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Conference Abstract

P.45 Characterization of the Microcirculatory Response to Gravity-Induced Changes using Thermal Imaging

Noam Moyal[1,*], Noa Darchi[1], Oshrit Hoffer[2], Neta Rabin[3], Benjamin Gavish[4], Moshe Halak[5], Zehava Ovadia-Blechman[1]

[1]*School of Medical Engineering, Afeka Tel-Aviv Academic College of Engineering*
[2]*School of Electrical Engineering, Afeka Tel-Aviv Academic College of Engineering*
[3]*Department of Industrial Engineering, Tel-Aviv University*
[4]*Yazmonit ltd*
[5]*Department of Vascular Surgery, Sheba Medical Center*

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ABSTRACT

Objective: The goal of this study was to characterize the changes in the palm's blood distribution in response to a decrease in blood pressure due to gravity-induced changes, using thermal imaging.

Methods: Thermal hands images were taken from ten healthy volunteers, without any known vascular pathologies, in three different stages: baseline, gravitation and recovery. In the baseline stage the hand was set on a table, at heart height. During the gravitation stage one hand was placed 40 cm above the table for 10 minutes, while the second hand was stayed on the table. The recovery stage, in which both hands were placed back on the table, was recorded for 10 minutes. Thermal images of both hands were taken every ten seconds throughout the experiment.

Results: Mean skin temperatures were increased during hand elevating in both the palm center and the distal phalanx of the middle finger by 2.57°C and 3.33°C, respectively. This increase was significant and remained high during the recovery period ($p < 0.01$). A similar effect was also observed with the other hand, which remained on the table.

Conclusions: The temperature increase of the palm during gravity conditions reflects blood perfusion compensation due to high local oxygen consumption during decrease in local blood pressure. The bilateral effect indicates the central nervous system involvement. Thermal imaging allows characterization of the palm's blood distribution under gravitational conditions. Since this technique is noncontact and safe, it could be useful for assessment of blood supply during physical effort.

*Corresponding author. Email: noammoyal10@gmail.com