



FourLegRehabInc

CANINE REHAB EDUCATIONAL RESOURCES

Modalities Update – Part 3

Laurie Edge-Hughes, BScPT, MAnimSt (Animal Physio), CAFCI, CCRT

The Canine Fitness Centre Ltd., Calgary, AB, Canada

Four Leg Rehab Inc, Cochrane, AB, Canada

Hot

- Thermal Therapies (HOT)
 - Mechanisms of Heat Exchange
 - Conduction (direct contact) ie hot packs
 - Convection (directing air or liquid) ie dryers
 - Radiation (from warm to cool) ie lamps
 - Conversion (altering energy) ie Ultrasound
 - Evaporation (fluid changes to vapor) ie perspiration



Hot

- Thermal Therapies (HOT)
 - INDICATIONS
 - Pain Relief
 - To increase circulation
 - Muscle spasm
 - Facilitate tissue healing
 - Prepare a stiff joint or muscle for exercise
 - Chronic swelling
 - Tissue scarring



Hot

- Thermal Therapies (HOT)
– CONTRAINDICATIONS

<ul style="list-style-type: none"> • Large area or high enough temps as to raise core body temps in pregnant patients, or patients with cardiac issues • Patients with DVT / thrombosis / thrombophlebitis • Patients infected with TB • Areas of impaired sensation • Actively bleeding tissues • Over reproductive organs (testes) 	<ul style="list-style-type: none"> • Recently irradiated tissues • In patients unable to give accurate / timely feedback • Areas of impaired circulation • Inflamed tissues (d/t recent injury or chronic flare-up) • Over heat sensitive skin • Over areas of skin break-down • Areas of edema
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Hot

- Thermal Therapies (HOT)
– CAUTIONS



- Areas near or over eyes
- Anterior neck & carotid sinus
- Pregnant women
- People with cardiac failure

Hot

- Thermal Therapies (HOT)
 - SAFE

- | | |
|---|--|
| <ul style="list-style-type: none"> • Over implants containing metal, plastic, or cement • Over electronic devices • Near chronic wounds • Over superficial or regenerating nerves | <ul style="list-style-type: none"> • Near the head, chest, or heart • Over active epiphysis • To patients with hypertension |
|---|--|

Hot

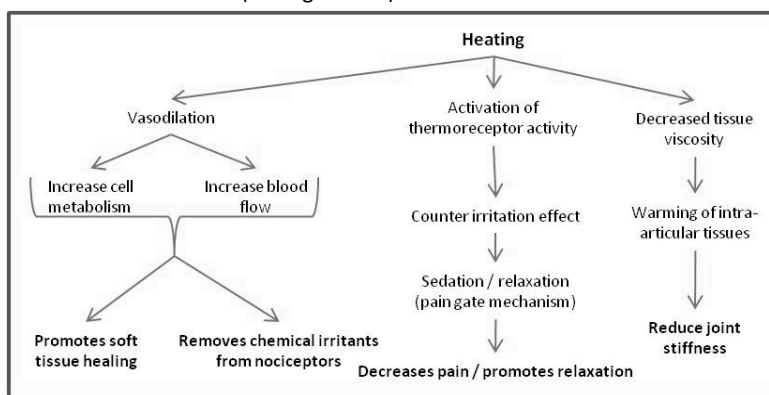
- Thermal Therapies (HOT)
 - PHYSIOLOGICAL EFFECTS
 - Increased local circulation
 - Decreased pain
 - Increased tissue extensibility
 - Decreased muscle spasm
 - Muscle relaxation
 - Via dilation of blood vessels and stimulation of local circulation, heat helps to mobilize tissue & metabolites, increase tissue oxygenation and increase metabolic rate of cells and enzyme systems.



Hot

☉ THERMOTHERAPY

> Proposed sequences of physiological & cellular functions... (Belanger 2004)



Hot

• Thermal Therapies (HOT)

– APPLICATION

- Best AFTER the acute inflammation stage
- Superficial heat directly penetrates only 1cm
- Most profound physiological effects are when tissue temps are raised to 105 - 113 degrees F.
- Skin & subQ fat will rise to these temps after 5 mins of superficial heat
- Deeper tissues need 15 – 30 mins to achieve the same (with superficial heat)
- Water as hot as the hand can tolerate is 101 – 105 F.
- Heat in one location may cause reflex vasodilation at a distal site.

Cold

- Cryotherapy (COLD)

- INDICATIONS

- Pain relief
- Inflammation
- Reduce swelling
- Hemorrhage
- Fever
- Muscle guarding spasm
- Control bleeding



Cold

- Cryotherapy (COLD)

- Contraindications



Impaired circulation
 Over chronic wounds
 Over regenerating nerves
 Patients with cold sensitivities

To patients with DVT / thrombosis / thrombophlebitis
 To anterior neck & carotid sinus
 To tissues affected with tuberculosis

Cold

- Cryotherapy (COLD)

- PRECAUTIONS (may treat this condition with lower intensities and/or more monitoring)

- To areas of impaired sensation
 - Tissues near / over eyes
 - Damaged or at risk skin
 - To patients with cardiac failure (reduce intensity or size of application)
 - To patients with hypertension (reduce intensity or size of application)



Cold

- Cryotherapy (COLD)

- SAFE

- Over active epiphysis
 - Over metal, plastic, or cement implants
 - Over electronic devices
 - Over areas of known malignancy
 - Over low back or abdomen of pregnant patients
 - Over recently irradiated tissues
 - Over reproductive organs
 - Skin diseased areas
 - Over the chest, heart, head
 - Any inflamed tissues

Cold

- Cryotherapy (COLD)

- EFFECTS

- Decrease in local circulation
- Decrease in pain
- Decrease in tissue extensibility

- MECHANISMS OF ACTION

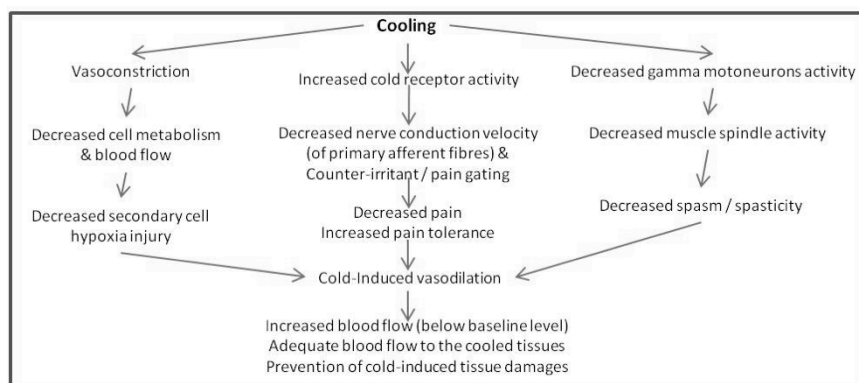
- Constriction of blood vessels
- Decreased tissue metabolism
 - » (inhibits inflamm. mediators)
- Affects small myelinated nerve fibres
 - » (reduce nerved conduction)
- Cold can directly affect 1 – 4 cm depths



Cold

- CRYOTHERAPY

- Physiologic effects... (Sluka 2009; Belanger 2004)



Cold



- **Cryotherapy (COLD)**

- APPLICATION

- Apply in the first 48 hrs following acute musculoskeletal injuries or any time there is heat and swelling
 - Repeat every 2 – 4 hrs for 10 – 20 minutes
 - Current trends are using cold for hours at a time (cryocuff, game-ready...)
 - Effects occur when tissue temp gets between 59 – 66 degrees F.
 - Do not allow for an airspace between the skin and cold medium (air gets colder and can damage the skin)

