



THE GAITRITE® SYSTEM FOR EVALUATION OF THE SPATIAL AND TEMPORAL PARAMETERS OF NORMAL DOGS AT A WALK

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INTRODUCTION

Gait analysis of dogs can be realized by many different techniques, including video, opto-electronic systems, and ground reaction force methods. The purpose of this study was to measure temporospatial parameters associated with the walk in normal dogs of variable size and age.

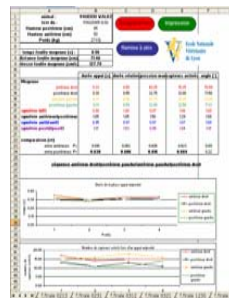
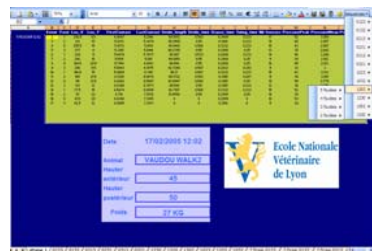
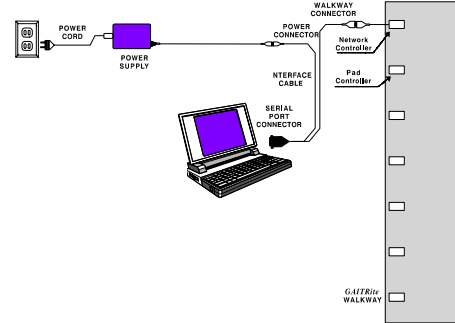
MATERIALS AND METHODS

The gait of a dog at a walk is analyzed with the GAITRite® walkway system (4.3m with 16,128 sensors) which measures temporospatial aspects of gait and is connected to a computer with software developed for quadrupeds (GAITFour).

Twenty-five healthy dogs from 1.5 to 10 years old were divided into three groups, group 1: 8 young adult large dogs (average weight: 28.2 ± 5.2 kg and average age: 2.8±1.6 years old); group 2: 9 young adult small dogs (10.4 ± 0.6 kg and 3.2 ± 0.7 years old) and group 3: 8 aged small dogs (12.2±1.0 kg and 9.7±0.5 years old).

Data collected by this system included: stride time, stance time, relative stance time (stance time/stride time), peak pressure, mean pressure, mean number of sensors activated by each paw and walking velocity.

Index of interlimb symmetries (right-left, fore-hind) was calculated by an original Excel macro.



RESULTS AND DISCUSSION

The smaller dogs prefer to walk faster than the larger dogs (1.57 m/s and 1.09 m/s).

The symmetry of the limbs from left to right; forelimb left to forelimb right; and hindlimb left to hindlimb right of the three groups were approximately 1 (one).

Table 1. Symmetries of parameters of young adult large dogs G1, young adult small dogs G2, and old small dogs G3

Parameters	Group	Symmetry Forelimbs/Hindlimbs	Symmetry LF/RF	Symmetry LH/RH
Relative Stance Time	G1	1.10	1.02	1.00
	G2	1.15	1.00	1.00
	G3	1.18	0.99	0.99
Peak Pressure	G1	1.47	1.00	1.00
	G2	1.43	1.01	1.02
	G3	1.47	1.05	1.08
Number of activated sensors	G1	1.29	1.03	0.99
	G2	1.32	1.01	1.04
	G3	1.30	1.00	1.01

For the 3 (three) groups: “stance time”, “mean pressure”, “number of activated sensors”, and values of forelimb/hindlimb symmetries were the most important. The maximal pressures were 1.43 and 1.47; and the numbers of activated sensors were 1.32, 1.30 and 1.29. These results were very similar to reports of Budsberg, (1987; peak pressure of 1.43) and Hottinger, (1996 relative stance time of 1.04).

Significant differences for maximal pressure and number of activated sensors were observed between G1 and G2 (p<0.05) for all limbs. This is due to the difference in size between the two groups.

Forelimbs of dogs in G2 and G3 had less pressure than the dogs in G1 (1.43/1.47) but longer stance times (1.15 (1.18)/1.10).

Gait parameters for groups 2 and 3 showed no significant differences (p<0.05) for all limbs (large standard deviations of G3). However, dogs of G3 (small and aged) had slightly greater pressure and longer stance time on the forelimb than the dogs in G2 (young, small). The reason for this trend may be related to the effects of osteoarthritis of hindlimbs of G3 dogs (verified by radiographic analysis).

CONCLUSION

The GAITRite® analysis system enables measurement of the temporospatial parameters of the dog at a walk. The study of symmetry allows an easier and quicker gait analysis as compared to other methods.

The small dogs walked faster than the large dogs. Pressure, stance time and number of activated sensors were more important in the forelimb than for the hindlimb.

The GAITRite® system was able to detect slight differences in the gait parameters in apparently sound, aged dogs compared with similarly-sized young dogs which may be due to the effects of osteoarthritis in the aged group.