Tissues, Pathology, and Diagnostic Microscopy

LS.2.P037
Parameters of microcirculatory blood flow in human skin under long-term thermal stress
(model experiment)

A. Fedorovich[1]

[1]Russian Cardiolody Research and Production Complex, Moscow, Russian Federation

faa-micro@yandex.ru

To study peculiarities of skin microcirculatory blood flow of the upper limbs according to computer capillaroscopy during the model experiment, restoring the conditions of the hot summer of 2010 in Russia.

The study included 6 healthy men aged 24 to 44 years (34.3±9.6), who stayed in the airproof accommodation module for 30 days, with constant day temperature +30+38ºC (33.9±2.3), relative humidity 30-50% (38.3±6.9) and night temperature values +26+31ºC (28.1±1.5), relative humidity 50-75% (68.5±7.1). Investigation of microvasculature was performed twice a day (in the morning and evening) every other day in the sitting airproof accommodation module with air temperature +29+30ºC and humidity 30%.

According to the computer capillaroscopy, there were marked a dramatic increase in the capillary blood flow speed >3500 µm/s and significant elevation in the size of pericapillary zone (PZ), reflecting the hydration degree of the interstitial space (figure 1). Pericapillary zone had a distinct daily fluctuations - in the morning it was higher (p<0.000001) than in the evening, and was significantly correlated (figure 2) with systolic blood pressure (SBP) - r = -0.59 (p = 0.000000002) and diastolic blood pressure (DBP) - r = -0.46 (p = 0.000007).

In the long-term heat stress efficiency thermoregulatory processes in the skin depends on the filtration process at the level of capillaries. Formation and evaporation of sweat and have a significant effect on the parameters of blood pressure.
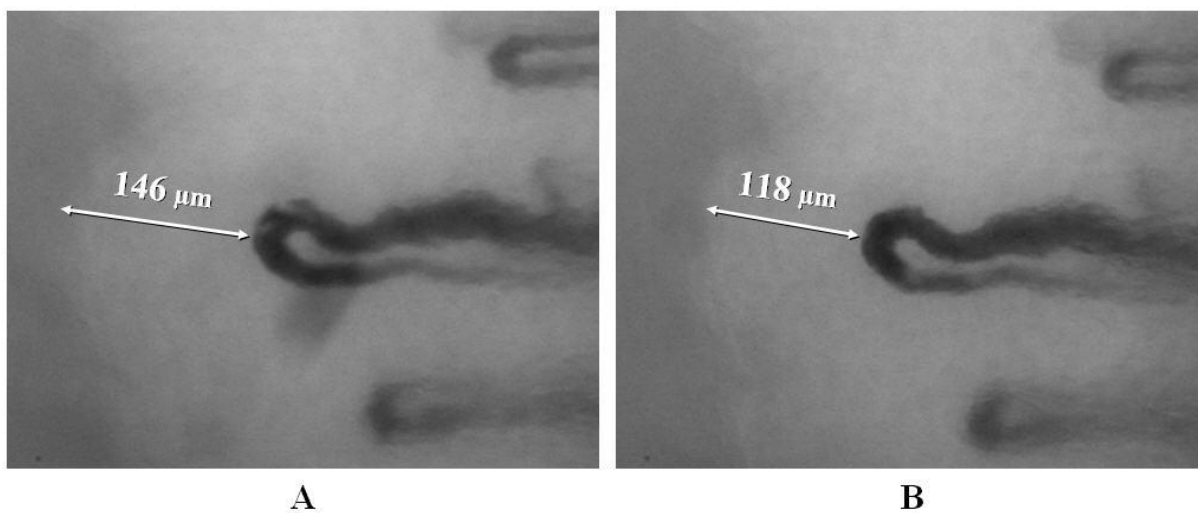
Figure 1. Dimensions of the pericapillary zone: **A** – morning; **B** – evening.

PZ:SBP: r = -0.5937, p = 0.000000002; y = 133.670504 - 0.199207541*x

PZ:DBP: r = -0.4647, p = 0.000007; y = 84.5186296 - 0.124296782*x

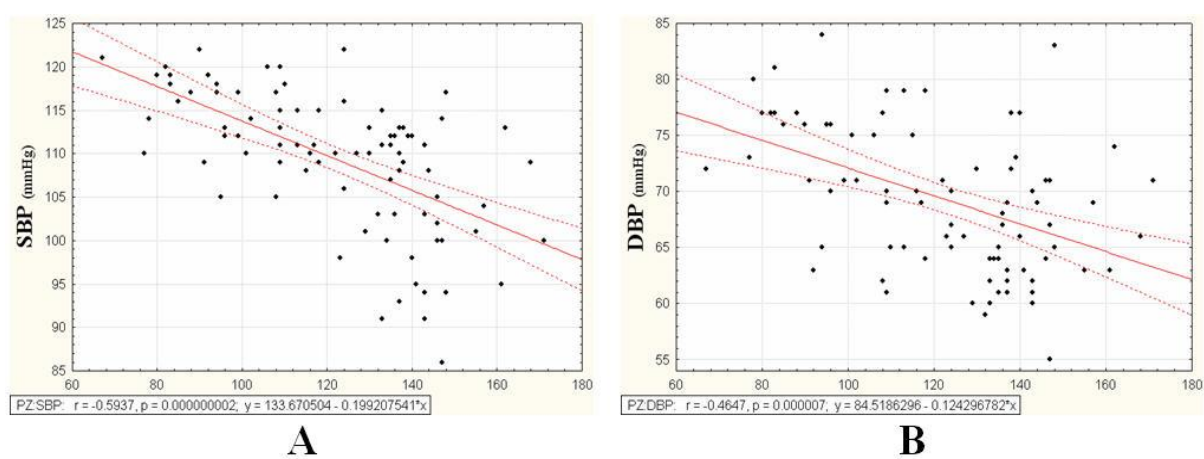**Figure 2.** Relationship size pericapillary zone with blood pressure: **A** – systolic; **B** – diastolic.