

# Evaluation of the reliability of real-time ultrasonography to measure muscle thickness of the canine middle gluteal muscle

by Roberts S.E., McLennan, L., Cartilage, H.C., Evans, L.K.M., Baugh, S.

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**A37****Evaluation of the reliability of real-time ultrasonography to measure muscle thickness of the canine middle gluteal muscle**

Elizabeth Roberts, Leander McLennan, Helen C. Cartildge, Lucy K. M. Evans, Stephen Baugh

Animal Production, Welfare and Veterinary Sciences Department, Harper Adams University, Edgmond, Shropshire, TF10 8NB, UK

**Correspondence:** Elizabeth Roberts - broberts@harper-adams.ac.uk  
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**Background:** Development of physiotherapy techniques and rehabilitation protocols is dependent on accurate measurements of outcome parameters [1]. Physiotherapists frequently focus on helping build muscle strength, yet few objective tests to evaluate the effectiveness of these treatments exists [1–3]. Maximum isometric force of a muscle correlates with its cross sectional area (CSA) [4]. Therefore, in situations where a muscle cannot be contracted voluntarily or strength measurements are inappropriate, changes in muscle size, [measured in CSA or thickness (MT)], are used as an indication of muscle strength [4, 5].

**Objectives:** The study was an operator-blind clinical trial of repeated ultrasonography (ULT) to determine a standardised method for MT measurement in the middle gluteal muscle of canines in the clinical setting.

**Materials and methods:** ULT measurements were taken from ten healthy canines, by three operators (operator one inexperienced, operator two moderate experience, and operator three experienced), each following a protocol that evaluated three repeated measurements of both hind limbs to evaluate MT of cross-sectional (CS) and longitudinal (LT) views. Measurements were taken one-third of the distance between the origin on the wing of the ilium and the insertion onto the greater trochanter of the femur.

**Results:** Good intra-rater reliability was found with MT measurements of both CS and LT views, with the operator variability for the right leg ranging from 0.09 to 0.23 cm<sup>2</sup>, and the left 0.27 to 0.41 cm<sup>2</sup>. There was significant difference between limbs using ANOVA, the left limb was considered not clinically reliable for all operators due to variability values being twice that of the right limb. No significant differences between the readings for the operators, determined that there was good inter-rater reliability for CS ( $P = 0.55$ ,  $cv = 63.7\%$ ) and LT ( $P = 0.298$ ,  $cv = 61.3\%$ ) measurements, tested using ANOVA one-way correlation coefficient testing. Table 8 shows between operator correlations, comparing these with Pearson's critical value of 0.6319 at  $P = 0.05$  indicates: strong correlations between operators two and three, and moderate correlations between one and two, and one and three.

**Conclusions:** This study indicates that ULT for both CS and LT measurements appears to be a reliable tool for measuring MT in vivo in canines. The absence of scientifically proven and quantified measurements of MT means that no conclusions regarding the accuracy of measurements can be made. Further research is required to demonstrate that ULT is measuring the actual MT, to test the reliability of the CS versus LT measurements, and determine the reasoning behind the left limb results.

**Table 8 Correlation coefficients for operator variability**

Operators	Left CS	Right CS	Left LT	Right LT
1 v 2	0.71	0.50	0.83	0.69
2 v 3	0.82	0.75	0.84	0.80
1 v 3	0.62	0.71	0.68	0.65