Kinematic analysis of the hind limb during swimming and walking in healthy dogs and dogs with surgically corrected cranial cruciate ligament rupture.

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Abstract

OBJECTIVE: To determine hip, stifle, and tarsal joint ranges of motion (ROM) and angular velocities during swimming and walking in healthy dogs and dogs with surgically corrected cranial cruciate ligament (CCL) rupture.

DESIGN: Prospective clinical study.

ANIMALS: 13 healthy dogs and 7 dogs with CCL rupture.

PROCEDURE: Dogs with CCL rupture were enrolled in a postoperative aquatic rehabilitation program and evaluated 21 to 35 days after surgery. Dogs were filmed while swimming in a pool and while walking at a fast (1.3 m/s) or slow (0.9 m/s) pace on a treadmill. Maximal angles of extension and flexion, ROM, and angular velocities were calculated.

RESULTS: In healthy dogs, swimming resulted in a significantly greater ROM in the hip joint than did walking, but in dogs with CCL rupture, ROM of the hip joint did not vary with swimming versus walking. For dogs in both groups, swimming resulted in significantly greater ROM of the stifle and tarsal joints than did walking, primarily because of greater joint flexion. Stifle joint ROM was significantly lower in dogs with CCL rupture than in healthy dogs, regardless of whether dogs were swimming or walking.

CONCLUSIONS AND CLINICAL RELEVANCE: Results suggested that following surgical management of a ruptured CCL in dogs, swimming resulted in greater ROM of the stifle and tarsal joints than did walking. This suggests that if ROM is a factor in the rate or extent of return to function in these dogs, then aquatic rehabilitation would likely result in a better overall outcome than walking alone.