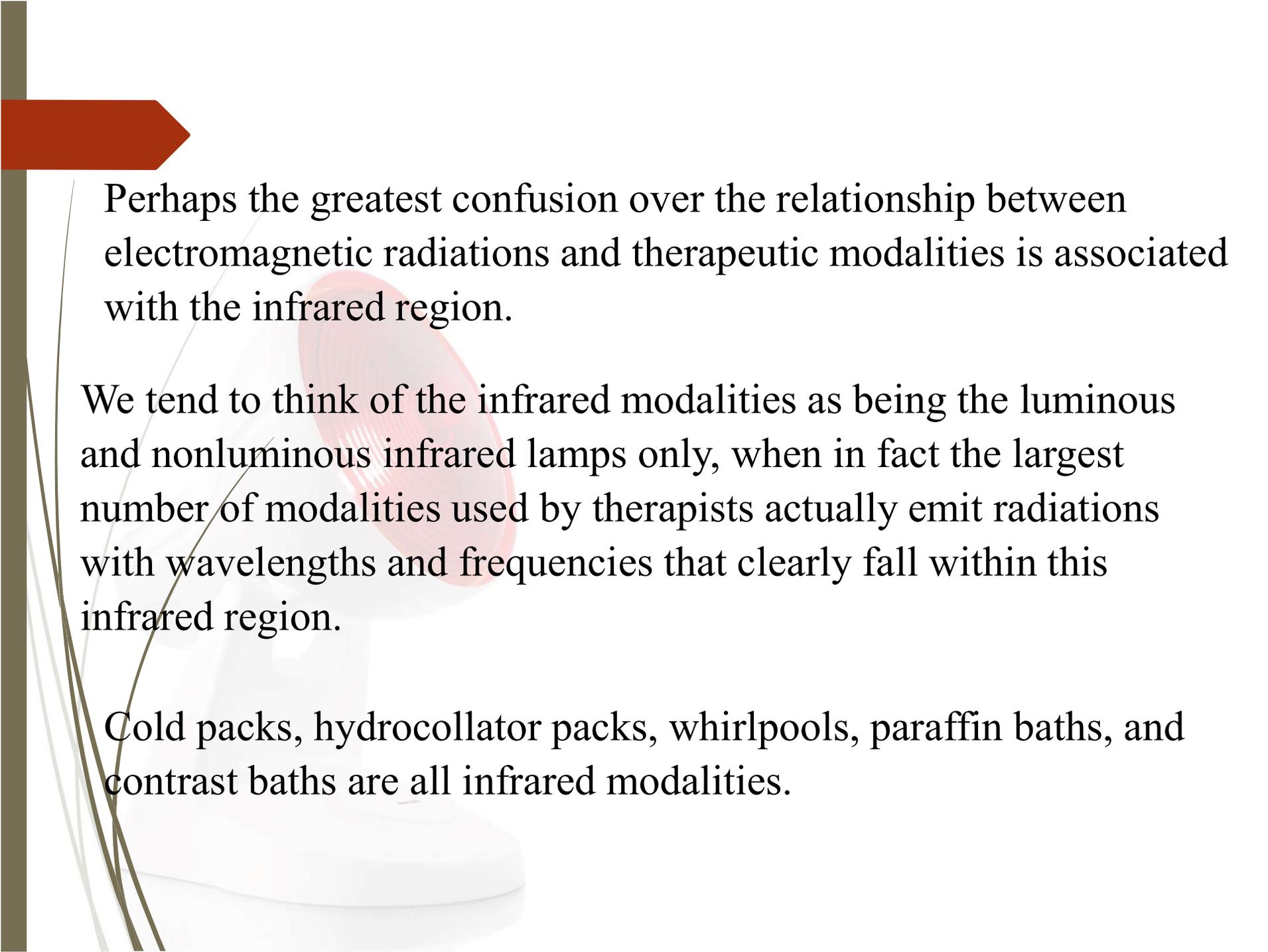
دانش

The Infra-red Radiation Therapy



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The illustration shows a person lying on a treatment table, receiving infrared radiation therapy from a machine. A red beam of light is directed at the person's back. The machine is a large, wheeled unit with a control panel and a large, curved arm that holds the radiation source. The person is lying on their side, and the machine is positioned to the right of the table. The background is a light, sketchy drawing of the person and the machine.



Perhaps the greatest confusion over the relationship between electromagnetic radiations and therapeutic modalities is associated with the infrared region.

We tend to think of the infrared modalities as being the luminous and nonluminous infrared lamps only, when in fact the largest number of modalities used by therapists actually emit radiations with wavelengths and frequencies that clearly fall within this infrared region.

Cold packs, hydrocollator packs, whirlpools, paraffin baths, and contrast baths are all infrared modalities.



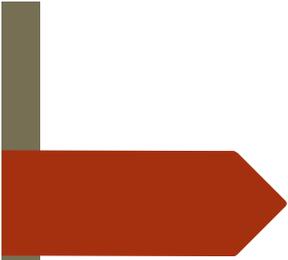
The infrared modalities are used to produce a local and occasionally a generalized heating or cooling of the superficial tissues.

It is generally accepted that the infrared modalities have a maximum depth of penetration of 1 cm or less.

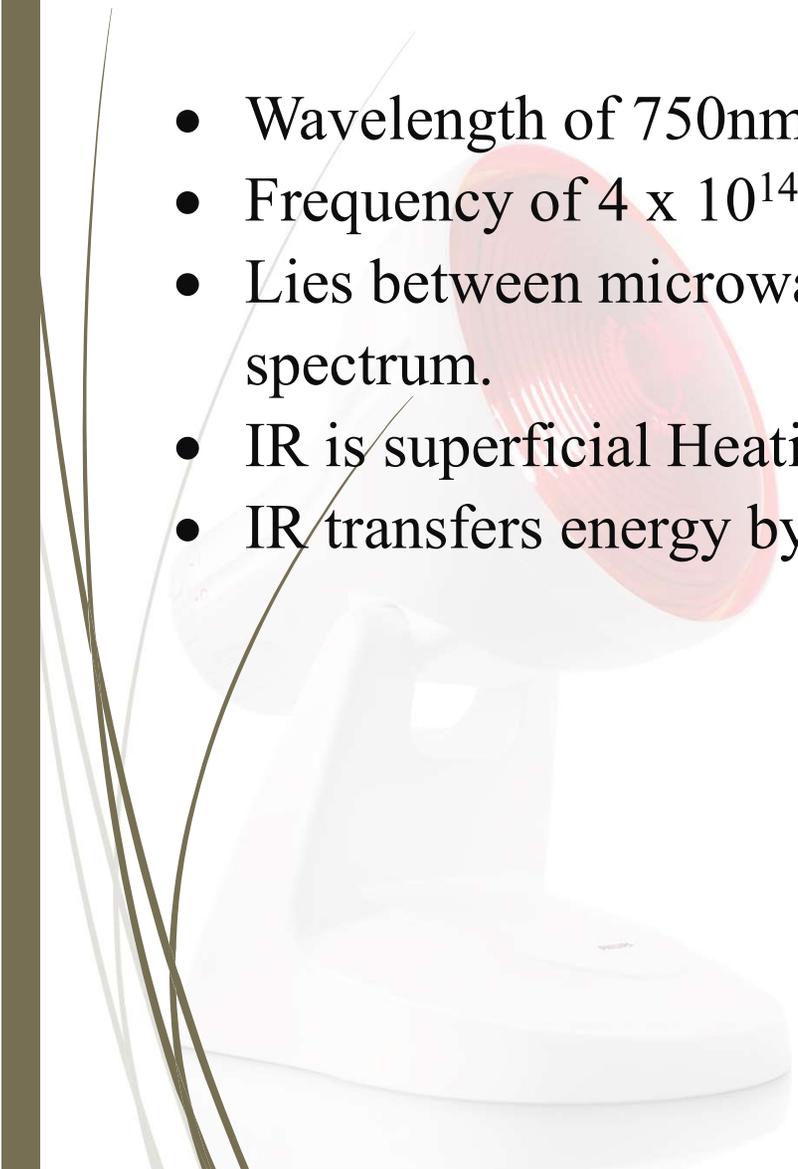
The infrared modalities can elicit either increases or decreases in circulation depending on whether heat or cold is used.

They are also known to have analgesic effects as a result of the stimulation of sensory cutaneous nerve endings.

The infrared region of the spectrum is located adjacent to the red end of the visible light region.

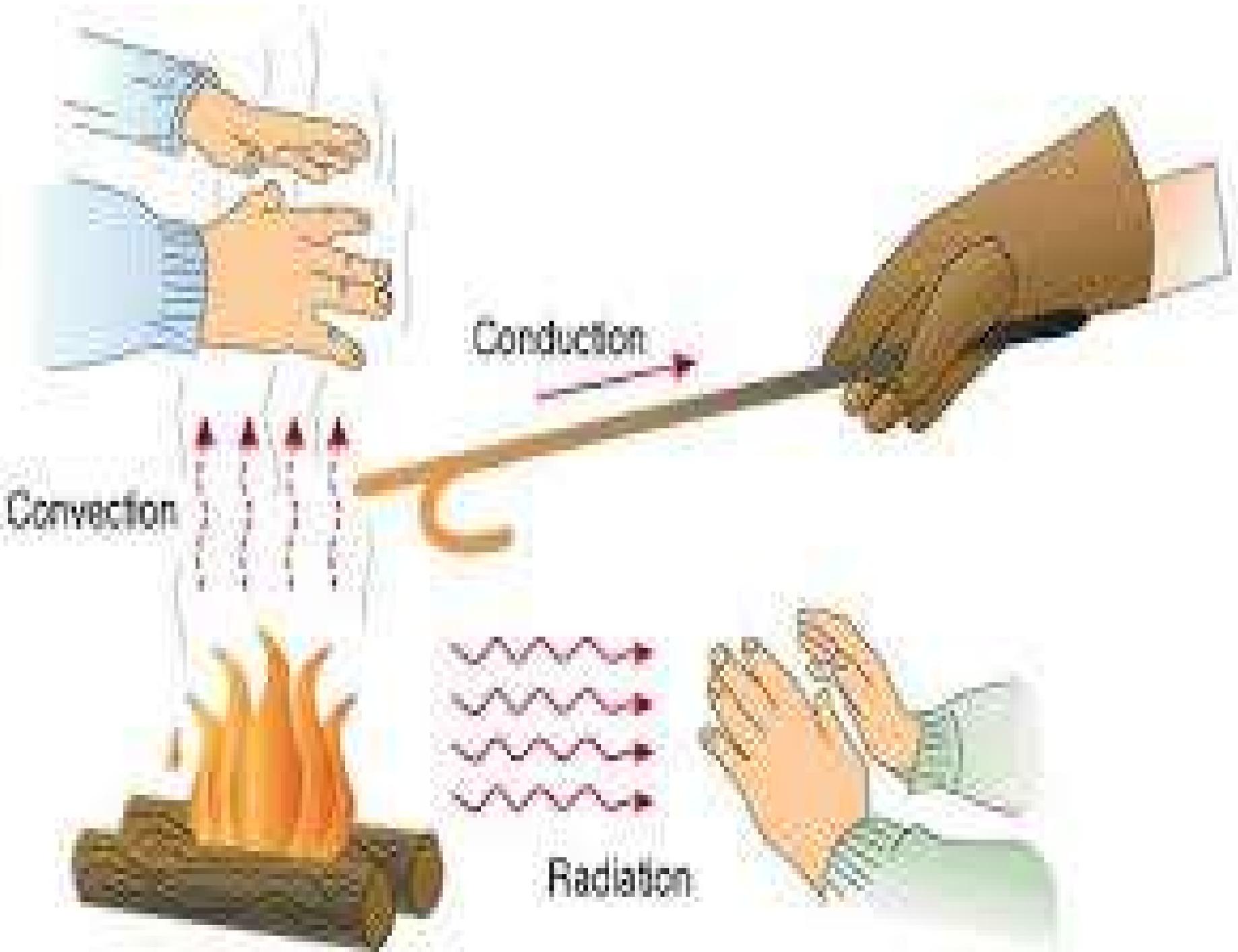


Infrared radiations (IR) are electromagnetic radiation with

- Wavelength of 750nm-1mm,
 - Frequency of 4×10^{14} and 7.4×10^{11} ,
 - Lies between microwave and visible light in electromagnetic spectrum.
 - IR is superficial Heating modality (penetration depth ≤ 1 cm)
 - IR transfers energy by radiation.
- 

Transferring heat (energy) to and from the body transfers

- ✚ **Conduction** : is a direct transfer of energy between two objects in physical (direct) contact with each other.(Ice packs, hot packs, Paraffin wax and Ultrasound).
- ✚ **Convection** is a transfer of heat through direct contact between a circulating medium (air/ water) and another material of different temperature . (Fluidotherapy, Whirlpools, Blood circulation)
- ✚ **Radiation** is a direct transfer of energy from higher temperature to lower temperature without the need for an intervening medium. No-contact is made.(Shortwave diathermy ,Microwave Diathermy ,Laser, Infrared & Ultraviolet therapy).
- ✚ **Conversion** is a conversion of non-thermal form of energy (mechanical, electrical and / or chemical) into heat.(Ultrasound ,Shortwave diathermy (SWD) ,Microwave diathermy (MWD))
- ✚ **Evaporation** heat is absorbed by the liquid on the skin surface and cools the skin as it turns into a gaseous state. (Vapo coolant sprays, alcohol, Sweating).



Source of Infrared radiation

Source of Infra Red Radiation

Artificial

luminous

Non luminous

Natural

Sun

Near I R

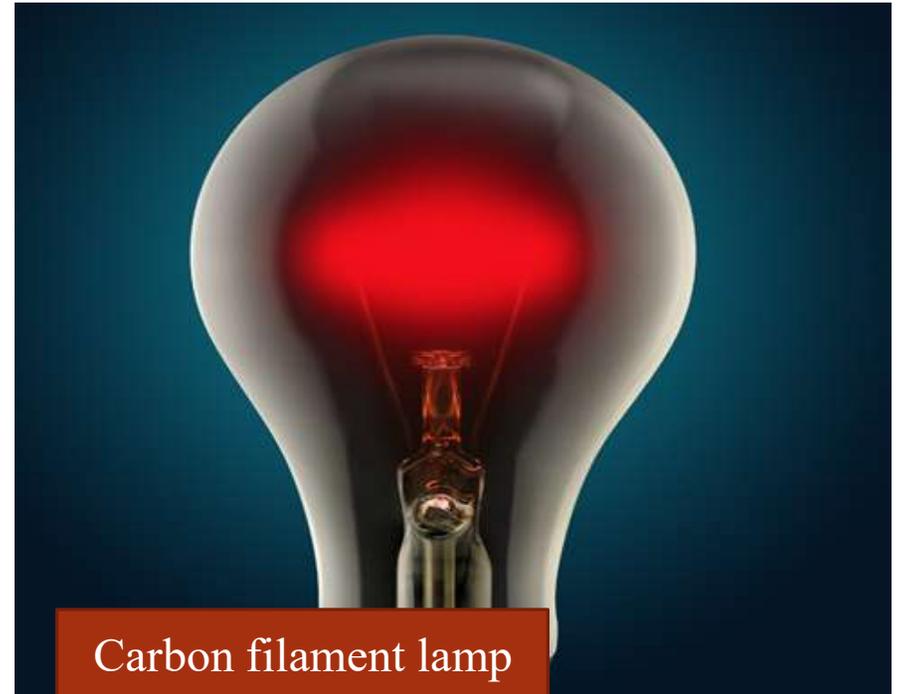
Far I R

Luminous versus non-luminous IR

	Luminous	non-luminous IR
Source and type	Electrically heated filament <ul style="list-style-type: none"> • Quartz lamp, • Tungsten lamp, • Carbon filament lamp 	Electrically heated resistance wire coiled. It takes to be heated and emit their maximum intensity,
Wavelength	350-4000nm(maximum 1000nm)	1500-12000nm(maximum 4000nm)
Emission	it produces visible light, IR and few UVR.	It produces IRR and Some visible rays.
Penetration	Epidermis, dermis & subcutaneous tissue (5-10mm)	Epidermis & superficial dermis (2mm)
Uses	Chronic inflammation.	Acute conditions.
Physiological effect	Pain reduction via counter-irritant	Pain reduction via sedative effect
Treatment Time	15-20minutes	20-30minutes
Distance	45-50cm from treated area	45-60cm from treated area



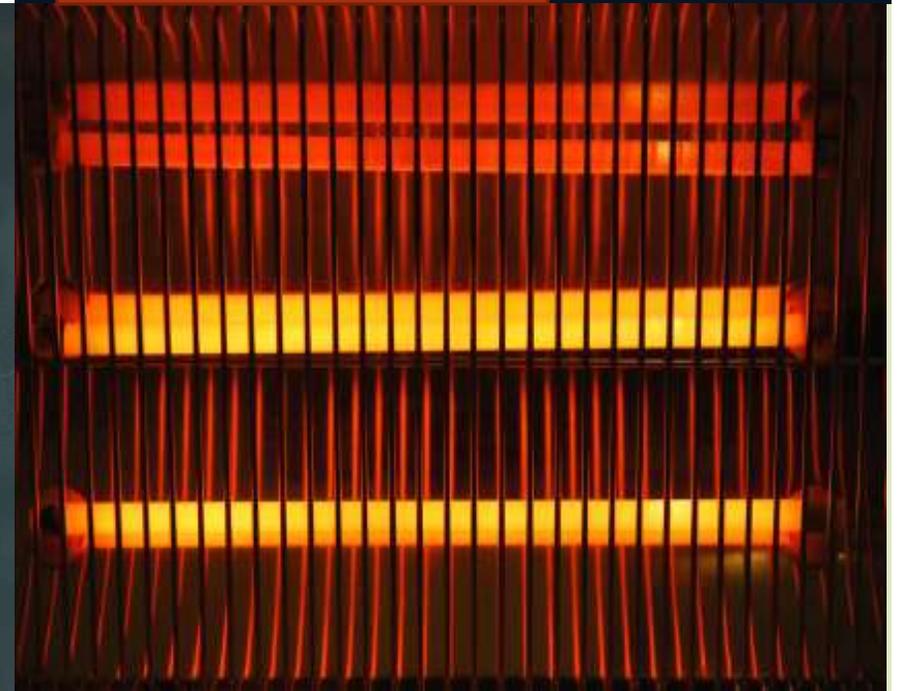
Quartz lamp

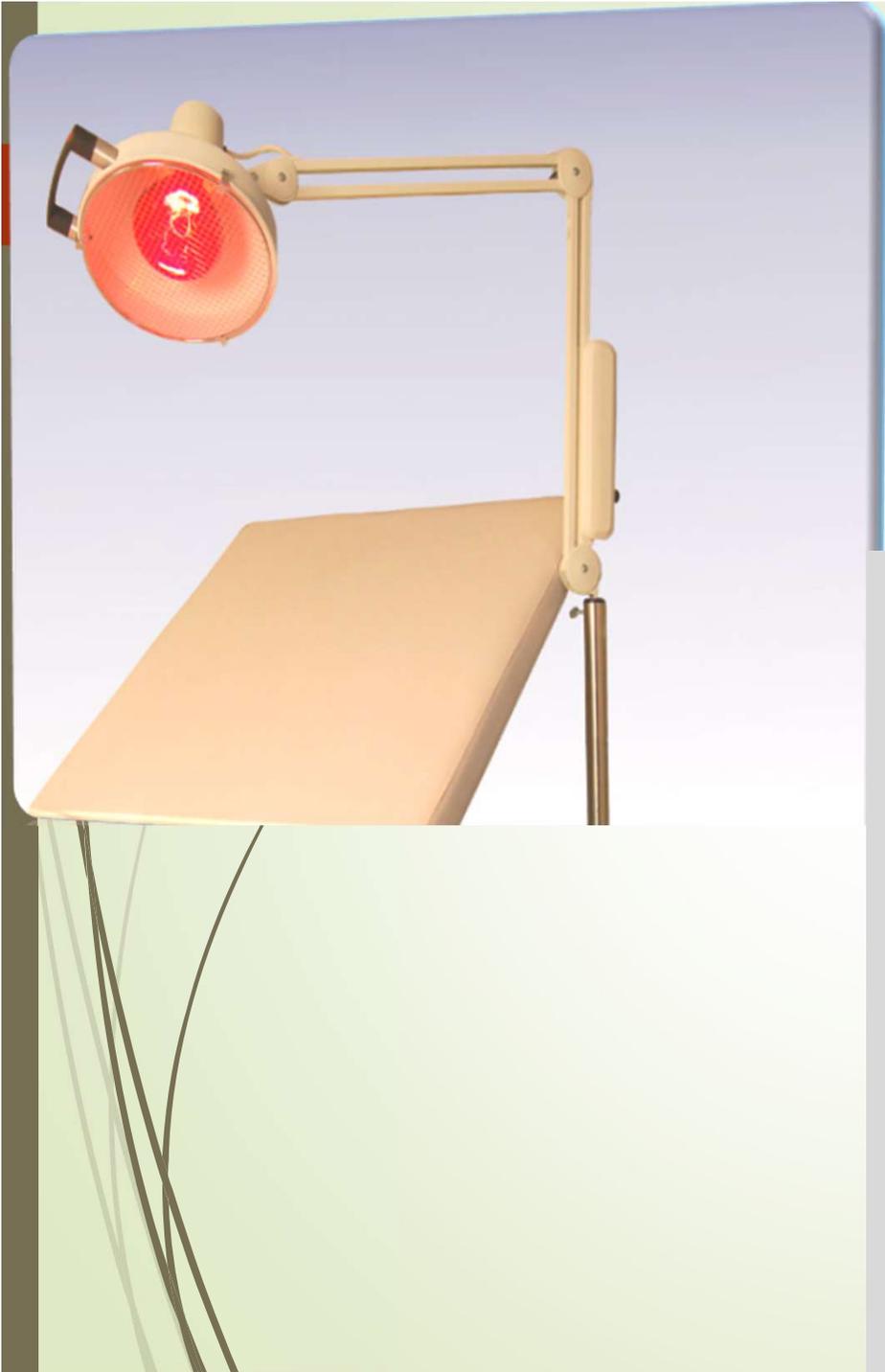


Carbon filament lamp



Tungsten lamp





Physiological Effects of IRR

INCREASE

- ❖ Local temperature superficially
- ❖ Local metabolism
- ❖ Cutaneous vasodilatation
- ❖ Increase blood flow

DECREASE

- Decrease pain perception

Vasodilatation

- Starts after 1–2 minutes and lasts for 30 minutes.

Erythema:

- Is irregular patchy red appearance of skin (lasts for about 30 minutes) after IR application.

Therapeutic Effects and Uses

1. Relief of pain

When the heating is mild, the relief of pain is probably due to the sedative effect on the superficial sensory nerve ending.

Strong heating stimulates the superficial sensory nerve endings .It has been suggested that pain may be due to the accumulation in the tissues of waste products of metabolism, and an increased flow of blood through the part removes these substances and so relieves the pain.

Pain due to acute inflammation or recent injury is relieved most effectively by mild heating.

When pain is due to lesions of a more chronic type, stronger heating is required. The irradiation should cause comfortable warmth and the treatment last for at least thirty minutes.



2. Muscle relaxation

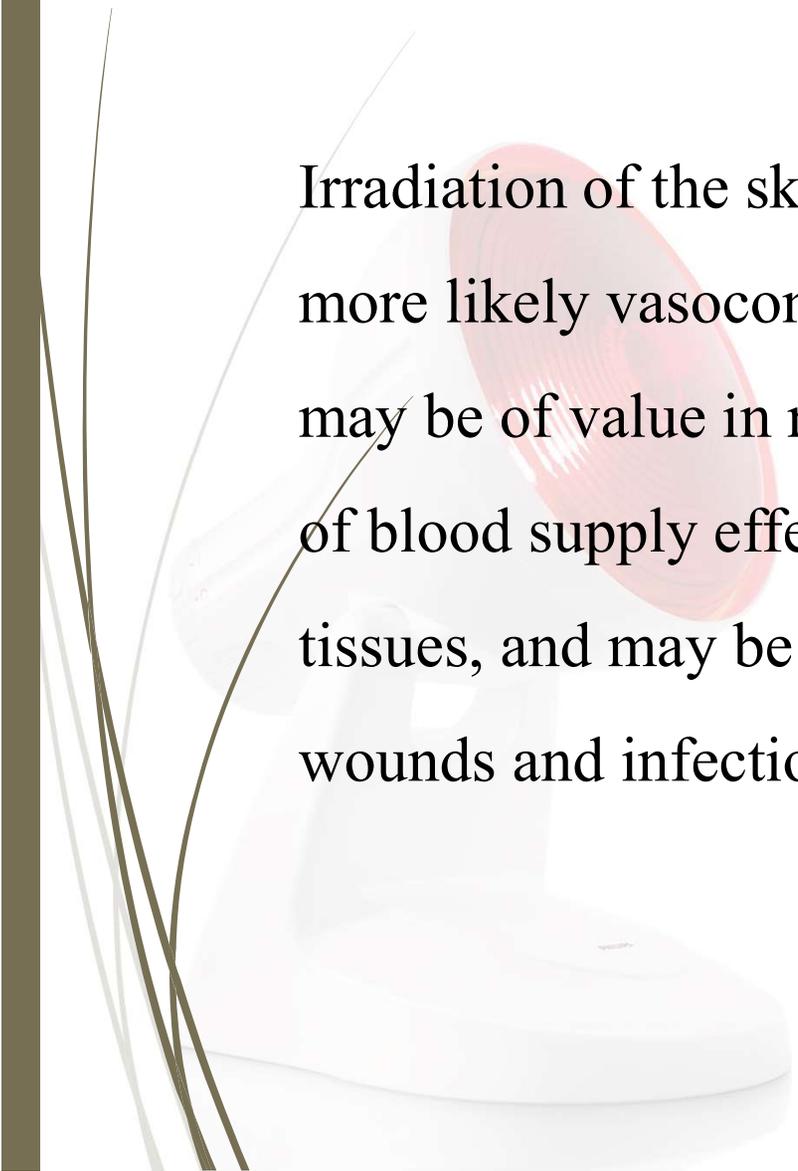
Muscles relax most readily when the tissues are warm and the relief of pain also facilitates relaxation.

Infra-red irradiation is thus of value in helping to achieve muscular relaxation and for the relief of muscle spasm associated with injury or inflammation.

Because it relieves pain and induces muscle relaxation infra red is frequently used a preliminary to other forms of physiotherapy.

A decorative vertical bar on the left side of the slide, consisting of a dark brown vertical line and a red arrow pointing to the right.

3. Increased blood supply

A faint background illustration of a person sitting at a desk, with a red heat pad placed on their lap. The person is wearing a white shirt and a white skirt. The desk is white, and there are some papers on it. The overall scene is dimly lit, with the red heat pad being the most prominent color.

Irradiation of the skin over deeply placed structures is more likely vasoconstriction in the deep tissues, but this may be of value in relieving congestion but the increased of blood supply effect is most marked in the superficial tissues, and may be used in the treatment of superficial wounds and infections.

Dangers of infra-red radiation

1. Burn

- a. Intensity of radiation is so high
- b. Loss of sensation,
- c. Reduce consciousness
- d. Unreliable patients
- e. Accidentally touch of hot element
- f. Metal & Inflammable materials in treated area,

2. Dehydration

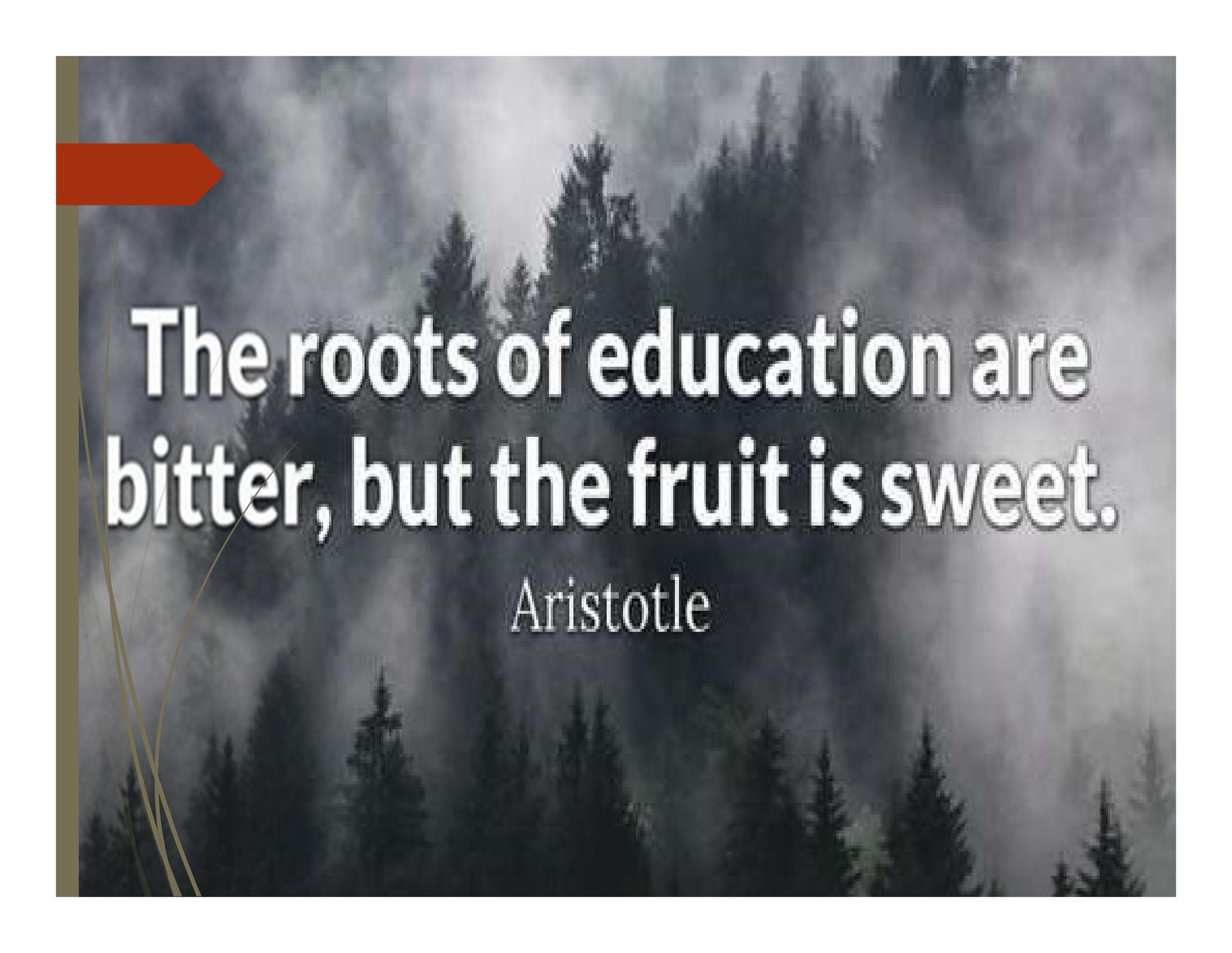
3. Lowering blood pressure & fainting

4. Damage to the eyes

5. Electrical shock

Contraindications and Precautions of Infra-red Radiation

1. Acute inflammatory conditions.
2. Impaired cutaneous thermal sensation and circulation
3. Peripheral vascular disease.
4. Markedly loss of consciousness.
5. Acute skin disease, e.g. Dermatitis or eczema
6. Deep X-ray therapy
7. Defective blood pressure regulation

A dark, misty forest of evergreen trees, likely a coniferous forest, with a soft, ethereal light filtering through the fog. The trees are silhouetted against a lighter, hazy background. In the top left corner, there is a solid red arrow pointing to the right. The quote is centered in the middle of the image.

**The roots of education are
bitter, but the fruit is sweet.**

Aristotle



References

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