Unit 6: Hot and Cold Application

Hot and Cold Application

Heat and cold are applied to a part or all of the patient’s body to bring about a local or systematic change in body’s temperature for various therapeutic purposes.

Heat application

Temperature is between 30 – 45 deg. C, electric moist-heat pad with on-off control, hot compresses; not a cream or lotion with a heating effect.

Indications for heat application

1. With chronic injuries - two weeks or more and have persisted for a length of time.

2. Fibromyalgia.

3. Osteoarthritis.

4. Tension headaches.

5. With colds, sinusitis or respiratory tract infections (through steam inhalations).

6. For relaxation (baths).

7. Before deep stretching.

8. After deep tissue work from a therapist.

9. Before exercise to warm the muscles
Examples of Hot Applications

1. **Heating Pad**: place a towel over the area to be treated, apply for up to 10 minutes checking regularly that the skin is not becoming too hot.

2. **Wax Baths (Paraffin Wax)**: within a commercially temperature controlled unit, dip hand or foot into paraffin wax 6 to 10 times, allowing wax to cool between each dip; then place plastic bag over the hand or foot to protect surfaces from the wax; wrap in a towel to retain the heat for up to 20 minutes; peel off wax.

3. **Full Body Baths**: keep temperature below 38 degrees to reduce a stimulating effect especially before bed; keep a cool cloth handy for the forehead and a glass of drinking water to keep you hydrated; herbal extracts, Epsom or Dead Sea Salts(1/2cup – 2 cups) can be added to the water; soak up to 20 minutes.

4. **Steam Inhalations**: sit in front of bowl filled with water that had been brought to boiler stand at stove over pot of water - herbal extracts may also be added; cover head, shoulders and pot with a large towel; close the eyes and inhale steam for up to 10 minutes; allow cool air in as needed if too hot; keep a cool cloth handy to wipe the face

**Local Effects of Heat**

1. vasodilatation and increases blood flow to the affected area.
2. Bringing (oxygen, nutrients, antibodies, and leukocytes).
3. Promote soft tissue healing process.
4. Sedative effect.
5. Increase inflammation.
7. Promote relaxation of muscles, so it relieves muscle pain.
8. **Systemic effects**: include, increase cardiac output, increase heart rate and decrease blood pressure.

**Disadvantage of Heat Application**
1. Increase capillary permeability.
2. Extra cellular fluid and substance as plasma to pass through the capillary walls.
3. Edema.

**Contraindications to the use of heat application**
1. The first 24 hours after traumatic injury (heat increase bleeding and swelling).
2. Active hemorrhage (heat causes vasodilatation and increase bleeding).
3. Non inflammatory edema (heat increases capillary permeability and edema).
4. Skin disorder (heat can burn or cause further damage to the skin).
5. Localized malignant tumor (heat increase cell growth and accelerate metastases).
6. Hypertension or other circulatory issues are present.

**Cold application**
Temperature is between 0 to 12 deg. Celsius; cool is considered between 13 to 18 degree Celsius, not a topical room-temperature cream or lotion with cooling effect.

**Effect of cold application**
1. When applied locally (to affected area) it reduces the temperature of the skin, then the muscles and joints.
2. Effect may last up to 45 minutes after cold source is removed.
3. Restricts blood flow to the area by narrowing the blood vessels (vasoconstriction).
4. Decrease inflammation, swelling and muscle spasm.
5. Reduces bleeding.
6. Decreases pain.
7. Causes a temporary stimulating effect.

**Indications for cold application**

1. Acute and severe injuries – from the moment of the injuring up to 3 days after.
2. As long as pain, heat and swelling are still present.
3. Sprains, strains and bruises.
4. Repetitive use conditions/Overuse injuries and flare-ups i.e.) tendinitis.
5. Carpal tunnel syndrome.
7. During exercise in hot environment - cool down with fans, ice packs and cold towels

**Examples of cold applications**

   Cold applications should not be used for longer than 30 minutes at a time.

1. **Cold Gel Pack/Ice pack**: wrap in a towel to prevent frost bite, place and hold over the area, ice packs contain crushed or chipped ice and are more efficient than commercial gel packs.

2. **Cold Arm/Foot Bath**: size of container depends on body part, great for awkward bony areas such as elbows, hands and ankles; immerse the body part for up to 1 minute; dry thoroughly afterwards. Wrapping body part in a towel can help insulate it while in the cold water.
3. **Ice Cup:** take a paper cup filled with water and put it in the freezer; when frozen tear a way paper to expose ice as you massage/stroke it over affected area. Best suited for muscle injury and larger area.

**Contraindications of cold application**
1. Reynaud's Disease or decreased skin sensitivity to temperature is present.
2. The person feels chilled.
3. Impaired circulation.
4. Do not use over new wounds.

**Contrast - Heat then Cold Application**
Alternating heat then cold causes a flushing effect – blood vessels dilate then constrict, causing an overall increase of circulation to the area, tissue healing and reduces swelling.

It is also thought that the brain is momentarily distracted away from sending or receiving pain messages through the use of contrasting temperatures.
1. Applied in a ratio of 3:1, 3 minutes of heat to 1 minute of cold and repeat 3 times for maximum effect.
2. The greater the difference in temperature of the application, the greater the effect on the local circulation.
3. Always end with cold application to prevent congestion

**Indications of Contrast application**
1. Approximately 2 days to 2 weeks after an injury.
2. The presence of inflammation, swelling and heat should be diminishing.
Examples of contrast applications

1. Arm/Foot Baths:

   for contrast, fill one sink with warm/hot water and the other side
   with cool/cold water (use plastic bins for feet); place body part(s) in
   warm side first then the cool side; repeat 3 times.

2. Compresses:

   have both a hot water basin and a cold water basin available; dip
   one cloth in hot water, wring out and place on area; dip the other cloth
   in the cold water, wring out and replace the hot compress with the
   cold one.

Temperature for hot and cold applications

<table>
<thead>
<tr>
<th>Description</th>
<th>Temperature</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Cold</td>
<td>Below 15 C</td>
<td>Ice bag</td>
</tr>
<tr>
<td>Cold</td>
<td>15 -18 C</td>
<td>Cold packes</td>
</tr>
<tr>
<td>Cool</td>
<td>18 -27 C</td>
<td>Cold Compresses</td>
</tr>
<tr>
<td>Tepid</td>
<td>27 -37 C</td>
<td>Alcohol sponge bath</td>
</tr>
<tr>
<td>Warm</td>
<td>37 -40 C</td>
<td>Warm Bath</td>
</tr>
<tr>
<td>Hot</td>
<td>40 -46 C</td>
<td>Hot soak, hot Compresses</td>
</tr>
<tr>
<td>Very Hot</td>
<td>Above 46 C</td>
<td>Hot water bag for Adult</td>
</tr>
</tbody>
</table>
Therapeutic Effects of Heat and Cold Applications

<table>
<thead>
<tr>
<th>Physiological response</th>
<th>Therapeutic benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heat therapy</strong></td>
<td></td>
</tr>
<tr>
<td>- Promotes vasodilation.</td>
<td>- Improves blood flow.</td>
</tr>
<tr>
<td>- Decreases blood viscosity.</td>
<td>- Increases delivery of oxygen and nutrients, leukocytes, and antibodies to facilitate the inflammatory process.</td>
</tr>
<tr>
<td>- Increases tissue metabolism.</td>
<td>- Facilitates removal of wastes and toxins.</td>
</tr>
<tr>
<td>- Increases capillary permeability.</td>
<td>- Produces a local warming effect.</td>
</tr>
<tr>
<td>- Reduces muscle tension.</td>
<td>- Decreases venous congestion in injured tissues.</td>
</tr>
<tr>
<td></td>
<td>- Increases absorption of fluid by capillaries and promotes removal of excess fluid from interstitial spaces, thereby reducing edema.</td>
</tr>
<tr>
<td></td>
<td>- Promotes muscle relaxation and decreases pain from spasm or stiffness.</td>
</tr>
<tr>
<td><strong>Cold therapy</strong></td>
<td></td>
</tr>
<tr>
<td>- Promotes vasoconstriction.</td>
<td>- Decreases blood flow to site of injury, thereby decreasing inflammation and edema formation.</td>
</tr>
<tr>
<td>- Increases blood viscosity.</td>
<td>- Decreases blood flow, facilitating clotting and control of bleeding.</td>
</tr>
<tr>
<td>- Decreases tissue metabolism.</td>
<td>- Reduces the tissues’ oxygen consumption.</td>
</tr>
<tr>
<td>- Has a local anesthetic effect.</td>
<td>- Raises the threshold of pain receptors, thereby decreasing pain.</td>
</tr>
<tr>
<td>- Decreases muscle tension.</td>
<td></td>
</tr>
</tbody>
</table>
Precautions in the use of heat and cold applications

1. Neurosensory impairment: Clients with reduced perception of sensory or painful stimuli (e.g., spinal cord injuries) are at an increased risk for tissue injury.

2. Impaired mental status: Clients who are confused or unconscious need to be monitored and assessed frequently to ensure safety.

3. Impaired circulation: Clients with cardiovascular and peripheral vascular problems or diabetes may not have the ability to dissipate heat through dilation of blood vessels and are at an increased risk for tissue injury.

4. Skin and tissue integrity (open wounds, broken skin, scar formation, edema): Subcutaneous tissues are more sensitive to temperature variations than are superficial tissues. (e.g., cold can decrease blood flow to an open wound, thereby inhibiting healing).

Common Methods of Applying heat and cold

1. Hot water bag (bottle)
   - More Common source of dry heat
   - Inexpensive
   - Improper use leads to burning

2. Hot and cold packs
   Commerially prepared hot and cold packs provide heat or cold for a designated time
3. **Electrical Pads**
- Provide constant heat
- Are light weight
- Some have water proof covers to place over a moist dressing

4. **Ice Bags,**
- Filled either with ice chips.

5. **Compresses**
- Can be either warm or cold
- Are moist gauze dressing applied to a wound

6. **Soak**
- Refers to immersing a body part in a solution
- Sterile technique is generally indicated for open wound

7. **Sits Bath or hip bath**
- Used to soak a client’s pelvic area
- The client’s sit on the chair and immersed in the solution

8. **Cooling Sponge Bath**
- Promoting heat loss through conduction
- Companied by antipyretic medication