

GAIT ANALYSIS: COMPUTER AIDED NON- INVASIVE DIAGNOSIS OF LAMENESS IN DOGS.



INTRODUCTION

Gait analysis refers to the understanding of the muscles and skeletal system using a variety of instruments. We can measure the amount of pressure and force of the dog using each leg (kinetics), and the angles to which the dog flexes and extends each joint (kinematics), including the neck, head and tail. This is useful information that allows us to identify alterations in normal joint function and to assess response to treatment (medical or surgical). All joints should blend and work in harmony, however if one joint or movement is not attuned, it can become evident in the gait analysis of all of the other joints.

The right hind and the left foreleg move in unison, and the left hind and right fore also. Movement is balanced throughout the body in dogs with normal locomotion.

In dogs 60% of the weight is carried by the forelimbs and 40% by the hind limbs when standing. Travelling uphill transfers the weight to the hind limbs and downhill to the forelimbs. For this reason gait is always analysed on a flat, level surface.

Kinetic analysis

Kinetics in gait analysis refers to the *force* of each limb during walk and trot, this is measured using a forceplate built into a walkway, or a special pressure-sensitive mat (Tekscan). This data is collected on a computer and we can differentiate between each limb.

Since the foreleg should carry 60% of the weight and the hind leg 40%, if we see a change in this ratio, for example the fore leg carries 80% and the hind leg 20%, this can determine a painful or disabled leg.

We can also use this analysis to predict the usage and improvement of a limb following medical or surgical intervention.

Other assessments

Joint *motion* can also be measured in degrees and the results can be charted and compared between limbs. A dog with restricted motion would demonstrate a smaller range of movement in that joint.

While collecting data from your dog we will take videos and photos to be used in the analysis, and also to support the work of the SDC in publications and in teaching.



During your dog's visit they will also be weighed.

We measure each dog's muscle mass using a tape measure for a good indication of muscle disuse and it allows us to keep track of any muscle wastage or return of muscle mass over time. Again, this is not very invasive, and there is no discomfort.

Whilst your dog is with us at the QVSH, they will have their own kennel space. We understand that patients with musculoskeletal diseases or painful legs will need extra padding, comfortable blankets, and to be kept well away from draughts. If they are not having sedation or general anesthesia we will accommodate their dietary needs and allow them out and about to use the toilet, whatever the weather. We ask that all leads and jackets etc. are kept with the owners until collection, as we provide leads, bowls, bedding and food during your animal's stay in hospital.

Further information can be obtained from Nicola Cumbridge (clinical research co-ordinator) who can be contacted via email at clinical-research@vet.cam.ac.uk or phone: +44 (0) 1223 37665