

Reliability and repeatability of thermographic examination and the normal thermographic image of the thoracolumbar region in the horse.

Tunley BV, Henson FM; *Queen's Veterinary School Hospital, Department of Clinical Veterinary Medicine, University of Cambridge, Madingley Road, Cambridge, Cambridgeshire CB3 0ES, UK.*

REASONS FOR PERFORMING STUDY: Thermographic imaging is an increasingly used diagnostic tool. When performing thermography, guidelines suggest that horses should be left for 10-20 mins to 'acclimatise' to the thermographic imaging environment, with no experimental data to substantiate this recommendation. In addition, little objective work has been published on the repeatability and reliability of the data obtained. Thermography has been widely used to identify areas of abnormal body surface temperature in horses with back pathology; however, no normal data is available on the thermographic 'map' of the thoracolumbar region with which to compare horses with suspected pathology. **OBJECTIVES:** To i) investigate whether equilibration of the thermographic subject was required and, if so, how long it should take, ii) investigate what factors affect time to equilibration, iii) investigate the repeatability and reliability of the technique and iv) generate a topographic thermographic 'map' of the thoracolumbar region. **METHODS:** A total of 52 horses were used. The following investigations were undertaken: thermal imaging validation, i.e. detection of movement around the baseline of an object of constant temperature; factors affecting equilibration; pattern reproducibility during equilibration and over time (n = 25); and imaging of the thoracolumbar region (n = 27). **RESULTS:** A 1 degrees C change was detected in an object of stable temperature using this detection system, i.e the 'noise' in the system. The average time taken to equilibrate, i.e. reach a plateau temperature, was 39 mins (40.2 in the gluteal region, 36.2 in lateral thoracic region and 40.4 in metacarpophalangeal region). Only 19% of horses reached plateau within 10-20 mins. Of the factors analysed hair length and difference between the external environment and the internal environment where the measurements were being taken both significantly affected time to plateau (P<0.05). However, during equilibration, the thermographic patterns obtained did not change, nor when assessed over a 7 day period. A 'normal' map of the surface temperature of the thoracolumbar region has been produced, demonstrating that the midline is the hottest, with a fall off of 3 degrees C either side of the midline. **CONCLUSIONS:** This study demonstrates that horses may not need time to equilibrate prior to taking thermographic images and that thermographic patterns are reproducible over periods up to 7 days. A topographical thermographic 'map' of the thoracolumbar region has been obtained. **POTENTIAL RELEVANCE:** **Clinicians can obtain relevant thermographic images without the need for prior equilibration and can compare cases with thoracolumbar pathology to a normal topographic thermographic map.**