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The Right Angle: Validating a standardised protocol for the use of infra-red thermography of eye temperature as a welfare indicator

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Abstract

Infra-red thermography (IRT) is a non-invasive tool for measuring eye temperature as an indicator of stress and welfare in animals. Previous studies state that images are taken from 90° but do not specify a reference point or method of standardisation. The aims of the current study were to determine whether the position of the IRT camera has an impact on recorded temperature and which camera position is optimal for indicating stress in a mammal with anterolateral eyes. IRT images were taken from 90° to the nasal plane, eye and sagittal plane on the left side of the horses' faces (n = 14) at eye level before and after exposure to a novel object. Distance and angle of measurement was standardised using ground markers. Temperature at each point of measurement was compared against heart rate variability. A significant difference was found between recorded temperature at all three of the points of measurement, both before and after the novel object test, suggesting that IRT camera position has an impact on eye temperature results. There was a significant strong positive correlation between eye temperature taken from 90° to the sagittal plane and heart rate variability, but no such correlation was observed from 90° to the nasal plane or eye. This suggests that a 90° angle in relation to the sagittal plane is the optimal position for taking eye temperature measurements using IRT, whereas 90° to the eye is commonly used. This study offers a validated protocol for using IRT to measure stress and welfare in mammals with anterolateral eyes.

Keywords: *angle of measurement, animal welfare, eye temperature, heart rate variability, horse, infra-red thermography*