“Ice It.” Why the Ubiquitous Advice Isn’t Healing Your Injury

Boston (March 30, 2015)—Applying ice to a muscle after injury is a commonly prescribed therapy for treating muscle bruises. But does it really speed recovery time and help the muscle to heal?

Researchers from the Institute of Health and Biomedical Innovation at Queensland University of Technology in Australia investigated whether icing after a muscle impact injury contributed to new blood vessel formation (angiogenesis) and muscle regeneration.

The research team looked at two groups of rats with thigh contusions. One group received ice within five minutes of injury for 20 minutes. The second group received no ice. During the acute phase three days after injury, infiltration of inflammatory cells and the markers of angiogenesis—vascular endothelial growth factor (VEGF) and von Willebrand factor (vWF)—were lower in the icing group compared with the non-icing group. During the early repair phase (seven days), inflammatory cell numbers were higher, while VEGF and vWF expression remained lower, in the icing group compared with the non-icing group. In the late repair phase (28 days), inflammatory cell numbers, VEGF expression and the number of regenerating muscle fibers were all greater in the icing group (causing less inflammation and swelling) compared with the non-icing group. Muscle fiber cross-sectional area was similar between the groups at seven and 28 days after injury.

Despite popular belief, inflammation can be an important process in tissue regeneration. The results suggest that ice may delay inflammation, angiogenesis and the formation of new muscle fibers during recovery from severe muscle injury. “These findings challenge the practice of using ice to treat muscle injuries,” the research team wrote. Practitioners should therefore reconsider how they use treatments such as icing and non-steroidal anti-inflammatory drugs to manage acute soft tissue injuries.

Jonathan Peake will present “The Effects of Topical Icing after Contusion Injury on Angiogenesis in Regenerating Skeletal Muscle” in a poster session on Monday, March 30, at the Experimental Biology Meeting (Boston Convention and Exhibition Center from 12:45 to 3:00 PM EST).

**Full Abstract**

We investigated the effects of topical icing after muscle contusion injury on angiogenesis in regenerating skeletal muscle. Male Wistar rats were subjected to contusion injury by dropping a cylindrical-shaped weight (370 g) on the biceps femoris muscle of one leg. Within 5 min after injury, a block of ice (contained within a paper cup) was applied to the skin surrounding the muscle for 20 min. Control groups received no ice treatment. The rats were euthanized at 1, 3, 7 and 28 days post-injury (n=24 per time point). In 12 rats in each group, a punch biopsy (diameter: 8 mm) was taken from the region of injury and fixed in 10% neutral buffered formalin. Tissue sections (5 mm) were then mounted on glass slides for immunohistochemical analysis of CD68+ macrophages, vascular endothelial growth factor (VEGF) and von Willebrand's factor (vWF). After euthanasia, the others rats in each group were flushed with heparinized saline, and then perfused with a radio-opaque contrast agent using an infusion pump. Muscle biopsies were also collected from these rats, and analyzed to determine blood vessel volume and number using high resolution micro computed tomography. Macrophage numbers were lower at all time points, VEGF expression and vessel number were lower at 3 days and vWF expression and vessel...
volume were lower at 3 and 7 days post-injury in the icing group versus the non-icing group (p<0.05). By contrast, VEGF expression and vessel number were higher at 28 days post-injury in the icing group versus the non-icing group (p<0.05). In conclusion, topical icing suppressed inflammation but also delayed angiogenesis in regenerating muscle. These findings challenge the practice of using ice to treat muscle injuries.

NOTE TO JOURNALISTS: To schedule an interview with a member of the research team, please contact Stacy Brooks at sbrooks@the-aps.org or (240) 432-9697.

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Physiology is the study of how molecules, cells, tissues and organs function in health and disease. Established in 1887, the American Physiological Society (APS) was the first U.S. society in the biomedical sciences field. The Society represents more than 11,000 members and publishes 14 peer-reviewed journals with a worldwide readership.