

PARAFFIN WAX BATH

INTRODUCTION

- Paraffin wax bath is a superficial agent used for delivering heat to small irregularly shaped areas such as hand, fingers , wrist & foot. Wax bath consist of paraffin wax , mineral oil & petroleum jelly mixed in the ratio of 2:1:1 .
- **Temperature range:**
- Paraffin wax melts at around 54°C but this point can be lowered by the addition of mineral oil.
- The melted wax needs to be maintained at temperature of 40 to 44°C for treatment purpose.

Wax bath unit

- The wax bath is maintained molten in stainless steel and enamelled baths which are electrically heated , temperature is kept constant by thermostat. Some baths have fixed thermometer to check the temperature but instead of all the safety for temperature regulation the temperature of the wax must be checked by the therapist.
- The modern designs of wax bath can be adjusted for height . They are light weight with a stainless steel bowl & outer fiberglass shell.

Methods of application

1. Dip & wrap method:

- This is also known as glove method or pack method. This method can only be used for the extremities such as hands, wrist, feet & ankle.
- The part is immersed for a second in wax bath withdrawn and allowed to cool for 4 to 5 seconds and then reimmersed.
- It is important to immerse the part briefly otherwise the outermost coating is melted off & the thickness of wax does not build.
- The procedure is repeated 6 to 12 times to produce a coating of wax 2 to 3 mm thick over the body part.
- The part is then put in plastic bag or paper cover and wrapped in a towel to limit the rate of heat loss to the air. For any condition in which there is oedema the part should be elevated.

2. Brush method:

If the part can not be immersed in wax bath it is possible to coat the surface by painting the wax using a large wide brush.

3. Pouring method:

Here the melted wax is poured over the part to be treated with the help of stainless steel bowl.

4. Bandage method:

The bandages of suitable size and mesh can be soaked in hot wax and then wrapped around the limb, additional wax can then be brushed over the bandage.

5. Dip and leave in method:

This method is used to achieve a higher temperature for longer periods. After a suitably thick layer of wax has been built up by succession of dips the part is left in the wax for 15 to 20 min. this can produce greater increase in temperature but this method is very uncommon and is often deleterious because it needs continuous observation throughout the treatment.

Physical characteristics or principles of working of wax bath

Skin temperature above 45°C can lead to damage but it is possible to put the hand comfortably in a bath of wax at some 50°C . This is because;

- The specific heat of paraffin wax is about $2.72 \text{ kJ/kg}^{\circ}\text{C}$ or less with added mineral oil and therefore much lower than that of water at $4.2 \text{ kJ/kg}^{\circ}\text{C}$. Thus the amount of energy released by wax cooling 1°C is less than that of water.
- Thermal conductivity of the wax is low so first coating of wax acts to insulate the skin from hotter surrounding wax, so the amount heat delivered can be adjusted by increasing or decreasing the wax layers.
- Some air may be trapped between the solidified wax and the skin adding to insulating effect.

Transmission of heat energy to the tissue:

- The wax transmits heat energy to the tissues by giving up energy as it solidifies i.e. the latent heat of fusion.
- The temperature of thin layer of wax on the tissues falls quite quickly on its outer surface but the low thermal conductivity prevents much heat loss from skin surface. It also prevents any evaporation of water from skin thus further improving the insulating effects, so the net effect of wax treatment is to provide **low temperature heating of part.**

Effects of wax treatment

1. Effects on vessels:

- There is stimulation of superficial capillaries and arterioles causing hyperaemia and reflex vasodilation.

2. Effects on sensory nerve:

- Mild heating appears to have a sedative effects on sensory nerve endings.

3. Effects on the skin:

- Following skin treatment the skin becomes moist and pliable.

Indications

- 1. To relief the pain.
- 2. Degenerative joint diseases like OA of the joints.
- 3. Before mobilising the stiff joints.
- 4. Softening of adhesions and scars.
- 5. Prior to stretching.

Contra indications

- - Open wound – Wax should not be allowed to enter an open wound since it will set in the tissues acting as an inert foreign body and delay healing.
- - Skin infection - Patient with skin infection of the part are not usually treated as heat may increase the inflammatory activity such as acute dermatitis , eczema etc.
- - Defective thermal sensation.
- - Defective arterial blood supply.

References:

- Forster & Palastanga, (2004), Clayton's Electrotherapy; Theory & Practice, Bailliere Tindall, U.K.
- John Low and Ann Reed, (2008), Electrotherapy Explained, Principles and Practice, Elsevier, India.