

Comparison of a Novel Axillary Sensor to Digital Rectal Thermometer for Canine Body Temperature Measurement

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INTRODUCTION

Axillary temperature measurements are commonly used as an alternative to rectal temperature measurements in dogs. However, there is disagreement in the veterinary community about the validity of using axillary measurements as a proxy for rectal measurements because published research often reports lower axillary temperatures compared to rectal temperatures, statistically significant differences between rectal and axillary measurements, and unacceptable variability in measurement data.

METHODS

- A prospective, single center study was designed to assess the accuracy of canine body temperature measurements using harness-mounted axillary sensors (AS) compared with simultaneous rectal digital thermometer (RDT) measurements. Simultaneous body temperature measurements of twelve (12) healthy dogs with short to medium hair coats were collected automatically by AS and manually (at 15-minute intervals) by RDT for up to 2 hours (range = 70-120 minutes).
- Dogs wore the harness for 15 minutes prior to data collection to allow the harness to 'settle' into position and played freely in the dog daycare facility between data collection time points. Rectal measurements were taken from animals in a standing position. Simultaneous axillary temperature measurements were taken by pressing a touch sensor on top of the harness to initiate wireless data retrieval when the animal was positioned for rectal measurements.
- A linear mixed model of the Difference between RDT and AS measurements considered fixed effects for Time, Harness, Circumference (thorax), Humidity, Temperature, all pairwise interactions of these variables, and random effects for Dog.

RESULTS

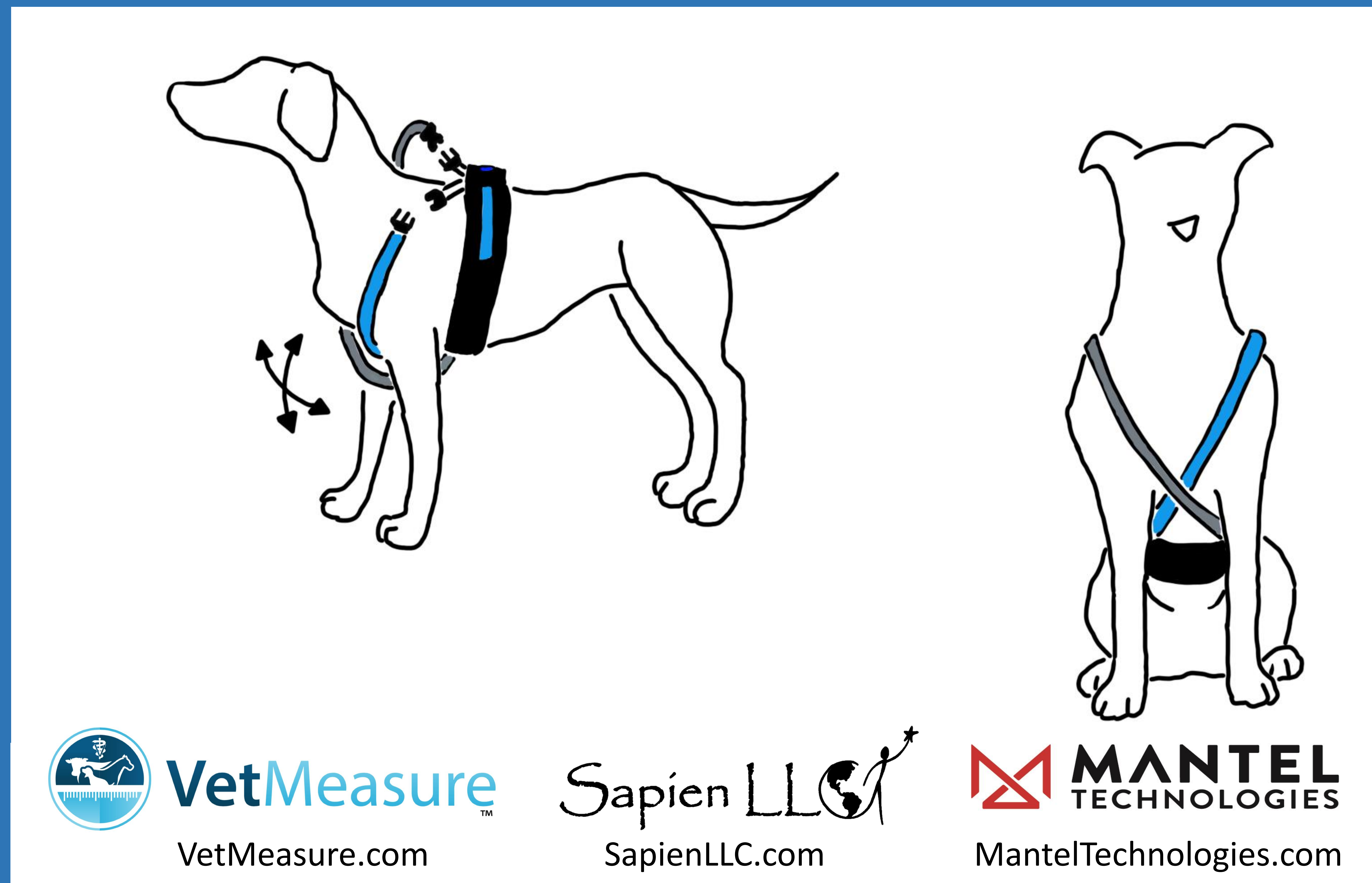
- The harness-mounted, axillary temperature sensor measurements were not clinically different from RDT measurements in this group of healthy, medium-sized dogs with short to medium hair coats.
- Body temperature measurements obtained by the harness-mounted AS system using integrated sensors and post-processing algorithms had an averaged difference of $<1^{\circ}\text{F}$ ($<0.5^{\circ}\text{C}$) when compared with simultaneous RDT measurements.

DISCUSSION

- The harness-mounted AS system can provide reliable body temperature measurements without the need for manual restraint or handling of the dog.

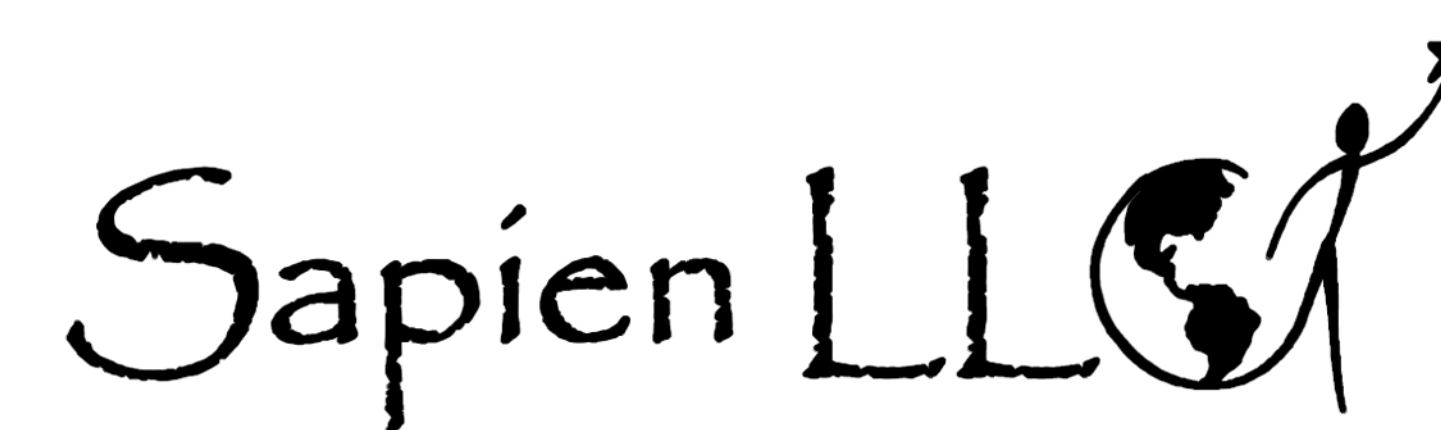
Harness Mounted Axillary Temperature Sensors

Decrease the need for restraint and handling of canine patients.



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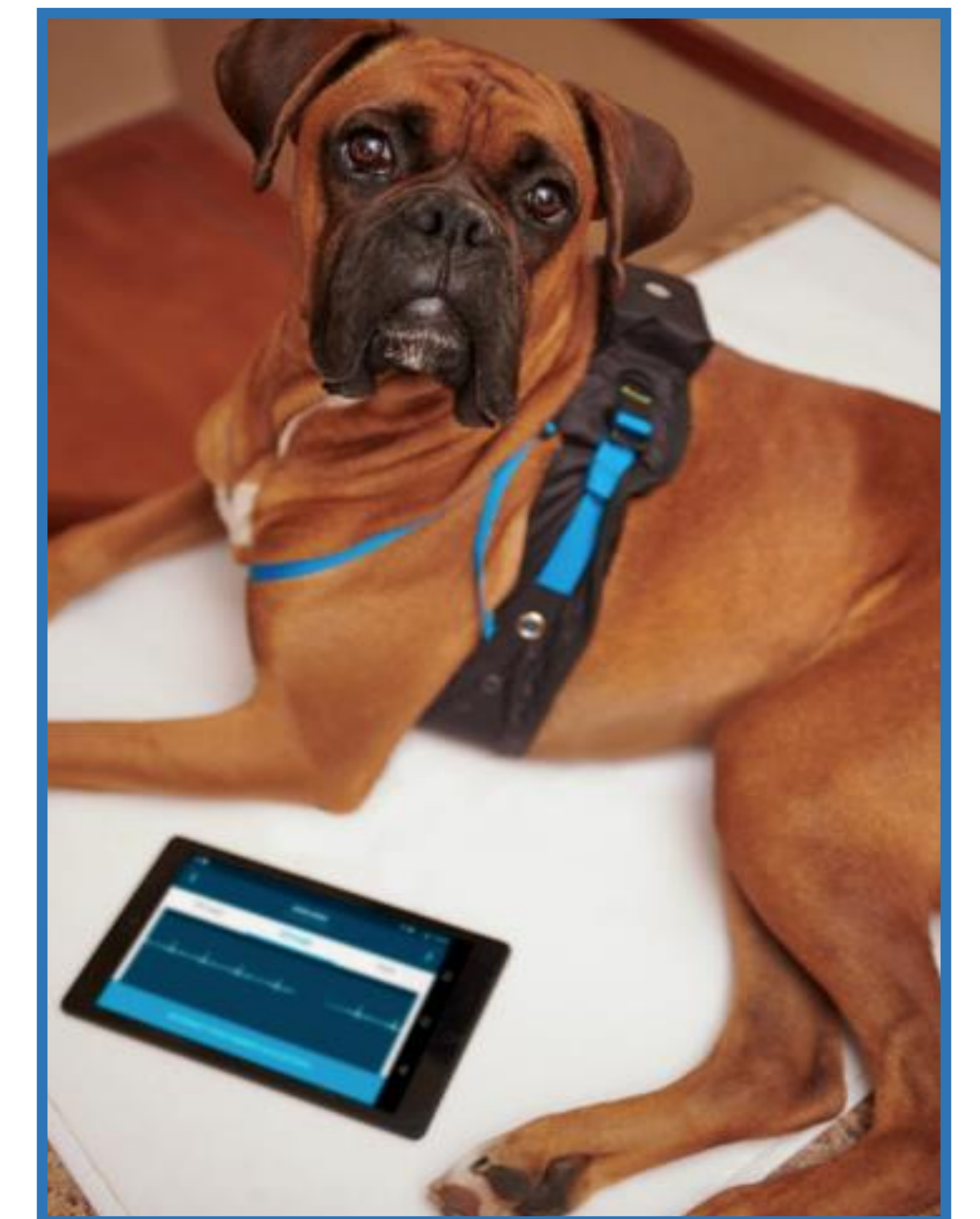
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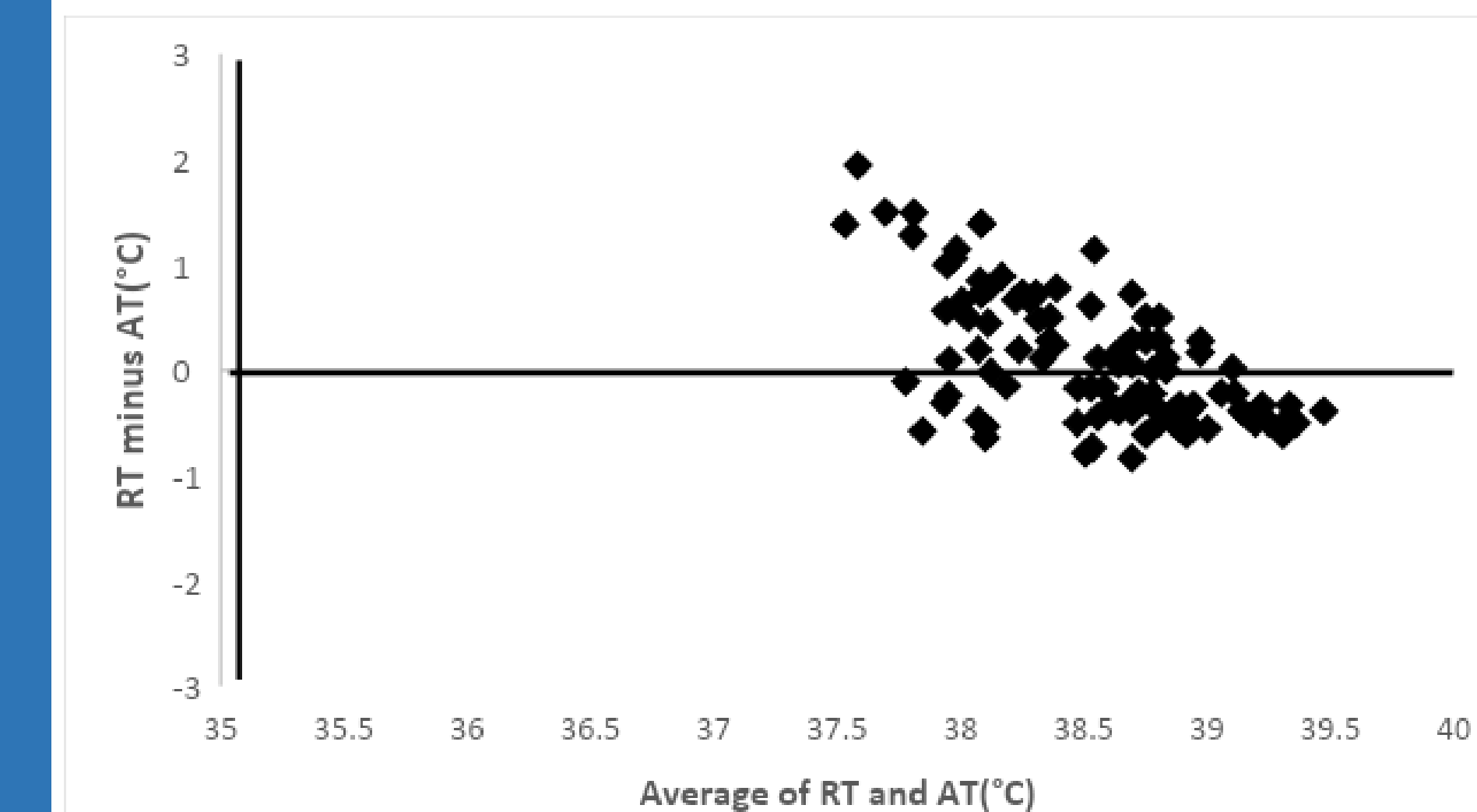
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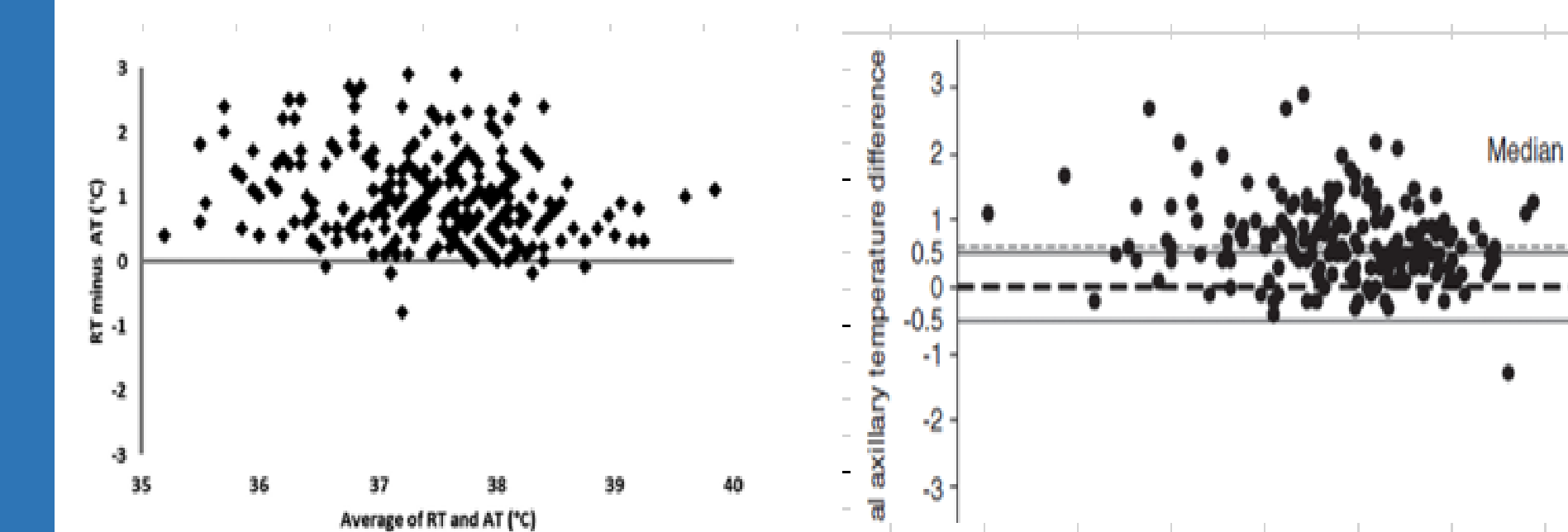


Key Facts

- The harness-mounted AS system had similar precision but greater accuracy than previously published axillary temperature measurement techniques.
- Consistent AS contact with the skin surface is an important factor.



Bland-Altman plot of the Rectal Temperature (RT) and Axillary Temperature (AT) differences for the harness-mounted AS system. For an individual Dog, the AS to RDT Difference varied within (-1.8, 1.8°F; -1.0, 1.0°C). Averaging over all dogs, the mean Difference was -0.0009°F with a 95% confidence interval of (-0.7241, 0.7223°F; -0.4023, 0.4013°C).



Previously Published Graphs for Comparison

1. Gomart, S. B., Allerton, F. J. W., & Gommeren, K. (2014). Accuracy of different temperature reading techniques and associated stress response in hospitalized dogs. *Journal of Veterinary Emergency and Critical Care*, 24(3), 279–285. doi: 10.1111/vec.12155
2. Lamb, V., & Mcbrearty, A. R. (2013). Comparison of rectal, tympanic membrane and axillary temperature measurement methods in dogs. *Veterinary Record*, 173(21), 524–524. doi: 10.1136/vr.101806