

## The use of thermal infrared imaging to assess the efficacy of a therapeutic exercise program in individuals with diabetes.

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[Al-Nakhli HH<sup>1</sup>](#), [Petrofsky JS](#), [Laymon MS](#), [Arai D](#), [Holland K](#), [Berk LS](#).  
**[Author information](#)**

- <sup>1</sup>Loma Linda University, Loma Linda, California 92350, USA.

### Abstract

#### BACKGROUND:

Exercise is of great value for individuals with diabetes in helping to control their hemoglobin A1c levels and in increasing their insulin sensitivity. Delayed-onset muscle soreness (DOMS) is a common problem in healthy individuals and in people who have diabetes. People with diabetes are also faced with metabolic and endothelial impairments, which could make DOMS even worse. But because they usually have neuropathies, they may not feel this soreness appropriately, leading to premature return to exercise and causing further injuries.

#### RESEARCH DESIGN:

One hundred eighteen subjects participated in this study and were divided into four groups. Two groups (healthy and diabetes) performed a series of abdominal exercises, and the other two groups (healthy and diabetes) performed a series of arm exercises to induce DOMS. Skin temperature above the muscle was assessed using a thermal infrared camera, and perceived soreness of the exercised muscle was assessed using a 100-mm visual analog scale. Serum myoglobin concentrations were also measured.

#### RESULTS:

There was a significant increase in skin temperature 24 h post-exercise for all four exercise groups ( $P < 0.05$ ), where the combined average increase in skin temperature for all four groups was approximately  $0.65^{\circ}\text{C}$  from baseline. Also, 24 h post-exercise, all four groups were significantly sorer than they were at baseline ( $P < 0.05$ ). Serum myoglobin levels were also significantly higher on day 3 compared with day 1 ( $P < 0.05$ ).

#### CONCLUSION:

Infrared thermal imaging may be a valuable technique of seeing which muscles are sore hours or even days after the exercise is over. Thus, thermal imaging would be an efficient and painless way of looking at DOMS in both healthy individuals and individuals who have diabetes, even if they are facing neurological problems.

### Comment in

- [Thermography, therapeutic exercise, and individuals with diabetes.](#) [Diabetes Technol Ther. 2012]

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