Investigating the impact of working dog trials obstacles on kinetics and kinematics of dogs: preliminary summary

The aim of this work was to determine whether a reduction in height of the scale, and length of the long jump present in working trials, impacted on landing force and joint angles on landing in competing dogs. Presently, the height/distance used on the scale and long jump are 6ft and 9ft respectively. However, these height/distances are arbitrary and concerns have been raised in other disciplines that landing forces after hurdling jumps may lead to the presence of soft tissue injuries in dogs. There is a paucity of research into the impact of these obstacles on landing force and angulation on landing in dogs.

21 dogs (over the age of 12 months) were recruited from the working trials population to take part in this work. 15 male and 6 female dogs of 5 breeds/cross breeds took part in the research project. Dogs were asked to complete both the scale and the long jump a minimum of three times at three experimental distances/heights. Height/distances were randomised across dogs to reduce the impact of fatigue on the findings of the study. Scale heights were 6ft (current height used in working trials), 5.5ft (equivalent to one plank removed) and 5ft (equivalent to two planks removed). Long jump lengths were 9ft (current length used in working trials), 8ft and 7ft.

Data were collected on peak vertical landing force (PVF) (Figure 1), which served as a measure of impact on landing and on angles of the ankle and shoulder joints between the point of the first front paw touching the floor and the first back foot touching the ground. Duration of time (seconds) taken to complete the obstacle was also recorded. The impact of dog weight (<25kg or >25kg) was also considered.

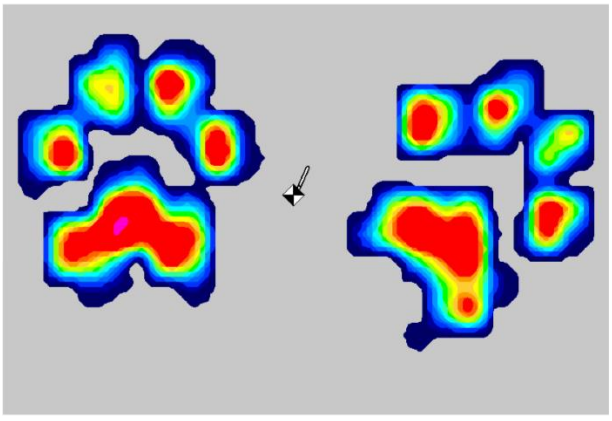

Figure 1. Peak vertical force (PVF) outline on the Tekscan mat, produced via Matscan XL software

Long jump results: Duration of landing did not change as a function of long jump length, and there was no difference between lighter or heavier dogs. Overall, lighter dogs (<25kg) had greater compression of the ankle on landing than bigger dogs (>25kg), however there was no relationship between this and length of the long jump. Heavier dogs had greater compression of the shoulder on landing, although again this was not related to the length of the long jump. PVF was not affected by length of long jump for either dogs <25kg or >25kg. Crucially, individual variation was seen in terms of peak vertical landing force for individual dogs in the front paws; with some individuals showing consistently higher PVF on one foot over the other throughout all jumps, and others showing approximately equal distribution.

Scale results: Landing force was greater in dogs >25kg at 6ft than at 5ft, however there was no difference between 5.5ft and 6ft. PVF did not alter according to different heights in dogs <25kg but more variation was seen in lighter dogs. Landing duration was longer for dogs <25kg at 5ft than 5.5ft and for dogs >25kg at 5ft than 6ft, which suggests an alteration in landing technique to the scale obstacle at the lower height. For dogs <25kg ankle angle was lower on the 6ft scale than either the 5ft or 5.5ft alternatives. No changes to shoulder angles were seen as a function of reduction in scale height (Figure 2). Individual variation was again seen in PVF on landing but dogs were tending towards more equality in the two on landing.

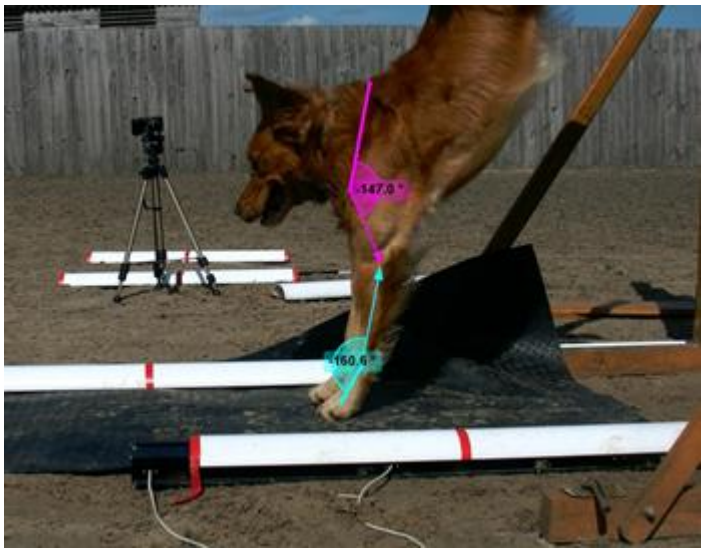

Figure 2. “Ankle” and “shoulder” angles of a dog (>25kg) landing after traversing the scale

Evidence-based approaches to canine working trials are important to ensure minimum impacts on physical health and welfare of participating dogs, in terms of risk of injury in both competition and training. Individual variation was observed in dogs on both the long jump and the scale obstacles. Recommendations arising from this work will follow in the full report.