Kinematic gait analysis in dogs with hip dysplasia.

by R L Bennett, C E DeCamp, G L Flo, J G Hauptman, M Stajich

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Abstract

OBJECTIVE: To define alterations of movement in dogs with hip dysplasia by use of noninvasive, 3-dimensional, computer-assisted kinematic gait analysis. DESIGN: Kinematic and force plate data were collected at the trot from clinically normal dogs and from dogs with hip dysplasia. ANIMALS: 12 large adult dogs of various breeds with clinical and radiographic evidence of hip dysplasia, and 12 clinically normal adult large dogs of various breeds with body weight similar to that of the dogs with hip dysplasia. PROCEDURE: Dynamic flexion and extension angles and angular velocities were calculated for the coxofemoral, femorotibial, and tarsal joints. Temporal and distance variables were also computed. Essential Fourier coefficients were determined and used to reconstruct mean dynamic flexion and extension curves for all joints, and to compare differences in movement between dogs with hip dysplasia and clinically normal dogs. RESULTS: Dogs with hip dysplasia had subtle characteristic changes in dynamic flexion and extension angles and angular velocities of each joint, verified by significant differences in essential Fourier coefficients between the 2 study groups. Stride length was increased and peak vertical force was decreased in dogs with hip dysplasia. Subject velocity, maximal foot velocity, stance duration, stride frequency, and impulse area did not differ between the 2 groups. CONCLUSIONS: Kinematic gait analysis indicated that hip dysplasia is associated with alterations in movement of the coxofemoral, femorotibial, and tarsal joints. Computer-assisted kinematic gait analysis provided a noninvasive, objective tool with which to evaluate these complex motion alterations. CLINICAL RELEVANCE: The information obtained may be useful in future evaluations of various modes of treatment for hip dysplasia.

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