

# THE TEMPERATURE OF THE BACK MUSCLES OF PEOPLE WITH SEDENTARY JOBS

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## *Abstract*

*One of the problems today is lifestyle diseases, especially back pain. The aim of this study was to determine how much and what parts of back muscles are metabolically active during static sitting position during work hours. This project takes place within a specific research.*

*We monitored the muscles of back and neck in 7 men with a sedentary job. Measurements of infrared radiation and calculate the temperature on the surface of the skin before work and after work was carried out thermal imager FLIR SC620.*

*Graphs were compiled and described thermal images, which confirmed the rise in temperature up to 1% of those monitored in m.rhomboideus and down 2% in m.trapezius.*

*Research confirms the ability of infrared thermography to register temperature changes at the statically loaded back. Thermography could contribute to the proper choice of release and relaxation exercises and pain relief during working hours at sedentary jobs. It's need to collect more data, we use these initial findings could be confirmed.*



Fig. 1: Infrared thermographic system FLIR SC 620

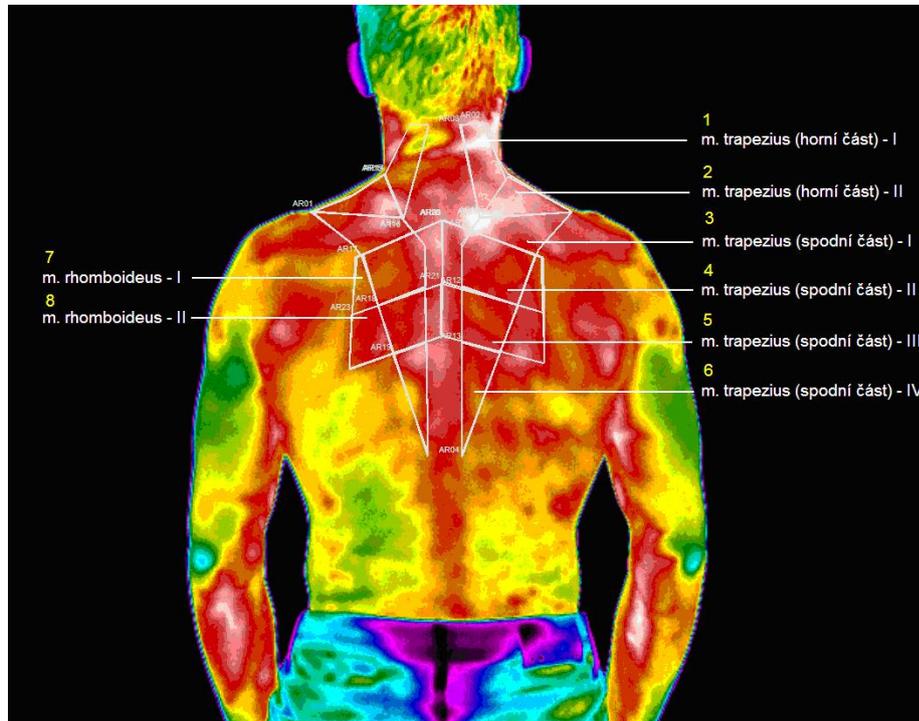


Fig. 2: Example of data processing in the ThermalCAM Researcher Professional 2.9 and selected areas representing muscles and their descriptions

The following two examples (man D and E), figures and graphs are shown places that the most thermally altered.

The test person D: morning temperatures are highest in the neck - m.trapezius upper portion on both sides. In the afternoon, temperatures rose significantly in m.rhomboideus on the left side and part m.rhomboideus m.trapezius and middle part on the right (Figure 3 and Figure 2).

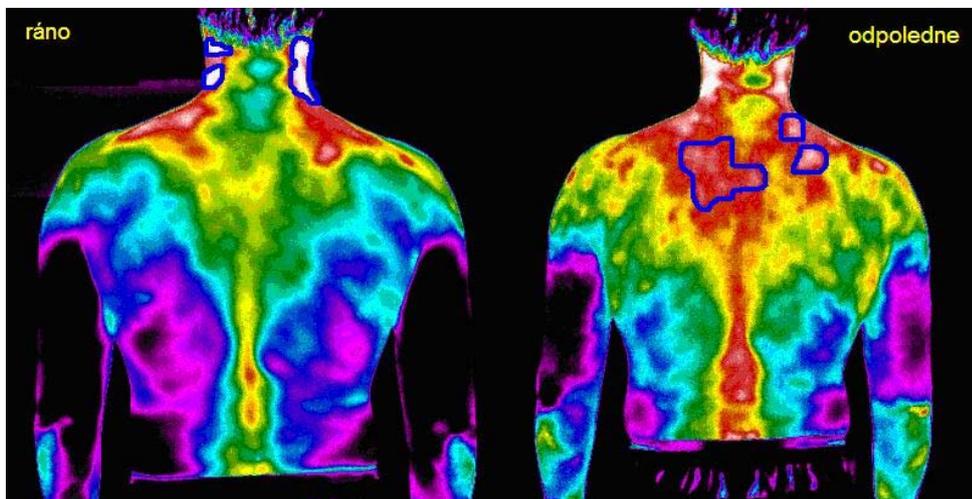


Fig. 3: Thermal images of tested person D

The test person E: Morning is the warmest place in the upper part m.trapezius areas on both sides. Afternoon temperatures are more pronounced in the central part m.trapezius m.rhomboideus left and right and around the spine (Figure 4 and Figure 3).

Legend: P1 - m.trapezius (I), P2 - m.trapezius (II), P3 - m.trapezius (I), P4 - m.trapezius (II), P5 - m.trapezius (III), P6 - m.trapezius (IV), P7 - m.rhomboideus (I), P8 - m.rhomboideus (II): right side; L1-L8: left side

The test person E: Morning is the warmest place in the upper part m.trapezius areas on both sides. Afternoon temperatures are more pronounced in the central part m.trapezius m.rhomboides left and right and around the spine (Figure 4 and Figure 3).

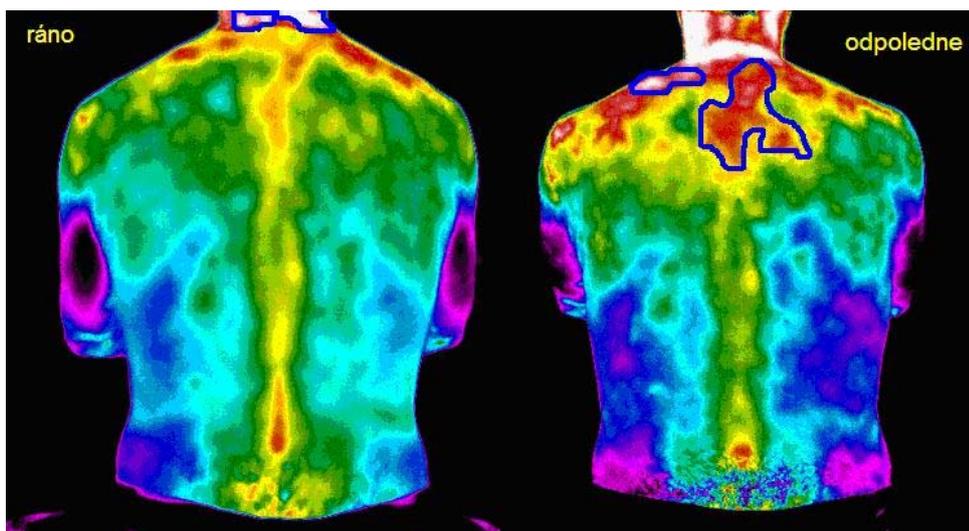


Fig. 4: Thermal images of tested person E

## CONCLUSIONS

Results of the analysis thermal images of back:

- The relative increase in temperature occurred after a sedentary job at rhombic muscles and the lower part of trapezius.
- In contrast, the relative temperature drop was reflected in the upper parts of the trapezium muscles.
- We can say that actually there was a visible movement of heat epicenter of the upper part of trapezius muscles toward rhombic muscles.

To methodology of evaluation of changes in temperature in the morning and afternoon:

When evaluating changes in temperature (metabolic activity of muscles) back before and after work one day, it is necessary to rely on relative indicators - ratios of areas of skin temperature (e.g.%) to the mean temperature of all surfaces (100%). Can not well be used only directly computing the temperature.

To further refine the methodology further recommend:

- Determine how much time passive thermal adaptation of the skin is needed to stabilize the temperature of the cooling fan.
- Check skin thickness influence on the emissivity of IR radiation.
- Preserve, best measured by the same silhouette of a person in the picture.
- The system measured the muscles involved and the lumbar part m.erector spinae.

## Literature:

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