

## Research Abstract

**Academy Title:**Topp2007\_BF

**Research Article:** Effects of Menthol on Skeletal Muscle Blood Flow

**PURPOSE:** Commercially sold menthol balms and ointments are commonly used after exercise to retard inflammation and to serve as a cooling pain reliever. However, the effect of menthol on blood flow response is not well established. The purpose of this study was to investigate the effects of a natural menthol product\* (3.5%) on blood flow in the forearm. **METHODS:** Twelve males and females between the ages of 21-32 years (24 ± 4 years) were recruited to participate in the study. Blood flow was measured in the brachial artery using quantitative Doppler ultrasound before and after the application of a 3.5% menthol ointment to the forearm. The application of ice to the other forearm of each subject served as a control for the study. Forearm surface area was measured (553 ± 84 cm<sup>2</sup>) for each person and used to standardize the amount of ointment applied for each person (2.77 ± 0.42 mL). Continuous blood flow measurement for 5 minutes before and for 10 minutes after the application of the ointment or the ice allowed for the determination of the time course of the blood flow response. The blood flow response was averaged after the application of the menthol or ice to give blood flow measurements at 30, 60, 120, 180, 240, and 600 seconds, respectively. **RESULTS:** Blood flow was not significantly different between the conditions at baseline or after the application of the menthol ointment or the ice ( $p = 0.204$ ). The average blood flow response over the 10 minutes post application was reduced by approximately 30% compared to baseline. A repeated measures ANOVA indicated that there was a significant time effect for blood flow ( $p < 0.001$ ). Post hoc analysis indicated that blood flow was significantly reduced from baseline at 30, 60, 120, 180, and at 600 s ( $p < 0.040$ ). Furthermore, the blood flow at 30 and 60 s was reduced (~ 43%) to a greater extent than at 120, 180, 240, and 600 s (~ 23%) ( $p < 0.039$ ) compared to baseline. There was no significant difference between 30 and 60 seconds or between any time points after 120 second. **CONCLUSIONS:** The application of a 3.5% menthol ointment elicits an immediate decrease in blood flow for up to 10 minutes after its application. The reduction in blood flow was similar to the response associated with the ice condition. **PRACTICAL IMPLICATIONS:** Natural menthol product (3.5%) have a similar effect to the application of ice on decreasing blood flow by an average of 30% up to ten minutes following the application.

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