

SUMMARY OF SOME RESEARCH AND ARTICLES ON DOGS AND JUMPING.

As part of the heights review, the subcommittee presents a number of documents on the topic. We hope that you will take some time to read the summary of each article, and maybe take a closer look at some of them. The intention is to share some of the research that has been done, and to be better informed on this topic. This is not an exhaustive list, but gives us an idea of the studies that have been done around the world.



The list includes:- title of the study/document, a short description of the study/document and a link to the full document on the internet.



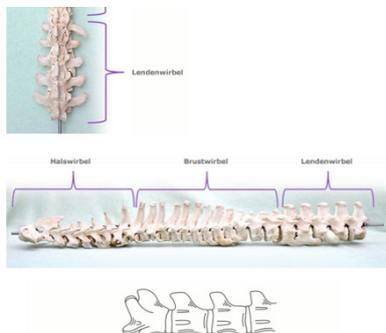
SUMMARY OF ANATOMICAL AND BIOMECHANICAL CONSEQUENCES OF DIFFERING JUMP HEIGHTS IN DOG AGILITY, 2013

Discusses the anatomy of a dog and how it jumps. Confirms the front assembly of the dog is a big shock absorber. Discusses effect of speed rather than jump height on landing forces. Discusses impact of height/body weight ratios in dogs and the effect on jumping impact. It discusses various research (some of which are mentioned below) that has been done on this topic. [Read more...](#)



BIOMECHANICS OF WALKING AND JUMPING.

Biomechanics of walking and jumping and the various stresses/forces involved. [Read more...](#)



YOUNG DOG BIOMECHANICS.

Discusses how young dogs may get injured due to rough playing and romping, running fast turns, as well as zigzag movements. Recommends walking, step by step, trot (especially up hills) and canter without any tight turns - well-aimed and carefully directed walking on various different soils and landscapes which, in turn, helps to build up optimal masses of muscles. Also mentions lumbar spine and carpal injuries as a result of overloading due to stop and go and fast

turning. [Read more...](#)

SAFETY AND THE RISK OF INJURY IN AGILITY BY PETER VAN DONGEN

Summarises a Dutch paper written by three agility handlers and trainers, a vet, a physiotherapist and a vet student. They have based this report on a lecture by the late Mr. Schamhardt, a lecturer in biomechanics at the Utrecht Veterinary University, as part of a seminar on injuries in agility in the Netherlands. He had done research into sports injuries and stresses of jumping in horses and dogs.

This report discusses everything from basic anatomy and physiology, physics and the study of video footage of dogs doing agility (not just jumping!). It reaches some interesting conclusions. [Read more...](#)

ARTICLES BY WENDY BALTZER.

- a) [Sporting dog injuries.](#)
- b) Preventing injury in sporting dogs.
Topics discussed include:- Conditioning and training, frequency of training, endurance, proprioceptive work, delayed neutering, nutrition, pre and post-activity exercise, warmups and warmdowns. [Read more...](#)
- c) [Most common injuries.](#)
- d) Warming up and cooling down. Describes appropriate warmup and warm down procedures in canine athletes, starting and ending with 15 minutes of walk. Includes stretches and proprioceptive exercises. [Read more...](#)
- e) [Harmful warmup exercises](#) (This includes tugging and throw ball).
- f) [Get involved in canine sports medicine.](#) Many owners need education on canine fitness and injury prevention etc.
- g) [Proprioceptive exercises](#) including wobble board especially after injury.



EFFECT OF FENCE HEIGHT ON JOINT ANGLES OF AGILITY DOGS

When joint angles are flexed the stresses on the muscles are increased and this can lead to injury. As jump height increases joint flexion increases, mostly affecting the front legs, shoulder and back (sacroiliac joint at takeoff).

The study tested 8 medium sized dogs, jumping at 7% lower than their height (400mm) and 51% higher than their height (650mm – our maxi height).



Findings showed most significant changes were at take-off. No significant changes were recorded on landing. The article also mentions that 33% of dogs injuries are due to agility, with 58% of those occurring during competition. The A-frame, dogwalk and jumps account for 66% of injuries. [Read more...](#)

KINETICS OF JUMP LANDING IN AGILITY DOGS.

This was a study of 11 Border Collies. It studied the vertical, horizontal and accelerative forces associated with jumping over a long jump, and a hurdle set at 3.6m, 4m and 5m gaps.

It found a force 4.5 times body weight in the forelimbs when landing from a hurdle at full speed. The results indicated that agility dogs alter their jumping patterns to accommodate the spacing between hurdles, which ultimately may impact long term health and welfare due to altered kinematics.



The take-off distance/speed and landing distance/speed significantly increased when consecutive jump distances were at 5 m compared to 3.6 m and 4 m. If the dog cleared the jumps at the same height irrespective of condition, the longer jump distances would suggest a flatter trajectory, which would likely reduce vertical ground reaction forces. More skilled dogs took off and landed further away from the hurdle, at a greater speed when compared to less skilled dogs. This suggests that experienced dogs may be more adept at deciphering the optimum take-off point for the jump, as has been seen in equines. They found that dogs increased their speed, with shallower landing angles over the hurdles placed 5 m apart.

There was increased flexion of the neck, shoulder and lumbar spine in the 3.6 m and 4m distances which may be due to the dogs landing closer to the next hurdle so having to lift their heads in preparation for take-off over the third hurdle. This may be why injuries occur more commonly in this location. When controlling for skill, the greatest number of differences was seen at the 3.6 m distance, mirroring differences in take-off and landing distances and supporting the notion that dogs may find hurdles spaced at this distance more challenging. [Read more...](#)

STUDY BETWEEN COLLIE AND NON-COLLIE DOGS

Looked at topline angle and jumping speed for collie and non-collie breeds. [Read more...](#)



UKA JUMP HEIGHTS DECISION 2005

From Physics it is apparent that as jump height increases by 40%, impact increases by 40% but as the dogs speed increases by 40% the impact increases by 100%. While watching and running dogs at lower heights it is clear that they go faster and, therefore, lowering the jump heights for many of our dogs is likely to cause more impact injuries. [Read more...](#)



JUMPING PROBLEMS SERIES BY PHYSIO-VET

Jumping problems, 2014. [Read more...](#)

[Problems at takeoff](#)

[Injuries that occur on landing](#)

A PRELIMINARY RETROSPECTIVE SURVEY OF INJURIES OCCURRING IN DOGS PARTICIPATING IN CANINE AGILITY.

Of the 1627 dogs included in the study, 33% were injured, and of those 58% were injured in competition. Most injuries occurred on dry outdoor surfaces. Border Collies were the most commonly injured, and injuries were in excess of what would be expected from their exposure. For all dogs, soft tissue injuries were most common. The shoulders and backs of dogs were most commonly injured. Dogs were most commonly injured by contact with an obstacle. The A-frame, dogwalk and bar jump obstacles were responsible for nearly two-thirds of injuries that resulted from contact with the obstacle. [Read more...](#)

THE MAGNITUDE OF MUSCULAR ACTIVATION OF FOUR CANINE FORELIMB MUSCLES IN DOGS PERFORMING TWO AGILITY-SPECIFIC TASKS.

The purpose of this study was to measure the muscular activation in four forelimb muscles while dogs performed agility tasks (i.e., jumping and A-frame) and to provide insight into potential relationships between level of muscular activation and risk of injury. Eight dogs were studied, jumping a 555mm jump, and climbing two Aframes, one set at 1.75m and the other at 1.67m high. The study found that the peak muscle activations during these agility tasks were between 1.7 and 10.6 fold greater than walking. Jumping required higher levels of muscle activation compared to ascending and descending an A-frame, for all muscles of interest. There was no significant difference in muscle activation between the two A-frame heights. [Read more...](#)



AN EXAMINATION OF JUMP KINEMATICS IN DOGS OVER INCREASING HURDLE HEIGHTS (2016)

The aim of the study was to examine changes in kinematics as hurdle height increased. Twenty Border collies and BC crosses were analysed at heights from bar on the ground to 650mm. Data analysed length of trajectory, jump speed, neck, lumbar spine and shoulder angles. Jump speed decreased as height increased. Length of trajectory increased with jump height, except that when jump height was above 126% of jump height at withers, length of trajectory decreased and neck became more flexed. Lumbar spine and shoulder angles also increased with increased hurdle height. These results suggest that dogs alter jump kinematics as jump height increases. [Read more...](#)

SURVEY-BASED ANALYSIS OF RISK FACTORS FOR INJURY AMONG DOGS PARTICIPATING IN AGILITY TRAINING AND COMPETITION EVENTS

Internet-based survey of the nature and perceived causes of injury to dogs participating in agility training and competition events - Results—Data were collected from 1,669 handlers of 3,801 agility dogs internationally; 32% dogs incurred ≥ 1 injury. Previous injury, ≤ 4 years of agility experience for dogs, use of alternative therapeutic treatments, and Border Collie breed were associated with increased odds of injury. Handlers having 5 to 10 or > 10 years of experience and dogs having > 4 years of experience in the sport were associated with decreased odds of injury. [Read more...](#)

BALL THROWING HARM AND ALTERNATIVES.

[Read more...](#)



Puppy Fitness That Fits the Puppy

Age Appropriate Exercise Guidelines

By Jane Killean
Director of the new film, "Puppy Culture - The Critical First 12 Weeks That Can Shape Your Puppy's Future"

There's an idea that's caught on like wildfire that exercise is some kind of panacea that will solve all behavior problems. Not only is this not true, it's led to a dangerous trend of owners pushing their puppies to inappropriate levels of exercise. So let's look at the Why's and How's of appropriate exercise for puppies.



PUPPY CULTURE, APPROPRIATE EXERCISES AND EXERCISE CHART FOR PUPPIES.

These are examples of more appropriate exercise for adult dogs and puppies to minimise harm, and are examples of the sort of education that could be provided

to the agility community. [Exercise chart.](#) [Read more...](#)

Thankyou for taking time to read these articles.

Heights Review subcommittee,

Dogs NZ Agility Committee