A case study on thermal image monitoring of hand stress during keyboard typing

Vardasca R., Ring E.F.J., Plassmann P., Jones C.D.

Medical Imaging Research Unit, Department of Computing and Mathematical Sciences, Faculty of Advanced Technology, University of Glamorgan, Pontypridd, Rhondda Cynon Taff, CF37 1 DL, Wales (United Kingdom)

Abstract

Some repetitive tasks such as keyboard typing affect hand and forearm temperature after a certain time of exposure. A temperature increase is related to mechanical stress. This stress can be objectively quantified by the measurement of temperature variation over time. Several scientific studies have indicated that after a long period of exposure to this type of stress caused by a repetitive task, can cause serious injuries. Thermal imaging is a 100% safe, highly accurate involving no radiation or contact temperature investigation modality.

The main objective of this study is to analyse the temperature variation on one hand during keyboard typing in a standard keyboard having the other hand maintained in a static position. The temperature of the hands and forearm is recorded using thermal imaging; the IR camera is positioned in a vertical static position recording an image once a minute during a period of 15 minutes. The thermograms are analysed with the software package CTHERM and the number of healthy volunteers participating in this study is 12.

The results of this study have shown that after 10 minutes the temperature had increased by 1℃ on the stressed forearm when compared with the control one, the hands over the same period of time show a difference of 0.2℃. At the end of the test the difference between stressed and control forearm was 1.5℃ and on the hands was 0.5℃. We can conclude from this study that in order to assess thermal effects of keyboard stress on the hand we can observe differences after 10 minutes exposure.