



Laser retinopexy

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KONKURENCESCHOPNOST



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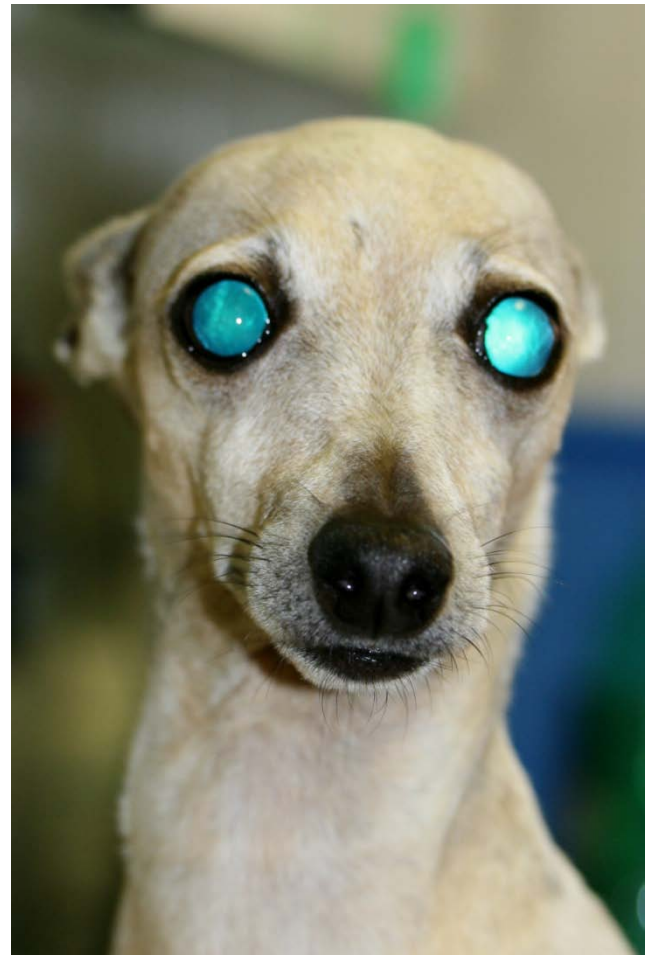
Case Report

- Italian Greyhound
- Akina, F, 5 years old
- Anamnesis: anisocoria for 3 weeks
- No signs of neurology problem and any systemic diseases
- Clinical examination, X-ray of thorax, abdominal USG, blood tests negative



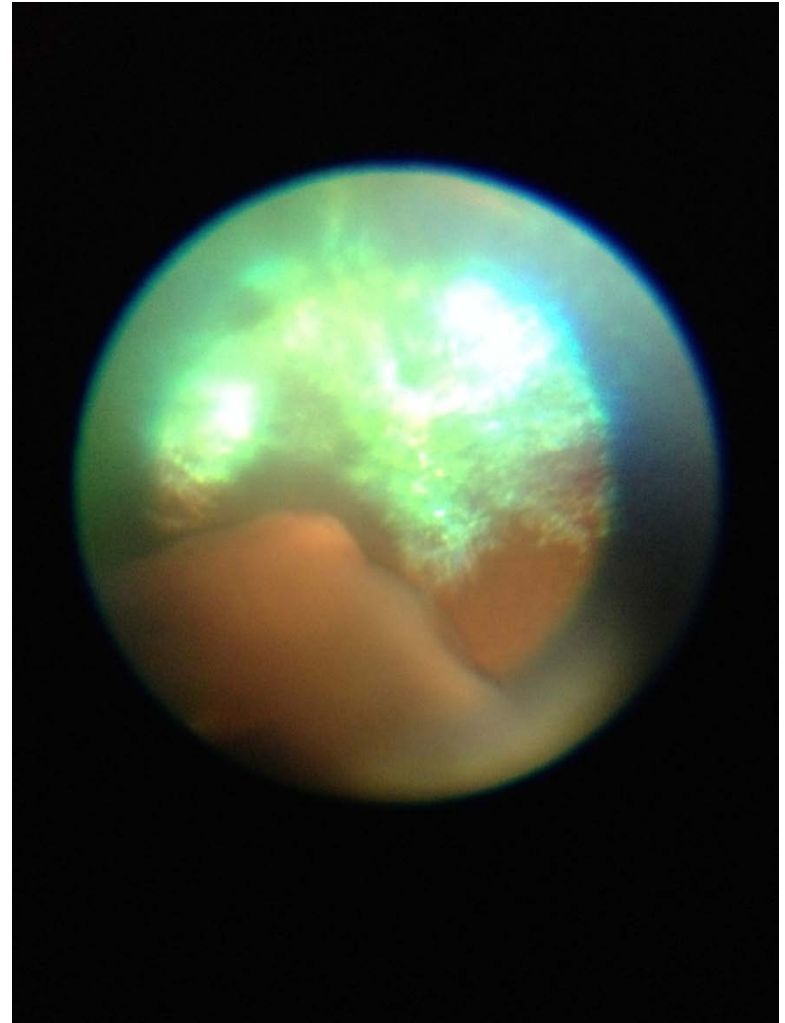
Ophthalmology examination

- OS: menace response -, dazzle reflex -, pupillary reflex -, palpebral reflex +, absolute mydriasis was evident, severe vitreal changes, total retinal detachment, STT 20, IOP 13
- OD: menace response +, dazzle reflex +, pupillary reflex +, palpebral reflex +, vitreal strand in the anterior chamber, severe vitreal changes, STT 22, IOP 15



Diagnosis

- Bilateral Vitreous Degeneration
- Giant retinal tear in the left eye
- Vitreal strand in the anterior chamber in the right eye
- Prophylactic Laser Retinopexy in the right eye
- Monitoring of lens instability
- Left eye - untreatable



Surgery Procedure

- Transpupillary retinopexy
- LIO – laser indirect ophthalmoscop
- 20D loop
- General anesthesia
- Ventral recumbency
- Eyelid retractor, stay sutures
- A double row of noncontiguous burns on the peripheral retina for 360 degrees is performed
- 100-150mW/200-400mS
- Avoid excessive energy – can cause choroidal hemorrhage or a retinal hole

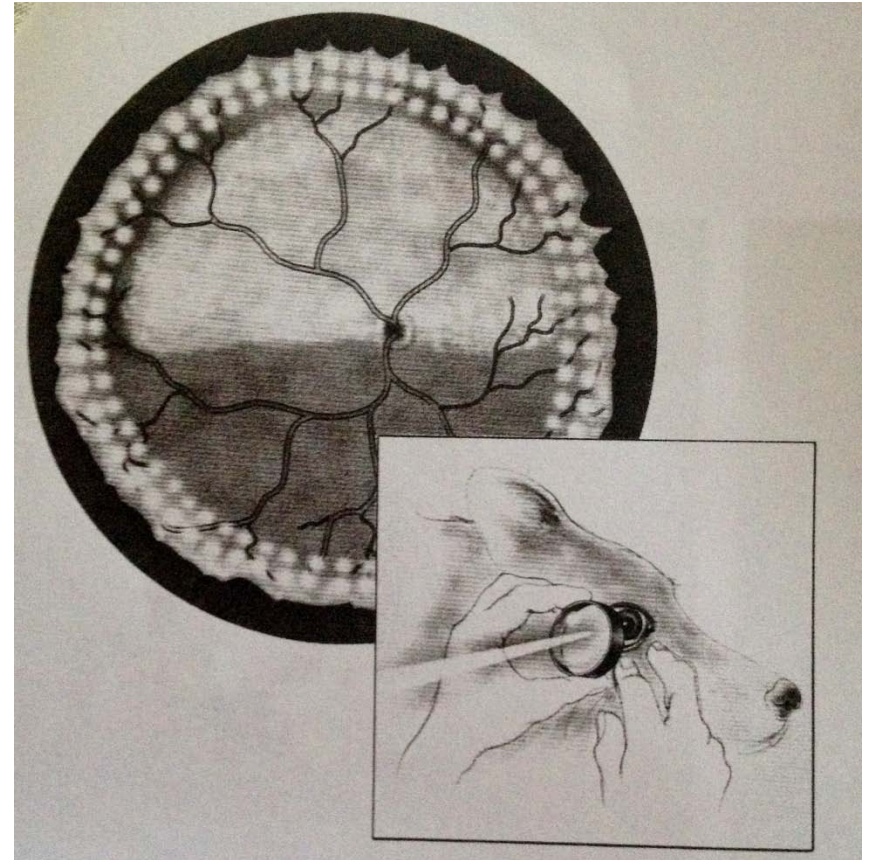


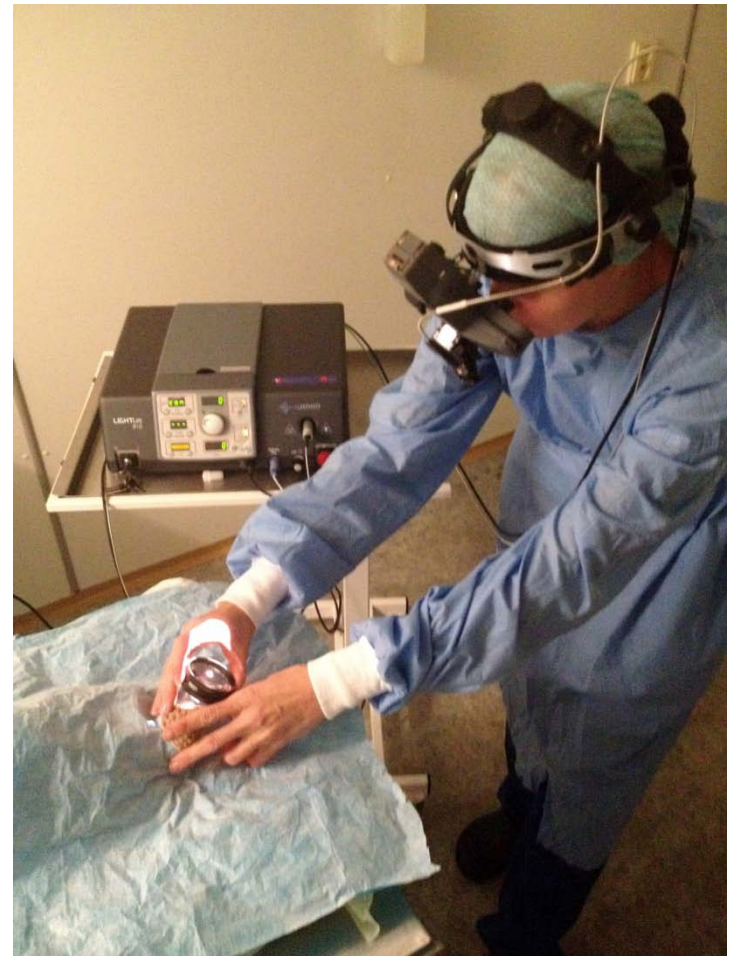
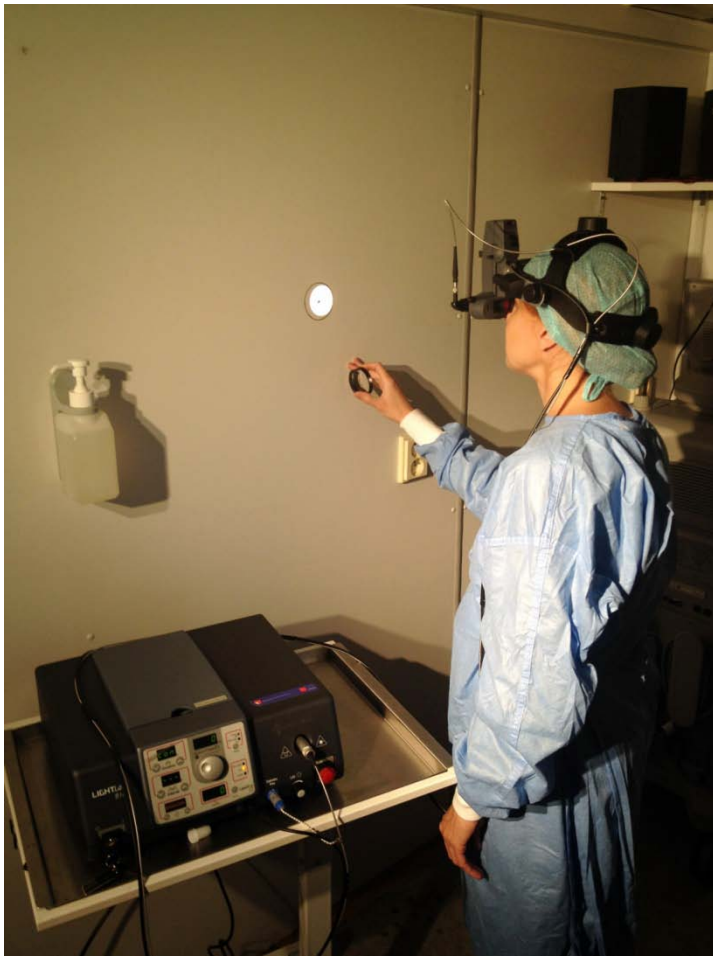
Table 3. Recommended initial power settings for diode laser retinopexy in the dog

Region of fundus	Power settings
Central nontapetal (mild to moderate pigment)	150 mW–200 mS
Peripheral nontapetal (moderate pigment)	100 mW–200 mS
Central tapetum (yellow-green color)	
Medial	200 mW–200 mS
Lateral	150 mW–400 mS
Central Tapetum (bright yellow color)	
Medial	200 mW–400 mS
Lateral	200 mW–500 mS
Peripheral Tapetum or Tapetal/NonTapetal Junction	150 mW–200–400 mS

mW, milliwatts; mS, milliseconds.

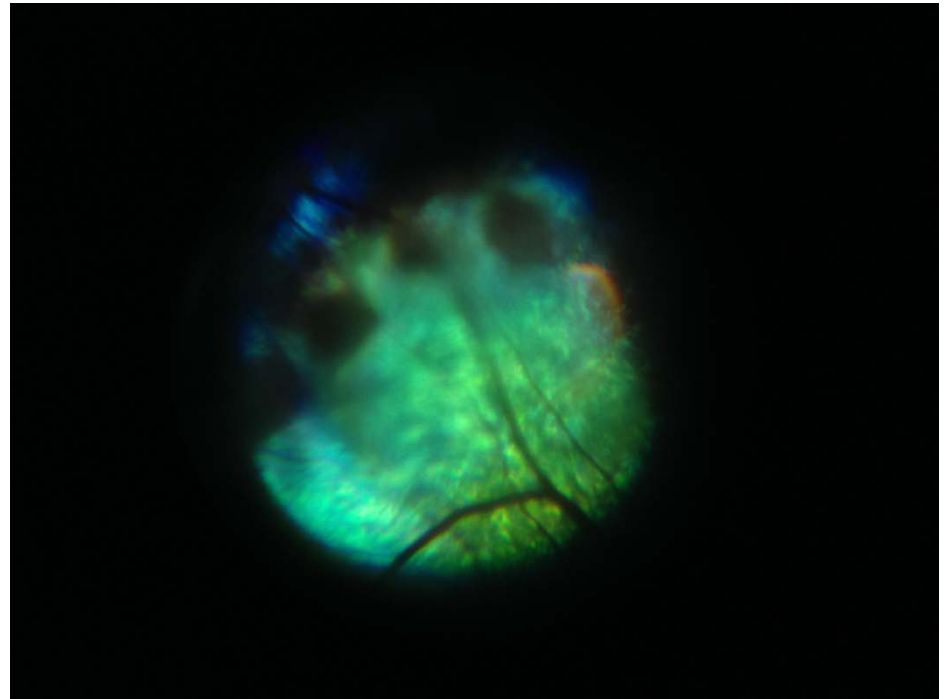
Transpupillary diode laser retinopexy in dogs: ophthalmoscopic, fluorescein angiographic and histopathologic study – S. Pizzirani, M.G. Davidson, B.C. Gilger, *Journal of Veterinary Ophthalmology*, 2003

Laser retinopexy



Follow up

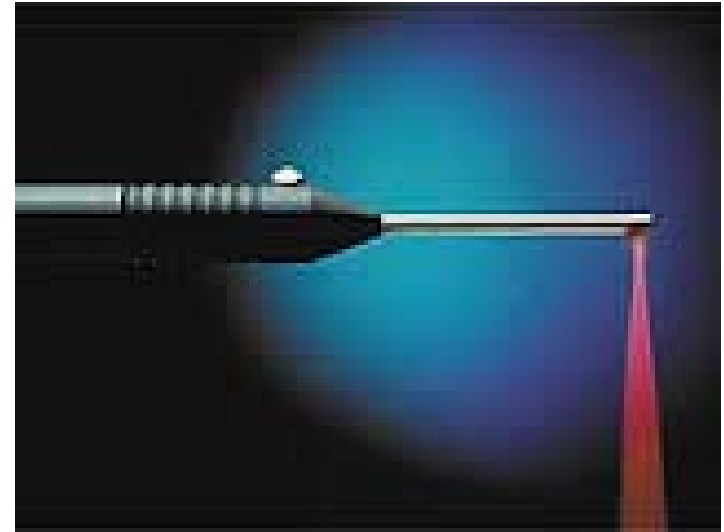
- Postoperative treatment
 - Systemic corticosteroids
 - Topical corticosteroids
 - Mydriatics
- IOP measurement, 1 day hospitalization
- local retinal inflammatory reaction disappear three days postop.



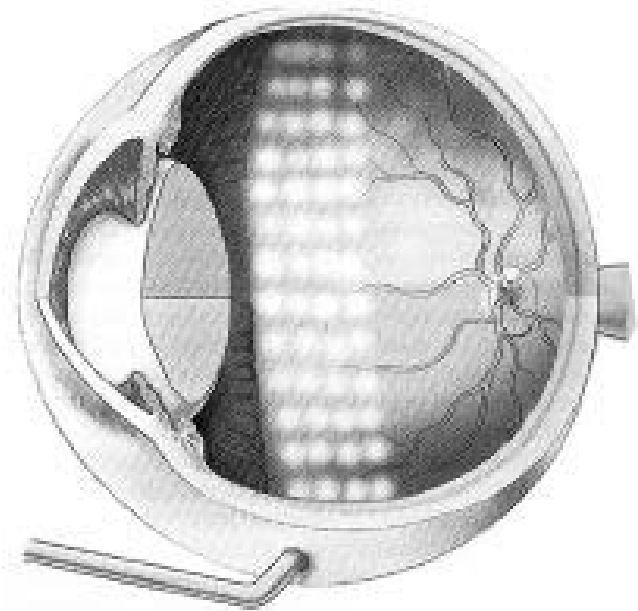
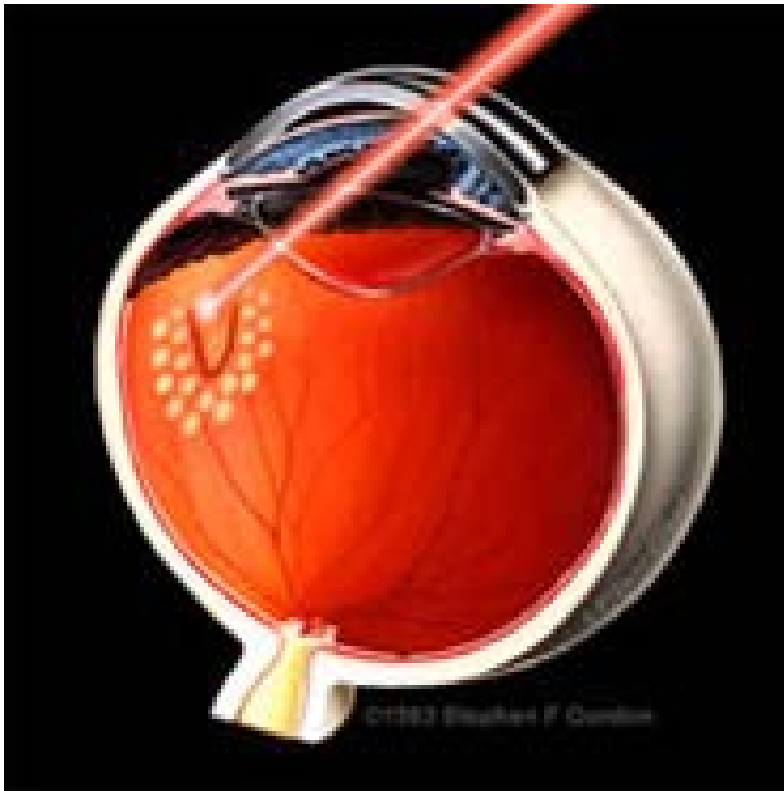
Discussion

- study of 760 eyes with RRD, 350 fellow eyes prophylactic treatment, RRD developed in 1,2% of treated eyes compared with 16,4% in the untreated group (Avitable, 2004)
- Another study: retinal breaks developed in 27% of untreated eyes compared with 4% of treated fellow eye (Freeman, 2001)
- Bichon Frise with cataracts associated with LIU – 57 dogs: 39 dogs received prior laser retinopexy before surgery, RRD developed in 5 dogs (12%). In 18 dogs that did not receive treatment, 10 dogs (55%) experienced RRD (Schmidt & Vainisi, 2004)
- **Depends on RD causes**

Transpupillary x Transcleral retinopexy



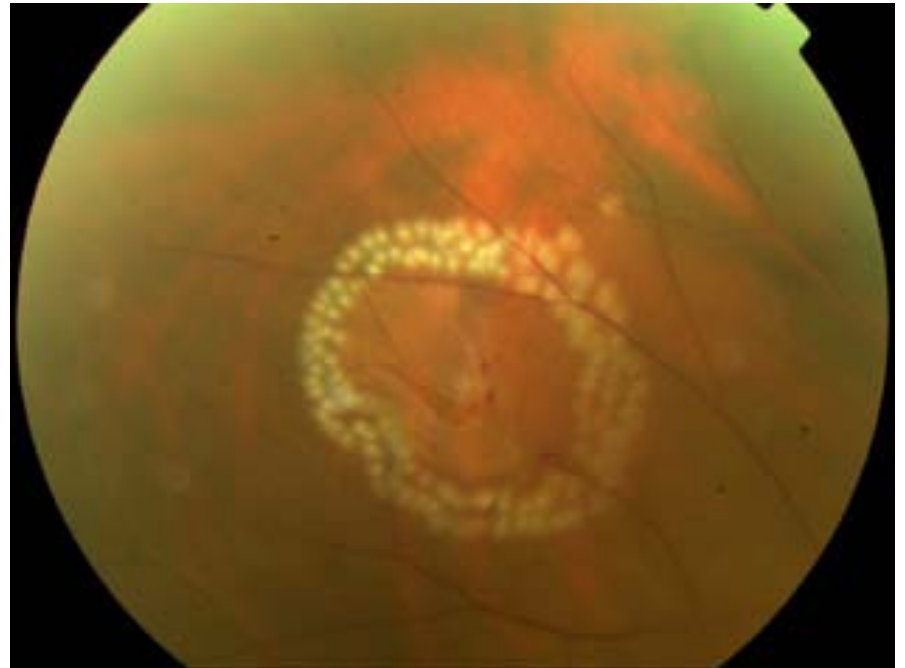
Transpupillary x Transcleral retinopexy



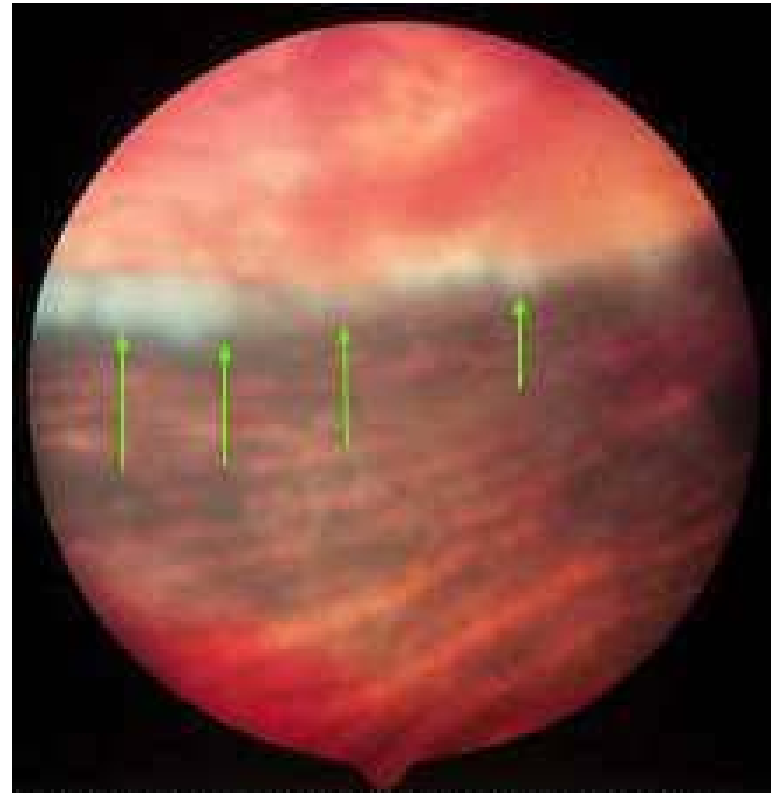
Transpupillary x Transcleral retinopexy

- Less invasive (non contact)
- Ocular media must be clear to permit focus on the target retina
- Diode laser 810nm has the best transmission
- **Prophylactic retinopexy** – vitreal degeneration, lens subluxation, cataract formation (predisposed breed)
- **Barrier retinopexy** – small tears, retinal holes, thin areas of retina associated with geographic retinal dysplasia
- **Demarcation retinopexy** – to stop partial RD
- Max. 250 mW for 400 msec
- Laser probe is in contact with the sclera
- Aproximately 9mm from the limbus, given 75-85 burns around the globe
- 750 mW for 1000 msec
- **Prophylactic retinopexy** before cataract surgery, in cases of LIU
- Bichon Frise, American Cocker Spaniel, Siberian Husky, Havanese – predisposed breed for peripheral retinal detachment after cataract surgery
- Higher risk of excessive treatment resulting in retinal holes or a giant retinal tear

Barrier Retinopexy

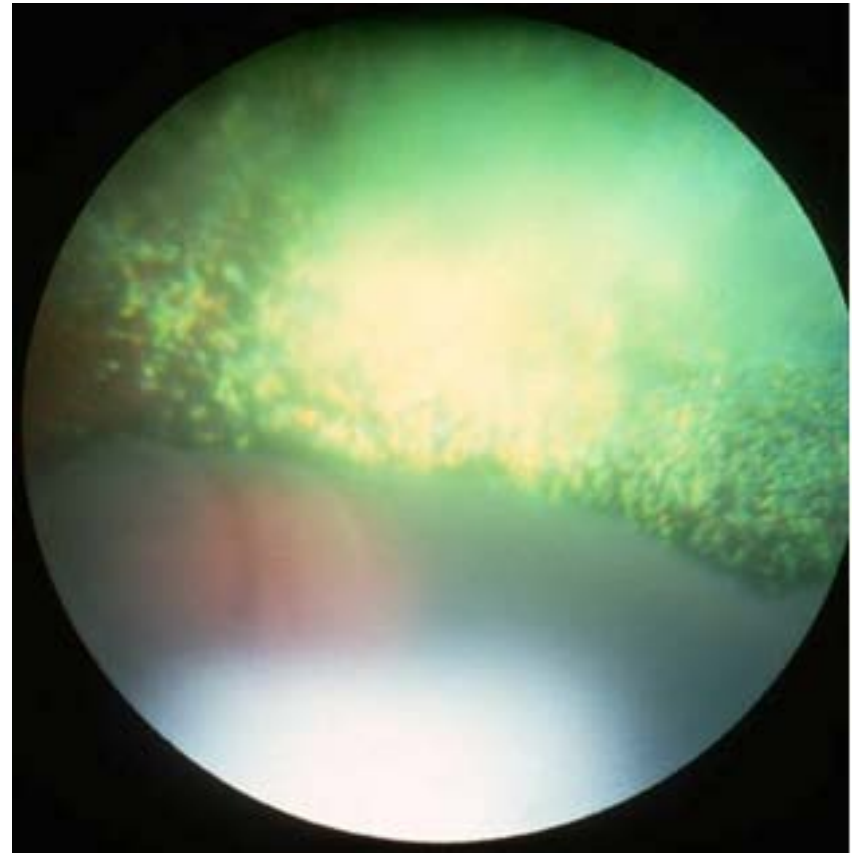


Demarcation Retinopexy



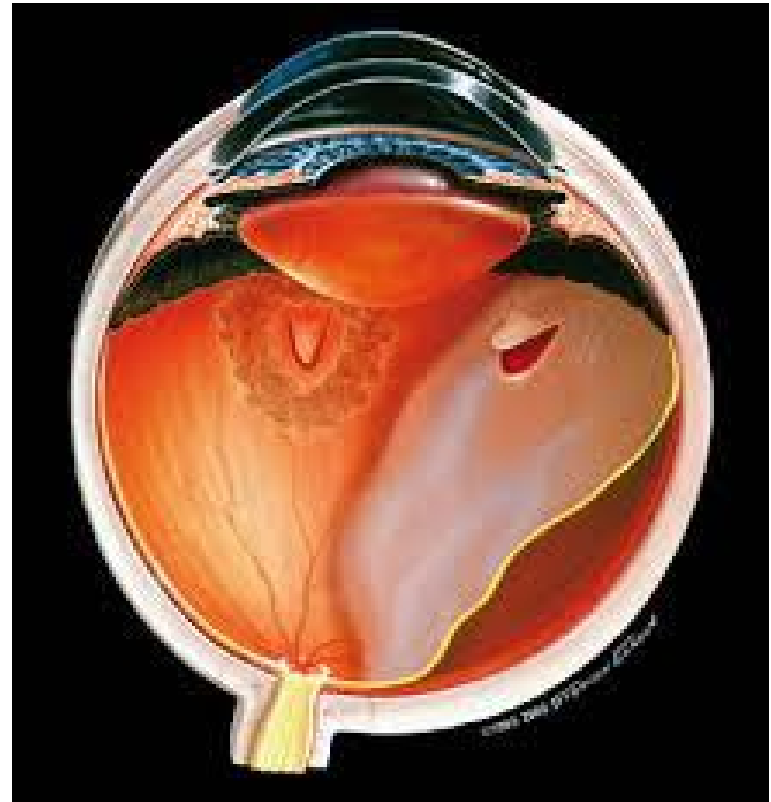
Retinal detachment

- separation of the neurosensory retina from underlying retinal pigment epithelium (RPE)
- Rhegmatogenous (RRD)
- Nonrhegmatogenous (non-RRD)



Rhegmatogenous Retinal Detachment (RRD)

- fluid from the vitreous cavity enters the subretinal space through a break in the retina
- **primary** (spontaneous)
- **secondary** (due to trauma, inflammation, surgery or other specific ocular disorder)

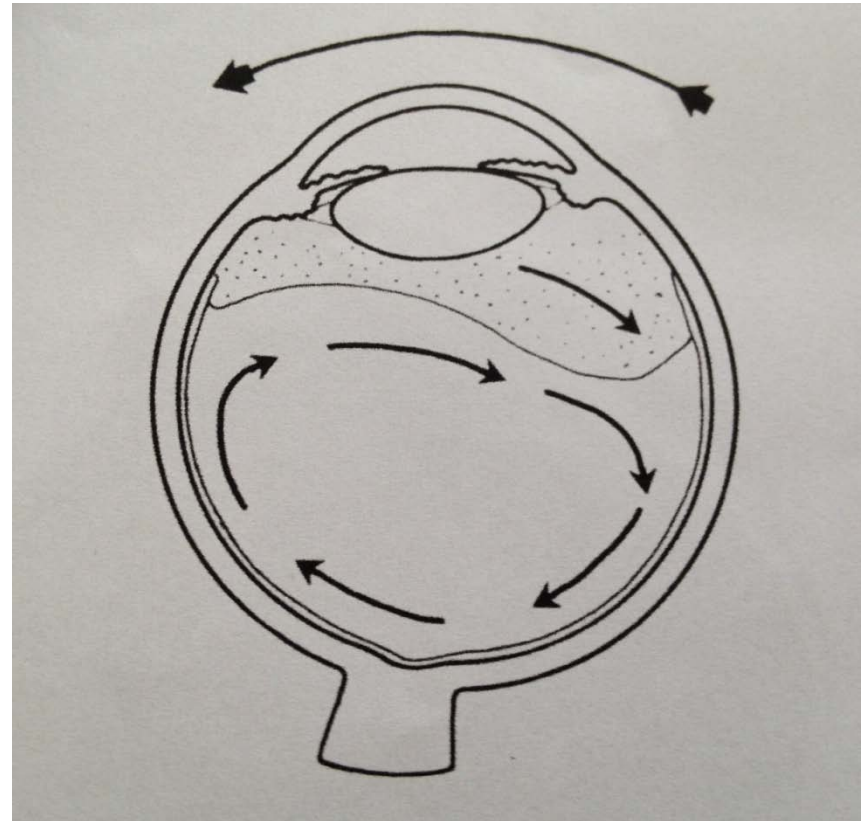


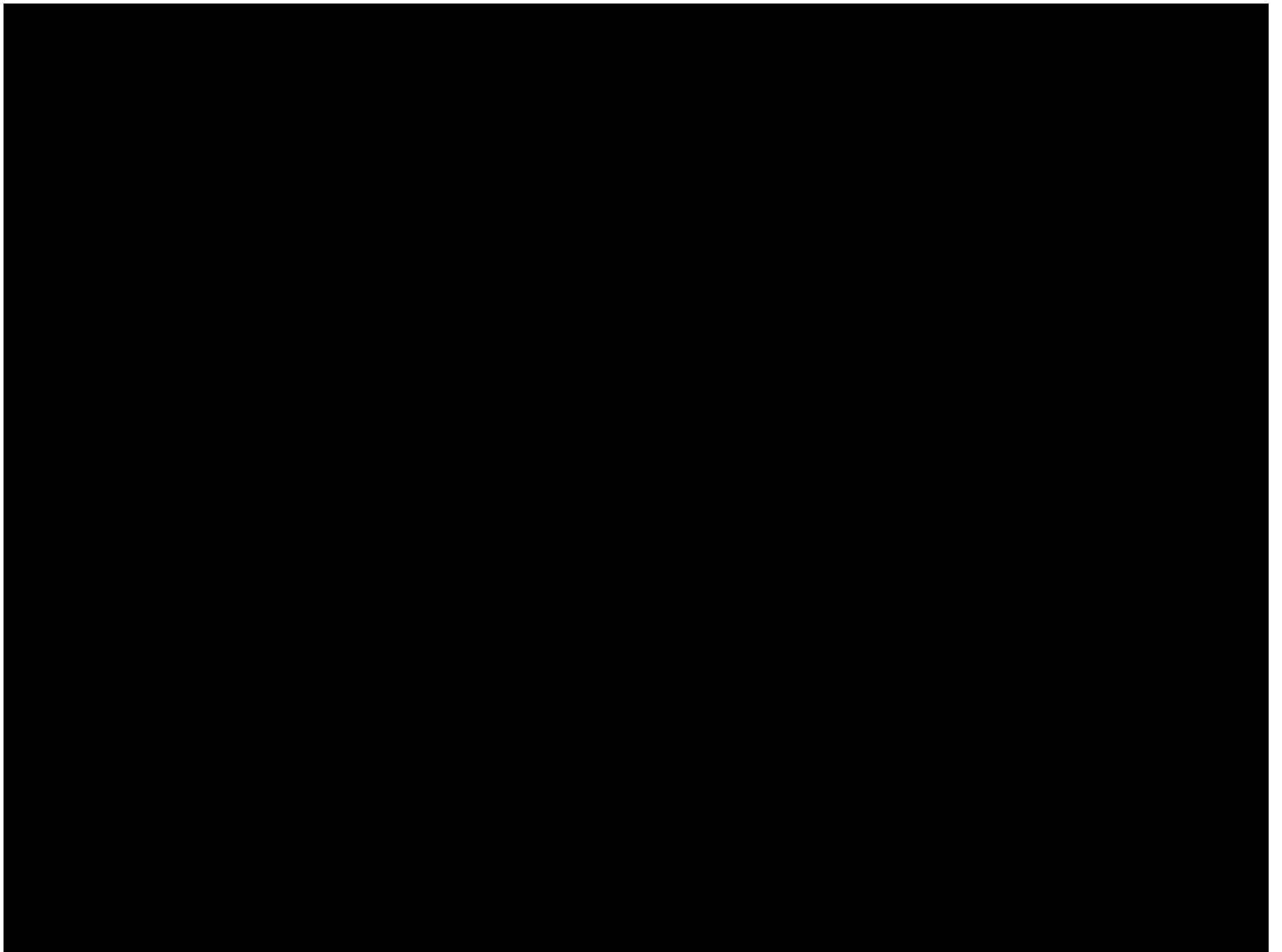
Primary RRD

- **by alteration or degeneration of the vitreous**
- Vitreous
 - most important intraocular tissue in the pathogenesis of retinal detachment
 - is composed of salts, proteins and hyaluronic acid contained in a network of insoluble protein fibrils
 - is attached to the retina via collagen fibrillar insertions into the internal limiting membrane
 - In the canine - " nuclear type" - opposite of that in humans

The vitreous body

- Eye movements result in countercurrents of the vitreous and intraocular fluids - can cause turbulence to induce a tear in the area of retinal atrophy
- **Vitreous degeneration** (Abnormal liquid vitreous) heritable disease in 11 breeds of dogs (Shih Tzu, Boston Terrier, Poodle, Jack Russel Terrier, Italian Greyhound and Yorkshire Terrier), reported in 85 other breeds
- The highest incidence of clinical spontaneous giant retinal tear - **head shaking dogs** (while playing with toys)





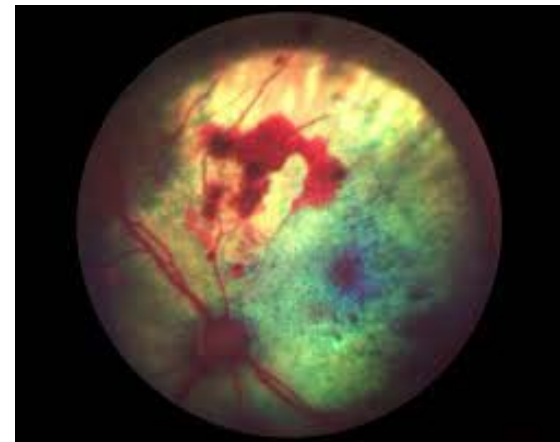
Secondary RRD

- Trauma
 - penetrating - bite wounds, cat claw injury, surgery
 - blunt
- Glaucoma
- Lens diseases
- Intraocular surgery
- Aggressive cryo or laser therapy



Non-RRD

- **Serous** - results from fluid accumulation in the subretinal space between the photoreceptors and the RPE
 - Exudative detachment
 - Hemorrhagic detachment
- **Tractional** - pulling force (band or membrane) in the vitreous that forces the retina to separate from the RPE
 - Intravitreal hemorrhage
 - Persistent hyaloid remnants
 - Iatrogenic – intraocular surgery



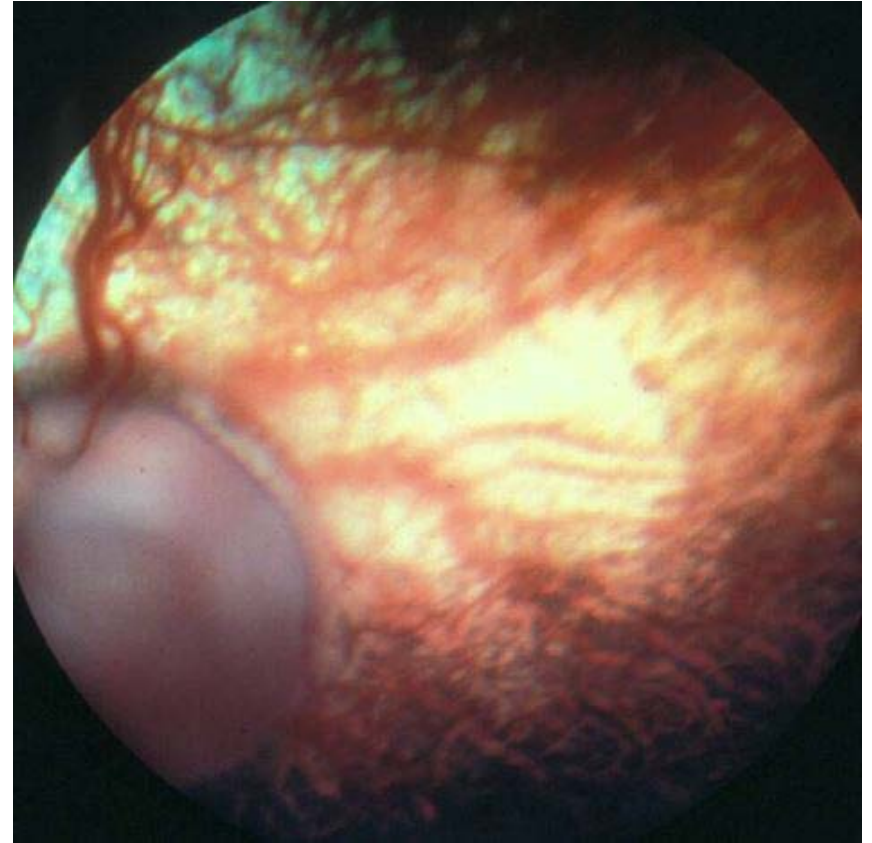
Most common causes of RD

- **Hyperimmune cataract and Lens induced uveitis (LIU)**
 - can cause vitreal degeneration, retinal cyst formation, obliteration of retinal vessels
 - Breeds (the Bichon Frise, Maltese, American Cocker Spaniel) with rapidly progressive cataract formation - more prone to LIU
- **Lens instability**
 - causes a disruption in the anterior hyaloid face, causing disturbance of the vitreous
- **Cataract surgery**
 - posterior capsular tear
 - vitreal hemorrhage



Most common causes of RD

- **Retinal abnormalities**
 - **Retinal dysplasia** (LR, ESS)
 - **CEA** - Optic nerve coloboma or pit can directly communicate with the subretinal space and can allow fluid from liquefied vitreous create an RD
 - **Senile** retinal thinning and atrophic retinal holes



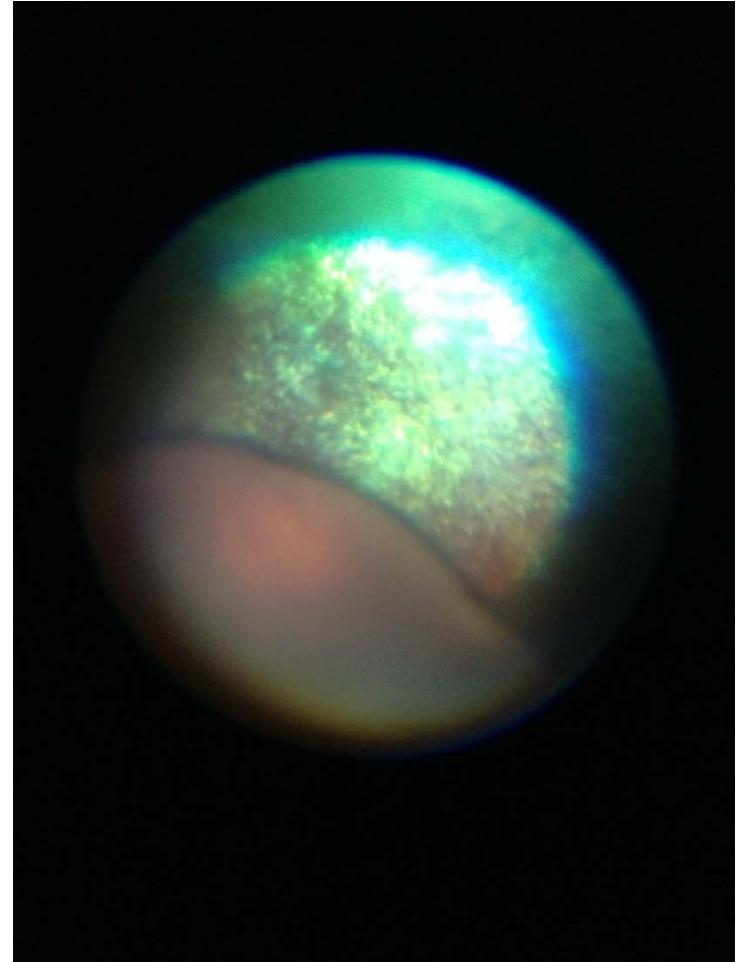
Other RD causes

- **Endophthalmitis (chorioretinitis)**
 - inflammatory response to ocular infection - bacterial, viral, fungal or parasitic
 - After intraocular surgery
 - Cat claw injury
 - Foreign body penetration
- **Iatrogenic**
 - aggressive laser or cryoablation of the ciliary body
 - During cryopexy or prophylactic transscleral laser retinopexy
 - Intravitreal or retrobulbar injections



Conclusion

- Risk factors:
 - Breeds predisposition
 - Cataract surgery
 - LIU
 - Lens luxation
 - Vitreous degeneration
 - Shi Tzu, Boston Terrier, JRT, Italian Greyhound, YT, Maltese, Poodle
 - Retinal dysplasia
 - CEA



Thank you for your attention

