Cold gel effects verified by thermal skin sensors and simultaneous dynamic thermography

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Aim:

Cold gel is used daily by hundreds of thousands of patients in the field of sports and occupational medicine. The subjective effectiveness is well documented. However, the objective temperature change and the duration of effect on treated area have to our knowledge not been studied .

Methods:

We recorded surface temperature of right vastus lateralis -muscle in 6 healthy adults with 8 thermal sensors taped to the border and 2 to the center (custom made, VTT, Finland) of a 6 x 12 cm skin area. 6 sensors were applied also to outside areas and to the left leg.

Temperature was recorded simultaneously from a distance of 60 cm once every minute (3 s epochs, sampling frequency of 25 Hz) with a medical IR-imaging system (Thermidas Ltd., Finland). Imaging was done at baseline and during cooling the area when a standard amount of cold gel (IcePower, Fysioline, Finland) had been applied to the skin.

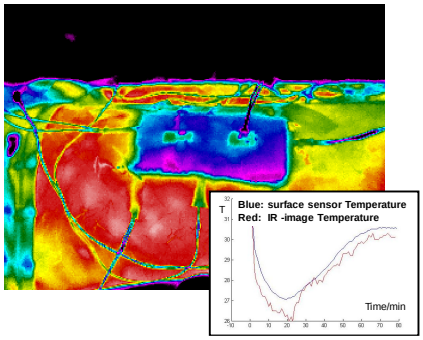


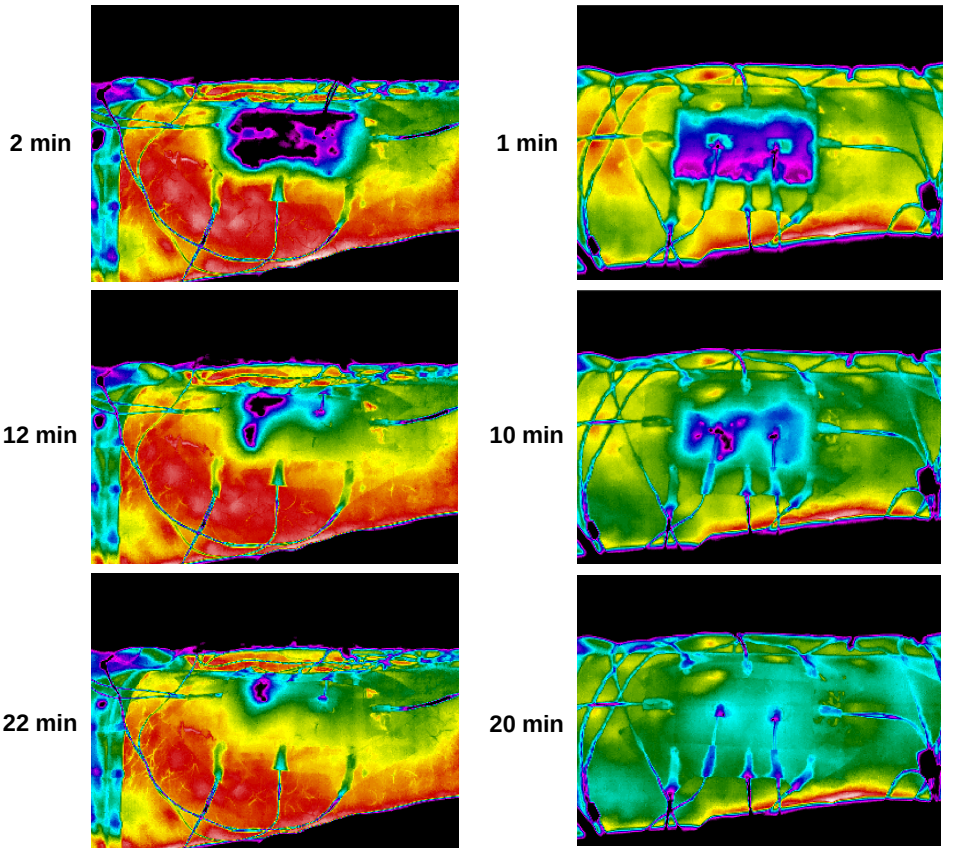
Figure 1: Cold gel (IcePower, Fysioline, Finland) was applied to 12 x 6 cm area at right lateral thigh. IR thermal image is taken immediately after the application of cold gel.

Results:

- Highly significant cooling of gel area (on average 4 degrees Celsius on the 6 x 12 cm skin area of cold gel application) was evident in all subjects.
- The relative dynamic change of temperature (observation accuracy of 0.02 degrees Celsius) was similar within 95 % confidence limits both in surface sensors and in the corresponding area of IR -images. *p<0.05*).
- Maximal effect appeared at 10 -15 min from application and duration of measurable effect was individual varying between 60-90 min
- We also observed an average cooling of 1 degree below the knee during the 60-90 min recording period.

Case 1, IR –images at 10 min interval

Case 2, IR –images at 10 min interval



Conclusions:

The effect of cold gel as verified by two independent methods is highly local, prominent up to several degrees of C and duration of about 1 hour. The preservation of medial and lateral thigh temperature may be related to compensatory circulatory mechanisms upon cold gel application and warrants further studies.