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Microvascular responses to exercise training, using a novel non-invasive approach: A study protocol

Ahmad Alkhatib[1] and **Sergey Podtaev**[2]
[1]Abertay University, UK
[2]Institute of Continuous Media Mechanics, Russia

Dermal-based vascular measurements have become popular non-invasive techniques to detect and track low-frequency perfusion changes in microcirculation. For example, photoplethysmography (PPG) and laser Doppler flowmetry (LDF) are now well recognized optical techniques that have been used in human studies to track endothelial vascular activity in healthy humans and patients with endothelial microcirculatory dysfunction. Most recent work has developed algorithms to track microvascular tone changes through temperature signals oscillations, following local heating and cooling tests (Microtest, http://fm-diagnostics.com). Endothelial, neurogenic and myogenic temperature oscillations (0.01-0.14 Hz) calculated using inverse wavelet transform. The tests have been shown to be sensitive to changes in healthy subjects and in patients with metabolic disorder such as type 2 diabetes and the metabolic syndrome. With exercise training being known as a preventative and treatment method for reversing endothelial dysfunction, such techniques can be an effective diagnostic methods to detect the exercise-dependent outcomes. Changes in LDF endothelial activity outcomes have been previously shown to be enhanced following exercise training; it is yet not known whether the newly developed technique Microtest can detect such exercise dependent outcomes. The aim of this study protocol is to determine, in healthy subjects, the clinically meaningful microcirculatory endothelial activity changes following a period of exercise training.

Biography

Ahmad Alkhatib is the Head of Division of Sport and Exercise Science at Abertay University in the UK. He is a Fellow of the Royal Society of Medicine, an accredited UK nutritionist (RNutr), a clinical physiologist, a certified international sports nutritionist (CISSN), and also a Fellow of the UK Higher Education Academy (FHEA). He was awarded his PhD in Exercise Physiology and Metabolism, and MSc in Exercise Sciences (Health and Fitness) from the University of Essex, UK. His research in exercise and nutritional sciences focuses on novel techniques to enhance health outcomes especially those combining nutraceuticals, with physical activity to enhance metabolic health, weight loss and disease prevention. He has over 100 publications and won several research and academic excellence awards.

drahmadalkhatib@gmail.com

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