

Preliminary report on the use of a pressure plate for objective lameness evaluation in dogs

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Introduction

- Visual scoring of lameness in dogs is **subjective** → need for **objective & quantitative** analysis in clinical setting
- Commercial **pressure plate**: recording of simultaneous, consecutive & collateral foot strikes in single passage
 - fewer trials required compared to single stride force plate analysis
 - calculation of spatiotemporal variables e.g. stride length

Materials and Methods



- Footscan[®] 3D 2m Gait Scientific system (plate of 2 × 0.4 × 0.02 m; 16,384 sensors; 126 Hz) in runway of 20 by 2m, covered by 5mm rubber mat + 2 photocell-activated gates for registration velocity (Oosterlinck et al., 2009)
- 4 client-owned dogs with forelimb lameness, evaluated at trot
 - **objective** measurements of fore and hind legs ↔ **subjective** grading: 0 (not lame) to 5 (not weight bearing)
 - 5 valid recordings / dog with pressure plate: whole footprints of 4 limbs + velocity within 1.3 – 1.6 m/s
- Data obtained by pressure plate (mean of 5 recordings / dog):
 - limb loading variables: peak vertical force (PVF) & vertical impulse (VI), normalized to bodyweight
 - calculation of symmetry index (SI) for PVF & VI = (lowest/highest value) * 100%

Results

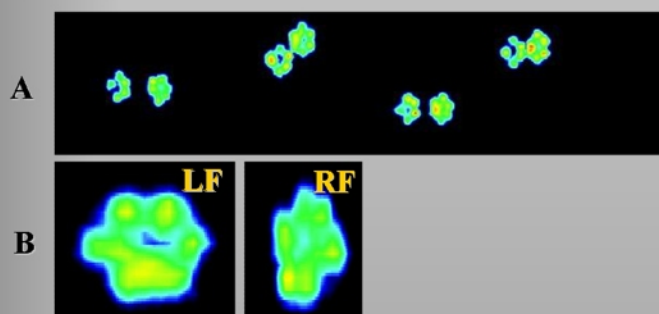


Figure 1
A: consecutive fore and hind footprints of one trial of a Labrador Retriever (31 kg) at trot
B: footprints of the left (LF) and right (RF) forelimb: a decrease in RF paw contact area is present, indicating considerable RF lameness

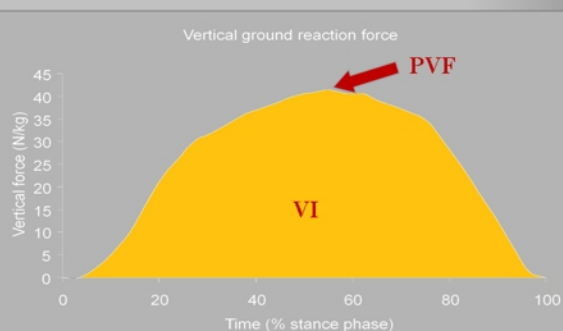


Figure 2
Graphical representation of the vertical ground reaction force as a function of time (% stance phase). The peak vertical force (PVF) & vertical impulse (VI; area under the curve) are the 2 main kinetic variables.

Dog breed	Visual lameness score 0 (not lame) to 5 (max)	Contact area (cm ²)		PVF SI (%)	VI SI (%)
		Lame limb	Contralateral		
<i>Bouvier des Flandres</i>	2/5 right fore	61.78	68.82	79.80	71.92
<i>Bernese Mountain</i>	3/5 right fore	58.94	61.68	66.07	66.02
<i>Labrador Retriever</i>	3.5/5 left fore	60.96	67.56	58.79	78.00
<i>Shepherd Malinois</i>	4/5 left fore	55.58	64.70	56.11	53.63

Conclusion

Preliminary evaluation of pressure plate analysis in lame dogs

1. can be performed in clinical settings (not time consuming)
2. allows objective and quantitative evaluation of lameness
3. promising for follow-up after medical & surgical treatments