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## Prevention and Treatment of Athletic Injuries

Westfield High School  
Houston, Texas

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## Cryotherapy

- Application of cold for the first aid of trauma
- Reduces many of the adverse conditions related to the inflammatory or reactive phase of an acute injury
- R.I.C.E may be used from day one to as long as day 14 of post trauma

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## Cryotherapy

- Two most common means to apply cold as therapy to the body are ice or cold packs and immersion in cool or cold water.
- Wet ice is the most effective type of application, rather than ice in a plastic container or in a commercial chemical pack.

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## Physiological Effects of Cold



- Placing cold to the skin for fifteen minutes or less at a temperature of 50 degrees F or less will cause vasoconstriction.
- If cold continuously applied for 15 to 30 minutes, an intermittent period of vasodilation occurs for four to six minutes. This is known as the hunting response, a reaction against tissue damage from too much cold exposure.

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## Physiological Effects of Cold



- Cold lowers the metabolic rate and produces vasoconstriction, swelling will be reduced in an acute inflammatory response. Cold does not reduce swelling that is already present.
- Cold decreases free nerve ending excitability as well as the excitability of peripheral nerves. Analgesia is caused by raising the nerves threshold.

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## Physiological Effects of Cold



- Cold, in general, is more penetrating than heat.
- Once a muscle has been cooled through the subcutaneous fat layer, cold's effects last longer than heat effects because fat acts as an insulator against rewarming.

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## Physiological Effects of Cold



- Cooling also has the ability to decrease muscle fatigue and increase and maintain muscular contraction. This is because of a decrease of the local metabolic rate and the tissue temperature.

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## Considerations for Cold Application, page 346



- Some individuals are allergic to cold and react in hives and joint pain and swelling.
- Raynaud's Phenomenon: is a condition that causes vasospasm of digital arteries lasting for hours, which could lead to tissue death. The early signs are attacks of intermittent skin blanching or cyanosis of the fingers or toes, skin pallor followed by redness, and finally a return to normal color. Pain is uncommon, but numbness, tingling, or burning may occur during and shortly after an attack.

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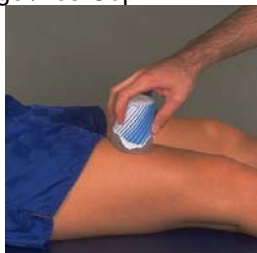
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## Cryotherapeutic Methods



- Ice Massage / Ice Cup



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## Cryotherapeutic Methods



- Ice Massage is used over small muscle areas. Seldom is there tissue damage.
- Cold or Ice Water Immersion: Place limb or injured anatomy in 50 degree water. Collagen becomes brittle and care must be taken if returning athlete to activity after therapy.

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## Cryotherapeutic Methods



- Ice Bags: Wet Ice is best, but messier. Chemical packs also can be used with caution.



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## Cryotherapeutic Methods



- Vasocoolant Sprays: to reduce muscle spasm and increase range of motion. Often seen at baseball games.



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## Thermotherapy



- Heat is an energy form that increases molecular activity by conduction, convection, and radiation. Thermotherapy modes are moist, dry, superficial, and deep.

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## Thermotherapy



- The desirable effects of heat include increasing the extensibility of collagen tissues; decreasing joint stiffness; reducing pain; relieving muscle spasm; reducing inflammation, edema, and allowing the swelling to spread out in all directions in the postacute phase of healing; and increase blood flow.

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## Thermotherapy



- Muscle cramps caused by ischemia can be relieved by heat.
- Ischemia is the lack of blood supply to a body part.

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## Special Considerations of Thermotherapy



- **NEVER APPLY HEAT TO:**

- Where there is a loss of sensation
- Immediately after an injury
- When there is a decreased arterial circulation
- Directly over the eyes or genitals
- Over the abdomen during pregnancy
- To a body part that exhibits signs of acute inflammation

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## Moist Heat Therapies



- Moist Heat Packs / Hydrocollator – Retain heat for 20 to 30 minutes. Heated between 160 – 170 degrees and must be careful not to burn athlete



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## Moist Heat Therapies



- Whirlpool Baths: not higher than 104 degrees. Careful with full body immersion. Keep water and whirlpool clean and change water often.

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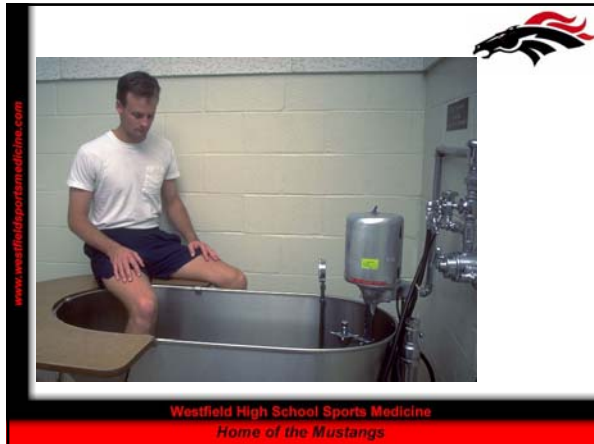
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### Moist Heat Therapies

- Paraffin Bath : good for heating distal extremities. Temperature of 126 – 130 degrees. Hot wax mixed with mineral oils.

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## Moist Heat Therapies



- Contrast Bath: alternating between cold and warm whirlpools. Used when a slight increase of temperature increase is needed without the and increase of additional edema.

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## Heat and Cold Therapy



- Both heat and cold will relieve pain!! Too many ole remedies of heat during initial phase of recovery are still being used. Tell athlete that under no circumstance that heat is to be used during an initial phase of injury.

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