Thermal sensitivity to a warm and a cold stimulus: An age comparison

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Thermal Sensitivity to a Warm and a Cold Stimulus: An Age Comparison

Thermal sensitivity is one of the main sensory modalities of the skin and is suggested to alter with age as the ability to detect temperature change declines. Consequently, during extreme weather conditions, older individuals may be more at risk of cold- and heat-induced illness than their younger counterparts. Previous studies have assessed age-related differences in thermal sensitivity at a limited number of body regions. However, little is known about how sensitivity varies over the entire body as it ages. This study investigated regional and age-related differences in warm and cold sensitivity in young and older individuals, using a body-mapping approach.

13 young (18-30 yrs) and 13 older (60-90 yrs) healthy males, matched for body characteristics, volunteered for the study. After a familiarisation session, participants rested in a thermo-neutral environment (25°C/40% RH) on two occasions, whilst a pressure controlled thermal probe set at 40°C (WARM trial) and 20°C (COLD trial) was applied to 33 body regions in a balanced order. Participants used a perceptual scale to rate thermal sensation pre and post (10 s) probe application. Whole body thermal sensation, thermal comfort and skin and core temperature were also recorded throughout the trials.

Sensitivity to WARM and COLD stimuli varied significantly between body regions within each age group ($p < 0.05$). However, there were only significant age-related differences at the foot. The older group were significantly less sensitive at the top and sole of the foot in response to a WARM stimulus and at the top of the foot only to a COLD stimulus ($p < 0.05$). The most sensitive region to COLD was the lateral torso and the least sensitive was the top of the foot in both groups. However, this varied between groups in response to WARM. Furthermore, it was observed that the inter-individual variation in sensitivity to WARM and COLD was much larger in the young compared to older group.

Regional variation in sensitivity to WARM and COLD exists across age groups. Older individuals were less sensitive at the foot compared to young. This suggests that sensitivity at the extremities may be the first to deteriorate, which coincides with previous findings. It was also observed that inter-individual variation in sensitivity decreases with age.