The Use of Cold in Athletic Therapy

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The use of cold to treat sports injuries is an almost universal practice in the U.S. Ice machines and freezers are some of the most well-used pieces of equipment in sports medicine clinics and athletic training rooms.

Cold is applied with ice packs, cold-gel packs, artificial ice cube packs, instant ice packs, ice massage, ice immersion baths, cold whirlpools, vapocoolant sprays and cuffs, and commercial cold equipment such as CryoCuff, Polar Care, or Icy/Hot machines. The type of cold selected depends on availability, purpose of treatment, and whether it will be combined with another modality such as electrical stimulation or elevation. Since cold machines can be expensive to purchase or operate, cost is a consideration.

The effects of cold are well documented. It temporarily reduces muscle tone and spasticity, and it decreases pain by slowing nerve impulses to affected muscles and pain fibers. It produces vasoconstriction, the amount and depth depending upon type of cold applied, duration of application, temperature of cold modality, and thickness of superficial fat. Cold also reduces cell metabolic activity and thus helps prevent secondary hypoxic injury to healthy cells from capillary leakage and swelling in the injured area.

Cold is a safe modality. However, some people are allergic to cold and develop urticaria. Although there is a chance of frostbite, the possibility is remote as long as the cold is applied for a short time of no more than 30 min and is regular ice—not a gel, artificial ice cube, or instant cold pack. The freezing point of human tissue is below that of water. Therefore, regular ice, even wrapped on, generally cannot cause frostbite. There have been reported cases of cold-induced nerve palsy, but in those cases ice was wrapped over a superficial nerve for extended periods of time.

Various acronyms—RICE, ICE, PRICE—describe treatment of acute injuries; the “I” refers to ice or cold. Cold is recommended for the first 48 to 72 hrs after injury, or until acute bleeding and capillary leakage has stopped, whichever is longer. The question then is, What, if any, is the role of cold following resolution of acute symptoms?

Some researchers have devised ways to apply cold throughout rehabilitation. Kenneth L. Knight, author of Cryotherapy in Sport Injury Management (Human Kinetics Publ., 1995), developed two rehabilitation systems with alternating cold and exercise. Cryokinetics is for ligamentous injuries, and cryostretch is for musculotendinous injuries. These modalities can also be combined to treat post-acute musculotendinous injuries.

Cryokinetics and cryostretch use cold to permit pain-free exercise. Most rehabilitation programs employ exercise as the major treatment, using thermal and electrical modalities only to facilitate the exercise. Cryokinetics and cryostretch are modifications of the acute care cold treatment. Both act to provide a pain-free environment for exercise.

Cryokinetics

Cryokinetics, used for ligamentous injuries, alternates 5 bouts of cold, preferably ice immersion, with active exercise. The injured body part is numbed, generally 10 to 20 min of immersion, and the athlete is instructed in various exercises. These exercises are progressive. They begin with simple, non-weight-bearing activities and progress to more complex, weight-bearing ones. This progression may occur over one treatment session or over several, depending on the severity of the injury.

All exercise bouts must be pain free. The athlete should not work through pain. As the mild anesthesia from the cold wears off, the body part is re-numbed with a 3- to 5-min cold treatment. This cold/exercise pattern is repeated 3 or 4 more times. It ends with exercise if the athlete is participating in practice, or with cold if he or she is not participating in practice.
Cryostretch

Cryostretch, a treatment for musculotendinous injuries, uses 3 bouts of cold, generally ice massage, ice pack, or cold pack, alternated with static and hold/relax stretching. It helps reduce the muscle spasm that may accompany musculotendinous injury. Cold is applied for 10 to 20 min to induce numbness. Then a 20-sec static stretch is applied, followed by a 5-sec contraction (hold) and a 10-sec relax/stretch.

The 5-sec hold, 10-sec stretch pattern is performed 3 times. The body part is returned to anatomic position for 20 sec, and the static stretch, hold/relax stretch pattern is repeated a second time. Following the second stretching bout, the body part is renumbed for 3 to 5 min. The stretching sequence is repeated, the body part is renumbed, and the stretching sequence is done again. This completes the treatment if the athlete is practicing; otherwise it ends with a 20- to 30-min cold treatment.

Combination Treatments

Cryostretch can be combined with cryokinetics as the athlete progresses. The combination treatment session begins with one initial numbing and stretching sequence. Following the last stretch of the initial sequence, the athlete performs 1 set of 6 to 10 reps of manual resistance exercise appropriate for the injured body part. The numbing, stretching, and exercise sequence is repeated 2 more times. If the athlete is attending practice, the treatment stops; otherwise it ends with a 20- to 30-min cold treatment.

Since cold of some type is generally available, cryokinetics and cryostretch treatments can be performed anywhere. They do not depend on expensive equipment and need only cold, an open space, and effort and planning by the athletic therapist and the athlete to be successful.

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