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**CT MEASUREMENT OF THE MOTION AND
INCLINATION ANGLES OF THE SACROILIAC
JOINT IN GERMAN SHEPHERD DOGS WITH AND
WITHOUT LUMBOSACRAL REGION PAIN, AND
IN GREYHOUNDS**

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Abstract

Objective – To develop an *in vivo* method to measure inclination angles and motion of the sacroiliac joint using CT, in two performance dog breeds, of which only one (the German Shepherd dog) has a predilection for diseases that cause lumbosacral region pain. Correlations were assessed in German Shepherd dogs between the presence of lumbosacral region pain and changes in these variables.

Animals – The study was comprised of 10 working German Shepherd dogs and 12 racing Greyhounds without history or evidence of lumbosacral region pain or neurological abnormalities, and 6 German Shepherd dogs with histories and examination findings consistent with lumbosacral region pain.

Procedures – CT scans were performed in flexed, neutral and extended positions. Lines placed on flexed and extended volume rendered images were used to measure motion of the ilium relative to the sacrum. Inclination angles (joint angle from a reference line placed in the dorsal plane) of the synovial and ligamentous joint components were measured on transverse plane images at a cranial and caudal location. Coefficients of variance were calculated.

Results – Coefficients of intra-observer variance ranged from 0.17-2.45%. German Shepherd dogs without lumbosacral region pain had greater rotational motion, and a more sagittally aligned cranial synovial joint component than Greyhounds. German Shepherd dogs with lumbosacral region pain had more rotational motion and X-axis translational motion than German Shepherd dogs without pain.

Conclusions and Clinical Relevance – A new method for measuring the motion and inclination angles of the sacroiliac joint, using CT has been presented. Small amounts of sacroiliac joint motion may be consistent with buffering of high frequency vibrations. The breed differences found may be linked to the German Shepherd dog's predilection for lumbosacral region pain. Differences in sacroiliac joint motion between German Shepherd dogs with and without lumbosacral region pain may be related to the presence of pain. There may be a causative relationship between diseases of the lumbosacral junction and increased sacroiliac joint motion. Further studies are needed to assess the motion and inclination angle variables, and to investigate these hypotheses.

Preface

This thesis explores the ranges of motion (rotational and translational), and the inclination angles, of the sacroiliac joint in two large, working dog breeds (German Shepherd dogs and Greyhounds). It assesses correlations between these variables in German Shepherd dogs with and without lumbosacral region pain.

Approval for the use of the dogs was obtained from the Massey University Animal Ethics Committee.

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Abbreviations

CT	Computed tomography
GSD	German Shepherd dog
GH	Greyhound dog
MRI	Magnetic resonance imaging
SIJ	Sacroiliac joint