

SKIN TEMPERATURE GRADIENTS

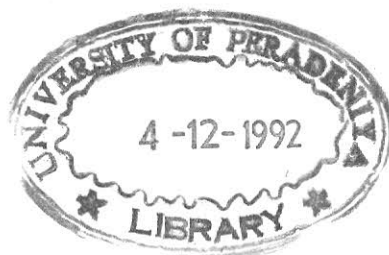
*An investigation
into their pattern
and some possible causative factors*

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SUMMARY

Skin surface temperature is not uniform. It is different in different parts of the body. There have been numerous studies done on skin surface temperature variations of the people living in temperate climates. The present study was aimed at investigating the skin surface temperature variations in individuals in Sri Lanka. The main objective was to find out the nature of *skin temperature gradients* present along the different axes of the body. In addition, an explanation was sought for the different features seen in the skin temperature gradients.

Skin temperature was measured in a group of 10 young adult Sri Lankan males with an age range of 21 - 23 years, along the anterior, posterior and lateral midlines in the upper limb, lower limb, trunk, head and neck regions. The measurements were made with an infra-red radiation thermometer, when the subjects were resting inside a cool room with constant thermal conditions. Dry bulb temperature of the room was 24.4°C (76°F).

The results have shown that there is a definite pattern of skin temperature gradients present along the body axes examined. In this pattern some characteristic features were observed. The essential feature of the pattern in the limbs was a proximo-distal skin temperature fall along the longitudinal axes. Head, neck and trunk were generally warmer than the limbs. However, the skin temperature gradients present along the different axes of the body were not uniform; instead they showed a number of significant fluctuations superimposed on the gradient. These were either warmer areas (temperature peaks) or cooler areas (temperature troughs). The locations of these temperature peaks and troughs were constant. Skin temperature peaks were seen in the forearm, thigh, shin and calf regions; cubital and popliteal fossae; central areas of the palm, dorsum of the hand, dorsum of the foot and sole; and anterior, posterior and lateral midlines of the trunk. Skin temperature troughs were seen in the patella and elbow regions, upper arm, upper forearm region, ankle, wrist, tip of the nose and in the trunk along the antero-lateral and postero-lateral lines.

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Two hypotheses have been suggested to explain these features observed in the skin temperature gradients. One of them takes into account the influence of deep tissue temperature on the skin together with the thermal conductivity of the subcutaneous tissues. To investigate this effect an experiment was conducted in a group of 48 young adults (23 males and 25 females) with an age range of 20-24 years. In these individuals skin temperature was measured using the same technique as above at four selected sites in the leg region (two of them were over predominantly bony sites and the other over predominantly muscular sites). The results of this experiment together with a consideration of the previous literature have shown that the above hypothesis is inadequate to explain the occurrence of skin temperature peaks and troughs observed in the present study. The second hypothesis assumes the fact that the variations present in the cutaneous blood supply which brings heat to the skin surface through convection, could correlate with the skin temperature variations. A review of literature in this area further indicates that this hypothesis could form a rational basis to explain the presence of skin temperature peaks and troughs seen in the present study.