

Critical appraisal – Diagnostic testing studies

Monitoring changes in body surface temperature associated with treadmill exercise in dogs by use of infrared methodology.

<b>Introduction</b>	
Are the aims clearly stated?	The aim of study is stated as determining the usefulness of infrared instruments measuring surface temperature variations before and after standardized treadmill exercise in healthy dogs.
<b>Methods</b>	
Is the study design suitable for the aims?	Yes, a non-contact infrared thermometer used to measure surface temperature at six anatomical locations, is compared to rectal thermometry, before and after exercise.
What population of animals was being studied?	Ten healthy Jack Russell Terrier cross Miniature Pinscher dogs (3 females and 7 males; 1–4 years; mean body weight $8 \pm 1.8$ kg) with short coat, deemed to be clinically healthy following clinical examination and laboratory blood test analysis.
Was this the right sample to answer the objectives?	No, this is a very specific and small sample of dogs, not truly representative of the wider canine population.
Was an independent blinded gold standard test applied to all subjects?	No. There was no mention of blinding of operators.
Is it clear what measurements were carried out in the study?	Yes: Surface temperatures are measured using both thermography and NCIT throughout a period of exercise, with rectal thermometry performed pre and post exercise.
Were the correct measurements chosen?  Do they that reflect (or are they strongly related to) the outcome of interest?	Yes they were appropriate and related directly to the outcome of interest.

Were previously established validated methods used to make the measurements?  (e.g. Glasgow pain score, International Units etc)	European standard of degrees Centigrade.
Are the statistical methods described?	Yes, Pearson's correlation was used to assess significant correlations between surface temperature and rectal temperature.
Was the statistical significance level stated?	Yes P<0.05
Was the sample size justified?	No mention of power analysis.
Was ethical approval obtained?	No mention of ethical approval.
Overall, are the methods described in enough detail that you could repeat them?	Yes.
<b>Results</b>	
Were the basic data adequately described?	In order to fully assess the usefulness of the NCIT device, no. Whilst results of a Pearson's correlation are reported for eye temperature versus rectal temperature, the difference between these readings is not reported.
Do the numbers add up?  Are all subjects accounted for?	Hard to say, as no mention of sample size is made in the results section.
Was the statistical significance (p value) stated in the results?  Is this consistent with the methods? (It should be stated in the sample size or power calculation)	Yes.  Yes.

<p>What were the main findings/key results?</p>	<p>Eye surface temperature measured at the lacrimal caruncle showed a moderate correlation with rectal temperature. No other anatomical locations measured correlated with rectal temperature.</p>
<p><b>Discussion and conclusion</b></p>	
<p>What do the main findings/key results mean?</p>	<p>Whilst the study reports a significant correlation between eye surface temperature and rectal temperature, the mean ocular temperatures reported in table 1 are all outside the normal canine temperature range. The authors state that ocular and rectal thermometry can not be used interchangeably. Without a direct comparison between ocular and rectal thermometry, it is not possible to determine if ocular thermometry can reliably detect hyperthermia.</p>
<p>Are the negative findings discussed?</p> <p>How are the negative findings interpreted?</p>	<p>Somewhat.</p> <p>As previously mentioned there is no direct comparison between NCIT and rectal thermometry, however several anatomical locations are reported to have poor correlation with rectal temperature changes.</p>
<p>Does the discussion reflect the results?</p>	<p>Yes.</p>
<p><b>Interpretation</b></p>	
<p>What are the clinical implications of this study?</p> <p>Are the subjects in the study similar to those in the BET/your own?</p>	<p>Hard to say, whilst NCIT used to measure ocular surface temperature appears to correlate with rectal, the study reports no sensitivity or specificity results for detecting hyperthermia. The study proposes NCIT could be used for measuring canine health and performance during exercise, but provides insufficient information to support the clinical use of NCIT.</p>

	Additionally, the subjects are of only one mixed breed type, with short hair so the results cannot be applied to all dogs.
<b>General</b>	
Who funded this study?	Not stated.