Is cryotherapy effective for acute management of ankle sprain?

Evidence-based answer
Cryotherapy in combination with exercise may be slightly more effective than other treatments for acute ankle sprain (SOR: B, systematic review with significant study heterogeneity). Intermittent cryotherapy may be more effective for pain relief than standard cryotherapy during the first week (SOR: B, single RCT).

Evidence summary
A 2004 systematic review of 6 RCTs with 267 patients with ankle injuries evaluated cryotherapy as a part of treatment. Eight different cryotherapy regimens were studied. Study quality was rated by a 10-point Physiotherapy Evidence Database Scoring Scale. Study characteristics and quality along with intervention effect-size estimates for outcomes are summarized in the TABLE. Ice therapy was generally associated with less swelling than heat or contrast therapy and was better at pain relief than no therapy. Cryotherapy was also associated with a small improvement in function when combined with compression compared with compression alone.

A single RCT published after the systematic review above compared 2 cryotherapy protocols for treatment of grade 1 or 2 acute ankle sprains in 89 patients aged ≥16. A standard cryotherapy regimen of melted ice water in 20×20-cm plastic bags applied for 20 minutes every 2 hours for the first 72 hours after injury was compared with an intermittent cryotherapy regimen of application for 10 minutes, followed by removal for 10 minutes, then reapplication for 10 minutes; this strategy was repeated every 2 hours as above. Measures of function, pain, and swelling were recorded for 6 weeks after injury.

Pain with activity, as measured by a 10-cm visual analog scale, was lower in the intermittent cryotherapy group during the first week only (2.8 vs 4.0; P<.05). No differences were noted between
groups in function, swelling, or pain at rest at any time, or in pain with activity after the first week postinjury.2

Recommendations
A recently published evidence-based clinical guideline on the diagnosis, treatment, and prevention of ankle sprains developed under the auspices of the Royal Dutch Society of Physical Therapy cautions that “there are no indications that the use of ice only is effective to reduce swelling, increase function and reduce pain at rest in the event of an acute ankle injury,” yet also states that “ice and compression in combination with rest and elevation is an important aspect of treatment in the acute phase of lateral ankle injury.”3

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<table>
<thead>
<tr>
<th>N in trial</th>
<th>Cryotherapy</th>
<th>Comparison</th>
<th>Outcome: effect size (95% CI)</th>
<th>PEDro</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Ice bath + exercise</td>
<td>Heat + exercise</td>
<td>Swelling: 1.4 (0.35 to 2.3)</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>Ice bath + exercise</td>
<td>Contrast bath + exercise</td>
<td>Swelling: 2.4 (1.13 to 3.4)</td>
<td>5</td>
</tr>
<tr>
<td>30</td>
<td>Ice</td>
<td>Ice + E stim frequency 28 pps</td>
<td>Pain: -0.64 (-1.5 to 0.28)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Swelling: -0.47 (-1.3 to 0.44)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ROM: -0.69 (-1.6 to 0.24)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Ice</td>
<td>Ice + E stim frequency 80 pps</td>
<td>Pain: -0.62 (-1.5 to 0.3)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Swelling: -1.4 (-2.3 to 0.36)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROM: 1.4 (-2.3 to -0.3)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Ice + compression</td>
<td>No Rx</td>
<td>Pain: 1.5 (1.2 to 1.8)</td>
<td>3</td>
</tr>
<tr>
<td>34</td>
<td>Ice + compression</td>
<td>Compression (same mode)</td>
<td>Function: -0.14 (-0.97 to 0.7)</td>
<td>3</td>
</tr>
<tr>
<td>34</td>
<td>Ice + compression</td>
<td>Compression (different mode)</td>
<td>Function: 0.55 (0.32 to 1.4)</td>
<td>3</td>
</tr>
</tbody>
</table>

Positive numerical outcomes favor cryotherapy. Outcomes in boldface type are statistically significant.

E stim=electrical stimulation; PEDro=Physiotherapy Evidence Database Scoring Scale; pps=pulses per second; ROM=range of motion.

ARR=absolute risk reduction
CDC=Centers for Disease Control and Prevention
CI=confidence interval
CT=computed tomography
FDA=US Food and Drug Administration
HR=hazard ratio
LOE=level of evidence
MRI=magnetic resonance imaging
NNH=number needed to harm
NNT=number needed to treat
NSAID=nonsteroidal anti-inflammatory drug
OR=odds ratio
RCT=randomized controlled trial
RR=relative risk
SOR=strength of recommendation
SSRI=selective serotonin reuptake inhibitor

EBP