AKITA INU

Retinal dysplasia

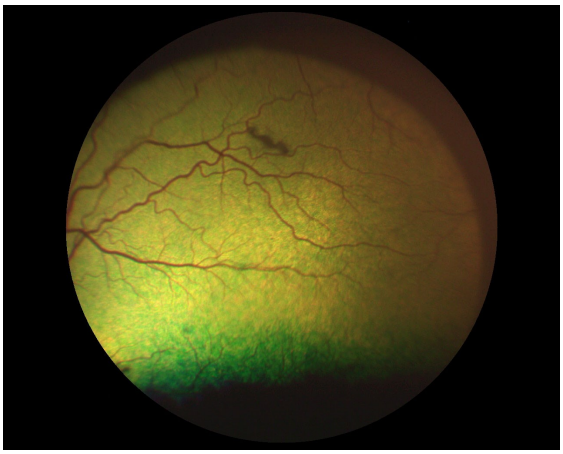


Photo by courtesy of Adolfo Guandalini

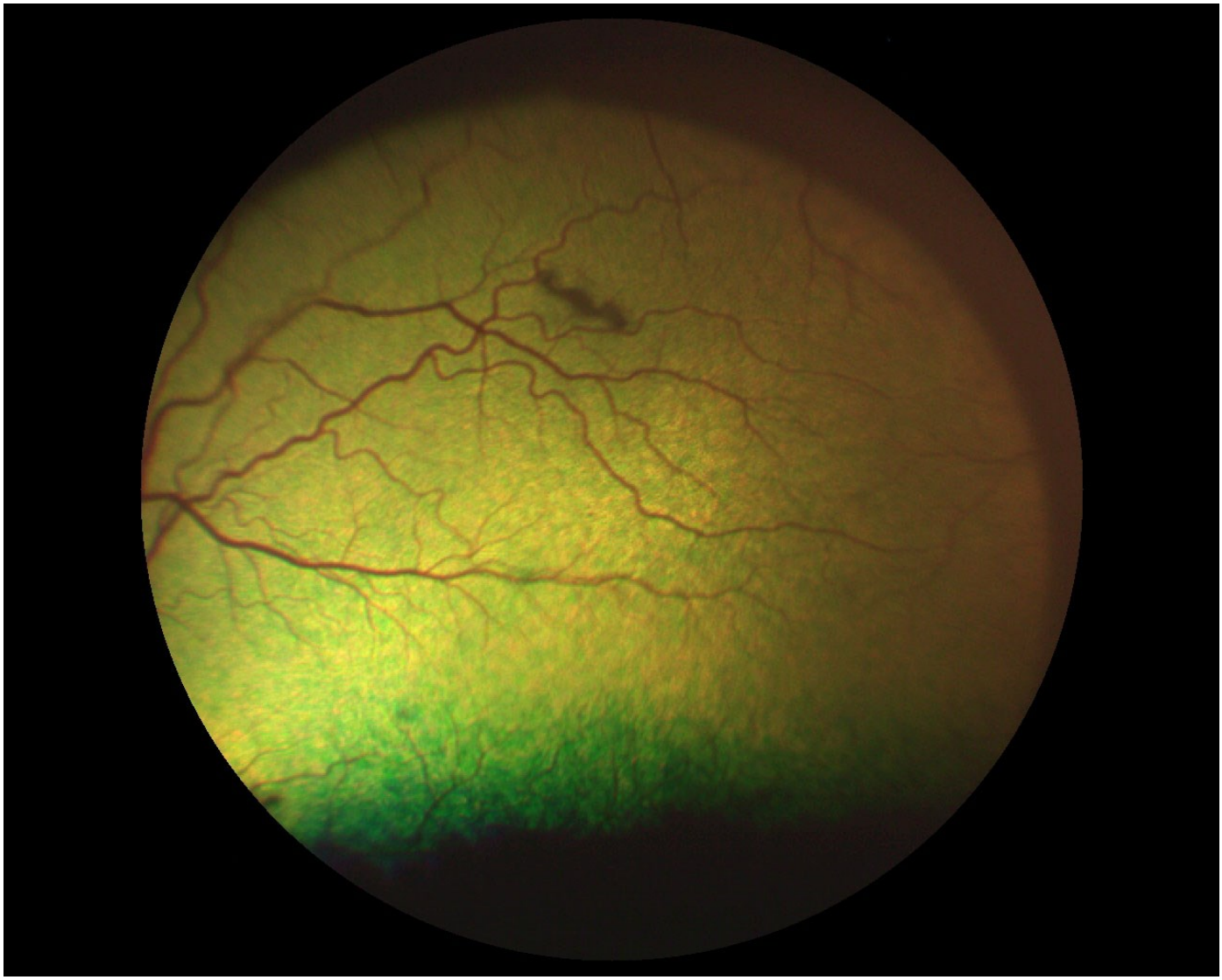
Clinical description

Focal/multifocal Retinal Dysplasia (MFRD): These are areas of reduced tapetal reflectivity, appearing as gray or green dots, linear or curvilinear streaks (or V- or Y-shaped streaks). They may occur anywhere in the tapetal region, but are most frequent in the central region of the fundus, around the dorsal retinal vessels

New data

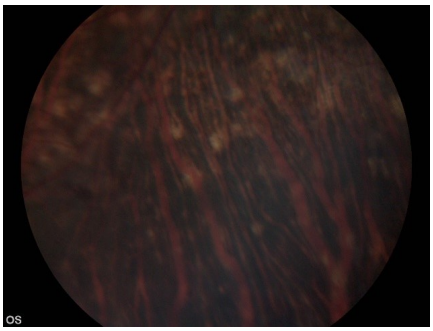
New references

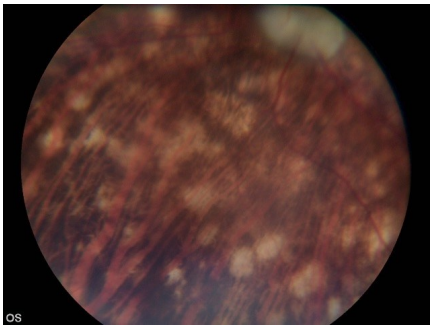
See Ch 9 (point E) for further information and Ch 8 for veterinary advice

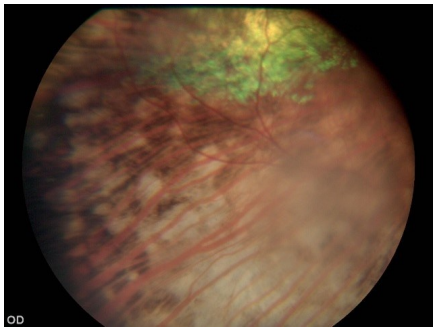


AKITA INU

Uveodermatologic syndrome







Photos by courtesy of Réka Eördögh

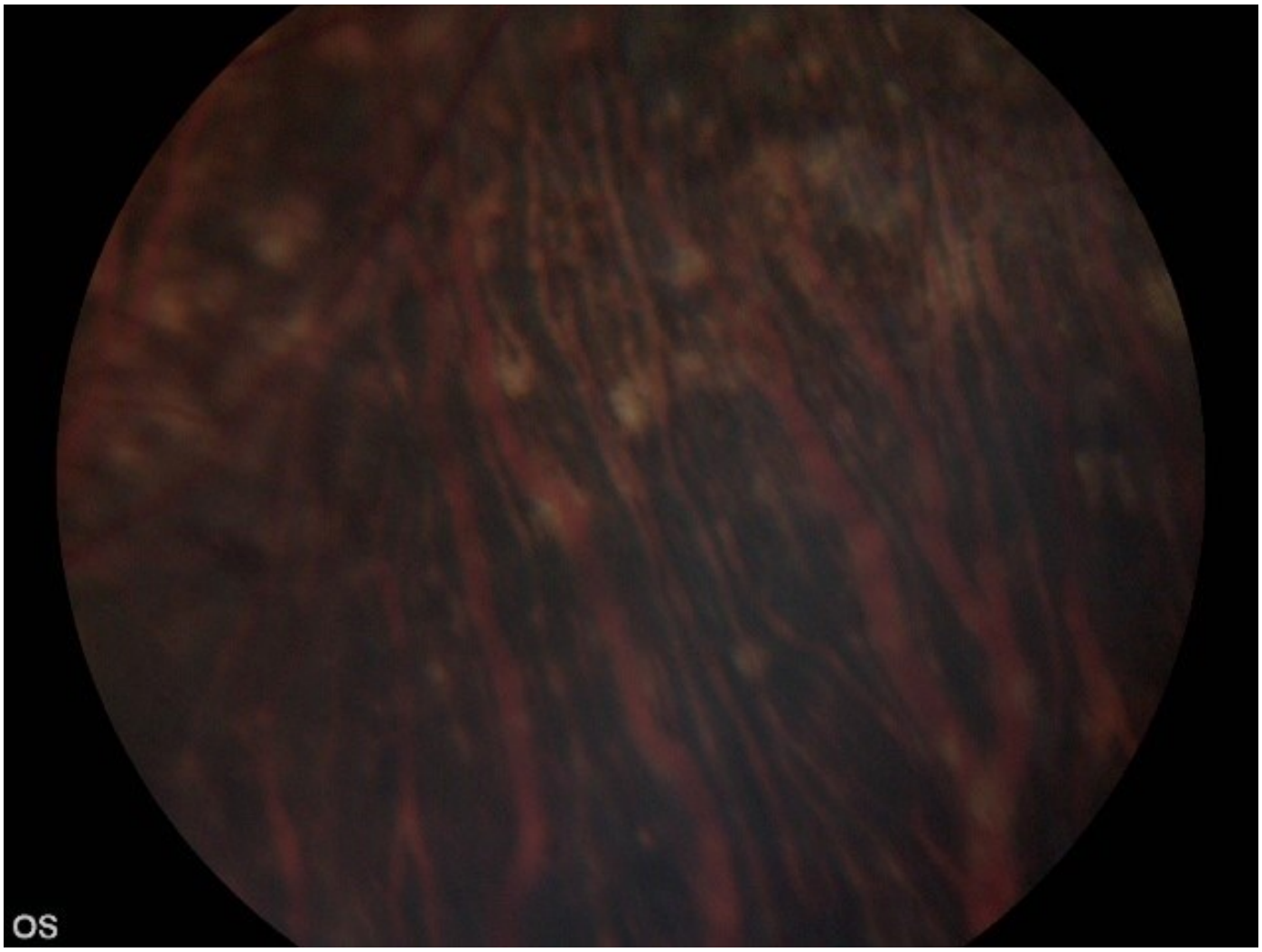
Clinical description

Immune-mediated condition of young adult dogs. Ocular findings include bilateral uveitis (anterior or panuveitis), retinal and choroideal depigmentation, retinal detachment. Secondary cataracts and glaucoma occurs frequently.

New data

New references

See Ch 9 (point C) for further information and Ch 8 for veterinary advice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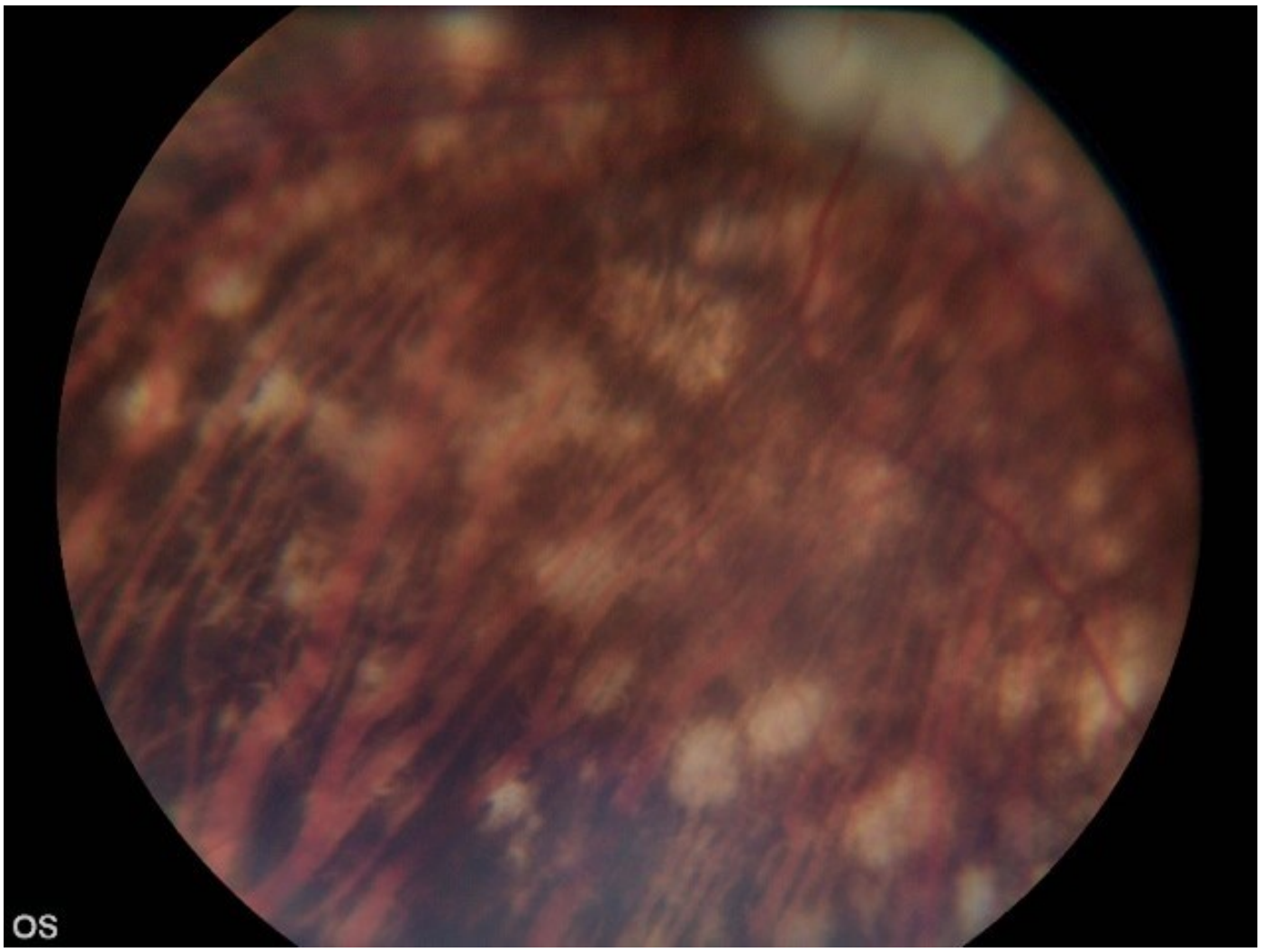
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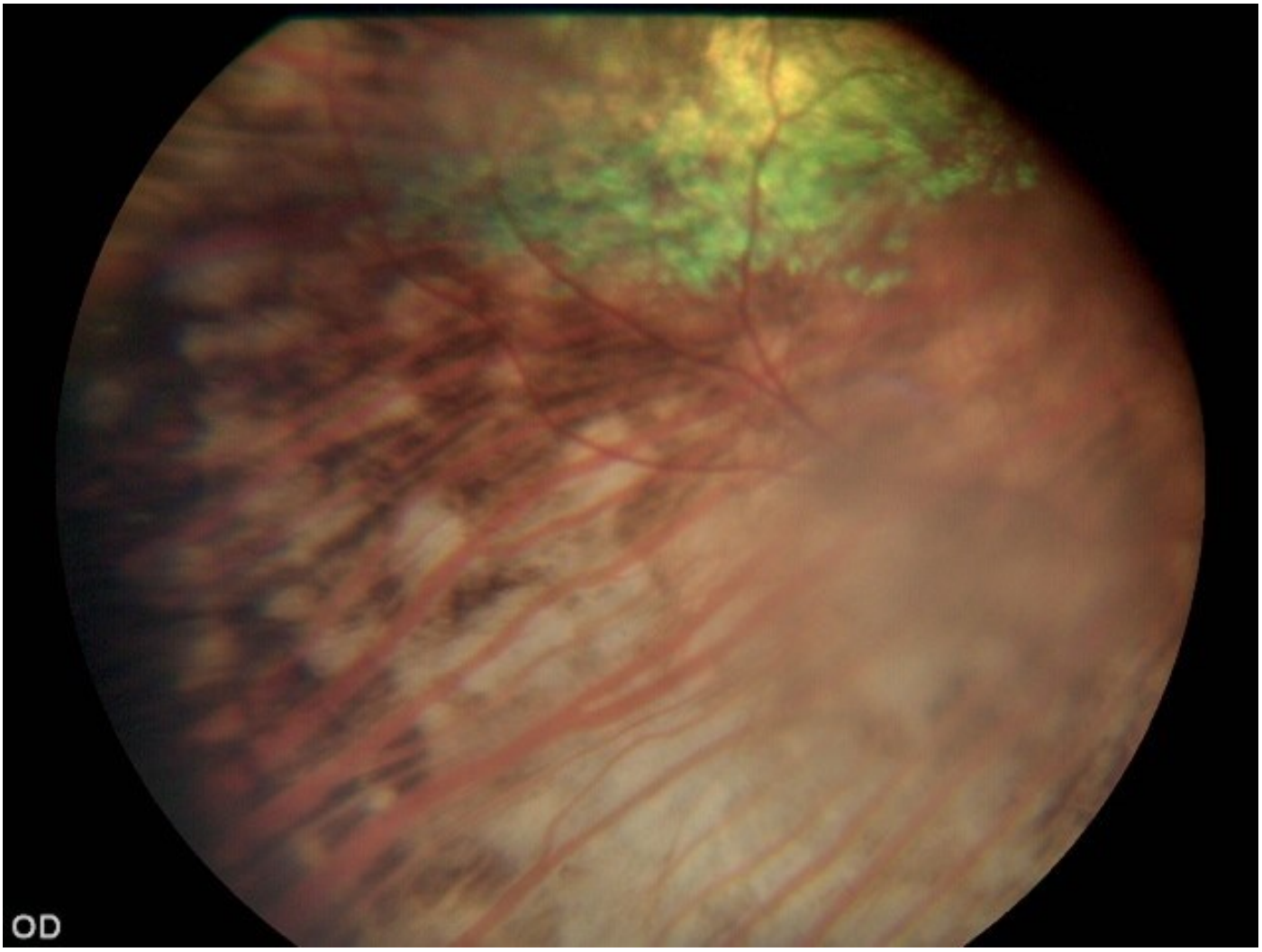
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AMERICAN PIT BULL TERRIER

PRA, crd2, mutation in IQCB1 (NPHP5)

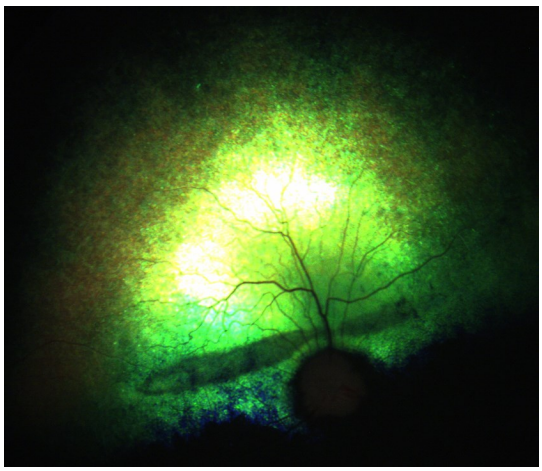


Photo by courtesy of Gustavo Aguirre

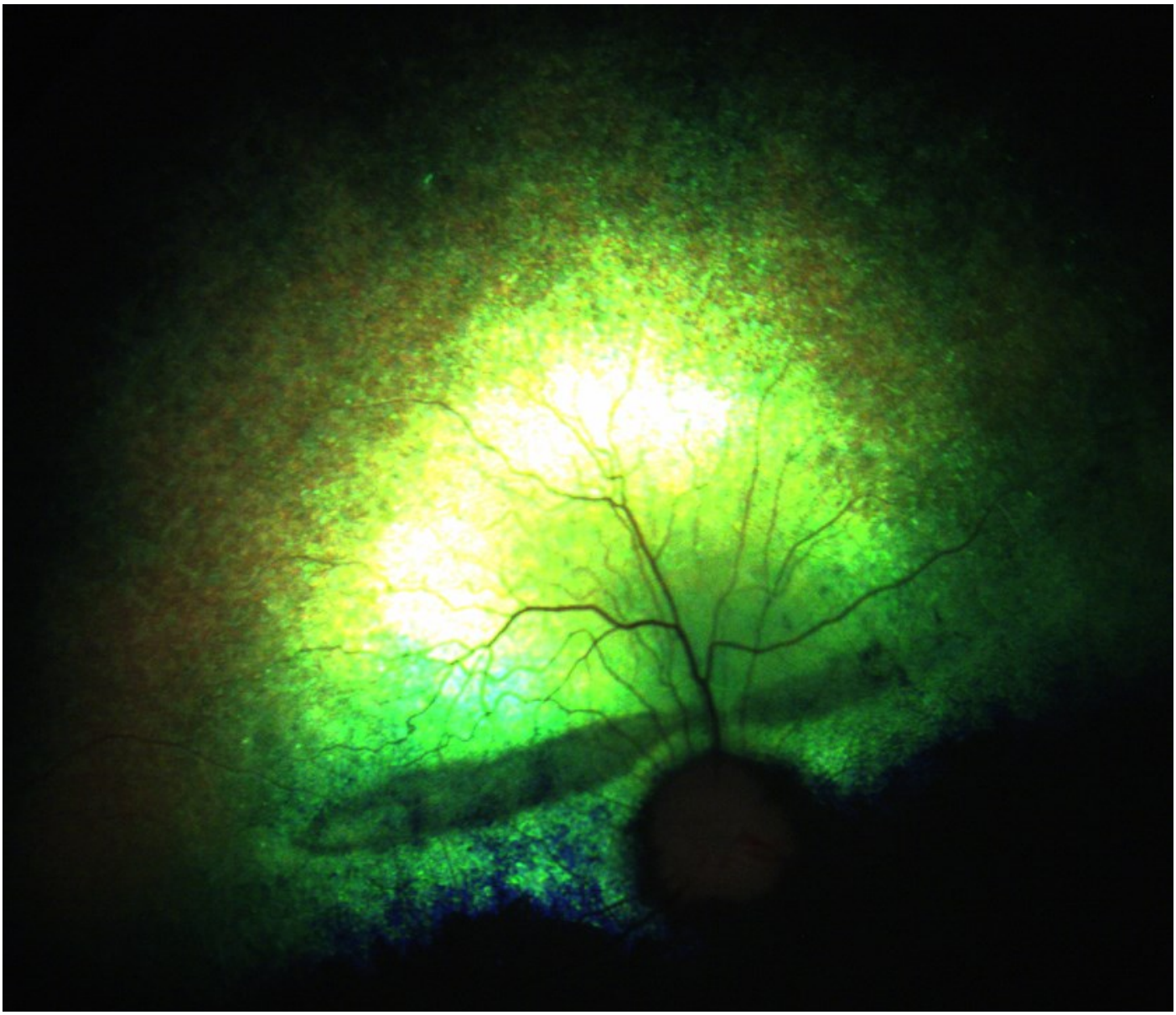
Clinical description

Form of PRA classified as a cone-rod dystrophy and named cone-rod dystrophy 2 (crd2). Fundoscopy could detect retinal thinning between 3 and 6 months of age and the dogs were blind at 12 months with an extinguished ERG and advanced generalized retinal degeneration.

New data

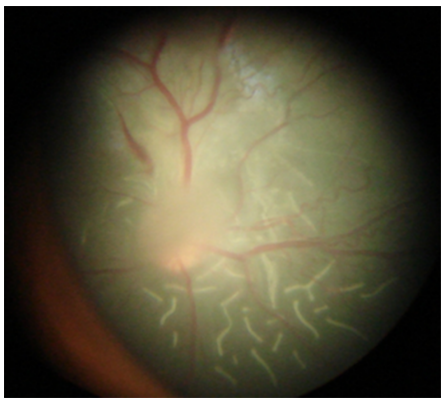
New references

See Ch 9 (point B) for further information and Ch 8 for veterinary advice



AMERICAN PIT BULL TERRIER

Retinal Dysplasia



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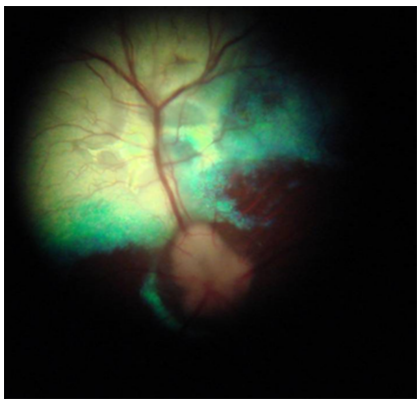

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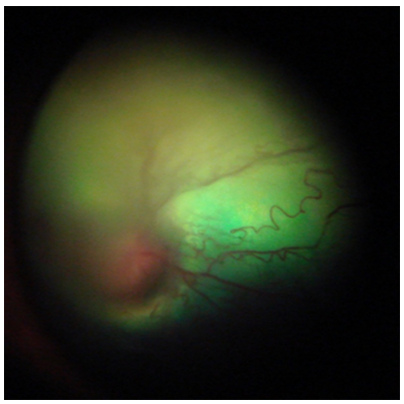


3

Photos by courtesy of Fabiano Montiani Ferreira

Clinical description

1. **Multifocal Retinal Dysplasia (MFRD):** 45 days of age. The ONH looks poorly myelinated at 45 days of age, there are multiple retinal folds in the tapetal and non-tapetal area. There is an opaque area above the optic disc suggesting a thickening of the retina in this area. A few dogs had MFRD lesions.

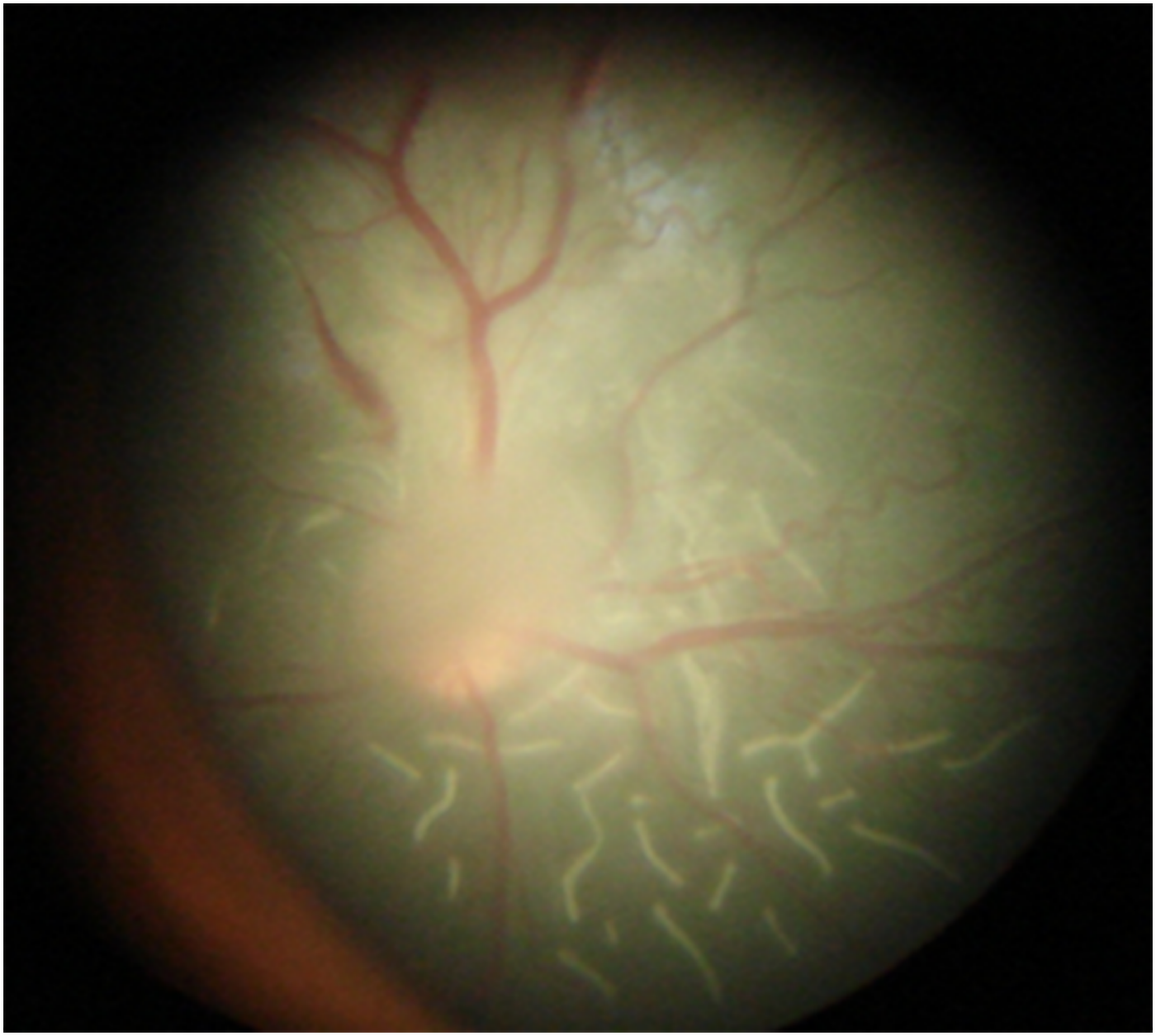
2. **Geographic Retinal Dysplasia (GRD):** There are extensive geographic RD lesions dorsal to the ONH with some hyporeflective areas. The majority of affected dogs had GRD lesions and in some cases these progressed to retinal detachment.

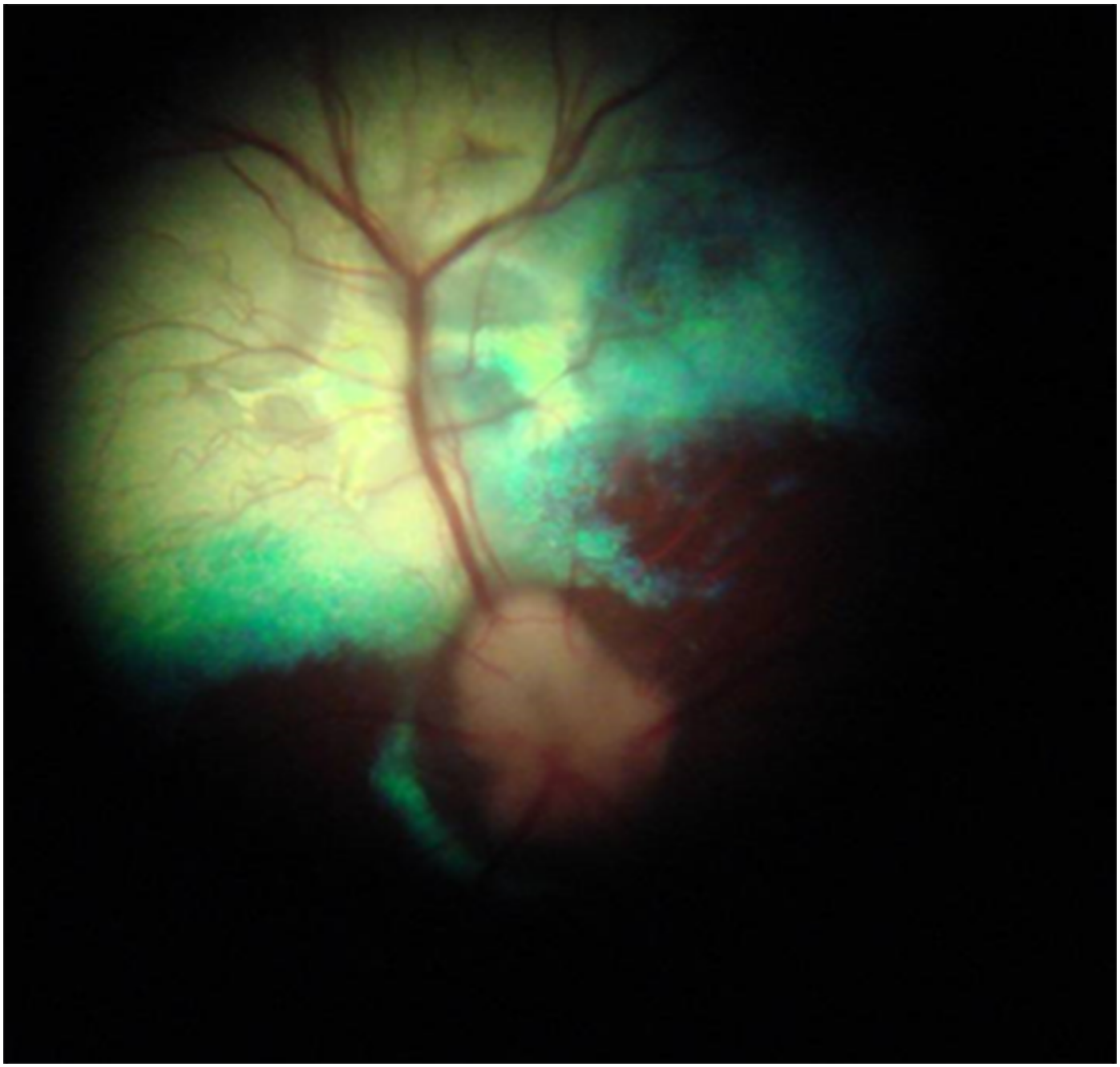
3. **Total Retinal dysplasia (TRD):** The TRD is associated with retinal nonattachment or detachment and resultant blindness. The affected dogs had significantly shorter stature than unaffected controls but radiographic examination of the limbs showed this was not a form of dwarfism.

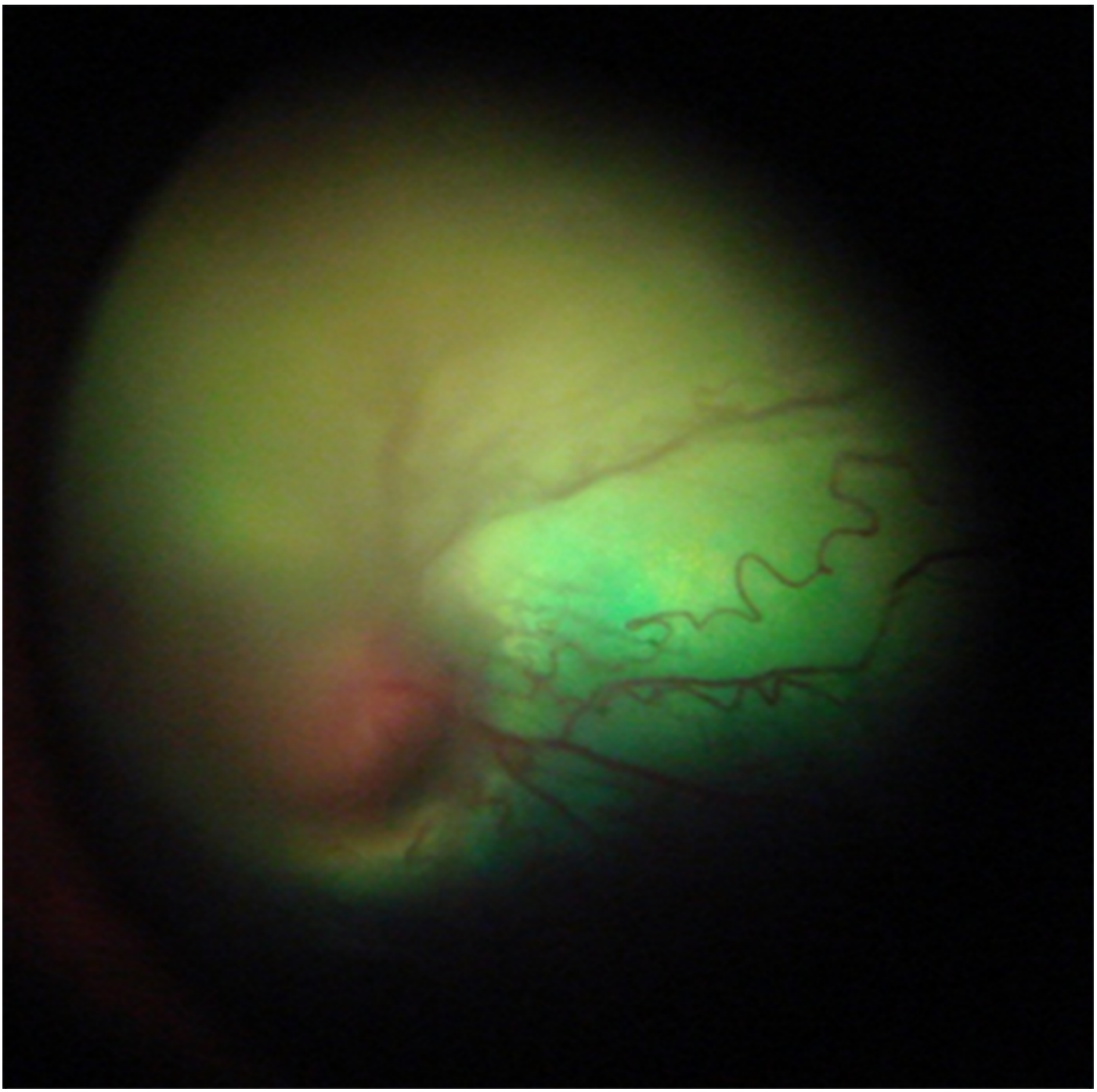
New data

New references

See Ch 9 (point C) for further information and Ch 8 for veterinary advice







AUSTRALIAN SHEPHERD

Canine Multifocal Retinopathy (CMR 1)

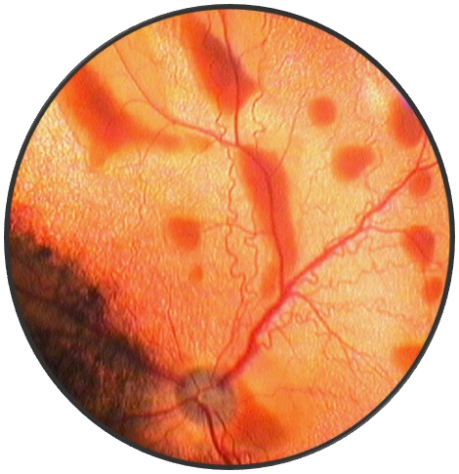


Photo by courtesy of Ingo Hoffmann

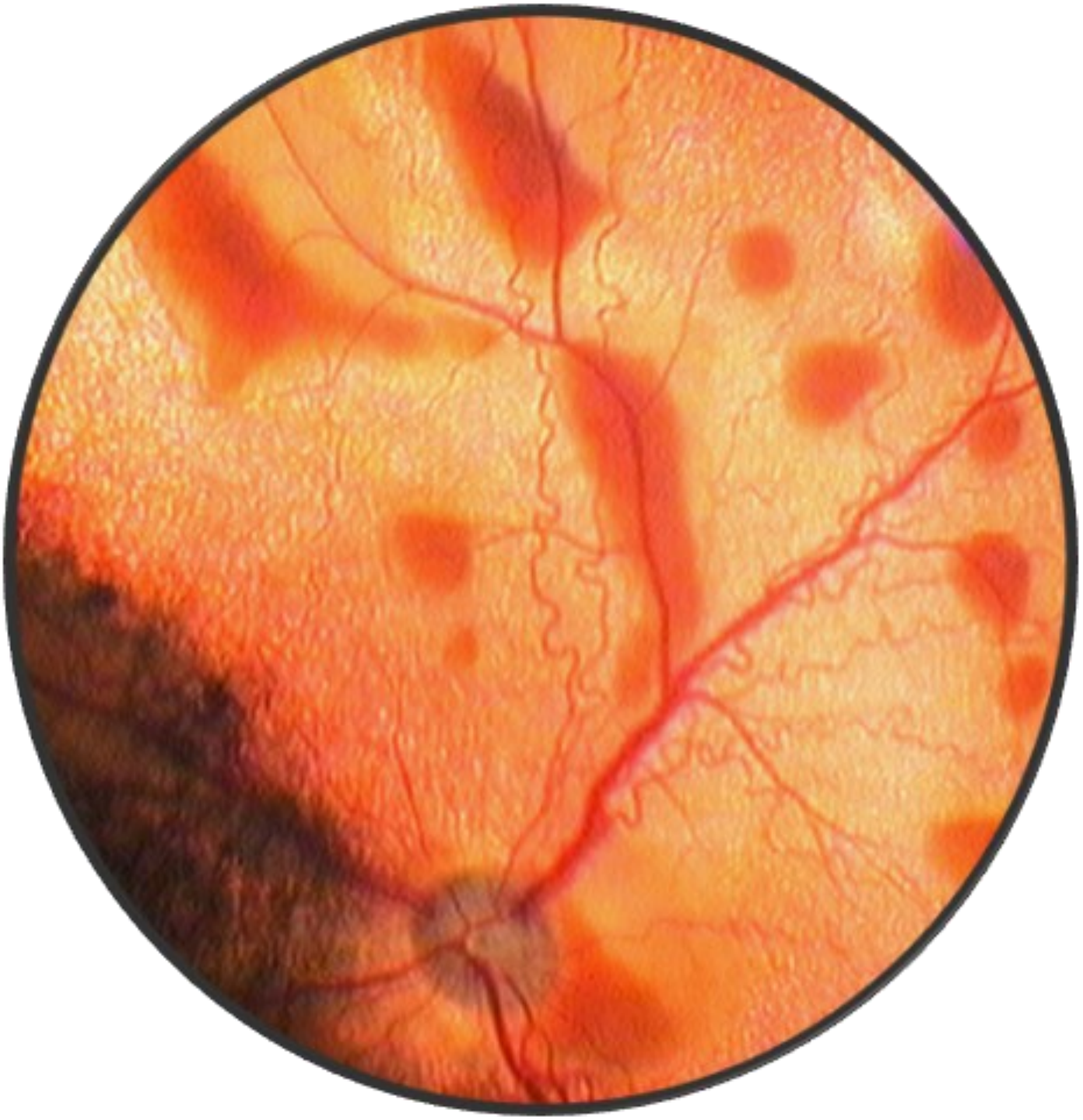
Clinical description

Multiple raised , brown to orange lesions were noted in the fundus

New data

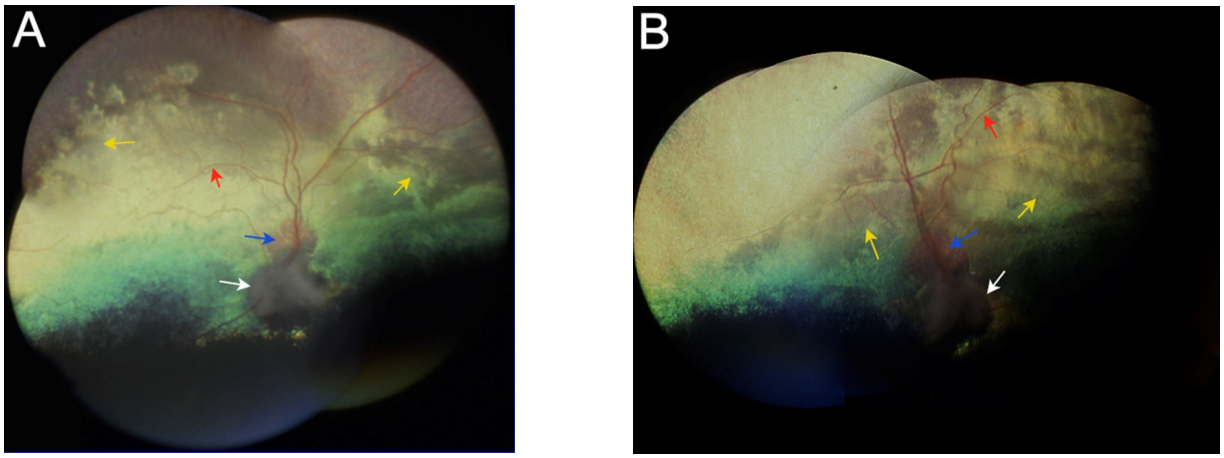
New references

See Ch 9 (point E) for further information and Ch 8 for veterinary advice



BASENJI

PRA (Bas_PRA1)



Photos by courtesy of Aguirre, G.D.

Clinical description

An inherited retinal degeneration in the breed was found to be associated with a mutation in S-antigen in a study by Goldstein, O., Jordan, J.A., Aguirre, G.D., Acland, G.M. A non-stop S-antigen gene mutation is associated with late onset hereditary retinal degeneration in dogs. Molecular Vision 19:1871-1884, 2013

In their study this was described as a PRA. They also noted that not all Basenjis with retinal degeneration had the mutation, suggesting there could be more than one inherited retinal degeneration in the breed. By about 5 years of age the tapetal fundus showed irregular hypo- and hyperreflectivity. The disease typically progressed with a thinning of the retinal vasculature evident by ophthalmoscopy by 6 or 7 years of age. A conus seen both in dogs affected with PRA and nonaffected dogs. In affected dogs affected by PRA the conus was sometimes observed to expand and become hyperreflective. In the final stage, the fundus appearance in Basenjis affected with PRA was often patchy or irregular.

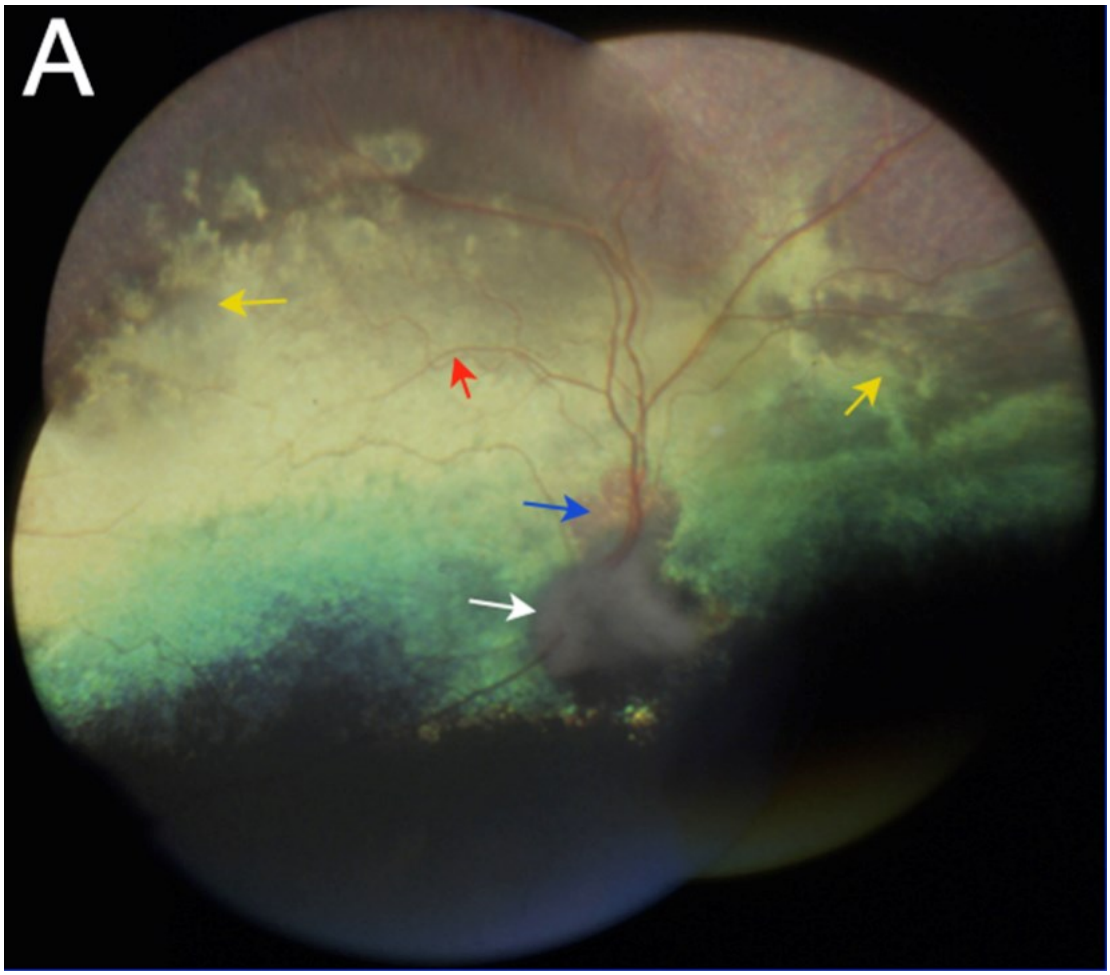
In a study by Narfström et al. a retinal degeneration in the Basenji, with similar appearance, was described as a retinopathy.

New data

New references

Narfström, K., Wallin-Håkansson, B., Hertil, E., Ekesten, B.: Familial retinopathy in Swedish Basenji dogs: Clinical and electrophysiological findings. The First European Conference on Veterinary Visual Electrophysiology, Vienna, ECVO Abstract, 2000.

See Ch 9 (point B) for further information and Ch 8 for veterinary advice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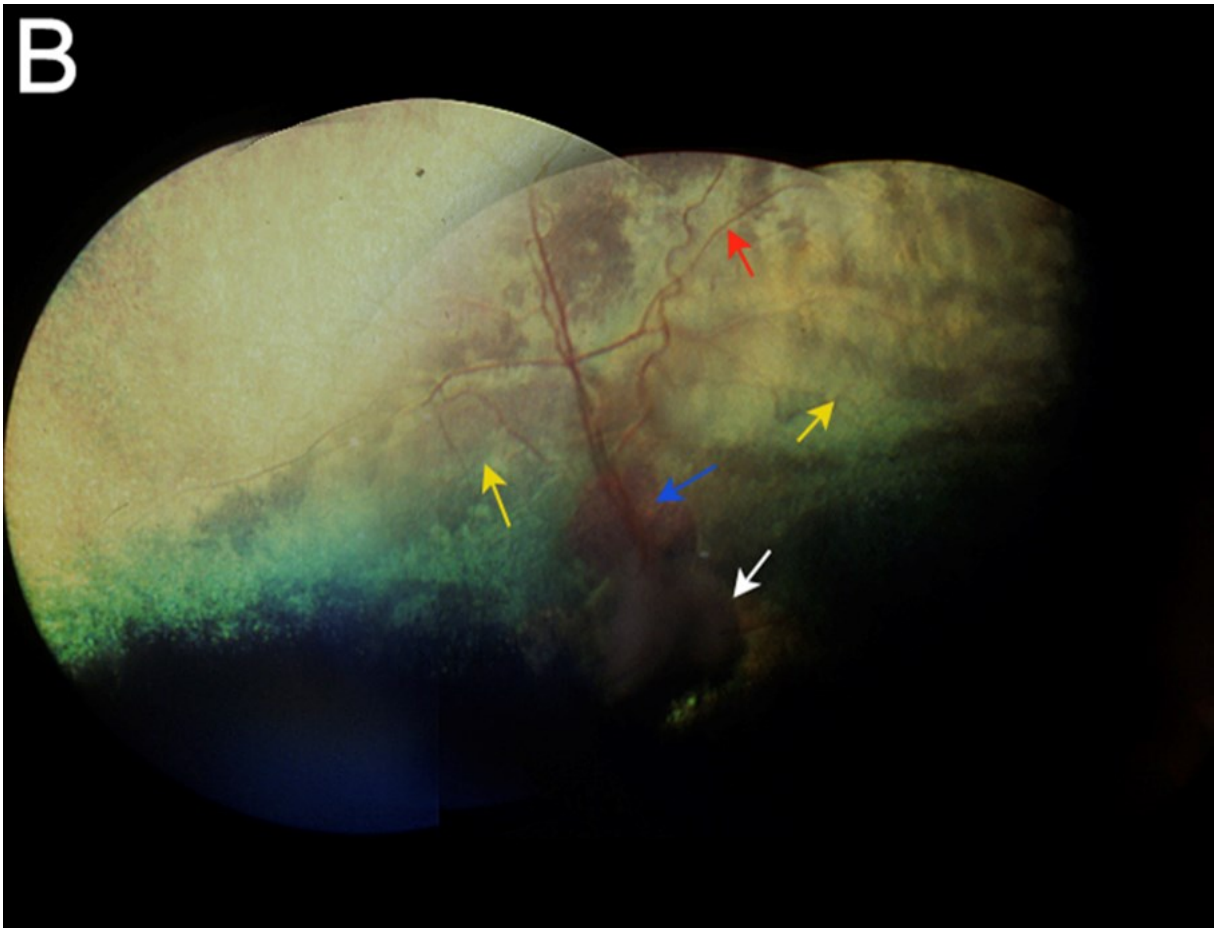

B

BEAGLE

Tapetal Degeneration

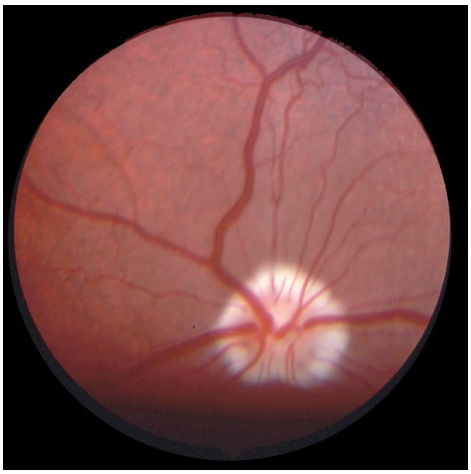


Photo by courtesy of Gustavo Aguirre

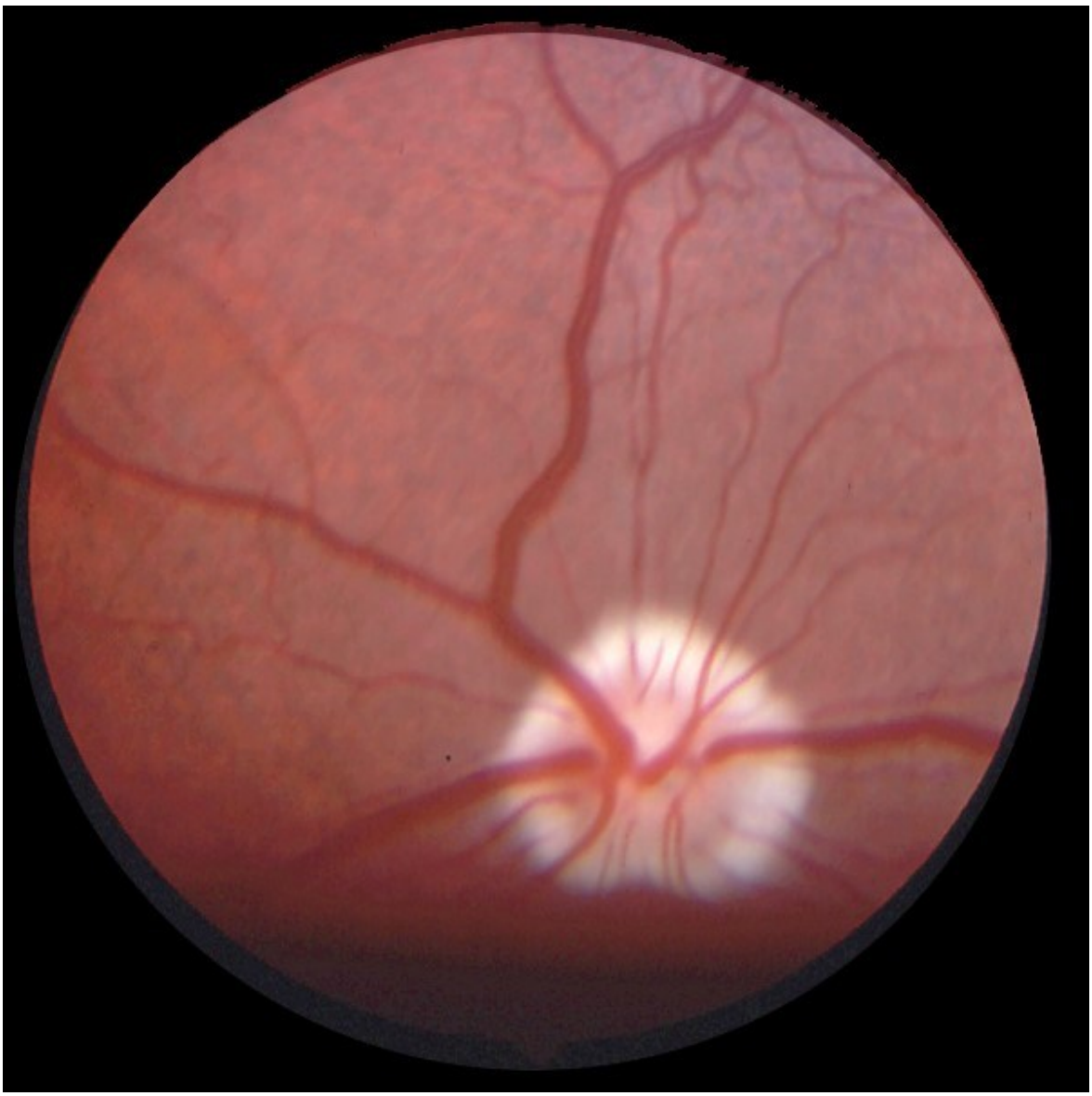
Clinical description

1. Post developmental tapetal degeneration (abnormal development of the tapetum followed by its degeneration. It is NOT clinically significant)
2. Choroid hypopigmented
3. With retinal pigment epithelium pigmented, the fundus is uniformly red-brown

New data

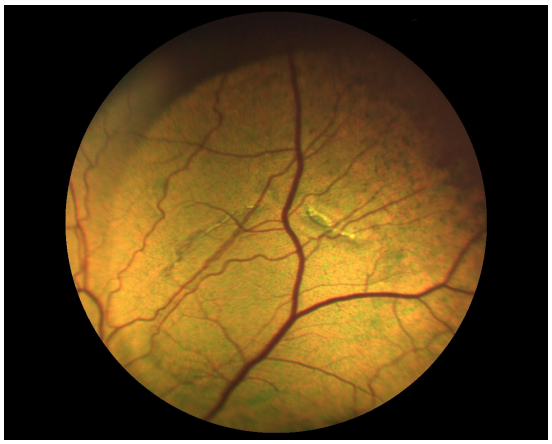
New references

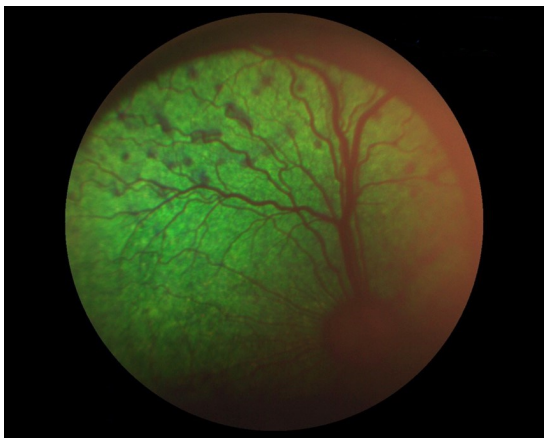
See Ch 9 (point I) for further information and Ch 8 for veterinary advice



BOLOGNESE

Retinal Dysplasia (MFRD)





Photos by courtesy of Adolfo Guandalini

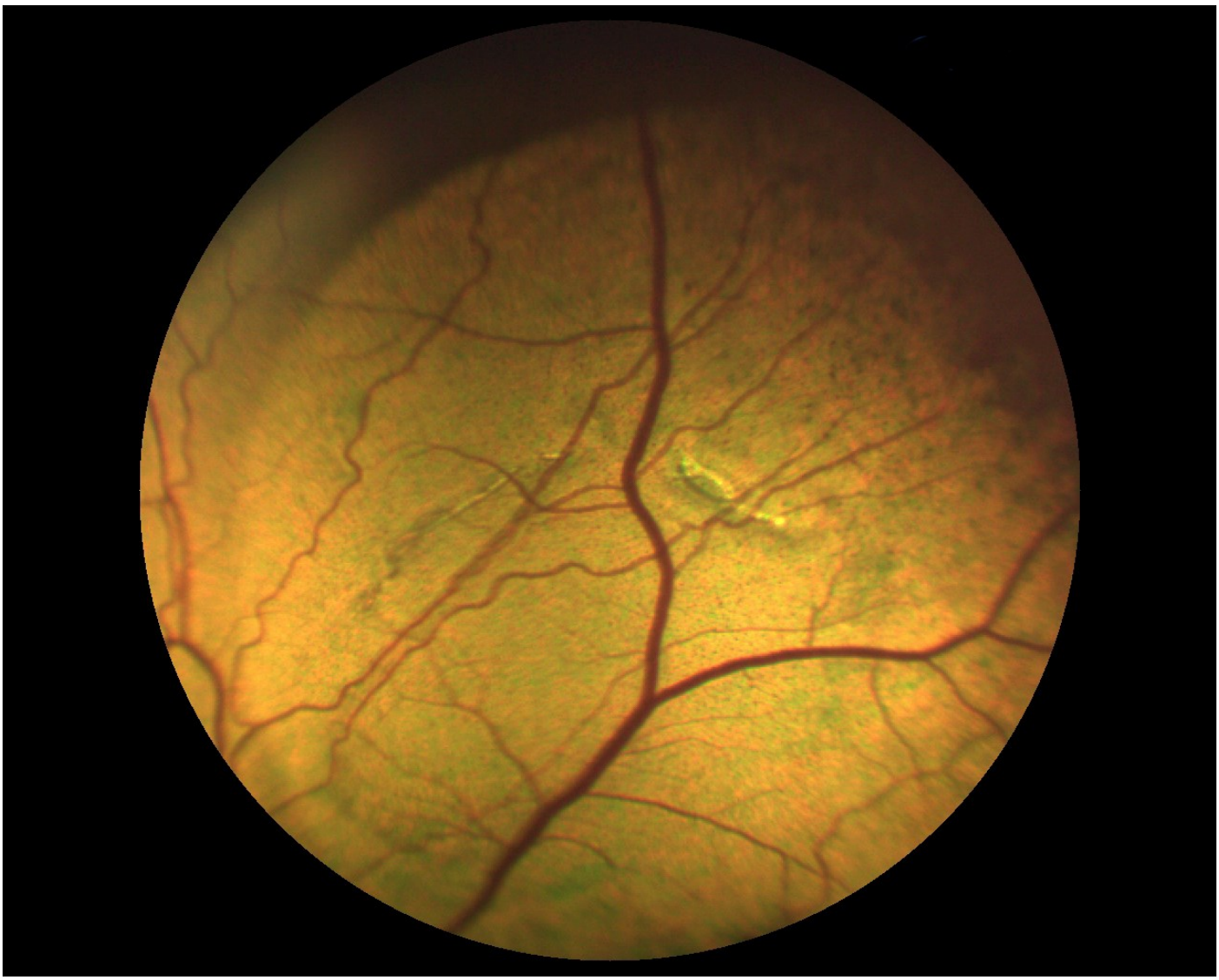
Clinical description

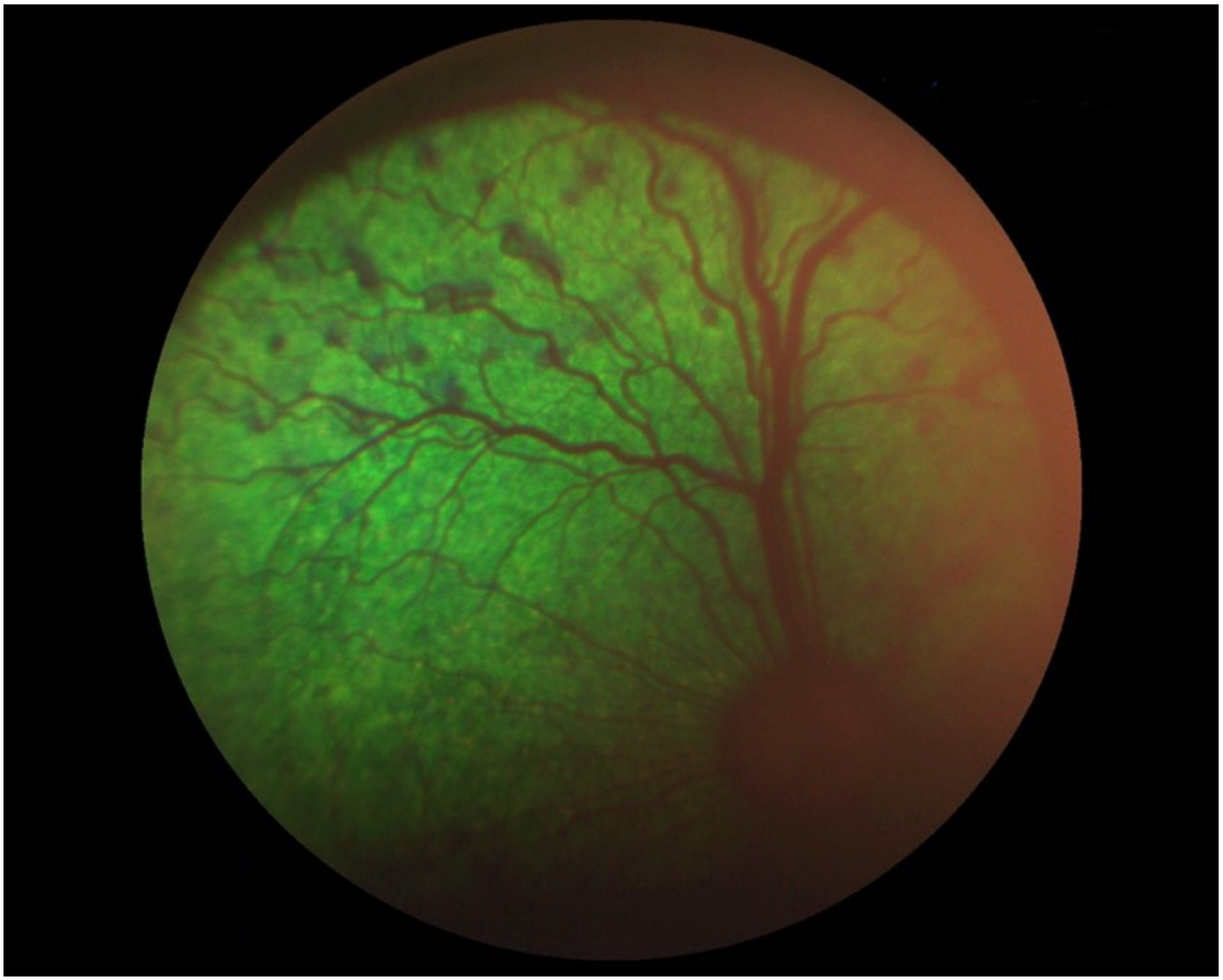
In MFRD the lesions consist of what are described on ophthalmoscopic examination as retinal “folds”. These are areas of reduced tapetal reflectivity, appearing as gray or green dots , linear or curvilinear streaks (or V- or Y-shaped streaks).

New data

New references

See Ch 9 (point F) for further information and Ch 8 for veterinary advice





BORDER COLLIE

CEA

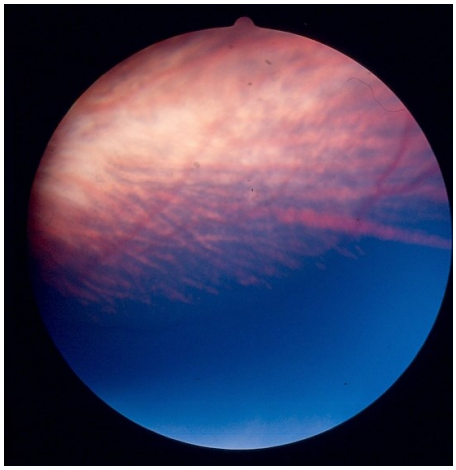


Photo by courtesy of Adolfo Guandalini

Clinical description

Bilateral but often asymmetric defect. Temporal or superotemporal to the optic disc.

The choroidal vessels exhibit abnormalities in both form and distribution, being fewer, wider and abnormal in their arrangement.

The diagnosis of choroidal hypoplasia can be difficult in eyes with albinotic or subalbinotic fundi in dogs with merle coats.

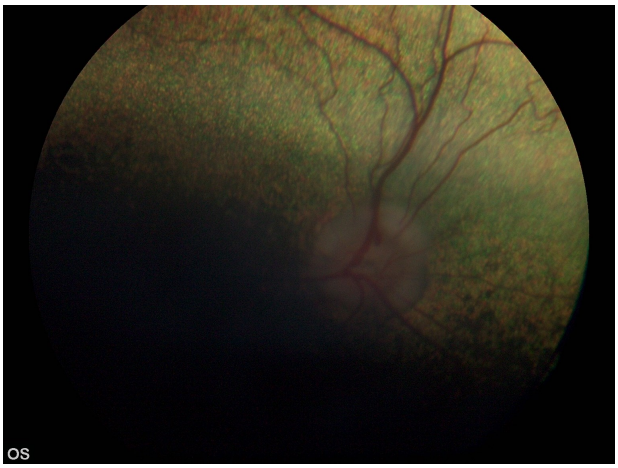
New data

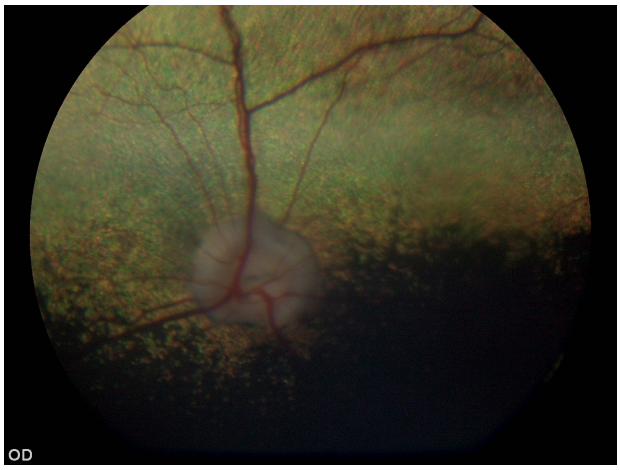
New references

See Ch 9 (point I) for further information and Ch 8 for veterinary advice

BOUVIER DES FLANDRES

PRA





Photos by courtesy of Réka Eördögh

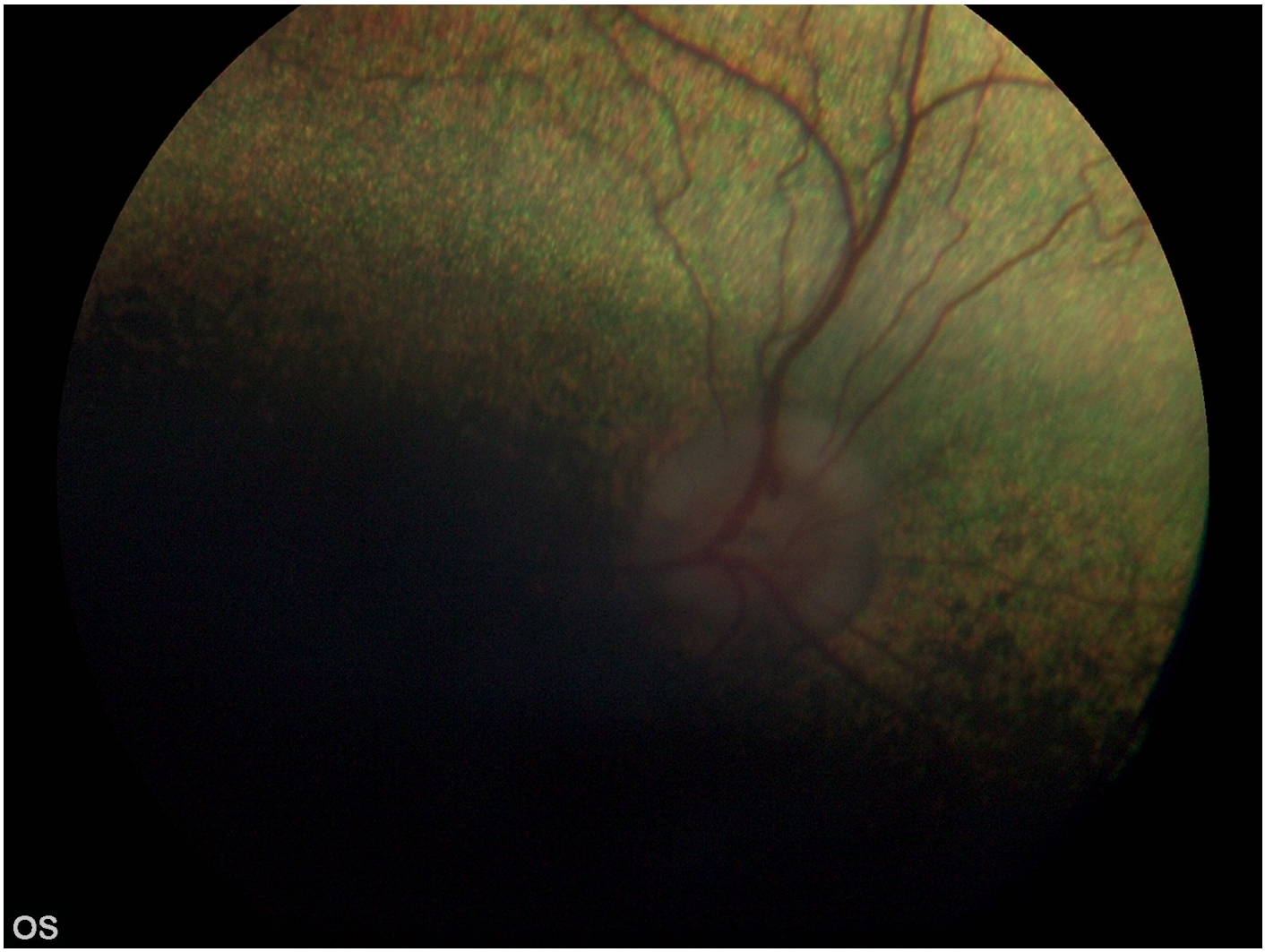
Clinical description

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

New references

See Ch 9 (point G) for further information and Ch 8 for veterinary advice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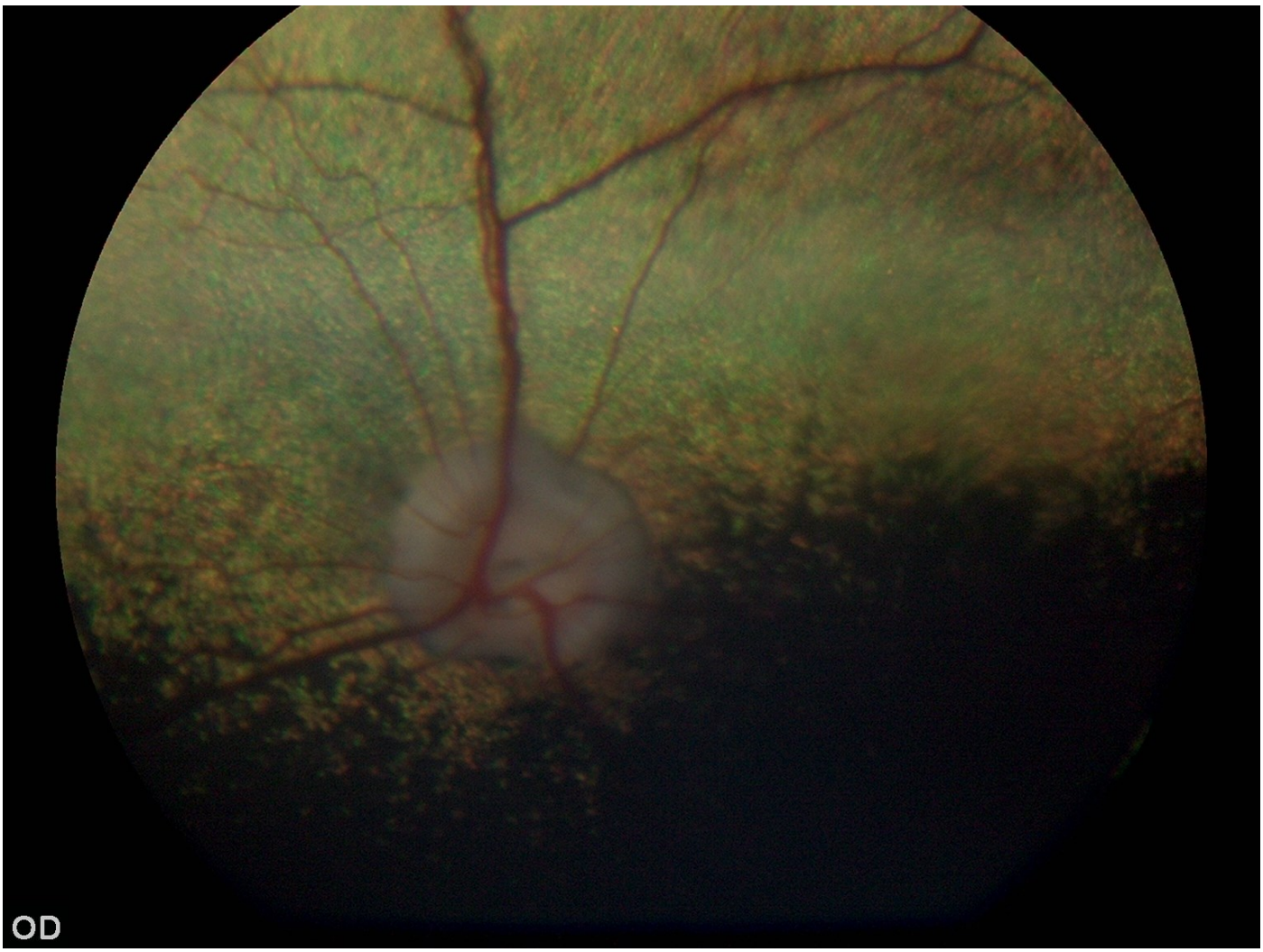
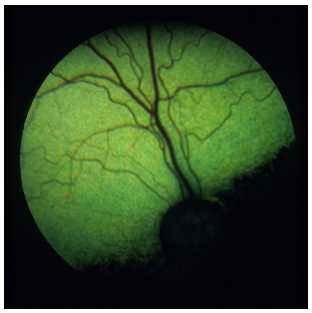
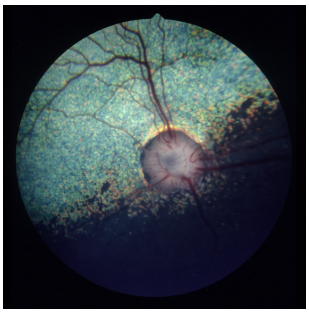

OD

BRIARD

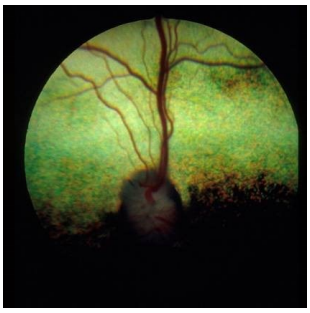
Retinal Dystrophy, RPE65 null mutation: primary retinal disease



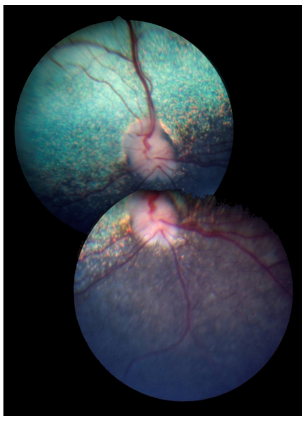
One year old



Four years old



Three years old



Same dog, five years old

Photos by courtesy of Kristina Narfström

Clinical description

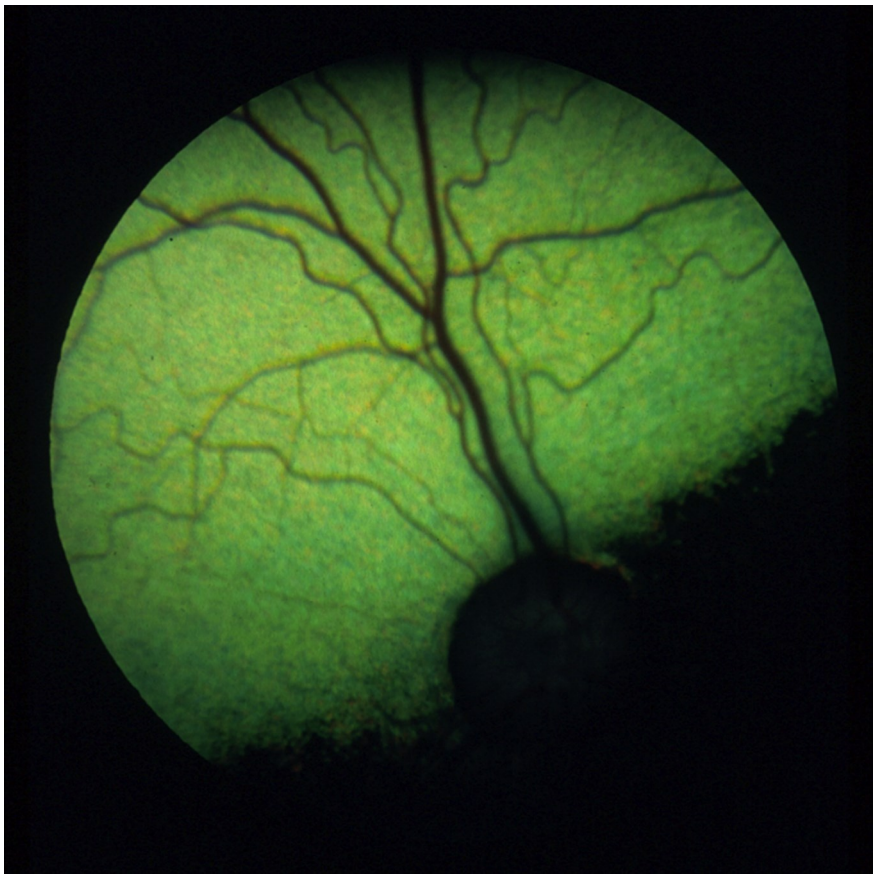
The retinal dystrophy of Briard dogs is a congenital aberration of neuroretinal function due to lack of the protein RPE65 in the retina. Clinically by ERG studies, affected puppies show severely reduced visual function at age 5-7 weeks, although fundus is usually ophthalmoscopically normal appearing. Night blindness is always present while some affected dogs show both night and day blindess at a young age. Most affected young dogs have marked nystagmus and reduced PLRs. In early middle age some affected dogs start to develop small grayish spots mainly observed in the tapetal fundus, which increase in numbers over time. The fundus lesions are bilaterally symmetrical. In older affected dogs a slight vascular attenuation may be observed. Kristina Narfström, personal communication.

New data

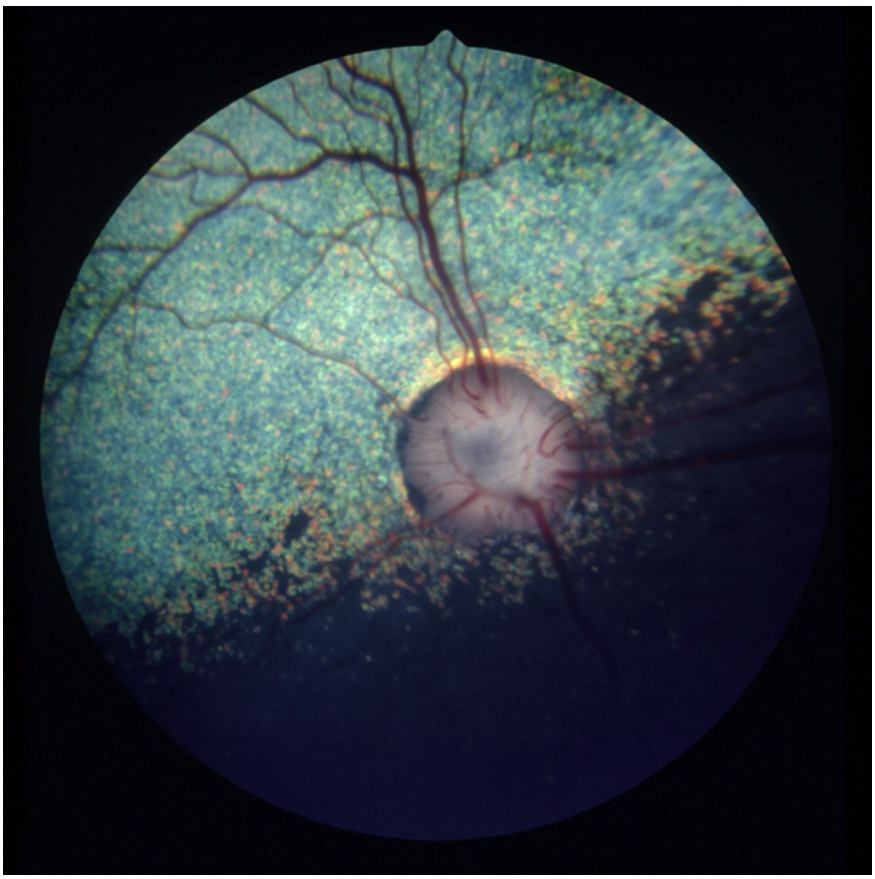
Gene therapy has been shown to be highly effective in the treatment of blindness of strains of RPE65 null mutation Briard dogs.

New references

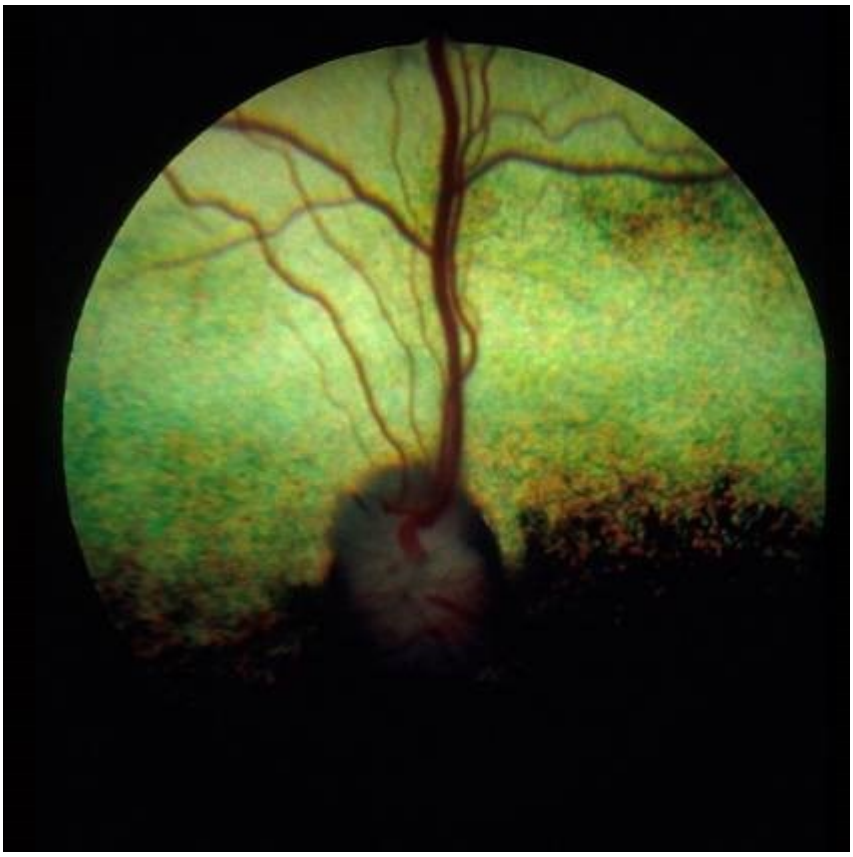
See Ch 9 (point E) for further information and Ch 8 for veterinary advice



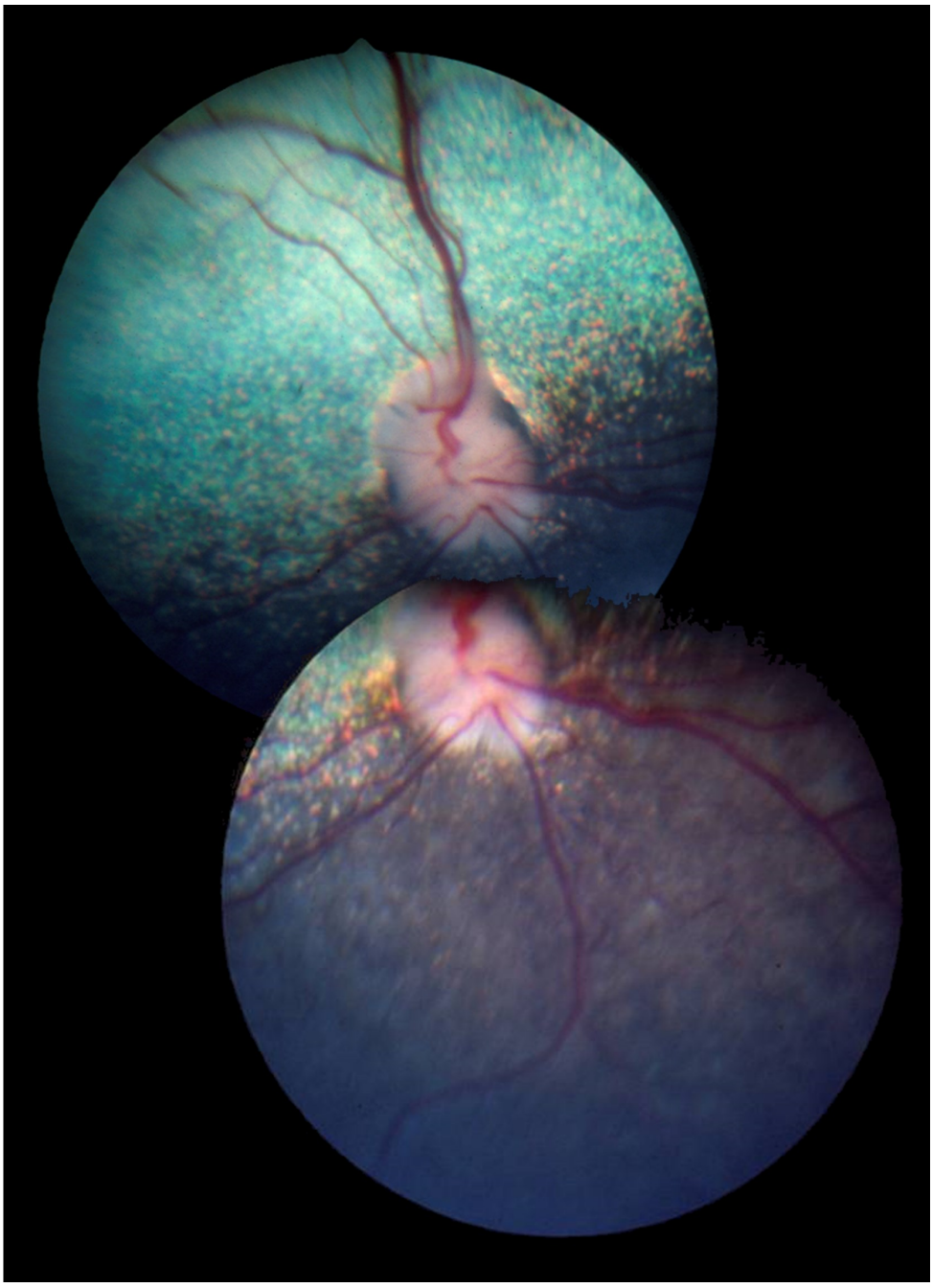
One year old



Four years old



Three years old



Same dog, five years old

CANE CORSO

Canine Multifocal Retinopathy (CMR 1)

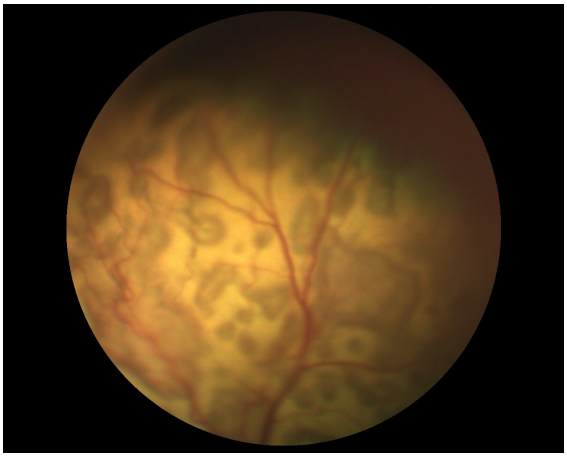


Photo by courtesy of Adolfo Guandalini

Clinical description

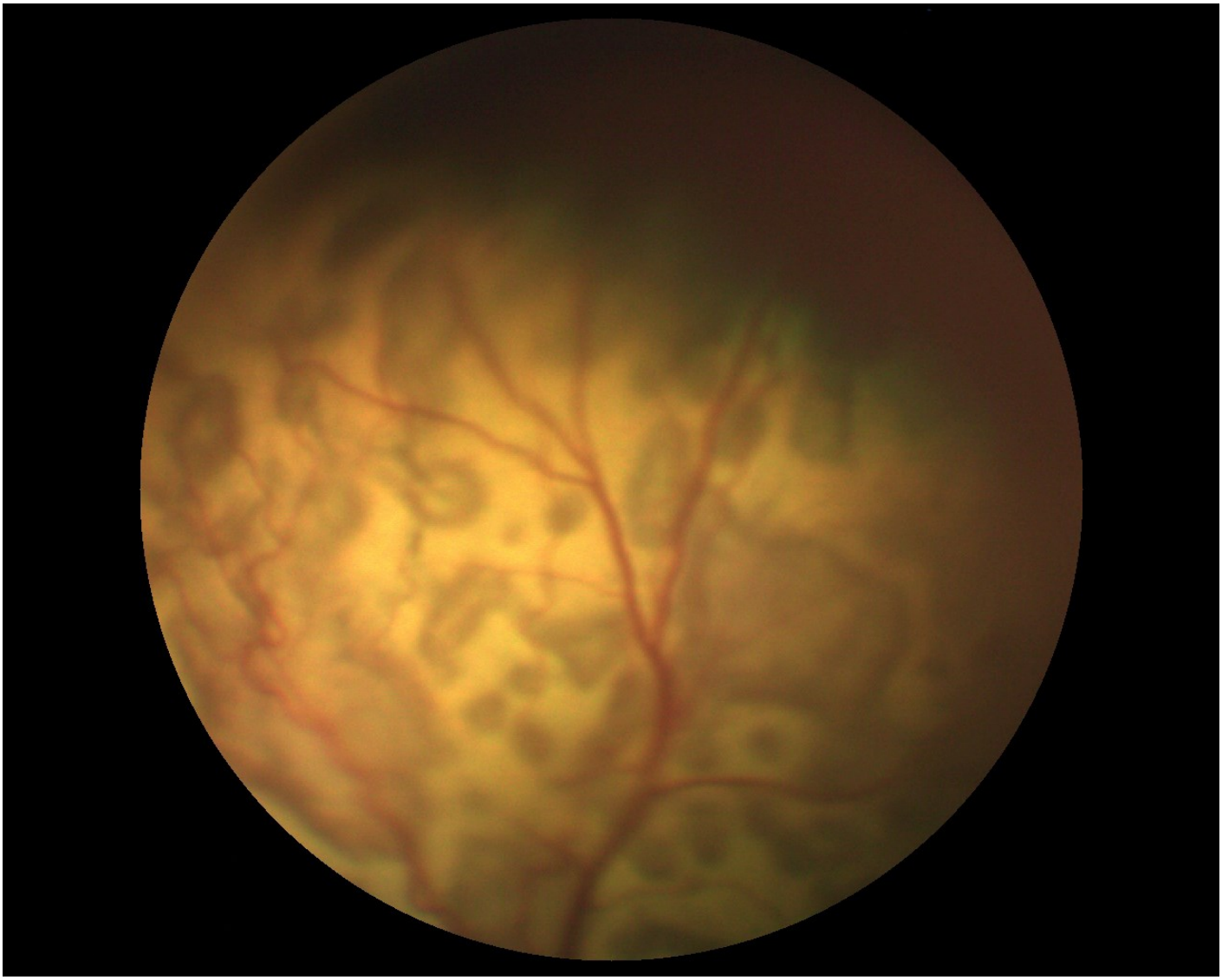
The CMR is characterized by the development of multifocal retinal bullae in young animals.

In dogs with cmr1 the retinal bullae are multifocal with gray to tan colored subretinal fluid. They vary in size from barely visible to some lesions that are larger than the ONH. They initially appear at approximately 11 weeks of age; usually they are sparse, but they develop bilaterally in the peripheral tapetal fundus, around the ONH, and occasionally under the major veins inferior to the ONH.

New data

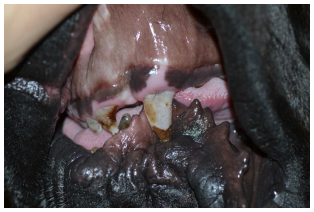
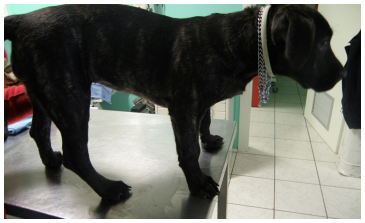
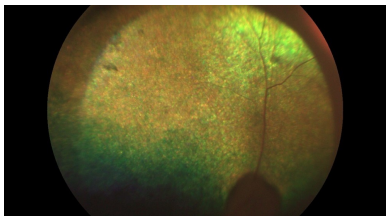
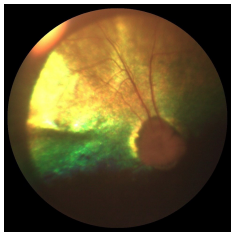
New references

See Ch 9 (point J) for further information and Ch 8 for veterinary advice



CANE CORSO

PRA & Dentinogenesis Imperfecta (Dental-Skeletal-Retinal Anomaly -DSRA)

Photos by courtesy of Adolfo Guandalini

Clinical description

The affected dogs showed early onset blindness (complete by 1 year of age), and the teeth, both deciduous and permanent, all appeared opalescent and translucent and they had an amber color, enamel hypoplasia and hypomineralization.

Affected dogs also were showing various degrees of dwarfism.

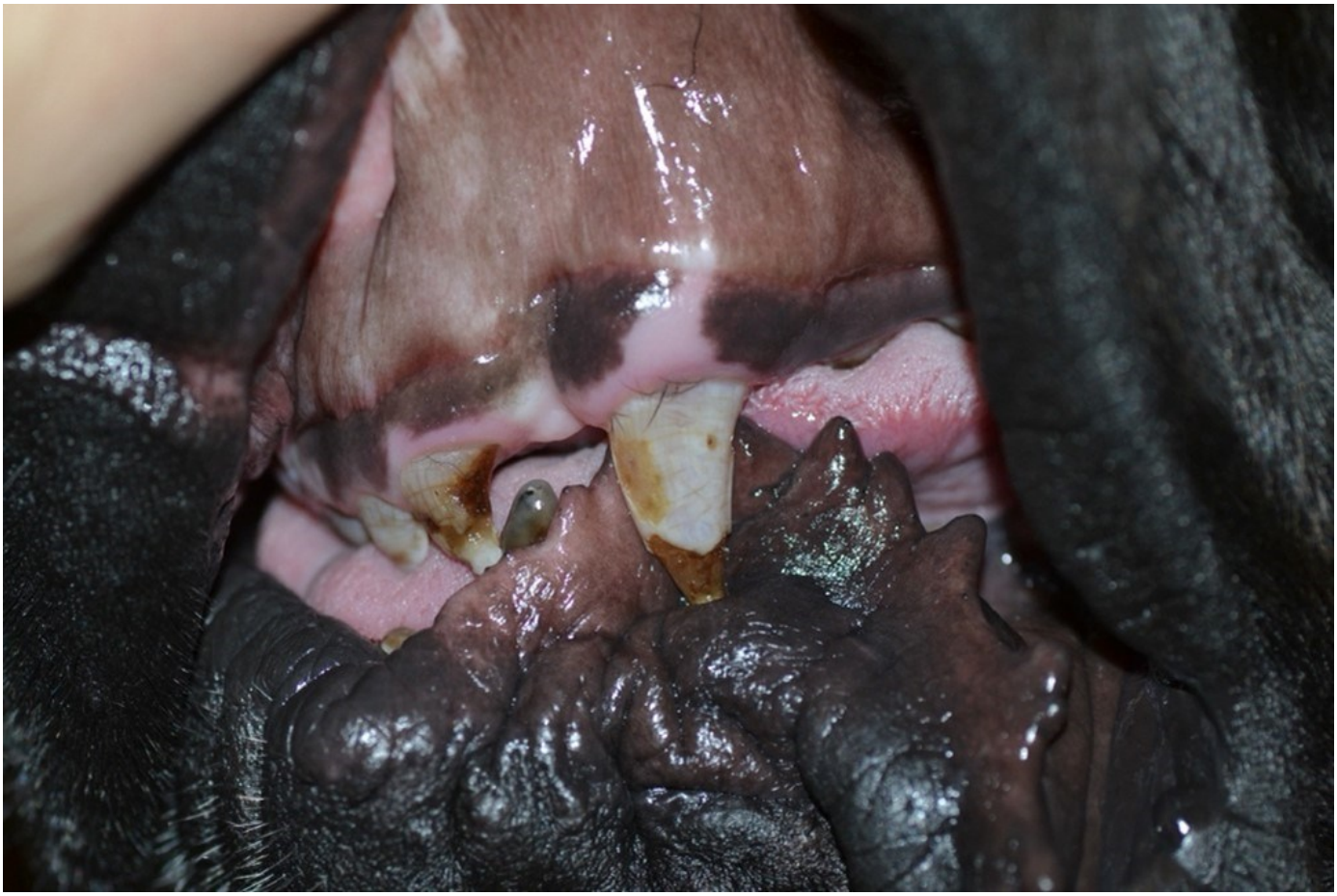
New data

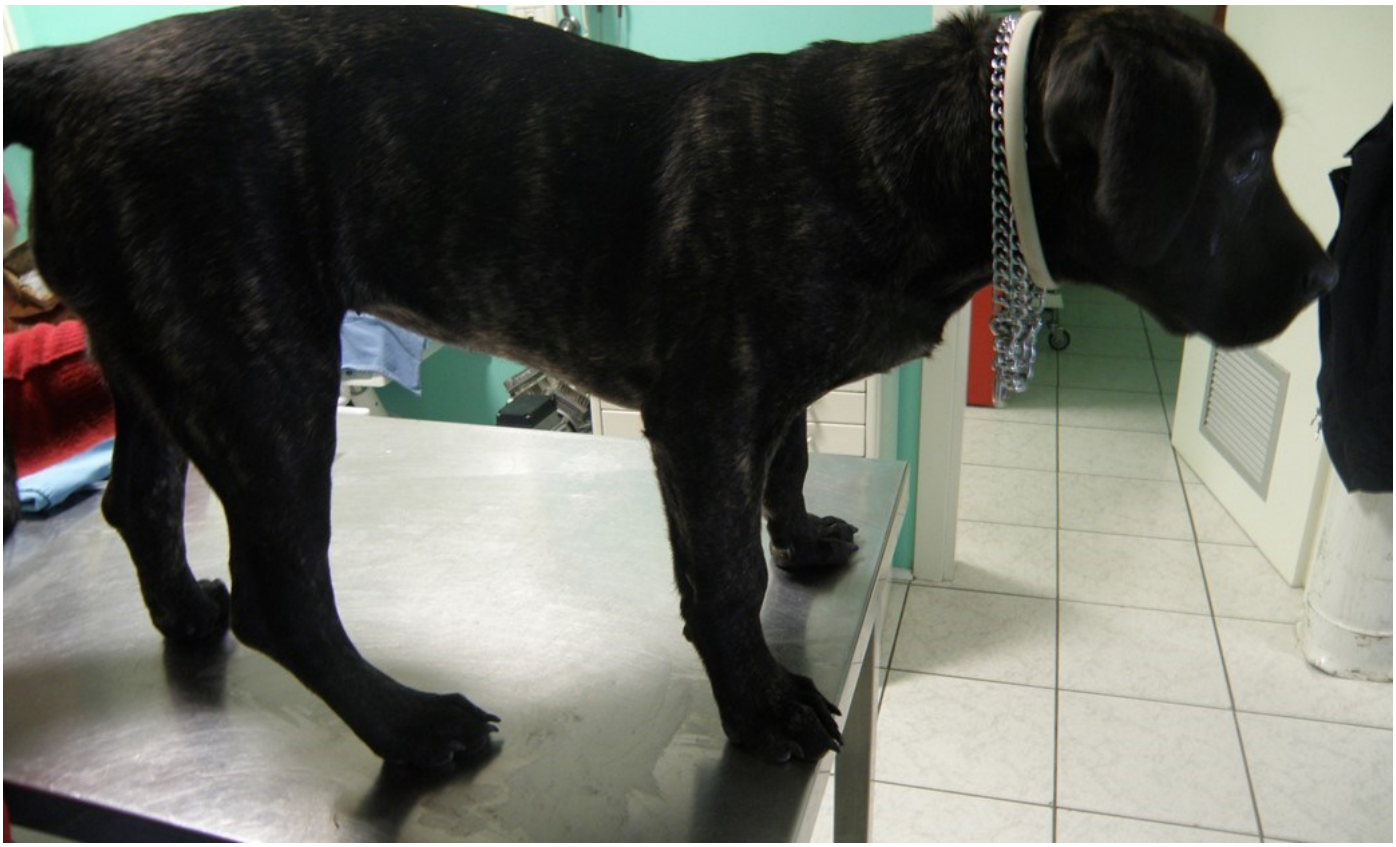
MIA3 Splice Defect

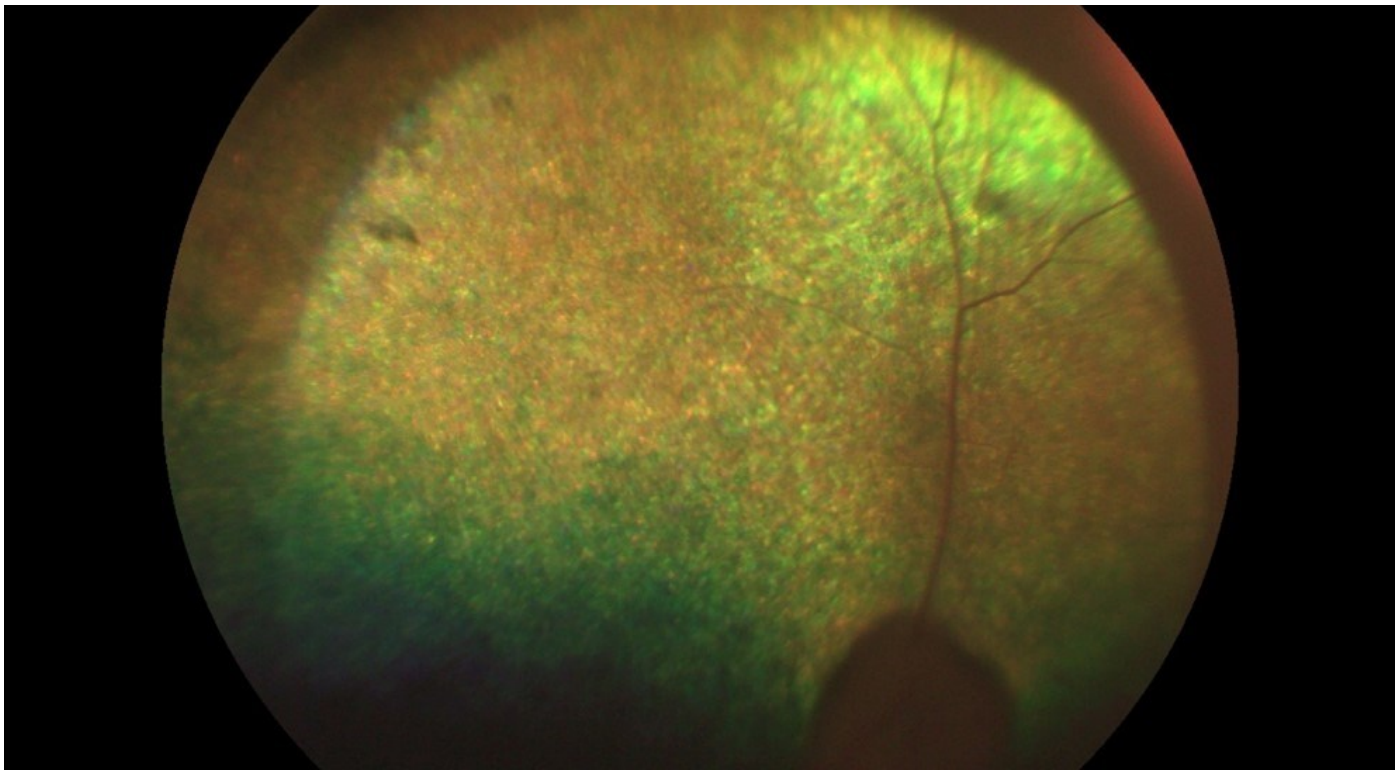
New references

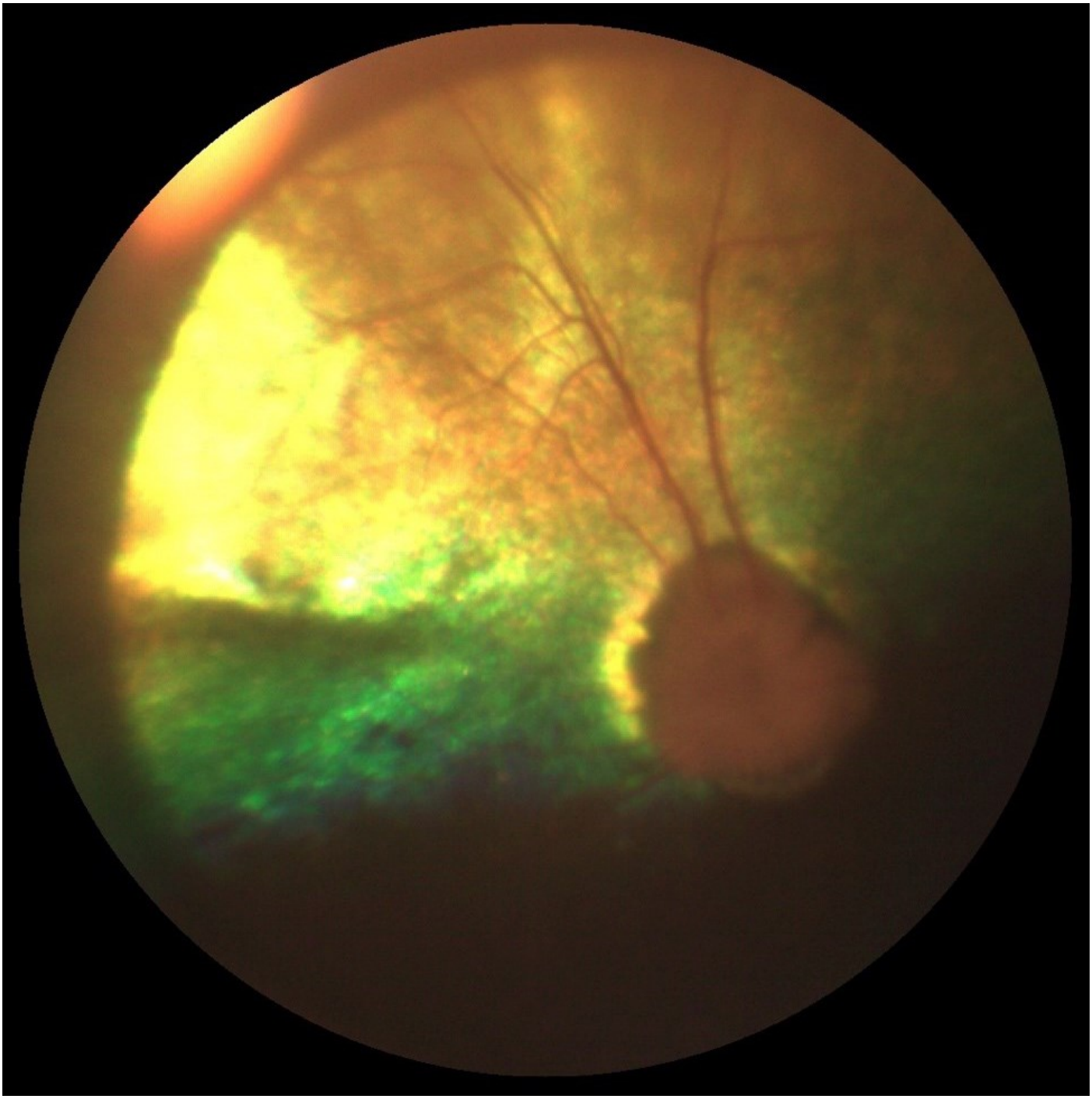
Christen M, Booij-Vrieling H, Oksa-Minalto J et al. MIA3 Splice Defect in Cane Corso Dogs with Dental-Skeletal-Retinal Anomaly (DSRA). Genes 2021, 12(10), 1497

See Ch 9 (point P) for further information and Ch 8 for veterinary advice









CANE CORSO

PRA

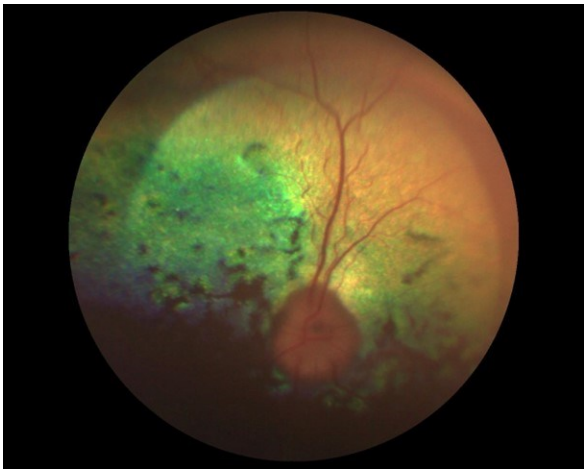


Photo by courtesy of Adolfo Guandalini

Clinical description

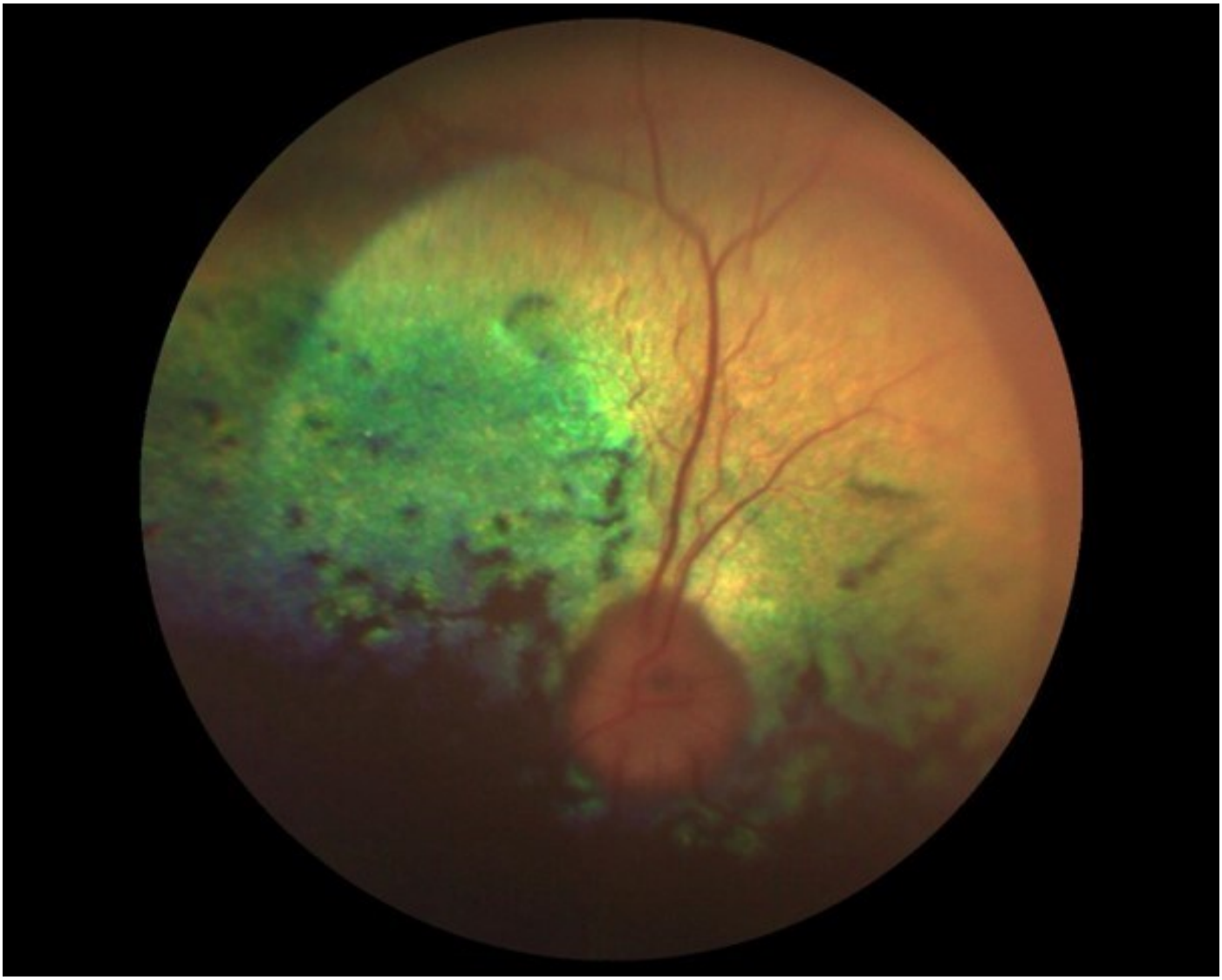
Early onset retinal degeneration.

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

New references

See Ch 9 (point I) for further information and Ch 8 for veterinary advice



CARDIGAN WELSH CORGI

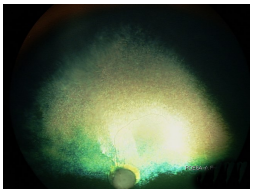
PRA , rcd3, mutation in PDE6A

4 months

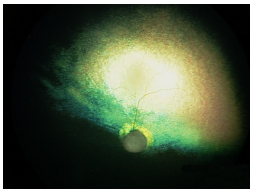
5,5 months

9 months

13 months



18 months



25 months

Photos by courtesy of Simon Petersen-Jones

Clinical description

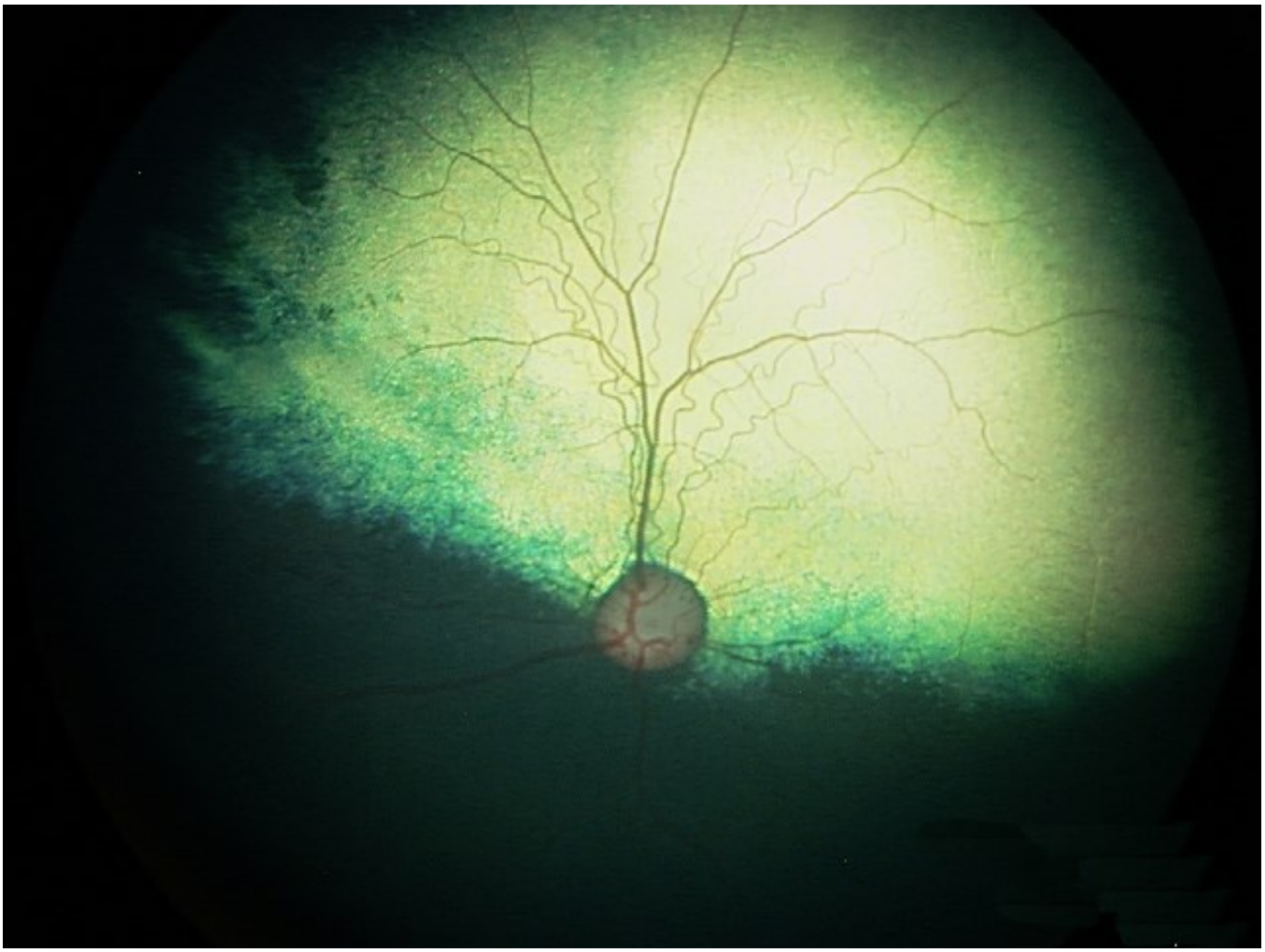
Dogs affected with this mutation have very similar phenotype with the PDE6B mutation (rcd1 in Irish Setters) and it was named rcd3.

Night blindness at 3 months of age, complete blindness by 1 year of age.

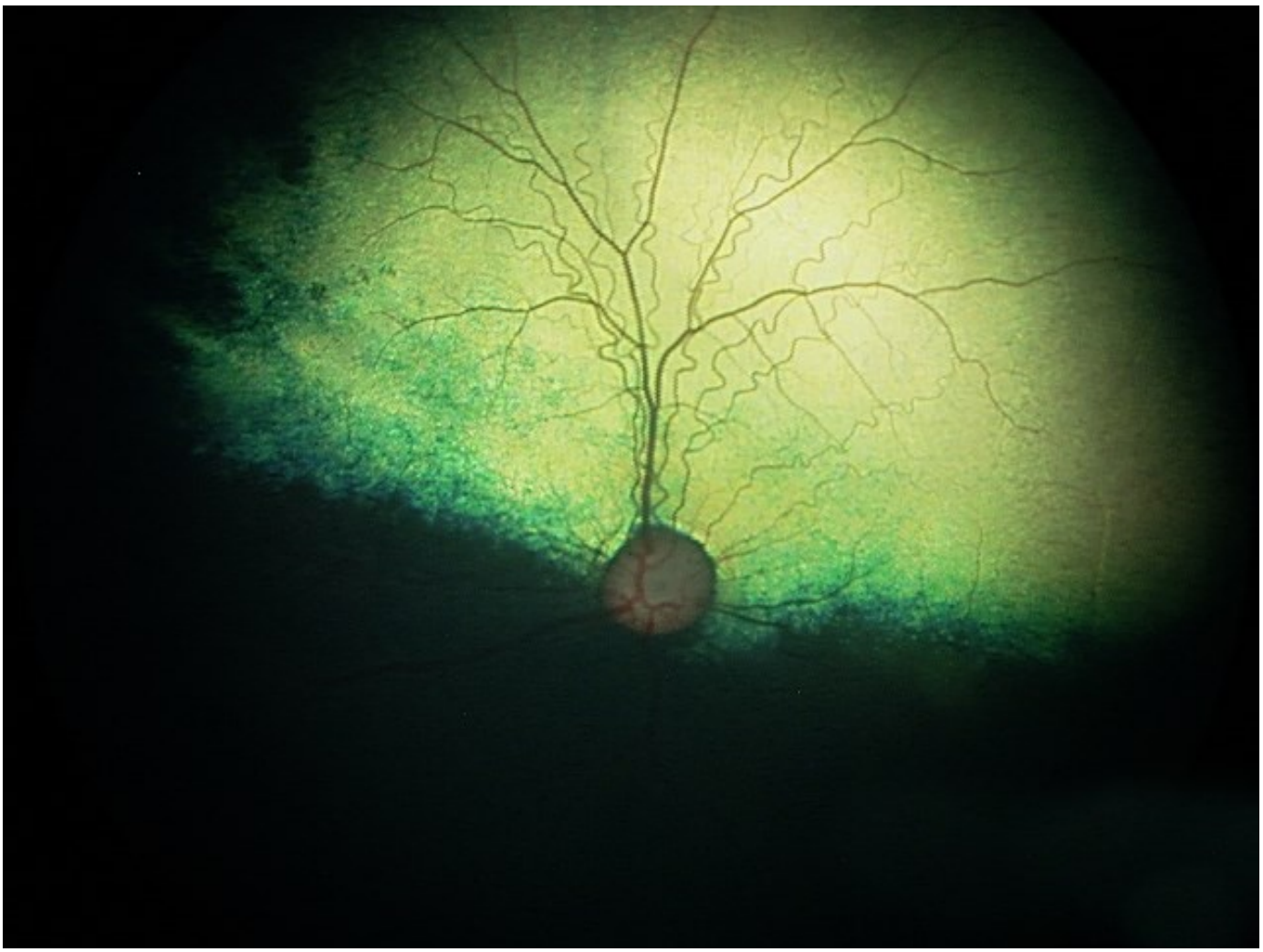
New data

New references

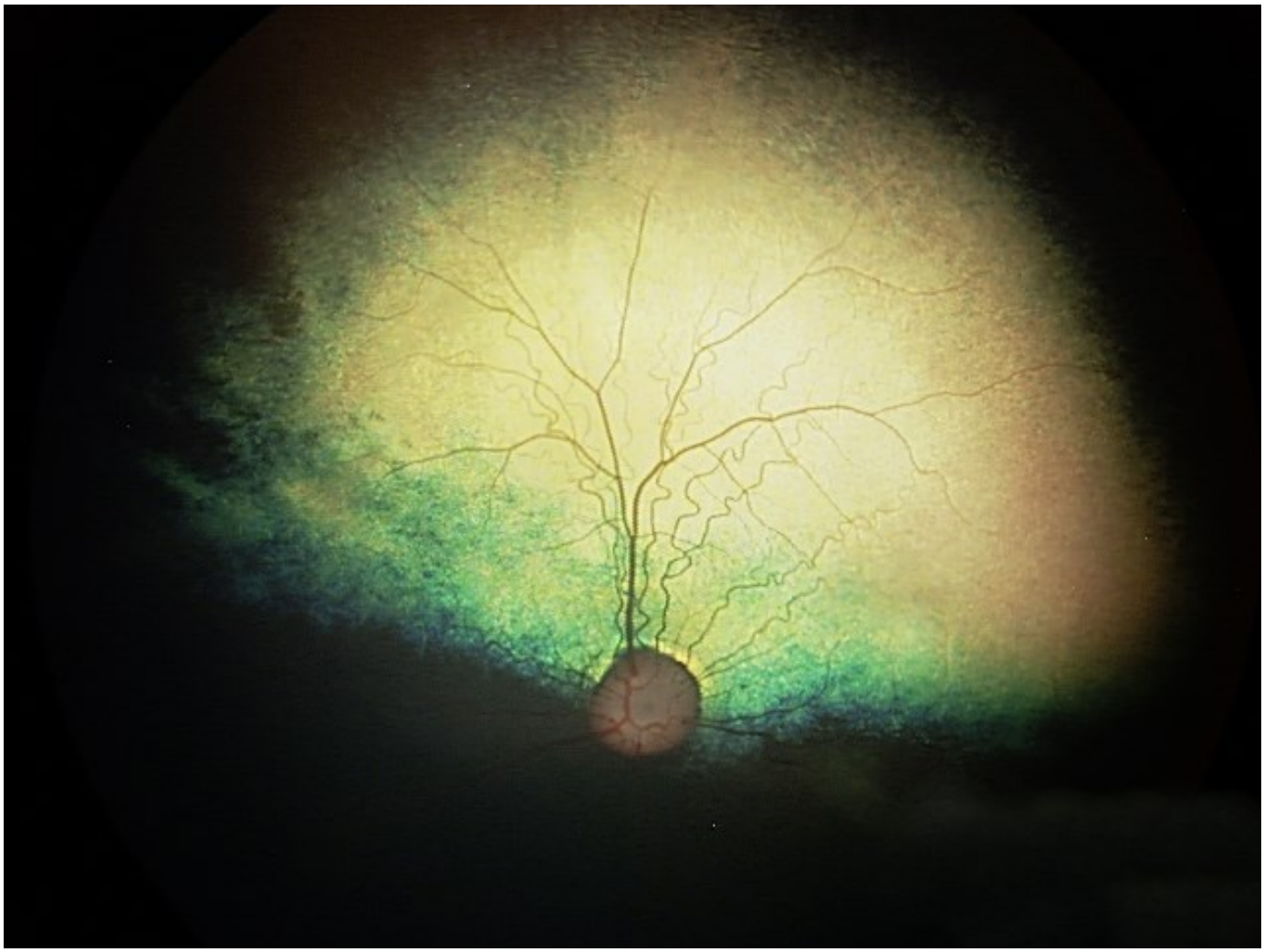
See Ch 9 (point B) for further information and Ch 8 for veterinary advice



4 months

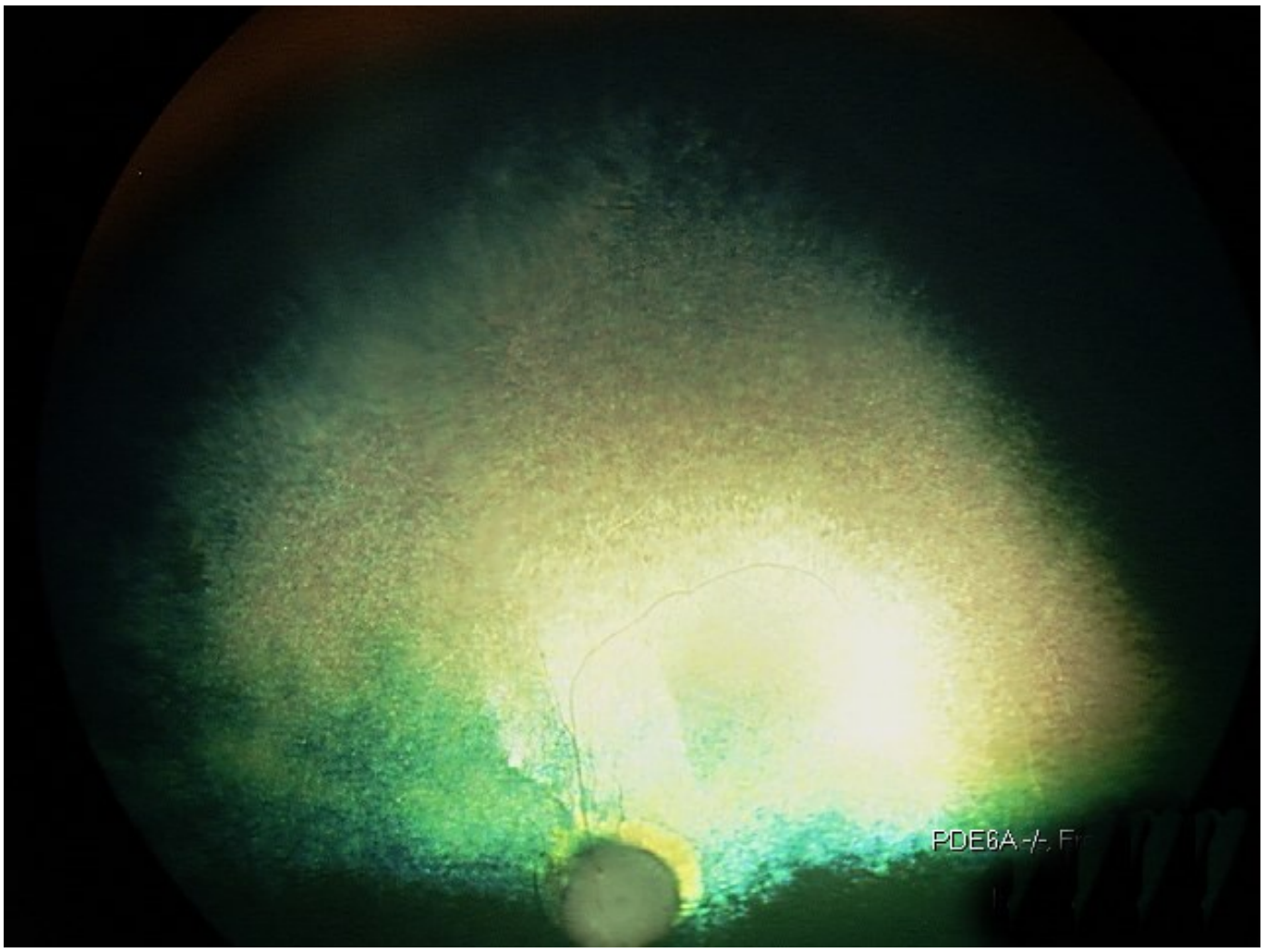


5,5 months

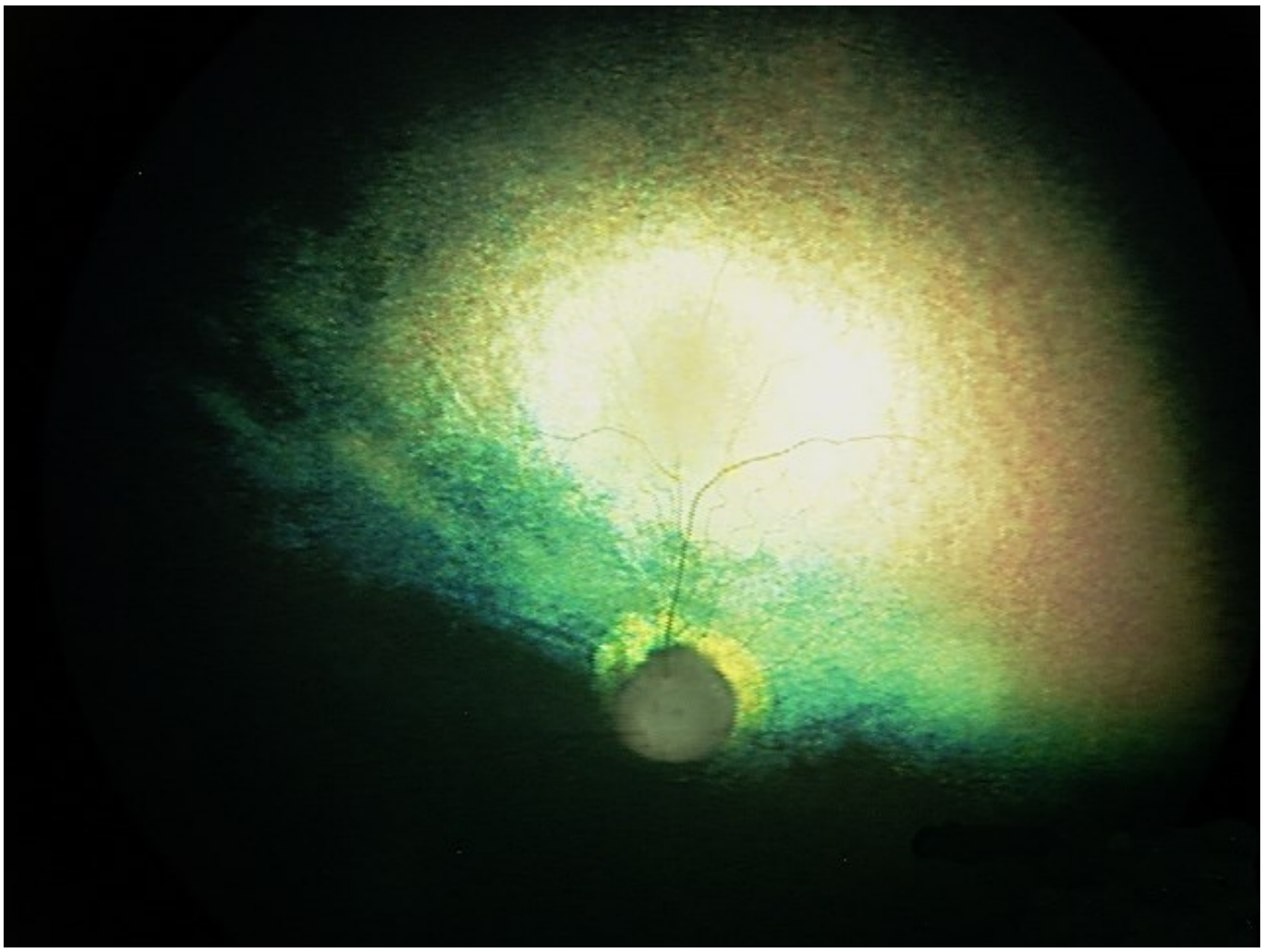


9 months

13 months



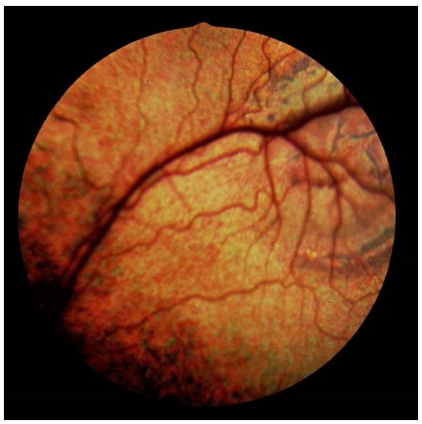
18 months

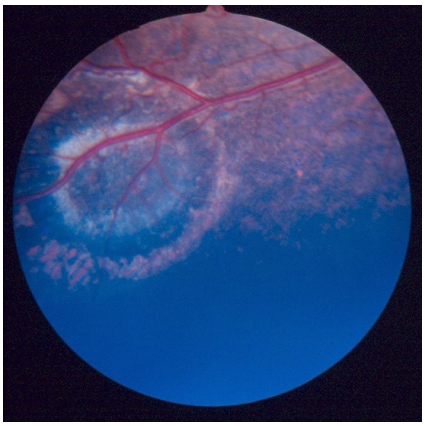


25 months

CAVALIER KING CHARLES SPANIEL

Retinal Dysplasia (GRD)





Photos by courtesy of Gilles Chaudieu & Adolfo Guandalini

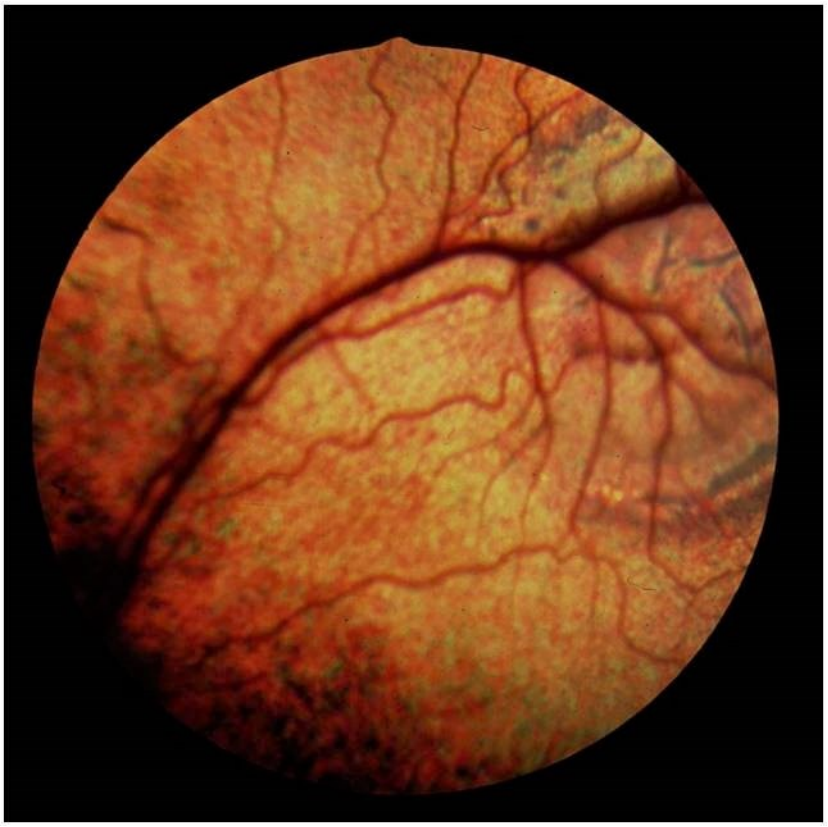
Clinical description

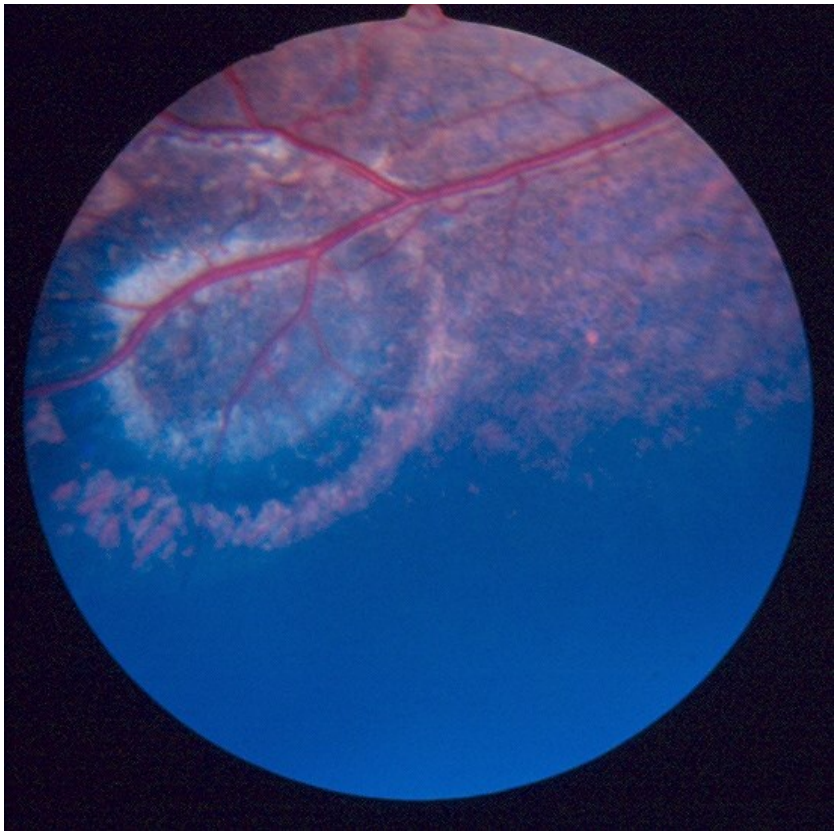
Geographical retinal dysplasia: the lesions are most commonly circular or horse-shoe shaped and often within the tapetal fundus dorsal to the ONH, although they can also occur in the non tapetal fundus.

New data

New references

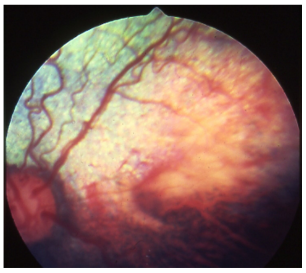
See Ch 9 (point F) for further information and Ch 8 for veterinary advice





COLLIE

Collie Eye Anomaly (CEA)



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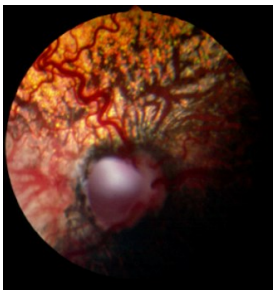

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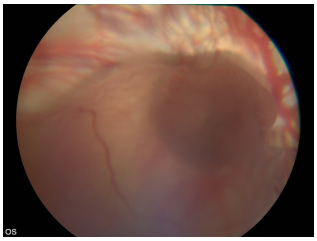

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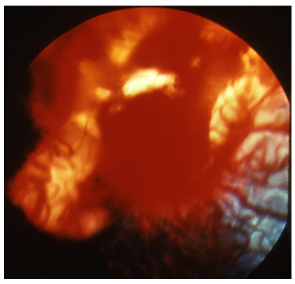


4

Photos by courtesy of Claudio Peruccio (1,2,4) & Réka Eördögh (3)

Clinical description

CEA is a congenital ocular syndrome involving defects of the posterior vascular and fibrous tunics of the eye. It is related to an abnormal mesodermal differentiation which results in defects of sclera, choroid, optic disc, retina and retinal vasculature.

CEA affects primarily the Collie breeds.

Clinical findings:
Choroidal hypoplasia (1): bilateral but assymetric defect, located temporally to the ONH. Within this area the choriodal vessels are abnormal both in size and distribution.

Posterior polar colobomas (2): involving either the ONH or the peripapillary area. They appear as pink or grey “indentations”.

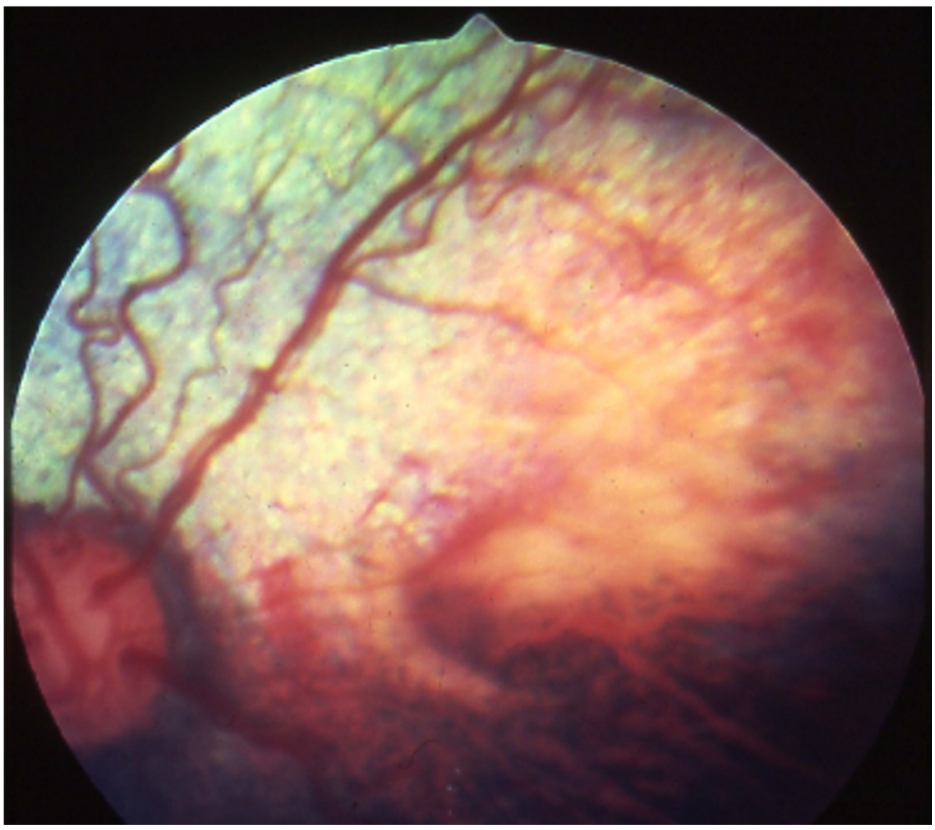
Partial or complete retinal detachments (3)

Intraocular hemorrhage (4)

New data

New references

See Ch 9 (point F) for further information and Ch 8 for veterinary advice



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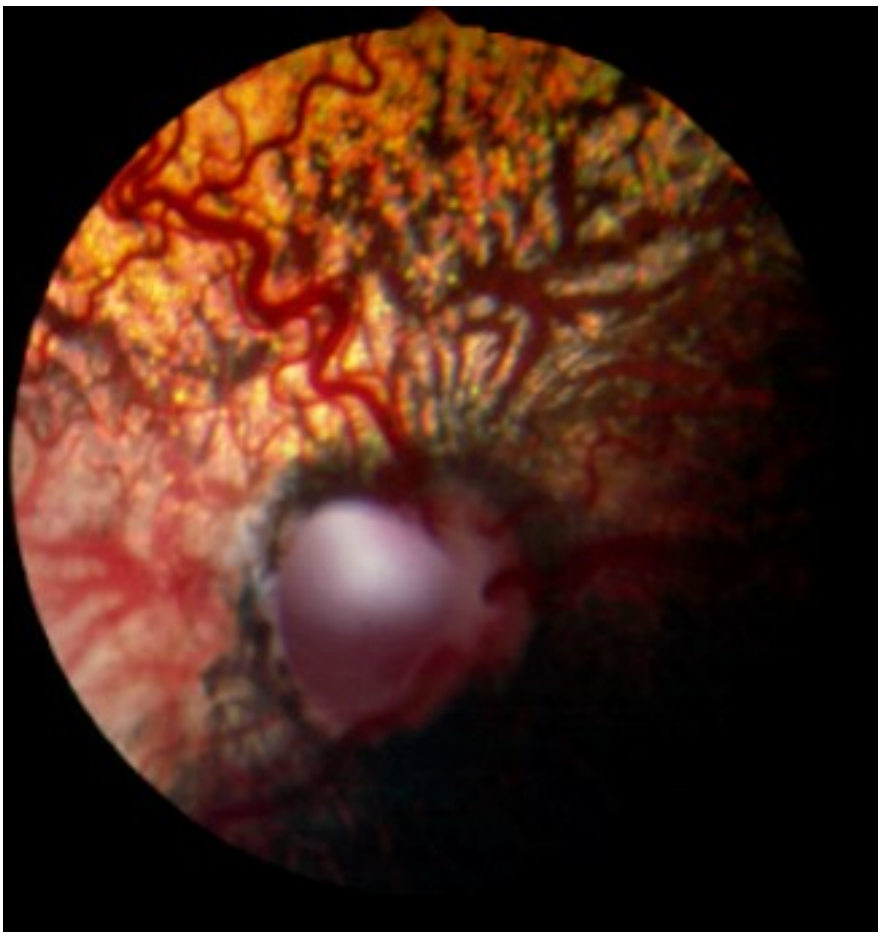

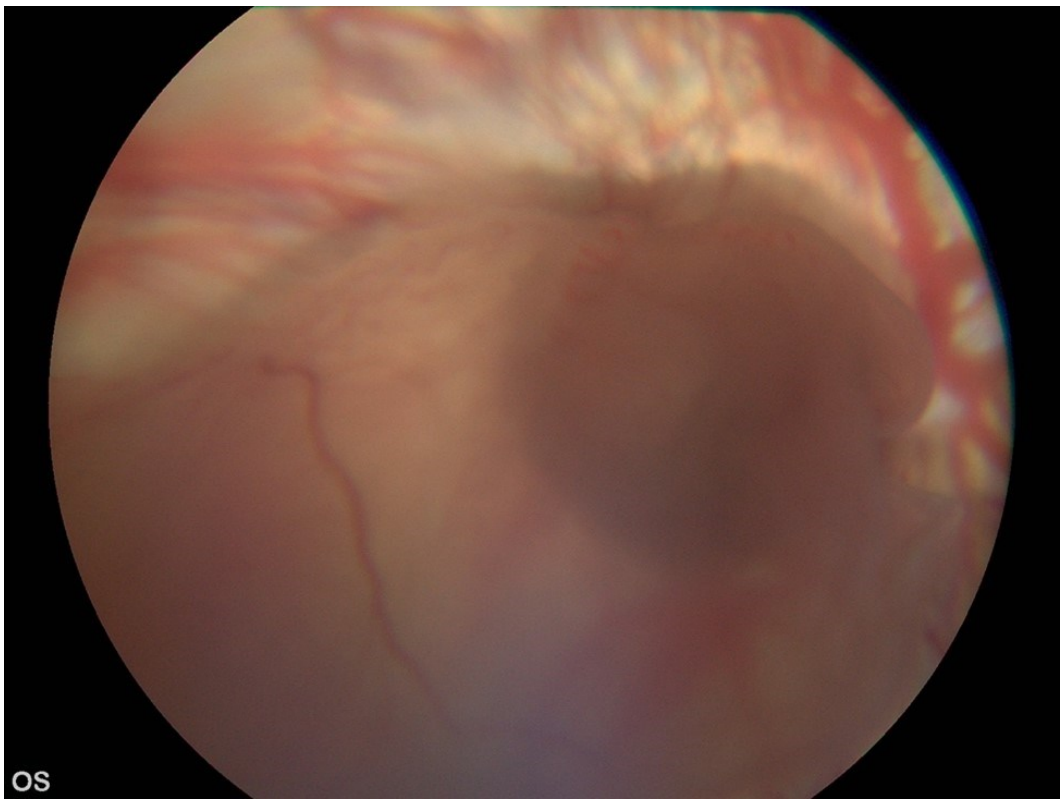
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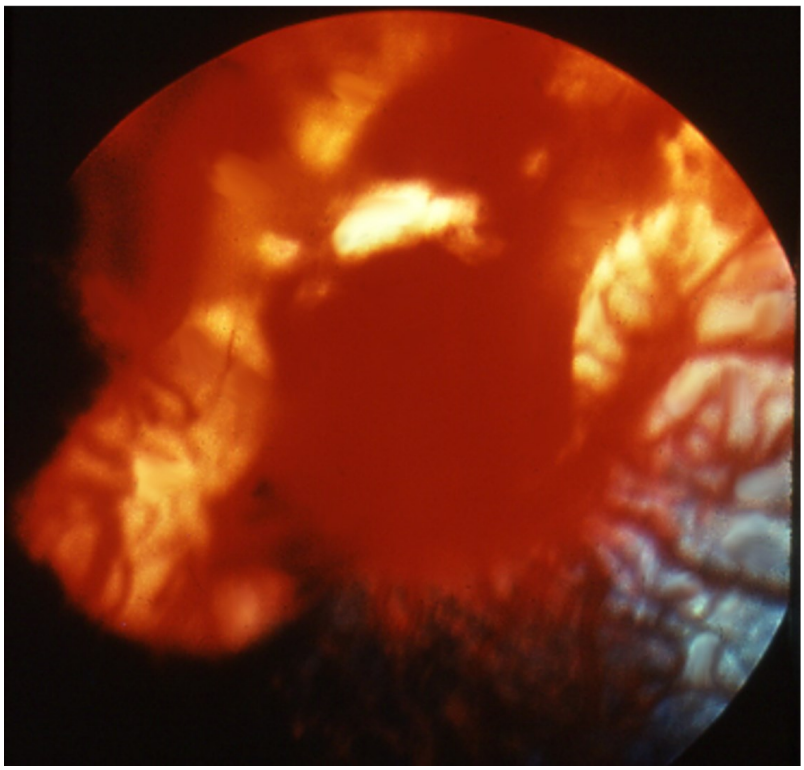
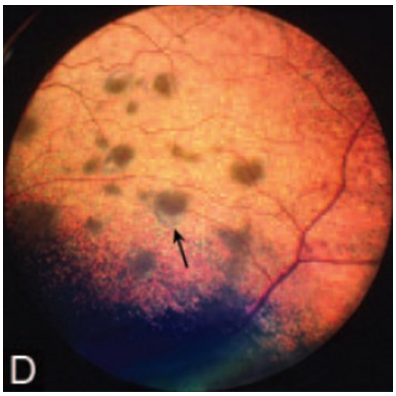
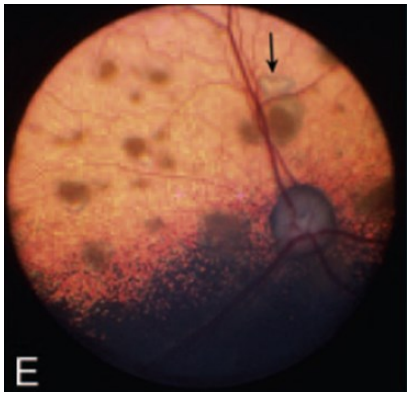


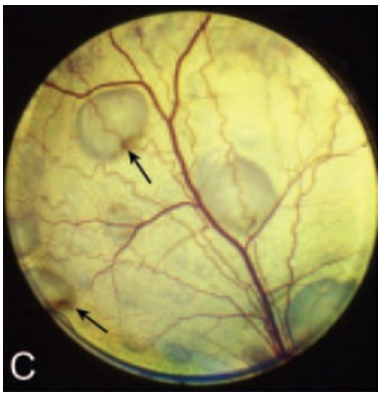
4

COTON DE TULEAR

Canine Multifocal Retinopathy (CMR 2)







Photos by courtesy of Gustavo Aguirre
(D & E:15 months old Coton de Tulear*; C: 18 months old Coton de Tulear°)

Clinical description

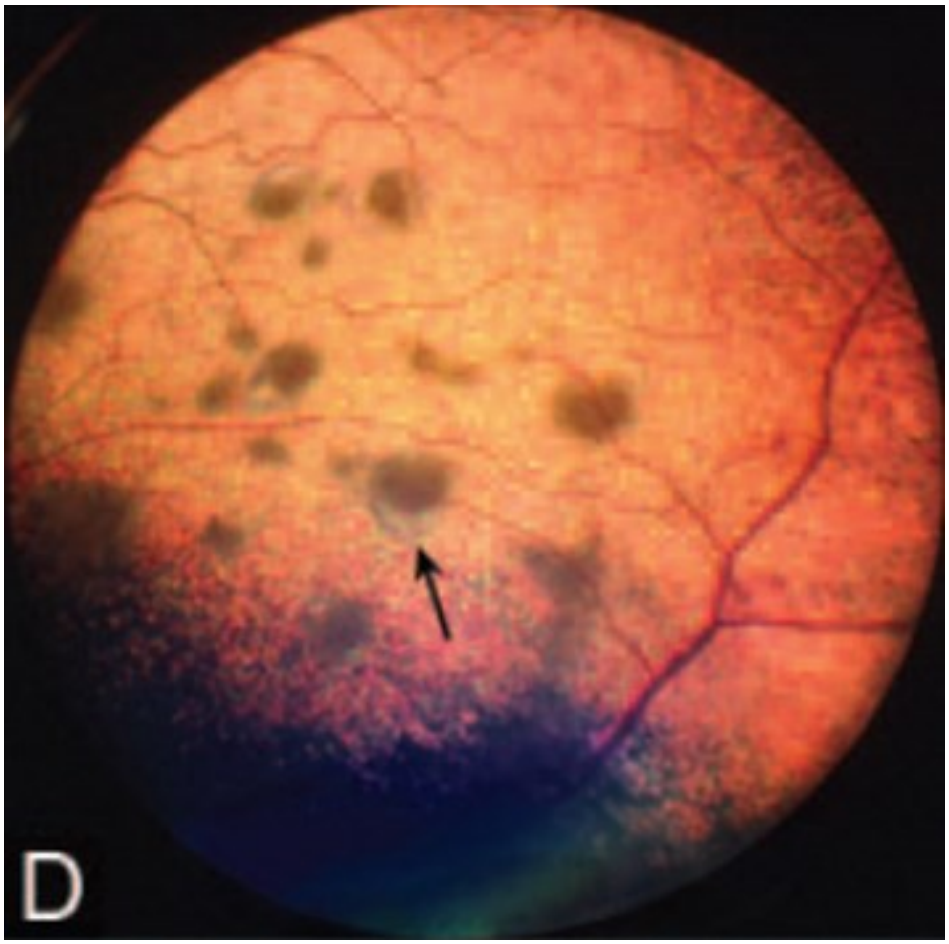
*Multifocal retinal lesions have tan-pink brown subretinal material. Adjacent to several lesions (arrows) the subretinal fluid is serous

° The fluid in the subretinal elevations is clear, though two lesions (arrows) show accumulation of a tan-pink material in the dependent portion of the blebs

New data

New references

See Ch 9 (point A) for further information and Ch 8 for veterinary advice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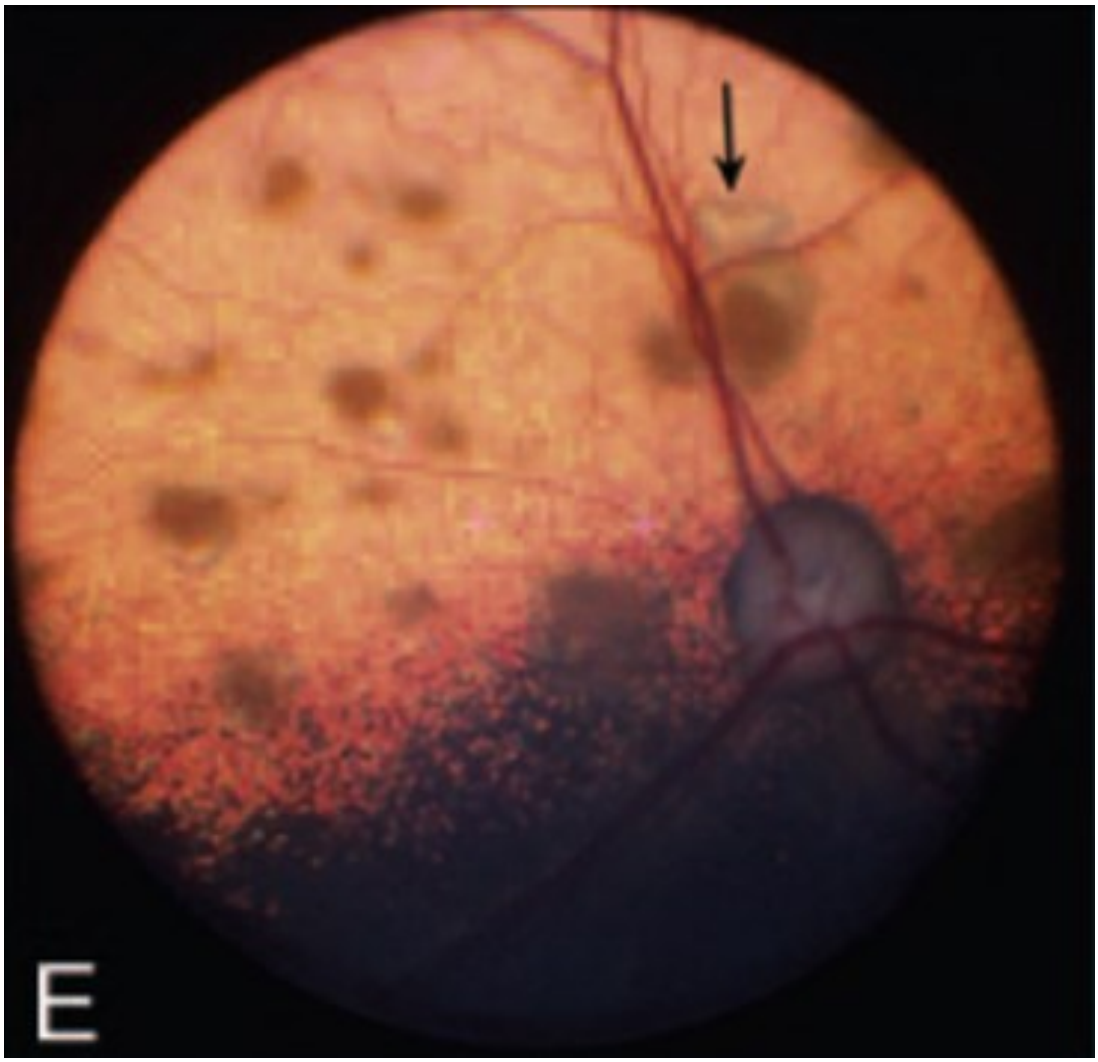
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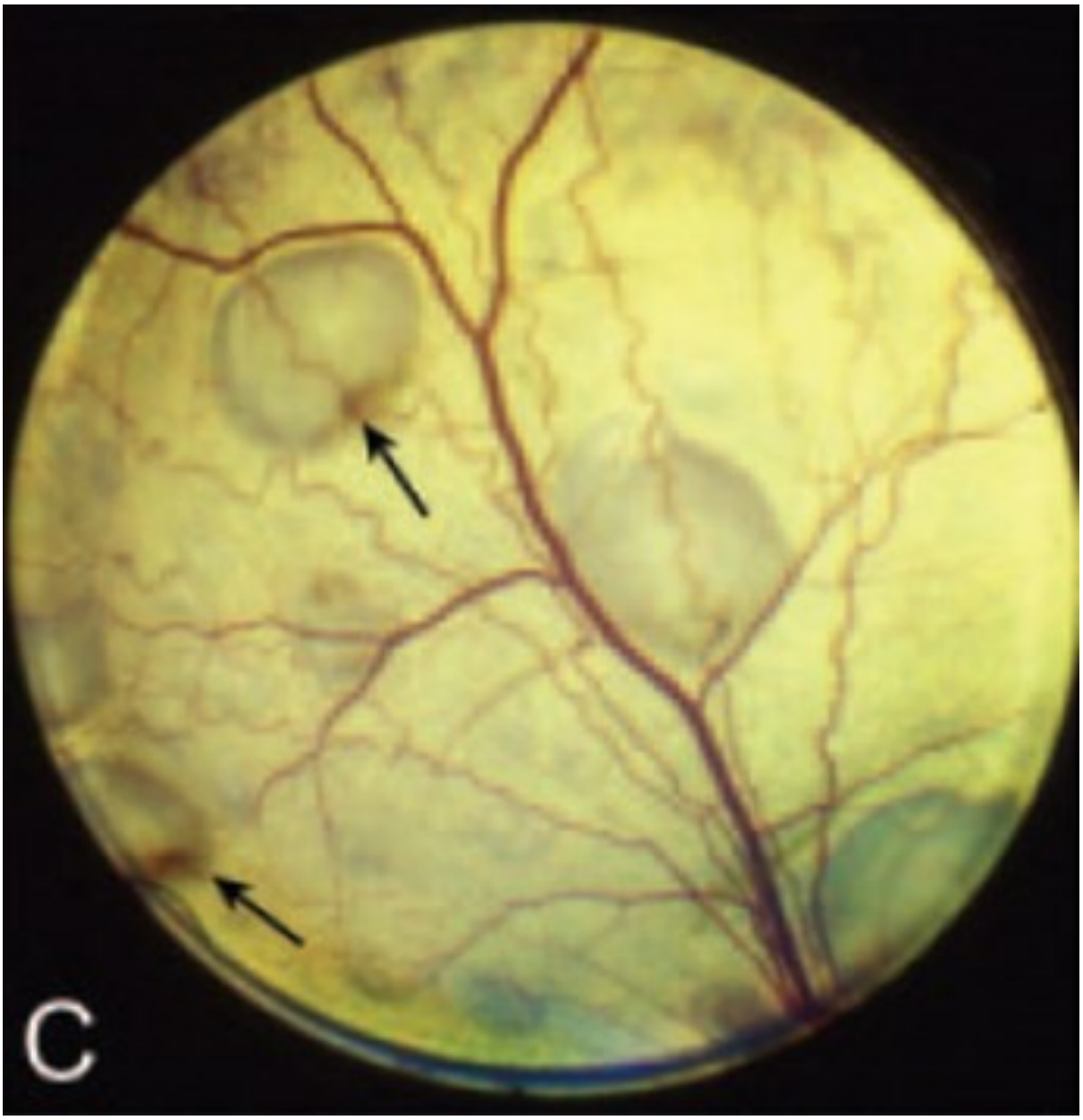
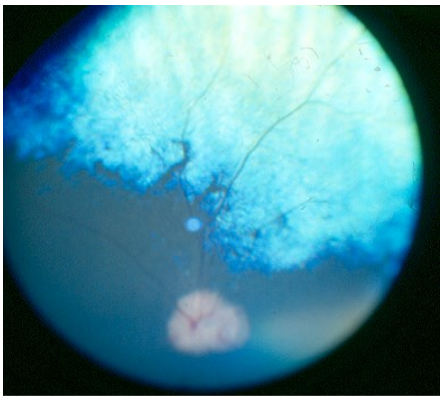
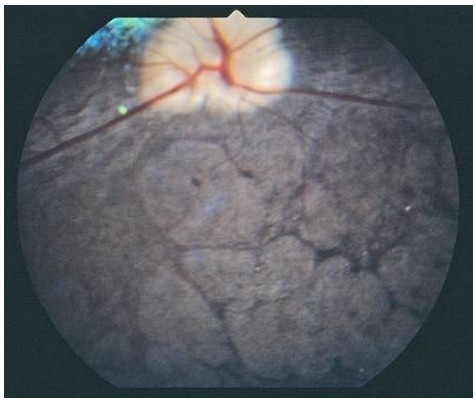

C

DACHSHUND

PRA, Early onset crd, mutation in NPHP4



*10 month old affected**



21 month old affected dog°

Photos by courtesy of Ernst Otto Ropstad

Clinical description

*****Tapetal hyperreflectivity and attenuated retinal blood vessels

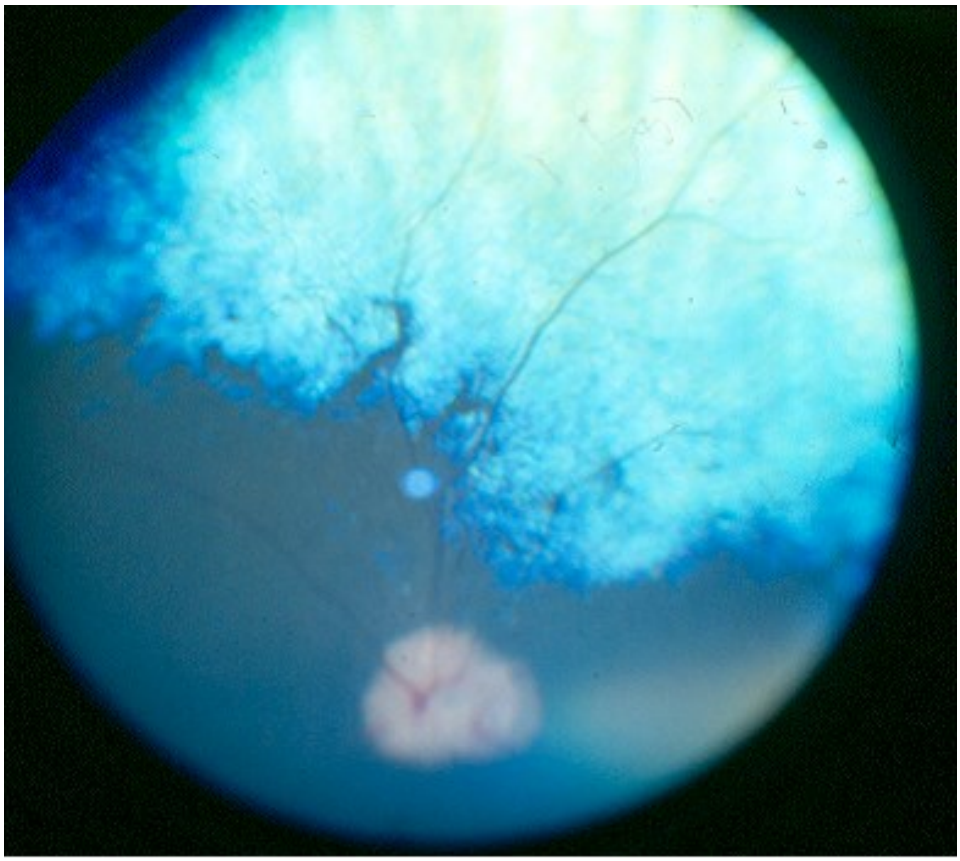
°Pigment migration in nontapetal fundus; large depigmented areas enclosed by hyperpigmentation

Approximately 60% of young animals affected showed severe miosis in the light. By the 5th week of age ERG was nonrecordable. Fundoscopic changes were not apparent until about 3 years of age. Then, signs of generalized retinal degeneration appeared with marked changes in the nontapetal fundus with severe mottling and within another year pigmented ridges and spots.

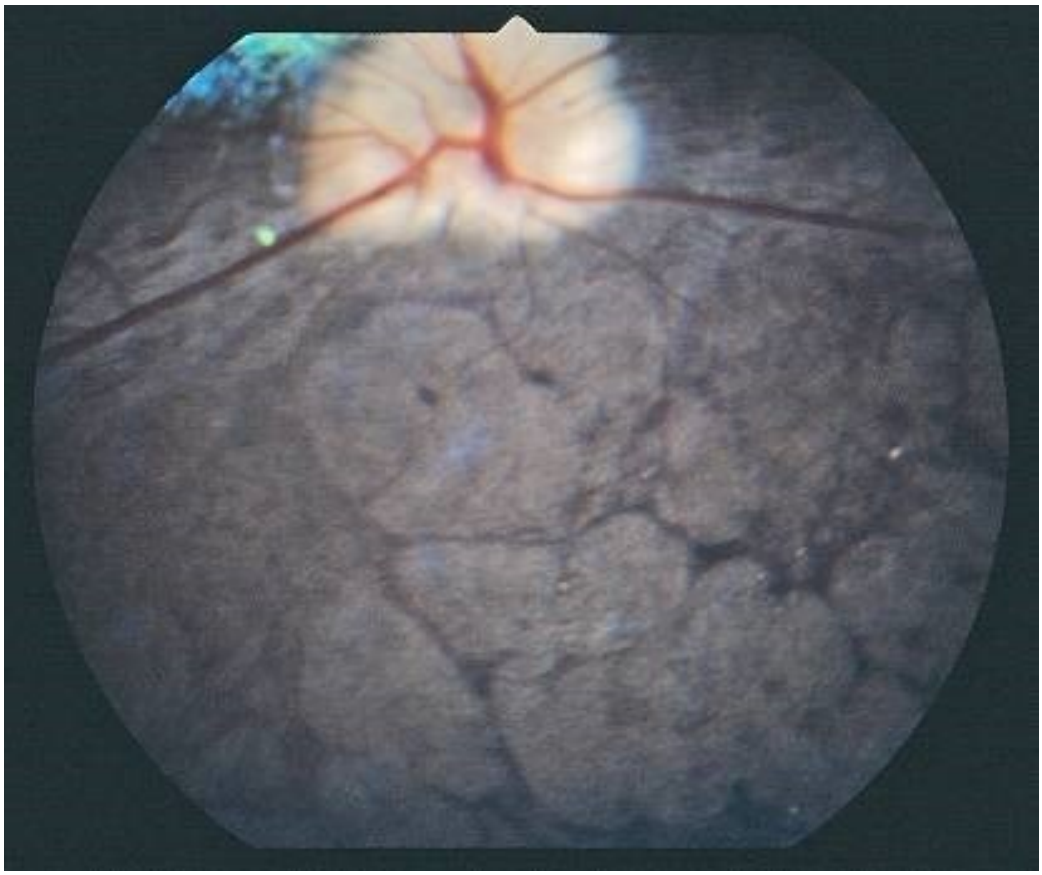
New data

New references

See Ch 9 (point J) for further information and Ch 8 for veterinary advice



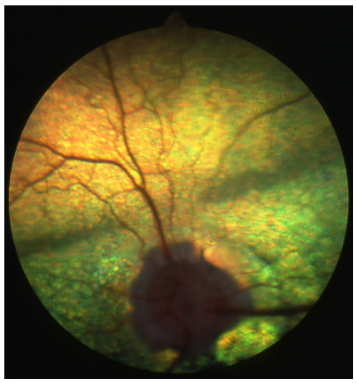
*10 month old affected**



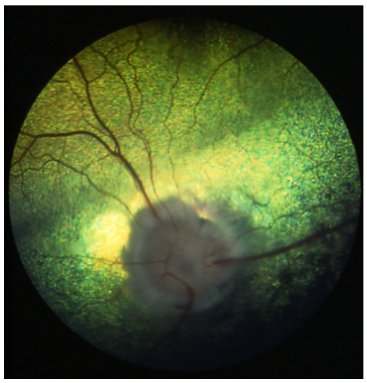
21 month old affected dog°

ENGLISH COCKER SPANIEL

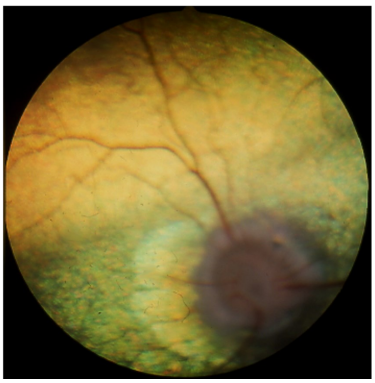
PRA, PRCD



4 years old



4,5 years old



5 years old

Photos by courtesy of Claudio Peruccio

Clinical description

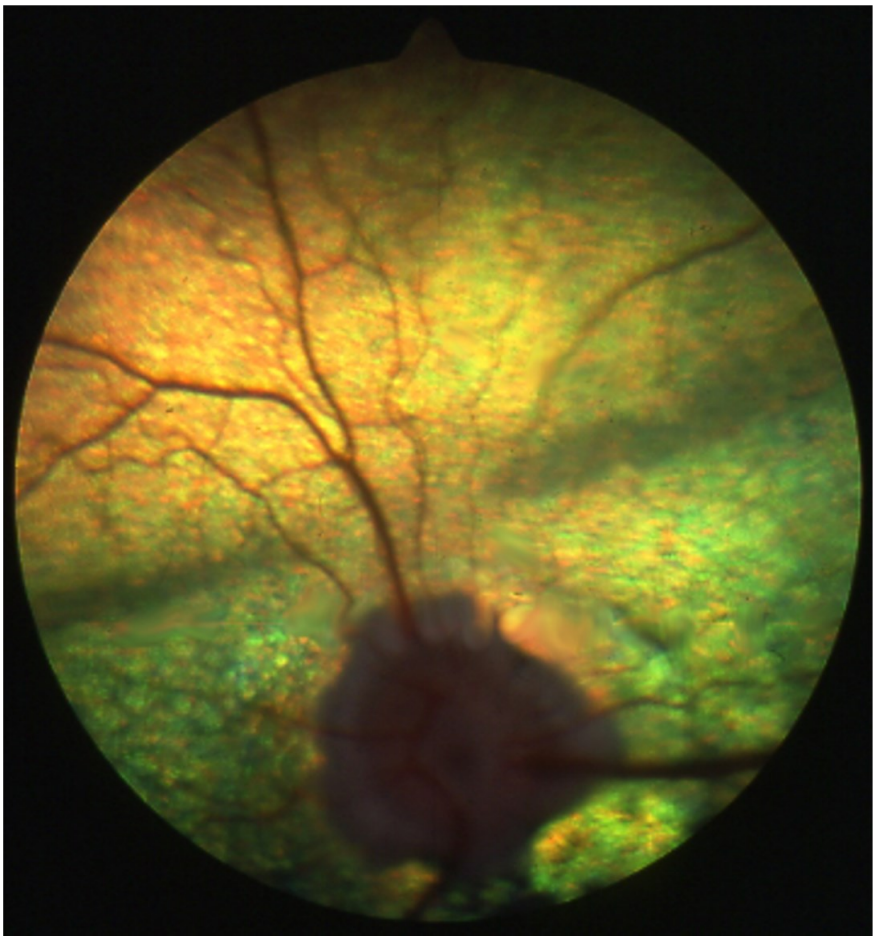
1. 4 years old
2. 4,5 years old
3. 5 years old

Most important form of PRA. Fundoscopic changes typically start at the peripheral tapetal fundus with an initial grayish discoloration, reflecting the onset of retinal thinning in this region. Blood vessel attenuation develops and with progression a more generalized tapetal hyperreflectivity becomes apparent. Secondary cataract usually develops as the condition progresses and may obscure visualization of the fundus.

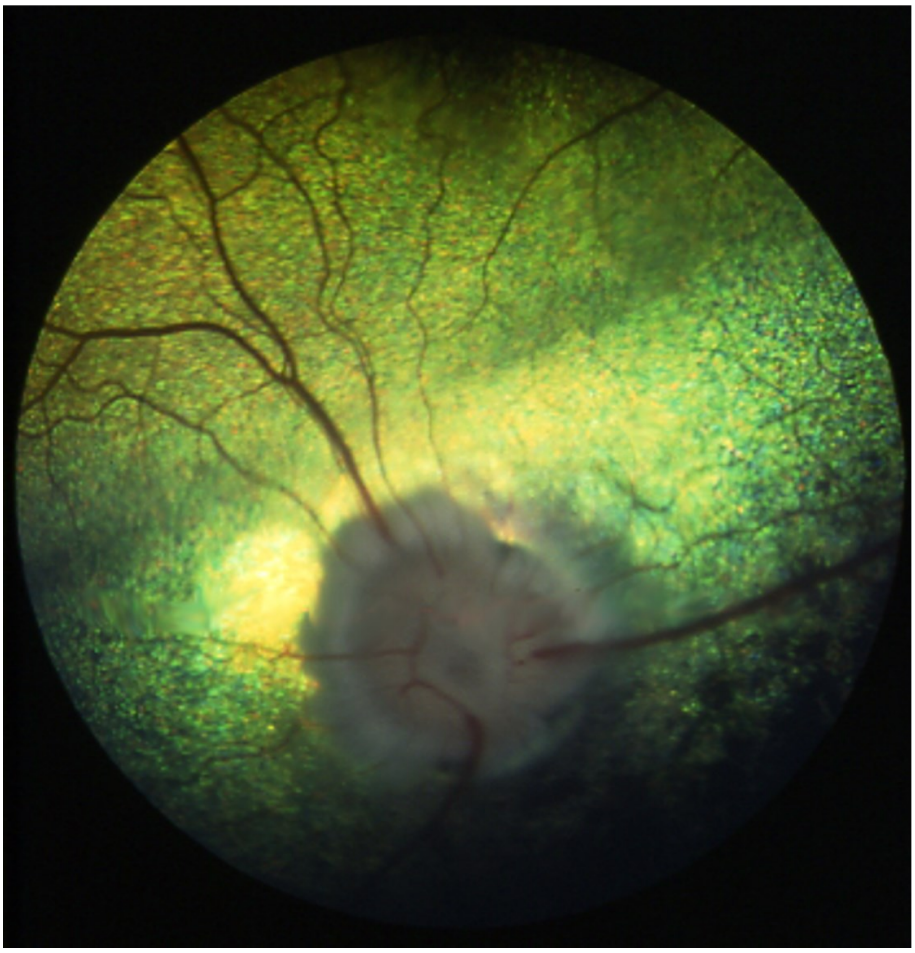
New data

New references

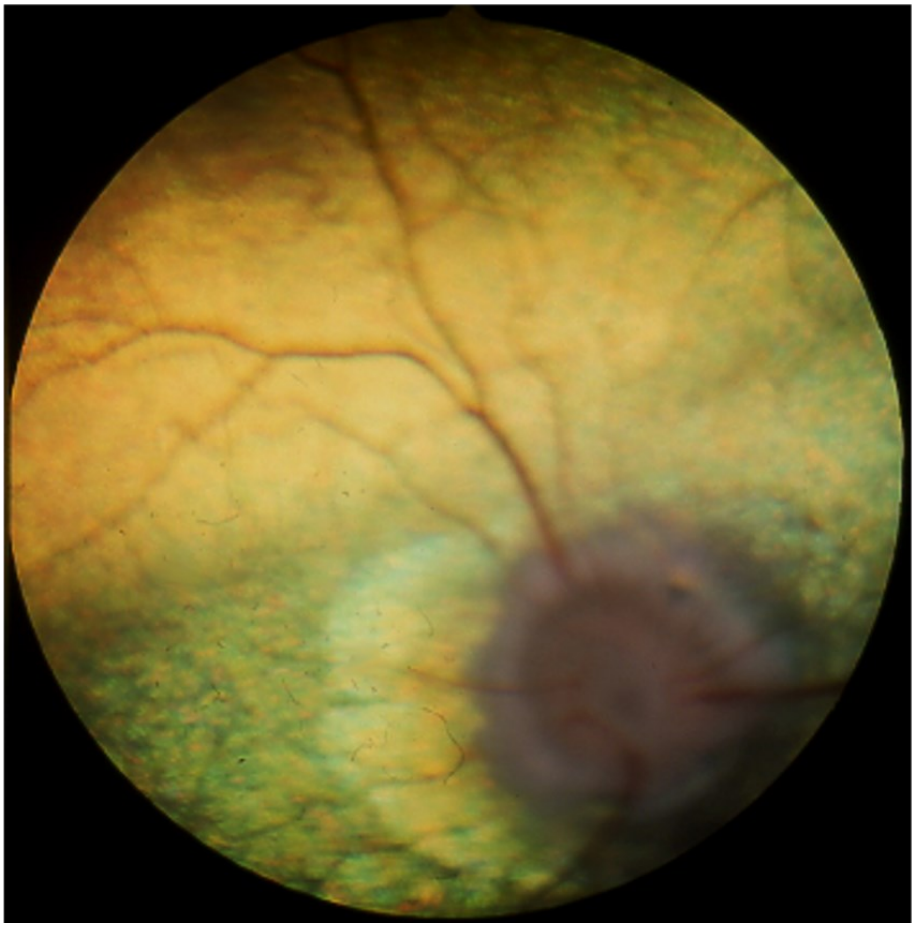
See Ch 9 (point D) for further information and Ch 8 for veterinary advice



4 years old



4,5 years old



5 years old

ENGLISH COCKER SPANIEL

Retinal Pigment Epithelial Dystrophy (RPED)

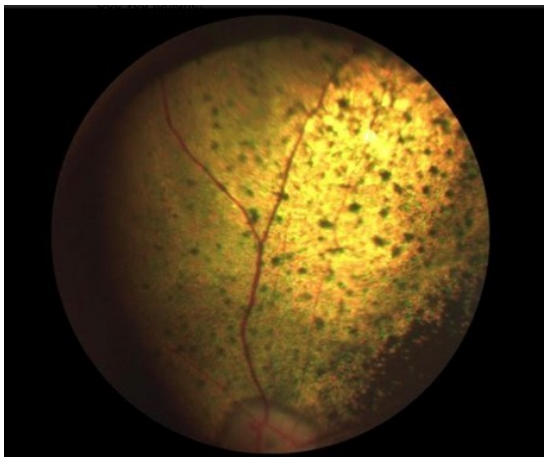


Photo by courtesy of Lena Karlstam

Clinical description

Formerly called CPRA. Initially considered hereditary, probably dietary factors may play a major role.

The fundoscopic changes start with the appearance of irregular light brown foci or spots in the tapetal fundus. Over time, these foci increase in size and become distributed throughout the tapetal zone. At this stage there are also atrophic changes, such as hyperreflecticity around the pigment foci that indicate atrophy of the overlying neural retina. The non-tapetal fundus shows similar foci, with hyperpigmentation and depigmented areas in between. With progression of the disease, pigmented lesions coalesce into widely spaced, irregular patches, interspersed with hyperreflective areas in the tapetal fundus. End stage atrophy includes a more generalized hyperreflectivity with sparse amounts of pigmented foci or striae (or both).

The effect of RPED on vision is apparent when there are moderately advanced retinal lesions. Initially affected dogs may have problems seeing stationary objects in brighter light but can still see moving and distant objects. Vision tends to be better at low light levels. Not all affected dogs become blind and there is a very variable age of onset and rate of progression. Secondary cataracts may develop in the advanced stages.

New data

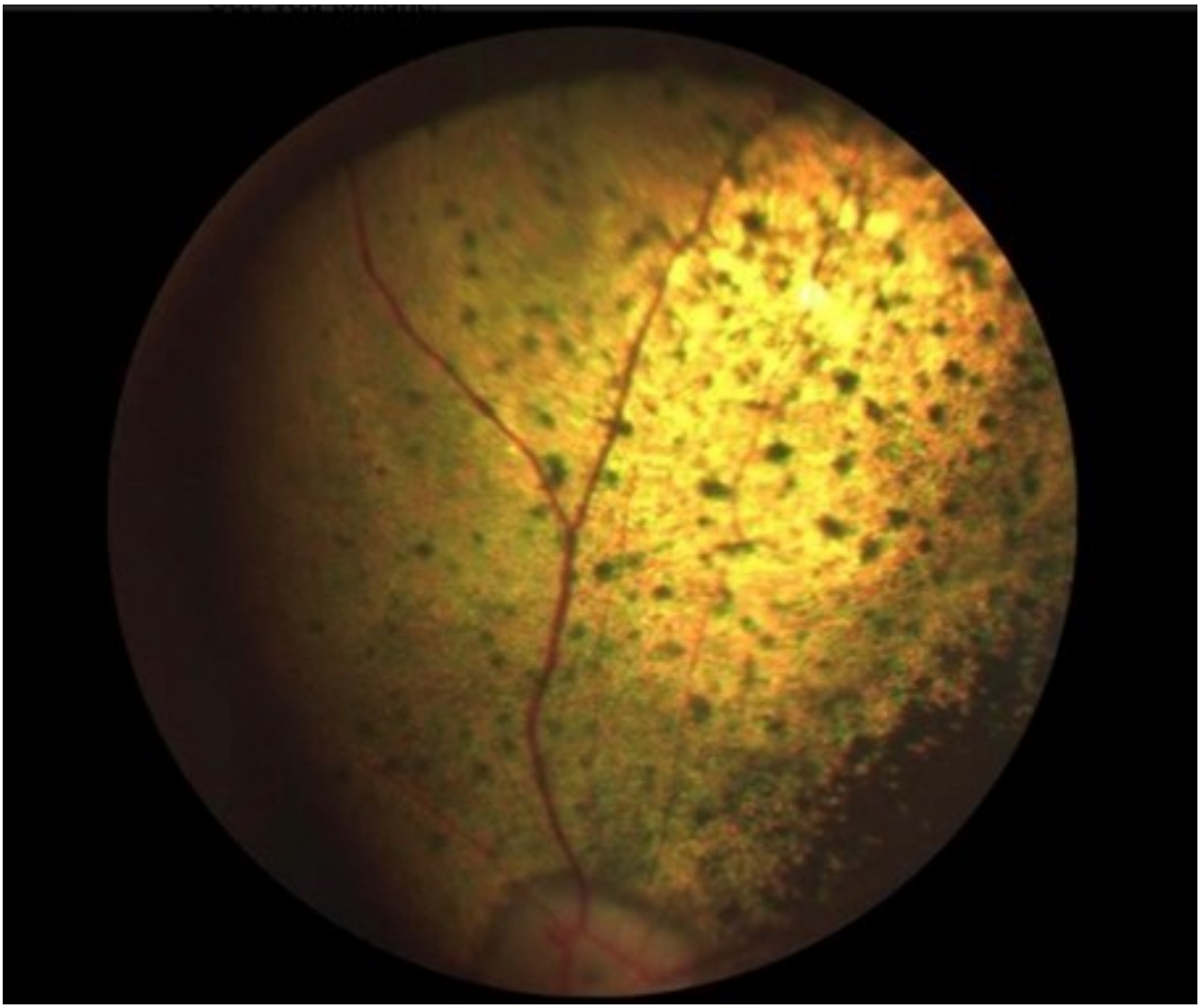
See Ch 9 (point F) for further information and Ch 8 for veterinary advice

New references

McLellan GJ, Cappello R, Mayhew IG et al. Clinical and pathological observations in English cocker spaniels with primary metabolic vitamin E deficiency and retinal pigment epithelial dystrophy. Veterinary Record (2003) 153, 287-292.

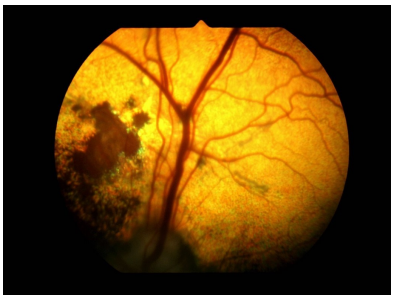
McLellan GJ & Bedford PGC. Oral vitamin E absorption in English Cocker Spaniels with familial vitamin E deficiency and retinal pigment epithelial dystrophy. Veterinary Ophthalmology (2012) 15, Supplement 2, 48-56

James Oliver (personal communication, 2022)



ENGLISH SPRINGER SPANIEL

Geographic Retinal Dysplasia (GRD)



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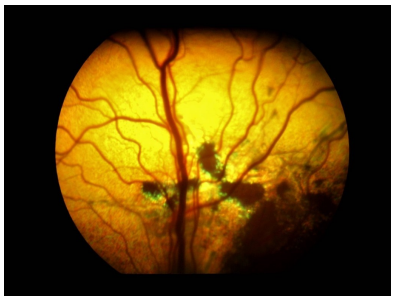

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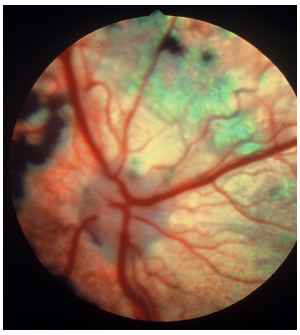


3

Photos by courtesy of Gilles Chaudieu (1 & 2) and Samuel J Vainisi (3)

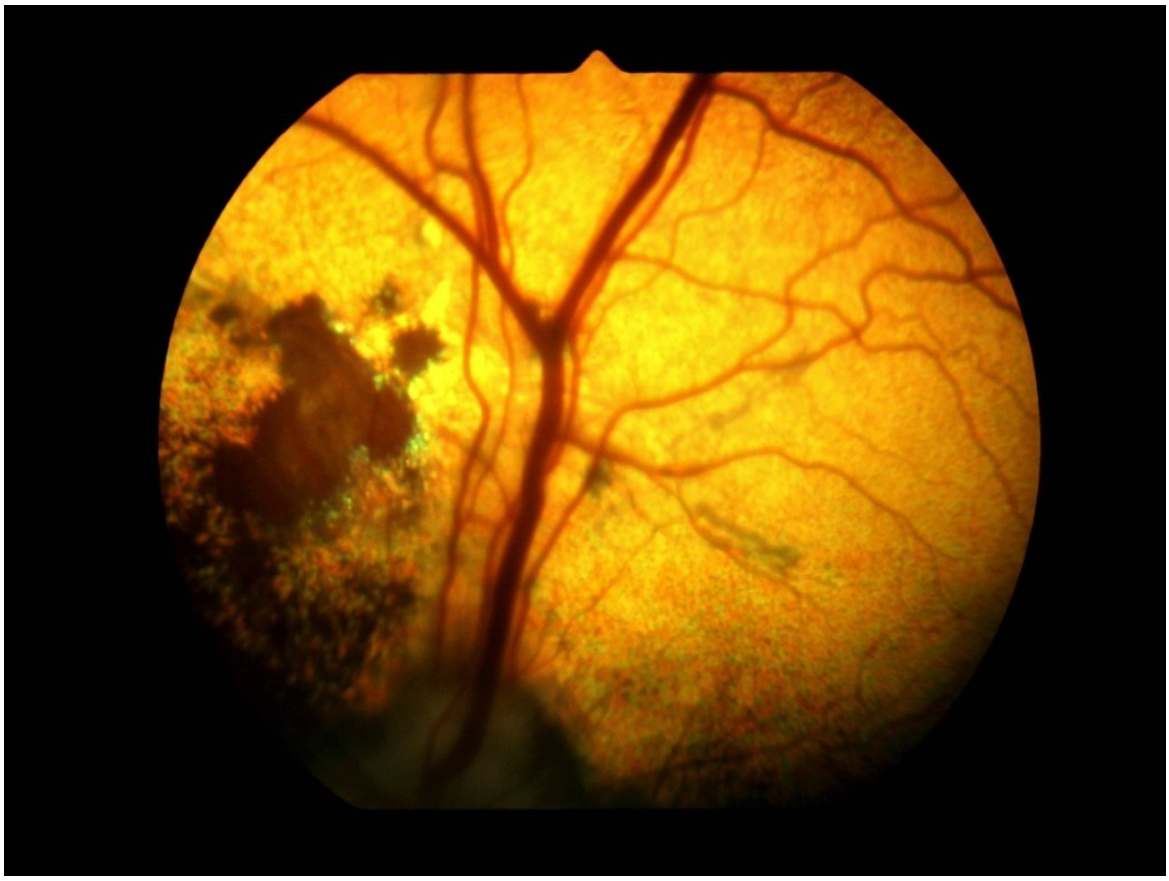
Clinical description

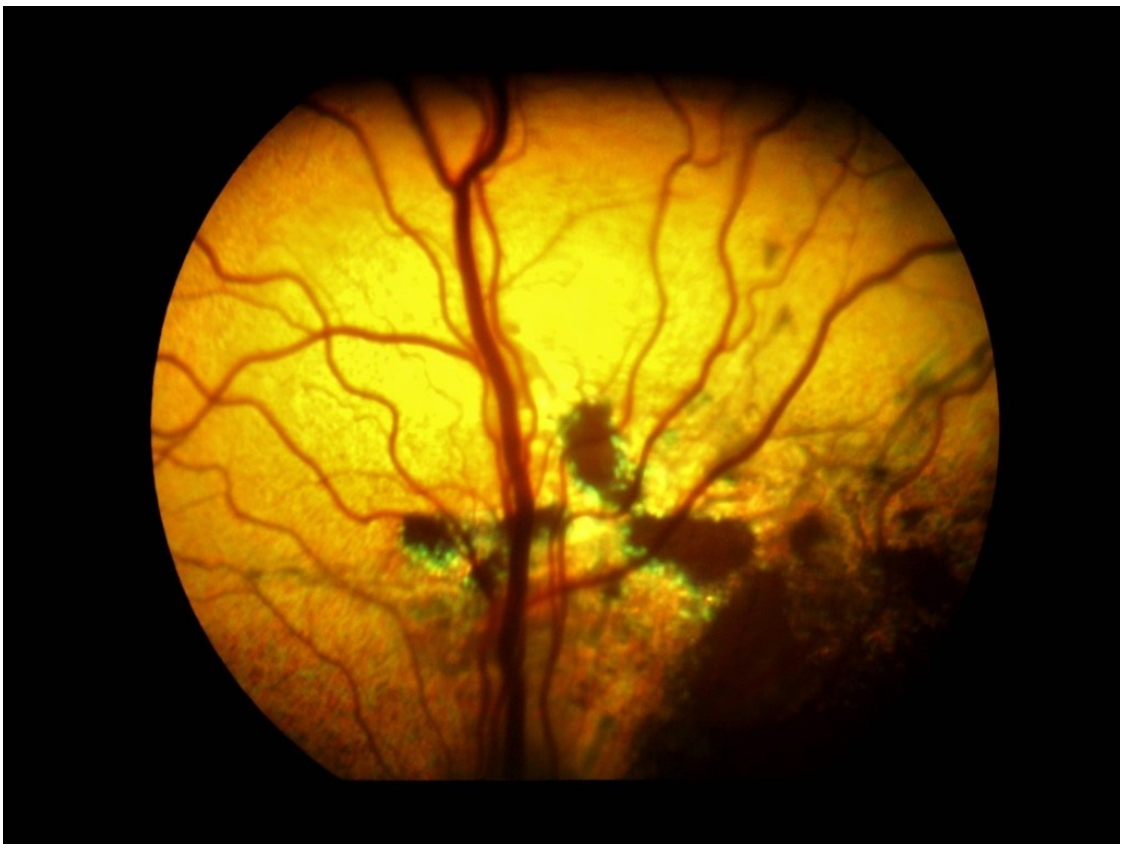
In this breed the condition is inherited as an autosomal recessive traite. Lesions are typically dorsal to the optic nerve head and in young animals may appear as retinal folds accompanied by larger regions of tapetal hyporeflectivity due to retinal thickening. With progression these areas may thin, resulting in areas of retinal atrophy with central dark pigmentation. Focal areas of retinal detachment may occur and in some dogs total retinal detachment develops.

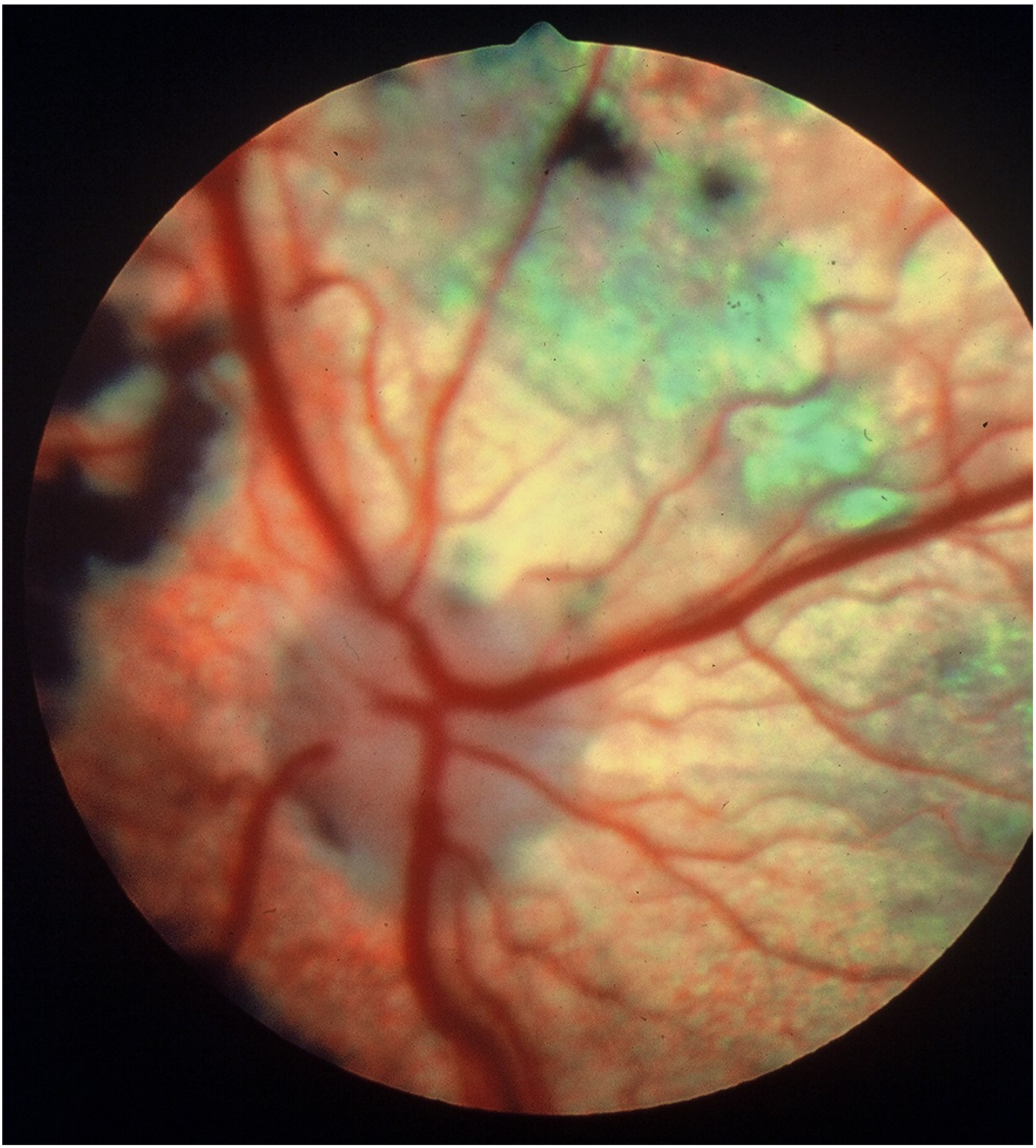
New data

New references

See Ch 9 (point B) for further information and Ch 8 for veterinary advice







FIELD SPANIEL

PRA-CORD1

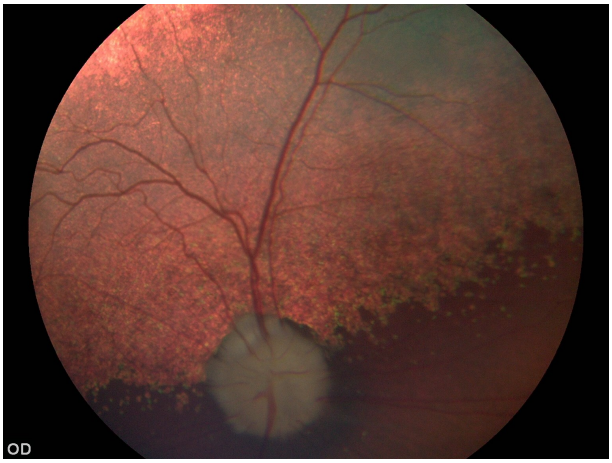


Photo by courtesy of Barbara Braus

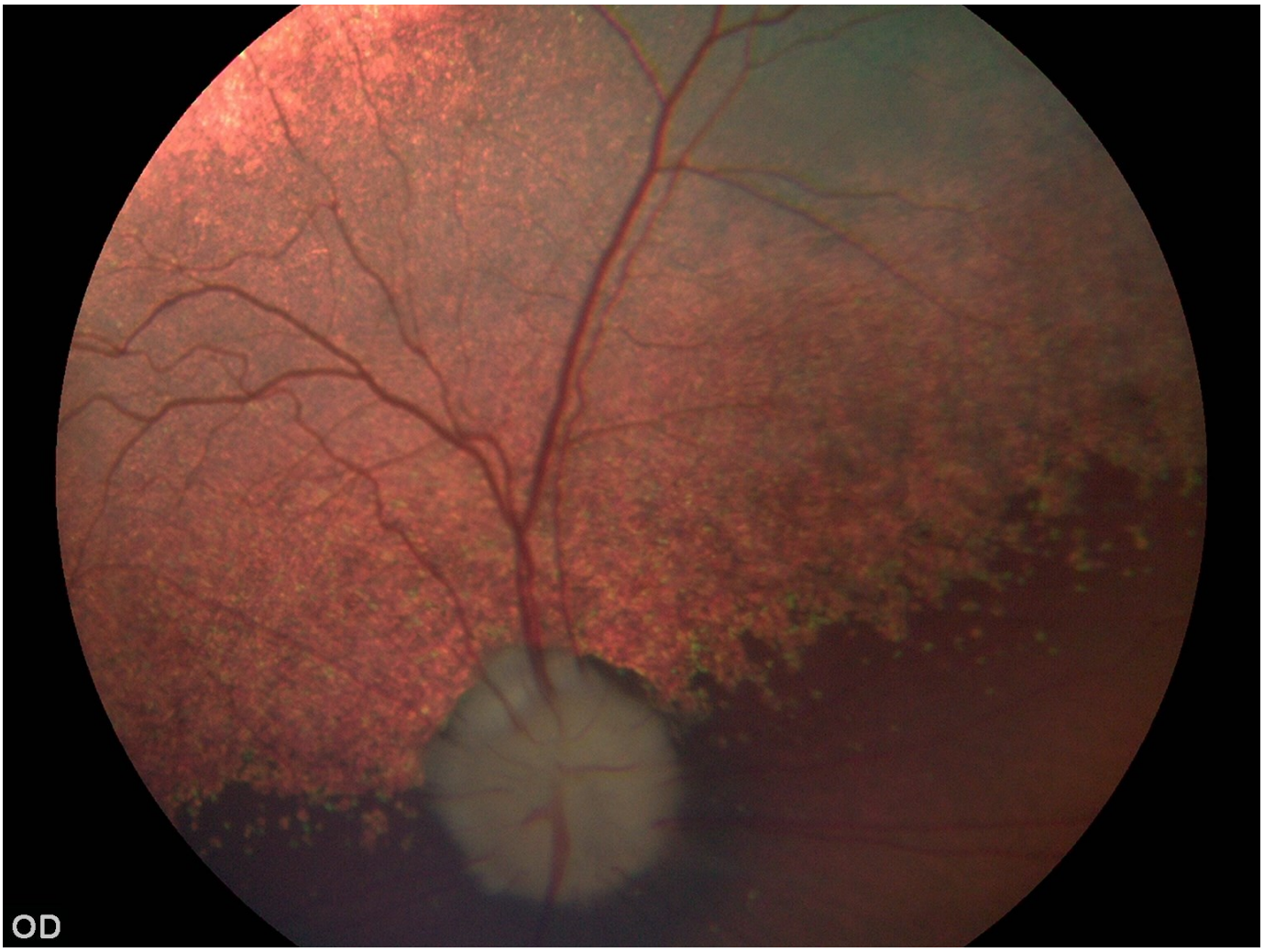
Clinical description

Night blindness from 5 years of age

New data

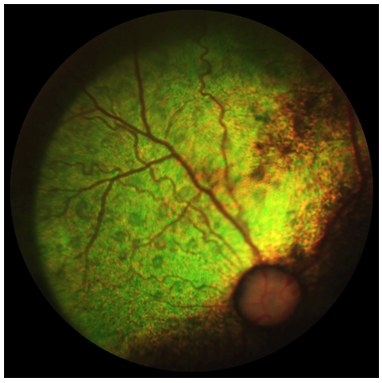
New references

See Ch 9 (point C) for further information and Ch 8 for veterinary advice


OD

GERMAN SPITZ

PRA



Retinal bullae in a 7-month-old dog

Photo by courtesy of Fabiano Montiani Ferreira

Clinical description

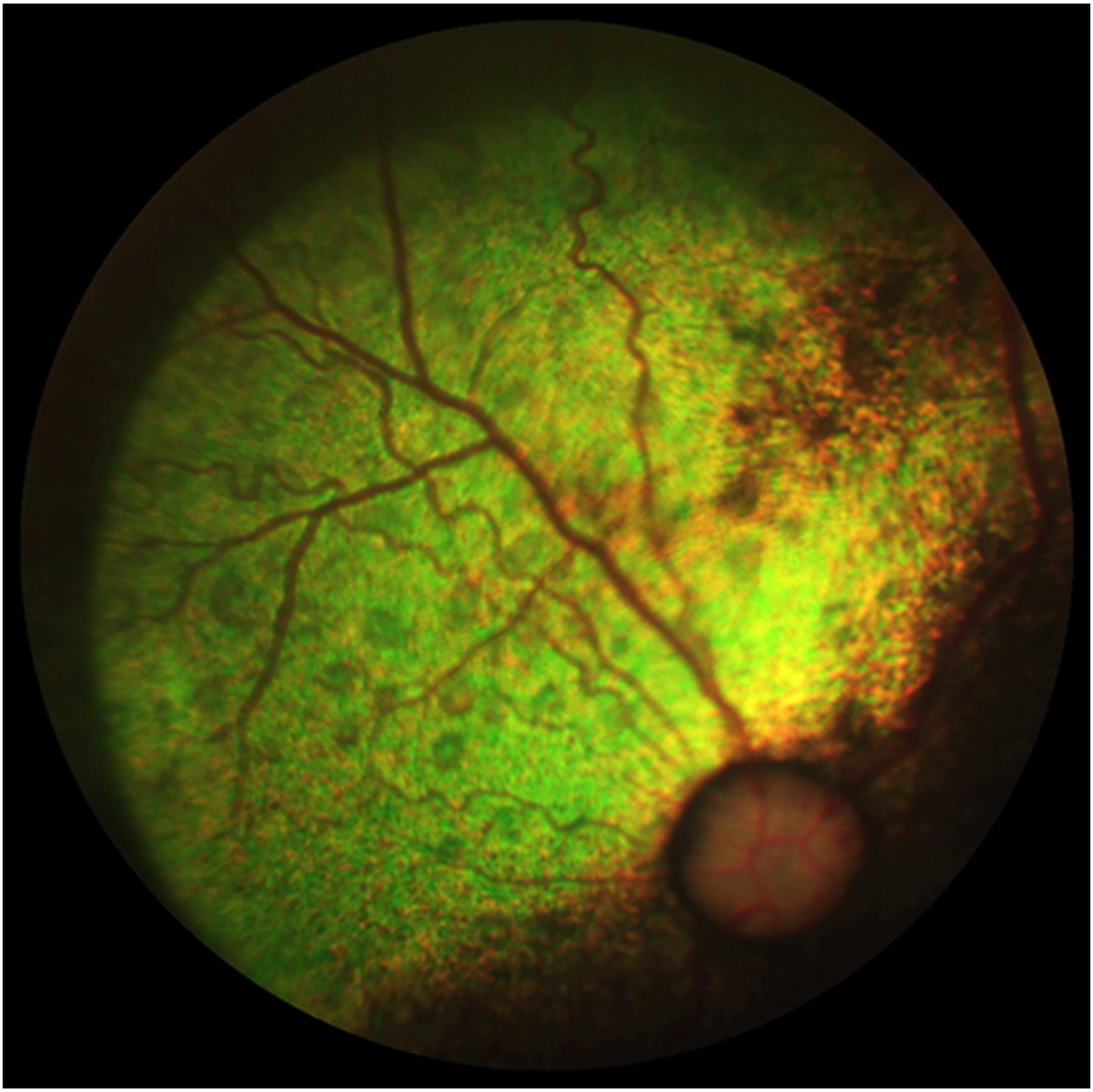
Retinal bullae were identified in dogs with three distinct forms of PRA (Whippets, German Spitzes and CNGB-1 mutant dogs). The lesions develop prior to retinal thinning.

New data

New references

Marinho LFLP, Occelli LM, Bortolini M, Sun K, Winkler PA, Montiani-Ferreira F, Petersen-Jones SM.
Development of retinal bullae in dogs with progressive retinal atrophy.
Vet Ophthalmol. 2022 Mar;25(2):109-117.

See Ch 9 for further information and Ch 8 for veterinary advice



retinal bullae – early change in puppies (female dog at 7 months of age)

GIANT SCHNAUZER

PRA, NECAP1

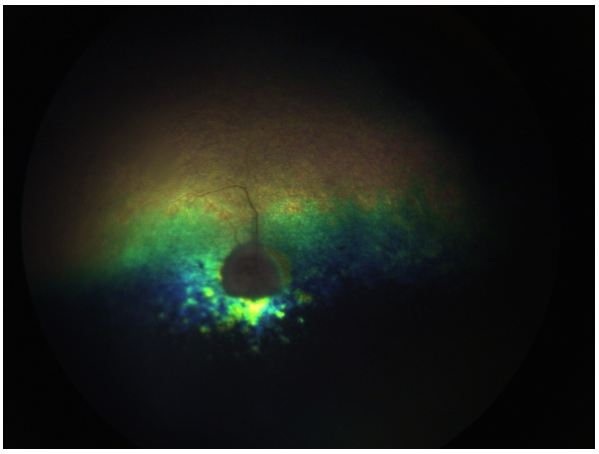


Photo by courtesy of James Oliver

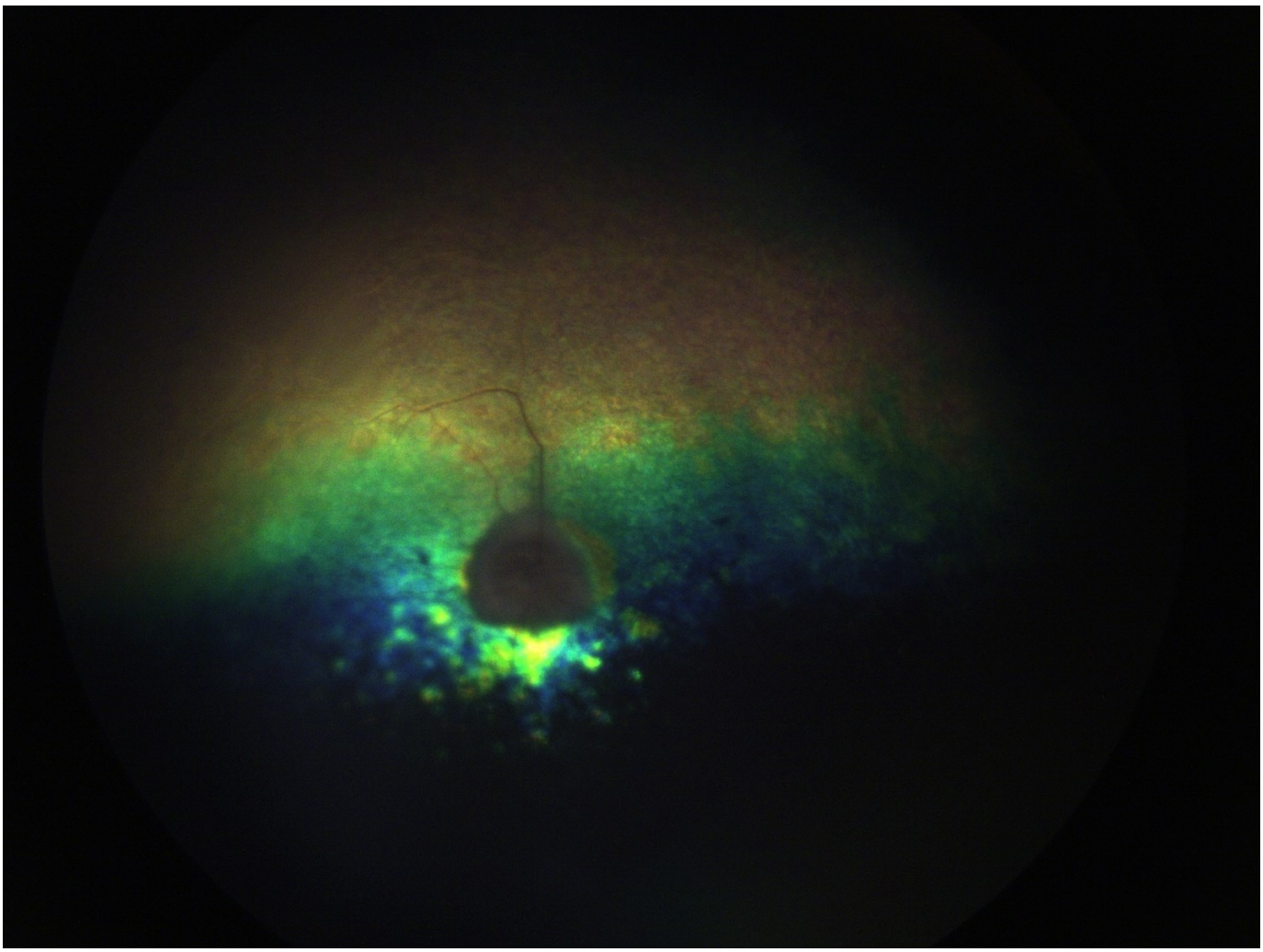
Clinical description

Typical clinical signs around 4 years of age. The proband was diagnosed with PRA at 4 years of age. A screening of other breeds identified heterozygotes for the mutation in various Spitz breeds and the Miniature Longhaired Dachshund.

New data

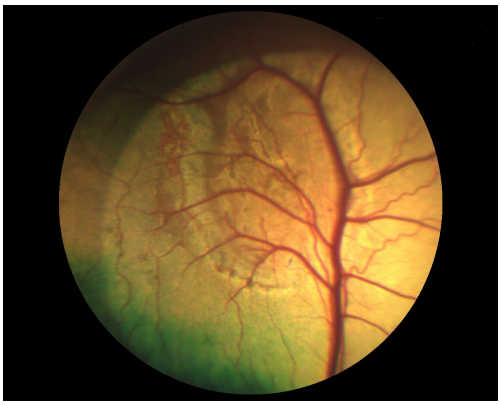
New references

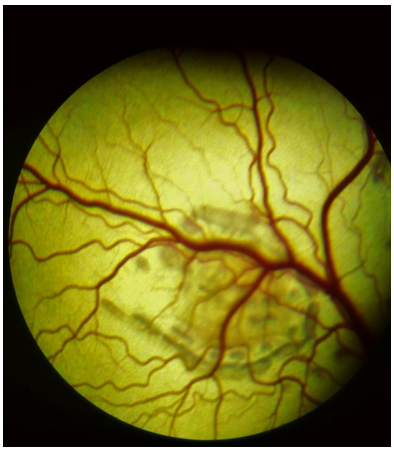
See Ch 9 (point B) for further information and Ch 8 for veterinary advice



GOLDEN RETRIEVER

Geographic Retinal Dysplasia (GRD)





Photos by courtesy of Adolfo Guandalini & Gilles Chaudieu

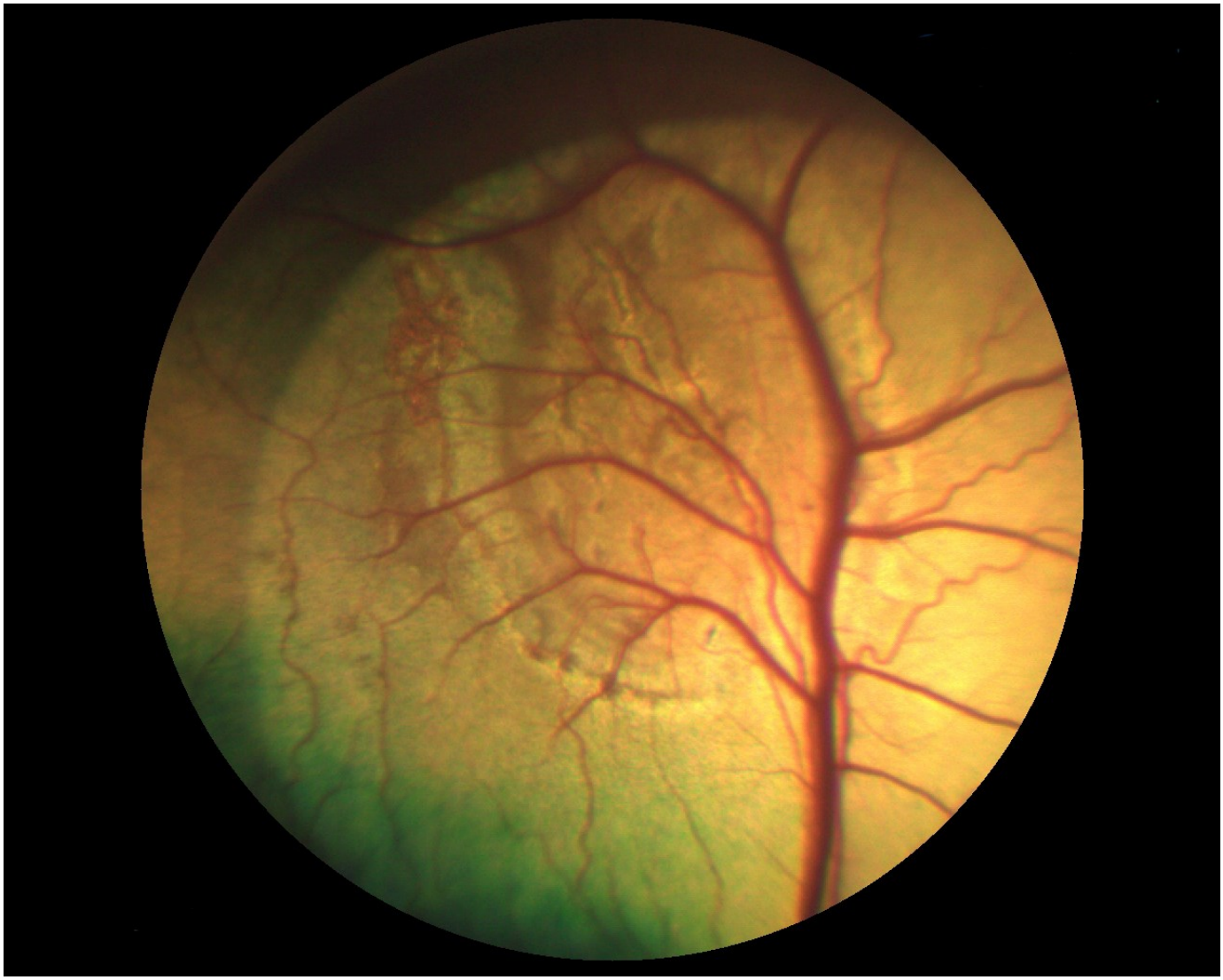
Clinical description

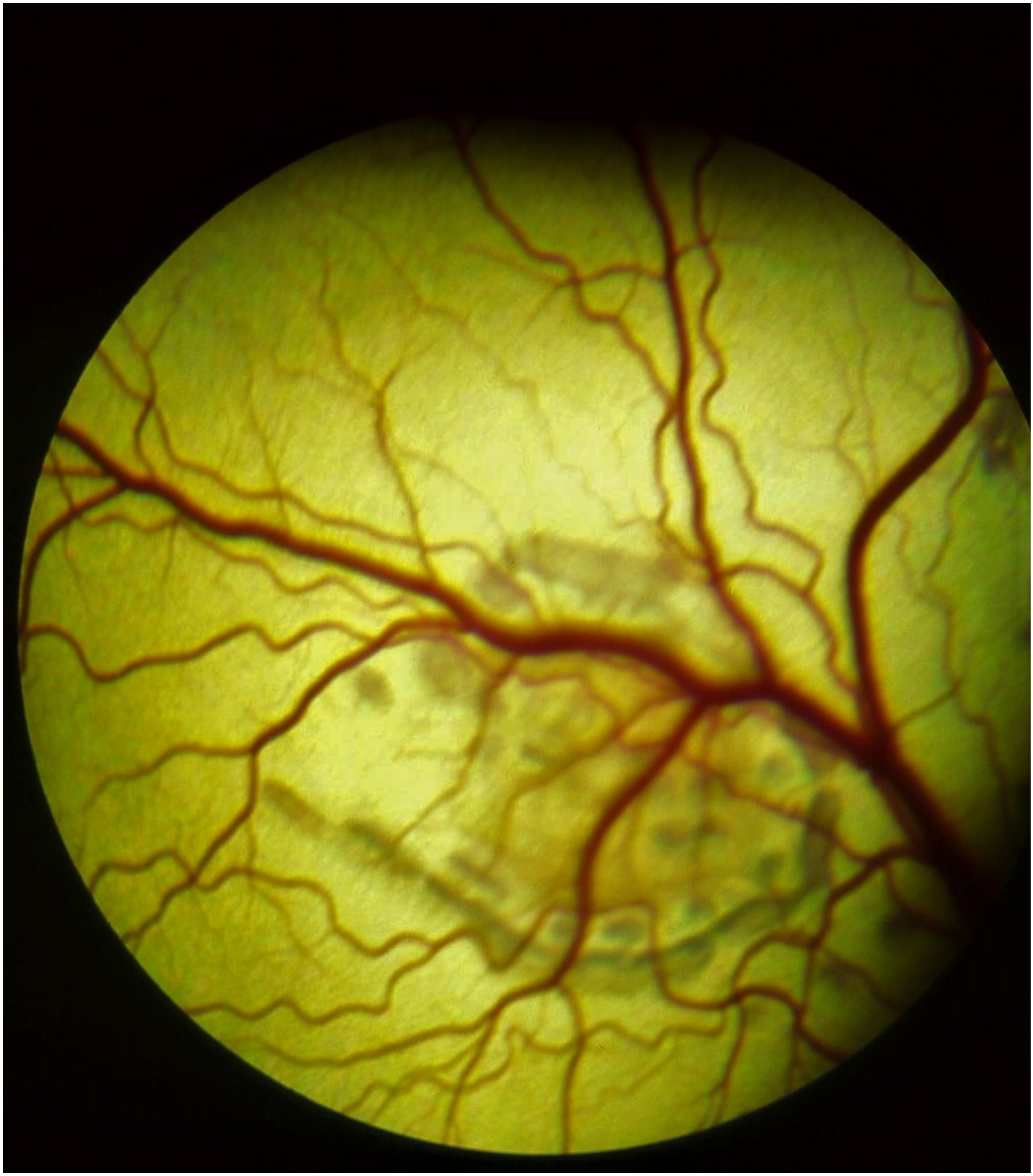
In GRD the lesion consists of an irregular or horseshoe-shaped area, typically among the blood vessels dorsal to the ONH. The lesion may have areas of both retinal thinning and retinal thickening and elevation.

New data

New references

See Ch 9 (point F) for further information and Ch 8 for veterinary advice





GOLDEN RETRIEVER

PRA, mutation in SLC4A3

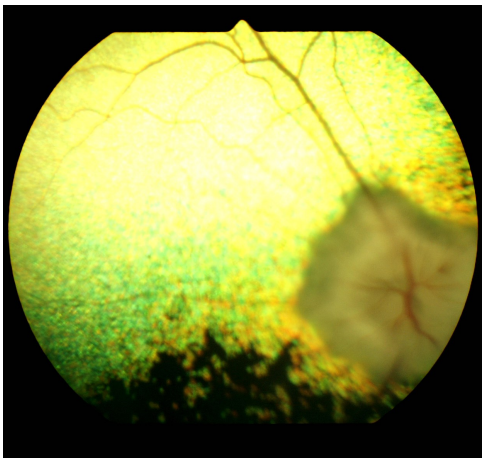


Photo by courtesy of Gilles Chaudieu

Clinical description

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

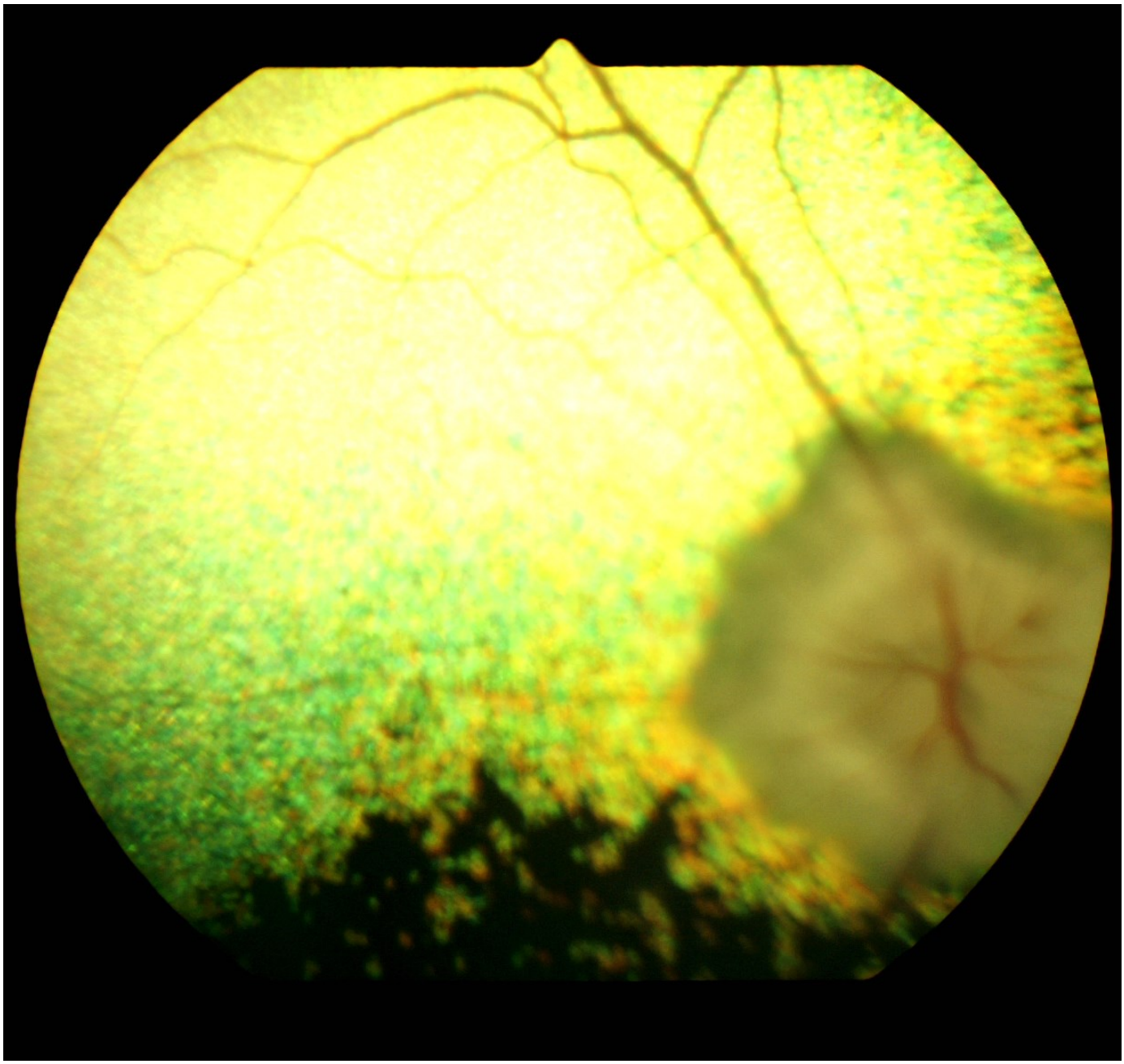
The mutation was reported to account for 60% of PRA in this breed in Sweden and 76% in UK.
It accounted for a lower proportion of PRA cases in France and Finland and was not identified in PRA affected GR from the US.

The average age at ophthalmoscopic diagnosis of PRA was 7 years of age.

New data

New references

See Ch 9 (point G) for further information and Ch 8 for veterinary advice



GORDON SETTER

PRA, rcd4

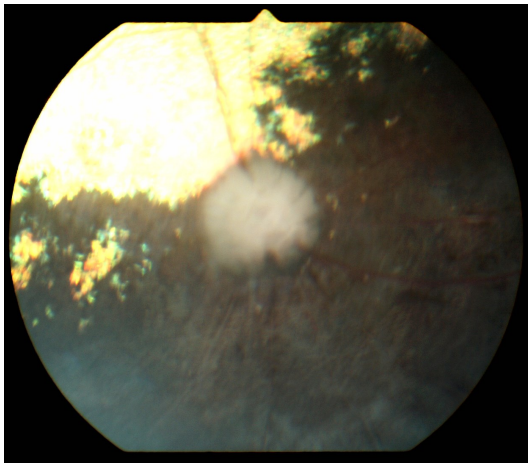


Photo by courtesy of Gilles Chaudieu

Clinical description

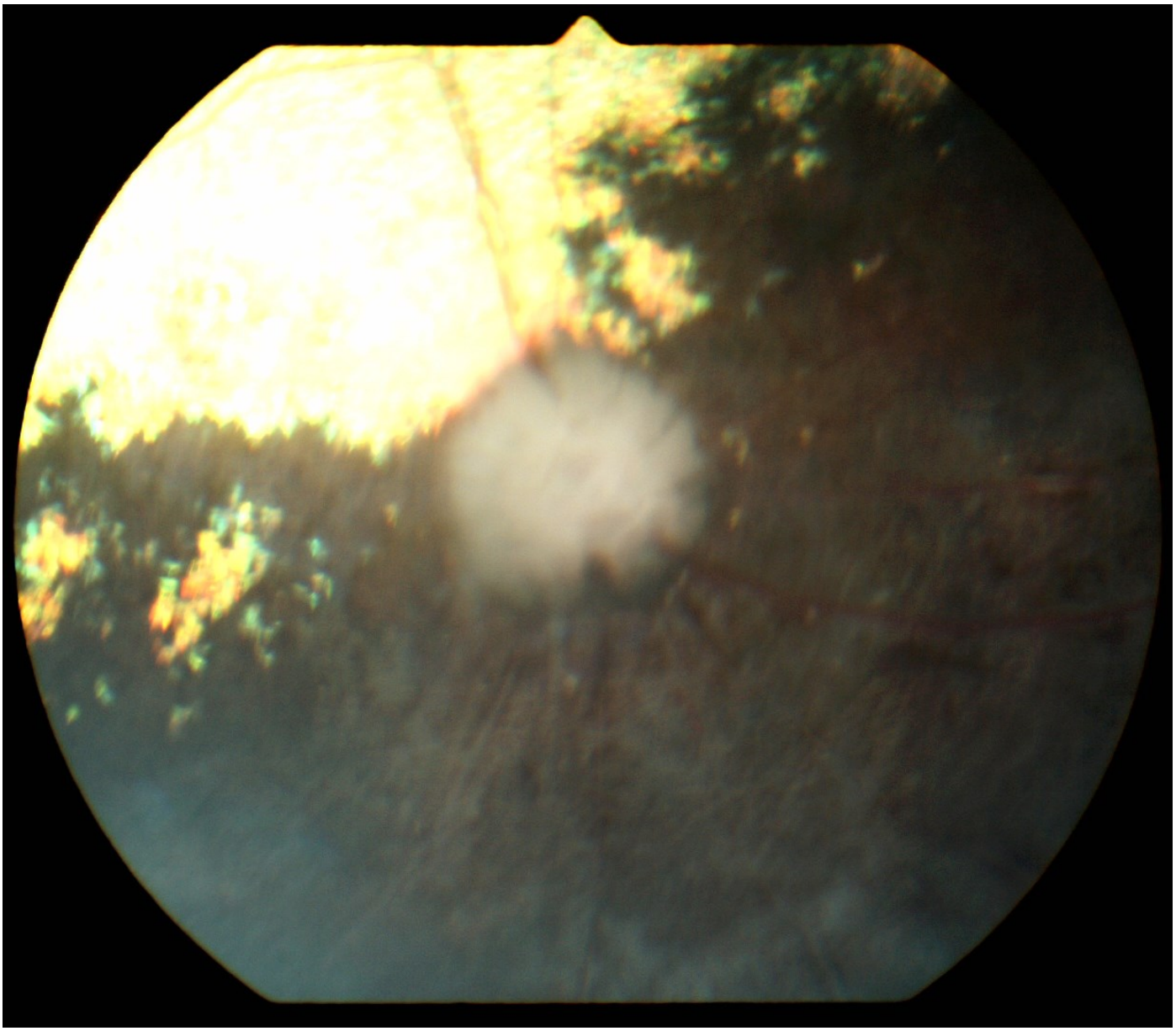
This condition has been identified in Gordon and Irish Setters. This form was called late-onset PRA or rcd4. Clinical signs are visible from 10-12 years of age. The same mutation was identified in other breeds with PRA. This makes this form of PRA numerically the second most important after PRCD.

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

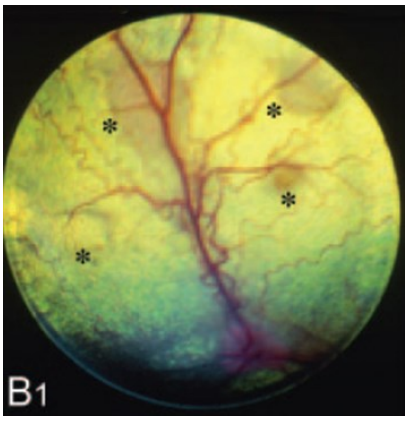
New references

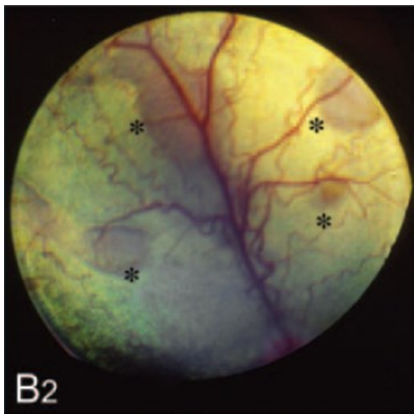
See Ch 9 (point B) for further information and Ch 8 for veterinary advice



GREAT PYRENEES

Canine Multifocal Retinopathy (CMR 1)





B1: 5 months old dog & B2 8 months old (same dog)*

Photos by courtesy of Gustavo Aguirre

Clinical description

The CMR is characterized by the development of multifocal retinal bullae in young animals.

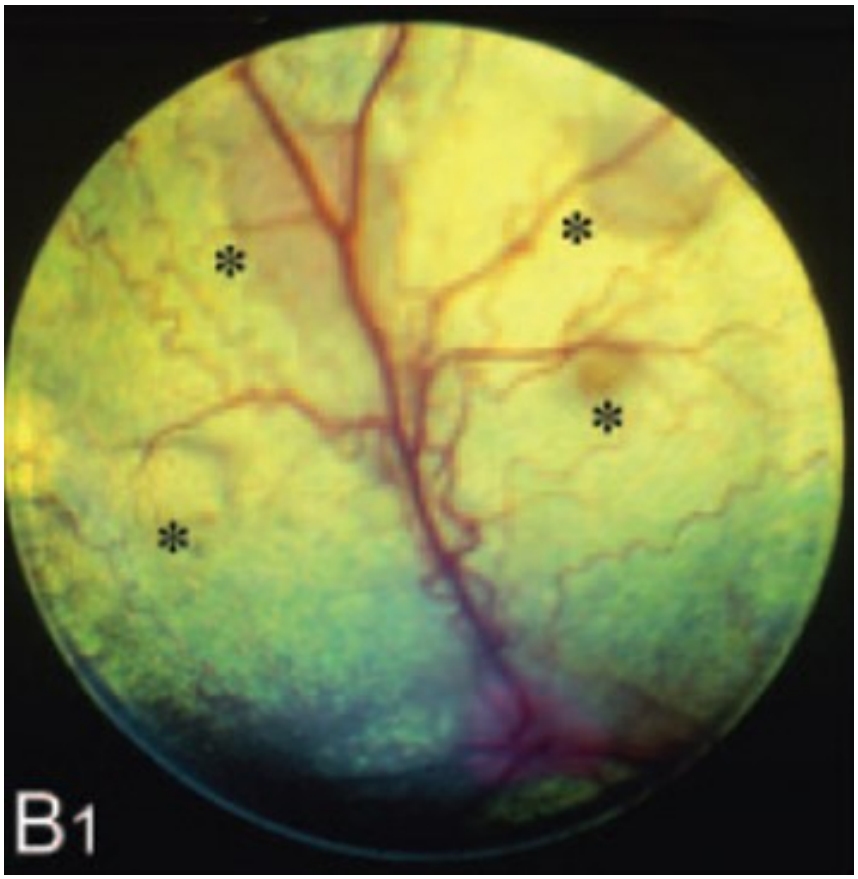
In dogs with cmr1 the retinal bullae are multifocal with gray to tan colored subretinal fluid. They vary in size from barely visible to some lesions that are larger than the ONH. They initially appear at approximately 11 weeks of age; usually they are sparse, but they develop bilaterally in the peripheral tapetal fundus, around the ONH, and occasionally under the major veins inferior to the ONH.

The peripapillary lesions , observed as serous retinal detachments, develop within a few hours but remain the same size for years, while the peripheral lesions develop gradually and appear to increase slowly in size and number until the age of 20 weeks.

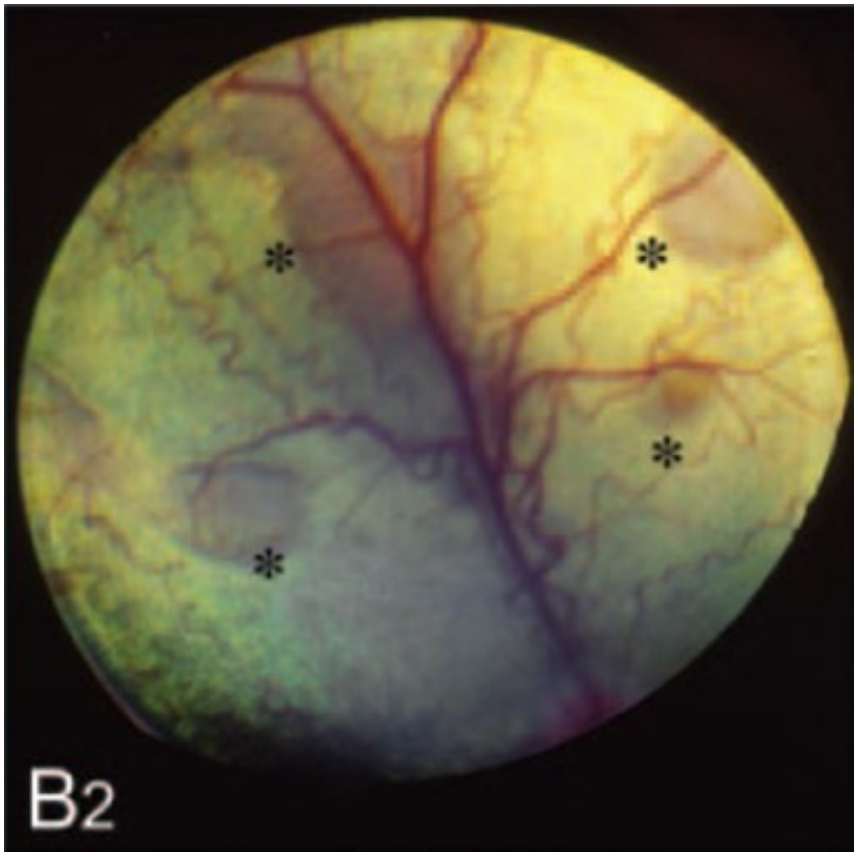
New data

New references

See Ch 9 (point F) for further information and Ch 8 for veterinary advice



B1: 5 months old dog



B2 8 months old (same dog)*

GREYHOUND

PRA

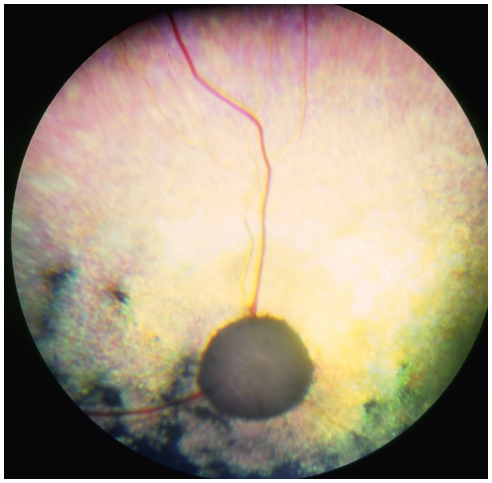


Photo by courtesy of Gilles Chaudieu

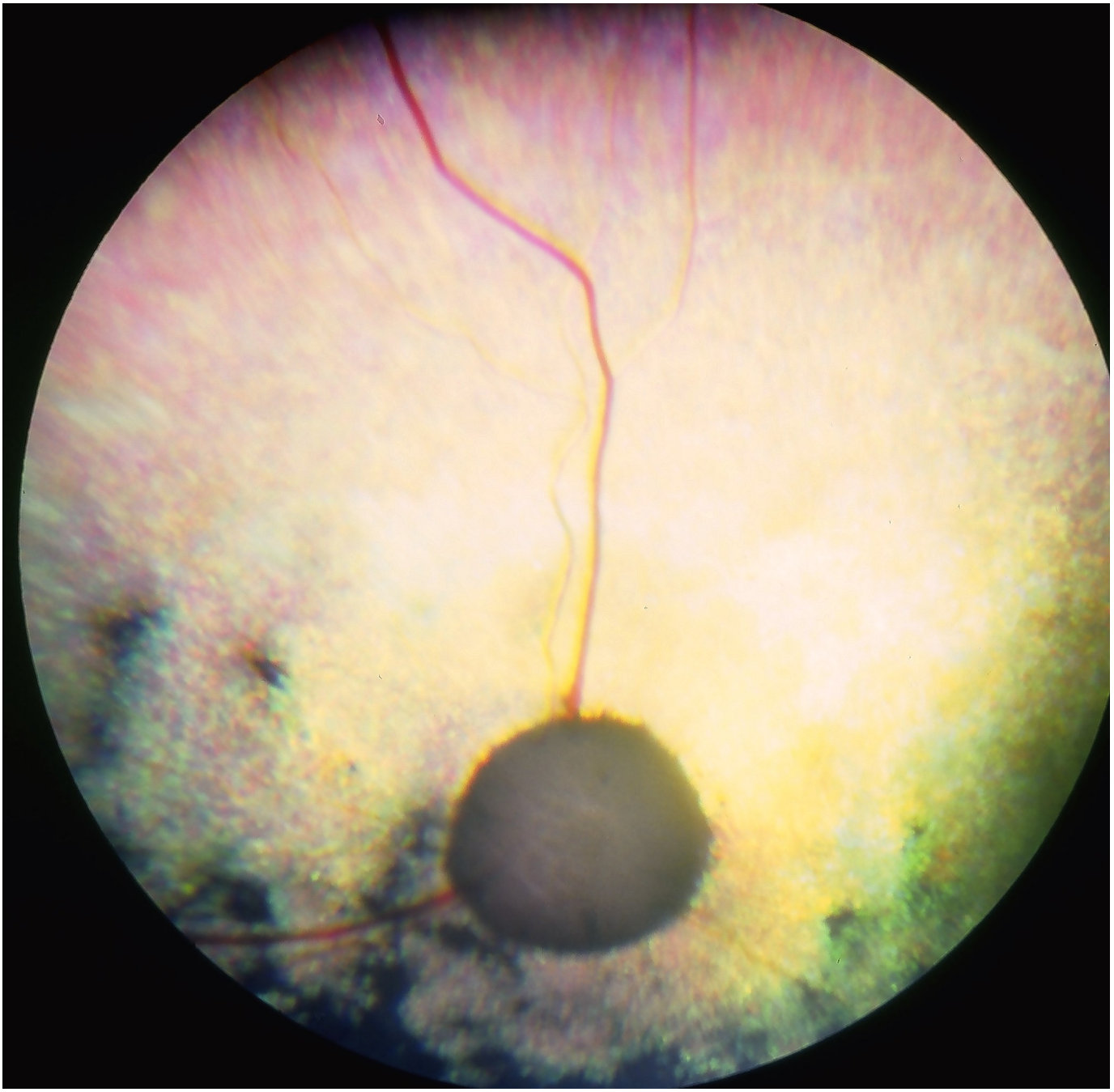
Clinical description

The disease affects relatively young dogs. Nyctalopia is not usually present early in the disease. Complete blindness between 3 and 4 years of age.

New data

New references

See Ch 9 (point H) for further information and Ch 8 for veterinary advice



KARELIAN BEAR DOG

PRA

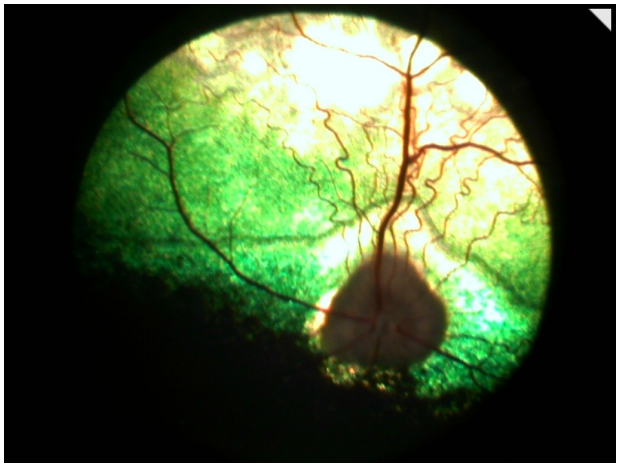


Photo by courtesy of Kaisa Wickström

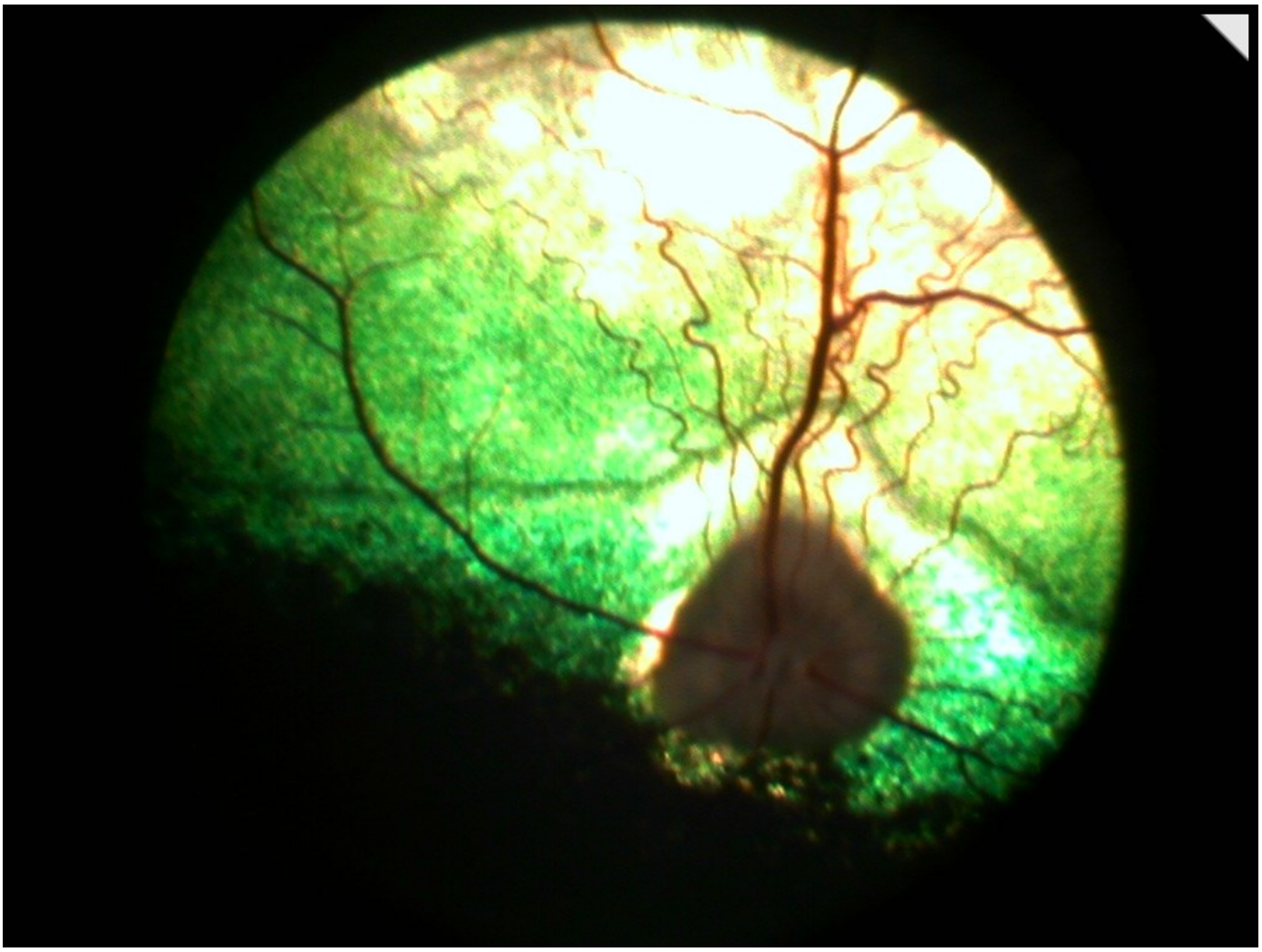
Clinical description

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

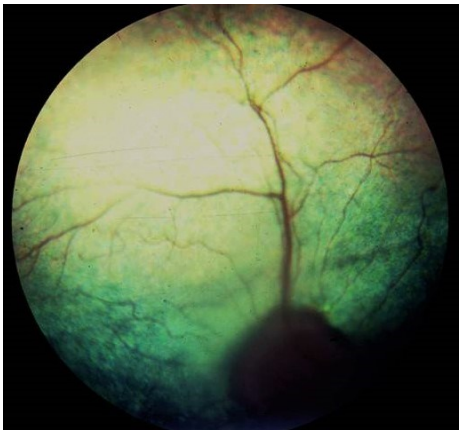
New references

See Ch 9 (point A) for further information and Ch 8 for veterinary advice



LABRADOR RETRIEVER

PRA-Progressive Rod Cone Degeneration (PRCD)



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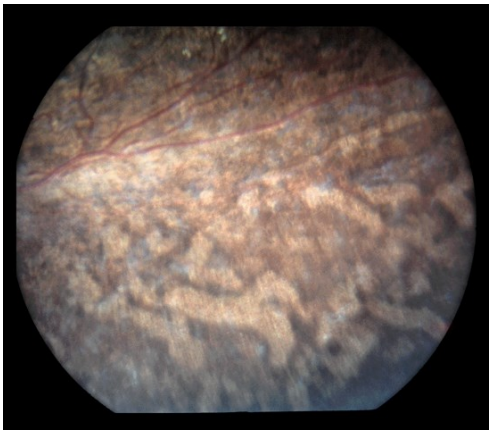


2.

Photos by courtesy of Gilles Chaudieu (1.) Barbara Nell (2.)

Clinical description

In the first stage is characterized by a grayish horizontal band on both sides of the optic disc. The tapetal area will become progressively hyperreflective peripherically. The retinal vessels become thinner with time.

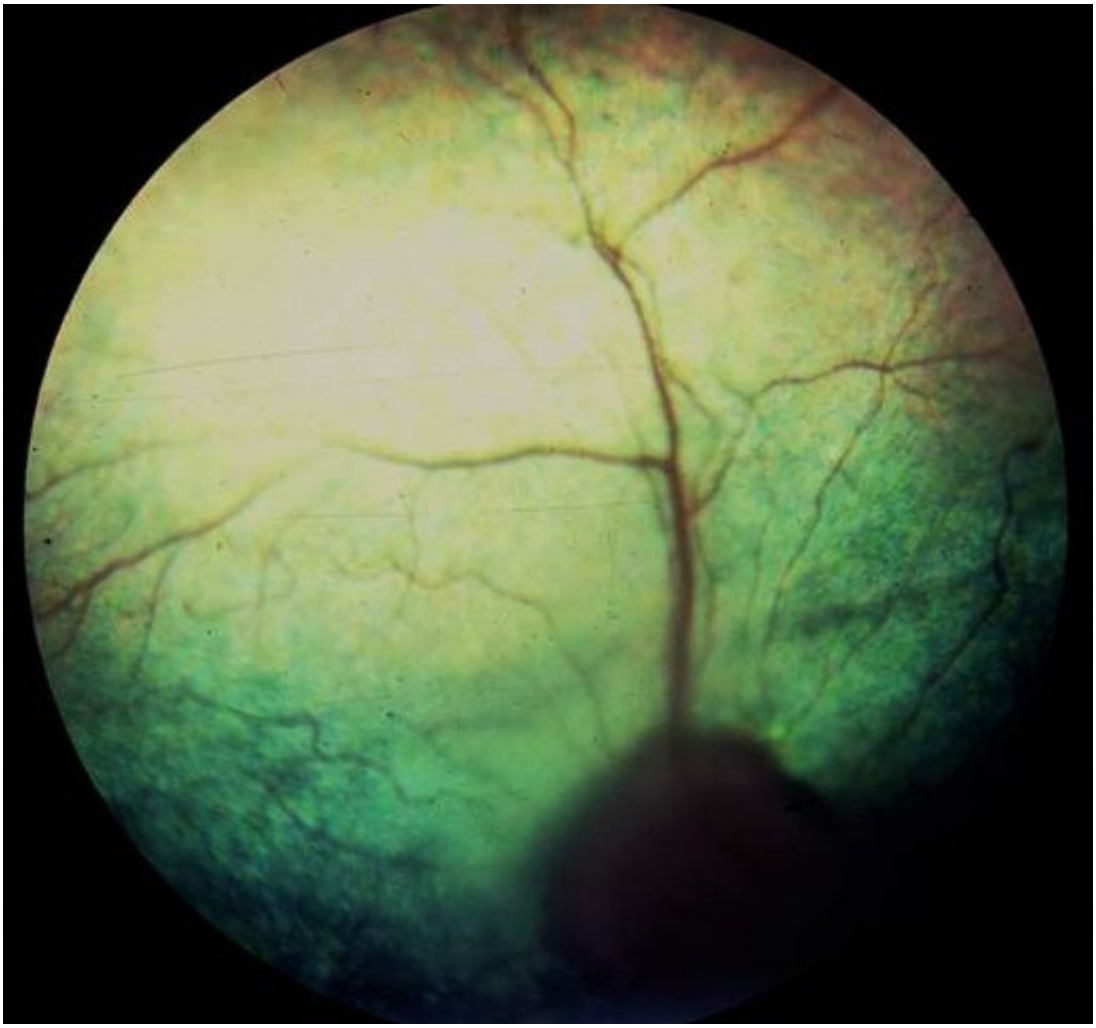
In the non tapetal area there is an obvious depigmentation.

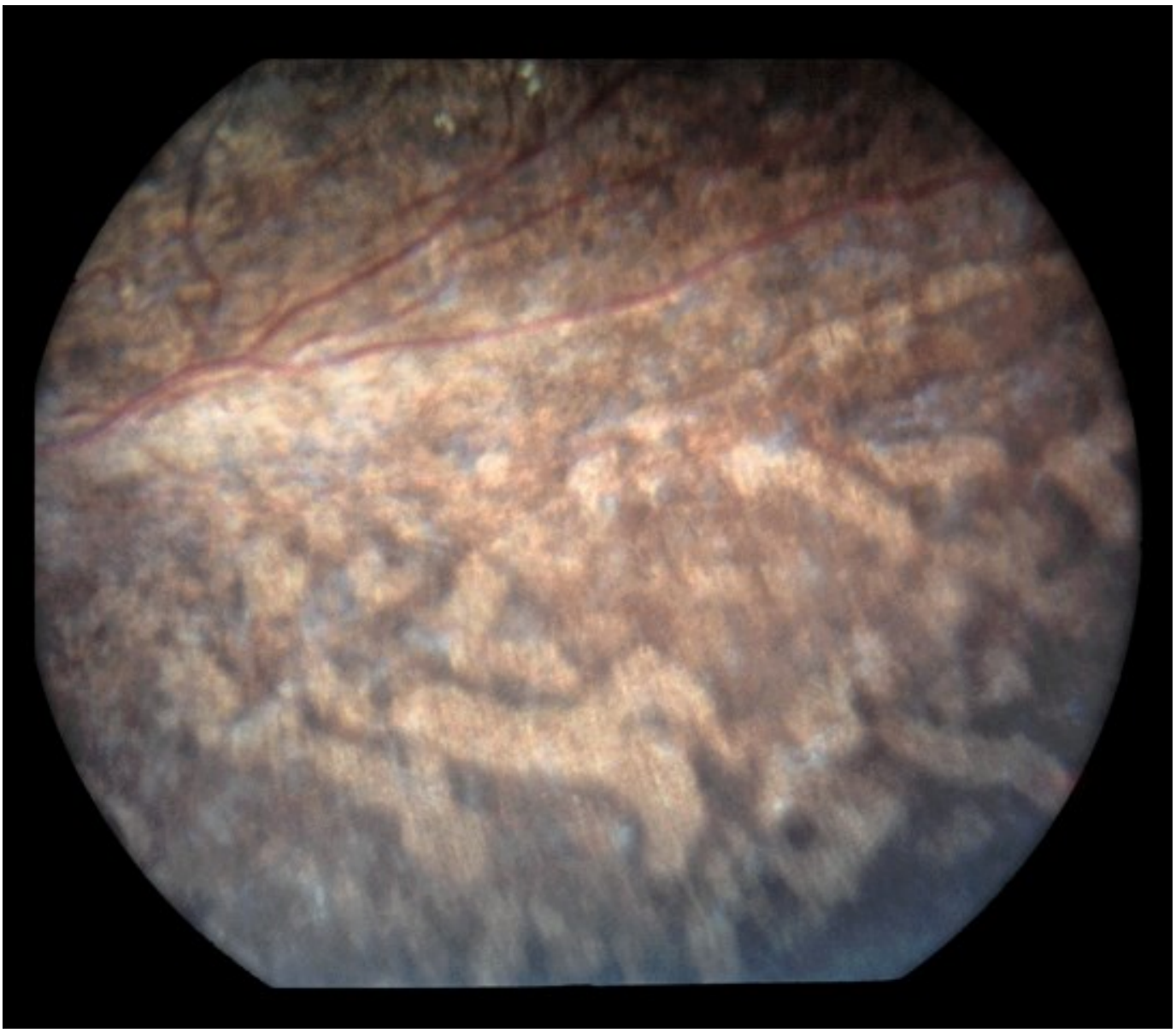
The night blindness appears between 4 and 6 years of age. Complete blindness usually between 6 and years of age.

New data

New references

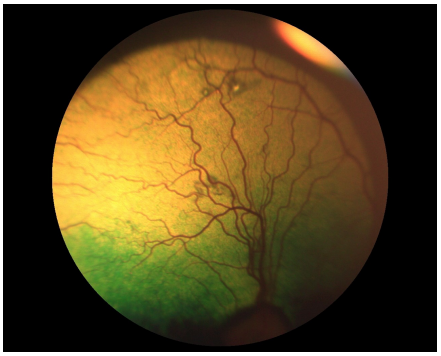
See Ch 9 (point G) for further information and Ch 8 for veterinary advice





LABRADOR RETRIEVER

Retinal Dysplasia Multifocal (MFRD) and Geographic (GRD)



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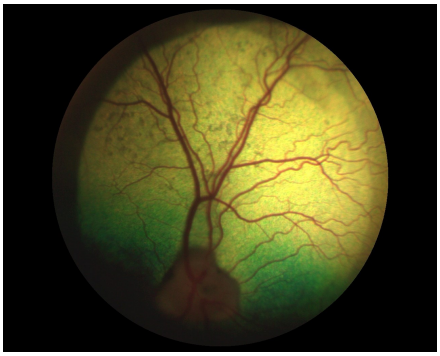

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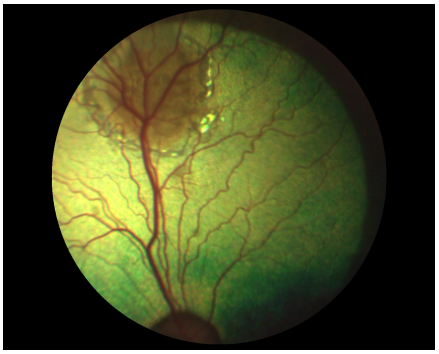


3.

Photos by courtesy of Adolfo Guandalini (1. MFRD) and Zselyke Szentpétery (2 & 3. MFRD & GRD)

Clinical description

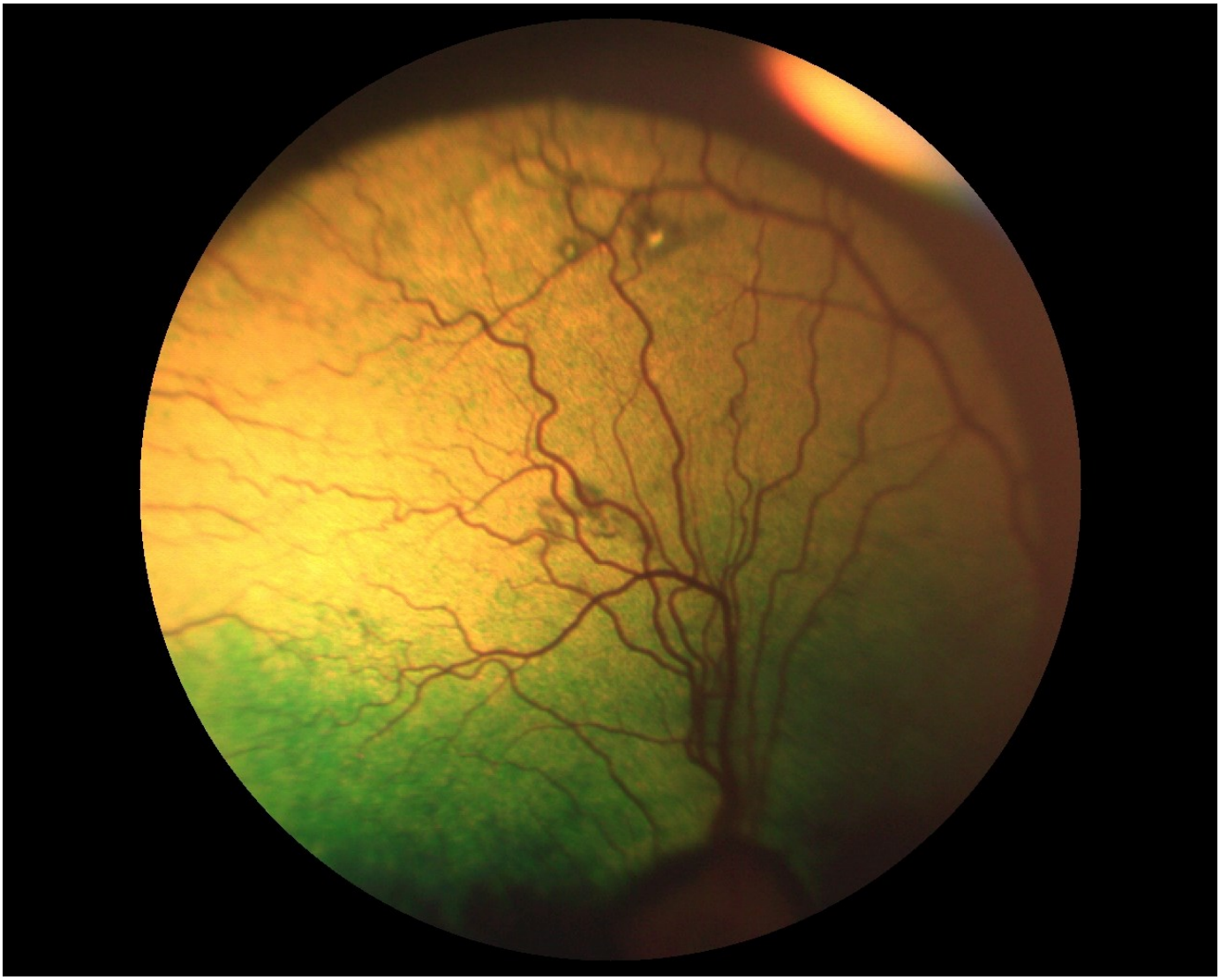
MFRD: In MFRD the lesions consist of what are described on ophthalmoscopic examination as retinal "folds". These are areas of reduced tapetal reflectivity, appearing as gray or green dots, linear or curvilinear streaks (or V- or Y-shaped streaks).

GRD: In GRD the lesion consists of an irregular or horseshoe-shaped area, typically among the blood vessels dorsal to the ONH. The lesion may have areas of both retinal thinning and retinal thickening and elevation.

New data

New references

See Ch 9 (point I) for further information and Ch 8 for veterinary advice



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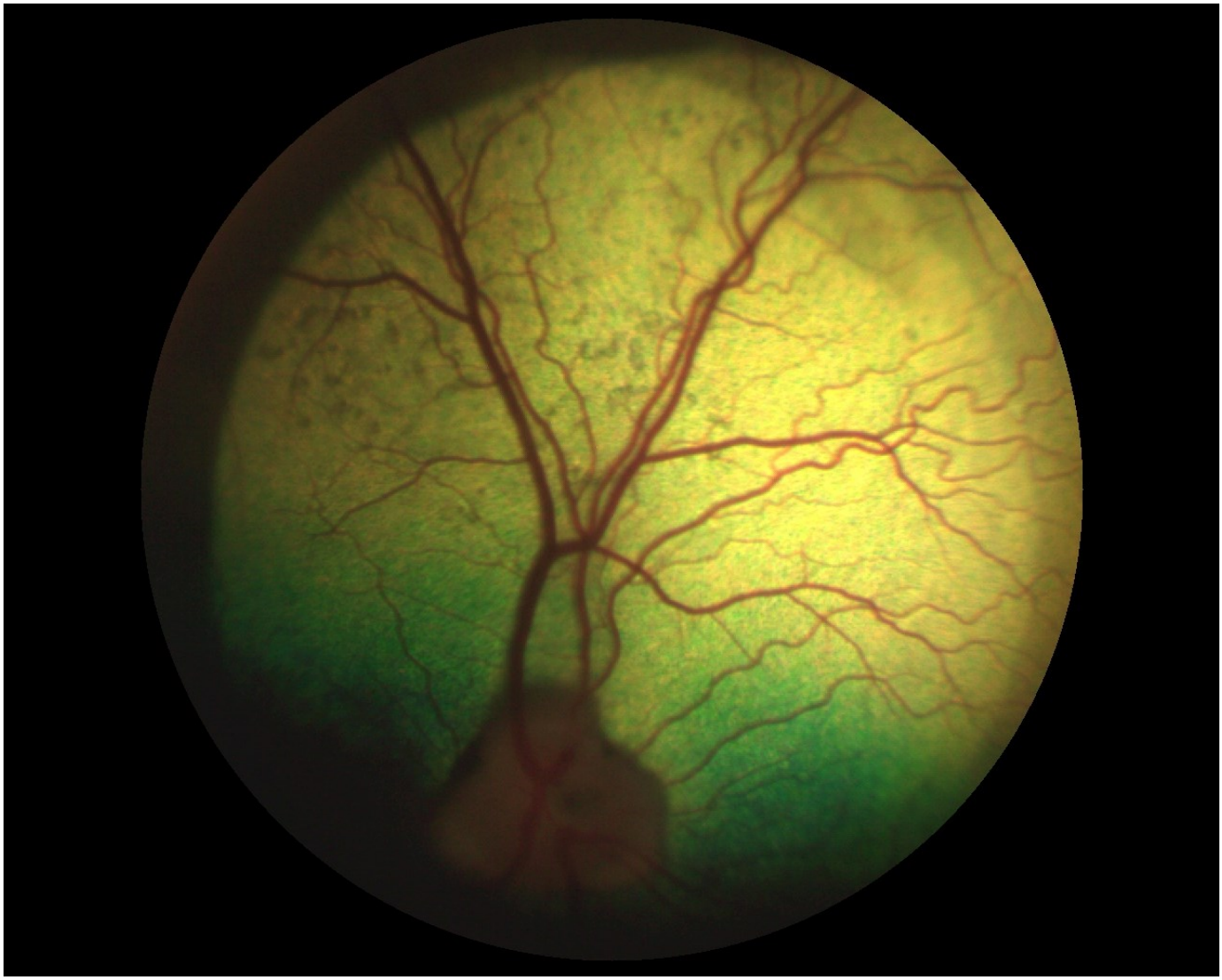

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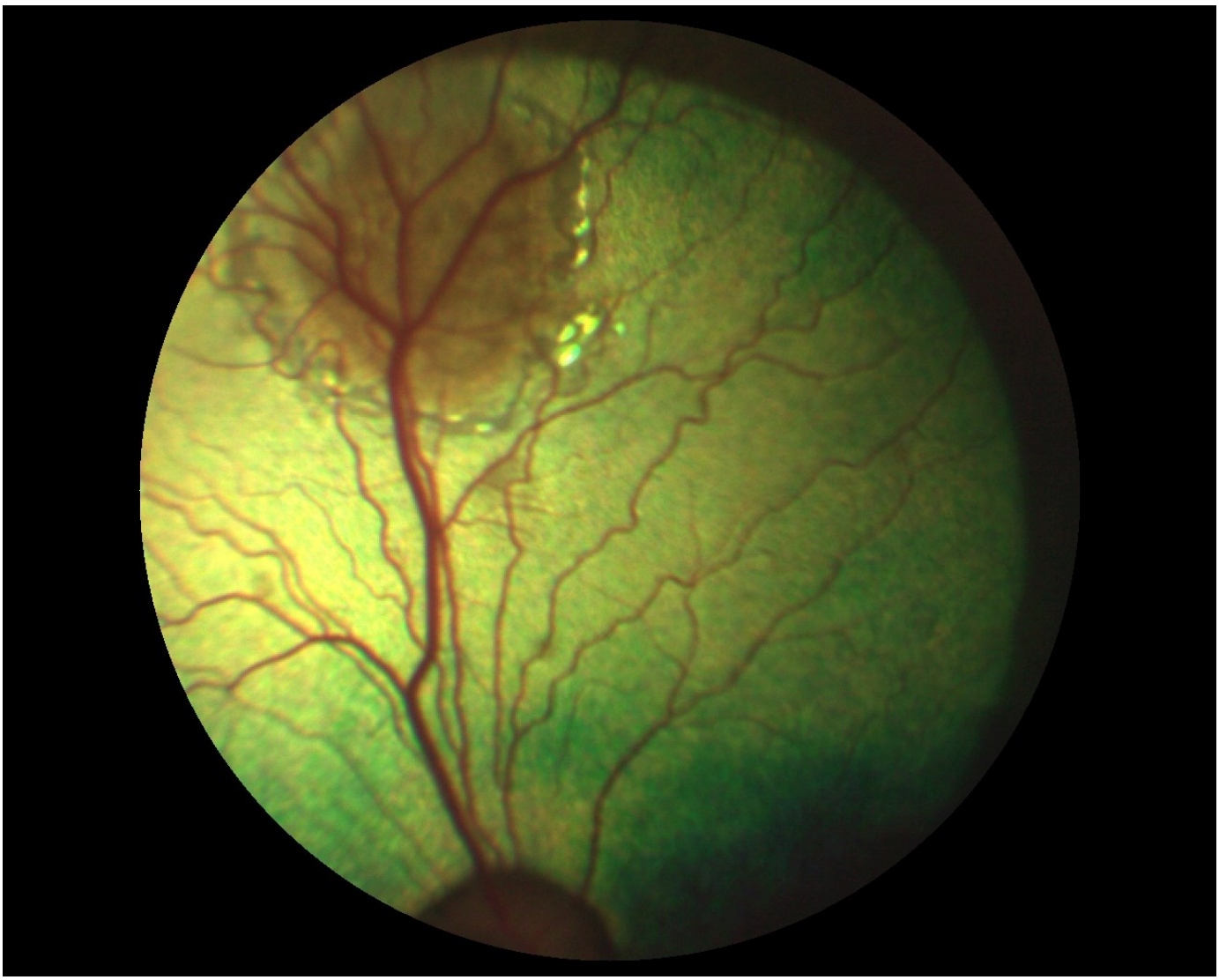


3.

LAGOTTO ROMAGNOLO

PRA PRCD

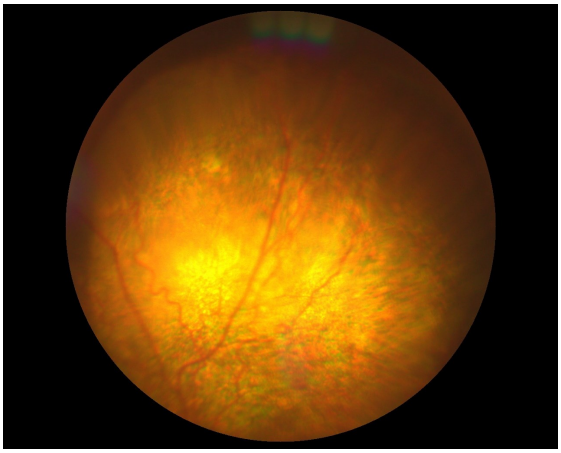


Photo by courtesy of Adolfo Guandalini

Clinical description

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation, pigmentary changes in the non-tapetum and the ONH.

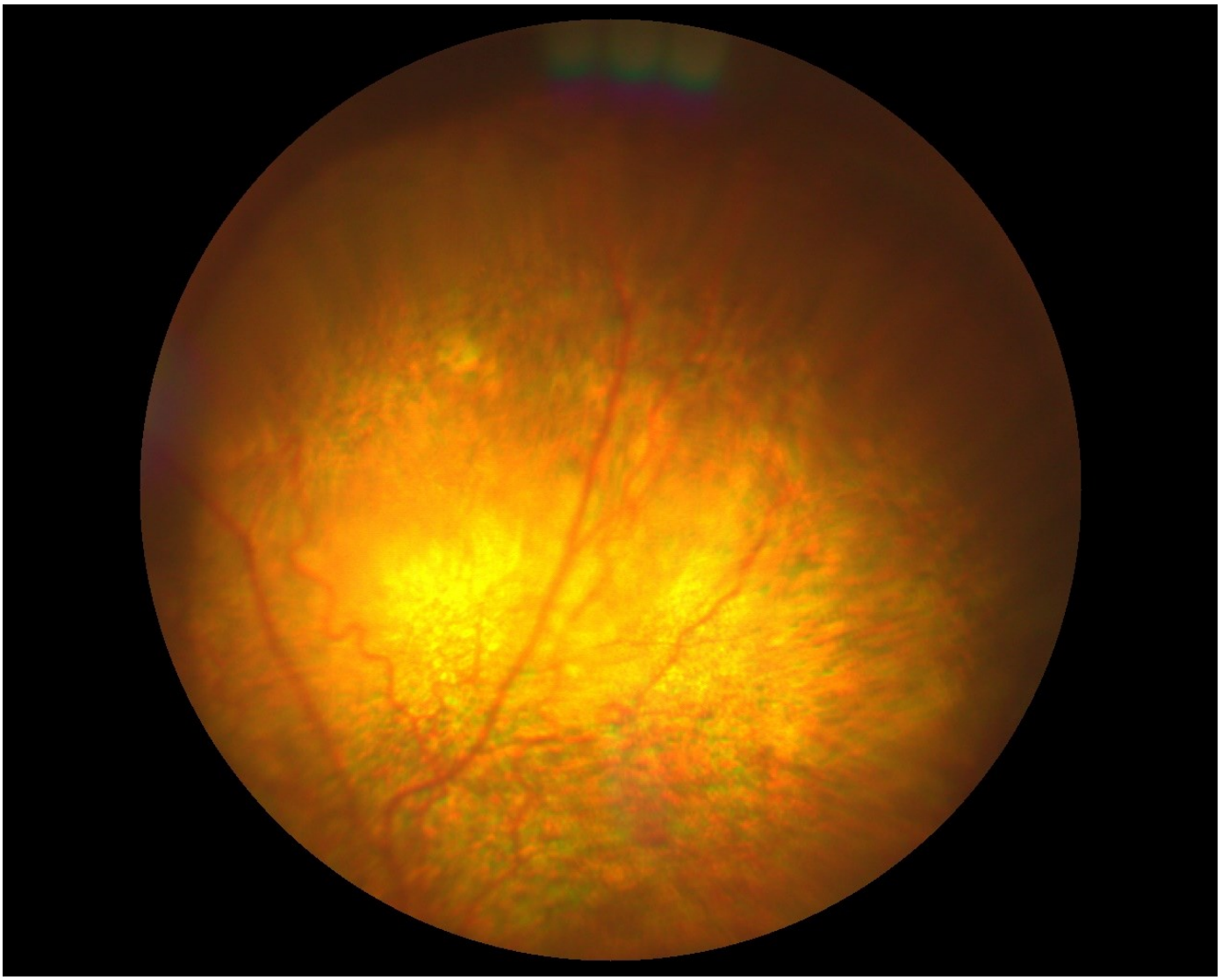
The median age at the time of diagnosis was 8.5 years of age.

New data

New references

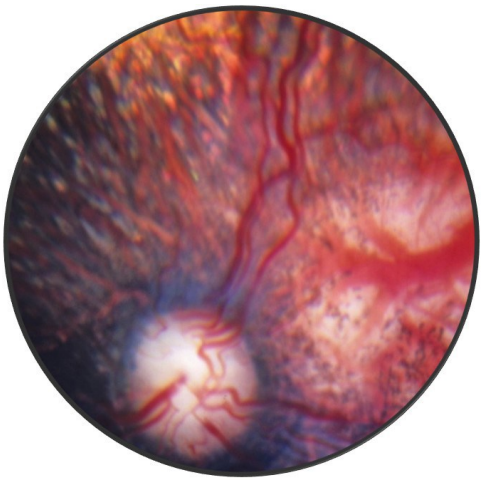
Crasta M, Arteaga K, Barachetti L & Guandalini A. A multicenter retrospective evaluation of the prevalence of known and presumed hereditary eye diseases in Lagotto Romagnolo dog breed within a referral population in Italy (2012-2020). Vet Ophthalmol 2022;00:1-8.

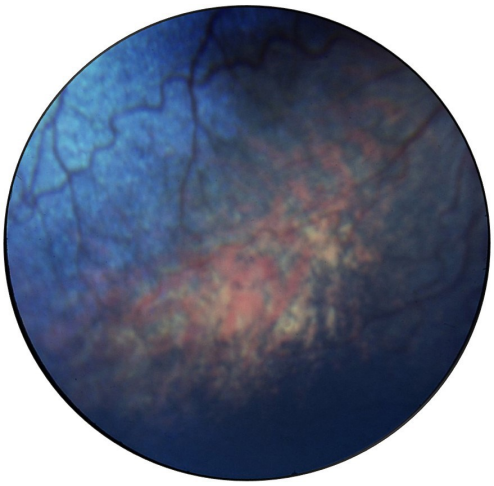
See Ch 9 (point E) for further information and Ch 8 for veterinary advice



LANCASHIRE HEELER

Collie Eye Anomaly (CEA)





Photos by courtesy of Peter Bedford

Clinical description

CEA is a congenital ocular syndrome involving defects of the posterior vascular and fibrous tunics of the eye. It is related to an abnormal mesodermal differentiation which results in defects of sclera, choroid, optic disc, retina and retinal vasculature.

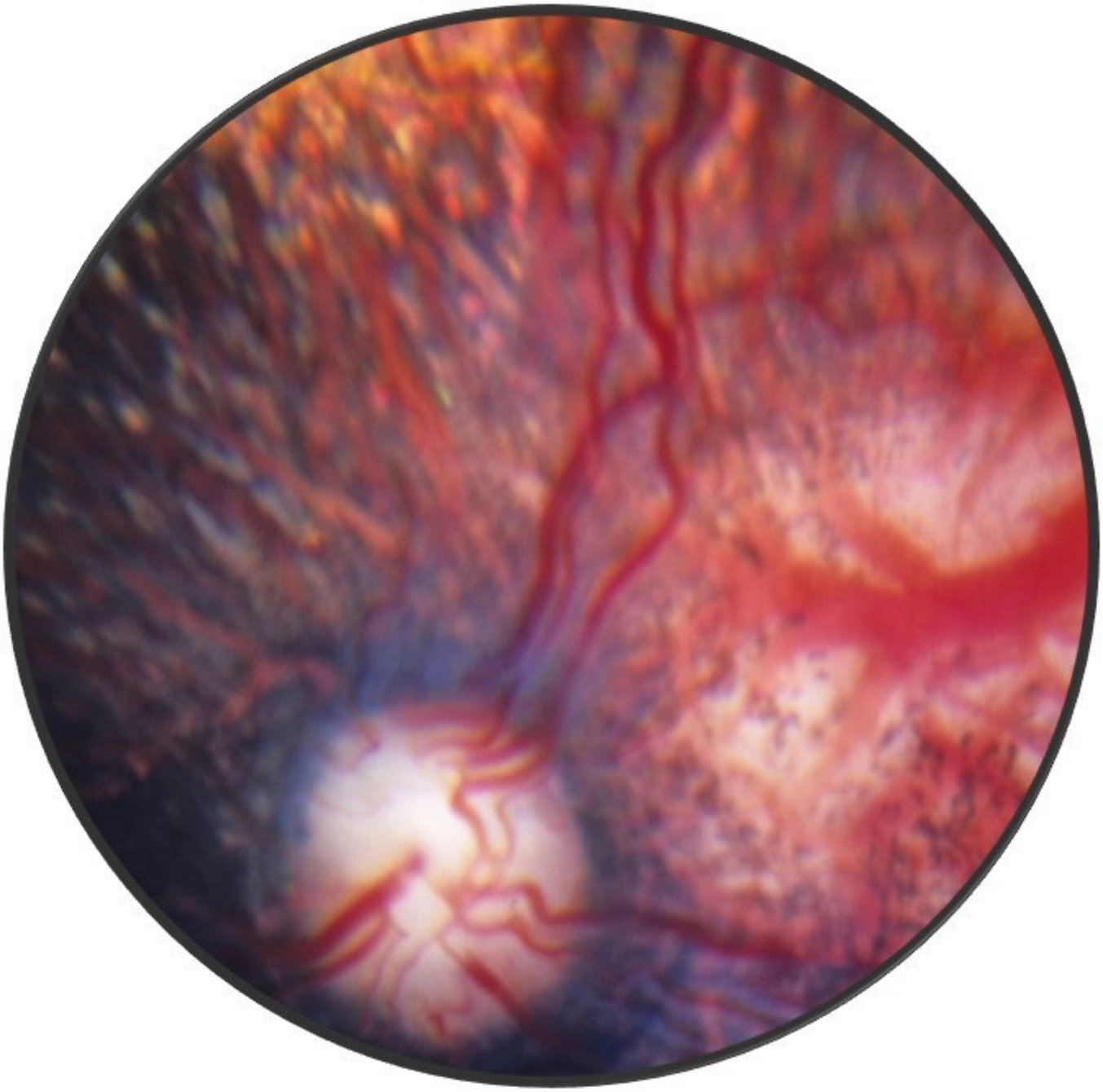
CEA affects primarily the Collie breeds.

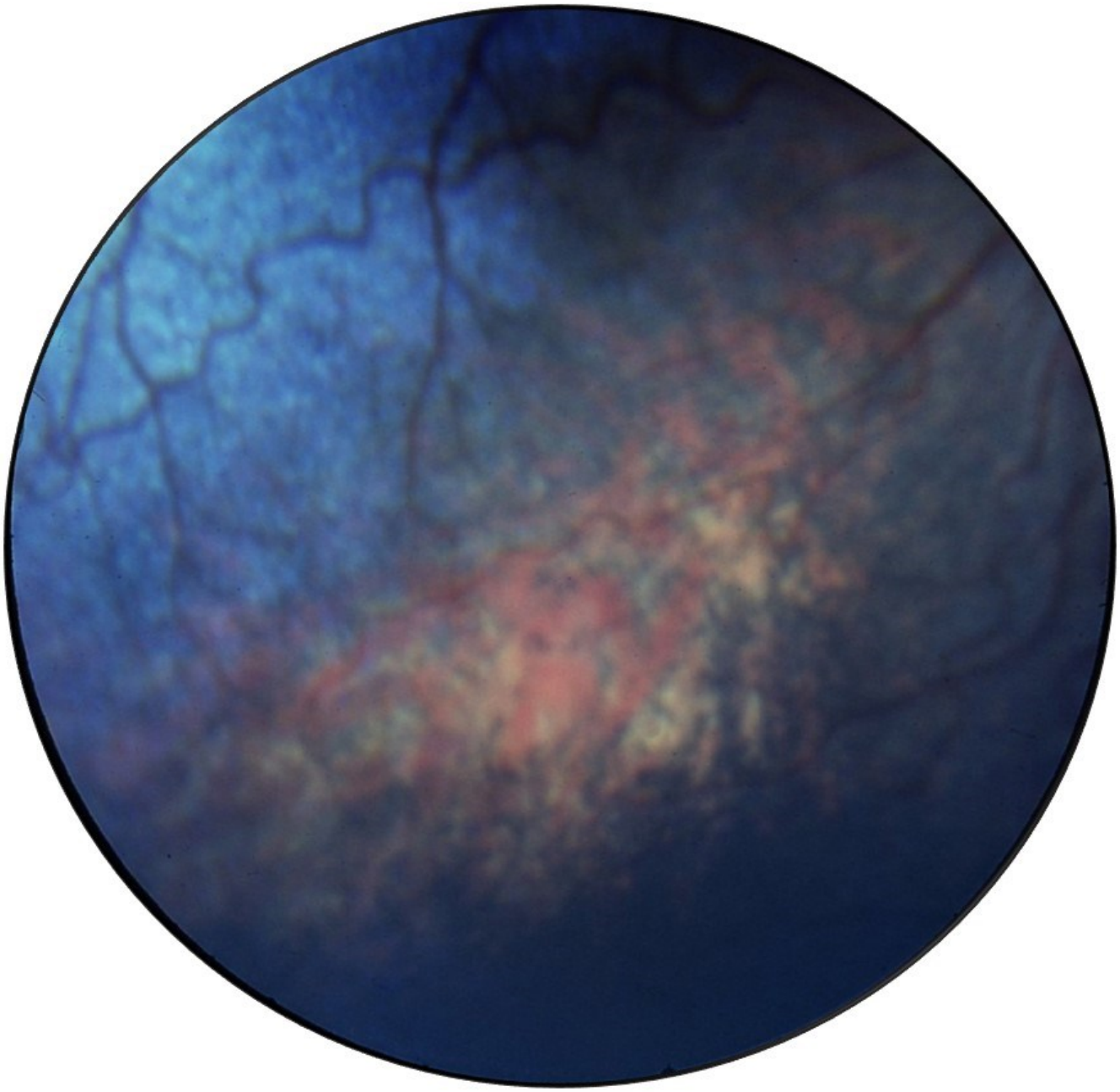
Clinical findings:
Choroidal hypoplasia: bilateral but asymmetric defect, located temporally to the ONH. Within this area the choroidal vessels are abnormal both in size and distribution.

New data

New references

See Ch 9 (point B) for further information and Ch 8 for veterinary advice





LAPPONIAN HERDER

Canine Multifocal Retinopathy (CMR 3)

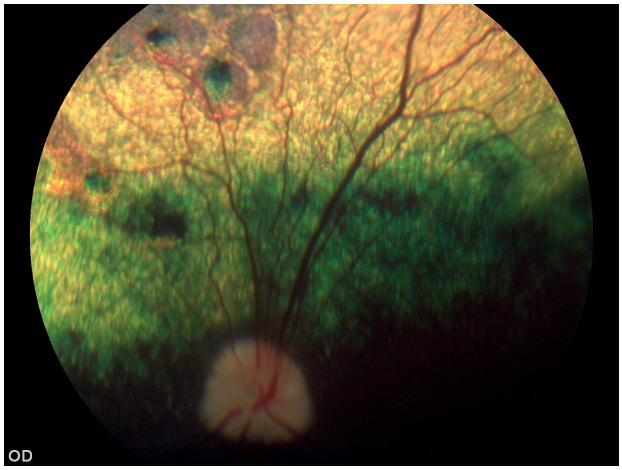


Photo by courtesy of Kaisa Wickström

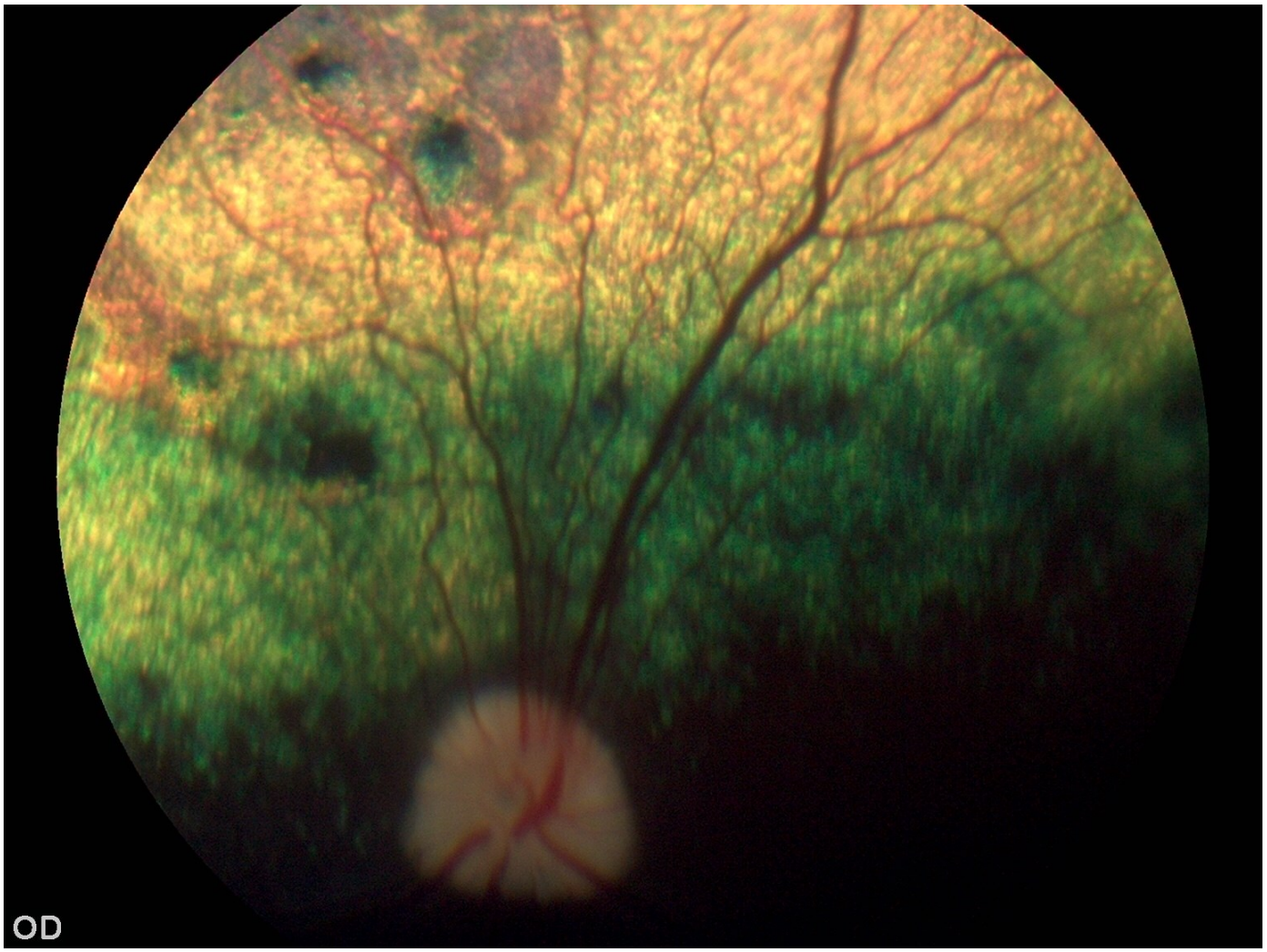
Clinical description

In CMR3 it was showed that the lesions developed between 9 months and 2 years of age and that some could disappear over time. Similarity in appearance to some MFRD lesions was noted and the suggestion made that there may be some overlap in the conditions, with perhaps some carriers for the cmr3 mutation developing a MFRD phenotype.

New data

New references

See Ch 9 (point A) for further information and Ch 8 for veterinary advice


OD

LAPPONIAN HERDER

PRA IFT122-variant

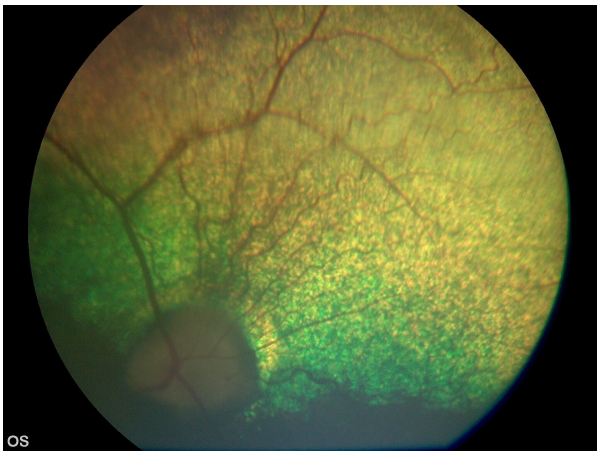


Photo by courtesy of Kaisa Wickström

Clinical description

Typical first clinical signs of IFT122-PRA affected dogs are night blindness and diffuse tapetal hyperreflectivity. The PRA is usually designed at the age of 5-12 years. Since disease progression is slow, some dogs still have some visual capacity left at the age of 13 years.

New data

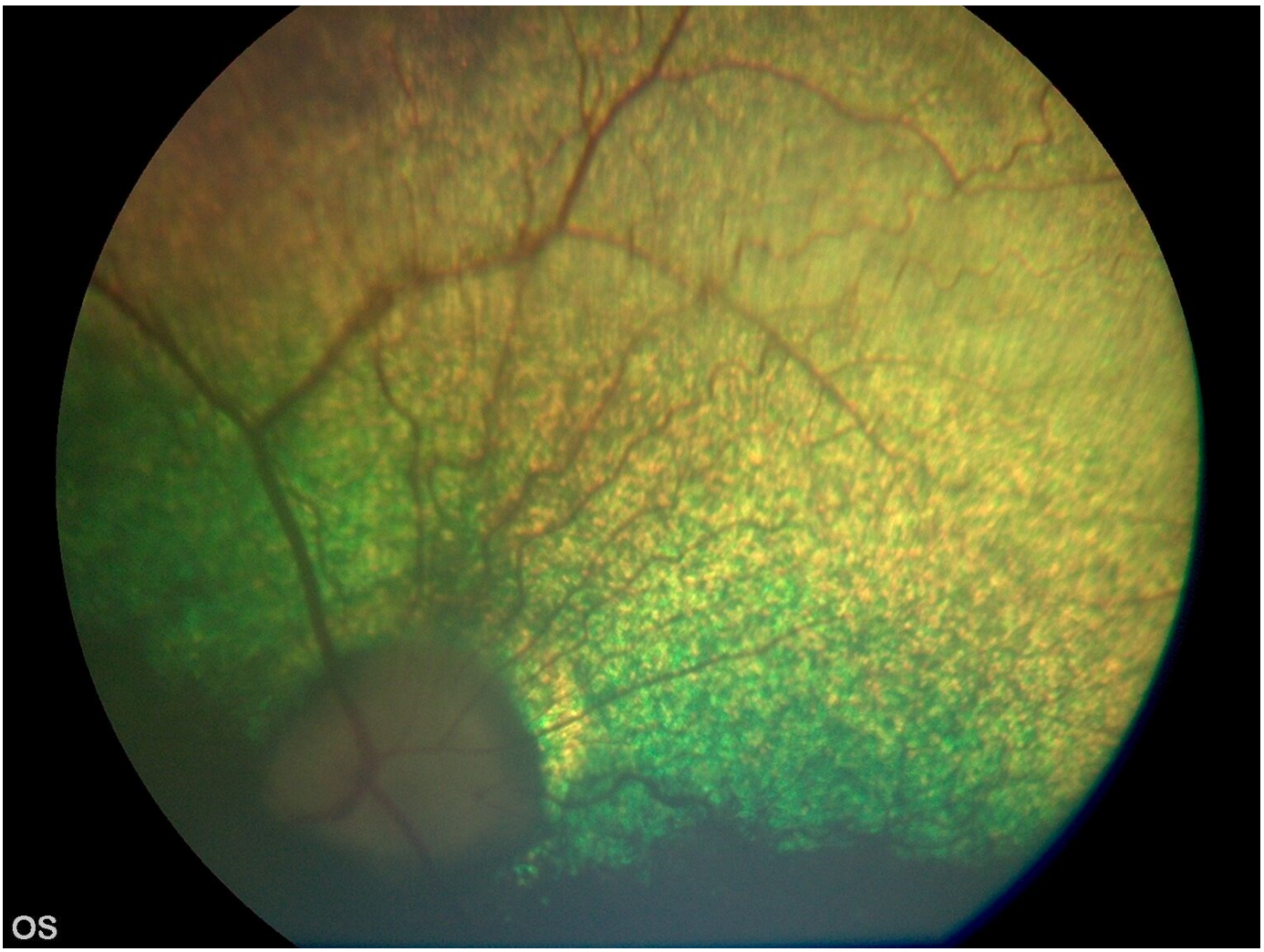
A genetic variant of the intraflagellar transport 122 (IFT122) gene is responsible of this type of PRA.

Inherited as autosomal recessive.

New references

Kaukonen M, Pettinen I-T, Wickstrom K et al. A missense variant in IFT122 associated with a canine model of retinitis pigmentosa. Hum Genet. 2021 Nov;140(11):1569-1579.

See Ch 8 for veterinary advice


OS

LHASA APSO

PRA4

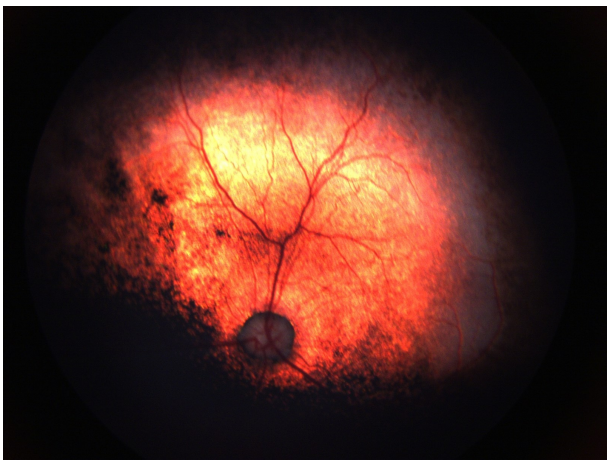


Photo by courtesy of Kristina Kafarnik and the RVC

Clinical description

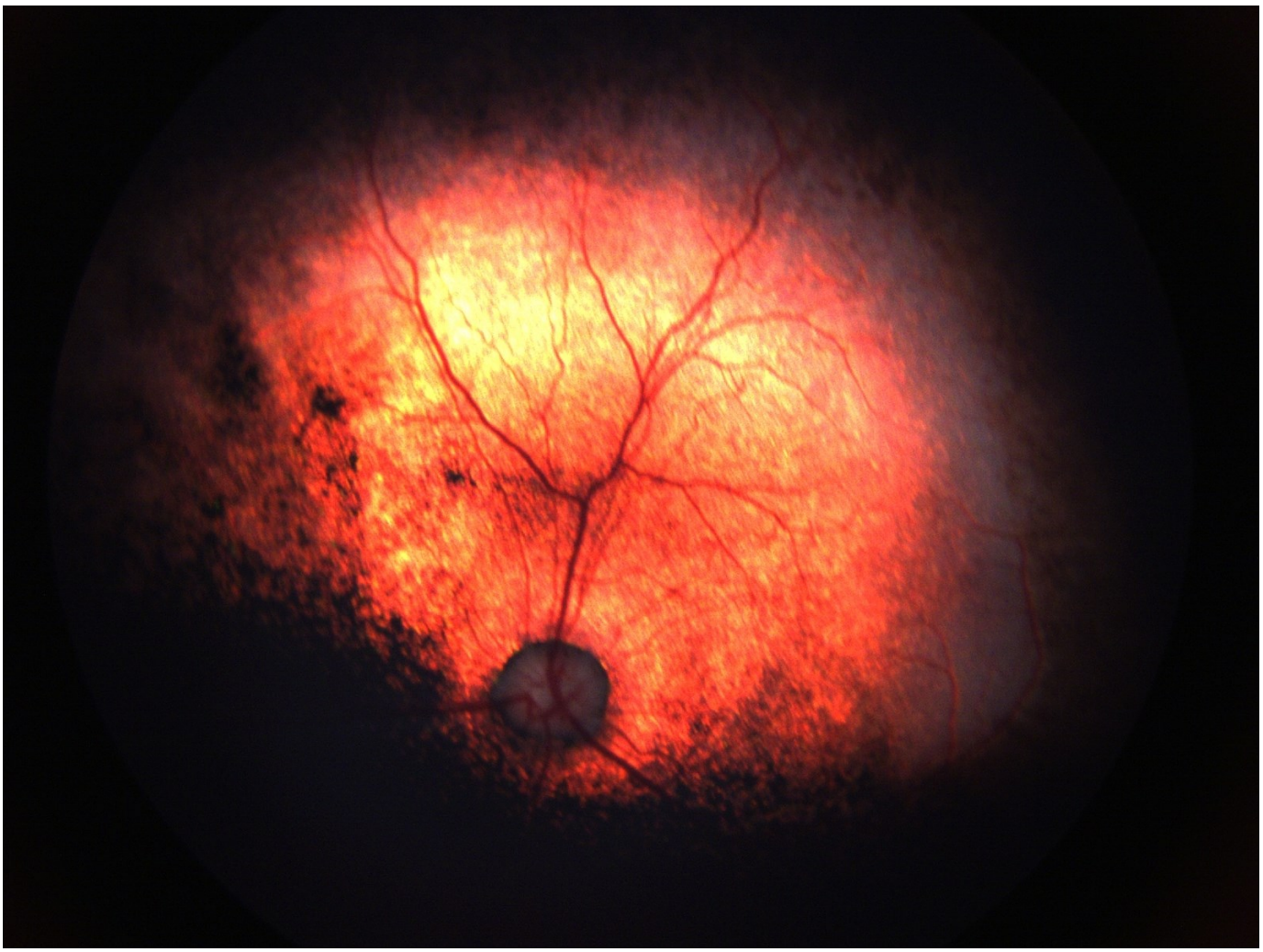
The age of onset of in this breed is variable. First clinical signs could be present at the age of 2.5 years. But sometimes it takes several years until the owner will notice the symptoms of the disease. Clinical signs start by loss of night vision when owners notice that the dog is afraid of darkness, then the disease progress to loss of day vision.

Bilateral tapetal hyperreflectivity was observed as well as mild vascular. attenuation and changes in the optic disc coloration.

New data

New references

See Ch 9 (point D) for further information and Ch 8 for veterinary advice



MAREMMA SHEEPDOG

PRA

Photo by courtesy of Adolfo Guandalini

Clinical description

PRA is a bilateral and progressive loss of vision which starts with loss night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation, pigmentary changes in the non-tapetum and the ONH

New data

New references

See Ch 9 (point D) for further information and Ch 8 for veterinary advice

MASTIFF

Rhodopsin-Dominant PRA

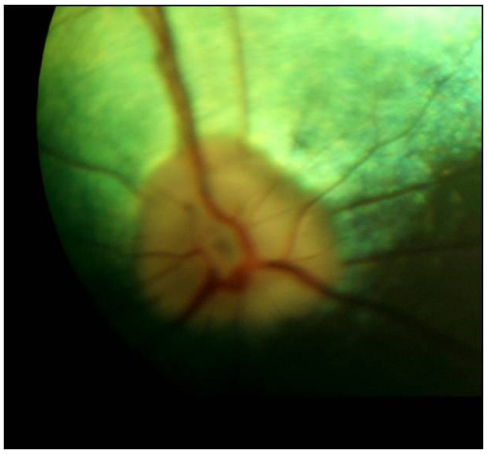


Photo by courtesy of Gilles Chaudieu

Clinical description

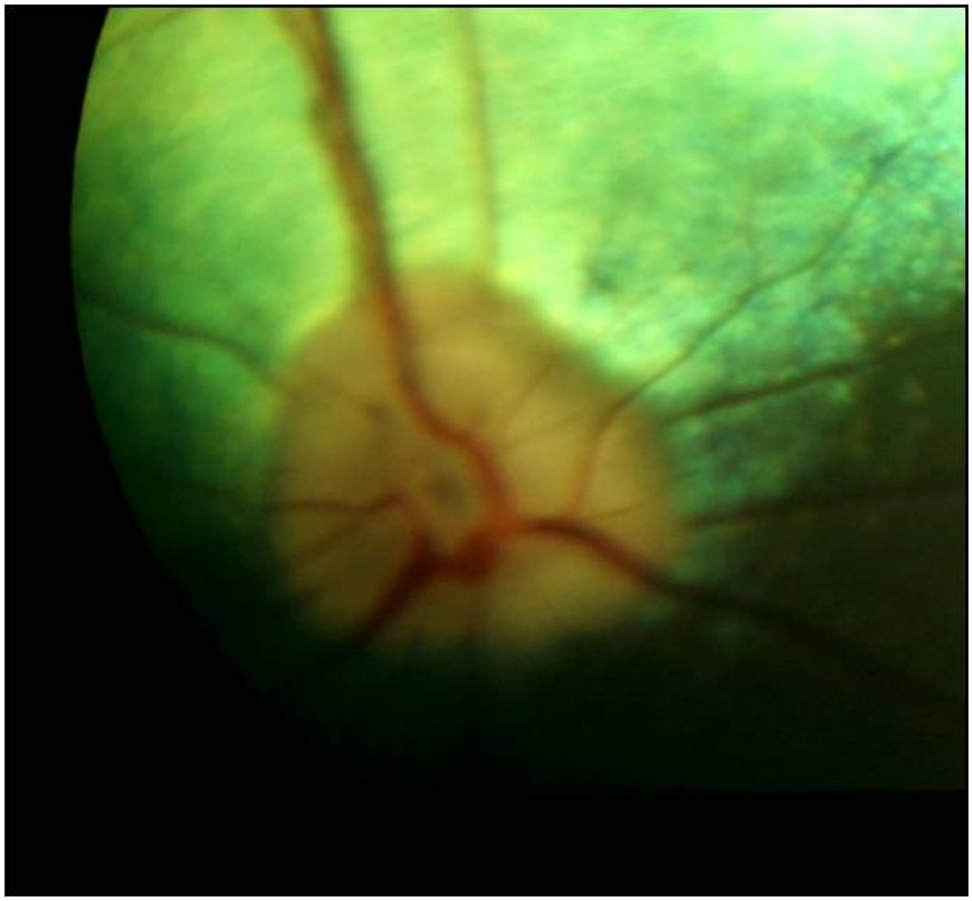
Acute damage to photoreceptors is induced by light exposure at levels that are not harmful to normal animals.

Typically , affected dogs show symptoms of the disease starting at approximately 2-3 years of age , however, clinical signs including night blindness have been observed in puppies as young as 6 weeks. Progression of the disease is fairly quick with most affected dogs suffering complete blindness within 1-2 years from the onset of the symptoms.

New data

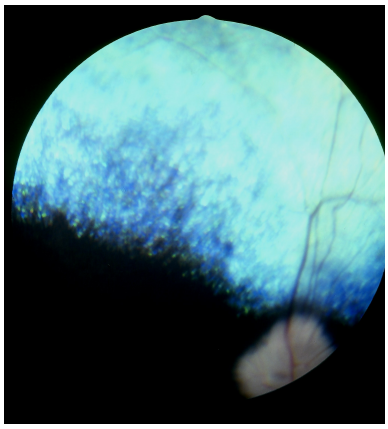
New references

See Ch 9 (point H) for further information and Ch 8 for veterinary advice



MINIATURE SCHNAUZER

TYPE B1 PRA, HIVEP3



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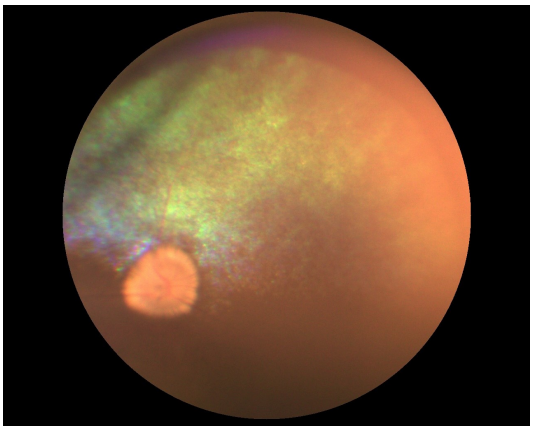


2.

Photos by courtesy of Gilles Chaudieu (1) & Adolfo Guandalini (2)

Clinical description

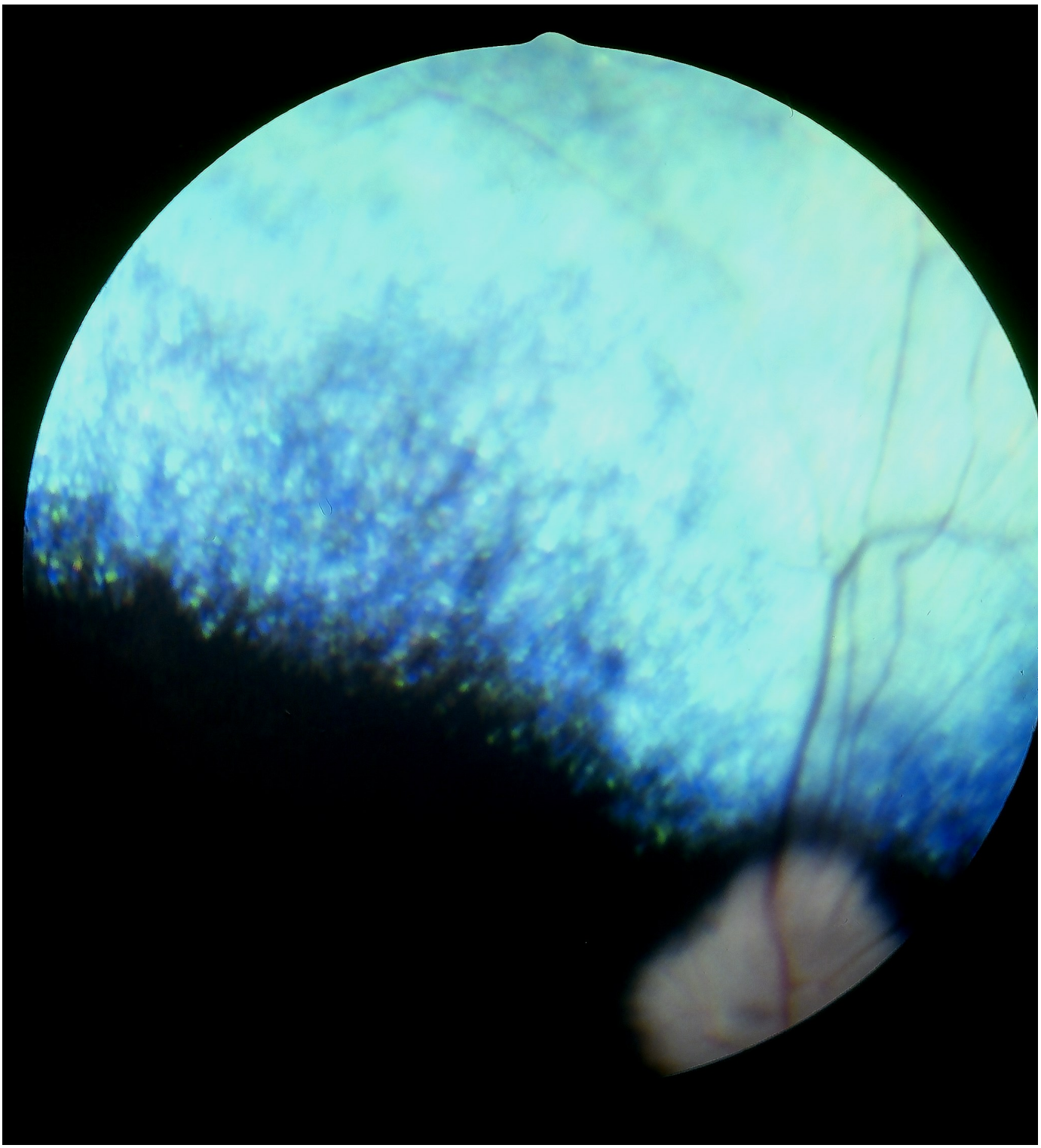
The symptoms start with night blindness which is followed with a slow deterioration of vision and complete blindness under any light conditions.

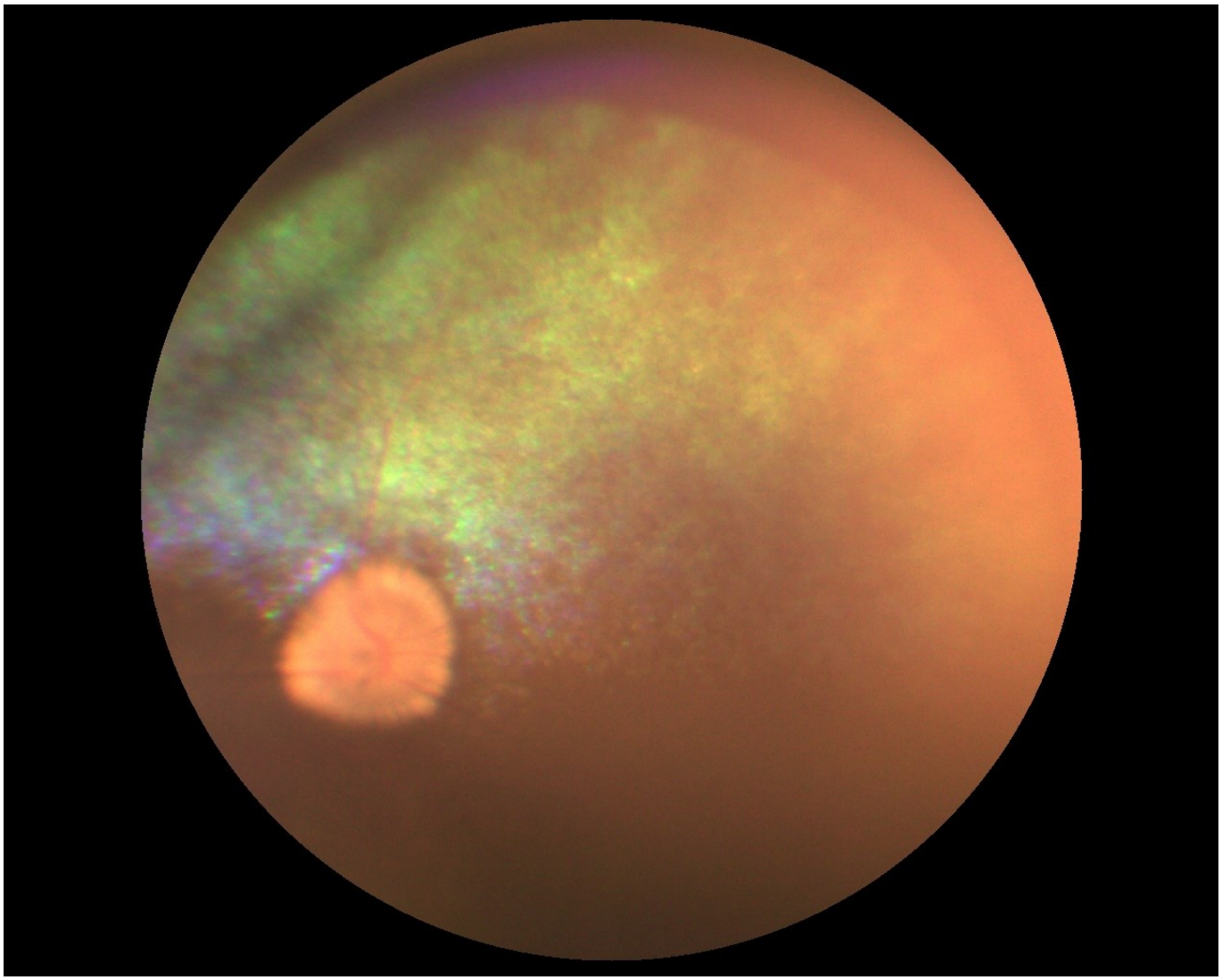
The onset of the clinical signs of this disease is about at 4 years of age.

New data

New references

See Ch 9 (point E) for further information and Ch 8 for veterinary advice





NEAPOLITAN MASTIFF

Multifocal Retinal Dysplasia (MRD)

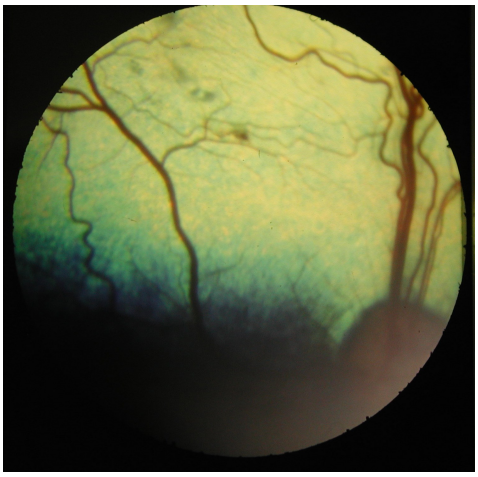


Photo by courtesy of Adolfo Guandalini

Clinical description

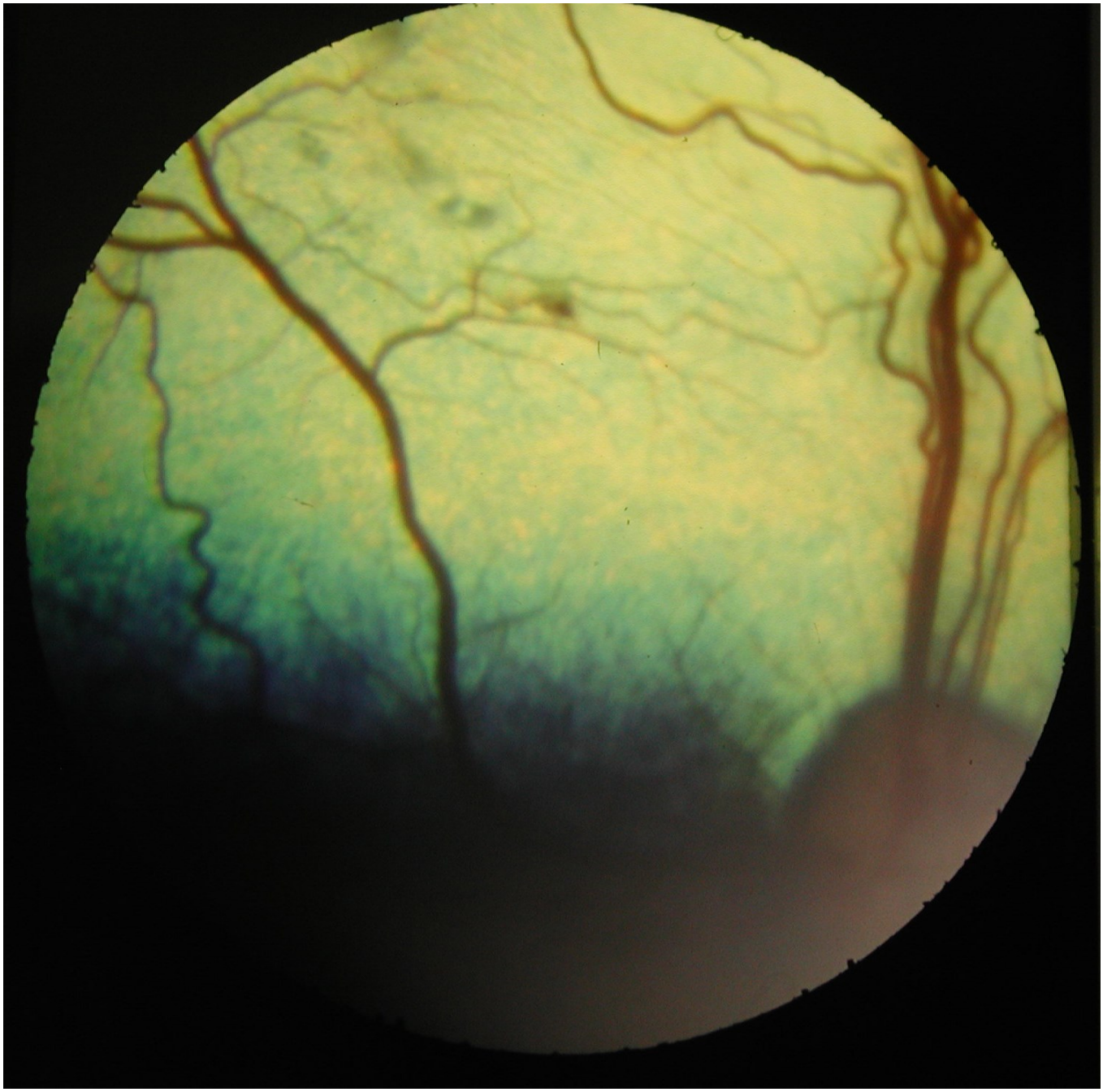
In MFRD the lesions consist of what are described on ophthalmoscopic examination as retinal “folds”. These are areas of reduced tapetal reflectivity, appearing as gray or green dots , linear or curvilinear streaks (or V- or Y-shaped streaks).

It is pretty rare in the breed. Most of the cases observed are focal/multifocal.

New data

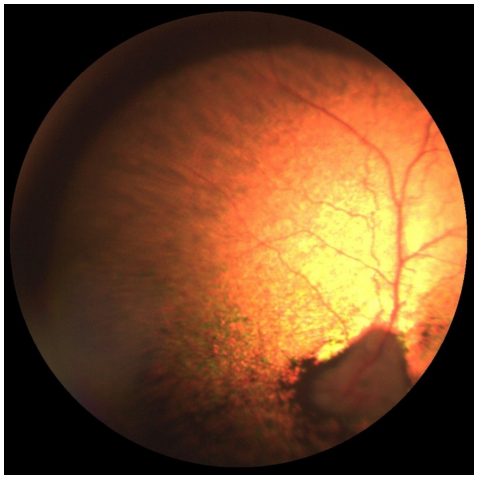
New references

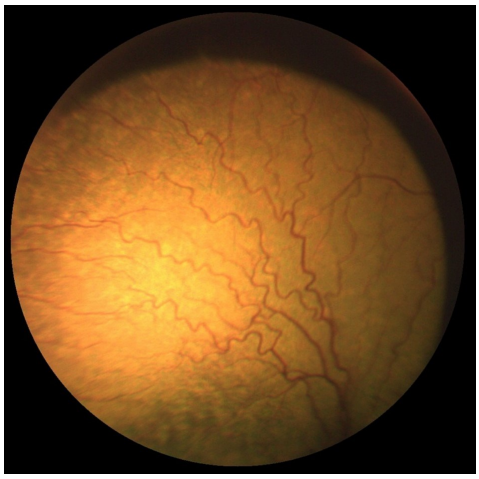
See Ch 9 (point J) for further information and Ch 8 for veterinary advice



POLSKI OWCZAREK NIZINNY

PRA





Photos by courtesy of Kristina Narfström

Clinical description

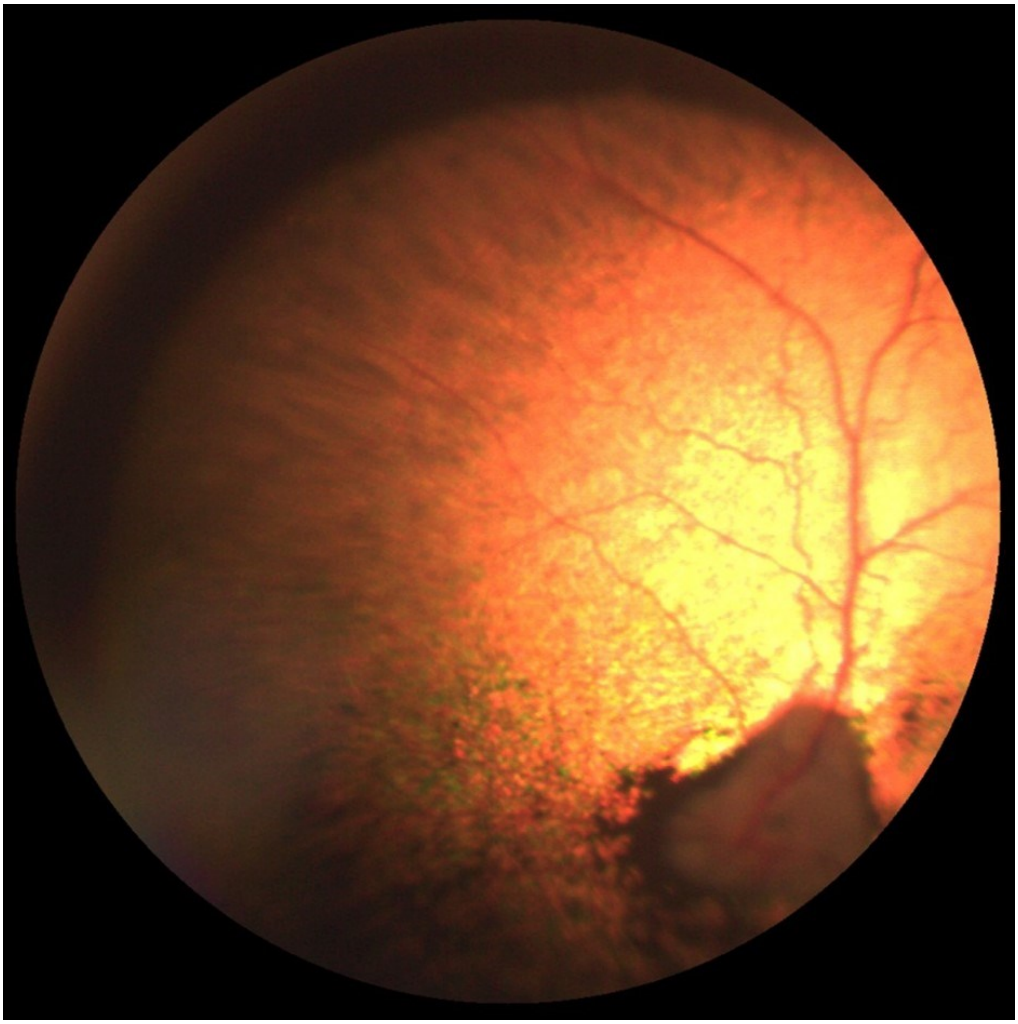
Late onset type of photoreceptor (rod and cone) disease. Early ophthalmoscopic changes were present at about 4.5 years of age. This appears to be a rod-led retinal degeneration.

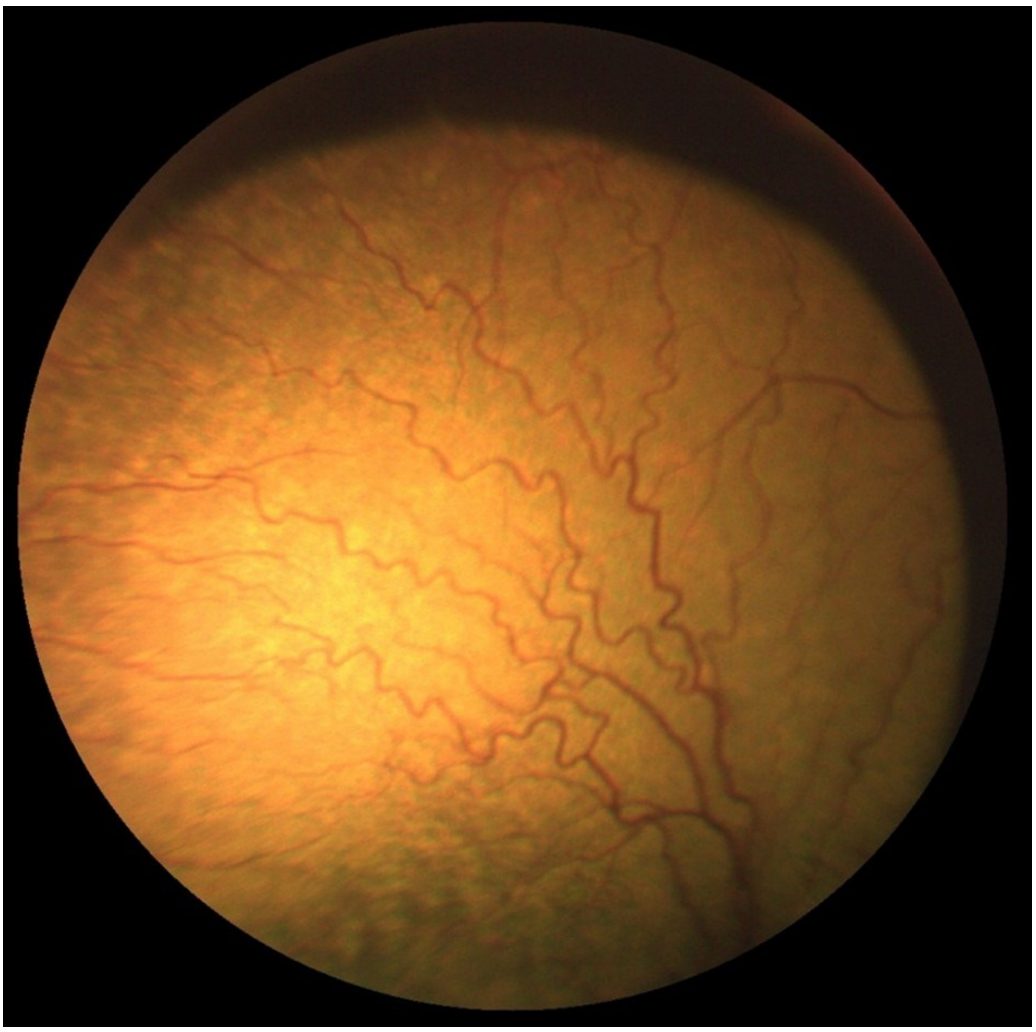
Night blindness is an early sign, ”afraid of the dark” is often shown before funduscopic changes are observed. Generalized vascular attenuation is often seen prior to marked changes in tapetal retinal reflectivity.
Always symmetrical changes in both eyes.

New data

New references

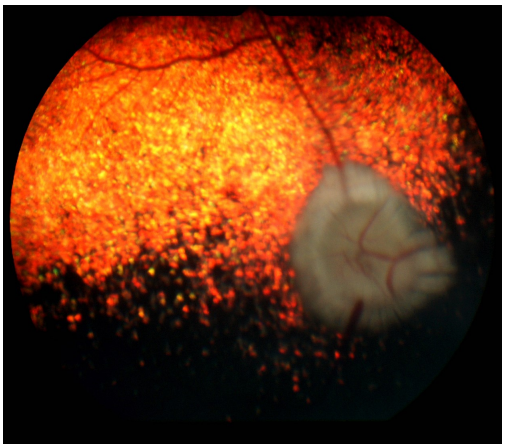
See Ch 9 (point C) for further information and Ch 8 for veterinary advice

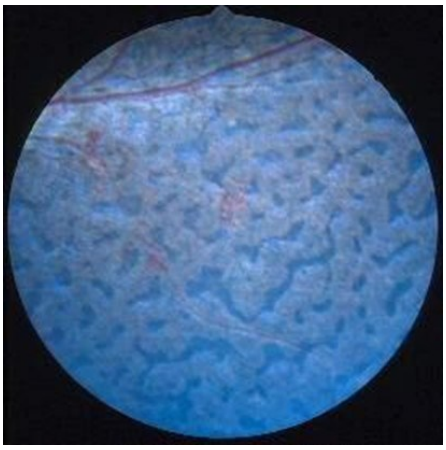




POODLE

PRA PRCD





Photos by courtesy of Gilles Chaudieu

Clinical description

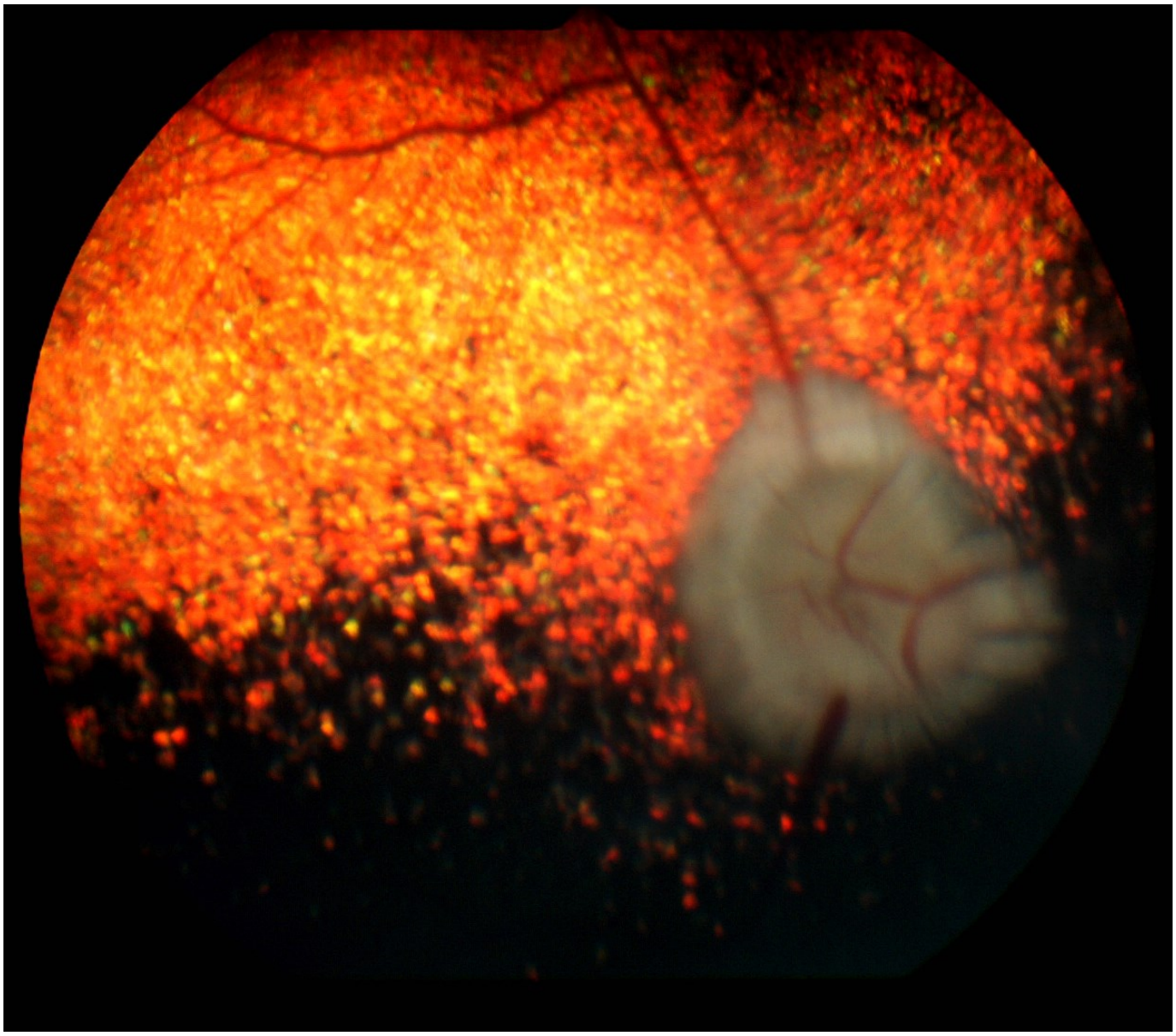
Most important form of PRA. In Miniature Poodle night blindness was noted in dogs between 3 and 5 years of age. This progresses to complete blindness at between 5 and 7 years of age. The onset and progression do vary considerably between and within breeds.

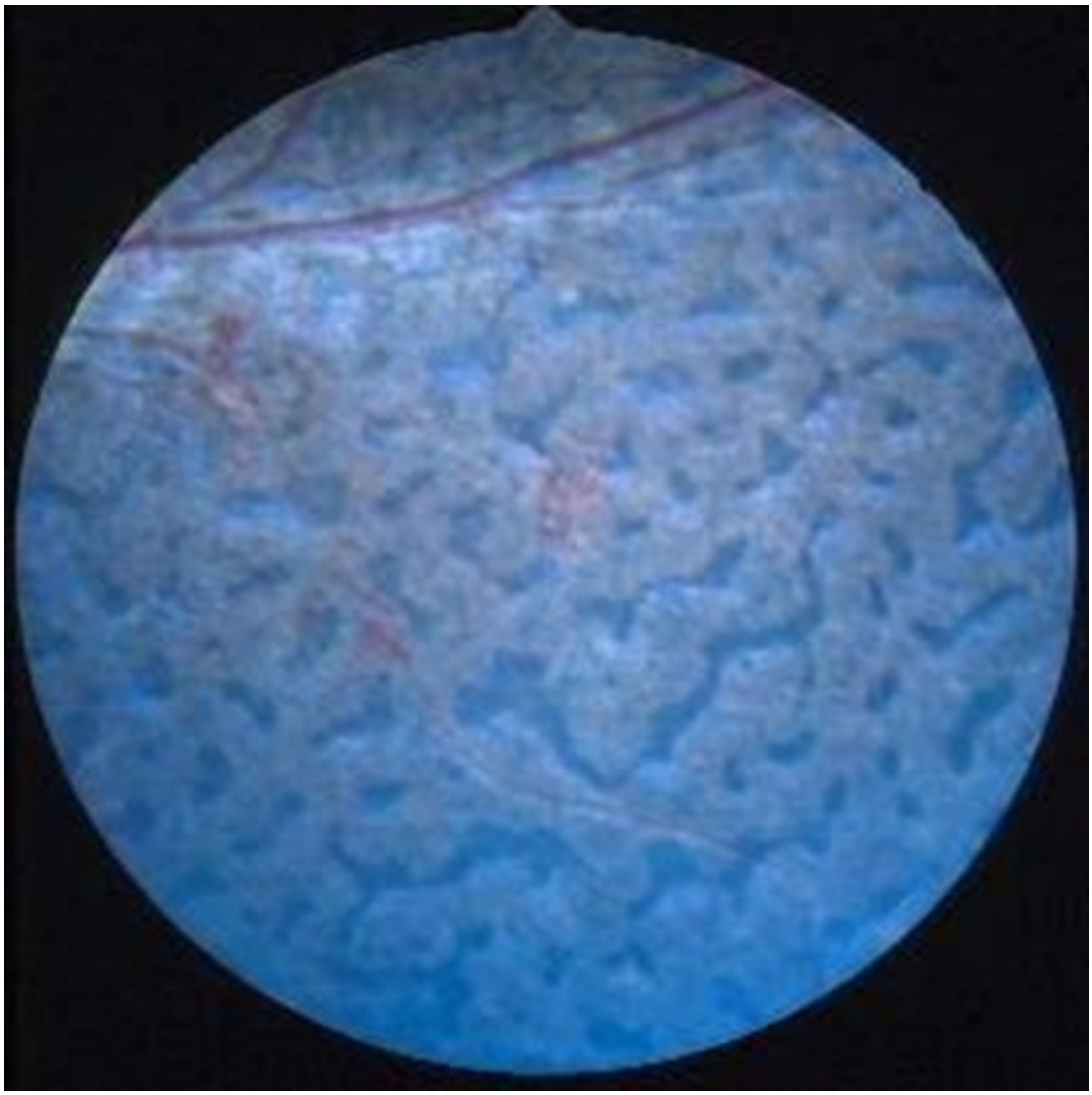
Fundoscopic changes typically start at the peripheral tapetal fundus with an initial grayish discoloration, reflecting the onset of retinal thinning in this region. Blood vessel attenuation develops and with progression a more generalized tapetal hyperreflectivity becomes apparent. Secondary cataract usually develops as the condition progresses and may obscure visualization of the fundus.

New data

New references

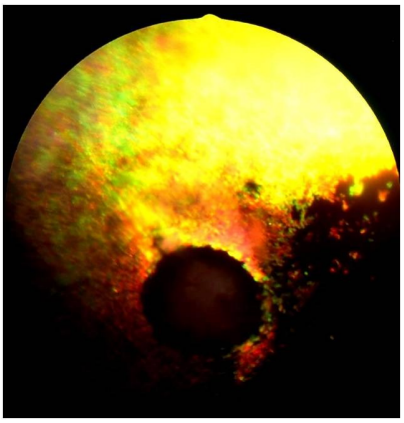
See Ch 9 (point H) for further information and Ch 8 for veterinary advice





PYRENEAN SHEPHERD

PRA



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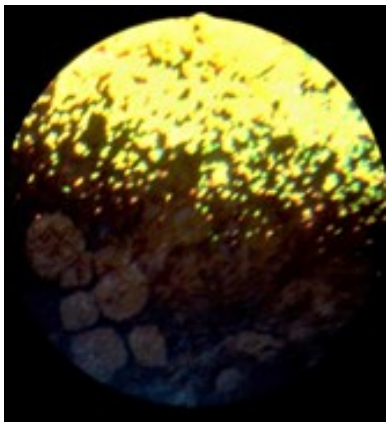


2.

Photos by courtesy of Gilles Chaudieu

Clinical description

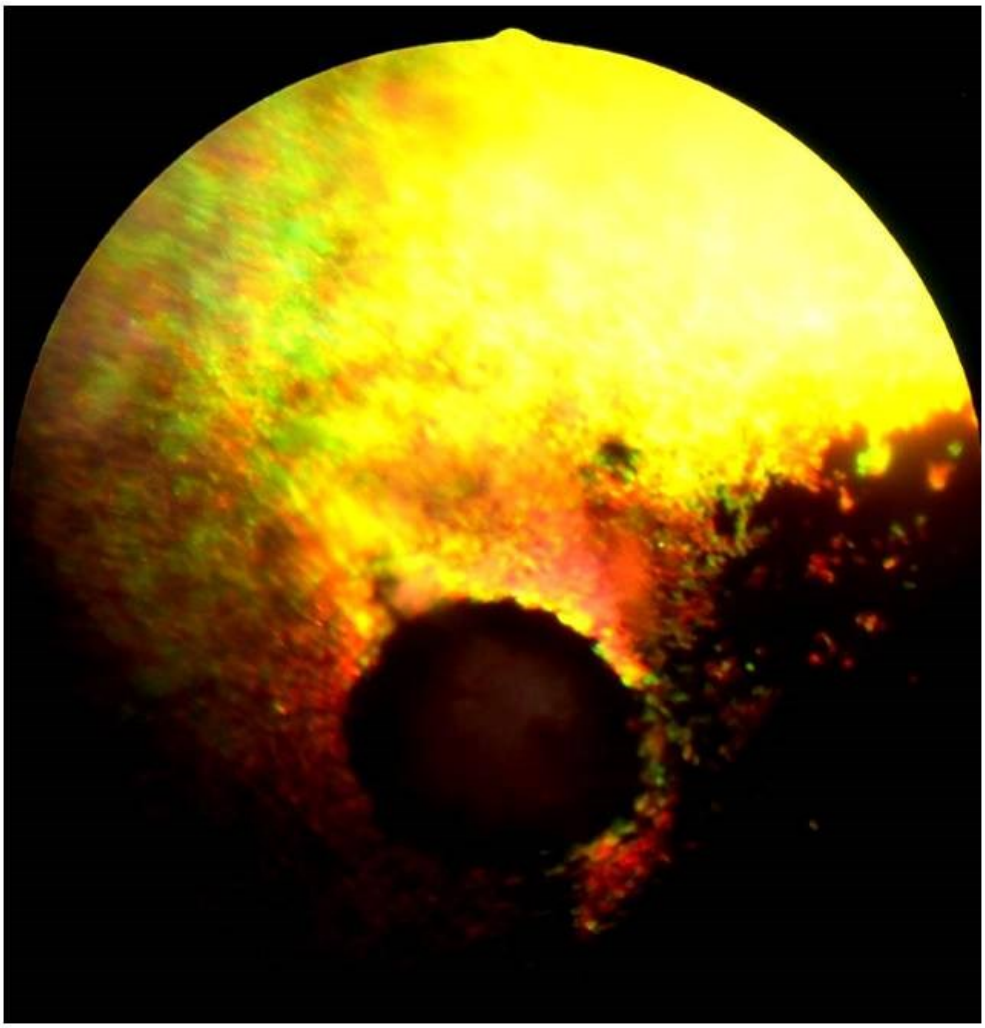
1. 3 years old dog, tapetal area
2. 3 years old dog, some pigmentary migrations in the tapetal area are observed and multiple depigmented focal areas in the non tapetal area depicting an RPE degeneration

Early changes of the fundus, complete blindness in 3 years old dogs

New data

New references

See Ch 9 (point G) for further information and Ch 8 for veterinary advice



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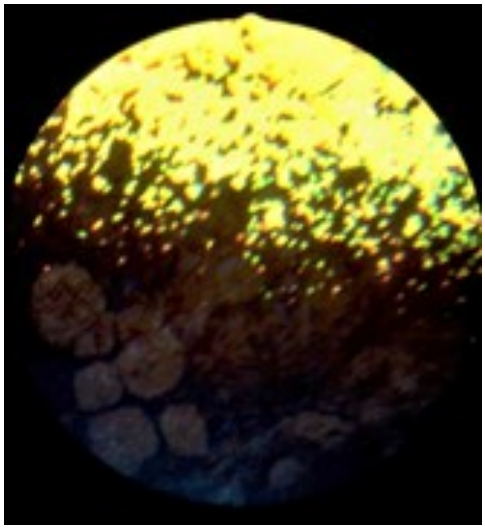
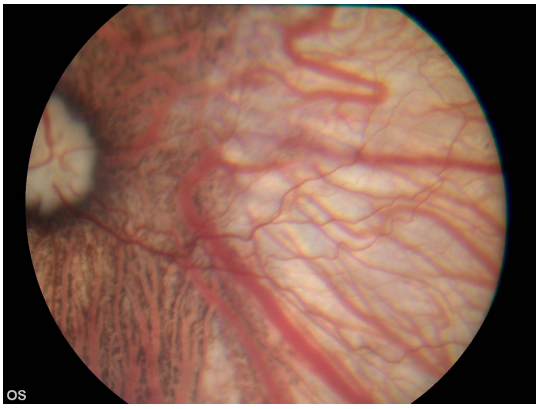


2.

SHETLAND SHEEPDOG

Collie Eye Anomaly (CEA)



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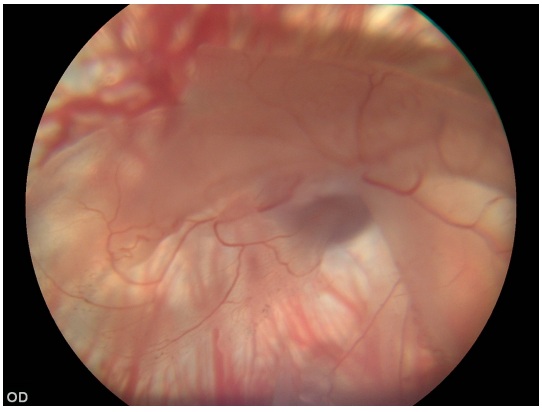


2.

Photos by courtesy of Reka Eordogh

Clinical description

CEA is a congenital ocular syndrome involving defects of the posterior vascular and fibrous tunics of the eye. It is related to an abnormal mesodermal differentiation which results in defects of sclera, choroid, optic disc, retina and retinal vasculature.

CEA affects primarily the Collie breeds.

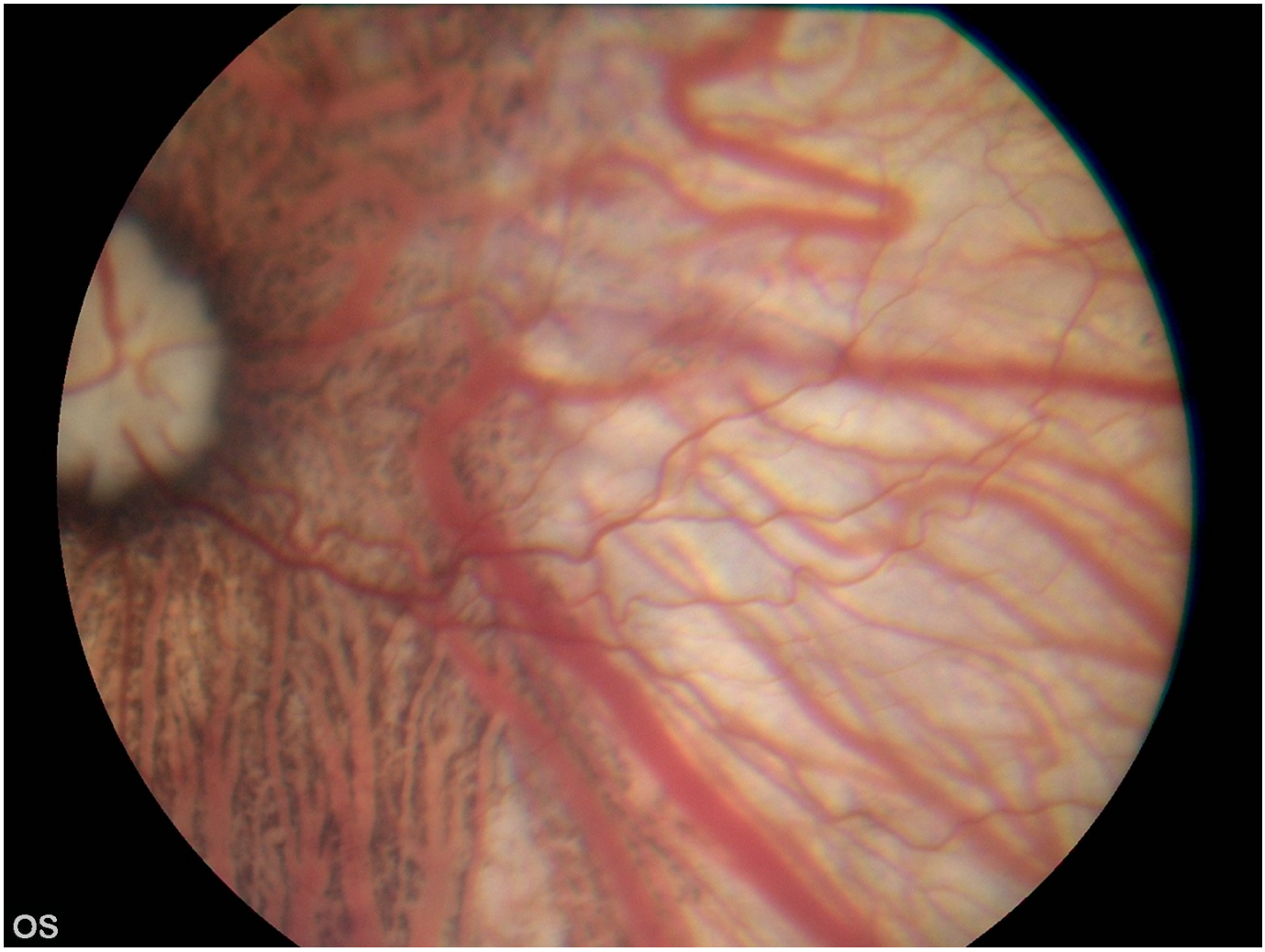
Clinical findings:
Choroidal hypoplasia (1.): bilateral but asymmetric defect, located temporally to the ONH. Within this area the choriodal vessels are abnormal both in size and distribution.

Partial or complete retinal detachments (2.)

New data

New references

See Ch 9 (point J) for further information and Ch 8 for veterinary advice



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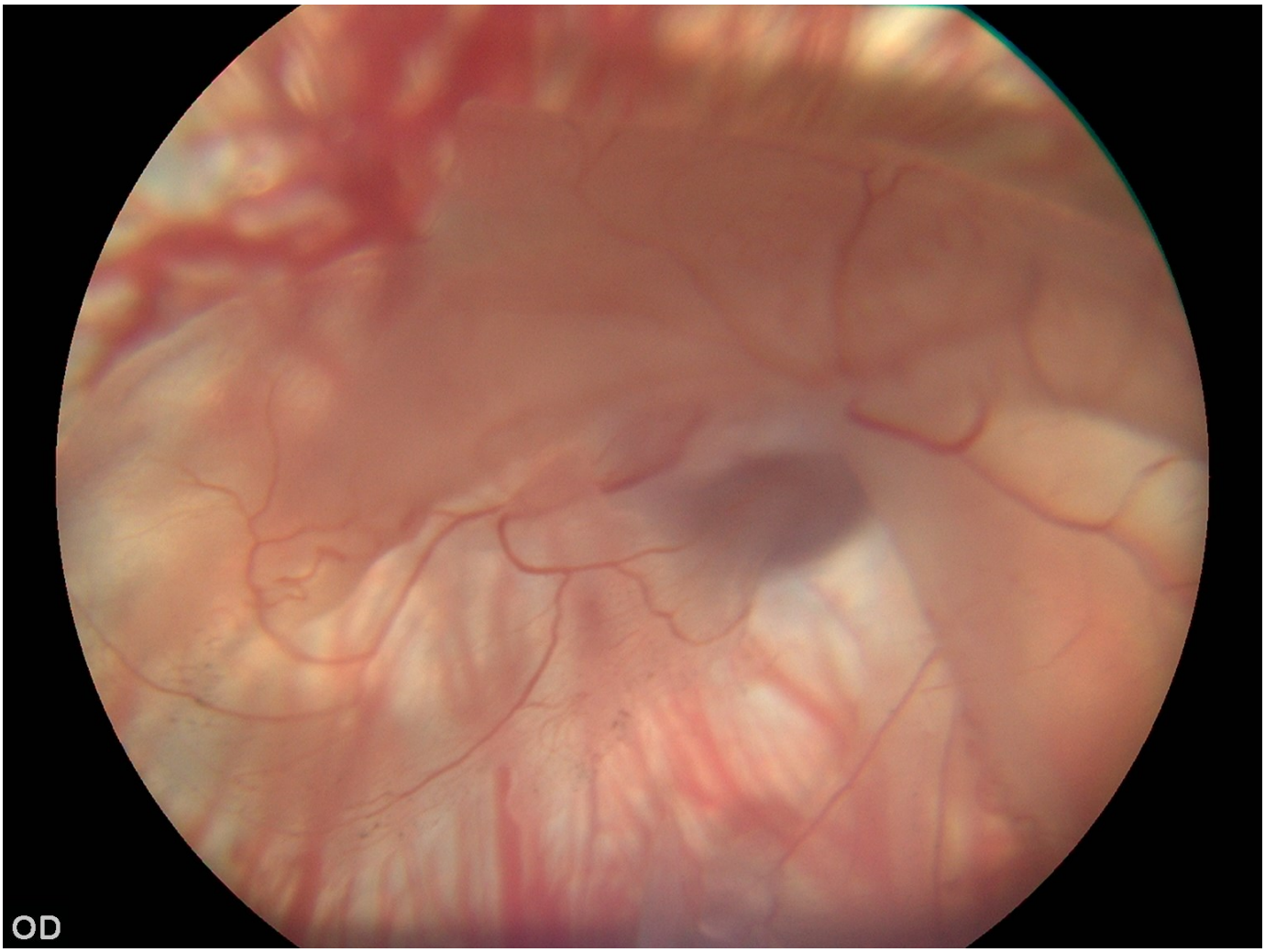


2.

SHIH TZU

PRA

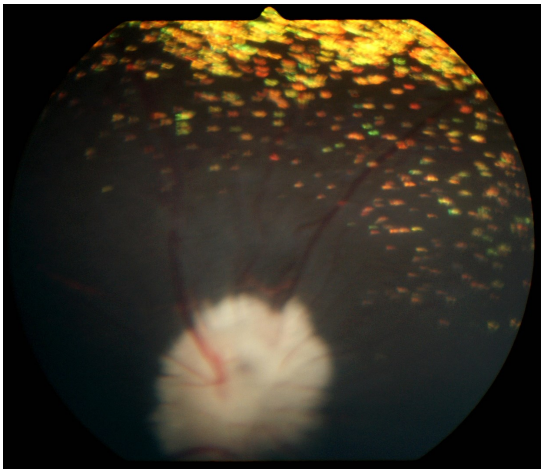


Photo by courtesy of Gilles Chaudieu

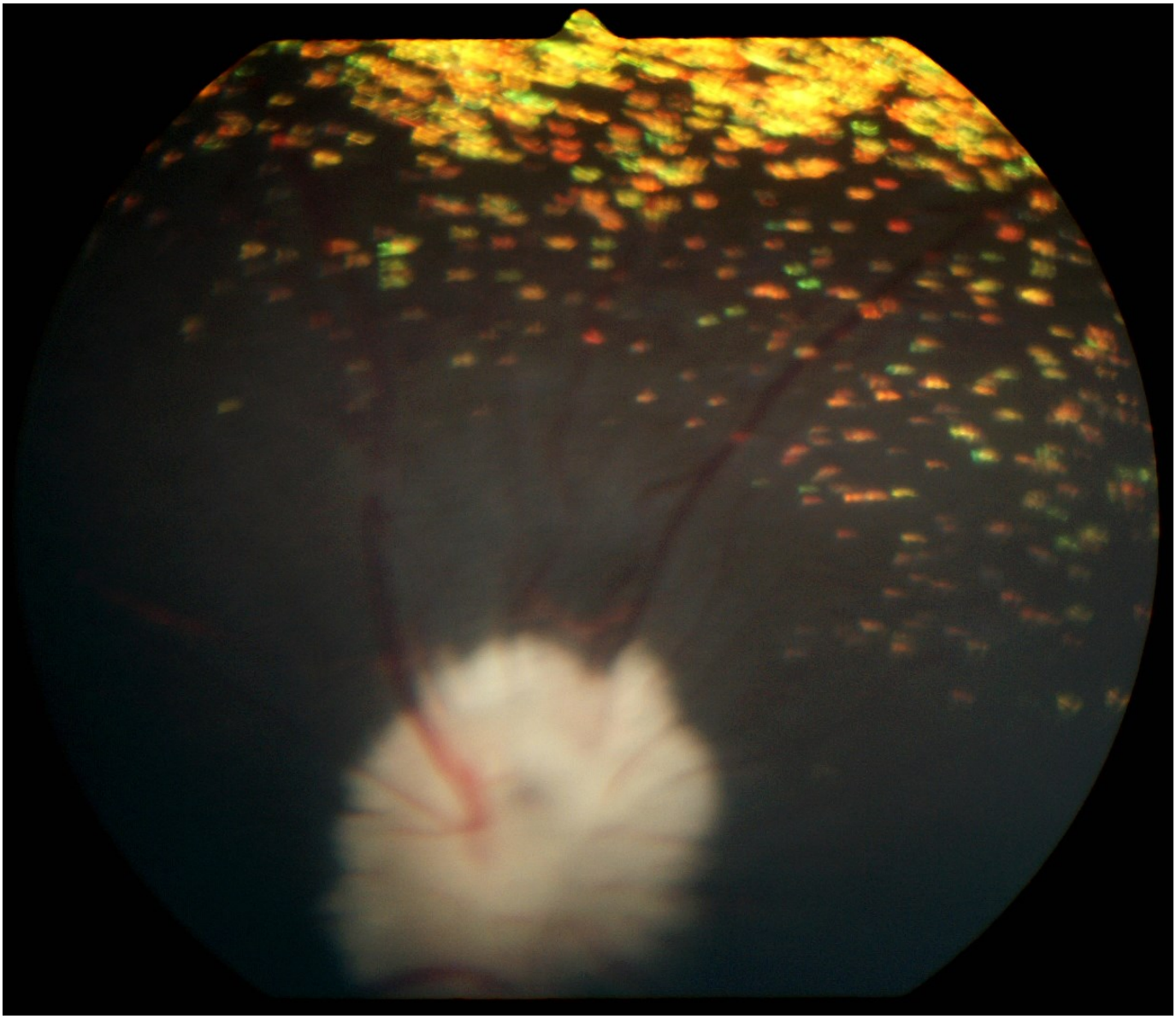
Clinical description

Night blindness in 2-5 years old dogs , slowly progressive.

New data

New references

See Ch 9 (point N) for further information and Ch 8 for veterinary advice



SLOUGHI

PRA, rcd1a, mutation in PDE6B

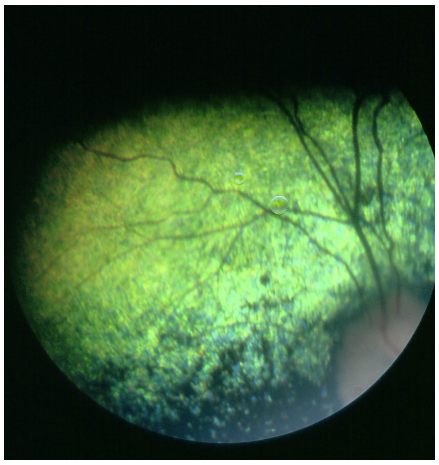


Photo by courtesy of Gilles Chaudieu

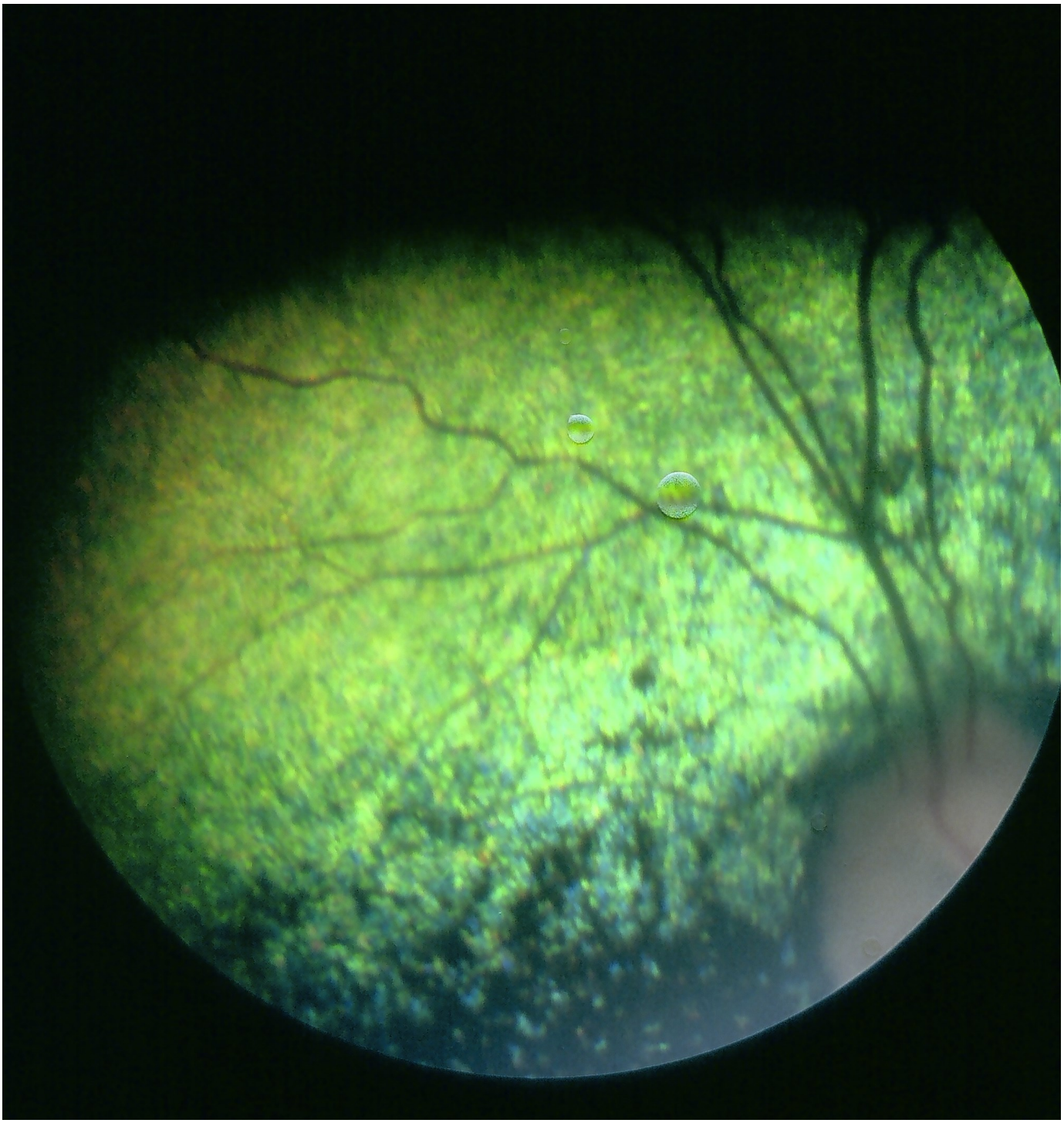
Clinical description

Dogs affected are older than 2 years old and the disease progressively deteriorates in dogs older than 4 years

New data

New references

See Ch 9 (point B) for further information and Ch 8 for veterinary advice



STAFFORDSHIRE BULL TERRIER

PRA

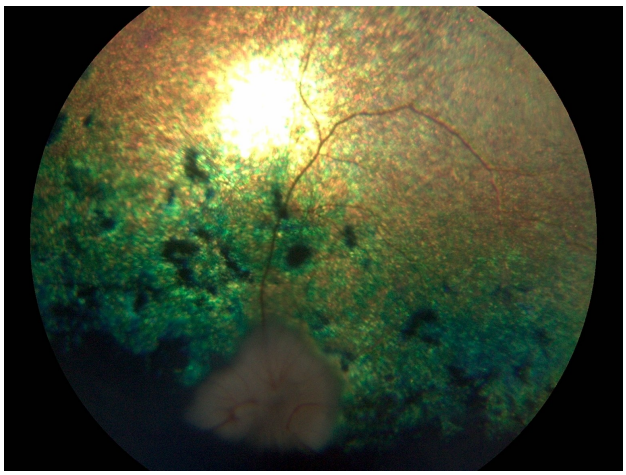


Photo by courtesy of Réka Eördögh

Clinical description

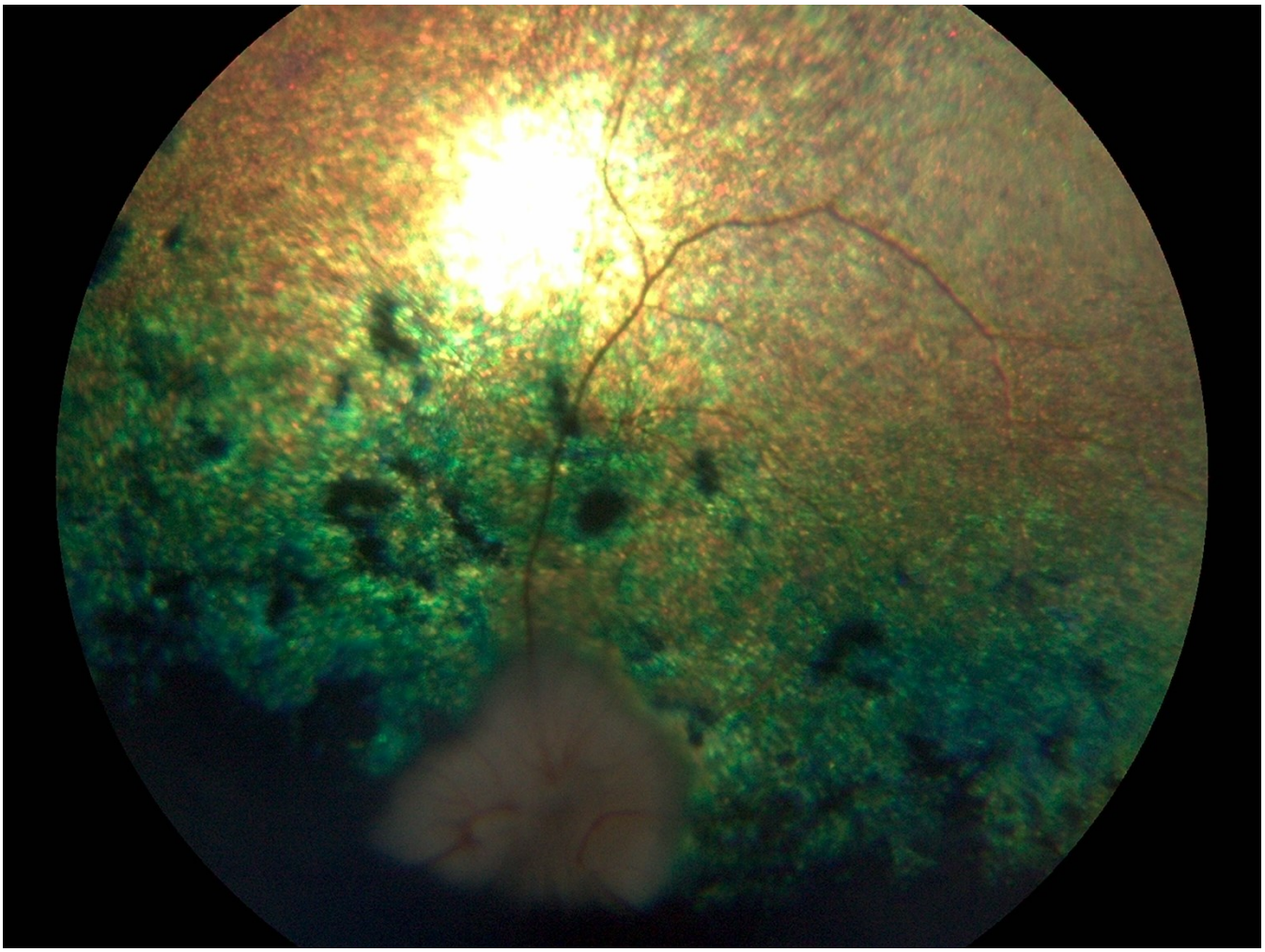
Middle-aged dogs are affected .

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

New references

See Ch 9 (point C) for further information and Ch 8 for veterinary advice



TIBETAN SPANIEL

PRA3

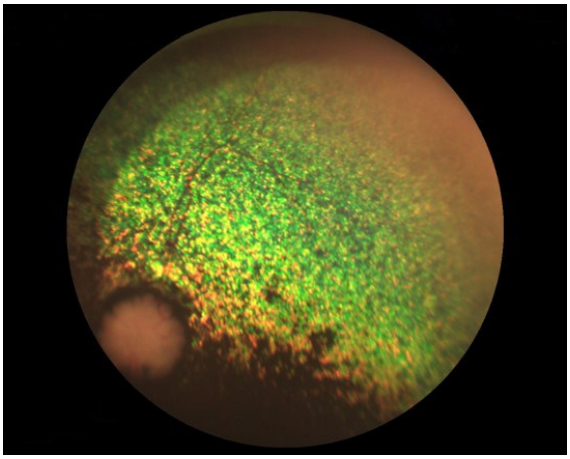


Photo by courtesy of Claus Bundgaard

Clinical description

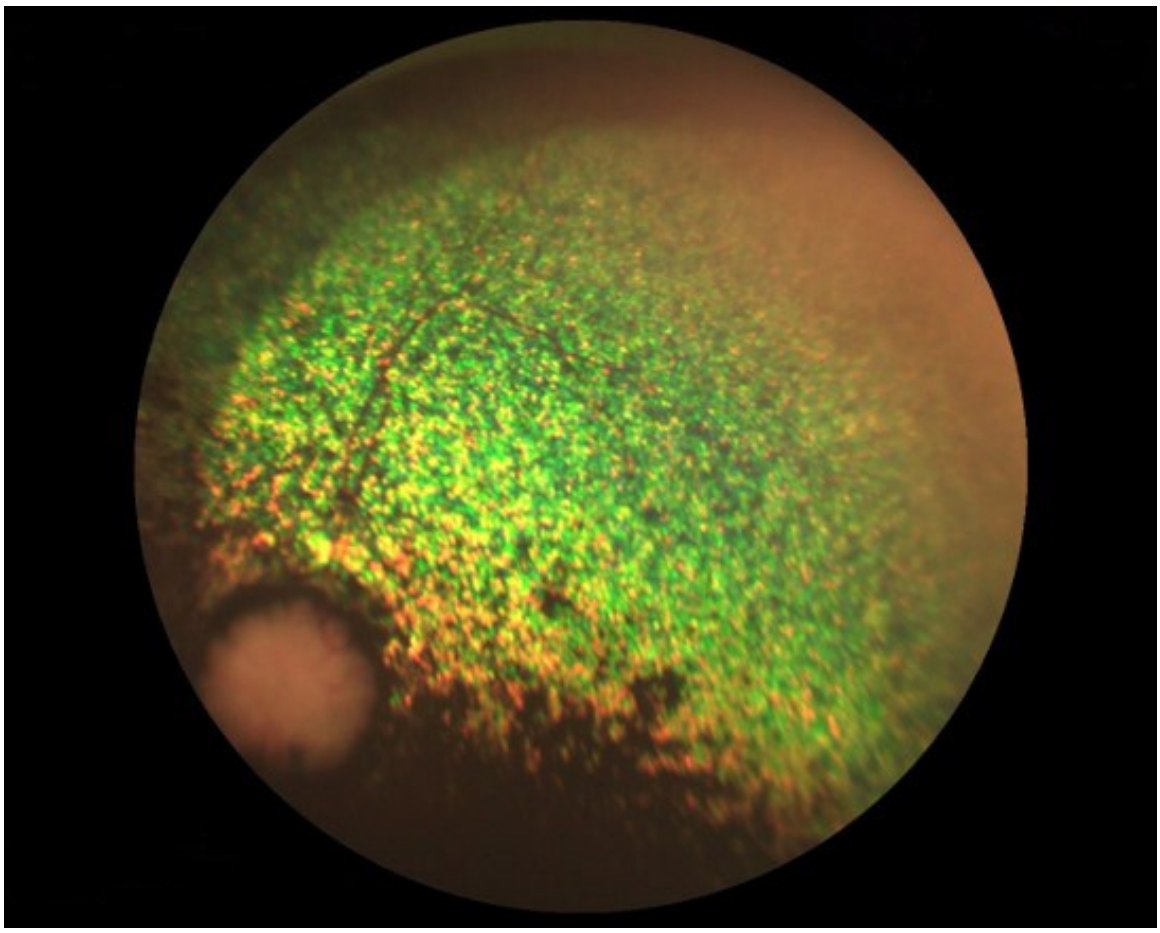
Ophthalmoscopic signs were detected between 3 and 5 years of age. Early detection by fundoscopy can be difficult due to variation in tapetal distribution and size.

Affected dogs lose vision rather quickly and they are severely visually impaired within a year following development of the initial ophthalmoscopic signs. Funduscopic examination reveals the classic findings for late-onset PRA, including hyperreflectivity of the peripheral tapetal fundus and severe attenuation of retinal vessels. The retinal atrophic changes spread inward, toward the optic nerve head.

New data

New references

See Ch 9 (point G) for further information and Ch 8 for veterinary advice



TIBETAN TERRIER

Neuronal Ceroid Lipofuscinosis (NCL)

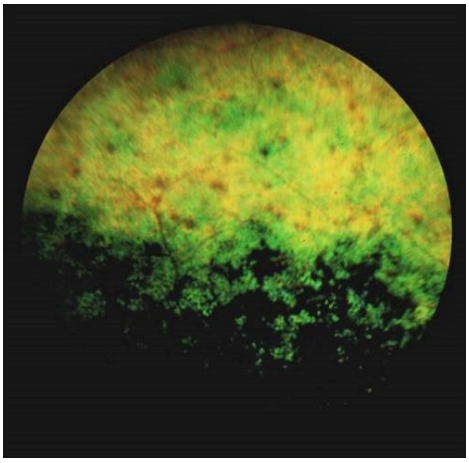


Photo by courtesy of Gilles Chaudieu

Clinical description

In NCL the dog should show a progression of neurologic signs and include at least 4 of the following: loss of vision, behavioral changes including changes in personality (e.g. , becoming aggressive), and loss of learned behaviors, tremors, cerebellar ataxia, cognitive and motor decline, sleep disturbance and seizures.

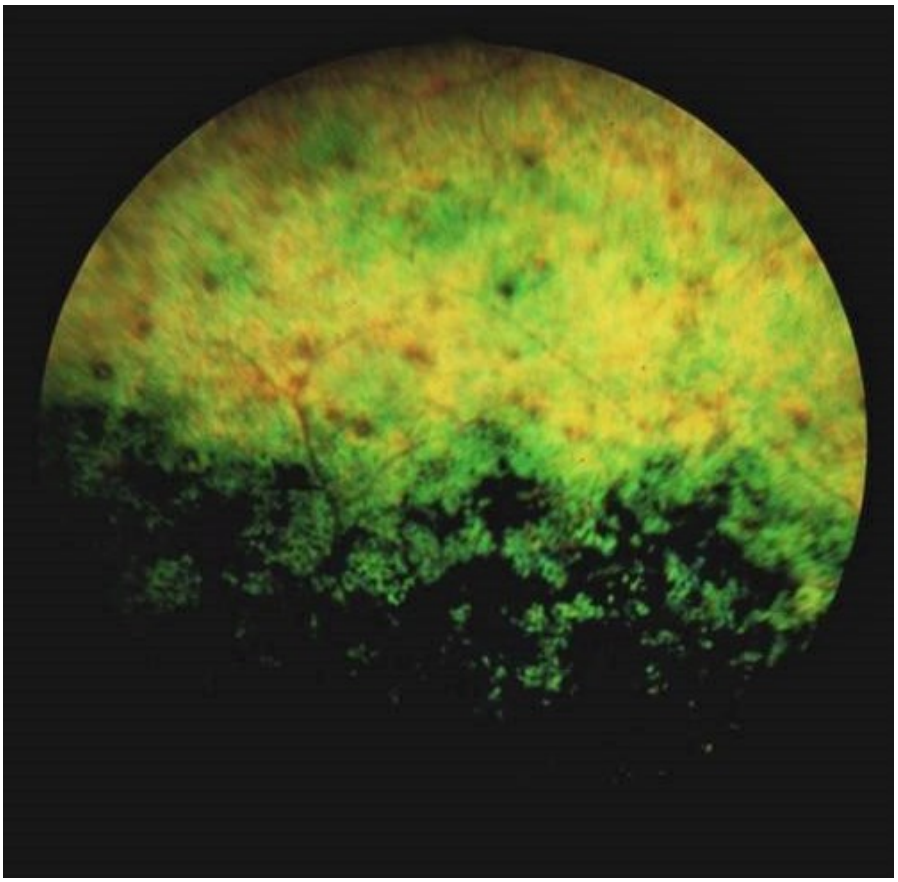
There is a variation in the onset and rate of progression of the different forms of NCL in dogs. Vision loss is a common feature but in several forms this has a central origin. In a study of Tibetan Terriers puppies the affected animals were night blind (the only neurologic sign for the first 5-6 years of life)

New data

New references

Katz ML, Rustad E, Robinson GO et al. Canine neuronal ceroid lipofuscinosis: Promising models for the preclinical testing of therapeutic interventions. Neurobiol Dis. 2017 Dec;108:277-287.

See Ch 9 (point H) for further information and Ch 8 for veterinary advice



WHIPPET

PRA

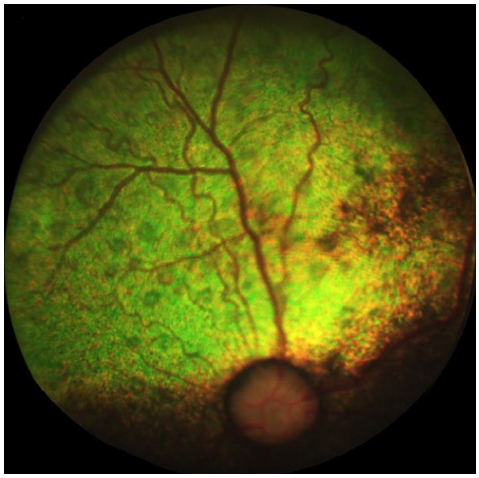


Photo by courtesy of Fabiano Montiani Ferreira

Clinical description

A somewhat unusual form of PRA in Whippets has been reported. Nystagmus was seen in young affected dogs, but was not apparent in adults. Small retinal bullae (small foci of separation between photoreceptors and RPE) were detected in the early stages, but these became less apparent as retinal degeneration developed.

Retinal bullae were identified in dogs with three distinct forms of PRA (Whippets, German Spitzes and CNGB-1 mutant dogs). The lesions develop prior to retinal thinning.

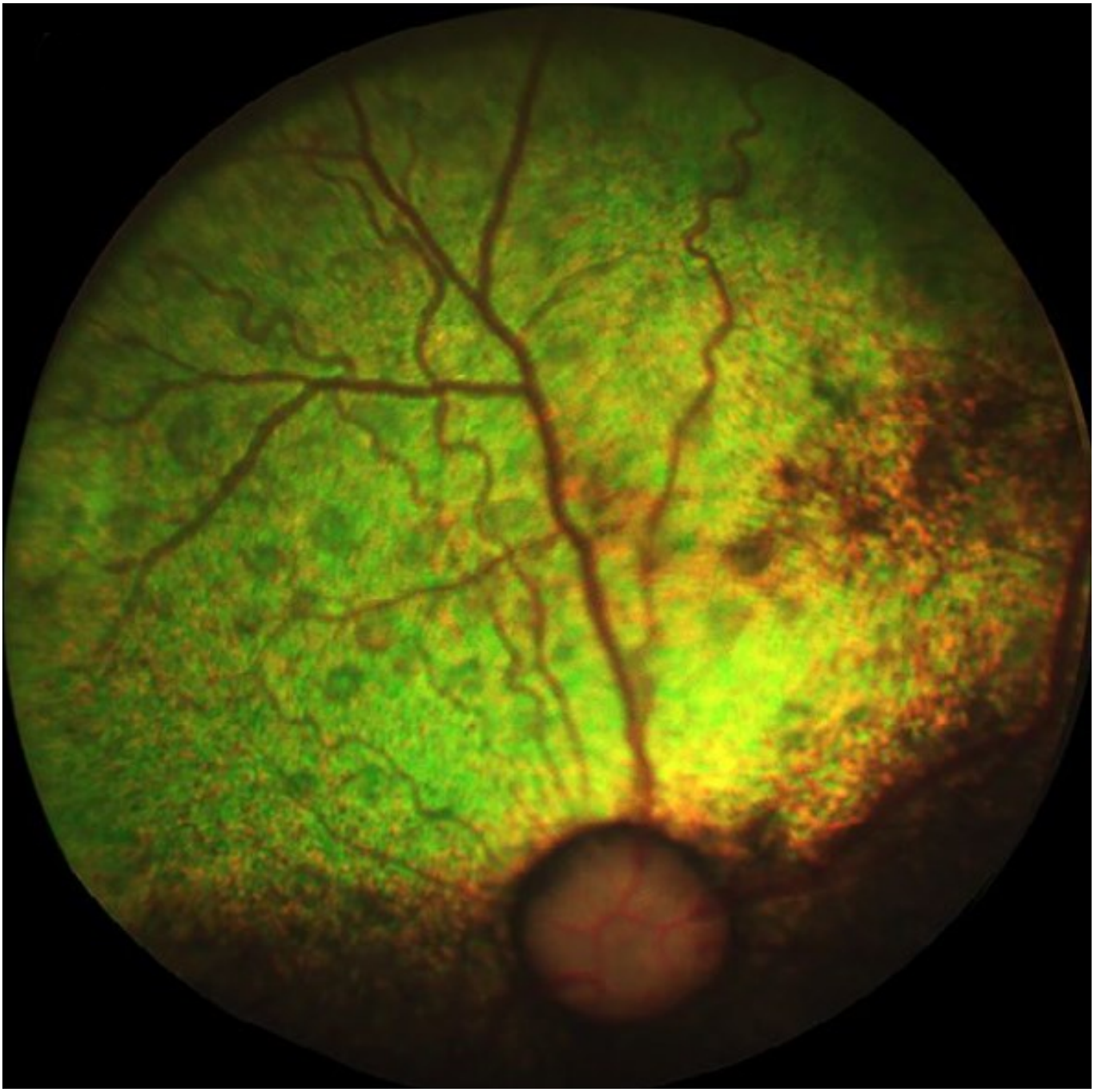
The picture above is of a German Spitz

New data

New references

Marinho LFLP, Occelli LM, Bortolini M, Sun K, Winkler PA, Montiani-Ferreira F, Petersen-Jones SM. Development of retinal bullae in dogs with progressive retinal atrophy. Vet Ophthalmol. 2022 Mar;25(2):109-117.

See Ch 9 (point G) for further information and Ch 8 for veterinary advice



YORKSHIRE TERRIER

PRA PRCD

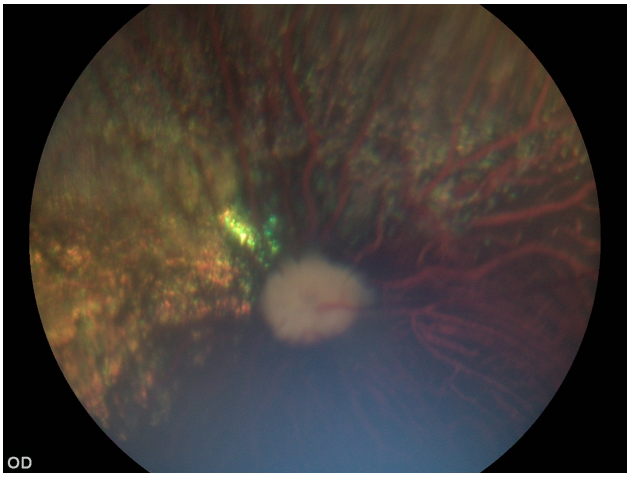


Photo by courtesy of Réka Eördögh

Clinical description

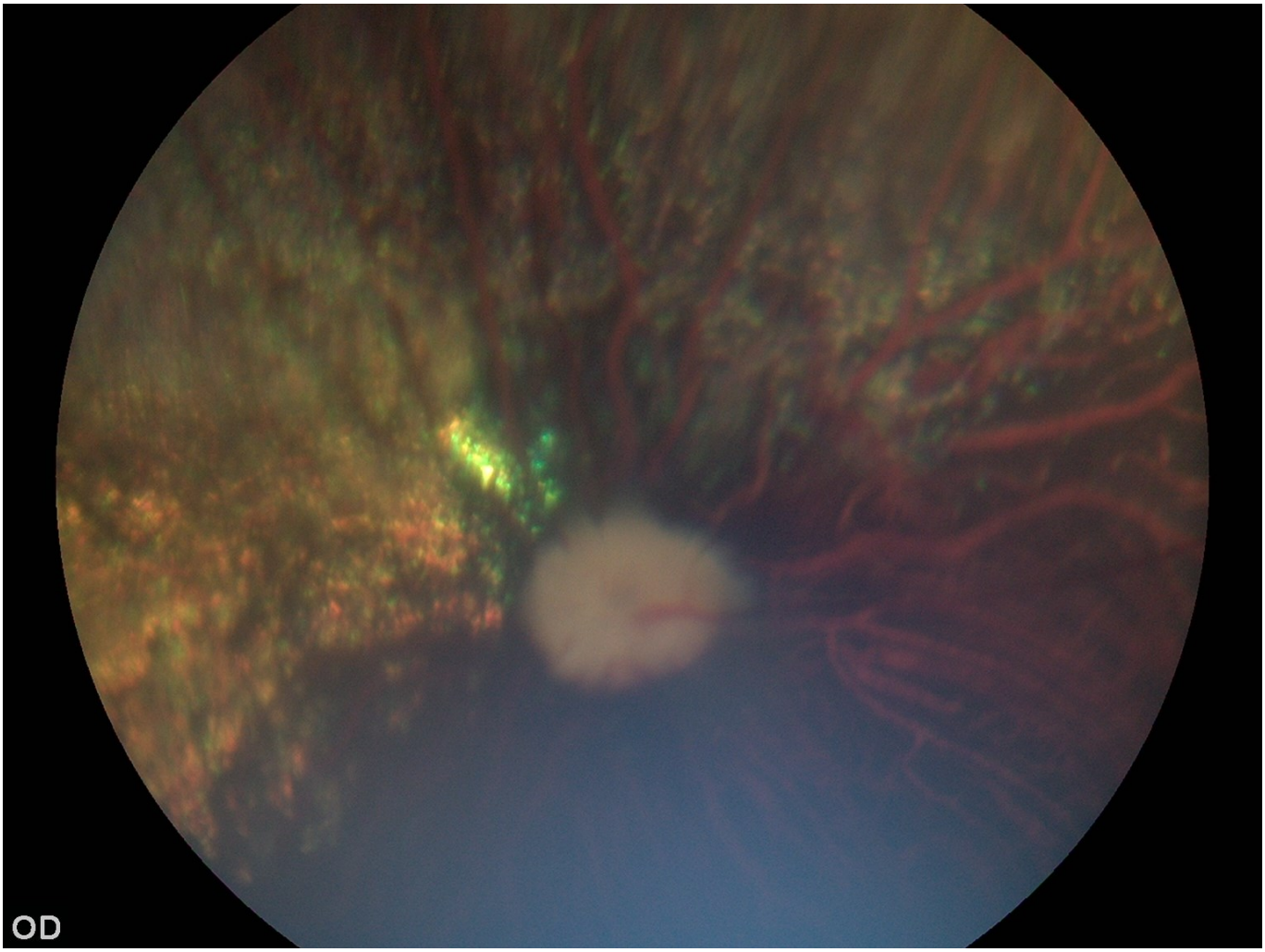
Clinical signs visible in 2-3 year old dogs or later (until 6 years old)

PRA is a bilateral and progressive loss of vision which starts with loss of night-vision and progresses into complete blindness. Funduscopic signs of PRA include changes in tapetal reflectivity, blood vessel attenuation and pigmentary changes in the non-tapetum.

New data

New references

See Ch 9 (point L) for further information and Ch 8 for veterinary advice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