Options For Animals Animal Chiropractic Course

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STUDY INTO THE

USE OF THE SCALE JUMP IN THE KENNEL CLUB (UK)

SPORT OF WORKING TRIALS

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Abstract

Hypothesis is "Dogs training or competing in Working Trials are injured as a result of negotiating the six foot scale jump.

Null Hypothesis is "Dogs training or competing in Working Trials are not injured as a result of negotiating the six foot scale jump."

Hypothesis is "Dogs are injured in the forearm as a result of landing from the six foot scale jump"

Null hypothesis is "Dogs are not injured in the forearm as a result of landing from the six foot scale jump."

This is the first study into risks of the six feet scale jump on dogs competing in Kennel Club Working Trials.

It is assumed that dogs in this study are fully mature and maintained and conditioned for this work.

This multimethod study includes a retrospective observation through video archive of Working Trials progress test agility at Banbury Dog Training Society (BDTS). 41 dogs and 203 scale jump descents were analysed to collate evidence of landing styles and to assess the risks and benefits of these styles. The styles considered were scaling down, flattening the trajectory, absorbing forces into canter; and avoiding mixing directional forces, landing on four legs and inconsistency.

A second element was a survey of Working Trials enthusiasts and their 70 dogs. It included a scoping study of injuries sustained, associated with the scale jump.

Half the dogs (50%) land by pushing off from near the top on the descent face of the scale jump. Another third (35%) scale down more than 30cm before jumping off and the remainder jump from the top (BDTS study). Scaling halfway down the scale jump was a rare event. In the survey, half (57%), always or sometimes scale down and the other (43%) rarely or never do.

Most dogs leap away from the scale rather than drop to the foot, which also may help in reducing landing forces (BDTS study and survey).

Almost half of dogs stop immediately on landing after being sent over by the handler, in anticipation of the return back over the scale rather than absorbing landing forces into canter. Half again, (25% of total) of these dogs are already starting to turn in the air before landing, anticipating the return over the scale (BDTS study). These practices may increase the valgus and varus landing forces and thus may increase the likelihood of injury.

After careful examination of all responses, instance of injury on scale jump was 18 (25.7%). 11 (15.7%) were permanent injury and 7 (10%) were temporary. Injuries were distributed between forelimb, hindlimb and back / spine, some with more than one area of injury.

The survey showed no widespread epidemiological traits of overt forelimb concussion pathology, as might be expected in dogs regularly landing a six foot drop. There were three individual dogs that might be affected, including two from breeds particularly vulnerable to this injury. Handlers of heavy breeds or those vulnerable to elbow dysplasia in general and fragmented medial coronoid process in particular should study whether their particular dog is suitable for Working Trials agility. There were two further incidents of forearm injury from the scale jump.

There were seven dogs with hindlimb injuries from the scale jump, one temporary. In four cases the scale jump may be contributing to underlying wider pathology.

Three dogs had back or spine injuries which were attributed to the scale jump and another two had chronic pathology where the scale jump may have contributed. The mechanisms of these injuries mostly remain unclear but are believed to include at least one dog (a GSD) falling off the scale jump.

There are four German Shepherd dogs injured, a higher number than any other breed, though this may be a random finding. The possible involvement of breed vulnerability to neurological pathology, increasing likelihood of accidents, is discussed. Further investigation is important to establish how these injuries occurred and how they can be reduced.

There is evidence in this study, of injuries caused to dogs through scale jump malfunction and so processes to reduce these accidents will be beneficial.

It was concluded that the first hypothesis was true and that dogs were injured on the scale jump. However there was no evidence that forelimb injury was caused and so the second null hypothesis was true. This study discusses the benefits to dogs of using the scale jump as well as threats.

This paper also advocates Kennel Club management redefining the aims of the sport, and putting processes in place to gather data about injuries in competition on the jumps, as part of a database on which to base future decisions. Injuries on Working Trials agility in general should be collated and regularly reviewed.

774 Words

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ABBREVIATIONS USED

BC	Border Collie
BDTS	Banbury Dog Training Society
CDRM	Chronic Degenerative Radiculomyelopathy
FMCP	Fragmented Medial Coronoid Process (of Ulna)
GSD	German Shepherd Dog
JFT	Jump From Top
JB	Jump Back
JO	Jump Out
KC	Kennel Club (United Kingdom)
KCWTLC	Kennel Club Working Trials Liaison Council
LAF	Land at Foot (of scale jump)
LPA	Leap away (from scale jump)
MSK	Musculoskeletal (assignment)
p	page
RVC	Royal Veterinary College
TATFF	'The Active Trialist' Facebook Forum
UK	United Kingdom of Great Britain
vGRF	vertical Ground Reaction Force
WT	Working Trials
WTFF	Working Trials Facebook Forum
<30cm	Less than 30 cm - twelve inches (from top of scale jump)
>30cm	More than 30 cm - twelve inches (from top of scale jump)
<3'	Less than three feet (from base of scale jump)
>3'	More than three feet (from base of scale jump)

Background

1. The British sport of Working Trials (WT) commenced shortly after The Great War where British soldiers admired the work of German war dogs. Dogs used in those early days were the German Shepherd (Alsation), most of them imported from Germany for that purpose. The British working trials were based on Germany's elite tests for their own breed (Cree iv).

2. As dogs became used by British police, WT became important for training and measuring the performance of police dogs. Many civilians admired the work of these dogs and aspired to compete themselves. In 1930, the sport was extended for mature individuals of any dog breed or breed mix to enter WT competition (Cree p32-34).

3. The scale jump was used since those early days, and 'The Times' newspaper on 14th August 1928 records that two dogs, in obedience tests organised by Southern Alsatian Training Society cleared eleven feet (Cree p32)!

4. Some WT handlers have since become reflective about stresses and risks caused to dogs in the sport, from the agility section. Much debate has taken place online and in the real world. ('The Active Trialist' (TATFF) 25.3.2018, 4.3.2019; and 'Working Trials' (WTFF) 28.9.2018 Facebook forums). Challenges are regularly brought to the Kennel Club Working Trials Liaison Council
5. (KCWTLC), with a view to changing these rules. No changes have yet taken place. One fact on which many agree; a desire for more information, so leaders of the sport, and individual handlers, can make a fully informed decision whether any changes are necessary; and whether it is safe to campaign their own dogs (KCWTLC Minutes; Cahill).

6. WT, for most stakes, consists of three sections; ‘nosework’ which includes tracking and searching, ‘control’ which is obedience, and ‘agility’ over WT jumps. All exercises MUST be attempted and a qualifying number of marks need to be attained in each section as well as a qualifying total score (Bellis).

7. Put simply, the scale jump and another jump must be completed successfully to qualify the agility section. A dog must be 18 months old to compete at a qualifying working trial.

8. There are three elements to the agility section:
    i. Clear jump, 914.4mm (3ft) (Upright jump).
    ii. Long jump, 2.743m (9ft) (Comprised of five graduated spaced boards)
    iii. Scale jump, 1.828m (6ft). “Vertical wall of wooden planks which may be grooved or chamfered along their bottom edge. The top may be slightly padded.” The dog is set up by the handler within an area nine feet (2.743m) from the jump. At the handler’s command, jump to top, descend to far side, wait in a position previously nominated by the handler, and return back over the scale jump on command (Kennel Club (KC) I Regs).

9. A British sport, the scale jump is known colloquially as “Six foot scale jump” and the jump heights will be referred to as ‘six foot’ or 'five foot’ with consideration for WT readers. The landing position guide of three feet is also used, due to relationship with and measurement against the scale jump.

10. Anecdotally, the long jump is the element where ageing dogs begin to fail, but the scale jump causes most worry for handlers due to forelimb impact from a six foot drop, or

potential for accidents. A few dogs do choose to scale down the jump, but some competitors believe this is rarely successfully taught (TATFF; Gregory 25.3.2018). Consequently, there is division; and alienation of some competitors away from trials, towards other sports (TATFF 25.3.2018; 4.3.2019; WTFF 28.9.2017).

Introduction

11. This study will first examine practices within other disciplines, and consider existing literature, focussing on the descent and impact from the scale jump, to evaluate safety patterns. A list of the advantages and disadvantages of the scale jump is provided against which to measure any decisions.

12. A multimethod research investigation, consisting both observation and survey. The first element is a retrospective assessment by video archive, of the jumping style of dogs using the scale jump in the progress tests run by a working trials club. The second piece of research is a survey of handlers on the WT interest Facebook forums. This too examines styles of descent of the scale jump, but also the incidence and nature of injuries sustained (Clarke 2005).

13. Multimethod research will give breadth and scope, since there is no prior research on this subject. These elements are intended to complement each other, and simultaneously triangulate, providing confidence and understanding in the outcomes. For this reason and for clarity both studies are discussed together after the data of both studies are given. Due to lack of previous research this will also act as a scoping study. (Clarke 2005; Walliman 2001; Cresswell 2003)

14. The next section will begin with a general summary, followed by a brief summary of both original studies, before a discussion of both studies together.

15. Next is a general discussion. The hypotheses and null hypotheses are as follows:

Hypothesis is "Dogs training or competing in Working Trials are injured as a result as a result of negotiating the six feet scale jump.

Null Hypothesis is "Dogs training or competing in Working Trials are not injured as a result of negotiating the six feet scale jump."

Hypothesis is "Dogs are injured in the forearm as a result of landing from the six feet scale jump"

Null hypothesis is "Dogs are not injured in the forearm as a result of landing from the six feet scale jump."

These will be considered through the following questions.

Is the scale jump injurious?
If so what are the injuries?
Does the scale jump need to be eliminated from WT tests?
Does the scale jump need to be safer?
How can it be made safer?
What should be done now? (Conclusions / Reflections.)

The study will end with suggestions for future studies.

Comparisons with other dog jumping sports.

16. The KC specify heights of jumps for fun-agility as 30cm small dogs, 40cm medium, and 60cm for big dogs. These heights have recently been reduced from 5cm higher, and new category (50cms) added for welfare issues. The heights in fun-agility sport are consistent throughout Europe, Australia and Canada (KC Agility Liaison Council Annex F(i)). As categories work, jump heights could range from 7% lower than the dogs height to 51% higher (Birch Lesniak 2013).

17. In American ‘Obedience’, similar to UK Working Trials, and for which similar qualifications are awarded, the height is set at 125% of the dogs’ height at the withers (Zink VanDyke p6). This includes a ‘high jump’ which is solid like the scale jump but is constructed for maximum height of four feet (American Kennel Club Obedience Rules p96).

18. The European sport of Mondio under FCI rules, has a ‘palisade’ similar to a WT scale jump. Minimum height is 1.7 metres (5.5 feet) (gains 8 points) and maximum height is 2.3 metres (7.5 feet) (gains 20 points). In this sport the palisade has a ramped landing side so the dog runs down rather than leap down to the floor (spoiltpups) (EuroJoe).

19. There is a palisade with ramped descent in Global Ringsport (Cahill personal communication).

20. French and Belgian Ringsport have a palisade with elective heights which are incrementally marked. In this sport, the dog is required to descend to the ground. (Soar Ringsport; Domaine de Luxor https://m.youtube.com/watch?v=uEO5pgcfiOU)

21. Ringsports and Mondio have been developed to advance the protection breeds, although any breed can enter. The Belgian Malinois may be best adapted for this sport. Video clips demonstrating the breed’s exceptional agility are widely available online. http://www.ringsport.org/Documents/Rulebook2009.pdf. (Federation Cynologique Internationale)

22. IPG (International Gebrauchshund) was probably developed from the original German tests for the GSD at the time of the Great War. Now an 'A' Frame (ramps) is used instead of a scale jump. http://leerburg.com/rulestbl.htm

23. Zink Vandyke (p4-5) list canine sports into two categories. 'Performance Events' for a specific breed to "recapitulate the original purposes of various breeds or groups of breeds," and those which encourage dogdom in general to compete, referred to as 'companion events'. Fun-agility is a companion event, whereas the other dog sports above are categorised as performance events. WT might be considered incongruous when compared to other companion events, (open to all breeds), and may sit more easily alongside breed specific performance events.

24. Police need their dogs to scale fences regularly, as criminals escape through residential gardens and private property. They mostly train on four or five feet scale jumps. Their licensing standards are four feet for standard, and six feet for advanced qualification. Bedfordshire Police do not use table landings, but Hertfordshire and West Midlands Police do. There is no significant history of injury with the scale jump, and no recollection of accidents over recent decades in Bedfordshire and Hertfordshire Police (Bedfordshire Police Constable; Davis; Tasker Personal Correspondence).

Kennel Club (KC) advice, Guidelines, Statements

25. There are limited organisational protections for a dog presented for WT competition despite being unsuitable through type or preparation.

26. In February 2016, “Kennel Club Guidelines for Owners / Handlers taking part in Canine Activities.” for generic KC dog sport was produced. It sets out KC organisational policy that canine welfare should come before competition demands.

27. It says, “Dogs must only undergo training that matches their physical capabilities and level of maturity…..” It lists obesity alongside other health conditions as precluding the dog from unsuitable sport. It further states that dogs must be fit, competent and in good health for training or competition, and those with illness, compromising welfare, should not compete. Trial Managers can ask the handler and dog to leave the ‘showground’ for significant or repeated breaches.

28. It recommends risk assessments in connection with equipment and training surfaces, as well as professional bespoke fitness and conditioning advice.

29. Judges may dismiss or allow withdrawal of a dog, if likely to suffer if it continues competing. Regulation 12, ‘I’ Regulations covering WT require an exhibitor / competitor at a trial to ensure their dogs needs are met and health and welfare not put at risk.

30. KCWTLC are commissioning research to compare the impact of a “six foot scale jump with a five foot one”; and “nine foot long jump with an eight foot one”. This is being formulated and is awaiting funding (KCWTLC minutes April 2019).

31. On the KCWTLC Meeting agenda for 24th April 2019 item 13, is the KCLC 5 year strategy, declaring intentions to “ensure the Kennel Club understands potential risks to dogs arising from undertaking working trials exercises and taking measures to minimise those risks; and ensuring that rules and guidelines, sharing good practice and

learning opportunities support safe conduct of the sport." There is commitment to modernising management of WT, annotated to the strategy paper; "This is about being proactive in understanding what information is available about potential risks to dogs from participating in WT exercises. e.g. What effect the jumps have on dogs……" (KC Website).

32. On 19th February 2018, Dr Jacqueline Boyd made a statement on behalf of Activities Health and Welfare Sub group of the KC relating to research commissioned by them, completed by Nottingham Trent University and RVC but not published. She gave the following preview regarding fun-agility. As a result, fun-agility jumps were lowered.
    i. Experienced dogs were more consistent in take off and landing and in limb angles than novice dogs and were more able to cope with jump styles and approaches.
    ii. Higher jumps result in "altered kinematics" especially at 75% of height to withers and 125%. There is greater force in the forelimbs at take off and landing, but this is less than a dog experiences running round a bend (RVC).
    iii. It is not clear how or where injury may be caused and injury changes with individual conformation.

Ethics / General Data Protection Regulations

33. The Committee of Banbury Dog Training Society (BDTS) have given written permission for their archive to be used for Study 1. Where individual subjects are transparent in the data (ie Hovawart), specific written permission from the handler has been obtained. The WT interest Facebook forums were used for the survey, with an explanation to the site owners and responders of the study clarifying that completion was optional. Where individuals have been referenced, this has been with their permission. Comments given in the survey are anonymous. Photographs are included with both

permission of the dog owner and the photograph copyright owner, but left anonymous. Photographs are presented for illustration and are not part of the study. Their use is gratefully appreciated.

Literature

34. Nothing in research evidences an appropriate height for dogs to jump, and where there is precedent, it invariably refers to countermovement jumps as opposed to drop from height. Human research suggests there is no correlation (Alfifi 2012). Horses are different from dogs and not suitable comparisons (Zink Daniels p2). Research mostly relates to fun-agility, where, although jumps are lower, there are different stresses from jumping, turning at speed and repetitive actions. These are forces widely understood to precipitate injury throughout soft tissues of the fore and hindlimb and believed less of an issue in WT agility. Dog anatomy is such that there is no bony connection between the forelimb and torso. (Zink, VanDyke p6; Z Fossey, K Skinner;J Fossey, S Kingdon; Boyd paragraph 31 above; Options for Animals UK chiropractic manuals, Bellis MSK Assignment 1).

35. McLean, Wills (2015) examined forelimb landing force at fun-agility hurdle height, and 10% higher and 10% lower than the first jump. “No significant difference in vertical Ground Reaction Force (vGRF) was found in landing three consecutive jumps, but there was increased peak limb force corresponding with increased height indicating that caution should be used at the borders of height classification within fun-agility sport.”

36. Pfau et al (2011) carried out simultaneous kinetic and kinematic measurements on 11 agility dogs over obstacle combinations. They reported increased risk of injury in fun-agility, based on ‘extremely high’ forces in the forelimbs measuring 4.5 times body weight whilst landing from a hurdle at speed. This is just under twice the impact from running. (It is not clear how that affects a dog landing without the agility speed.)

37. Williams, Jackson et al (2017) examined forelimb and spinal joint angles experienced by 8 agility dogs using the agility 'A' frame, and compared experienced and inexperienced agility dogs. There was no difference in forelimb angle between the dogs. Experienced dogs had head and neck in more flexion and were more consistent in style. Inexperienced dogs exaggerated a jump at the apex and were less consistent in head and neck position. The authors suggested that a more rounded apex would "encourage less extreme technique."

38. Birch, Lesniak (2013) measured effects of fence height on joint angles in dogs by using anatomical markers on leg joints and spine. With increased fence height, flexion of the scapulohumeral joint and tarsal extension increased significantly for take off and bascule, and caused more stretch to the biceps brachia, supraspinatus and the lumbosacral joint during take off. Neck extension increased on take off commensurate with height of the jump. The lumbosacral joint also extended at bascule. All these stretches and extensions they considered a cause for concern. There were no significant changes in flexion or extension of joints on landing or getaway with increased fence height. Note: No measurement was made of the second foreleg to land which may have had a greater impact than the leading leg (Paragraph 51; Zink Daniels p19-24).

39. Birch, Carter et al (2015) found that agility dogs had a larger trajectory over hurdles as heights increased. However, at 126% of the dog's height this pattern changed. The trajectory then became shorter and more vertical. It was also seen that the neck was more flexed and lumbosacral joint more extended. Shoulders were more flexed during

the bascule. Thus, it was believed 126% of dog's height may be reaching the dog's limit (Paragraph 31).

40. Levy et al (2009) found that 33% of agility dogs were injured due to agility, 58% of those in competition, remainder in practice. Nearly half of the 33% involved the 'A' frame or dog walk. Concussive landing forces often caused soft tissue injuries to shoulder and back. Of the injured, 17% were minor, 21% major injuries and 5.2% retirement injuries. 67% of retiring dogs were due to contact with an obstacle and of those a quarter were due to the A frame. Note: The 'A' frame in Working Trials is considered a low-impact anodyne training version of the scale jump. It differs in fun-agility by being taken at speed (Bellis).

41. Cullen et al (2013)(a) carried out a similar study to Levy with similar results. 'A' frame injuries were highest, especially to shoulder and phalanges. Higher injury incidence occurred in Border Collies (BC) (There were insufficient GSDs to report); and with less experienced dogs and handlers. 31% of dogs in this study had agility related injury, of which 50% were mild injury and 45% severe, the rest unclassified. In Vivo tests were carried out on 4 muscles most vulnerable to injury, Biceps Brachi, Supraspinatus, Infraspinatus and Triceps Brachi (Long Head) on BC athletes whilst undergoing two clear jumps and 'A' frame of two different heights (1.75m and 1.67m). No difference in the muscle use was found between the two 'A' frame heights. Jumping was the most demanding on the shoulder muscles compared to the 'A' frame. Supraspinatus activation, (and possibly to a lesser extent, biceps brachi) is greater in dogs taught to halt on descending contact points than those who run through (Cullen et al (2013)(b).

42. Appelgrein et al (2018) examined carpal extension on the 40 degree ‘A’ frame with 35 and 30 degree alternatives and found no difference. However (2019) they found that the higher frame required significantly more propulsion to negotiate. There was no difference in vGRF.

43. Gregerson Carrier (2003) measured the gear ratios in the joints of agility dogs. This relates to pennate muscle, where fibres twist as they contract giving progressively more strength for less contraction. They found that this specialisation was very effective for the shoulder (biceps brachii, deltoideus, anconeus) and stifle (rectus femoris) maximising power production.

44. Bellis (MSK Assignment 1 paragraph 14) quotes Bliss p51, Zink Carr p232 explains that eccentric muscle contraction (such as pushing against the jump or ground), is more vulnerable to injury than concentric contraction.

45. Azizi Roberts (2014) studied pennate muscle and found the highest gear ratio was in eccentric contraction and this provided a protective effect against damaging muscle lengthening strains.

46. Konow Azizi (2011) found that tendons absorb singular intense shock which muscle cannot cope with. The tendon is employed when the muscle is steeled against landing impact. Then, almost instantly, the muscle fascicles extend to absorb the forces from the tendon, so the tendons act as safety net.

47. Oricom Technologies (2004) found that impact forces were absorbed by returning to a running gait on landing. If there is too steep an angle for landing there is insufficient

forward momentum and the forces are not dissipated. The dogs legs then take the impact “pounded into the ground, initially on ankle and pads”. Conversely too shallow an impact will result in a skid. They did not state whether a shallow impact may encourage four leg landing.

48. Pardey et al (2018) completed a rare study which involved neither fun-agility, nor countermovement jump. They measured peak vGRF force in dogs landing, after jumping off various heights to simulate car boot egress. A ‘significant difference’ was found in recordings between the various heights of 0.55, 0.65 and 0.75. It was noted, however, that the percentage increase in vGRF was rather less than the percentage increment in height (critique - Bellis Assignment 2).

49. Wiles et al (2017) made an epidemiological survey of 43,005 KC registered dogs of 187 breeds. They noted that 4561 (16.87%) had current musculoskeletal conditions. including 118 (0.27%) osteoarthritis. ‘Elbow dysplasia' (all types) were 439 (1.02%). The proportion unaffected by disease generally was 65%. Labradors had the worst MSK health issues, being the only common breed with ‘significant’ incidence of arthritis, elbow and hip dysplasia. Temwichitr et al 2010 found 18-50% of Labradors had FMCP (Canapp p309)

50. GSD mortality due to; MSK conditions 16.3%; Inability to stand 14.9%; Spinal cord disorder, 13.6% (O’Neill et al 2017). Common spinal cord disorders in the GSD are Canine Degenerative Myelopathy (CDRM); Intervertebral Disc Degeneration (IVDD); and Lumbrosacral disease. These conditions might affect the dogs sensory or motor neurology and proprioception, and might show overt clinical signs around 8 years of age (Options for Animals Course Manuals).

51. This literature study should be considered with Bellis Assignment 1. 'Musculoskeletal Health of the Canine" in which research and pathologies of the forelimbs are examined in relation to the descent of the scale jump, together with conformational contributory factors for the jumping dog. Fragmented medial coronoid process of ulna (FMCP), can be genetic, developmental or caused by concussion. The study discusses the anisotropic nature of tissues whereby valgus and varus forces are a threat, with hyperextension strains from twisting on landing from drop down. It also considered the aggravating influence of repetitive strain, sudden stopping, changes of direction - with speed and combination forces, on the likelihood of injury in the jumping dog. (Paragraphs 12, 20 MSK Assignment 1) "Preparation of the Working Trials Dog with the guidance of a Rehabilitation Specialist." is Bellis Assignment 3.

52. Literature was sought, where ground forces in landing from height could be exacerbated or mitigated by the dog. These were as follows: Zink Daniels p19-24 explains the mechanics of dogs jumping in agility sport. Jumping is an extension of canter. On landing, the leading leg reaches forward making initial contact before the other foreleg substantially lands. As it does so the dog lifts his spine to reach forward with the back legs, to take up the ground forces and absorb them into an ongoing canter. A full stop landing may lose these benefits.

53. If the dog raises the head on descent the weight moves to the rear and the dog's front and rear legs land almost simultaneously. Whilst this shares the impact between the four legs, the forces from front and rear girdles clash together along the spine instead of absorbing or dissipating them (Zink Daniels p24).

54. Discussing fun-agility, Zink Daniels p26 moot, “Dogs that jump with a flatter trajectory experience less deceleration and less vertical impact on landing and thus suffer less stress to the front end.” They suggest that a dog habitually taking a shallow trajectory on agility jumps has a longer jumping career and less acute and chronic injury. It is not clear how relevant this is to a six foot high jump. They state that a flatter trajectory is even more important if the dog is also expected to turn after landing (Zink Daniels p26). The speed necessary for flat trajectory on a countermovement jump may not be necessary on jump from height, though doubtless the athleticism and conditioning is.

55. Zink Daniels Ch9 suggest signs a dog is stressed, or struggling with jumping.
    i. Stutter-stepping or hesitation on take off
    ii. Taking the jump too fast
    iii. Signs of stress (panting, yawning, lips pulled back)
    iv. Signs of fatigue or pain

Possible advantages of the Working Trials Agility Section and Scale Jump

56. Before drawing conclusions about dangers of the scale jump it is important to understand the benefits that it may bring.

57. The most clear welfare benefit of the challenging agility section may be an unequivocal retirement, meaning that handlers do not enter senescent dogs, causing them to carry out exhaustive tracking and especially patrol rounds which are physically beyond them. So, if the dog cannot do the scale jump, there is insufficient marks to qualify and the dog wont be entered. Equally, this excludes dogs which might have health or conformation problems and therefore capable of neither the scale nor other heavy work involved in this sport.

58. Due to the scale jump, handlers have become aware of their dogs' physical problems at an early stage because of a history of failure on the jumps (Bellis; Whittington TATFF 4.3.19). Some WT competitors believe that the jumps do not cause physical problems, but 'finds them out' (Roberts 2009).

59. To be able to do the working trials agility, as seen in Bellis Assignments 1 and 3, it is necessary for the dog to remain fit without carrying extra weight. This means that their health and quality of life may be much better than many pet dogs. This in turn may provide good role models for the wider dog world (Bellis 2019; Roberts 2009).

60. As seen in the MSK Assignment 1 (Bellis 2019), the amount of physical weight bearing exercise is directly correlated to the strength and quality of canine musculoskeletal structures, bone, cartilage, ligament, muscle and tendon. Therefore, steady

incremental jumping, then maintaining this may significantly benefit the individual healthy dog, and those genetically associated with it.

61. Many dogs and handlers get a great deal of pleasure from training and competing in working trials, as reflected in the numbers of entries for this sport despite a complex series of exercises and very high standards of competition. Many consider WT dogs have a rich quality of life (Roberts 2009).

The Disadvantages of the Working Trials Agility Section and Scale Jump

62. The scale jump is successfully completed by most dogs on most occasions within competitions. However, six foot will be too high for some dogs to jump. Either through lack of breeding; straight; or dysmorphic conformation; through inadequate preparation; obesity; latent disease or previous injury, or just simply because of physical individuality, jumping six foot, and landing from that height, injury may be caused (See MSK Assignment 1).

63. Some dogs, despite being fit, have been injured, some permanently, through accidents in falling from the scale jump. Other dogs have developed chronic forelimb pathology and can no longer work. (Cahill - Personal Correspondence). Perhaps too easy a mistake to make even in a dog with carefully nurtured proprioception and balance. Risks can be exacerbated by wet and slippery or rough ground (Zink Daniels p153; Mecklenberg p23).

64. Many competitors consult a rehabilitation therapist and manual therapist, and are guided in training the jumps through a working trials club, but some may not have a formal training plan (Bellis ‘Fitness for WT’ survey). There may be no formal assessment of the dog’s fitness, before starting agility training (Bellis). Without proper management, acute and chronic injuries might be more likely. “Rehabilitation [in Canine sports medicine] is acquiring, regaining and maintaining fitness and conditioning, targeted towards prevention of future injury.” (Zink VanDyke p1, Ch 1; Bellis - Assignment 3, Rehab Survey)

65. The scale jump has caused divisiveness amongst the working trials community over a long period of time, with some reluctant to train and enter, and this test puts off newcomers (Paragraph 4, 9). Whilst some concessions exist, the jumps prevent the smallest dogs from competing in top level WT competition.

Original Research - Study 1

Banbury Dog Training Society

Observation and Assessment of Scale Jump exercise

by video clip of Progress Tests

By kind permission of the BDTS Committee

66. Banbury Dog Training Society (BDTS) Committee have made available an archive of film clips of their half-yearly Progress Tests over six years. These show member dogs jumping the WT scale jump under test conditions. Some are experienced WT competitors, others not ready for full competition. The latter sometimes scale jumps lower than competition heights (Neiuwenhausen).
www.banburyanddistrictdogtrainingsociety.org/progress-tests-index/

67. This qualitative, retrospective observational research, examines how dogs may mitigate landing forces or injury when descending the scale jump; and also to examine ways where those forces may be exacerbated. Specifically this will look at the incidence of scale down (dog reducing drop height); leap away (shallowing trajectory); run on into canter (safely dissipate forces); consistency of jumping style; mixing directional forces (introducing skewed forces) and landing on four feet together (creating a clash of impact between both girdles) (Paragraphs 33-55)

68. Each scale jump descent on film clip, was examined, using slow motion where necessary to record data. Data includes, [handler; dog]; breed; whether outward (Jump Out (JO)) or return descent (Jump back (JB)); height of jump; point on scale where dog left it; whether dog 'landed at foot' (LAF) of scale or 'leapt away' (LPA) from it; whether landed on forelegs or all four legs; position of handler where relevant; and style notes. The style notes indicates whether the dog stopped immediately on landing or cantered on; whether on 'JO' the dog began to turn in preparation for the return whilst still descending or whether it leapt out to the handlers feet on the return (JB), leaving no room for canter steps. This data was entered on 'Numbers' software spreadsheet.

The Data - BDTS Study 1

69. Thirteen progress tests were examined from March 2013 to March 2019. The jump descents were broken down to JO and JB. Thus, there were between 7 and 23 jump descents for each progress test. There were forty-one individual dogs providing video data. Most had been entered multiple times as they had competed in several progress tests. 3 completed ten jumps (five entries); 4 completed eight; 9 x six jumps and 12 x four jumps. The breeds of individuals represented in the tests were Collies (14); Labrador (7); German Shepherd (GSD) (3); Golden Retriever (2); Cocker Spaniel (2); Springer Spaniel (1); Tervuren (1); German Wire-haired Pointer (1); Groenendael type (1); Hovawart (1); Staffordshire Bull Terrier (1); English Setter (1); Terrier (1).

Scale down

70. To examine scale down, Jump[ing] from the top (JFT) was contrasted with scale down less than 30cm, i.e. springing down from a high point on the far aspect of the scale (<30cm); as against scale down of more than 30cm (>30cm) that is the dog reducing the drop by more than 30cm. Where a dog, rarely, scaled beyond halfway down, that is noted. Incidence of JFT is high (approximately 50%) over small scale jumps. However this pattern changed with five and six feet jumps.

All dogs FIVE FEET Scale Jump

5 Feet	JFT	<30cm scale down	>30cm Scale Down	> Halfway Down
Jump Out (24)	3 (12.5%)	11 (45.8%)	9 (37.5)	1 (4.2%)
Jump Back (24)	2 (8.3%)	13 (54.2%)	8 (33.3%)	1 (4.2%)
Total (48)	5 (10.4%)	24 (50%)	17 (35.4%)	2 (4.17%)

All dogs SIX FEET Scale Jump

6 Feet	JFT	<30cm scale down	>30cm scale down	> Halfway Down
Jump Out (61)	9 (14.7%)	33 (54.1%)	19 (31.2%)	-
Jump Back (51)	5 (9.8%)	27 (52.9%)	19 (37.3%)	
Total (112)	14 (12.5%)	60 (53.6%)	38 (33.9%)	

Breed Comparison on Scale down

		JO	JO	JO	JO	JB	JB	JB	JB
	Total	**JFT**	**<30cm**	**>30cm**	**Halfway**	**JFT**	**<30cm**	**>30cm**	**Halfway**
Labrador 5 foot			2	1		-	3	-	
Labrador 6 foot	18 out 15 back	3 (16.7%)	10 (55.6%)	5 (27.8%)		1 (6.7%)	8 (53.3%)	6 40%	
Collie 5 foot		-	5	2	1	-	5	2	1
Collie 6 foot	21 out 17 back	3 (14.3%)	12 (57.1%)	6 (28.6%)		3 (17.7%)	8 (41.1%)	6 35%	
GSD 5 foot		1	-	-	-	-	1	-	
GSD 6 foot	8 out 8 back		6 75%	2 25%		-	6 75%	2 25%	

Jumping away from scale to shallow the trajectory.

71. Only five landings were LAF, less than three feet from the scale jump, (disregarding small jumps and small dogs to avoid confusion). Instead to some extent dogs jumped away from the scale. The five LAF scale landings were by three dogs. Only the setter landed close both in JO and JB over five foot jump, scaling down >30cm both ways and also 'turned as landing' on 'JO'. In other jumps this dog LPA. The Groenendael did one test at six foot and scaled down >30cm, LAF on the JO but not on JB. The final dog, a collie cross, twice LAF of the scale, both JO on two different tests. On both occasions the dog was turning during the descent. The remaining four descents, for that dog, of the three tests did not LAF.

Landing forces absorbed into canter on 'Jump Out'.

72. Of 107 JO descents, 50 (46.7%) had a full stop landing so did not absorb landing forces into canter. 39 (36.5%) did run on into canter. 9 took one step. In the remainder of cases it was not clear.

Landing forces absorbed into canter, on 'Jump back' (return over the scale).

73. In contrast to JO, dogs were not anticipating return and had no reason to change direction on landing. However, some dogs chose to leap out from the scale to the handlers feet. If it is useful to absorb the forces into canter, the handler sometimes stood where the dog was prevented from running on. 65 (67.7%) of the 96 JB ran on, possibly absorbing the landing force into canter. 16 (16.7%) had a full stop landing without a canter on. However only 6 of the latter were six feet jump descents. A further 7 were over five feet jump, the rest over a smaller jump. Of these 16 full stop landings, on four occasions, the handler took position within four feet of the scale, and

on eight occasions the handler was within nine feet. On four of these, the dog leapt to the handlers feet, including all three German Shepherds at some stage. The sixteen dogs were Collie (3); Labrador (2) plus cross (1); GSD (4), Golden Retriever (2); Groenendael, Hovawart, Pointer, Setter.

Consistency of Jumping Style

74. The JO data was again separated from the JB data. Where individual dogs did three or more jumps in one direction, they were compared for consistency. 17 dogs met this criteria. Where two adjacent categories of scale down were used this was ignored. The lead leg and take off point was not considered. The question of consistency was in the manner of landing, whether the dog ran on into canter, stopped immediately or turned whilst descending. In JO 7 dogs, (41.2%) acted consistently on descending the jump. 10 (58.8%) dogs behaved inconsistently related to the dog running on after landing or stopping immediately or turning in the air, behaving differently on some occasions to others.

75. From the JB data, 9 (52.9%) out of 17 gave consistent behaviour on scale jump landings. 8 (47%) gave an inconsistent performance in some way, and of these, 5 (29.4%) were inconsistencies about whether the dog ran on into canter.

Turning whilst Landing in Jump Out

76. In JO descents, 24 (22.4%) of 107 descents, dogs anticipated the 180 degree return back over the scale to the handler, and mixed landing forces with turning forces. These were Labrador (6 descents); Collie (13) Crossbreed (1); Golden Retriever (2); Cocker Spaniel (1); Pointer (1). The individual dogs were 10 border collies; 4 labradors; Golden Retriever, Pointer and Cocker Spaniel. 18 of the 24 dogs had no

continuance into canter on landing. Two took steps to continue the turn before returning and the other four took balance steps to regain stability before returning over the scale jump. A 'full stop landing' was in 'style notes' on four of the dogs.

77. A further 28 (26.2%) descents, dogs turned immediately after landing without obvious mix of directions in flight. All of these had no run on into canter. Three took balance steps before returning over the scale jump. This group included 11 Border Collie plus 2 crosses; 7 GSD; 3 Labrador; Setter (1); G. Retriever (2); Hovawart (1); Terrier (1). Turning whilst landing did not occur in Jump back.

Landing on all four-legs together

78. Twelve descents were considered to be landing on all four-legs together. Half of these were under five feet jumps and dismissed as less relevant, except that a Hovawart (5) consistently landed on all four-legs together including a height of five feet.

79. All except one of the all four-leg landings was on JB. The exception was the pointer who 'turned on descent' and 'nose dived.' There was no run on in canter. An individual labrador made a four leg landing twice. She had scaled down >30cm. On one occasion she ran on absorbing into canter. The other occasion she did not. No other dog continued on into canter. A collie landed on four legs by leaping to the handlers feet on JB, as did the GSD. These both scaled down <30cm with no run on.

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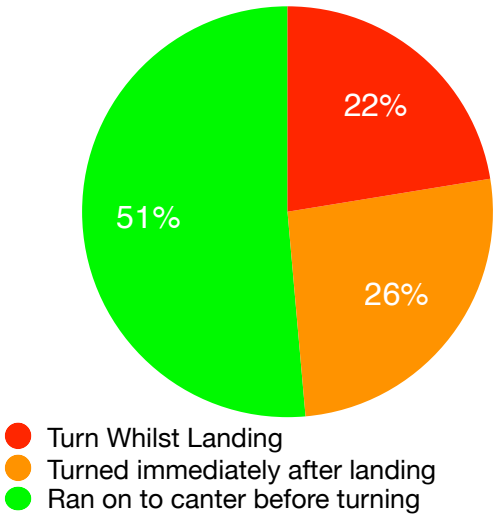
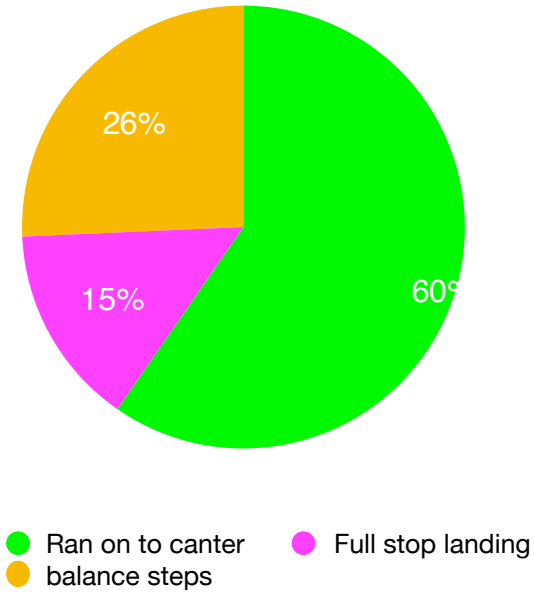
JUMP OUT (JO) Data - Total
107 Descents



JUMP BACK (JB) Date - Total
96 Descents



Original Research - Study 2

Survey on the Scale Jump for Working Trials Agility

80. This part of the multi-method study is a qualitative survey to understand the safety of dogs, on the scale jump in WT. Alongside study 1, this is also about styles of descent of the scale jump increasing breadth and scope. It also examines the incidence and nature of injuries sustained by dogs using the scale jump. As the first study of its kind it is a scoping study, founding research on injuries from the scale jump.

81. A 'Survey Monkey' questionnaire was completed by handlers in respect of dogs they have competed or trained for WT in the last five years. The 'Survey Monkey' facility used was the free version limited to ten questions. A second questionnaire, "Fitness for the scale jump in Kennel Club Working Trials" was presented and collected alongside, but subsequently disregarded for clarity (Bellis). (Paragraph 116, 119)

82. There were 72 responses to this survey, through collectors posted on TATFF and WTFF. Data for two dogs were extracted as duplications. Readership of these Facebook forums are 308 and 1327 respectively (Bellis). The responses were entered onto a paper chart and presented from that.

The Data - Survey Study 2

Question 1 (70 Responses)

83. "What breed or type is your dog

Border Collie / BC / Working Sheepdog / WS / Wsd = **16 (22.9%)**
German Shepherd Dog / GSD = **19 (27.1%)**
Labrador = **7 (10%**)

Other breeds were, Weimaraner 4 (5.71%), Malinois 3 (4.29%), Golden Retriever 3 (4.29%), Rottweiler 3 (4.29%), Australian Shepherd 2 (2.86%) Shorthaired Pointer 1 (1.43%), Cocker Spaniel 1 (1.43%), Groenendael 1 (1.43%), Australian Cattle

Dog 1 (1.43%), Welsh Sheepdog 1 (1.43%) Shorthaired Pointer 1 (1.43%) English Shepherd 1 (1.43%).

6 Crossbreed mixes were GSD x BC (1.43%); Malinois x GSD (1.43%); GSD X 2 (2.86%); Flatcoat x Lab (1.43%); Golden Retriever x GSD (1.43%).

Question 2 70 Responses

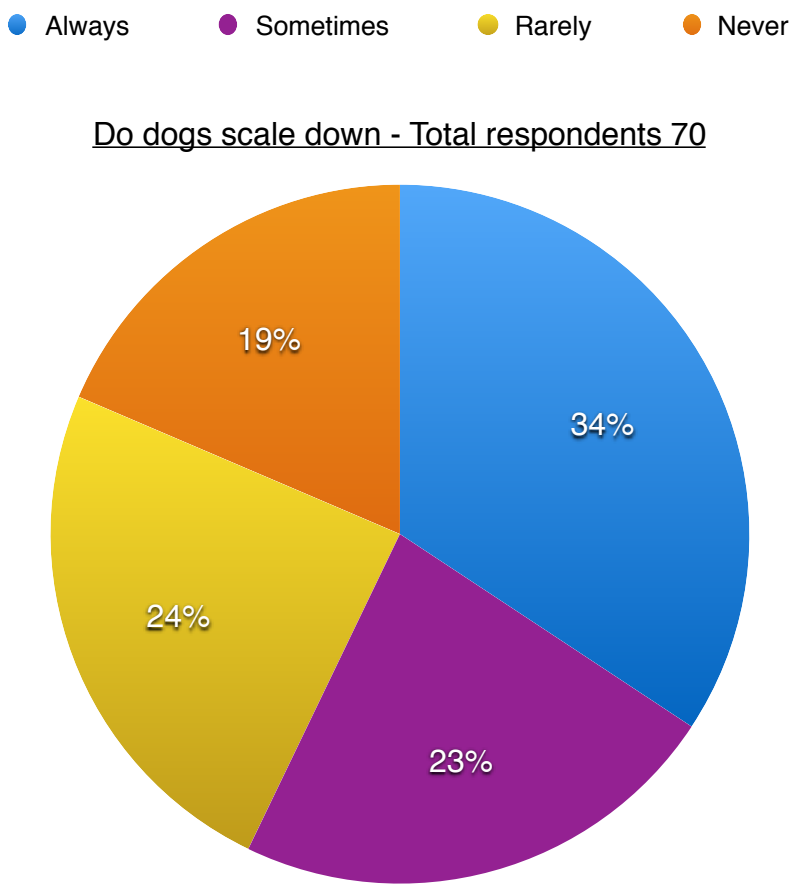
84. "Does your dog break the descent from the jump by scaling down?"

24 (34.3%) of the responders stated that their dogs "Always" scaled down the jump, or 'scaled over and back'.

16 (22.9%) "Sometimes scaled down" or scaled one way only.

17 (24.3%) "Rarely" scaled down

13 **(18.6%)** "Never" did



Question 3 68 Reponses. (1 respondent made contradictory selections so discounted.)

85. "Is this the dogs natural style or did you teach it?"

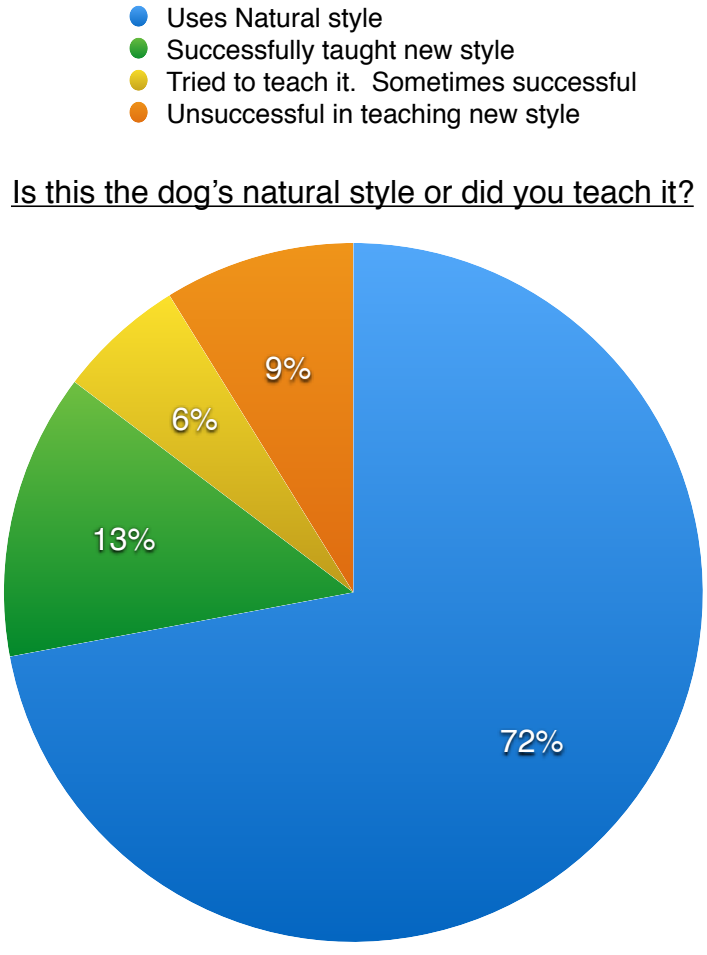
49 (72.1%) stated that this was "Dog's natural style."

9 (13.2%) selected, "Not a natural style. I taught it successfully."

4 (5.8%) selected, "I tried to teach it and is sometimes successful."

6 (8.8%%) selected, "I tried to teach a style but it didn't work out."

Of the 39 dogs that did scale down in part, 29 did so with a natural style and 11 were taught with various degrees of success. Of the 51 dogs with a natural style, 16 related to a natural consistent scale down (3 GSD, 4 Collies, 1 Labrador, 5 other breeds and 3 cross breeds.)



Question 4 68 Responses

86. If the dog does / did not scale down, where does the dog land on the far (or near) side. Tick all that apply or most commonly occur."

Responders had a choice of commenting on the dogs jumping style. 2 responders skipped the question. Others made a single or multiple indications as follows:

36 "At the foot of the scale or within [914.4mm] 3 feet of the base."

19 "Leaps away, landing more than [914.4mm] 3 feet away from the base

34 Handlers said their dog "Lands on two feet."

4 replied "Initially lands on one foot."

4 replied, "Lands on all four legs together."

19 "The dog stops immediately on landing on initial jump (go on over).

11 "Dog canters on after landing on initial jump.

15 "Dog stops immediately on return over scale."

14 "Dog canters on on landing from return over scale."

Question 5 70 Responses

87. When asked, "Has the dog had an injury you attribute to using the scale jump?"

48 (68.6%) said "NO"

2 (2.9%) said "Yes; Recovered quickly with no ongoing effects."

9 (12.9%) said "Yes; Prevented competition permanently." (+1 (No 58)

4 (5.7%) said "Yes; Out of Agility temporarily but recovered for competition."

3 (4.3%) said "Yes. Dog fine, but put the handler off"

2 (2.9%) said, "Yes. Affected the Quality of Life for the dog."

2 (2.9%) said, "Dog injured on a different jump"

Whilst this was a reply for every respondent, 2 went on to say that their dog was retired at an appropriate age; and 5 were retired prematurely not related to agility.

One handler made two entries for this question, which has been corrected.

Question 6 53 Responses

88. Irrespective of the cause, if the dog has retired prematurely from injury, what is the reason?

7 (10%) Hindlimb problems

9 (12.86%) Forelimb problems

0 Neurological or stability problems

1 (1.43%) Genetic injury or disease

8 (11.43%) Back or spinal problems

6 (8.57%) Other

26 reiterated there was no injury. Responders could select more than one answer.

Question 7 41 Responses

89. "If a forelimb problem, as far as you know, is it?"

2 (2.9%) said "Fragmented Medial Coronoid Process genetic or traumatic."

2 (2.9%) said "Other elbow problems"

1 (1.4%) said "Biceps tendinopathy."

3 (7.32%) said "Other Shoulder problems"

2 (2.9%) said "Injury to carpals"

None selected injury to metacarpals or feet. Responder selections were exclusive.

31 reiterated their dog had no injury.

Question 8 41 Responses

90. "If it is a hind limb problem, is it one of the following?"

2 (2.9%) said "Stifle injury"

1 (1.4%) said "Hock injury"

6 (5.7%) said a "Muscle injury."

32 said "No injury." Responder selections were exclusive.

91. Comments in the free text were as follows:

"Dog injured whilst picking up on a shoot diagnosed after a CT scan as soft tissue damage to the carpal joint."

"Very difficult to say if I taught my dog how to scale or if it was the dog's natural style because I used an A frame in teaching it, and I don't know how much this influenced the dog."

"Both scale jump and long jump need looking into both not good for large breed dogs."

"Was diagnosed with spondylosis along spine after starting to not want to return over scale plus not wanting fellow home dogs near her to a point of growling most unlike her so got her checked out which led to diagnosis."

"Scale jump came apart whilst my dog was at the top at a training course."

"I tried to teach my dog to scale down and scale up with ramps but it wasn't that successful. She reverts to her natural style most of the time, which is to jump right to the top of the scale and then partially scale down."

"My second dog had a completely different style. Always wanted to leap from top regardless of training."

"Had 8 GSDs that did the 6' scale - none had any injuries."

"Scale is too high the one thing is destroying trials and could SO easily be fixed."

"Scale should be lowered, long jump should be shortened. I had a Collie (many years ago) who tore both tendons on the back legs (hock to foot) which took a year to repair, (retired)! This was a young and extremely fit dog who had been taught properly (slowly) and warmed up for the exercise. The jumps in working trials can be igneous and I know of several dogs who have been retired / injured because of them, one dog I know hit the long jump and fractured his spine others have blown discs in their back."

“I think there should be a slope on the down side and it only needs to be done once with no return.”

“Always kept fit and never over jumped, only retired as he had a stay problem! Got to ticket and would never go further. Retired at 7 to make way for youngster.”

“I just want to say that no wonder entries are falling with this dreadful piece of equipment, for Collies, fab, but for larger dogs, dreadful.”

“The survey does not really cover my issues. My dog could not manage to get over or up the first side, let alone come back.”

“Dog liked paused on the top for up to two minutes. On these occasions he would come down the face of the scale. If he did not pause, he leapt from the top.”

“In general I am uncomfortable with the scale in terms of the dog’s potential for injury or long term joint stress. I see other sports progressing the scale in terms of safety by adding a break surface / table on the opposite side and I feel Working Trials should do the same.”

“I would much prefer to have an ‘A’ frame style obstacle instead of the vertical scale. At present I always retire my dogs early in the hope of reducing the risk of long term problems due to impact on the shoulders.”

“Train on an ‘A’ frame, 6’ one side, 9’ the other.

Both dogs owned have retired both old and sound.



All Injuries where Scale Jump is reason or contributory reason for injury.

Breed	Scale down?	Injury girdle	Type of Injury	1 = Due to scale 2 = Scale contributes	Genetic influence possible?	Injury - Permanent 1 Temporary 2
GSD	Never	Hindlimb	Hind muscle	1		1
GSD	Never	Hindlimb	Hind muscle	1		1
GSD	Never	Back / Spine		1		1
GSD	Sometimes	Back / Spine		1		1
Collie	Never	Back / Spine		1		1
Weimaraner	Always	Forelimb	Biceps Tendinopathy	1	Accident scale collapse	1
Rottweiller	Rarely	Forelimb	Other elbow	1	Elbow Rottweiler	1
FC x Labrador	Always	Forelimb Hindlimb	FMCP / Hind muscle	1	FMCP Labrador	1
Australian Shepherd	Always	Forelimb Hindlimb Back / Spine	Shoulder Stifle	2		1
Golden Retriever	Never	Hindlimb Back / Spine		2		1
Cocker Spaniel	Always	Back / Spine		2	Lumbar stenosis	1
GSD x Collie	Sometimes	Forelimb Hindlimb	FMCP / Hind muscle	1		2
GSD	Always	Not stated		1		2
Collie	Never	Not stated		1		2
Collie	Rarely	Hindlimb	Hock	1		2
Weimaraner	Rarely	Forelimb	Other elbow	1		2
Malanois	Sometimes	Not stated		1		2
Labrador	Always	Not stated		1		2

7 Entries removed from initial results as injury was not connected with the scale jump

(BOTH BDTS OBSERVATION AND SURVEY TOGETHER)

Scale Down Discussion (BDTS Observation and Survey)

92. In the video study, a single dog, collie, scaled down the descent beyond halfway. This dog struggled to pull itself up onto the scale and also remained perched on the top for fully ten seconds, whilst considering its descent. If health issues or weakness were a cause of this behaviour, the reverse may be true where dogs, feeling 'wellness', choose their point to descend the scale. This may be supported by the greater incidence of JFT at the lower heights, where the dogs might feel more confident to descend.

93. The progress test video descents were graded into categories 'Jump from Top (JFT)'; scale down <30cm; and scale down >30cm. Consistently in both JO and JB, the mode (c. 50%) scaled down <30cm; A third of dogs scaled down >30cm. The remaining c10-15% JFT. Whilst the very low jumps were more often JFT, there was very little difference in this behaviour over the five, or six feet scale jump. (Paragraph 69 Charts "All dogs five feet"; "All dogs six feet")

94. Dismissing the BDTS GSDs as too few measure, the isolated data from both Labradors and Collies followed a similar distribution pattern (Paragraph 60; Chart "Breed Comparison on scale down"). Pondering why most dogs scale down <30cm below the top of the scale, perhaps using the far aspect, even just 2-3cm below the top gives a better purchase for the front paws, to push away from the scale, rather than from the 1cm wide top edge. There may be economy of effort in choosing to jump from a high position in a healthy dog; or coordination skills required in running down the scale meaning the less deft dog (or breed) might choose to jump from a high position?

Might a different position be chosen as the dog ages? If so, might that indicate increased experience or age related deterioration?

95. In the survey, slightly more handlers said their dogs 'always' or 'sometimes' scaled down, than 'rarely' or 'never'. An opportunity was lost for good comparison, as parameters were different to those used in the progress test study. A handler's individual decision as to whether a dog scaled down or not, was subjective; so there was little control on the responses. A push off from just under the top of the jump could be seen as JFT, and conversely some handlers might see a scale down only as running down the far side, instead of pushing off from near the top. Clearer parameters are needed in a future survey.

Training / Changing the dog's jumping style

96. In the survey, nearly three quarters of handlers chose not to influence their dogs jumping style. 6 (9%) tried but failed; what effect would that influence have had on the jumping style and could it introduce threats, not present in the natural jumping style? Of the 9 (13%) who believed they had consciously changed the dog's jumping style, is the style taught safer than the dog's natural style choice? There is an expectation in some handlers (Paragraph 90) that their dog should scale right down to the ground, yet this may be a rare skill by a very lightweight and highly coordinated, fast dog. Could an effort to insist, invoke an accident?

97. Attempts to teach dogs a new style seem more successful than not, and this is seen in some collies, but GSD handlers were, at best, only sometimes successful.

98. The Handlers' opinion on whether they have successfully influenced the dogs style is in retrospect, subjective. For example if the dog was trained on an 'A' frame before using a scale in the hope that the dog would behave in the same way by running down a scale, it would be unclear whether the dog's style was changed or not. Also the handler may be unaware of the dog's natural style if influencing from the beginning.

Jumping away from the scale to shallow the trajectory - discussion.

99. BDTS data indicates that it is unusual for the dog to land within three feet of the base of the scale even where the dog has scaled down >30cm. It seems likely that those few occasions where this has occurred, may be influenced by the dog turning as descending in preparation for the return. All but one were JO and three of those were turning on landing. None ran on to canter. The fact that most dogs jump away from base, shallowing the trajectory, may possibly be a positive factor in the context of Zink Daniels p26 unless it results in landing on four legs or skidding (See paragraphs 33, 46, 50, 52, 53).

100. The survey and progress tests were at variance, regarding whether dogs LPA or LAF. The progress tests were reexamined but the findings stand. There were five descents which clearly landed (front legs) within this area (disregarding small jumps and small dogs for clarity). There were many, about 30 dogs, who landed at the three foot point.

101. Part explanation is, whilst handlers may use multiple working trials clubs, or may teach the jumps independently using various methods, BDTS teach a practice of going over the scale to a mat placed on the far side, before returning on the handlers command (Neiuwenhausen Personal Contact). This may create skew to LPA from

LAF, and away from ‘natural style’. Some in the survey may train to encourage descent close to the scale to achieve a scale down.

102. The lack of GSD in the Banbury study may contribute, as they might leap away compared to the other breeds. (GSD 42.1%; Collies 12.5%; Labrador 14.3%; Other breeds 29.2%). Contrary to the BDTS study, the survey indicates that in LAF or LPA there is difference in style, by breed, (e.g. GSD and Collies) in the perception of their handlers. If the dogs in the survey jump less than five feet (height), these results have not been culled, although height may affect the landing position.

Turn whilst landing - The effect of turn and return

103. The BDTS data indicates different behaviour between JO and JB. Almost half had a full stop landing on JO, without absorbing the landing forces into canter if useful. Almost a quarter of dogs turn in the air whilst simultaneously landing, with just over another quarter turning immediately after landing.

104. In JB this behaviour does not occur, so likely due to anticipated return back over the scale jump to the handler. This affects Collies and Labradors in the ratio of their demographic. In the wider WT community the number may be higher, given that club training to a mat at Banbury, discourages this behaviour (Neiuwenhausen).

105. Bellis MSK Assignment 1 indicates that injury is caused by valgus or varus forces more than craniocaudal forces. It also highlights risks with sudden stopping, changes of direction and combination of forces. Therefore the forces caused by turning whilst descending are much more likely to cause injury than jumping and landing in a straight plane (Paragraphs 33, 43, 46, 50, 52, 53)

Canter On; Absorbing Forces

106.In the BDTS study, nearly twice the number of dogs run on into canter after descent of the scale on JB than JO, without the anticipated turn and return. However some dogs, and possible high incidence of GSD is noted, leap off the scale to land at the handlers feet. The GSD trait of wanting to be as close to the handler as possible may be a factor; perhaps strong enough to disregard personal injury (Paragraph 46, 52)

www.pets4homes.co.uk/dog-breeds/german-shepherd/

107.In the Survey, more dogs also stop immediately following JO than JB (19:15). Considerably more dogs, both directions, generally stop immediately after landing than run on into canter (34:25). Many handlers teach in the early stages to go over a jump and return without a wait, before later establishing a wait. It is therefore expected that many dogs may follow that behaviour in their career (Bellis personal contact). The survey did not incorporate ‘turning whilst landing.’

108.So in both studies, more dogs canter on, on JB; in contrast to sudden stopping to turn on JO (Zink Daniels p 26, Oricom Technologies 2004, paragraph 46, 50).

Land on 4 legs Together

109.The survey and BDTS observation coincide in that landing on four legs simultaneously is rare, specifically five landings (of six feet scale jump) in the observation and four dogs in the survey.

110.Leaping out away from the scale may flatten the trajectory so much that it is more likely the dog will land on four legs simultaneously. With one exception (BDTS) all four leg landings took place on JB, and two dogs landed at the handlers feet. Another

factor in dogs landing on four legs is the reduced height of the scale as half of (overall) 12 descents were descending scale jumps lower than five feet. Landing on four legs together may be undesirable (Paragraph 46, 52; Zink Daniels p46). Handler positioning may therefore be a factor on the return.

Consistency

111. Consistency of style may reduce likelihood of chronic or acute injury as the tissues will be well adapted to particular stresses (Musculoskeletal Assignment 1 Bellis). Williams Jackson et al (Paragraph 36) notes that experienced dogs are more consistent in style, particularly with head (and eye) positioning. Although rules in WT lend the jump to be addressed in an identical way, this study suggests that consistency of style is uncommon. Inconsistency is brought about by the difference in the way the JO and JB are addressed. Even considering these as separate entities, more dogs are inconsistent than are consistent, with dogs only slightly more consistent in JB. The dog that uses a consistent style may be better able to cope if the unexpected takes place, such as a slippery landing site. (Williams Jackson et al 2017)

Injury- Survey only

112. The survey is the first time that any study has directly looked at the incidence of injury to dogs using the scale jump, and results at first, appear to be high. Just under 70% claimed dogs that had never been injured on the scale jump, leaving 30% who had been injured in some way. Of those, half had been permanently injured on the scale jump, preventing Working Trials competition, with two dogs injured to the extent that their quality of life was affected. Initial indications were high numbers of German Shepherds (8) have been injured or retired early from injury, (6) from the scale jump. (But see paragraph 165)

113. Injuries reported were evenly distributed between forelimb, hindlimb and back / spine.

114. However, of the nine forelimb injuries reported, four dogs (collie, 2 labradors and a Groenendael) were not injured on the scale but by unconnected means. Of the remainder one Weimaraner's injury was temporary, another Weimaraner was injured as a result of the scale collapsing. The Rottweiller, and Flatcoat x Labrador have injury which may meet the epidemiology of their breed. FCMP injury in the GSD x BC is the permanent forelimb injury without explanation. This Respondent put 'dog fine but put the handler off' which was incongruent for a disabling chronic condition. No responder details were provided to seek clarity (Bellis Assignment 1; Canapp et al p30-309, Paragraph 48, Wiles et al 2017).

115. From this survey there is no evidence of a pattern of occupational forearm injury associated with the scale jump, but possibly random examples in line with breed epidemiology. A learning event is seen in the Weimaraner which was injured in scale collapse. Careful maintenance of jumps, risk assessment, accountability, and double checking is a useful lesson for the future, and an easy way to reduce injury. There is only one shoulder injury reported and no phalanges injuries, yet Cullen (2013a) and Levy (2009) found high number of these injuries from the fun-agility 'A' frame (Paragraph 48, 39, 40; Wiles et al 2017)

116. After studying all comments on the survey, 9 hindlimb injuries are detailed. These included the two crossbreeds who had muscle injury in hindlimb alongside FMCP in forelimb (Paragraph 113). Any connection is not clear. A GSD was permanently injured from a fun-agility tunnel collapse; another GSD was unable to ever scale up so

was probably not injured on the scale jump. A collie was temporarily injured on the hock, and a golden retriever's handler believed the scale jump contributed to chronic hindlimb injury. The Australian Shepherd had hindlimb problems amongst whole body arthritis. There were two further GSD with permanent hindlimb injury from the scale jump. Further research is required to learn the mechanisms of hindlimb injury on the scale jump.

117. Of 8 dogs with back / spine problems, three, (GSD and two labradors), were not injured on the scale jump. A further 2 handlers (Australian Shepherd and Cocker) were not sure how much scale jump contributed to arthritis and lumbar stenosis. This leaves 2 GSD and 1 Collie directly permanently injured in back / spine on the scale jump. Spine and back issues were not drilled for clarification, though free text has made some references to spondylosis and stenosis. One GSD is thought to have fallen from the top of the jump permanently injuring the back (See paragraph 80). Further research is necessary to understand the mechanics of these injuries.

118. Additionally, a GSD, Collie, Labrador and Malinois were injured, all temporarily but no injury details supplied. All recovered quickly. These same injuries discussed above are now considered again in the context of the dog's breed.

Discussion by breed

German Shepherd Dogs (GSD) - Survey

119. Of 19 GSD, four dogs had been permanently injured which the handler attributed to the scale jump (24.01% of GSD). Of these, one dog had ongoing quality of life issues. Two were injured in the back or spine, and two had hind limb issues.

120. On the discarded survey, presented concurrently to the same collectors, regarding fitness for the scale jump, a respondent with GSD retired lame, commented, “Dog injured at a trial. Accidentally lost footing on top of scale and slammed into ground - permanent back injury.” It is reasonable to assume that it refers to a GSD in paragraph 116 (Paragraph 80).

121. A further two were injured. However one had hindlimb weakness and was never strong enough to scale up. The other was temporarily injured in an unspecified way but put the handler off jumping (10.5%).

122. A further two GSD were injured, but not on the scale jump. One was injured Patrol Dog training, the other, equipment malfunction in fun-agility training (10.5%).

123. The handlers said 14 (73.68%) of 19 GSD used natural style; 15th did not comment; a further two tried unsuccessfully to influence jumping style; and the final two was an attempted intervention which was sometimes successful for scaling down, sometimes not.

124. 11 (57.89%) of the 19 GSD ‘Rarely’ or ‘Never’ scaled down; 5 (26.31%) Sometimes scaled down, and 3 (15.79%) regularly or always scaled down.

125. 9 GSD landed close (<3’) to the base of the scale jump, of these 4 (24.01%) regularly or always scaled down. 8 GSD leapt away from the base of the jump (>3’) of which 5 rarely or never scaled down.

126. One GSD, who never scaled down, regularly landed on all four feet together. The other dogs were reported to land on the forelegs. 5 Handlers confirmed their dogs stopped immediately on landing. One dog canters on when landing in both directions. Another canters merely on outrun, stopping immediately on return.

127. Eight injured GSD, out of nineteen (42.1%) of which 5 were injured on the scale is a very high proportion but with such a small cohort, could be random. None were affected in the forelimb. Further research should be made into the nature of scale jump injuries. However the high numbers of GSD with neurological mortality and morbidity may suggest that early stages of these conditions may be implicated (Paragraph 49, O'Neill et al 2017).

128. Levy et al (2009) and Cullen (2013)(a) both point out that a high ratio of collies are injured to those competing. GSDs were not a populous breed in those studies and epidemiology was therefore not presented.

129.GSDs are particularly vulnerable to hyperextension and hyperflexion injuries (MSK Assignment paragraph 21, Zink Carr p7). Serious neurological conditions such as CDRM, IVDD and spondylosis are widespread in the breed (Paragraph 49; O'Neill et al 2017; Options for Animals Manuals). An accident on the scale jump might be the first signs of such a condition, long before widespread clinical signs.

130.GSDs in WT are generally of continental working lines and do not have the controversial extreme angulation seen in the British show ring.
Many however, have very high drives to work, which they may have in common with the Border Collie breed, a reason for excelling at WT (Bellis). Injuries may be caused

by speed, and a ‘gung ho’, frantic or invincible attitude rather than physical weakness, or just less able coordination (Zink VanDyke p3) (Paragraph 111). https:// www.ourdogs.co.uk/News/2008/Dec2008/News051208/kcgsd.htm

Kennel names taken from GSD entries on the 2019 Enfield Championship trial catalogue include Bannersway, Lakatamia, Rosehaus, Hartshill, Khamysker, Raven Valley, Readepter, Wolfhart, Tracelyn, Aniwahyas, Nicolee, Shardee, most breeders having websites with photographs.

Collies - Survey

131. Of 16 Collies, 1 responder attributes their dog’s permanent injury (back and spine) to the scale jump. A further 2 collies were temporarily injured, (one hock injury, the other unspecified). The fourth collie was temporarily injured in the shoulder but on a different jump from the scale. All 4 (25%) of these dogs rarely or never scaled down. 12 handlers reported that their dogs had no injuries on the scale jumps.

132. Altogether, for the collies, 6 (37.5%) always scaled down, 2 (12.5%) sometimes did, and a further two would regularly scale down in one direction only. 6 (37.5%) ’Never’ or ‘Rarely’ scaled down. 3 taught the dog successfully to scale down. However one of these only scaled down in only one direction. A further collie handler claimed partial success in influencing the style. However this dog rarely scaled down.

133. One dog who ‘Rarely’ scaled down, consistently lands on four feet together. Six others report their dog landing on two feet.

134. The findings of Levy et al (2009) and Cullen et al (2013a) that collies are the breed most often injured in fun-agility is not replicated in this study. The opportunity to take

the obstacle in a steady way rather than the turning and speed in fun-agility may be an advantage.

Labradors

135.Of 7 labradors, 1 was temporarily injured (details unknown) on the scale jump but quickly recovered. That dog always scaled down which had been taught successfully rather than natural style, but jumped away from the scale, landing more than three feet from the base.

136.However 3 dogs (42.9%) retired due to injury apparently unconnected with the scale jump. One had forelimb (shoulder); hindlimb (stifle) and spinal (lumbar disc) problems. A second retired with forelimb injury to the carpals, due to gundog work. The third retired due to genetic spondylosis. The first two dogs rarely scaled down and the third scaled down on go over but not return.

137.All the labradors except that in paragraph 134 had a natural style. 2 habitually scaled down and 2 sometimes did. 3 never did. 3 land close, and 1 (above) leaps away. Four dogs land on two feet, the others did not comment on this element of style. Three dogs stop immediately after being sent over the jump. One canters on, on landing.

138.Labradors are particularly susceptible to elbow problems, fragmented medial coronoid process (Canapp p309; Bellis Assignment 1) often caused by repetitive or significant concussion on the forelimbs. This in Labradors is 18 - 50% (Temwichitr et al 2010, Paragraph 48). Labrador x Flatcoat in this study was diagnosed with this condition but the pure labradors in this small study seemed unaffected. The labradors in WT are often a more lithe version of their heavy show counterparts (Bellis Personal experience). There is musculoskeletal pathology throughout this Labrador cohort

(43%) but except to a slight extent, is not apparently associated with the scale jump. (See Paragraph 48)

Injury - Other Breeds

Australian Shepherds

139. Two were surveyed, both always scaled down naturally. One was permanently unwell with arthritis in the spine and both girdles, the owner was unsure how much effect the scale jump had on this. Hip and Elbow dysplasia are common problems in the breed. https://canna-pet.com/common-australian-shepherd-health-problems/

Weimaraners

140. Of the 4 Weimaraners, 2 had been injured on the scale jump, one permanently (biceps tendinopathy) and the other temporarily (elbow problems). The former was attributed to scale jump collapse accident. A third Weimaraner had been retired early for reasons unrelated to agility. He habitually lands on all four feet together. The uninjured unretired Weimaraner with the first two, lands on forelegs. The permanently injured Weimaraner always scaled down which was successfully taught. The others rarely or never scaled down, in natural style.

141. There is no obvious reason why Weimaraners feature highly in the injured demographic, and may well be random. https://www.weimaranerclubofgreatbritain.org.uk/index.php/the-breed/weimaraner-health/25-healthwhat health issues in weimaraner

Golden Retrievers

142. One of three Golden Retrievers (GRet) was permanently injured on the scale jump. This affected the spine and hindlimb muscle. The owner believes using the scale was

contributory. This dog lands close to the jump on two feet. (S)he never scaled down although the handler tried to teach it. Of remaining GRets, one always scaled down and the other did on outward jump but not on the return. All GRet stop immediately on landing rather than canter on.

Rottweillers

143. Of three Rottweilers, one always scaled down, trained rather than natural style. The remainder rarely or never scaled down. One Rottweiler is permanently injured to elbow, attributed to the scale jump. Another Rottweiller, uninjured, gives concern for the handler who comments that the scale jump is really bad for big dogs.

Malinois

144. Three Malinois all used natural style. One rarely scaled down, one sometimes did and the third did on JO, but not on JB. The latter had been injured temporarily on the scale jump, details not given. Two of the dogs stopped immediately on landing from the Jump Out, but cantered on landing on the return. The other stops immediately on the return.

The Others

145. German Shorthaired Pointer rarely scaled down. Slovakian Rough Haired Pointer was taught to scale down and retired appropriately aged.

146. Australian Cattle dog rarely scaled down, attempts to teach him failed, he jumps away from the scale.

147. The Groenendael and the Cocker Spaniel both always scale down. The Cocker was taught, and Groendendael did this naturally. The Cocker Spaniel is retired with a permanent injury to the spine, lumbosacral stenosis, handler unsure how much the

scale jump is associated with this. The Groenendael has retired prematurely with carpal problems not attributed to the scale jump.

148. Welsh Sheepdog sometimes scaled down, had a natural style and lands close to the base of the jump. He is uninjured.

Mixed breeds

149. Of the six mixed breed dogs, five were a GSD cross.

150. Of those, the GSD x Border Collie had FMCP and hindleg muscle injury on the scale jump, whilst recovered it put the handler off (See Paragraph 104). This dog sometimes scaled down which was due to natural style. This injury is a concern as it is not a pathology associated with these breeds but is with jump down. In this isolated example, without being able to examine the circumstances it is not possible to draw any conclusions (Paragraph 113).

151. The two GSD cross, and GRet x GSD all scale down, the two former naturally, and the latter as taught. None have been injured. Neither has the Malanois x GSD who never scales down and leaps away from the base of scale. He canters on landing from both directions.

152. The sixth dog is a flatcoat x labrador. This scales down from natural style, landing close on two feet. This dog has an injury the owner attributes to using the scale jump and which affects the dogs quality of life ongoing. This is also FMCP, and also a hindlimb muscle injury. This may be due to genetic disposition. (Paragraph 48, Wiles et al 2017 and 137)

Permanent Injuries from the scale jump

Breed	Scale Down?	Injury Girdle	Injury	Direct injury from scale = 1 Scale contributes to injury = 2	Genetic influence possible?	Permanent 1 Temporary 2 Not clear 3
GSD	Never	Hindlimb	Hind muscle	1		1
GSD	Never	Hindlimb	Hind muscle	1		1
Collie	Never	Back / Spine		1		1
Collie	Never	Not stated		1		2
Collie	Rarely	Hindlimb	Hock	1		2
Weimaraner	Rarely	Forelimb	Other elbow	1		2
Rottweiller	Rarely	Forelimb	Other elbow	1	Elbow Rottweiler	1
Malanois	Sometimes	Not stated		1		2
Labrador	Always	Not stated		1		2
Golden Retriever	Never	Hindlimb Back / Spine		2		1
Cocker Spaniel	Always	Back / Spine		2	Lumbar stenosis	1

	Banbury and District Dog Training Society Progress Tests	Working Trials Forum Survey
Total Number	203 Descents	68 Respondents
Scale Down	JFT 14 (12.50%) <30cm" 60 (53.57%) >30cm 38 (33.93%)	27 (47.37%) Always/ Sometimes 30 (52.63%) Never / Rarely
Lands at foot of Jump (<3')	5 (2.46%)	36 (52.94%)
Leaps Away from Jump (>3')	198 (97.54%)	19 (27.94%)
Lands on forelegs (One or two)	198 (97.54%)	38 (55.88%)
Lands on four (4) legs	5 (2.46%)	4 (5.88%)
Stops immediately after landing on Jump Out	50/107 (46.73%)	19 (27.94%)
Canters on after landing on Jump Out	39/107 (36.45%)	11 (16.18%)
Stops immediately after landing on Jump back	16/96 (16.67%)	15 (22.06%)
Canters on after landing on Jump back	65/96 (67.71%)	14 (20.59%)

Summary and

Discussion

General Summary

153. Today, the scale jump with six foot drop is specific to WT, French and Belgian Ringsport and some police dog sections. Other disciplines have mainly dispensed with the scale jump or ameliorate the drop in some way (Paragraphs 17-23).

154. Unlike other sports that use the scale, WT invites any dog to enter and compete. Scale down is sometimes taught but not always achieved. Scale down may be one of a number of ways that the landing forces can be moderated. Others may be flattening the trajectory and running on to canter (Paragraphs 9, 46, 50-53).

155. Risks of injury may increase by mixing forces, e.g. turning whilst landing, by full stop landing or landing on four legs. Landing forces should be craniocaudal rather than valgus or varus. Consistency of style may be helpful (Paragraph 33, 36, 73-74 [MSK Assignment 1 - paragraph 12, 20])

156. In fun-agility there is a high incidence of injury associated with the 'A' frame jump. The reasons for this are unclear. However supraspinatus and to a lesser extent biceps brachia, work harder where the dog brakes on the descending contact point. (Paragraph Nos 36, 39, 40).

157. Congruity of the elbow joint, with the rotating forces of the biceps brachia on landing together with concussion can influence joint pathology. This can be genetic and/or traumatic cause. (Bellis Musculoskeletal Assignment 1; paragraph 28-40; Burton et al 2013; Boettcher et al 2009; Canapp et al p312; Hulse et al 2010)

158.Many dogs successfully complete the scale without injury over a long working trials career, but injury and accidents, including falling from the scale jump, do occur. It is clear from Bellis Musculoskeletal (1) and Rehabilitation assignments (3) that correct preparation of tissues and maintenance of fitness including balance and proprioceptive training is fundamentally important to prevent injury.

159.Further, the dog's conformation and specialisations within the tissues protect it from considerable forces. The shoulder girdle has no bony connections to the central structure, so that forces can be dissipated through the soft tissues around the shoulders. Provided the dog steels the muscles in anticipation of an impact, pennate muscle such as biceps brachia will employ high gear ratio to protect on eccentric contraction. Tendons may also intervene momentarily to absorb impact and protect if muscle is suddenly overwhelmed (Paragraph 33, 42-45, 59).

Summary - Study 1. Banbury Progress Tests.

160.There are a number of ways the dog mitigates landing forces when descending the scale jump. Most dogs push off the descent face within 30cm from the top of the scale jump. Choice may be affected by health, wellness and training (Paragraph 60, 83).

161.The manner in which the jump is descended may be affected by the dog anticipating the return, and so commencing a rotary turn whilst still descending. This is likely to cause skewed and increased ground reaction forces likely to cause injury (Paragraph 75-76, 102-104).

162.Many dogs leap away from the base of the scale, if shallowing the trajectory is useful. However, half do not absorb the landing forces into canter, and half do not act

consistently, if these factors are useful. Only a handful land on four legs simultaneously if this is a threat (Paragraph 70-78, 83-85, 91, 98-109).

163.There is little difference in behaviour on the jumps associated with breed differences (Collies and Labradors), or whether the height is five or six feet. However lower jumps might encourage four foot landings (Paragraph 69, 93, 109).

Summary - Study 2. Survey on Scale Jump for Working Trials Agility.

164.Slightly more dogs scale down than do not. Almost three-quarters said their dog used a natural style, and the remainder were fairly evenly divided between successfully and unsuccessfully trying to affect their dogs' jumping style (Paragraph 84, 95-97).

165.Half the handlers state their dogs drop to the base of the scale on landing. Another quarter leap away from the top of the scale. A quarter turn immediately on landing after outward jump, and slightly less stop immediately after landing on the return. A fifth, canter on from outward jump, and slightly less on returning (Paragraph 85)

166. After careful examination of all responses, instance of injury on scale jump was 18 (25.7%). 11 (15.7%) were permanent injury and 7 (10%) were temporary. Injuries were distributed between forelimb, hindlimb and back / spine. There were five elbow injuries, to a Rottweiller, two Weimaraners - one due to scale collapse, and two crossbreed dogs both with FMCP. Of 7 hindlimb injuries, 5 were muscle injuries. There were 6 (8.5%) back / spine injuries, of which 3 (and 2 of the hindlimb and 1 forelimb injuries) were caused by the scale as a contributory factor rather than a direct cause. The aetiology of these injuries are not understood. Four further dogs had temporary injuries, but the nature was not described. (Paragraphs 86-90, 111-117).

General Discussion

167. Is the scale jump injurious?

The hypothesis is “Dogs training or competing in Working Trials are injured as a result of negotiating the six foot scale jump.”

Null Hypothesis is “Dogs training or competing in Working Trials are not injured as a result of negotiating the six foot scale jump.”

Hypothesis is “Dogs are injured in the forearm as a result of landing from the six foot scale jump”

Null hypothesis is “Dogs are not injured in the forearm as a result of landing from the six foot scale jump.”

168. This study has shown the first hypothesis is true and the null hypothesis is untrue. Dogs training and competing in WT are indeed injured and of the cohort used, 18 (25.7%) out of a sample of 70 dogs were injured on the scale jump, 11 (15.7%) of these were permanently injured and 8 (11.4%) of those as a direct result of the scale jump, the other 3 had injuries partially contributed to, by the scale jump (Paragraph 87-90, 113-117).

169. Regarding the second hypothesis, the null hypothesis is true and the hypothesis is untrue. Widespread concussion injury in the forearms is not supported by the evidence in the limited sample of this survey. No GSDs are reported to have forearm injury, and the incidence in other breeds can almost all be explained within breed epidemiology. There is, however, one, questionable, incidence of fragmented medial coronoid process in a GSD x border collie, breeds not known as genetically troubled by the condition. One permanent forelimb injury is caused by the scale collapsing (Paragraph 113-117, Wiles et al 2017)

170. However, where it is intended to train heavy dogs or those breeds with breed vulnerability to fragmented medial coronoid press, including the Labrador and Rottweiller breeds, handlers should consider whether their individual dog, is suitable or whether a particular scale down strategy should be employed. (Paragraph 126-129, 48-49, Wiles 2017, ONeill 2017; Temwichitr 2010; MSK Assignment 1; Canapp p309)

171. Hindlimb injury is more common, with four dogs directly permanently affected, one temporarily injured, and the scale jump a contributory factor for chronic injury in the sixth dog (Paragraph 87-89, 115-116).

172. Three dogs were directly permanently injured in the back or spine, a further two, possibly affected by the scale contributing to arthritis or stenosis. A GSD has fallen from a scale with permanent injury and GSDs are well represented in back and hindlimb injury. Such accidents may be random. Handlers, however, should be alert to neurological spinal conditions, common in this breed, and prepared to withdraw their dogs at the first signs before accidents occur (Paragraph 49, 89-90, 116-117, 128-129; O'Neill et al 2017).

Should the scale jump be eliminated from Working Trials tests?

173. High levels of forearm concussion injury is not evidenced in the survey. Whilst the scale has caused injury in dogs, mainly to the hindquarters, or back and spine, further enquiry should be made to establish the mechanism of injuries.

174. At this stage there is insufficient evidence to recommend withdrawal of the scale jump, but there is sufficient indication of benefit, to continue with it.

175.Most handlers need to find their own balance between avoiding risk and providing a good quality of life for their dogs. How does injuries in WT compare with other dog sports, or the general dog population?

176.As a crude comparison, the fun-agility study by Cullen et al showed 31.8% of dogs had agility related injuries, greater than the 26% in this study. Wiles et al found 17% of the KC registered general dog population had MSK injury (Paragraph 40, 48).

177.There is evidence, within this study, of five permanent injuries in working trials dogs, which occurred in activities other than the WT scale jump. Incidence of injuries on the scale jump may be offset by associated health and welfare factors. See Advantages and Disadvantages of the scale jump' (Paragraphs 55-64)

Does the scale jump need to be safer?

178.Suggestions have been made to lower the jump. Investigations commissioned by KCWTLC are to compare risks of five and six foot scale jumps (paragraph 29). There are indications that there might be less difference in forces than expected (Para 34, 37-38, 40-41, 47, 52; McLean Wills 2015; Birch Lisniak 2013; Birch Carter 2015; Cullen et al (2013a); Pardey et al 2018; Appelgrein et al 2018). Banbury study 1 paragraph 69 also indicates that dogs choose similar strategies for both heights. The research team should be asked to examine whether there is any greater propensity for four leg landing at lower heights and whether this is a risk (Para 47-49; Zink Daniels p24).

179.Suggestion has been made to place a table on the landing side of the scale to retain the height but obviate the drop. There may be concerns that a dog taught to descend

an ordinary scale might try to clear the table, thus causing an accident. (TATFF 28.9.2017; 25.3.2018; 3/4.3.2019; WTFF)

180. Suggestion to place a ramp on the descending side. (TATFF 11.10.2014; 2.3.2019). This would retain the height but encourage a steady scale down (Paragraph 81). However, consideration of numerous injuries on the 'fun-agility A' frame ramp versus scale jump would be necessary (Levy and Cullen). It may even be that the scale jump is safer when protective physiology for sudden high impact is employed; against braking strains to the shoulders / forearms for lesser impact without those strategies (Paragraph 36, 39-45, 155, 185; Azizi Roberts 2014, Konow Azizi 2011). The benefits to the tissues described in paragraph 59 would be lost with this change.

181. The narrow top edge of the scale might be a reason why dogs might lose their footing; and may demands "extremes of technique" in negotiating the apex, as described by Williams Jackson (2017) (Paragraph 36). This might be a particular problem in GSD, many of whom develop neurological problems as they age (Paragraph 49, 128; O'Neill et al 2017).

182. In equestrian eventing, frangible technology is used on apparently solid jumps so that some elements collapse under impact to minimise horse and rider injury. Ways to use this in Working Trials are not obvious. https://www.eurosport.co.uk/equestrian/improving-safety-in-eventing-an-ongoing-priority_sto6664389/story.shtml However it may be possible to develop a shock absorbing landing surface.

183. Future KCWTLC must understand that failure on the scale must ALWAYS result in failure of the competition, because otherwise handlers would be encouraged to

campaign a dog not capable of doing the jump, with high likelihood of injury and other welfare issues (TATFF, WTFF)

How can it be made safer?

184.The scale jump may be made safer by the way individual dogs mitigate landing forces.

Scale Down

185.Some dogs scale down, decreasing landing impact by springing off the descending face of the scale, rather than jumping straight off the top. It is thought to reduce injury and increase working life and dogs sometimes naturally do this. Such dogs and handlers we believe to be very fortunate (Paragraph 82-85).

186.Braking on the 'A" frame in agility dogs rather than running through the contacts brings more forces through supraspinatus and to a lesser extent biceps brachia. Can the same additional, or greater, forces be assumed by these muscles on scale down on the scale jump? If so, is that harmful in this context? (Paragraph 36, 39-45, 155, 185; Cullen 2013a; Azizi Roberts 2014, Konow Azizi 2011)

Other ways of mitigating scale descent.

187.In addition to scale down, there is evidence from fun-agility for other possible means of mitigating landing forces, reducing injury, extending working life, but are mutually exclusive with scale down. These are 'shallowing the trajectory' and 'running on into canter'. It is not known at this stage how these techniques transfer from fun-agility to the working trials scale jump (Paragraph 46, 52-53, 70-72, 85, 98-107; Oricom Technologies 2004; Zink Daniels p26)

188.Pathological impact may be also be reduced by avoiding ‘mixing turning forces with landing’, and avoiding ‘landing on all four legs together’ (Paragraph 46-52, 102-104, 108-109)

Selecting Technique - Discussion

189.Should dogs be permitted to take a natural preference on whether to scale down or whether to use the other strategies? Teaching scale down is unsuccessful, or unreliable almost as often as is successful. To what degree could an individual dog’s decision to scale down indicate problems negotiating the drop? Or excellent coordination (scale down); or strong physicality (leap away)? What about a sudden change of style to a scale down, could this indicate ageing or pathology? Or is it just a good sense strategy by the dog to prevent injury and work on into old age? (See Paragraph 86-88, 159)

190. A poor scale down technique or indecision, perhaps due to influence over technique, may in itself cause accidents (Paragraph 86-88, 157; MSK Assignment 1).

191.There is widespread evidence within BDTS study, that dogs on Jump Out turn, in anticipation of the return, whilst they are still descending the scale. Literature would indicate this a dangerous practice. It is recommended that interventions are put in place to discourage this, either or both by organisational rule change, or by educating handlers and dogs. (Bellis Musculoskeletal Assignment 1 paragraphs 18, 20, 24, 46, 49; Canapp et al 294-304; Marcillin-Lille et al 2007; Kapatkin et al 2012; Zink Daniels p22, p9)

192.The same dogs, plus others who turn immediately after landing, and those who leap to their handlers feet on ‘Jump back’ immediately stop on landing and may ‘pound into the ground’ (paragraph 46). Injury might be resisted by encouraging the dog to run into canter to dissipate landing forces. (Para 46; Oricom Technologies 2004)

193.Delaying drop down by sitting on top of the scale might be a sign of incompetence on the scale jump, as might be hesitant scaling beyond halfway on the descent if this has not been taught, especially if it is out of character or a change in behaviour. These points should be noted alongside Zink Daniels advice on recognising dogs having difficulties in agility (Paragraph 55, 68, 91).

Limitations of the study

194.This was a low response rate, commensurate with a minority sport. Future surveys supported by the KCWTLC may be more successful. The survey would be more beneficial if similar parameters were used as in the BDTS observation and that they were more closed to independent interpretation. On another survey all question options would be mutually exclusive and analysis of injuries more structured. There are risks of misclassifications in surveys.

195.Future surveys could consider age, include age of retirement, longevity, experience of handler and dog, and be more specific and discriminatory about what constitutes a scale down. Data may be easier to handle if breed and types were prescriptive to avoid multiple names. Care should be taken that entries are not duplicated and if possible can be easily identified if they are. Some questions gave duplicate answers “Always scaled down” and “scaled down on first approach and return”. Injuries to dogs

could be more specific, and could specify whether diagnosed by a veterinary surgeon or not.

196. The preparation, Assignment 1 “The musculoskeletal health of the canine for the Working Trials agility scale jump” did not anticipate the possible implication of GSD degenerative neurology developed in this paper. These conditions are a large subject suitable for a separate paper.

197. Interviews of handlers with injured dogs might be more revealing.

198. With small numbers which speak for themselves and a single snapshot in time in this scoping study, significance testing has not been completed at this time. Statistics, significance and survey design should be considered at an early stage in further studies.

199. Specific improvements in a future survey are listed in ‘Further Studies Recommended’ below.

Conclusions / Wider Considerations

What should be done now?

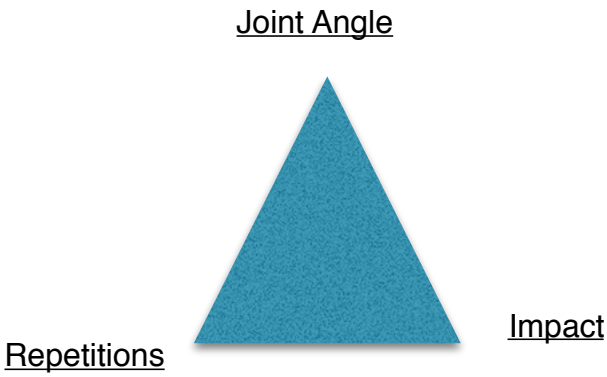
200. Over the last 100 years human attitudes may have changed towards our dogs, and as well as being enthralled by what our animals are capable of doing, now question whether we should ask them to do it. In Equestrian three day eventing it is estimated that horses work to within 95% of their capability (Guire 2019). What are the parameters we are prepared to work our dogs?

201. The policies of WT, and fun-agility activities sections appear to have separate approaches. The fun-agility group, much larger, have stimulated several research projects. The essence is that great caution should be used with anything bigger than jumps slightly over the dogs' height for welfare reasons. (Boyd KC Statement 19.2.2018). Researchers use emotive language expressing significant concerns over comparatively small jumps. (See paragraphs 30-31, 33-38) This appears at great variance to the height of the WT scale jump and other WT jumps. This may create anxiety for WT handlers. Can the elements of speed, turning and repetition, which only feature in fun-agility, justify this difference of attitude?

202. Certainly MSK assignment 1 (Bellis) indicates that valgus, varus; and repetitive forces are the bigger risk, precipitating injury with turning and jumping at speed. However, these factors are not widely expounded in some fun-agility literature. I recognise the bottom up management of the KC through the various activities' Liaison Councils invites disparity. However is there a role for the shared Activities Health and Welfare Sub Group in correlating research findings throughout the disciplines and accounting

for difference? Perhaps agility researchers could add a paragraph about translation of their research to WT agility.

203.A simple model which may help to explain the differences of approach between the disciplines, of the factors affecting injury in an exercise



204. The way the model might be used is that where joint angle and impact are severe, stresses may be ameliorated by less repetitions. Where repetitions are high, the joint angle may ameliorate forces with a lower jump. If both those forces are high, reduced height may ease the impact of landing forces.

205.Where turning at speed and the mix of forces creates more likelihood of injury in fun-agility than WT, a dog turning 180 degrees after the scale jump to rescale may well be a risk not worth doing. To allow a reset of the dog on the return might be a simple adjustment which would reduce injury yet take little away from the skill of the exercise. The evidence in this study is clear that many dogs risk injury by commencing their turns whilst still descending.

206.Other than the turn and rescale, a case for withdrawing the scale jump, has not been made out at this time. The benefits that it gives suggest, at this time, that it should

continue. However great care should be used in safety of equipment and environment to prevent accidents, and handlers of dogs from breeds with genetic elbow dysplasia FMCP (Labrador), and degenerative neurological conditions (GSD) should take regular, continuing care to ensure that their particular dog, at that particular time, is suitable to use the scale jump. Handlers changing the dogs style of descending the jump should be done after careful consideration of any additional risks and with a good understanding of the different ways of mitigating landing forces.

207. The character of WT is not clearly defined, there are no corporate aims and objectives, and it is not clear from documentation, whom the sport wishes to attract. Is it for professional dogs and to further that use, or is it a sport for companion dogs, or is it to further quality of dogs in breeding for health? Once that is made clear, the jumps and other ethical questions may be easier to deal with.

208. There is not currently a culture of recording accidents on the agility equipment at WT. (Rachel Mansfield Personal communication 22.3.19). However, there is anecdote of injury, which has not wholly been established through this work. It is recommended that owner, handlers, trial officers and staff use the trial incident book (I Regulations paragraph 9f) to report to the KC incidents where dogs are injured on the scale jump. Where the injury becomes apparent later this could be reported by the handler to the trial or direct to the Kennel Club. The schedule, (I regs paragraph 20) could be marked up to that effect. So, in the future, the issues can be better understood. Once processes are in place, everyone can work together to drive down incidents of injury and accident. It is hoped that the KC would construct these processes, which could then be available for research.

209.These suggestions are a natural succession to the positive actions made by KC with recent recommendations for use of rehabilitation specialists, and the use of risk assessments. This paper is intended to support and assist. (Paragraphs 24-30)

Further Research Recommended

Professional Research suggestions. (Technological resources required)

210.Experiments in force place study, to explore studies of Zink Daniels, Cullen et al (b) and Oricom Technologies, to see how their findings about mitigating landing forces in fun-agility, translate to the scale jump. Is there less stress to the dog by leaping out from the top of the scale to land and canter on, or dropping to the foot of the scale? Is the force less by changing the angle of descent by leaping out or because of absorbing the forces into canter, or both? Does shallowing the trajectory too much encourage four leg landing? Does lowering the scale encourage four leg landing? Where dogs do scale down to the foot of the jump, what are the forces to the shoulders / forearms and are they a concern? What are the differences in joint angles on the 'land at foot' 'compared with 'Leap away' and what does this mean in risk?

211.Birch Lesniak (2013) examined the joint angle effects of jumping on the first leg to land and get away. How would that affect landing on the second leg?; also in take off and bascule? This study might have missed a more extreme angle taken by the second foreleg to contact the ground (Paragraph 37, 50)

212.Experiments to support Zink Daniels theory that there is a clash of forces from both girdles when a dog lands on four legs together. Do Hovawarts, as a breed, land like that, and might they be useful for study? (Paragraph 52, 77).

213.Consideration for establishing an invitro dog model from which to learn more about impact from jumps in the same way as the equine study, Moershank et al (2001).

Agility Comparison studies recommended

214.How does the impact of jumping and landing the scale jump compare with jumping agility jumps at speed with turns, in order to interpret agility related literature?

215.Study of WT dogs who are also trained in fun-agility, addressing contacts statically on the ‘A' frame. How do they deal with the scale jump, and how does that change when contact points are distinguished on the scale jump? Comparison of forces between ‘A’ Frame and scale jump, to help understand the findings of Levy and Cullen, with consideration for the studies of Azizi Roberts (2014) and Konow Azizi (2011) (Paragraph 39, 40, 42, 44, 45)

Working Trials Community Investigations

216.Encourage texturized padding to the top edge of scale jump and consider ways to support dogs in their balance and proprioception and ‘extreme technique’ at the top of the scale jump to reduce accidents. (Paragraph 36, 180; Williams Jackson et al 2017)

217.Consider developing safe shock absorbing landing surface to provide a consistent landing, without losing any benefits of the scale jump.

218.How do injuries occur to WT dogs in the hindlimb and back/spine. A further survey for thorough and extensive anatomical interrogation of injuries, noting diagnosis vs lay interpretation. It would also be interesting to carry out long term studies on different

dogs WT agility trained in different ways and with different strategies to see what differences in health might be.

219. Study of injuries to WT trained dogs and see how they become injured in their activities of daily living including WT agility, and compare this to dogs competing in fun-agility and breed competition and pet dogs. This might include whole life morbidity, mortality and quality of life research.

220. Are GSD more vulnerable to injury on the WT scale jump as this very limited study may suggest? Are hyperextension or hyeprflexion injuries connected? Are neurological problems connected (Paragraph 118-129)?

221. Several handlers attribute structural and degenerative conditions in their dogs to the scale jump. To what degree is this valid? (See paragraphs 126, 128, 129, 135, 138, 141, 142, 146, 149, 151)

222. Networking partnership working with Labrador and GSD breed communities to drive down pathologies which threaten involvement of the breeds in WT.

223. Develop support package for WT GSD owners. Education and awareness of degenerative neurological changes including list of sensitive and specific signs of early disease. Recommendation for professional rehabilitation support. Development of specific and sensitive low-tech. orthopaedic tests to detect changes in the WT dog at early stages to reduce accidents.

224.Most importantly, with data collection mechanisms in place, injuries which take place in WT, can be monitored for future studies. (See paragraph 207)

Words 14,941

Conflict of Interest

The author, Penelope Bellis declares an interest. She has worked four dogs in working trials in the past but is not currently competing. She has recently retired her nine year old GSD x Malanois dog whilst the dog was still competent through the agility section.

She has had one dog that had difficulties with the jumps (the clear jump), but was found to have spondylosis and retired at the age of three. This led to an earlier diagnosis than usual for the condition (Boness Veterinary Surgery, Barton-le-Clay).

Penelope Bellis commenced this enquiry seeing both sides of the issues with the intention of finding out enough to give the best advice to patients and other Working Trials enthusiasts.
She is a human and animal chiropractor.

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