Ice and cold application for musculoskeletal soft-tissue trauma

Background
Ice and cold application (cold cryotherapy) have long been used by athletic trainers, physical therapists, occupational therapists, and physicians in the treatment of soft-tissue musculoskeletal injury. It is safe to say the idea is not new. Hippocrates first described the use of cold application as an analgesic measure around 400 BC.¹

Review of the evidence
More modern experts assert 3 main physiologic effects from cold cryotherapy. First, it is suggested that decreasing tissue temperature vasoconstricts nearby vasculature, slowing bleeding into damaged tissue. Second, there is a proposed decrease in the release of inflammatory mediators from damaged muscle/tendon/ligament tissue, hindering protein extravasation from the vasculature. Finally, there is almost universal belief that cold therapy facilitates analgesia, perhaps by slowing nerve conduction.²,³

Although these responses to cold application may seem intuitive physiologically, little scientific evidence exists to support these claims. The studies that have been performed to evaluate the therapeutic effect of cold cryotherapy are of such low quality as to only further confound the issue.

Authors of a meta-analysis hoped to clarify the issue by searching MEDLINE, the Physiotherapy Evidence Database (PEDro), SPORTDiscus, Cochrane reviews, and CINAHL for studies using cold cryotherapy in the treatment of soft-tissue musculoskeletal pathology. Return to sports participation was the main outcome evaluated.⁴

Covering the years from 1976 to 2003, the authors found just 4 articles of original research. They used the PEDro scale to rate each study’s methodologic quality. The PEDro scale is scored from 0 to 10, with 10 being the highest quality study. None of the 4 papers rated higher than 4. Furthermore, 2 of the 4 studies noted no difference between patients treated with cold cryotherapy and patients receiving no cold treatment, including the study with the highest PEDro score.⁴

Later in 2003, a double-blind RCT evaluated the use of a menthol-based cold-producing gel (CPG) versus placebo. The CPG is assumed to lower the temperature of the tissue to which the gel is applied. The 74 patients who had sports-related soft-tissue injury of any body part (primarily the ankle and knee) were divided into 2 groups. The first group used CPG on the affected body part 4 times a day for 14 days, and the other group used a placebo gel for the same frequency and duration. Neither group was informed of the sensation associated with gel application; likewise, the effects of cold therapy were not discussed with any of the participants.⁵

On day 7 after treatment initiation, visual analog scale (VAS) pain scores (from 0 [no pain] to 100 [worst pain]) had decreased by 29 in the CPG group and by 13 in the placebo group (P<.001). On day 28, 2 weeks after cessation of treatment, VAS pain scores had decreased by 52 in the CPG group and by 45 in the placebo group (P<.001).⁵ A deficiency of this study was that there was no group using traditional cold cryotherapy agents (eg, ice) for comparison.

Clinical considerations
Cold cryotherapy is an ancient treatment modality currently recommended by almost all musculoskeletal professionals. Unfortunately, exceedingly few high-quality clinical trials have evaluated its efficacy in the treatment of soft-tissue trauma. Although initial results with menthol-based gel suggest its effectiveness for reducing the pain of musculoskeletal soft-tissue trauma, it is not clear how this therapy compares with traditional (and inexpensive) methods of cold application.⁶

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REFERENCES

We invite your questions and feedback. Email us at EBP@fpin.org.