**THERMAL IMAGING AS METHOD TO STUDY EFFECT OF INDUCED ISCHEMIA ON VASOMOTION.**

*Annabel Bantle\*\*, Christian Korfitz Mortensen, Toby Steven Waterstone\**

**Group 7407**

**Introduction:** Despite various studies dealing with occurrences within the capillary network, this area is not completely investigated. Particularly not vasomotion. Previous studies detected that vasomotric blood flow is quantifiable as temperature micro oscillations in the frequency range of 0,005−0,15Hz [1,2]. Based on this, a study of vasomotion in the peripheral circulation with infrared thermography has been conducted. Aim of this study was to investigate if it is possible to measure changes in vasomotric blood flow caused by partial occlusion of blood supply by using thermal imaging.

**Methods and Material:** The temperature oscillations in the skin [2,3] of four healthy subjects are measured by Xenics Gobi 640 17µm GigE infrared camera. The measurements are done on the dominant hand under two conditions. The first measurement under normal conditions used as a control, whereas the second measurement is conducted with 50% restriction of hand’s blood supply. In order to aid comparison, 28 regions of interest (ROI) are determined. After drift corrections of the thermal data continuous wavelet transform is applied. Five ROI are chosen to compare both conditions quantitatively within three frequency bands and qualitatively by visualization of paired t-test’s t-values.

**Results:** The comparison within the frequency bands shows no significant difference between the means over time. The means of the frequency bands in both conditions resemble one another in each ROI of each subject. Likewise qualitatively comparison by mapping of t-values shows no clear significance with regard to vasomotric activity.

**Discussion:** It can be invoked the impossibility of measuring vasomotric activity is due to the slight amount of subjects. However the larger impairment of the finding is on account of the limitations of the setup and resulting limitation of data. Wherefore the planned larger number of subjects would not give a better result.

**References**

[1] Geyer MJ, Jan YK, Brienza DM, Boninger ML. Using wavelet analysis to characterize the thermoregulatory mechanisms of sacral skin blood flow. Journal of Rehabilitation Research & Development. 2004; 41, 6A: 797-806.

[2] Sagaidachnyi AA, Fomin AV, Usanov DA, Skripal AV. Thermography-based blood flow imaging in human skin oft he hands and feet: a spectral filtering approach. IOP Publishing: Physiol. Meas. 2017; 38: 272-288.

[3] Tang YL, He Y, Shao HW, Mizeva I. Skin temperature oscillation model for assessing vasomotion of microcirculation. Acta Mechanica Sinica. 2015; 31(1): 132-138.