

DOI 10.24425/pjvs.2024.149328

Original article

Ocular abnormalities in Whippets practicing lure coursing in Poland

K. Miazga^{1,2}, A. Tomkowicz³, J. Wilczak⁴, A. Cywińska⁵

¹ Department of Pathology and Veterinary Diagnostics, Institute of Veterinary Medicine, Warsaw University of Life Sciences-SGGW, Nowoursynowska 159c, 02-776 Warsaw, Poland

² Municipal Zoological Garden in Warsaw, Ratuszowa 1/3, 03-461 Warsaw, Poland

³ Veterinary Ophthalmology Center “EyeVet”, Chałupnicza 67, 51-503 Wrocław, Poland

⁴ Department of Physiology, Institute of Veterinary Medicine, Warsaw University of Life Sciences-SGGW, Nowoursynowska 159c, 02-776 Warsaw, Poland

⁵ Faculty of Biological and Veterinary Sciences, Nicolaus Copernicus University in Torun, Lwowska 1, 87-100, Torun, Poland

Correspondence to: A. Cywińska, e-mail: anna_cywinska@wetrynaria.pl, tel.: +48 501136300

Abstract

Coursing is a canine sport discipline invented for sighthounds. The dogs chase the mechanically operated lure on an open area at the track that consists of straight lines as well as turns. Thus, the dogs must rely mainly on their sight in order to chase the lure and to compete.

Whippets are the most popular sighthound breed in Poland and more and more dogs practice lure coursing on professional level. Several ocular disorders are known or presumed to be inherited in Whippets, so we decided to check how often they occur amongst competing dogs and if they have any impact on the results during competitions.

Forty-five regularly competing Whippets underwent complete ophthalmic examination, including evaluation of menace response, pupillary light reflex and dazzle reflex, biomicroscopic examination conducted before and after dilating pupils with topical tropicamide and fundus examination with indirect ophthalmoscopy. Refractive state of each eye was assessed via streak retinoscopy.

Ocular abnormalities were identified in 24 dogs (53.3%). The most common finding was vitreous degeneration identified in 9 dogs (20%), five dogs presented multiple lesions. There were no statistically significant differences regarding sex, age, and ranking points between the dogs with and without lesions.

However, some of the identified lesions are likely to progress, so we postulate that the ophthalmological examination should receive more attention in sport Whippets, to check if it has any impact on competing dogs at more advanced age.

Keywords: lure coursing, ophthalmology, ocular disorders, Whippets



Introduction

English Whippets represent the group of sight-hounds and are one of the most popular breeds from this group. Poland is recognized as the biggest Whippet exporter all over the world. By the end of December 2022 there were 168 Whippet kennels registered as active by the Polish Kennel Club (Hodowle – Whippet w Polsce 2022). Sight-hounds rely on their sight and speed rather than scent and endurance while hunting. Nowadays hunting with sight-hounds is forbidden in many countries, including Poland (Act of 13 October 1995 on hunting law) and has been replaced by sport competitions. Coursing has traditionally meant a canine activity involving the pursuit of other animals. Today, it has become a sport where live bait is replaced by an artificial lure. Races take place on an open, grassy, and possibly flat area. The lure is placed on a line stretched close to the ground, arranged in a track, consisting of lines and turns. Whippets are known to be ideal for lure coursing as they are the fastest accelerating breed. They are solo hunters willing to take the lure as quickly as possible. An ophthalmological examination is not compulsory for introducing dogs for breeding purposes hence there is not much data of ocular diseases in this breed. However, on the basis of published data, several ocular disorders have been listed by the European College of Veterinary Ophthalmologists (ECVO) as known or presumed to be inherited (ECVO Manual: Breeds 2021). The ECVO list includes: cataract (familial predisposition), progressive retinal atrophy – PRA (in case of night blindness – suspected autosomal recessive and in case of vision deficits in dim light and retinal thinning – autosomal recessive), multifocal retinopathy (X-linked suspected) and collie eye anomaly in long-haired Whippets – CEA (autosomal, recessive, polygenic, NHEJ1 - related). Inheritance of disorders such as chronic superficial keratitis, corneal dystrophy, iris atrophy, vitreous degeneration are still unknown (ECVO Manual: Breeds 2021). The impact of the diseases listed above on vision may vary, depending on the origin of the disease, the degree of its advancement and the treatment undertaken or not at the appropriate time. For example, progressive retinal atrophy leads to blindness, chronic superficial keratitis may lead to chronic loss of vision if not treated, while iris atrophy and vitreous degeneration are not sight threatening. Progressive retinal atrophy described in Whippets by Somma et al. (2016) leads to severe vision deficits in affected dogs. Studies conducted on dogs training agility have shown that dogs with jumping issues are more likely to have visual disorders than normal jumping dogs and these disorders affect their results during competitions (Day et al. 2015). The authors showed that dogs with myopia,

astigmatism, and anisometropia had jumping problems. Dogs with hyperopia did not have problems, and emmetropes and strabismics were evenly divided between good and poor jumpers. However, this study focused only on refractive state of the eyes. Another study conducted on working dogs in Brasil showed that even though a considerable number of ophthalmic abnormalities and refractive errors (54% of examined dogs) were found, work performance was good with no signs of impairment (de Oliveira et al. 2020). Knowing that dogs training for coursing rely mainly on their sight, we decided to check the prevalence of ocular diseases that occur in actively training dogs and whether they have an impact on the results achieved during coursing competitions.

Materials and Methods

The study group consisted of 45 Whippets, 26 males and 19 females, from 11 months to 7.5 years old, the median age was 4 years (IQR range 4-5). All dogs were regularly trained and took an active part in coursing competitions and were officially ranked in the Polish Cup (Coursing Polish Cup Results 2021) by the points obtained in the competitions. Whippets underwent complete ophthalmic examination, including evaluation of menace response, pupillary light reflex and dazzle reflex, biomicroscopic examination (KOWA SL-15 Portable Slit Lamp, Kowa) was conducted before and after dilating pupils with topical tropicamide (Tropicamidum WZF 0.5%, Polfa Warszawa). Fundus examination was completed with indirect ophthalmoscopy (Omega 500 Binocular indirect ophthalmoscope, Heine) using 30D condensing lens (Volk). Fundus photographs were taken in some dogs by use of ClearView Fundus Camera (Optibrand). Refractive state of each eye was assessed via streak retinoscopy (Beta 200, Heine). Dogs were considered ametropic (myopic or hyperopic) when the mean refractive state exceeded ± 0.5 diopter (D). The dogs with and without ocular lesions were compared regarding the age, sex and ranking points using Mann-Whitney U Test (Statistica 13, TIBCO). Ophthalmological examination performed as a part of routine health examination, on the owners' request and thus, according to the European directive EU/2010/63 and Polish regulations there was no need for the approval of the Ethics Committee for the described procedures, qualified as non-experimental clinical veterinary practices, excluded from the directive (Act of 15 January 2015 on the protection of animals used for scientific or educational purposes).

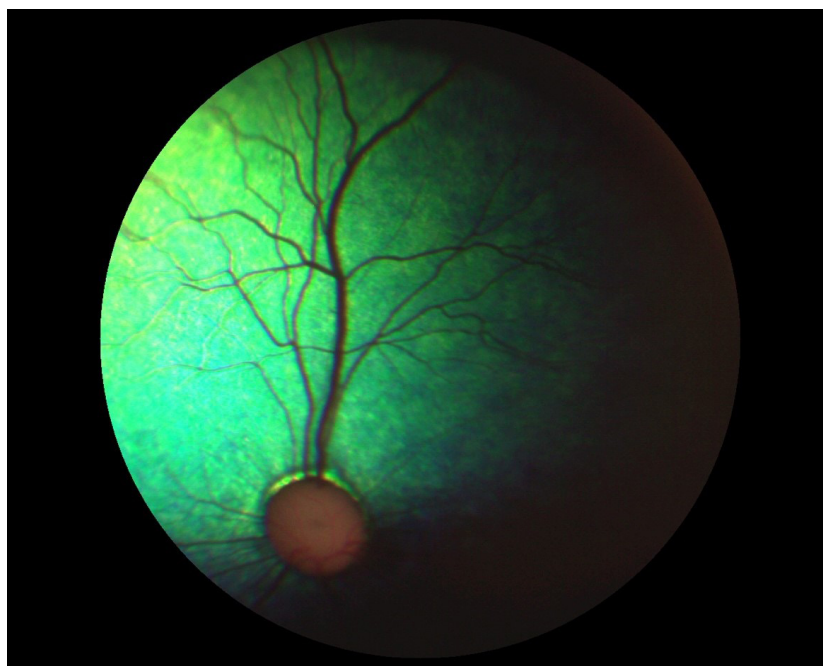


Fig. 1. Normal ocular fundus in a Whippet dog. Visible hyperreflective zone around the optic nerve disc.

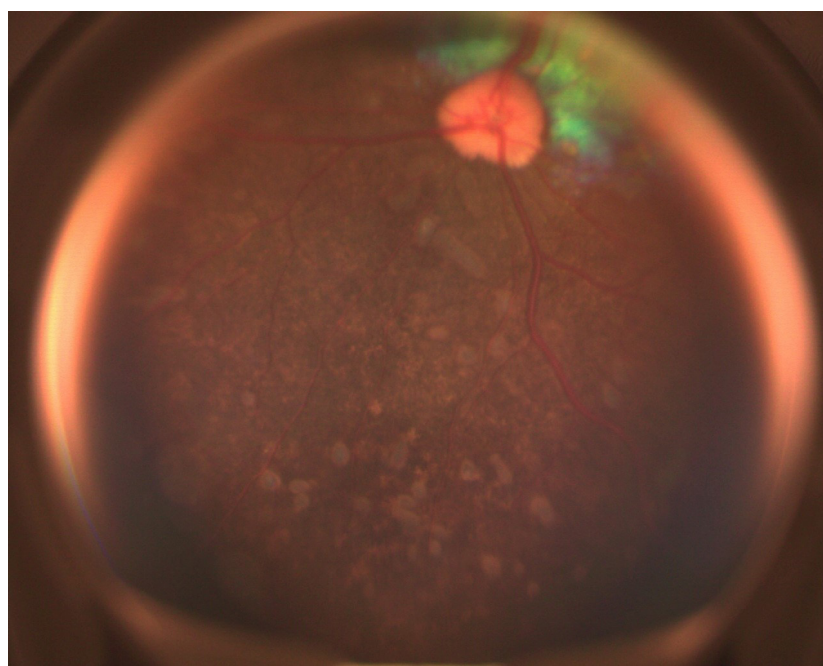


Fig. 2. Depigmentation of the non-tapetal fundus in a dog with retinopathy.

Results

The population examined in this study covered 30% (45 out of 161 ranked dogs) of sport Whippets in Poland, so constitutes the representative population. Twenty one (46.3%) had no ocular lesions (Fig. 1). Ocular abnormalities were identified in 24 dogs (53.3%), 16 males and 8 females, median age was 4 years (4-6). There were no statistically significant differences regarding sex ($p=0.282$), age ($p=0.15$)

and ranking points ($p=0.138$) between the dogs with and without lesions.

The most common finding was vitreous degeneration, identified in 9 dogs (20%), in 6 of them in both eyes and in 3 of them only in the left eye. Other detected lesions involved cataract (suture tips, fiberglass and suture tips, pulverulent, nuclear), nucleosclerosis, retinopathy (Figs. 2, 3a and b), iris atrophy, anterior lens capsule pigment deposits, uveal cyst, corneal foreign body (Fig. 4), corneal scar and retinal scar (Fig. 5). Five dogs

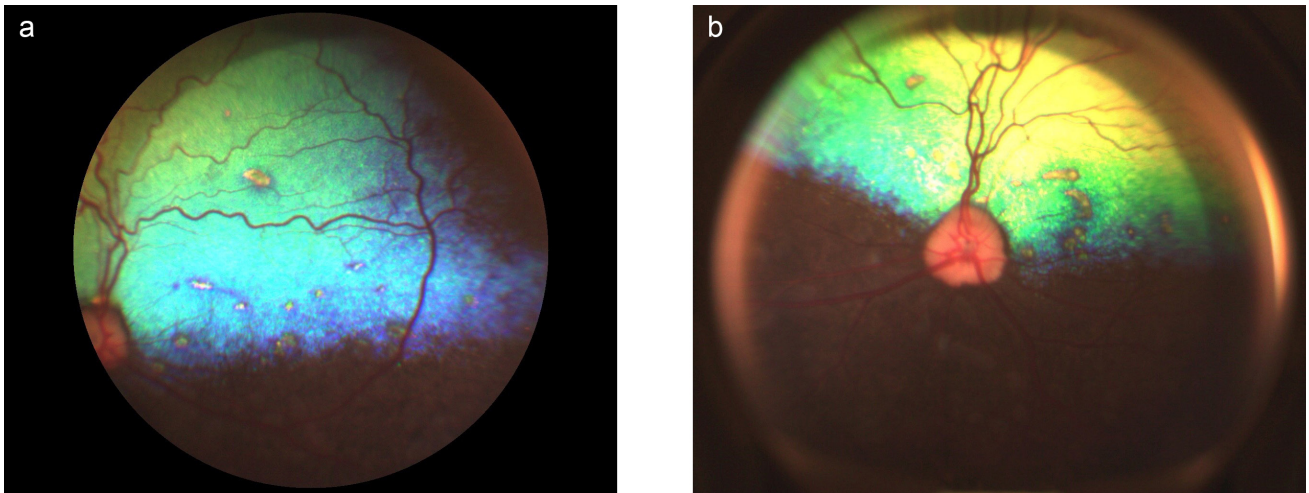


Fig. 3a, b. Multiple lesions in the tapetum fundus in a dog with retinopathy.

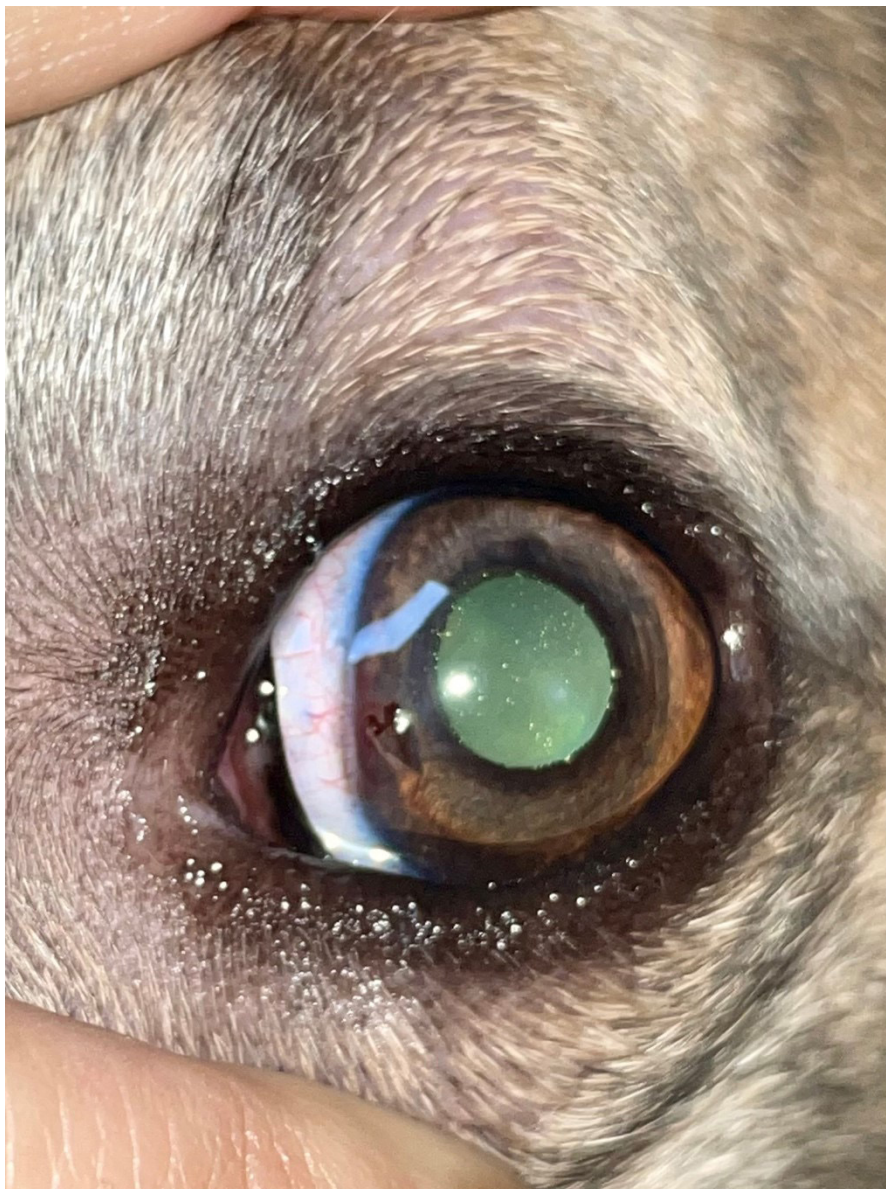


Fig. 4. Corneal foreign body in a Whippet dog.

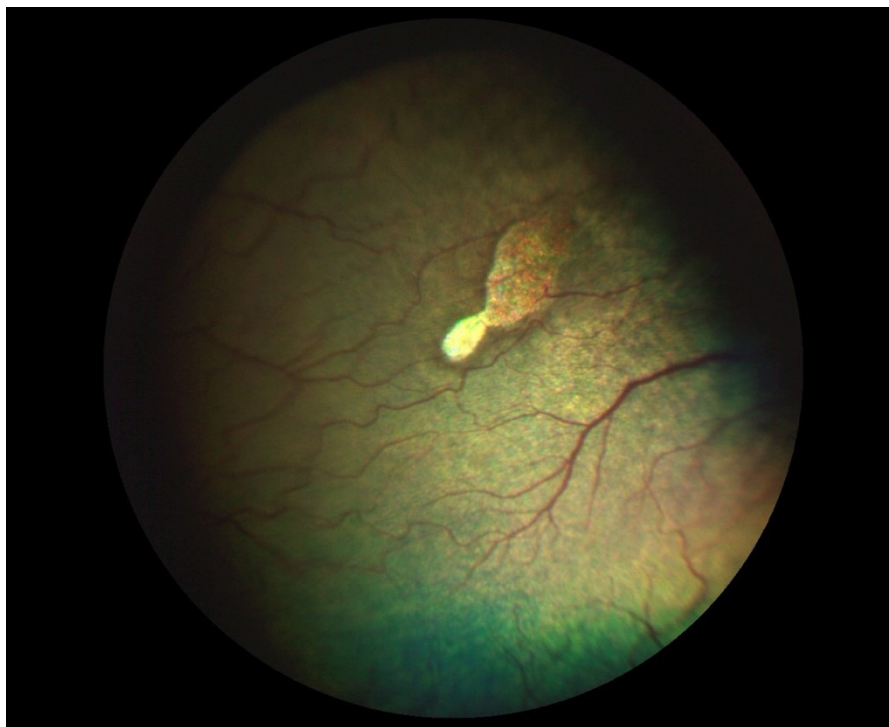


Fig. 5. Retinal scar in a Whippet dog.



Fig. 6. Vitreous material in the anterior chamber of the eye in a Whippet dog.

presented multiple lesions in at least one eye (Table 1). All defined lesions are listed in Table 2.

Discussion

This is the first study describing the occurrence of ocular lesions in Whippets involved in regular training and competitions. In Poland, despite the popularity of

Table 1. Dogs with multiple lesions.

ID	Age	Sex	Lesions in the right eye	Lesions in the left eye
9	4	F	Pulverulent cataract; vitreous degeneration	Pulverulent cataract; vitreous degeneration
12	6	M	Fiberglass and suture tips cataracts; vitreous degeneration	Fiberglass and suture tips cataracts; vitreous degeneration
27	6	F	Vitreous degeneration	Vitreous degeneration, uveal cyst floating in vitreous chamber, vitreous material in anterior chamber of the eye (Fig. 6)
29	7.5	M	Vitreous degeneration, iris atrophy, nucleosclerosis	Vitreous degeneration, iris atrophy, nucleosclerosis
32	3	F	ALC pigment deposits	ALC pigment deposits, nuclear cataract

ID – identification number of the dog, F – female, M – male, ALC – anterior lens capsule

Table 2. Abnormalities found in the examined dogs.

Abnormality	Number of right eyes affected	Number of left eyes affected	Total number of dogs affected	Median age of dogs (IQR range)
Vitreous degeneration	6	9	9	5 (5-6)
Cataract	Suture tips	3	6	4 (4-5.5)
	Fiberglass and suture tips	1		
	Pulverulent	1		
	Nuclear	0		
Nucleosclerosis	3	3	3	7.17 (7.17-7.25)
Retinopathy (Fig. 2, 3a and 3b)	2	3	3	4 (4-4.5)
Iris atrophy	1	3	3	4 (4-4.875)
ALC pigment deposits	1	2	2	2.75 (2.75-2.67)
Uveal cyst	0	1	1	6
Corneal foreign body (Fig.4)	0	1	1	1.5
Corneal scar	0	1	1	1
Retinal scar (Fig. 5)	0	1	1	1.17

The age is given in years, as median (IQR – InterQuartile Range) if more than one dogs were affected, ALC – anterior lens capsule

this breed, only 161 dogs were officially ranked as sport competitors in 2021 season, thus we have examined the representative population. Ocular abnormalities were diagnosed in 53.3% of the study population, which is very similar to the prevalence (54%) reported by de Olivera et al. (2020) in working dogs in Brasil. Although the tendency that the lesions occur more likely in older dogs and the dogs with lesions have worse sport results can be suspected, in our study these differences were not significant. This lack of differences seems to be related to the fact that the sport carrier of the dogs is limited, so none of the dogs examined in this study was older than 7.5 years and that is why the group was more homogenous regarding the age than groups examined in other ophthalmological studies (Guandalini et al. 2017, Balicki et al. 2021, Palmer et al. 2021, Crasta et al. 2022, Karamatic et al. 2022). Although median ranking points were lower in the dogs with ocular lesions, the difference was not significant

since many other factors (fitness and physical performance) are important for the result. There were dogs without lesions but with poor sport results and dogs with ocular abnormalities and very good results.

In this study we have identified 4 types of abnormalities: vitreous degeneration, cataract, iris atrophy and retinopathy, listed among 8 disorders presented in ECVO section as known or presumed to be inherited in Whippets. Additionally, we have identified senile nucleosclerosis, one uveal cyst, and coincidental corneal foreign body and scars (corneal and retinal). The most common type of ocular anomaly was vitreous degeneration (VD). Vitreous body is a colorless gel containing mainly water – 99% and the remained 1% is formed from collagen fiber, hyaluronic acid and glycosaminoglycans. It removes toxic metabolites from the posterior segment of the eye, protects lens from oxidative damage and is responsible for nutrients diffusion. Changes of its molecular composition result in

degeneration. There are few types of VD described e.g., liquefaction also called syneresis or formation of vitreous floaters, asteroid hyalosis or synchysis scintillans (Bishop et al. 2004). Although VD is a common finding, in recent retrospective study conducted on 1569 whippets, the incidence of it was low, reaching only 5% (Krishnan et al. 2019). In our study vitreous anomalies were found in 20% of dogs. Six dogs had syneresis, 2 syneresis that result in vitreous material in anterior chamber and one dog had extensive vitreous attachment to posterior lens capsule causing marked opacity (Fig. 6). Average age of Whippets with VD was 5 years which corresponds with the study of Krishnan et al. (2019), where authors show a relationship between age and VD. With every 1-year age period there is a 24% higher likelihood of VD development. Similar conclusions can be drawn from a study of 100 retired racing Greyhounds, where 31% of dogs presented with VD (Lynch 2007). Interestingly, although the previously reported prevalence of VD in Whippets was only 5% (Krishnan et al. 2019), in Italian Greyhound which have the same genetic clad as Whippets, it was much higher – 30.5% in Krishnan et al. (2019) study and 46.7% according to Guandalini et al. (2017). In the earlier American project, that enrolled 352 Whippets, the prevalence of VD was 13.6% (Vitreous Degeneration in Whippets 2021) and the authors planned to examine the dogs annually to follow the progression and the outcome of the disease. Kirshanan et al. (2019) study found also a not significant association between cataracts and VD, 2 whippets had lens luxation and none of the dogs had retinal detachment or glaucoma. According to ECVO manual, VD in Whippets can cause secondary glaucoma, lens luxation and retinal detachment (ECVO Manual: Breeds 2021). ECVO manual, however, does not report the prevalence of VD among Whippets and defines the inheritance as unknown. In our study the prevalence of VD was high in comparison to other studies (Krishnan et al. 2019, Vitreous Degeneration in Whippets 2021). However, we have examined only the purebred dogs that regularly trained and competed. Taking into account the fact that 1452 dogs were registered as purebred in 2021, but only selected lines are used for sport activities, the high prevalence of VD in the studied population might have additionally contributed to the hereditary nature of the disease. In Italian Greyhounds the genetic background of VD has already been identified as associated with chromosomal region indicating a recessive disease at the canine chromosome 17 (Kaukonen and Lohi 2018). Four of 9 VD dogs in our study had other ocular anomalies. One had iris atrophy and nucleosclerosis, one had uveal cyst floating in the vitreous chamber and two had cataracts (pulverulent cataract and fiberglass and suture tips cataracts,

respectively). Except of those 2 cases, cataract was diagnosed in 4 other dogs, and it was pulverulent, suture tip and nuclear cataract. These findings do not correspond to ECVO manual where information about equatorial and posterior subcapsular cataract were noted in Whippets. Third most common affected part of the eye in our study was the retina. One dog had a local area of tapetal hyperreflectivity with visible pigment accumulation in the center. Those changes indicate inactive chorioretinitis and if they are small, they are of no visual significance. In 3 dogs there were multifocal small white areas in tapetal fundus. Owners of the dog with most numerous changes have reported vision problems – what indicates not only anatomical but functional problem of the retina with such a change. All 3 dogs with nonspecific retinal changes required further investigation. In Whippets two types of progressive retinal atrophy (PRA) described. One in which hyper reflection around the optic nerve is the first ophthalmological sign and total blindness occurs at the age of 5 years. The second, described by Somma et al. (2016) happens in younger dogs. Clinical signs are visible in few month-old dogs, starting from mild vascular attenuation in the retina and progress to advanced retinal degeneration at the age of 24-36 months. Very young, 1 to 6-month-old, affected dogs exhibited oscillatory nystagmus, which is less apparent with age. Interestingly multiple small retinal bullae were present in 5–8-month-old dogs and they also as nystagmus are less apparent with age (Somma et al. 2016). None of dogs in our study had ophthalmological signs corresponding with PRA. As there is no genetic test for PRA available in Whippets, it is possible that affected individuals were present in the study but have not shown clinical sign yet. Other pathologies seen in the study were iris atrophy and pigment on anterior lens capsule (ALC). Iris atrophy was found in 3 dogs with mean age of 4 years. That indicates rather genetic base than senile changes. Senile changes in the lens (nucleosclerosis) were observed in 2 cases. Coincidental finding was corneal foreign body (Fig. 4). Owners observed excessive tearing and squinting in this eye, but as clinical signs resolved, they did not decide to get a veterinary consult. Corneal foreign bodies are mostly found in young, active dogs, so 1.5-year-old Whippet perfectly fits to those description (Pont et al. 2015). A piece of plant was removed in local anesthesia and meds for corneal ulcers were prescribed.

All dogs examined in this study were emmetropic, so the eyes were free of refractive error. It means that the optic with no accommodation - without the tension of the ciliary muscles – is able to focus light rays exactly on the retina. The most common refractive disorders are myopia and hyperopia. Most dogs are emme-

tropic which corresponds with our study. All of dogs fit to the range $-0.5D$ to $+0.5D$. Predisposition of refractive errors is described in different breeds. Some of them have tendency to be myopic e.g. Miniature Schnauzers or Rottweilers others to be hyperopia, e.g. Bouvier des Flandres or Alaskan Malamute (Murphy et al. 1997, Kubai et al. 2008). Brazilian working dogs described by de Oliveira et al. (2020) tended to be myopic, except for guided dogs (Retrievers) and tracking dogs (Belgian Malinois, Bloodhound and German Shepherd) who were rather emmetropic. The main limitations of this study were the small group (although representative for the sport population) and the fact that only one examination was performed, so there were no data regarding the progression of the disease. Since more than half of the examined population presented ocular abnormalities, we can postulate that ophthalmological examination in sport Whippets should receive more attention. In conclusion, ophthalmic abnormalities are common among Whippets practicing coursing. At the same time, it seems that noted ocular disorders do not negatively affect the results achieved by the dogs during coursing competitions. Nevertheless, it is worth performing further research on a larger group of dogs to confirm this hypothesis.

References

- Act of 15 January **2015** on the protection of animals used for scientific or educational purposes, art 1.2 (5), Dz.U.2018.0.1207 <https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU20150000266/U/D20150266Lj.pdf> (Accessed on 3 February 2023)
- Act of 13 October **1995** on hunting law, Dz. U. 1995 Nr 147 poz. 713 <https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU19951470713/U/D19950713Lj.pdf> (Accessed on 3 February 2023)
- Balicki I, Goleman M, Balicka A (2021) Ocular Abnormalities in Polish Hunting Dogs. *Plos One* 5; 16(11): e0258636
- Bishop PN, Holmes DF, Kadler KE, Mcleod D, Bos KJ (2014) Age-related changes on the surface of vitreous collagen fibrils. *Investig Ophthalmol Vis Sci* 45: 1041-1046
- Coursing Polish Cup Results, **2021** <https://coursing24.eu/cupResultsPublic/2> (Accessed on 5 January 2023).
- Crasta M, Arteaga K, Barachetti L, Guandalini A (2022) A multicenter retrospective evaluation of the prevalence of known and presumed hereditary eye diseases in Lagotto Romagnolo dog breed within a referral population in Italy (2012-2020). *Vet Ophthalmol* 25: 426-433
- Day G, Powers M, Gyes N, Plummer L (2015) Visual Disorders in Agility Dogs with Jumping Problems. <http://www.awesomepaws.us/wp-content/uploads/2015/04/canine-vision-project.pdf> (Accessed on 3 February 2023)
- de Oliveira JK, Bortolini M, Schaller M, Schuchmann RK, Moore BA, Montiani-Ferreira F (2020) The ophthalmic health and refractive state of working dogs in South Brazil. *Open Vet J* 10: 22-30.
- ECVO Manual: Breeds, **2021** <https://www.ecvo.eu/media/whippet.pdf> (Accessed on 3 February 2023)
- FCI International Guidelines for Lure Coursing Judges. www.fci.be (Accessed on 3 February 2023)
- Guandalini A, Di Girolamo N, Corvi R, Santillo D, Andreani V, Pinzo B (2017) Epidemiology of ocular disorders presumed to be inherited in three small Italian dog breeds in Italy. *Vet Ophthalmol* 21: 524-529.
- Hodowle – Whippet w Polsce (2022) <http://www.whippet.topcharty.net/hodowle.php> (Accessed on 11 November 2022)
- Karamatic S, Goode R, Bageswaran N, Willet CE, Samaha G, Ferguson R, Mazrier H, Wade CM (2022) Genome-Wide Association Analysis for Chronic Superficial Keratitis in the Australian Racing Greyhound. *Genes* 13: 1328.
- Kaukonen M, Lohi H (2018) Clinical and Genetic Characterization of Canine Vitreous Degeneration. *ARVO Annual Meeting, Honolulu, Hawaii. Invest Ophthalmol Vis Sci* 59: 6042.
- Krishnan H, Diehl K, Stefanovski D, Aguirre GD (2019) Vitreous degeneration and associated ocular abnormalities in the dog. *Vet Ophthalmol* 23: 219-224.
- Kubai MA, Bentley E, Miller PE, Mutti DO, Murphy CJ (2008) Refractive states of eyes and association between ametropia and breed in dogs. *Amer J Vet Res* 69: 946-951.
- Lynch GL (2007) Ophthalmic examination findings in a group of retired racing Greyhounds. *Vet Ophthalmol* 10: 363-367.
- Murphy CJ, Zodnik K, Mannis MJ (1997) Myopia and Refractive Error in Dogs. *Investig Ophthalmol Vis Sci* 33: 2459-2463.
- Palmer SV, Gomes FE, McArt JA (2021) Ophthalmic disorders in a referral population of seven breeds of brachycephalic dogs: 970 cases (2008-2017). *J Am Vet Med Assoc* 259: 1318-1324.
- Pont TR, Matas Riera M, Newton R, Donaldson D (2016) Corneal and anterior segment foreign body trauma in dogs: a review of 218 cases. *Vet Ophthalmol* 19: 386-397.
- Somma AT, Moreno JC, Sato MT, Rodrigues BD, Bacellar-Galdino M, Occelli LM, Petersen-Jones SM, Montiani-Ferreira F (2017) Characterization of a novel form of progressive retinal atrophy in Whippet dogs: a clinical, electroretinographic, and breeding study. *Vet Ophthalmol* 20: 450-459.
- Vitreous Degeneration in Whippets (2021) <https://www.akcchf.org/research/research-portfolio/0011.html> (Accessed on 9 January 2023)