



Canine Vision Project

1 Background

Agility dog trainers have noticed that some dogs have difficulty jumping obstacles because the dog consistently takes off too early on the approach to the jump. These dogs exhibit a pattern that also involves taking stutter steps, and dropping their heads as if to get a better look at the jump. The purpose of this study was to look for visual abnormalities in dogs with jumping problems.

2 Methods

Two hundred ten (N=210) agility dogs were evaluated using optometric techniques to determine refractive and binocular status. They were recruited through word of mouth and tested in a light-controlled environment at agility events in California, Texas, and Washington. Retinoscopy was performed through undilated pupils. Binocularity was tested using the cover test, the Hirschberg test, and the Bruckner test. Binocular vergence ranges were tested with a prism bar at 16 inches and 6 feet. Handlers self-reported their dogs' jumping ability.

Of the 210 dogs tested, 10 were too young to determine jumping behavior, one was too excitable to test, and 2 had undefinable jumping behavior. Thus the final sample reported on = 197.



Acknowledgments: Supported by generous donations from agility dog owners. Special thanks to Nancy Kemna (Seattle, WA) and Krissy Day (Ft. Worth, TX) for help in recruiting participants and setting up test sessions.

Visual Disorders in Agility Dogs with Jumping Problems

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3 Jumping Problems

Owners categorized their dog as a good jumper or as having problems with jumping. Trainers' input was also used for final determination. Most problems were "early takeoff" (see image below), where the dog initiates the jump too soon to reliably clear the obstacle. Owners sometimes report these dogs also misjudge jumping onto a sofa or hesitate when climbing an unfamiliar staircase. Our research is the first attempt to determine whether vision is a contributing factor in jumping problems.

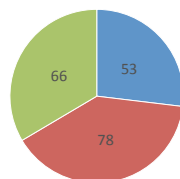


In this sample (N=197), 112 dogs did not have jumping problems, and 85 had jumping problems. Photo from article by Linda Mecklenburg in *Clean Run*, May 2010.

4 Visual Disorders: All Dogs

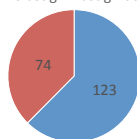
Defining emmetropia as $> -0.25D$ to $+0.25D$, data from all dogs refracted reveals a relatively even distribution of refractive state.

■ emmetropia ■ myopia ■ hyperopia

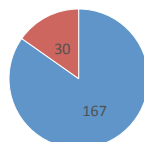


Note: This sample is probably not representative of all agility dogs because problem jumpers are likely to be over-represented.

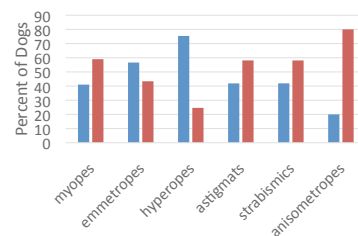
■ no astig ■ astigmatism



■ no strab ■ strab

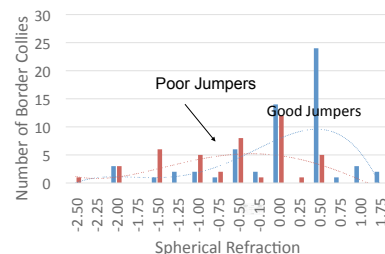


5 Relation to Jumping Behavior



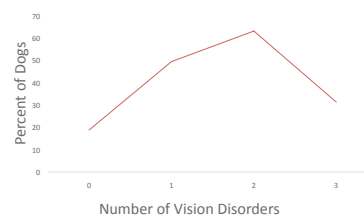
Significantly more dogs with myopia, astigmatism, and anisometropia ($p < .05$ for each) had jumping problems. Dogs with hyperopia did not have problems ($p < .001$), and emmetropes and strabismus were evenly divided between good and poor jumpers.

6 Myopia: Poorer Jumping



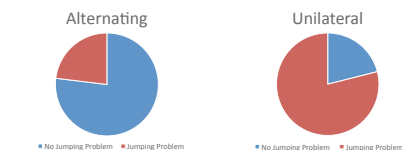
Poor jumpers (red) tend to be more myopic than good jumpers (blue). Shown above are data for Border Collies (N=104, with 42 poor jumpers), the most popular breed for agility.

7 Multiple Visual Disorders: Poorer Jumping



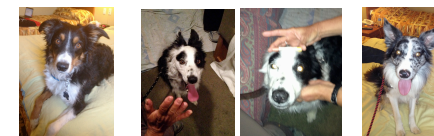
Having more than one vision condition (myopia, astigmatism, strabismus, anisometropia) increases the probability of having a jumping problem.

8 Unilateral Strabismus: Poorer Jumping



Alternating Exotropia

Left Exotropia



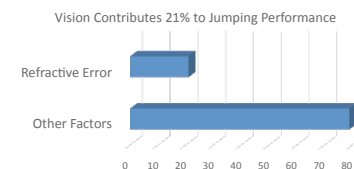
Right Exotropia

Right Esotropia

Orthophoria

9 Vision Problems and Jumping Performance

Multiple regression of variables that were significantly related to jumping revealed spherical refraction as by far the most heavily weighted. Age entered the equation as well, but others had insignificant weight.



10 Conclusion

Dogs with jumping issues are more likely to have visual disorders than normal jumping dogs. In particular, myopia, astigmatism, anisometropia, and unilateral strabismus are prevalent in dogs that jump poorly. More research is needed to determine whether correcting refractive error will improve a dog's jumping behavior.