Rapid vs. Delayed Infrared Responses after Ischemia Reveal Recruitment of Different Vascular Beds

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Abstract

To identify vascular dysfunction in sickle cell disease patients, we compared transient changes in forearm temperature during arterial occlusion, reperfusion, and recovery in Healthy, Sickle Cell Steady State, Sickle Cell Pain Crisis, and Recovered from Pain Crisis subject groups. Combining this test with continuous infrared imaging followed by image processing with the *k-means* algorithm revealed reactive vascular sites in the skin where rapid and delayed temperature amplification were statistically different between subject groups. Observed temporal and spatial diversity of blood flow-derived forearm temperature allow consideration of thermographically guided placement of skin sensors for more sensitive monitoring of skin hemodynamics.

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