

Atlas of Feline Ophthalmology

Atlas of Feline Ophthalmology

Second Edition

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Preface

Who can believe that there is no soul behind those luminous eyes!
— Théophile Gautier, French writer and critic

Has it really been 18 years since we completed our first feline atlas? Since that publication, the feline population has reached 83 million and the cat has surpassed the dog as the most popular pet in the United States. An increasing number of veterinarians cater preferentially or exclusively to feline patients. And now there is digital photography!

As before, our goal is to illustrate the normal and abnormal feline eye as seen in clinical practice. We had intended to make the first atlas timeless by concentrating on its images and excluding treatments likely to change with time. However, previously unrecognized pathogens and ongoing investigations of classical disorders have expanded the panorama of ocular disease in the cat. Approximately one-third of the 394 images in this edition are new. We have replaced a number of photos from the first edition with superior images, included more examples of common disorders, and added figures of ocular diseases that were not recognized in the feline eye in 1994. New entries include lesions of emerging systemic infections such as bartonellosis and aspergillosis and of novel agents including *Encephalitozoon cuniculi* and *Mycobacterium* spp. Examples of herpetic blepharitis and mycoplasmal keratitis suggest the familiar pathogens may be more pervasive than once supposed. Agents such as leishmania are noteworthy additions to the image bank as global travel facilitates the movement of foreign pathogens. Sclerosing pseudotumors, cystadenomas, iris abscesses, septic lens implantation, and aqueous misdirection syndrome round out the cast of recent characters impacting the feline eye.

The atlas is meant to serve as both a diagnostic reference with which to compare a patient's clinical signs and a colorful tool for educating its caregivers. Images are arranged anatomically, beginning externally with globe–orbit relationship and concluding with disorders of the retina and optic nerve. Each photo is accompanied by diagnosis, signalment, and a

description of the pertinent ocular lesions. Keep in mind that some patients were examined more than 30 years ago, with clinical conclusions based on then-current differentials and testing. In light of today's expanded list of etiologies and diagnostic modalities, we concede that alternative diagnoses likely exist in some of these cases.

The table of contents outlines lesions structurally and lists each figure according to diagnosis. A new addition to the atlas is an appendix that groups figures by etiology rather than structure. This format makes it possible to retrieve every image linked to a selected agent or disease and better exposes the widespread effect of these various disorders on ocular health. As an example, lesions of lymphosarcoma can be found within the orbit, eyelid, conjunctiva, anterior uvea, retina, and optic nerve. Once a diagnosis is made (hopefully with the aid of the atlas), readers can then refer to the bibliography, available ophthalmic texts, or online resources for ever-changing therapeutic recommendations.

We are fortunate to have known these wonderful animals and their devoted families. Our thanks go to the referring veterinarians and ophthalmic colleagues who generously shared their patients, images, and expertise to help illustrate the beauty and resiliency of the feline eye. We sincerely appreciate the encouragement and support of our Wiley-Blackwell editors—Erica Judisch and Nancy Turner. We are without question indebted to Marsha Ketrington, without whom this project would never have been completed. The countless hours she devoted to digitizing images archived as 2 × 2 slides and to refining colors and features to accurately recreate the original figures have made this atlas the best it can be. Frankly, her name belongs on its cover.

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Contents

The Table of Contents is presented in outline form to make it as useful and informative as possible. The figures have been grouped into 12 main sections, each corresponding to a condition or specific area of the eye. The initial subheads identify the disease, condition, or injury. Subsequent subheads are used to define specific aspects of each figure. Some figures are referenced more than once because they depict more than one clinical sign or condition; thus the numbers of the figures do not always appear in sequential order.

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Breed Predispositions to Ocular Disease

ABYSSINIAN

Progressive retinal atrophy: Rod-cone degeneration
Narfstrom 1985; Stiles and Townsend 2007; Narfstrom et al 2009; Menotti-Raymond et al 2010

Progressive retinal atrophy: Rod-cone dysplasia
Curtis, Barnett, Leon 1987; Stiles and Townsend 2007

BIRMAN

Corneal dermoid
Hendy-Ibbs 1985; Stiles and Townsend 2007

BRITISH SHORTHAIK

Cataract
Irby 1983

BURMESE

Corneal dermoid
Hendy-Ibbs 1985; Stiles and Townsend 2007

Corneal sequestration
Pentlarge 1989; Narfstrom 1999

Eyelid coloboma
Koch 1979

Glaucoma
Hampson, Smith, Bernays 2002

Lipid-laden aqueous
Gunn-Moore, Crispin 1998

Third eyelid gland prolapse
Chahory et al 2004; Stiles and Townsend 2007

DOMESTIC SHORTHAIK

Corneal dermoid
Hendy-Ibbs 1985; Stiles and Townsend 2007

Lysosomal storage disease
Stiles and Townsend 2007

HIMALAYAN

Cataract
Rubin 1986

Corneal sequestration
Pentlarge 1989; Morgan 1994; Narfstrom 1999

Eyelid cystadenoma
Chaitman, van der Woerd, Bartick 1999

KORAT

Lysosomal storage disease (GM₁ and GM₂ gangliosidosis)
Stiles and Townsend 2007

MANX

Corneal dystrophy
Bistner, Aguirre, Shively 1976

OCICAT

Progressive retinal atrophy: Rod-cone degeneration (*rdAc*)
Menotti-Raymond et al 2010

PERSIAN

Chediak-Higashi syndrome (Blue smoke variety)
Collier, Bryan, Prieur 1979

Corneal sequestration
Pentlarge 1989; Morgan 1994; Narfstrom 1999; Featherstone and Sansom 2004

Entropion
Narfstrom 1999; Williams and Kim 2009

Eyelid coloboma
Bellhorn, Barnett, Henkind 1971

Eyelid cystadenoma
Chaitman, van der Woerd, Bartick 1999; Cantaloube, Raymond-Letron, Regnier 2004; Giudice et al 2009

Idiopathic epiphora
Stiles and Townsend 2007

Lysosomal storage diseases
Stiles and Townsend 2007

Progressive retinal atrophy (early onset)
Rah et al 2005

SIAMESE

Convergent strabismus and nystagmus
Johnson 1991

Corneal sequestration
Pentlarge 1989; Narfstrom 1999

Glaucoma
Jacobi, Dubielzig 2008

Lens luxation
Olivera et al 1991

Lysosomal storage diseases
Stiles and Townsend 2007

Periocular leukotrichia
Scott, Miller, Griffin 2001a

Progressive retinal atrophy
Giuliano, van der Woerd 1999

SOMALI

Progressive retinal atrophy: Rod-cone degeneration (*rdAc*)
Narfstrom et al 2009; Menotti-Raymond et al 2010

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SECTION I

Normal Eye



Figure 1
Cross-sectional diagram of feline eye

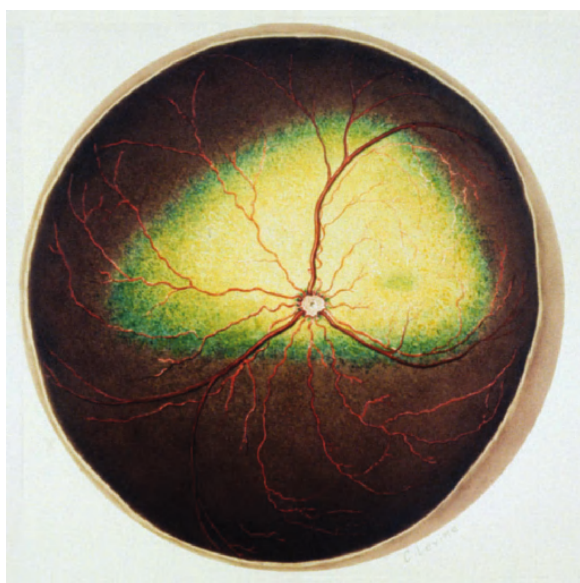


Figure 2
Fundus oculi

The entire fundus oculi of a cat's eye is represented in the artist's drawing. The nasal side is to the left and the temporal side is to the right. The brown nontapetum completely surrounds the green and yellow tapetum. The termination of the sensory retina, the ora ciliaris retinae, is represented by the pale margin surrounding the nontapetum. Peripheral to the ora is the pars plana of the ciliary body. The tapetum in the cat has a more granular appearance than in the dog. The green area in the tapetum, superior and temporal to the optic disc, represents the area centralis. The three primary venules are illustrated, two of which arch temporally. The primary venules and smaller arterioles drop off the edge of the depressed optic nerve, which is located well within the tapetum. The optic disc has a sieve-like appearance due to the structure of the lamina cribrosa.



Figure 3
Heterochromia iridis
(3-year-old domestic shorthair)

In addition to the blue iris, the right eye has a red reflex through the pupil due to the atavistic fundus and lack of pigment in the retina and choroid. A typical green tapetal reflex is present in the left eye. This cat was deaf since birth, a problem linked with blue eyes and a white haircoat in domestic cats.

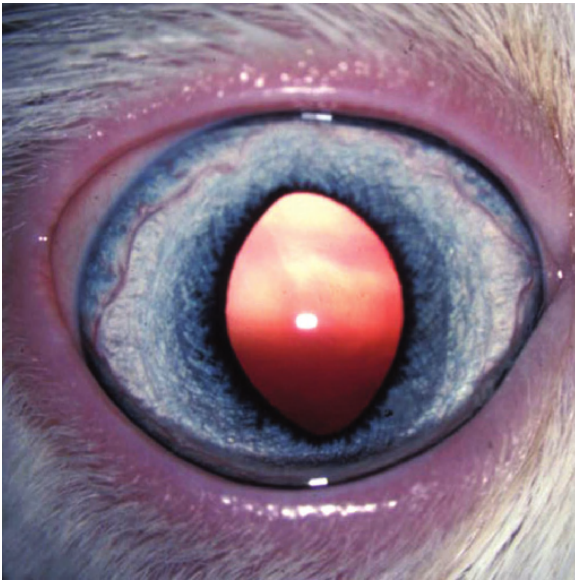


Figure 4
Normal adnexa/Anterior segment, frontal view
(1-year-old Persian)

Pictured here is the blue right eye of a white Persian, showing how little sclera is normally exposed temporally (*left side of photograph*) in the cat. Only the edge of the nictitating membrane is visible on the right. The iris vascular arcade can easily be seen against the light iris. The iris surface has a woven appearance, which is most obvious near the pupil. The pupil margin is slightly roughened because of the posterior pigmented epithelial layers, which terminate at the pupil. The red color seen through the pupil represents the reflection from the subalbinotic atapetal fundus.



Figure 5
Normal adnexa/Anterior segment, lateral view
(3-year-old domestic shorthair)

Focused on the anterior axial cornea (*black arrow*), this photograph shows the normal corneal curvature. The anterior surface of the lens (*white arrow*) can be seen as it extends into the anterior chamber. The deep anterior chamber of the cat is the area between the arrows. Only the lateral sclera is normally visible.

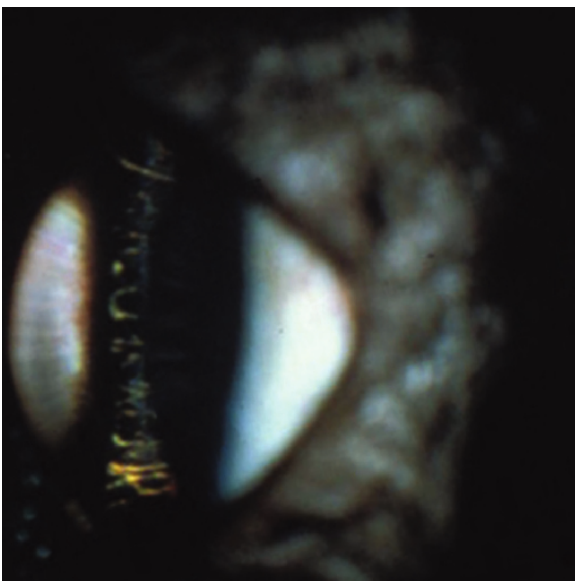


Figure 6
Normal iridocorneal angle, gross view
(2-year-old Persian)

With the camera aimed parallel to the iris face and focused at the level of the iridocorneal angle, the yellow pectinate ligaments have been brought into view. The cat's deep anterior chamber and degree of corneal curvature make it possible to see these ligaments without a gonioscopic lens.

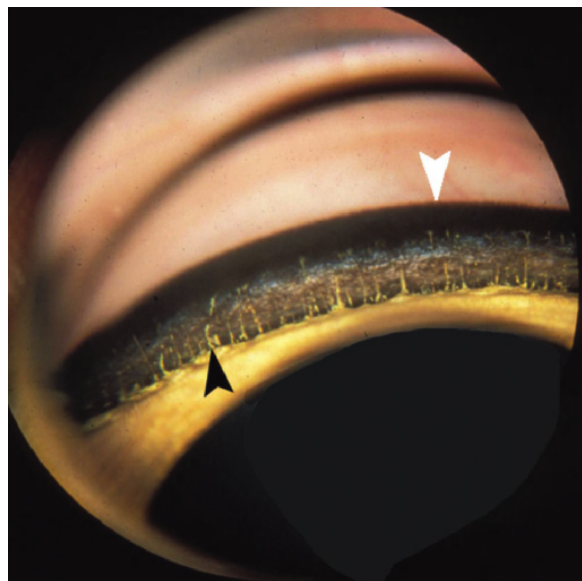


Figure 7
Normal iridocorneal angle, gonioscopic view
(3-year-old domestic shorthair)

Taken through a Koeppel gonioscope, this photograph shows the normal wide drainage angle in the cat. The pectinate ligaments (*black arrow*) can be seen extending from the base of the iris to their insertion into the cornea at the termination of Descemet's membrane. The area deep to the ligaments is the trabecular meshwork. The large dark band (*white arrow*) is the superficial pigmented band representing scleral pigment.

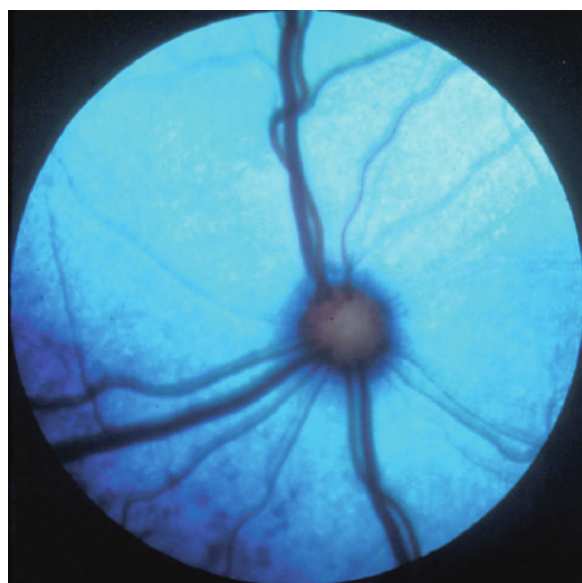


Figure 8
Normal fundus
(8-week-old domestic shorthair)

The immature tapetum is blue in all cats and gradually assumes its adult coloration by 4 months of age. The optic disc appears pinker in the kitten than in the adult cat.



Figure 9
Normal fundus
(2-year-old domestic shorthair)

The area centralis (*arrows*) is seen temporal to the disc in this left eye. The area is cone-rich and comparatively devoid of vessels. The region is often a slightly different color than that of the surrounding tapetum, as the green color here demonstrates. The photograph was taken with a neutral density filter, causing the optic disc to appear darker than normal.



Figure 10
Normal fundus
(3-year-old Persian)

The sieve-like appearance of the optic disc is due to the lamina cribrosa. The incomplete green circle around the disc is referred to as conus and may appear hyperreflective. The normal retinal vessels, both the larger venules and the smaller arterioles, emerge near the rim of the optic disc. The cat has a complete physiologic cup at the disc's center.

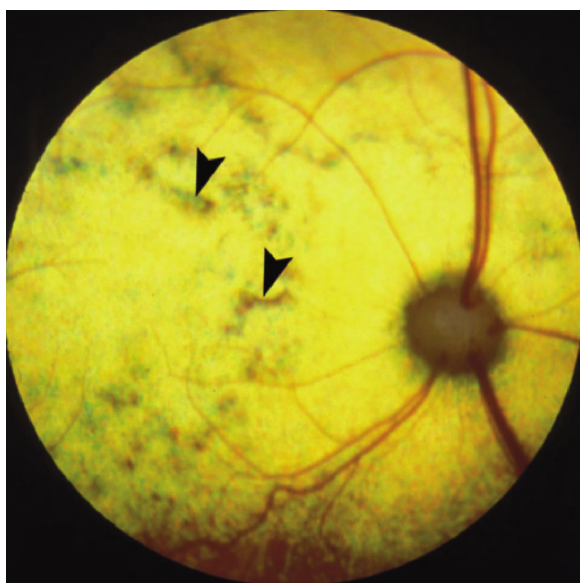


Figure 11
Normal fundus
(4-year-old Himalayan)

When the underlying choroidal pigment is exposed by thinned or hypoplastic tapetum, green and dark spots (*arrows*) are created.

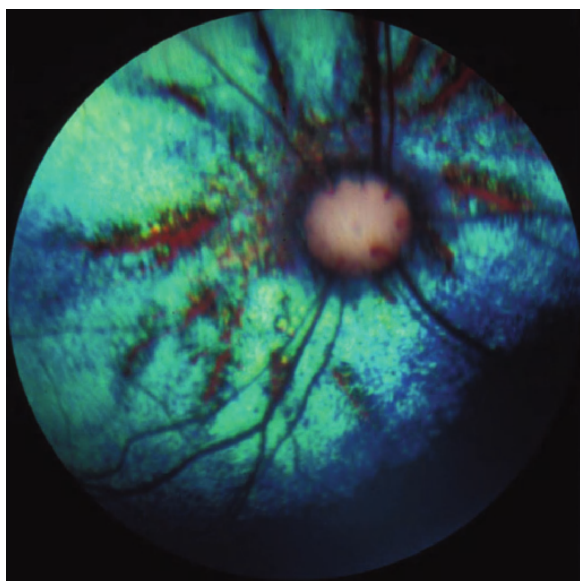


Figure 12
Normal fundus
(4-year-old domestic shorthair)

The dark red streaks seen in the tapetum are a consequence of tapetal hypoplasia. The underlying normal choroidal vessels and pigment are now more easily visualized.

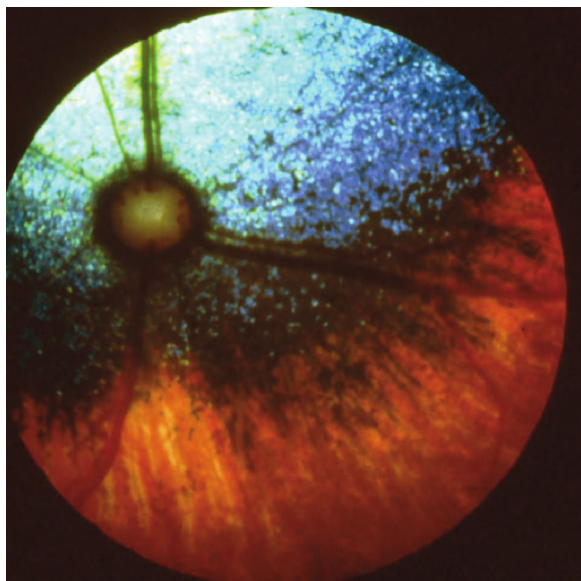


Figure 13
Normal fundus
(adult domestic shorthair)

The blue color of the immature tapetum persists in this adult cat. The inferior nontapetal area lacks pigment, allowing visualization of the normal choroidal vessels.

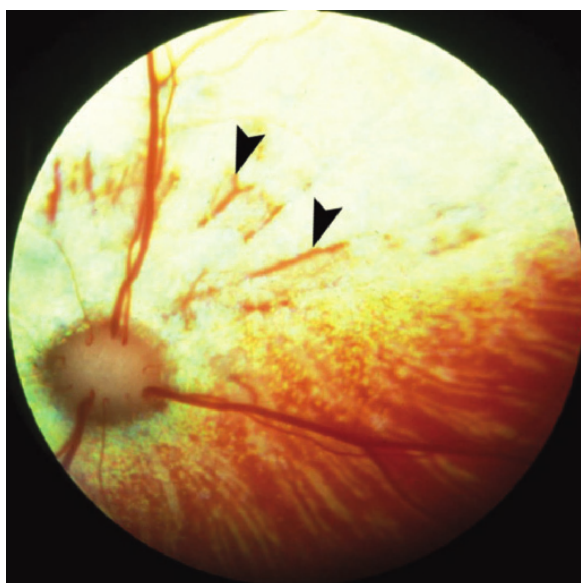


Figure 14
Normal fundus
(4-year-old Siamese)

Focal tapetal hypoplasia exposes choroidal vessels, producing red streaks and dots (*arrows*) within the tapetal fundus. Lack of pigment in the inferior nontapetal area allows the normal choroidal vessels to be seen. Both findings are normal in the Siamese and other color-dilute breeds.

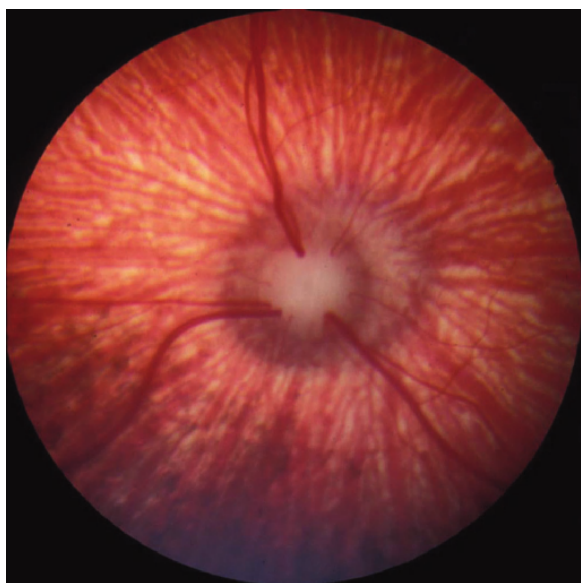


Figure 15
Normal fundus
(4-year-old domestic shorthair)

This white cat has no tapetum. Pigment in the retinal pigmented epithelium (RPE) and choroid is also sparse. With these variations, the choroidal vessels are easily seen. The shaded area surrounding the optic disc may be a subalbino variation of conus. Normal retinal vessels span the area but choroidal vessels decrease in density.

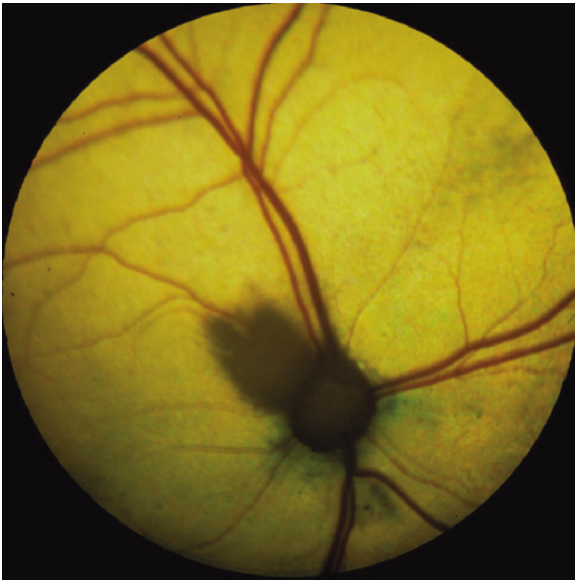


Figure 16
Normal fundus
(12-year-old domestic shorthair)

Excessive myelin radiates from the disc surface into the surrounding nerve fiber layer, creating a feathered or flame-shaped pattern distally. This was a unilateral finding in this patient, but the variation does occur bilaterally.

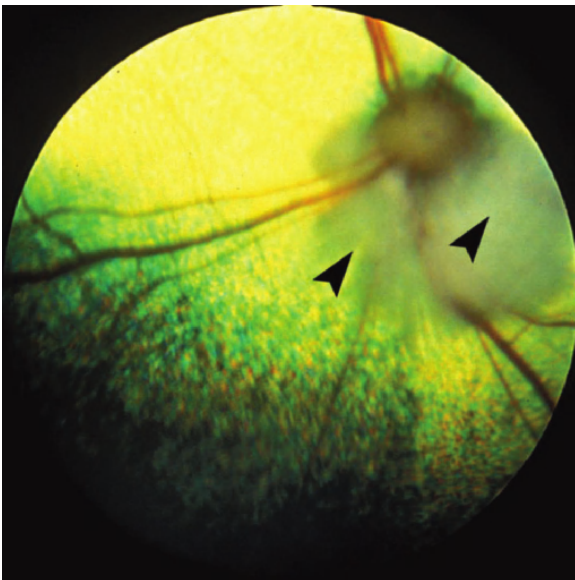


Figure 17
Normal fundus
(11-year-old domestic shorthair)

Excessive myelin anterior to the lamina cribrosa radiates from the disc in the nerve fiber layer (*arrows*). Some retinal vessels are covered by the myelin. The variation was present in both eyes of this cat.

SECTION II

Globe–Orbit Relationship



Figure 18
Convergent strabismus
(adult domestic shorthair)

The medial deviation of the globes produces a crossed-eye appearance and exposes more lateral sclera than usual. The cat has no recognizable visual deficit. The red color of the pupils is a result of limited choroidal pigmentation in this blue-eyed patient.

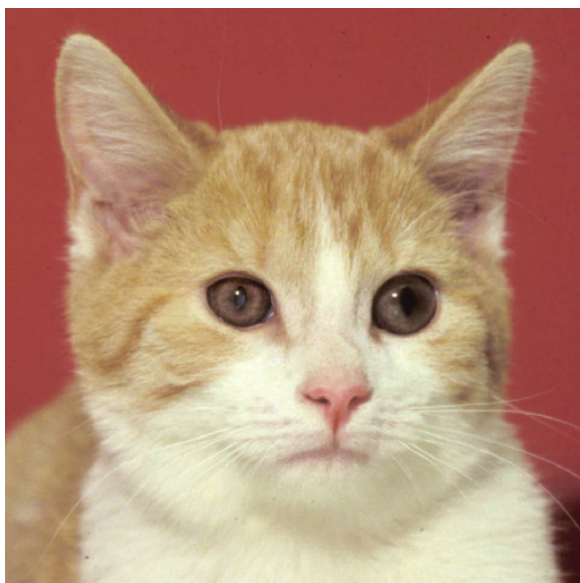


Figure 19
Microphthalmia
(6-month-old domestic shorthair)

The owners sought to explain a difference in size between the two eyes. The right eye is smaller than normal. A resorbing cataract lends a cloudy appearance to the right pupil and prevents visualization of the fundus. The left eye is normal.



Figure 20
Phthisis bulbi
(6-year-old domestic shorthair)

Severe anterior uveitis developed in the left eye when this cat was hit by a car 3 years prior to this photograph. Ptosis of the upper lid reduces the palpebral fissure. The black margin of the third eyelid covers the medial aspect of the smaller-than-normal globe. The iris is darker and intraocular pressure is low due to prior inflammation. Multiple iris cysts were present but not visible in the photo. The pupil is irregular with no direct or indirect pupillary light reflexes (PLR). This is a blind but pain-free eye. The normal right eye also had no indirect PLR.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 21
Horner's syndrome
(6-year-old domestic longhair)

Presented for evaluation because of a film on the right eye, this cat demonstrates an enophthalmic globe and protrusion of the nictitating membrane. Ptosis of the superior lid results in a reduced palpebral fissure. The pupil is miotic and does not dilate in dim light, despite normal direct and indirect pupillary light reflexes. The nictitans retracted following application of topical dilute phenylephrine. Thoracic radiographs suggested a mediastinal mass but owners declined further investigation.

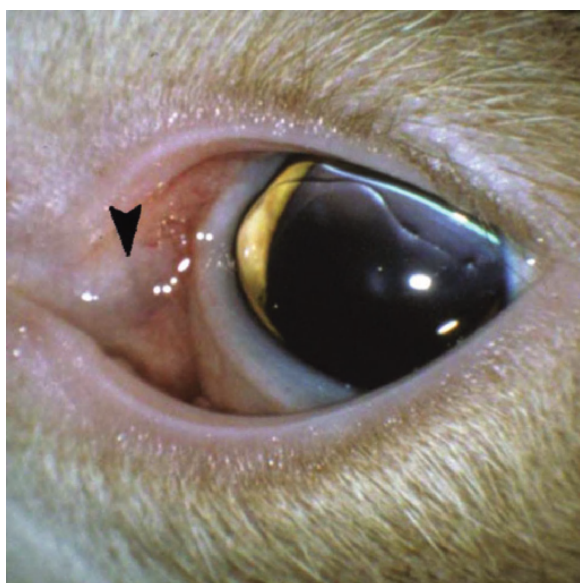


Figure 22
Prolapsed nictitans/Retrobulbar tumor
(3-year-old domestic shorthair)

The referring veterinarian treated this cat for conjunctivitis over a period of several weeks. Recently, the globe recessed and the nictitans became prominent. A firm mass (*arrow*) is palpable between the prolapsed nictitans and the orbital rim, pushing the globe posteriorly and indenting its posterior surface (see Figure 374). A needle aspirate of the mass was interpreted as a poorly differentiated sarcoma.

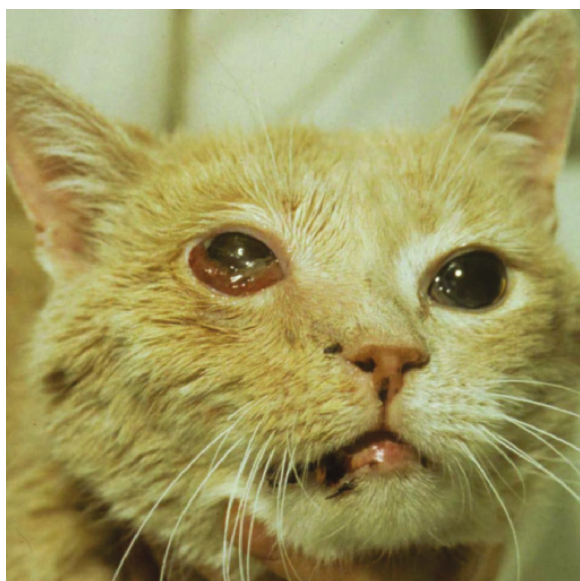


Figure 23
Retrobulbar abscess
(8-year-old domestic shorthair)

This was an outdoor cat whose owners were unaware of the duration of the condition. The conjunctiva is severely chemotic and hyperemic. The globe is exophthalmic and cannot be easily retropulsed into the orbit. Intraocular structures are normal. On oral examination, a large, swollen hemorrhagic area was found in the posterior upper dental arcade.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

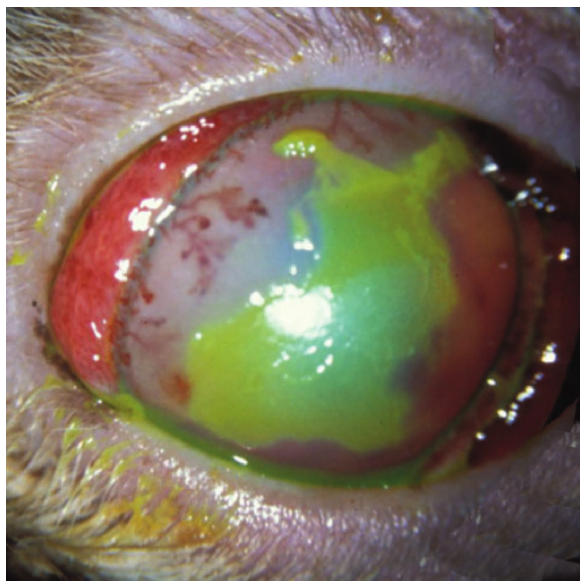


Figure 24
Retrobulbar abscess
(3-year-old Persian)

This right eye has been irritated for several weeks but recently enlarged, according to the owner. The globe is exophthalmic, painful when palpated, and difficult to retropulse. The blink response is incomplete, resulting in lagophthalmos. The conjunctiva is severely hyperemic and chemotic. The cornea has diffuse edema, a large superficial axial ulcer (stained with fluorescein dye), and vascularization. Intraocular structures were difficult to evaluate but intraocular pressure was normal. The cause of the abscess could not be determined.



Figure 25
Orbital aspergillosis
(12-year-old Persian)

This cat was referred with a 2-month history of sneezing and bilateral nasal discharge. The biopsy-confirmed lymphoplasmacytic rhinitis resolved with oral prednisone therapy. Two months after treatment stopped, the rhinitis recurred and the right eye appeared swollen. In the photograph, the globe is exophthalmic and deviated laterally. The third eyelid protrudes, with its bulbar conjunctiva swollen beyond the nictitans' pigmented leading margin. The exposed and desiccated cornea is centrally ulcerated and discolored a light brown, with diffuse edema and intense stromal vascularization. Intraocular detail is obscured. A fine-needle aspirate of the right orbit revealed pyogranulomatous inflammation and *Aspergillus* spp hyphae.

(Image courtesy of Laura Barachetti, DVM; Barachetti L, Mortellaro CM, Giancamillo MD, Giudice C, Martino P, Travetti O, Miller PE: Bilateral orbital and nasal aspergillosis in a cat. *Vet Ophthalmol* 12(3):176–182, 2009.)



Figure 26
Retrobulbar lymphoma
(7-year-old domestic shorthair)

The owners and referring veterinarian thought this left eye had enlarged over the last 5 days. The globe is prominent, as evidenced by the amount of visible sclera laterally. The only abnormality of the anterior segment is the accompanying episcleral vascular congestion. The pupillary light responses were normal and intraocular pressure (IOP) was 26 mm Hg, interpreted as high normal. The right eye IOP measured 20 mm Hg. A retrobulbar mass was suspected following the ophthalmoscopic examination (see Figure 373) and diagnosed as lymphoma at necropsy.



Figure 27
Zygomatic osteoma
(11-year-old domestic shorthair)

A mass lateral to the left eye had enlarged over an 8-week period, distorting the lateral canthus and preventing eyelid closure. The mass was hard, irregular, and nonpainful. Radiography confirmed a single bony mass involving the facial zygomatic bone. Excisional biopsy provided tissue for the histopathologic diagnosis of osteoma.

(Image courtesy of Robert H. Foley, DVM, DABVP; Foley RH: Zygomatic osteoma in a cat. *Feline Pract* 21:26, 1993.)

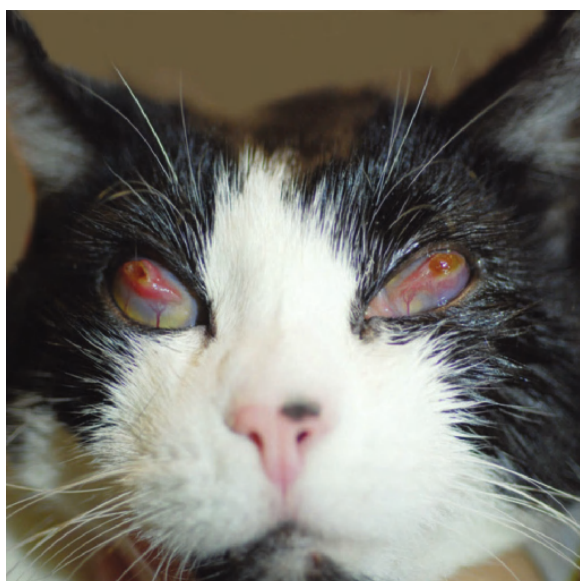


Figure 28
Orbital sclerosing pseudotumor
(12-year-old domestic shorthair)

This patient presented with a complaint of bilateral nonhealing corneal ulcers. Both globes are immobile and lid closure is incomplete. Large vessels extend from the edematous peripheral corneas toward central areas of intense vascularization. The desiccated, discolored centers of these axial lesions rise well above the surrounding tissue. The horizontal orientation mimics the shape of the palpebral fissures and suggests exposure as a factor in the chronic ulceration. The patient was euthanized 11 months later as a consequence of its unremitting orbital disease.

(Image courtesy of Marjorie H. Neaderland, DVM, DACVO.)



Figure 29
Orbital sclerosing pseudotumor
(adult Persian)

This patient presented with a red, cloudy left eye of unknown duration. The globe is exophthalmic and resists both forced duction and retropulsion. The eyelids are also fixed in position and unable to close over the corneal surface. Retraction of the upper lid accounts for the increased visibility of the dorsal sclera. A brownish plaque of dried exudate and desiccated tissue characterizes the exposed corneal surface. Other signs include conjunctival hyperemia, corneal edema, and superficial vascularization. Over time, the opposite eye was also affected and equally refractory to therapy.

(Image courtesy of RB Mould, BA, BVSc, CertVOphthal, MRCVS; Billson FM, Miller-Michau T, Mould JRB, Davidson MG: Idiopathic sclerosing orbital pseudotumor in seven cats. *Vet Ophthalmol* 9(1), 45–51, 2006.)



Figure 30
Traumatic proptosis
(4-year-old domestic shorthair)

Severe head trauma occurred when the cat was hit by a car. The right globe is completely displaced from the orbit and is trapped anterior to the lid margins. Multiple cranial and mandibular fractures were also identified in this patient.



Figure 31
Orbital mucocele
(7-year-old domestic shorthair)

The right globe was enucleated due to trauma 3 months prior to this photograph. The arrow points to the area over the bony orbit where a soft swelling subsequently developed.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

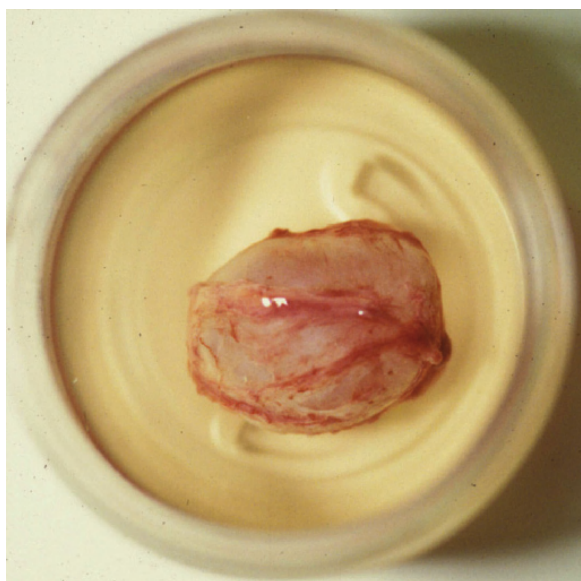


Figure 32
Orbital mucocele
(7-year-old domestic shorthair)

This thin-walled cystic structure was dissected from the orbit of the patient in Figure 31. The cyst wall was lined by conjunctival epithelium containing mucin-producing goblet cells.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

SECTION III

Adnexa



Figure 33
Eyelid agenesis/Persistent pupillary membranes (PPM)
(6-month-old domestic shorthair)

The temporal two-thirds of the superior lid margin is absent. Superficial vascularization and pigmentation are present in the superior cornea. The white arrow points to an area of endothelial pigmentation attributed to PPMs.



Figure 34
Eyelid agenesis
(6-month-old domestic shorthair)

Almost the entire upper lid margin is absent. Misdirected facial hairs can be seen in contact with the corneal surface. Severe corneal vascularization is evident against the tapetal reflection, a consequence of both trichiasis and exposure.

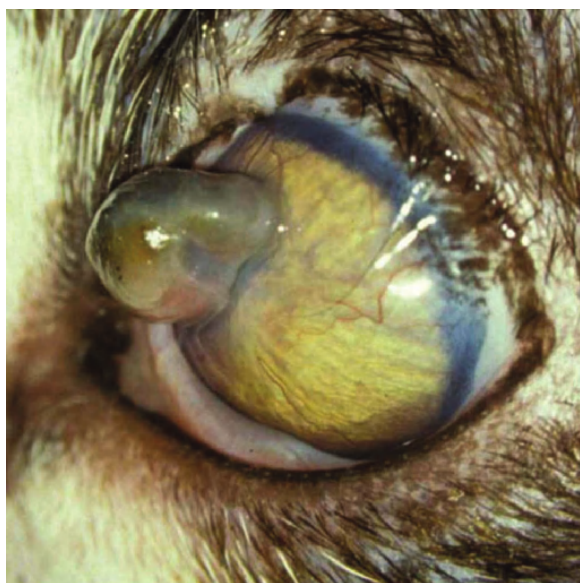


Figure 35
Eyelid agenesis/Iris prolapse
(5-month-old domestic shorthair)

The lateral two-thirds of the superior lid margin failed to develop and the cornea ulcerated due to exposure and irritation by misdirected hairs. Pigmented iris is seen extending above the corneal surface through a ruptured descemetocoele. Superficial corneal vessels are highlighted against the yellow iris. The anterior chamber is flat, with the iris in close proximity to the inner cornea. The pupil is not visible.



Figure 36
Eyelid agenesis/Dermoid/Iris coloboma
(3-month-old domestic shorthair)

Multiple congenital ocular anomalies are present in this kitten. The temporal half of the upper lid margin is absent and facial hairs are misdirected against the eye. A dermoid spans the lateral limbus, creating a mild opacity at its attachment to the cornea. The pupil is eccentric and misshapen owing to its colobomatous defect.

(Image courtesy of José Luiz Laus, DVM, MSc, PhD.)

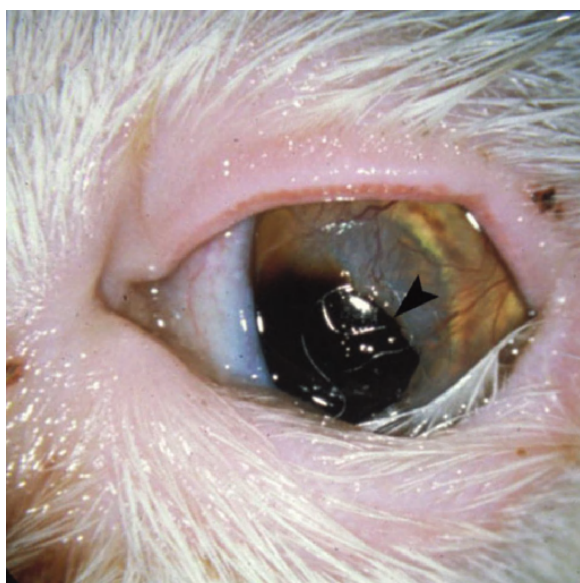


Figure 37
Entropion
(19-year-old Persian)

This cat had a lifelong history of ocular irritation and discharge. The lower eyelid is inverted, resulting in contact of the cornea by the facial hair. Prominence of the third eyelid suggests a painful eye. Superficial corneal vascularization accompanies a darkly colored sequestrum (*arrow*) in the central cornea.

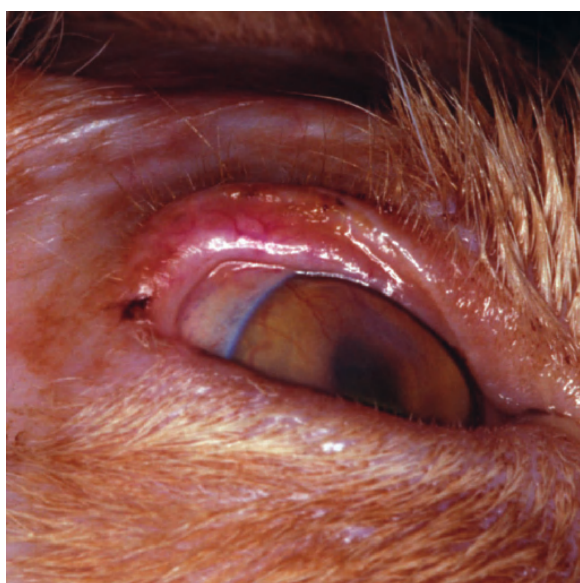


Figure 38
Cicatricial ectropion
(9-month-old domestic shorthair)

When rescued from an industrial site as a kitten, this patient's haircoat was plastered with a thick black substance resembling crude oil and the skin beneath was ulcerated. Copious mucopurulent discharge, severe conjunctivitis, and extensive superficial corneal ulceration were present bilaterally. The ocular sequelae of the chemical injury can be seen months later, with alopecia and thinning of the periocular skin. Tissue contracture compromises lid function and creates a secondary ectropion, with eversion of the upper lid margin and palpebral conjunctiva. Corneal scarring and superficial vascularization are also present, consequences of both the initial ulceration and current lagophthalmos.



Figure 39
Distichiasis
(adult domestic shorthair)

A slight serous discharge from the left eye was a recurring complaint. Several cilia extend from the meibomian gland openings along the lower eyelid margin. The remainder of the ocular examination was unremarkable.



Figure 40
Herpetic blepharitis
(1-year-old domestic shorthair)

This patient was adopted from a municipal shelter at approximately 12 weeks of age, with bilateral ocular discharge and occasional sneezing that resolved within a week. From time to time, a mild discharge had been noted from the right eye. One week prior to presentation, that same eye appeared acutely painful, red, and swollen. The eyelid margins are erythematous and thickened, and marginal pigmentation is decreased. The palpebral conjunctiva is hyperemic and chemotic. Third eyelid prominence attests to the cat's discomfort. A corneal ulcer is present centrally, highlighted by the tapetal reflection. Clinical signs improved quickly with antiviral therapy.



Figure 41
Allergic blepharitis
(4-month-old domestic shorthair)

The owners of this cat observed increasing discomfort and redness of the eyelids following the use of a topical tetracycline ointment prescribed for mild conjunctivitis. The cat is squinting and the lid margins are hyperemic. Edematous conjunctiva can be seen extending beyond the superior lid margin. All signs resolved when topical medication was discontinued.

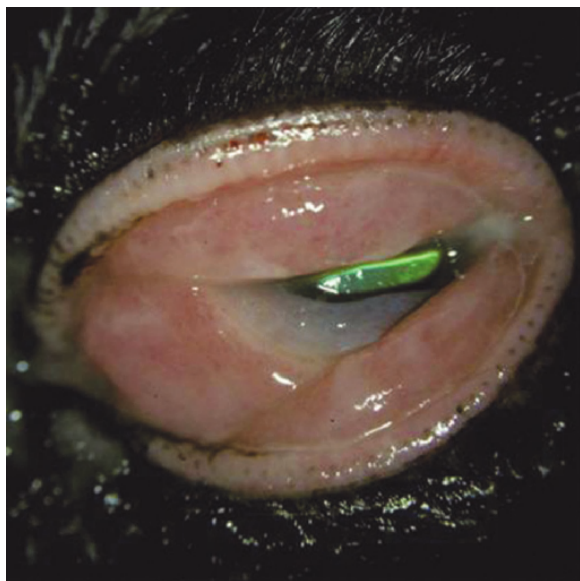


Figure 42
Allergic blepharitis/Conjunctivitis
(2-year-old domestic shorthair)

In spite of progressively worsening blepharospasm, the owner continued to apply trifluridine several times daily to treat a herpetic ulcer. As a consequence, the lid margins are inflamed and depigmented. Severe conjunctival hyperemia and chemosis combine with the prominent third eyelid to obscure the cornea.

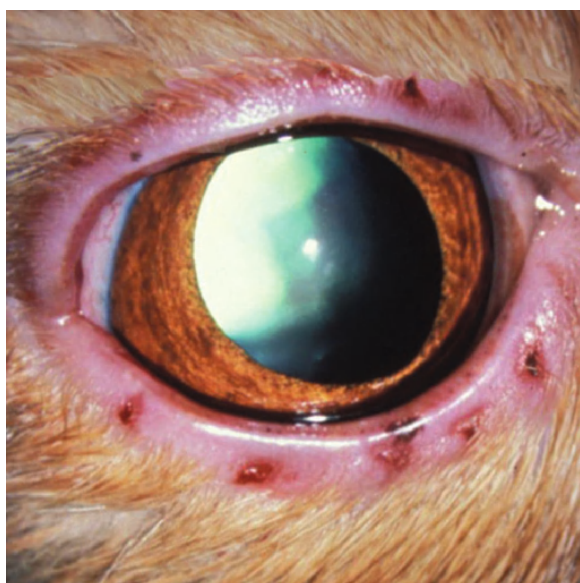


Figure 43
Bacterial blepharitis
(5-year-old domestic shorthair)

Both lids of each eye were focally hyperemic with punctate abscesses below the lid margins. *Staphylococcus* spp was cultured from the lesions.

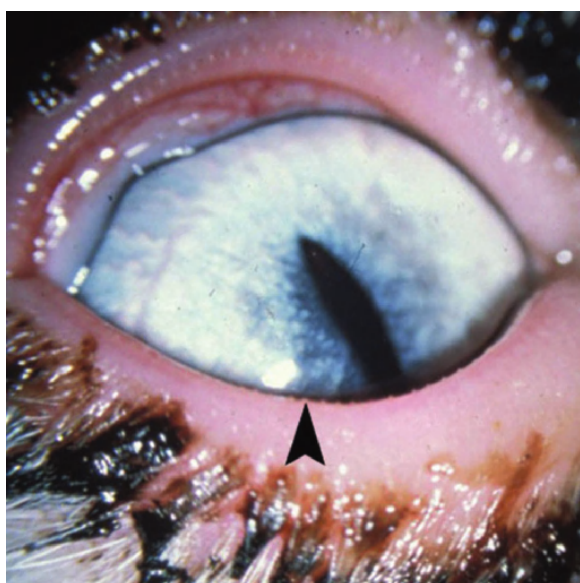


Figure 44
Meibomianitis
(6-month-old Persian)

The lid margins appear roughened due to the presence of fine caseous plugs (arrow) at the openings of the meibomian glands. Copious dark periocular discharge, conjunctival hyperemia, and chemosis accompany the lid changes. Swabs of meibomian secretions and the conjunctival surface failed to identify any bacterial, viral, or fungal etiology.



Figure 45
Apocrine cystadenoma/Hidrocystoma
(1-year-old Persian)

This patient exhibits only mildly elevated gray to black lesions near the lower lid margin and medial canthus, typical of the early stages of this disorder. Lesions were present bilaterally.

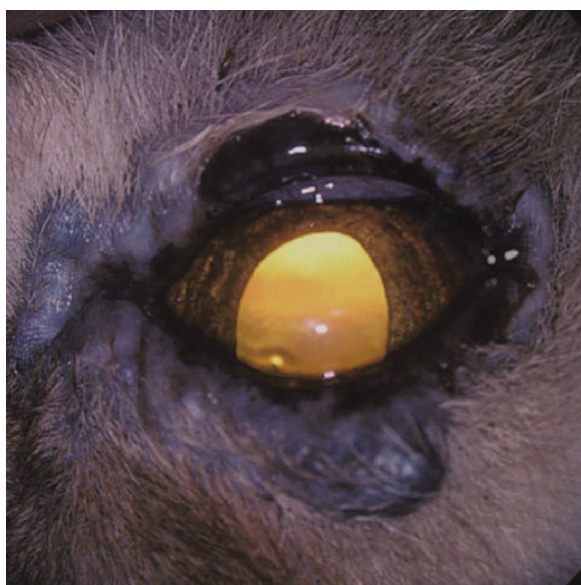


Figure 46
Apocrine cystadenoma/Hidrocystoma
(10-year-old Persian)

The owner first noted a small, dark gray swelling near the medial canthus of the left eye 8 months prior to presentation. Over time variable-sized nodules developed within the eyelids of both eyes. No other dermatologic lesions were present. Multiple dark gray to black soft, fluid-filled cysts are present in the upper and lower eyelids of the more severely affected left eye. Fine-needle aspiration of a larger lesion collapsed the swelling, producing a small quantity of brown fluid containing red blood cells, nondegenerate neutrophils, and macrophages.



Figure 47
Chalazion
(5-year-old domestic shorthair)

A large white swelling beneath the superior palpebral conjunctiva can be seen in this cat with chronic conjunctivitis. A firm caseous material compatible with that of inspissated meibomian gland secretions was curetted from the mass.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrings, McLellan, Albert. Elsevier Limited, 2010.)



Figure 48
Lipogranulomatous conjunctivitis
 (12-year-old domestic shorthair)

This bilateral disease was restricted to the inner surface of the upper eyelids. The palpebral conjunctiva is mildly hyperemic and distended in subtly lobulated fashion. Multiple distinct white nodules were present in the contralateral eye, a classical feature attributed to accumulations of lipid-laden macrophages or leaking meibomian secretions beneath the conjunctiva.



Figure 49
Demodicosis
 (13-year-old domestic longhair)

Blepharitis in this diabetic cat is characterized by exudative dermatitis, alopecia, erosion, and crusting. The eyes were normal. Periocular skin scrapings were positive for *Demodex* spp.

(Image courtesy of Barbara A. Kummel, DVM.)



Figure 50
Mycobacterial dermatitis/Blepharitis
 (5-year-old domestic longhair)

This indoor/outdoor cat was known by the owners as an aggressive hunter. Multiple pink to gray nodules can be seen on the face, a few of which are encroaching within the medial canthus of the right eye. Similar lesions were also present on the paws. The nodules were located in the subcutis and were not painful, hot, or ulcerated. The granulomas were caused by *Mycobacterium* sp. strain *Tarwin*.

(Image courtesy of Janet A. Fyfe, BSc (Hons), PhD; Fyfe JA, McCowan C, O'Brien CR, et al: Molecular characterization of a novel fastidious mycobacterium causing lepromatous lesions of the skin, subcutis, cornea, and conjunctiva of cats living in Victoria, Australia. *Clin Microbiol* 46(2):618–626, 2007.)



Figure 51
Allergic blepharitis
(2-year-old domestic shorthair)

The owners observed irritation around the eyes and nose 3 days after starting tetracycline/polymyxin B (Terramycin[®]) ophthalmic ointment, but continued treatment for a total of 7 days, when this photograph was taken. The lids and nasal planum are hyperemic and ulcerated. All lesions significantly improved 3 days after discontinuing the topical medication.

(Image courtesy of David T. Ramsey, DVM, MS, DACVO.)



Figure 52
Food allergy
(4-year-old Persian)

Pruritus and constant rubbing led to this cat's patchy periocular alopecia and excoriation. Exudative facial fold dermatitis is also present. Food allergy was suspected on the basis of clinical signs and confirmed by a food elimination trial.

(Image courtesy of Barbara A. Kummel, DVM.)



Figure 53
Pemphigus erythematosus
(adult domestic longhair)

The left eyelids are spared the erythematous macular dermatitis and excoriations of the right periocular region. Combined with those of the nose, muzzle, and pinnae, these periocular lesions are compatible with pemphigus erythematosus.

(Image courtesy of Barbara A. Kummel, DVM.)

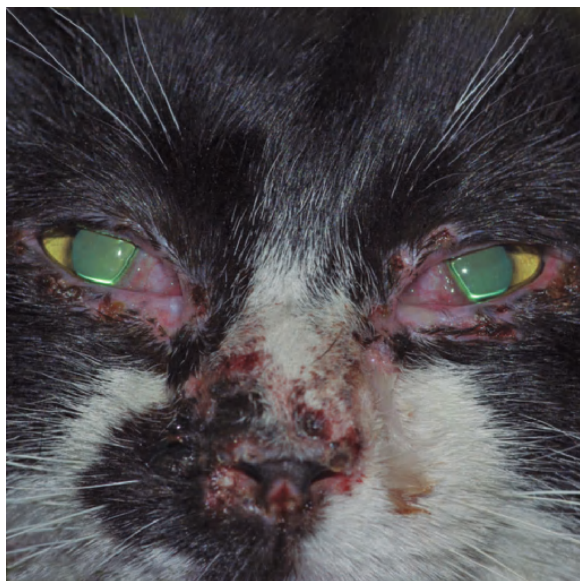


Figure 54
Herpetic blepharitis/Dermatitis
(2-year-old American shorthair)

This cat was adopted from a shelter at 8 weeks of age. Lymphadenopathy and fever of unknown origin developed 4 months prior to presentation. Following a thorough diagnostic workup to rule out infectious disease, systemic corticosteroid therapy was begun. The fever resolved with treatment but daily therapy was required to prevent relapses. Three weeks after beginning steroids, ocular discharge and redness developed. A bacterial infection was diagnosed based on culture but ocular signs persisted despite antibiotic therapy. Accompanying nasal lesions were incorrectly attributed to the constant ocular discharge. At examination, both eyes are painful, with squinting and third eyelid protrusion. The eyelids are erythematous, with alopecia, marginal erosions, and crusting. Similar lesions extend to the nasal planum. Dendritic corneal lesions were present bilaterally but are not visible in the photo. The ocular and skin lesions improved rapidly with antiviral therapy.



Figure 55
Idiopathic facial dermatitis of Persians
(4-year-old Persian)

This cat had a long history of black ocular discharge that required daily cleansing. Increasing redness of the eyelids and facial folds began 1 year ago. Yeast and cocci were identified cytologically but antimicrobial therapy failed to resolve the problem. Lesions surrounding the eyes and along the facial folds are characterized by black exudates adherent to the skin and hair, with erythema and excoriation of the underlying skin. This incurable dermatologic disorder has been misinterpreted as facial scalding related to excessive ocular discharge.



Figure 56
Cutaneous histiocytosis
(11-year-old domestic longhair)

The owners noticed this medial canthal mass for about 1 month. The raised, firm, nonpigmented, and ulcerated mass measures approximately 5×7 mm. There was no conjunctival involvement. Histopathology diagnosed a progressive dendritic cell histiocytosis.

(Image courtesy of Paige M. Evans, DVM.)



Figure 57
Squamous cell carcinoma
(12-year-old domestic shorthair)

According to the owner, this red spot on the lower eyelid gradually enlarged over a 3-month period. The lid margin is notched by an erythematous, ulcerative lesion. The right eyelid, nasal planum, and pinnae of both ears were similarly affected.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 58
Squamous cell carcinoma
(12-year-old domestic shorthair)

The medial canthus and nasal one-third of the lower lid are eroded by the tumor. The bulbar conjunctiva is normal. Biopsy confirmed the diagnosis.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 59
Squamous cell carcinoma
(17-year-old domestic shorthair)

This large erosive mass involved the lower lid, palpebral conjunctiva and nictitans. Biopsy confirmed the diagnosis.



Figure 60
Adenocarcinoma
(16-year-old Abyssinian)

A firm, irregularly lobulated mass distorts the superior nasal lid and palpebral conjunctiva. The nictitating membrane was spared. Biopsy confirmed the diagnosis.

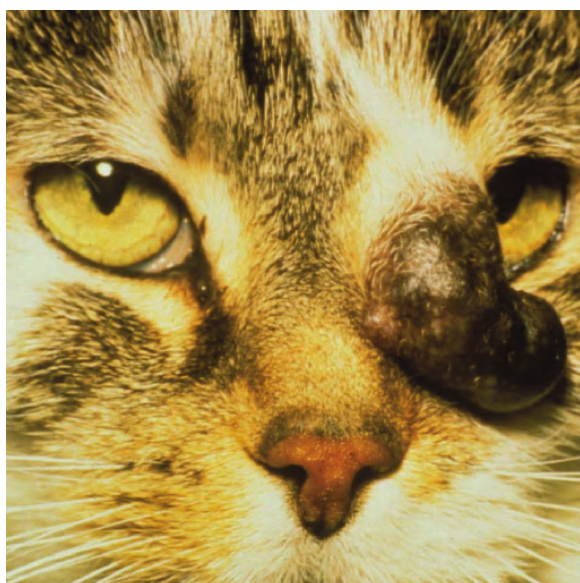


Figure 61
Adenocarcinoma
(14-year-old domestic shorthair)

A slow-growing mass had been observed for 5 years by the owners of this cat. The elongate mass resembles a proboscis, attached at its base near the medial canthus but free of surrounding tissue at its distal (inferior) end. The eyelid margin near the medial canthus was spared. Histopathology confirmed the diagnosis.

(Image courtesy of Denise Lindley, DVM, MS, DACVO.)

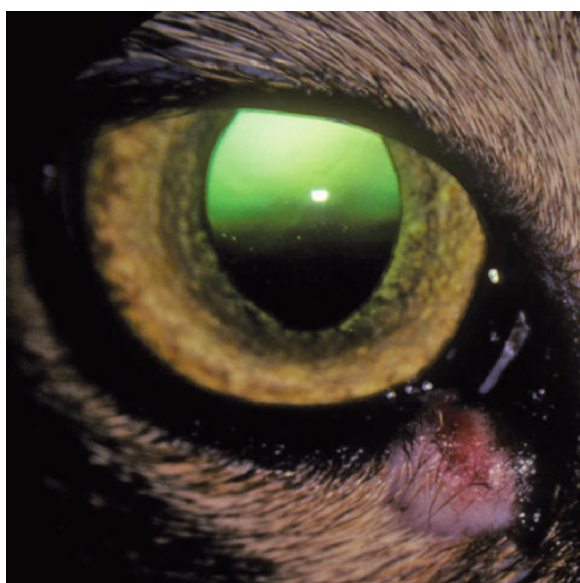


Figure 62
Mast cell tumor
(7-year-old domestic shorthair)

Four months ago, the owner noted a pink swelling near this cat's medial canthus. The lesion remained unchanged until a crust developed on its surface a few days prior to presentation. The pink, relatively hairless mass is raised above the surrounding tissue. An area of ulceration along its upper margin is deeper red in color. Fine-needle aspiration revealed a homogeneous population of mast cells.



Figure 63
Mast cell tumor
(9-year-old domestic shorthair)

This lesion increased in size over a period of 9 months. A pink, firm, multilobulated, alopecic, and ulcerated mass encircles the medial canthus and extends onto the bridge of the nose. Diagnosis was based on cytology of a fine-needle aspirate and later confirmed histopathologically. Preoperative blood work and thoracic radiography were normal. No recurrence was seen in the 6 months following surgery that combined enucleation, tumor resection, and skin grafting.

(Image courtesy of Jean Stiles, DVM, MS, DACVO.)



Figure 64
Mast cell tumor
(8-year-old Siamese)

The entire lower lid was distorted by soft swelling. The inferior palpebral conjunctiva is hyperemic and elevated by the tumor. Cytologic evaluation of a fine-needle aspirate confirmed the diagnosis.

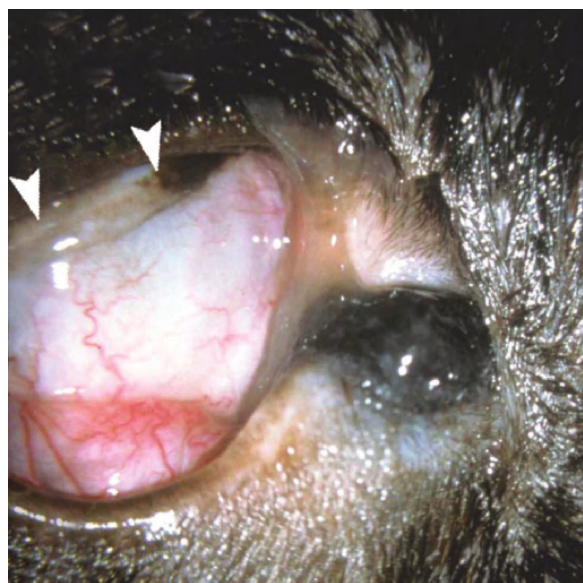


Figure 65
Melanoma
(10-year-old Siamese)

This black mass had been present for an unspecified period of time. It is well delineated from surrounding tissue within the medial canthus. The third eyelid (arrows) has been intentionally prolapsed for the photograph. Melanoma was diagnosed following histopathology of the surgically excised tissue.

(Image courtesy of Art J. Quinn, DVM, DACVO.)



Figure 66
Periorbital lymphoma
(9-year-old domestic shorthair)

Facial swelling had been present for 2 months, but this cat appeared otherwise healthy prior to presentation. The swelling is reasonably circumscribed, surrounding the right eye and extending across the bridge of the nose. The eyelid margins and conjunctiva are hyperemic but the globe itself is unaffected despite reduced lid mobility. A fine-needle aspirate of the subcutaneous tissue confirmed the diagnosis of lymphoma. No other lesions of lymphoma were identified.

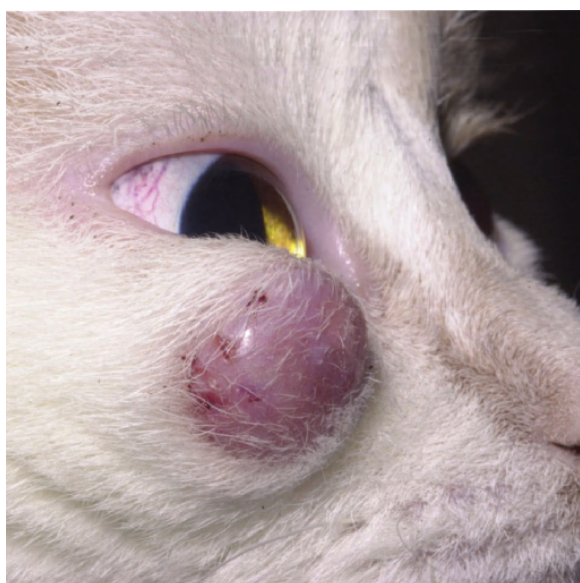


Figure 67
Peripheral nerve sheath tumor
(middle-aged adult domestic shorthair)

Local shelter personnel had no history regarding this patient or its periocular swelling. A large subcutaneous tumor distorts the lower lid. The overlying skin appears thin and hairless. Physical examination was otherwise unremarkable. The tumor type was determined on biopsy. Additional staging and treatment were declined.

(Image courtesy of Jean Stiles, DVM, MS, DACVO.)



Figure 68
Granuloma/Histoplasmosis
(8-year-old domestic shorthair)

Mucopurulent discharge accompanies a proliferative, hyperemic lesion along the lower eyelid. The bulbar and third eyelid conjunctiva are also hyperemic, but intraocular detail is difficult to visualize. *Histoplasma* organisms were identified in this granulomatous lid lesion. Anterior uveitis and chorioretinitis (see Figures 204 and 312) were also present, along with oral and cutaneous lesions.

SECTION IV

Conjunctiva

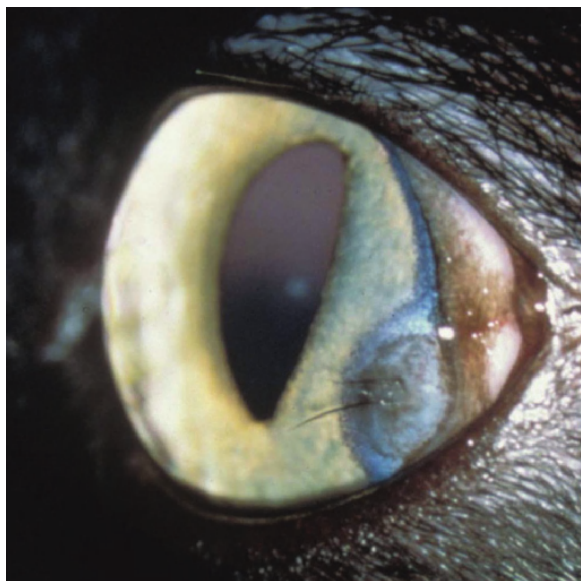


Figure 69
Dermoid
(3-year-old Burmese)

An abnormally located patch of skin extends onto the cornea from the temporal limbus. Several cilia arise from follicles within the lightly pigmented surface. This is both a congenital and inherited disease in this breed.



Figure 70
Dermoid
(13-week-old Persian)

Increased tearing called attention to this eye with a dermoid in an unusual dorsal location. Long hairs extend across the central cornea, originating from hair follicles based solely within the bulbar conjunctiva. The deeper sclera and cornea were unaffected.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 71
Neonatal ophthalmia
(2.5-week-old domestic shorthair)

Only these two kittens survived of a litter of six. Their poor general health was blamed on an upper respiratory infection complicated by malnutrition. In the smaller kitten, exudate is trapped beneath the closed lids, with secondary swelling. Purulent material seeps through the partially opened palpebral fissure of the right eye. The larger kitten's open eye is superficially ulcerated and vascularized, though lesions are not apparent in the photo. The right eye is obscured by exudate. Feline herpesvirus and secondary bacterial opportunists were the presumed pathogens.

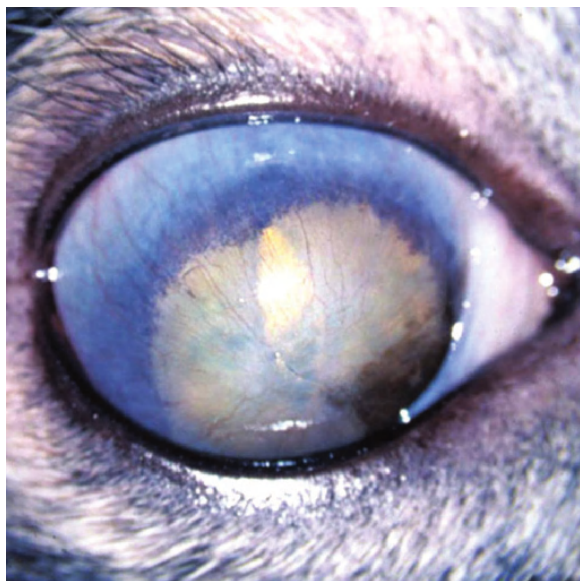


Figure 72
Symblepharon
(8-year-old domestic shorthair)

Rescued as a kitten with severe upper respiratory disease, this patient's cloudy right eye had remained unchanged through the years. Conjunctival vessels cross the unusually pigmented limbal region and extend circumferentially onto the corneal surface. Superficial pigment further obscures the iris near the prominent third eyelid. The symblepharon-related corneal pigmentation and vascularization are indicative of the prior herpetic infection.

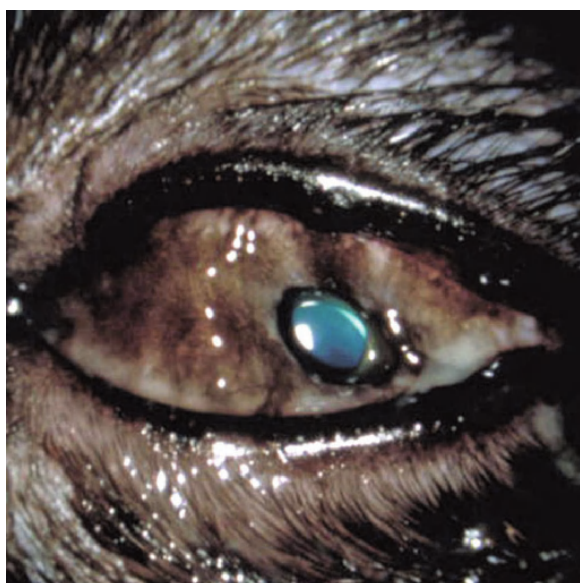


Figure 73
Symblepharon
(11-month-old domestic shorthair)

At 2 months of age, this patient was treated for bilateral herpetic keratoconjunctivitis that had been present since birth. Severe adhesions of the conjunctiva extend 360 degrees, totally obscuring the third eyelid and all but the axial cornea. The blue-green tapetal reflection is seen through a small hole at the center of the adhesions.

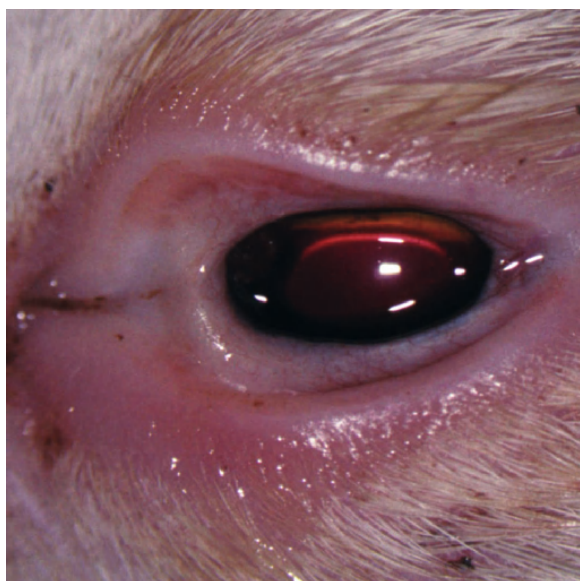


Figure 74
Median canthal symblepharon/Ankyloblepharon
(6-month-old domestic shorthair)

This patient was one of several feral kittens with upper respiratory disease rescued by an animal protection group. The respiratory signs resolved with supportive care. The left eye of this cat has since appeared smaller than normal, with constant tearing. There is extensive symblepharon formation spanning the medial canthus and palpebral fissure, reducing the length of the palpebral fissure and obliterating the nasolacrimal puncta. Palpebral conjunctiva is easily visualized along the remaining length of the lid where additional adhesions limit the depth of the conjunctival cul-de-sac. Intraocular structures were normal and the eye remained sighted.



Figure 75
Symblepharon
(8-week-old Somali)

The entire litter of kittens was affected with feline herpetic keratoconjunctivitis. The conjunctival overgrowth extends from the upper and lower cul-de-sacs to cover the entire cornea and nictitans. The globe is functionally blind.

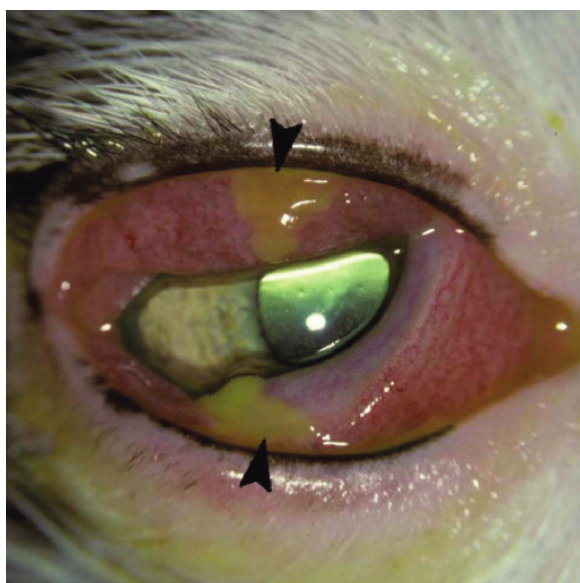


Figure 76
Herpetic conjunctivitis
(6-month-old domestic shorthair)

Similar clinical signs were present bilaterally in this young cat. The conjunctiva is severely hyperemic, with milder chemosis. The prominent third eyelid also reflects these changes and suggests the eye is painful. The arrows point to two fluorescein-positive areas on the conjunctiva that represent epithelial erosions caused by FHV-1. Lesions such as these are a factor in symblepharon formation. Neither cornea was ulcerated.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

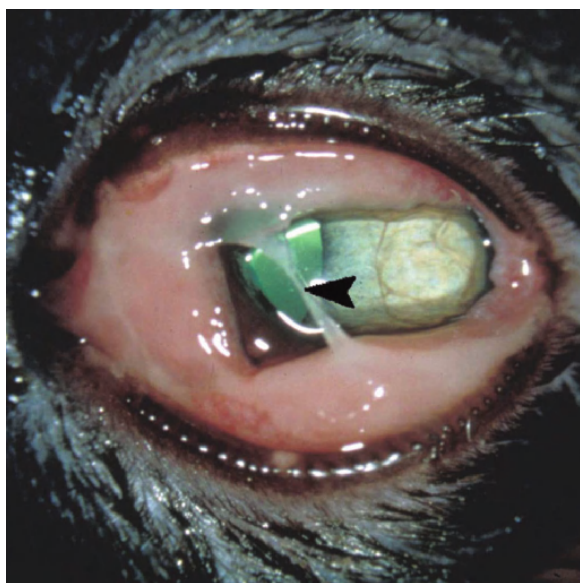


Figure 77
Herpetic conjunctivitis
(8-week-old domestic shorthair)

This kitten had an active upper respiratory infection accompanied by bilateral ocular signs. The conjunctiva is hyperemic and severely chemotic. A thick, white pseudomembrane has formed across the visible conjunctiva. A membranous strand (arrow) extends from the superior to inferior palpebral conjunctiva. The conjunctival surface beneath the membrane is raw, increasing the risk of permanent symblepharon.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 78
Chlamydophila conjunctivitis
(1-year-old domestic shorthair)

A history of periodic sneezing was associated with this bilateral condition. The conjunctiva is moderately hyperemic and chemotic. A mucopurulent discharge is present in the medial canthus. The cornea is normal. The axial opacity represents a nuclear cataract.

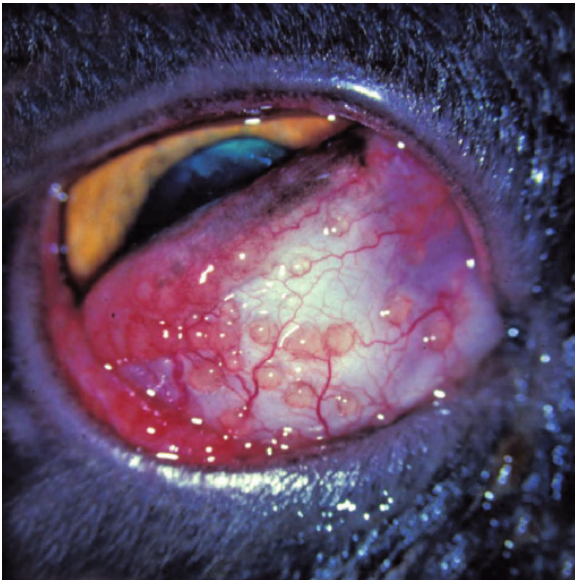


Figure 79
Chlamydophila conjunctivitis
(2-year-old Persian)

No signs of respiratory disease were seen in this patient with bilateral conjunctivitis. The third eyelid has been intentionally prolapsed to show the hyperemia and multiple lymphoid follicles found throughout the conjunctiva. An indirect fluorescent antibody test was positive for *Chlamydophila felis*.



Figure 80
Chlamydophila conjunctivitis
(6-month-old Persian)

This kitten has a mild upper respiratory infection and bilateral conjunctivitis. Follicles are especially prominent within the hyperemic dorsal palpebral conjunctiva. Ocular and respiratory signs resolved with oral doxycycline therapy.



Figure 81
***Bartonella* conjunctivitis**
(4-year-old domestic shorthair)

A mild mucoid discharge accompanies the bilateral conjunctivitis in this patient. Moderate conjunctival hyperemia and mild chemosis are seen, along with third eyelid prominence. Conjunctival scrapings submitted for PCR were negative for FHV-1, *Chlamydophila*, and *Mycoplasma*. *Bartonella* serology was positive.

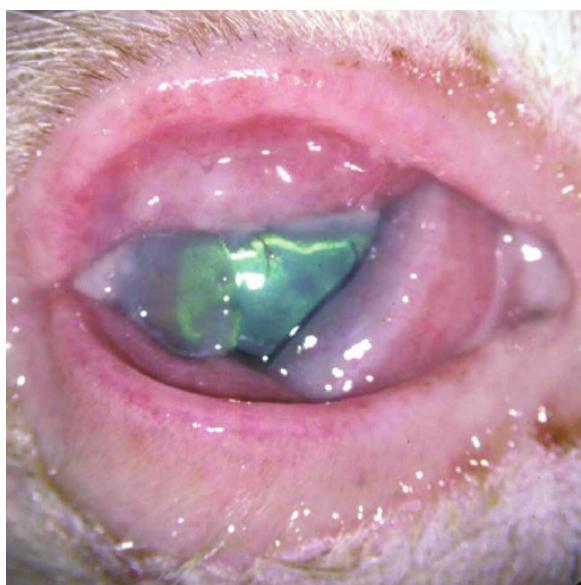


Figure 82
Mycoplasma
(8-year-old domestic shorthair)

This patient's chronic bilateral conjunctivitis is characterized by diffusely thickened and hyperemic conjunctiva and a prominent third eyelid. Moderate mucoid discharge is present along the lid margins and across the corneal surface. Conjunctival PCR was positive for *Mycoplasma* spp. PCR for FHV-1 and *Chlamydophila felis* was negative, as was serology for *Bartonella*.



Figure 83
Herpesvirus/*Mycoplasma*/*Bartonella* conjunctivitis
(2-year-old domestic shorthair)

This patient presented with a complaint of bilateral conjunctivitis. The conjunctiva is hyperemia and chemotic, with a serous ocular discharge. In this left eye, the temporal cornea is ulcerated, edematous, and superficially vascularized. A conjunctival scraping submitted for PCR was positive for both FHV-1 and *Mycoplasma*. Serology was also positive for *Bartonella*.



Figure 84
***Chlamydophila/Bartonella* conjunctivitis**
(2-year-old domestic shorthair)

Intense conjunctival hyperemia and mild chemosis characterize the bilateral conjunctivitis in this patient. Slight mucoid discharge is evident overlying the prominent third eyelid. There is no active corneal disease. PCR testing on a conjunctival sample was positive for *Chlamydophila* and negative for FHV-1 and *Mycoplasma*. Serology was positive for *Bartonella*.



Figure 85
Allergic conjunctivitis/Insect sting
(2-year-old domestic shorthair)

The owner noted acute swelling of the periocular area shortly after seeing his cat wandering through the garden. The eye had been normal 1 hour earlier. Chemosis is the predominant feature. A small area of subconjunctival hemorrhage is present beneath the superior lid. Prominence of the nictitans is also attributed to the conjunctival edema. The globe was difficult to evaluate in its entirety but was ultimately determined to be normal as the chemosis resolved over a 24-hour period. The cause was presumed to be an insect sting, although reaction to garden chemicals could not be excluded.

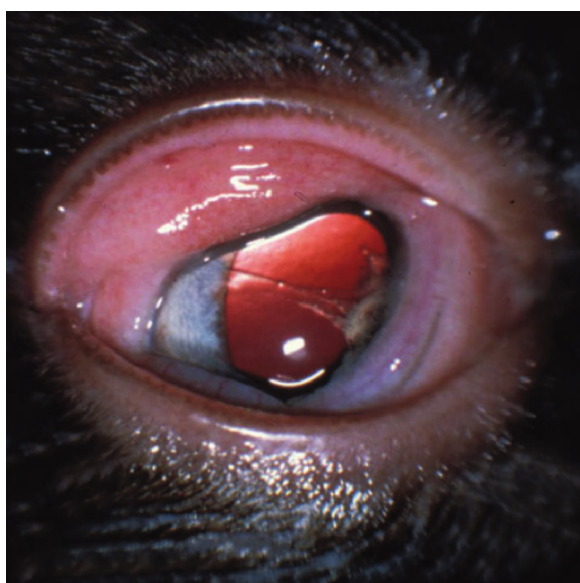


Figure 86
Eosinophilic conjunctivitis
(2-year-old Siamese)

This bilateral condition was restricted to the conjunctiva and nictitating membrane. All conjunctival surfaces are hyperemic and chemotic with a diffuse grainy appearance. Bacterial cultures and fluorescent antibody tests for feline herpesvirus and *Chlamydophila* were negative. Cytology of a conjunctival scraping revealed epithelial cells, lymphocytes, and eosinophils.



Figure 87
Eosinophilic conjunctivitis
(4-year-old domestic shorthair)

Early ocular history was unknown in this adopted patient. Intermittent episodes of conjunctivitis and ocular discharge had occurred in the right eye over a 2-year period, but clinical signs had escalated in recent weeks. Topical antibiotic therapy considered beneficial in previous episodes was no longer effective. Large lymphoid follicles create a nodular appearance to the exposed conjunctiva. In addition to marked conjunctival hyperemia and thickening, the eyelid margins are erythematous and depigmented. Cytology of a conjunctival scraping revealed eosinophils, lymphocytes, plasma cells, and macrophages. Although the eye itself could not be visualized at this initial visit, eosinophilic keratitis was evident as the conjunctival disease responded to therapy. The opposite eye was normal.



Figure 88
Leishmaniasis
(21-year-old European shorthair)

Masses affecting the eyes and mouth gradually enlarged and vision diminished in the 5 months preceding this patient's examination. Exophthalmos is accompanied by dramatic tissue proliferation that spans the limbus, creating a hyperemic, irregularly thickened mass that encircles most of the anterior globe. The adjacent cornea is infiltrated by the same flesh-colored tissue, with accompanying edema. Ocular ultrasound revealed bilateral exudative retinal detachments and extraocular myositis. Systemic signs included mild-generalized lymphadenopathy, ulcerative facial dermatitis, facial deformity, and oral mucosal masses. *Leishmania* amastigotes were found in a conjunctival biopsy. ELISA and RT-PCR for *Leishmania* spp were highly positive. Proliferative tissue decreased substantially following 2 months of therapy.

(Image courtesy of Teresa Pena, DVM, PhD.)

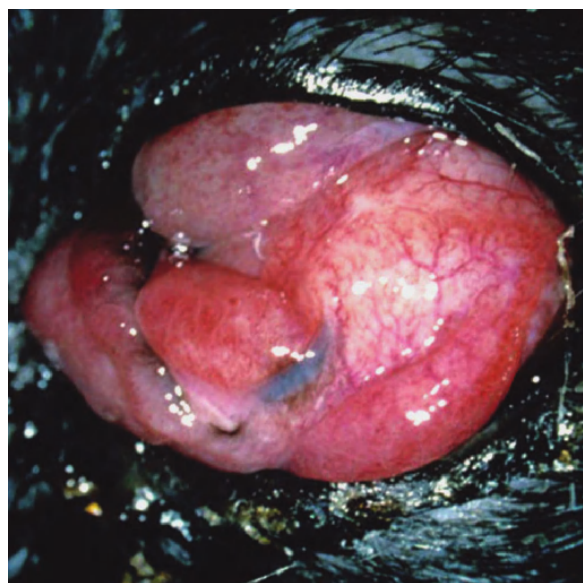


Figure 89
Blastomycosis
(6-year-old domestic shorthair)

This patient presented with a complaint of severe unilateral conjunctivitis. The cat's right eye and general health were considered within limits of normal. All conjunctival surfaces are extremely hyperemic and chemotic, making it impossible to visualize the cornea and intraocular structures. Blastomycosis was diagnosed based on histopathology of the globe.

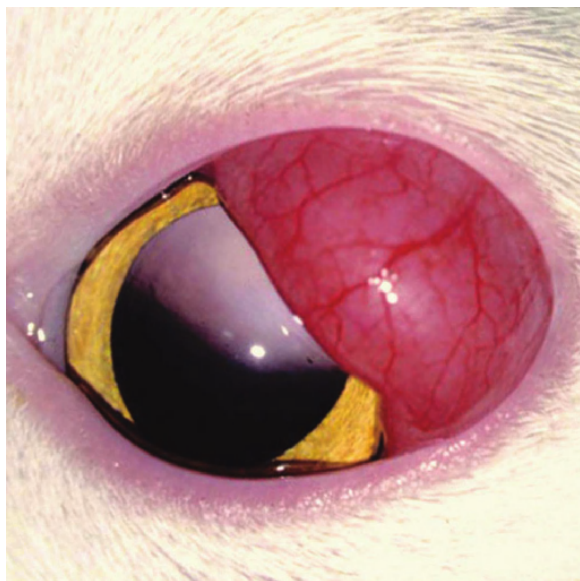


Figure 90
Histoplasmosis
(1.5-year-old domestic shorthair)

This cat was presented with progressive conjunctival swelling. A large and notably hyperemic bulbar subconjunctival mass obscures the adjacent limbus. This lesion was accompanied by a severe chorioretinitis in the opposite eye (see Figure 313). A fine-needle aspirate and biopsy of the mass identified *Histoplasma* organisms within macrophages.



Figure 91
Lymphoma
(5-year-old Persian)

A large subconjunctival mass affecting the superior palpebral and bulbar tissues had been present for 2 weeks. Lagophthalmos resulted in exposure and secondary corneal ulceration. A smaller mass had been noted in the left eye 4 days prior to this photograph. Biopsies of both masses were consistent with lymphoma.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 92
Conjunctival cyst
(5-year-old Persian)

This cat's ocular history was unknown. A subconjunctival mass overlies the dorso-temporal sclera. Several conjunctival vessels extend across its surface and onto an adjacent corneal opacity. The affected cornea is locally fibrotic with a more distinct vertical opacity near the central cornea. The mass was confirmed as a cyst by means of a fine-needle aspirate. The cyst and the corneal opacity may be a consequence of symblepharon or a prior surgical corneal-conjunctival transposition.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

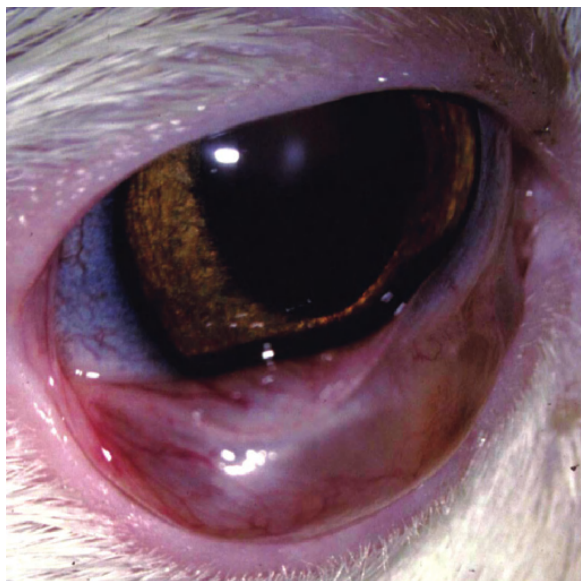


Figure 93
Conjunctival cyst
(2-year-old domestic shorthair)

As a kitten, this patient had an upper respiratory infection and conjunctivitis. The entire lower conjunctival cul-de-sac and inferior nictitans are distorted by a large cyst, confirmed by an acellular fine-needle aspirate.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

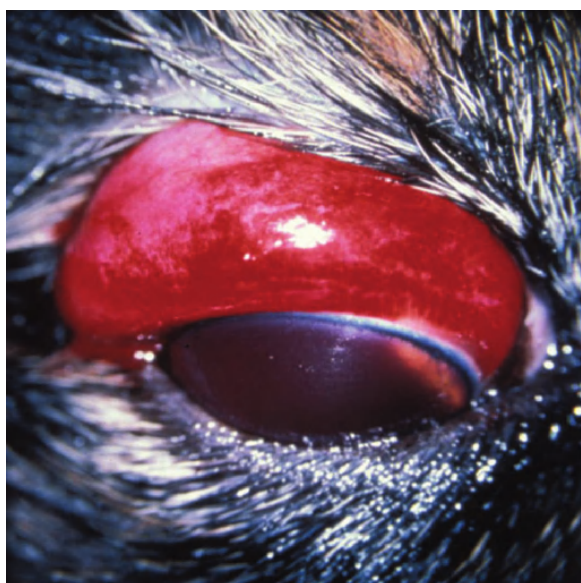


Figure 94
Subconjunctival hemorrhage/Hyphema
(3-year-old domestic shorthair)

Redness and swelling of the right eye were noted by the owners when their cat returned from out-of-doors. Blood beneath the dorsal conjunctiva distends the tissue beyond the lid margins, impairing lid function, and predisposing the surface to drying. Hyphema obscures intraocular detail. Trauma was the presumed etiology.

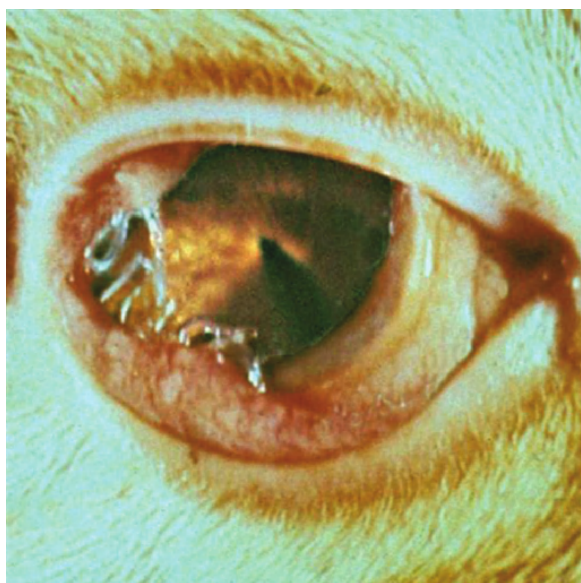


Figure 95
Thelaziasis
(3-year-old domestic shorthair)

A unilateral ocular discharge had been present for some time when owners noted a thread in the conjunctival cul-de-sac and presented the cat for removal of a foreign body. The conjunctiva is hyperemic and edematous. A thin, thread-like worm is coiled over the lateral aspect of the cornea. The nematode was identified as *Thelazia californiensis*.

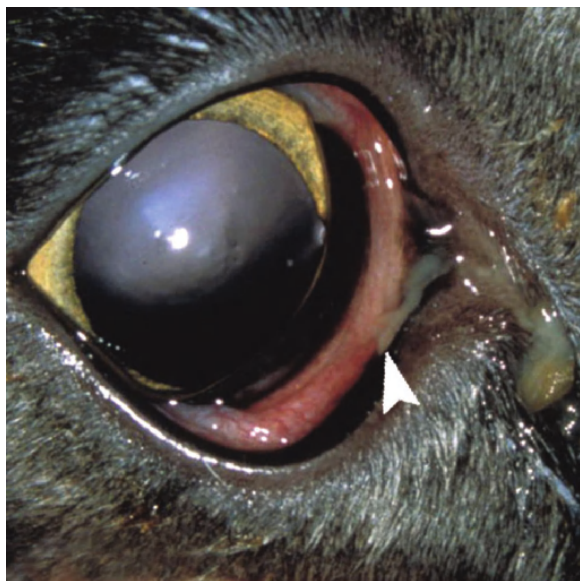


Figure 96
Dacryocystitis

(5-year-old domestic longhair)

A greenish ocular discharge had been present from the right eye for 6 months. The palpebral conjunctiva is chemotic and hyperemic. Mucopurulent discharge is present in the medial canthus. When a cannula was placed in the superior lacrimal punctum in an attempt to irrigate, a thick discharge came from the lower opening (*arrow*). No fluid or exudate exited the nares. Cytology identified a gram-negative rod, but culture results were negative.



Figure 97
Conjunctival melanoma

(11-year-old domestic shorthair)

Progressive prominence and discoloration of the third eyelid were noted for 4 months prior to examination. A darkly pigmented third eyelid is accompanied by dark pigmentation and mild thickening of the bulbar and palpebral conjunctiva surrounding the globe. Intraocular structures are normal. An ipsilateral submandibular lymph node was also enlarged. Malignant melanoma was diagnosed following biopsy of the conjunctiva and fine-needle aspiration of the lymph node.



Figure 98
Conjunctival melanoma

(11-year-old DSH)

This mass had been gradually enlarging for several years. The heavily pigmented mass with its large surface vessels obscures the limbus superiorly. A small area of tan iris can be seen between the mass and the dark pupillary margin. On histopathology, this melanoma also extended intraocularly. The primary site of the neoplasm could not be determined.

SECTION V

Nictitating Membrane



Figure 99
Idiopathic third eyelid protrusion/Haws syndrome
(4-year-old Siamese)

The only abnormality noted is the rather symmetrical protrusion of both third eyelids. Both retracted quickly following application of topical phenylephrine, indicating altered sympathetic innervation.



Figure 100
Prolapse of the gland of the third eyelid
(3-year-old Burmese)

The nictitans gland protrudes beyond the membrane's pigmented leading edge. The gland itself is normal despite the inadequacy of its connective tissue anchor.

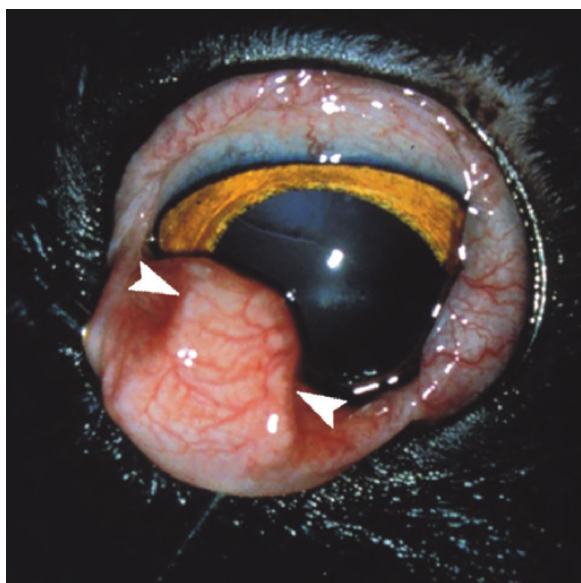


Figure 101
Everted third eyelid cartilage
(18-month-old Persian)

Presented for recurring conjunctivitis and protrusion of the third eyelid, this cat has moderate chemosis and mild hyperemia of the conjunctiva. The bulbar surface of the nictitating membrane and the cartilage can be seen between the arrows.



Figure 102
Symblepharon
(18-month-old domestic shorthair)

An abnormal adhesion is present from the superior lid to the palpebral surface of the third eyelid. The adhesion holds the nictitating membrane across the globe. An adhesion also covers the inferior nasolacrimal punctum, resulting in epiphora.

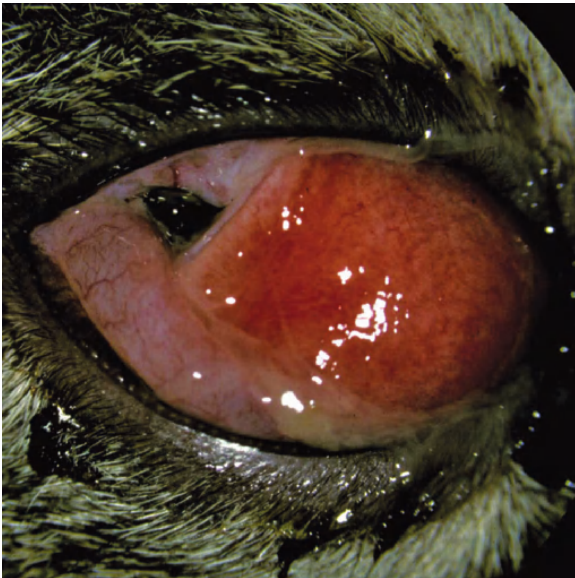


Figure 103
Abscess
(1-year-old domestic shorthair)

An acute onset of painful hyperemia and chemosis of the conjunctiva was followed by third eyelid swelling and prominence. A fine-needle aspirate was compatible with an infectious etiology. The initiating cause was never determined.

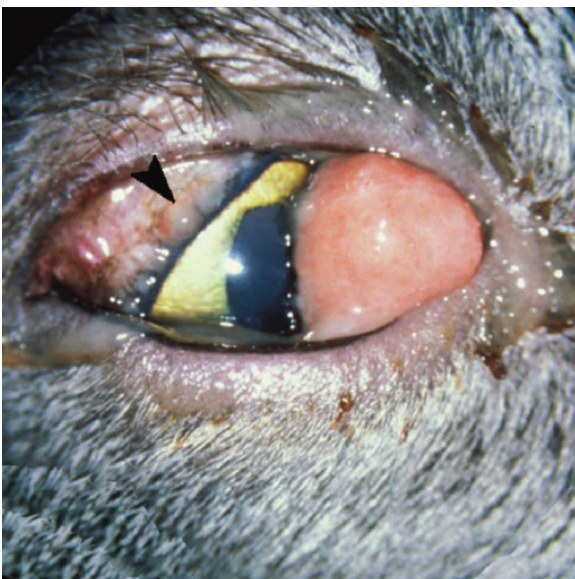


Figure 104
Eosinophilic conjunctivitis
(3-year-old domestic shorthair)

Owners watched as a mass enlarged over a 3-week period to obscure half the globe. A mucoid discharge and moderate conjunctival hyperemia accompany several perilimbal conjunctival nodules (*arrow*). The large flesh-colored mass near the medial canthus is the thickened margin of the third eyelid. Diagnosis was based on biopsy of the nictitans and cytology of a perilimbal conjunctival scraping.

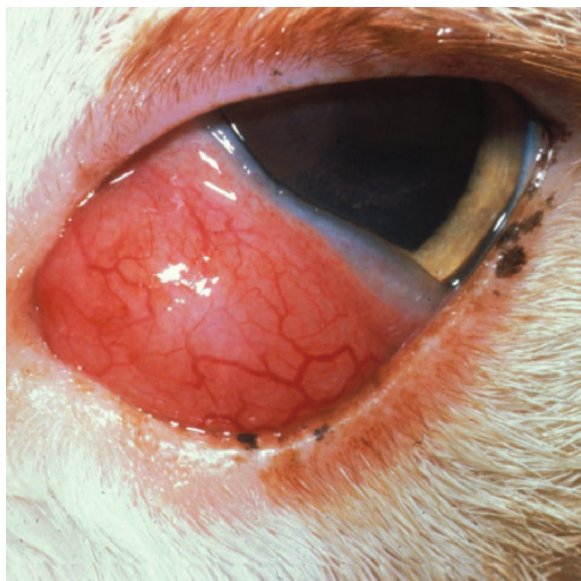


Figure 105
Fibrosarcoma

(15-year-old domestic shorthair)

Ocular problems were present for 2 months prior to this cat's examination. The nictitating membrane is enlarged and protrudes from its normal position. Palpation revealed a thickening of the entire membrane, narrowing to normal at its base. A FeLV test was negative. Histopathologic evaluation of the excised membrane was compatible with fibrosarcoma.

(Image courtesy of Nedim C. Buyukmihci, VMD, DACVO.)



Figure 106
Squamous cell carcinoma

(18-year-old domestic shorthair)

Recently this exophthalmic globe, with moderate chemosis, developed a swollen prolapsed nictitans. Diagnosis was based on biopsy of the nictitans. The origin and extent of the tumor was not determined.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 107
Squamous cell carcinoma

(13-year-old domestic longhair)

This cat was presented for evaluation of a progressively enlarging mass arising from the bulbar surface of the third eyelid. The nictitans has been everted to demonstrate the white finger-like projections that characterize the tumor. Corneal vascularization and scattered surface opacities are secondary to long-standing herpesvirus infection and eosinophilic keratitis. Squamous cell carcinoma was diagnosed on biopsy of the third eyelid mass. Interestingly, a firm subconjunctival mass in the inferior cul-de-sac of the opposite eye was diagnosed as a desmoplastic squamous cell carcinoma.



Figure 108
Lymphoma

(5-year-old domestic shorthair)

The third eyelid features a large well-delineated mass, swollen above the less hyperemic marginal tissue. The cat showed no subjective signs of pain. No other ocular abnormalities were noted. A fine-needle aspirate revealed neoplastic lymphocytes.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

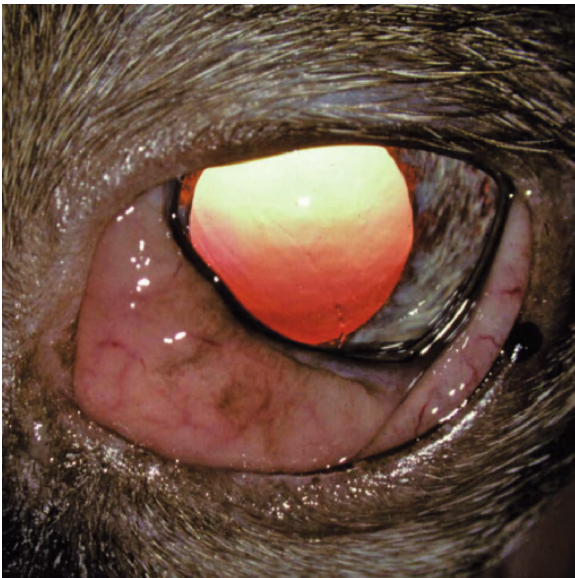


Figure 109
Plasmacytoma

(16-year-old Siamese)

The third eyelid is mildly prolapsed and diffusely swollen. Ventral conjunctiva is chemotic and extends above the eyelid margin. A fine-needle aspirate included a population of highly pleomorphic and multinucleated round cells compatible with a plasmacytoma. The red tapetal reflection is normal in this color-dilute breed.

SECTION VI

Cornea

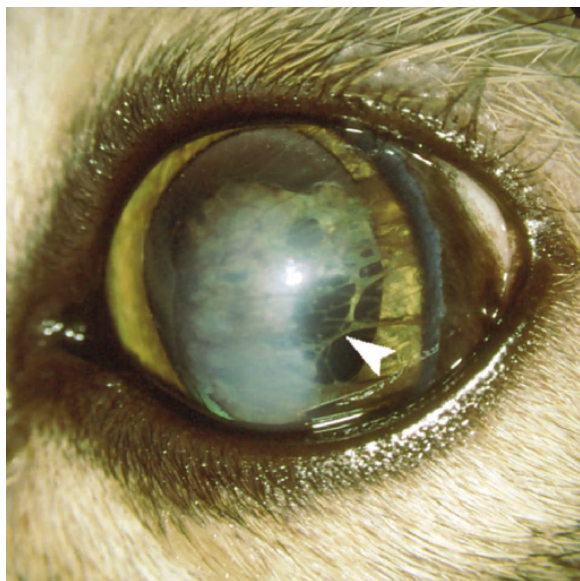


Figure 110
Persistent pupillary membranes (PPM)
(6-month-old domestic shorthair)

Pigmented strands (*arrow*) similar in color to that of the iris originate from the iris collarette and attach to the corneal endothelium. The PPMs create a web-like network near the inner corneal surface. Corneal edema decreases the visibility of the mottled endothelial pigmentation.

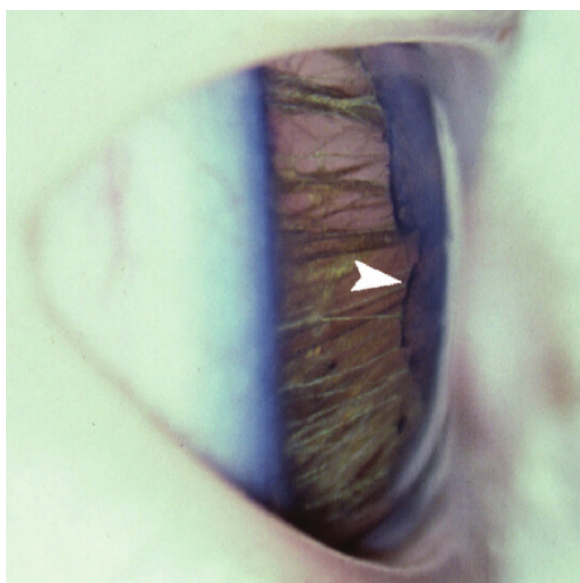


Figure 111
Persistent pupillary membranes (PPM)
(6-month-old domestic longhair)

A lateral view of the right eye shows numerous pigmented strands originating from the iris face, spanning the anterior chamber and attaching to the inner corneal surface. The result is a dense, pigmented layer (*arrow*) created at the endothelial level. The clinical consequences included a large axial area of corneal edema and fibrosis.



Figure 112
Persistent pupillary membranes/Bullous keratitis
(1.5-year-old domestic shorthair)

The pupil has been dilated as part of the initial examination, obscuring the origin of the PPMs. Multiple pigmented strands, highlighted by the tapetal reflection, insert at the corneal endothelial level. Over a period of time, secondary corneal edema has progressed to include multiple subepithelial fluid bullae (*arrow*).

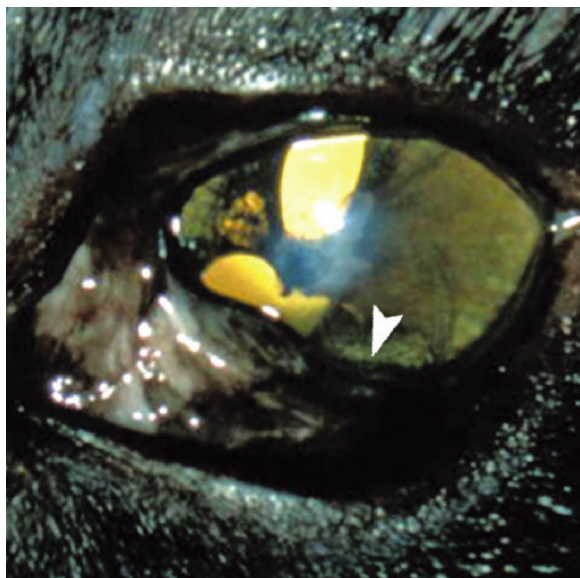


Figure 113
Adherent leukoma
(adult domestic shorthair)

This stray cat was presented for evaluation of excessive tearing and a cloudy central cornea. The nictitating membrane (*arrow*) is diffusely pigmented and permanently prolapsed because of adhesions between the bulbar and palpebral conjunctiva. The axial cornea is scarred, with attachment of the iris to the endothelial surface. Iris atrophy is also present to the left of the scar. The lacrimal puncta were obliterated by conjunctival adhesions, accounting for the epiphora. Ulceration secondary to feline herpesvirus infection was blamed for the symblepharon. The central scar implies a previously perforated corneal ulcer.

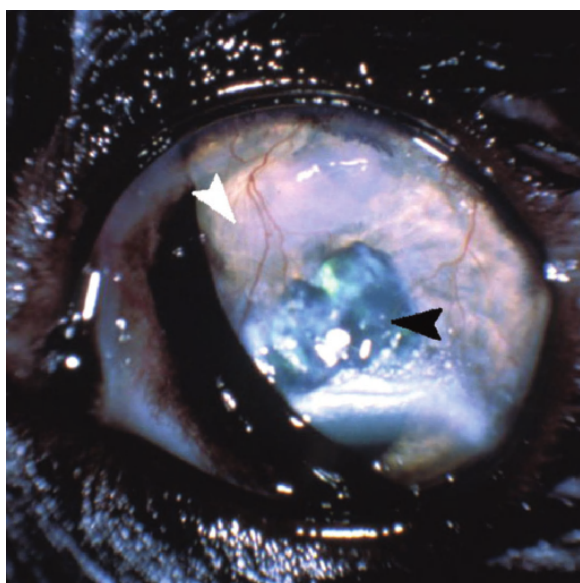


Figure 114
Terrien's marginal corneal degeneration
(9-year-old domestic longhair)

The vascularization, white discoloration, and irregular contours of the corneas first started in the left eye 3 years prior to this photograph. Abnormalities were confined to the cornea, which was edematous (*white arrow*), vascularized, and thinner than normal (*black arrow*). The epithelium is intact but elevated by diffuse white lipid deposits. Diagnosis was confirmed by histopathology.

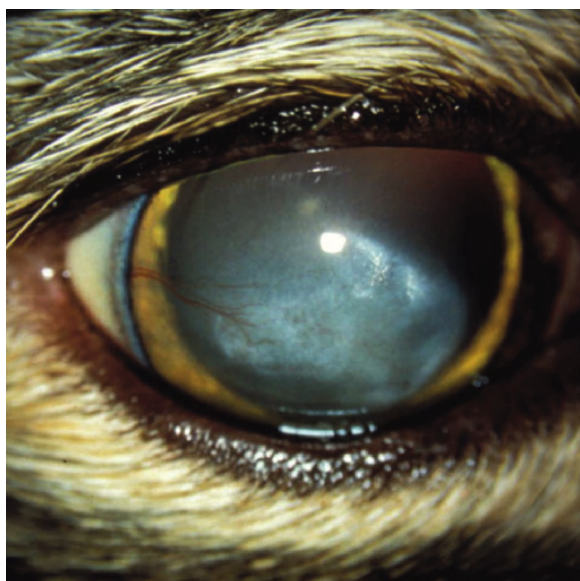


Figure 115
Corneal degeneration
(16-year-old domestic shorthair)

This patient had a history of ocular trauma, although details of the injury were unknown. The white ill-defined central opacity has the granular, refractile appearance of a stromal lipid infiltrate. Vascularization of the cornea is also present. A distinct white circular flash artifact is present at the dorsal margin of the opacity.

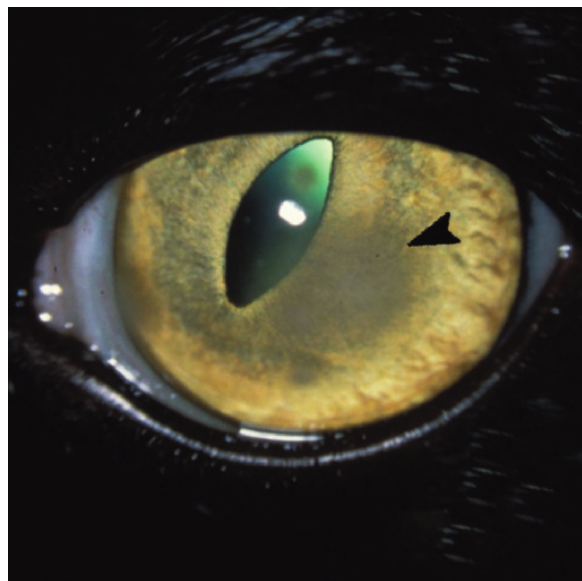


Figure 116
Florida spots

(2-year-old domestic shorthair)

Multiple poorly demarcated opacities are apparent in the temporal (*arrow*) and nasal corneal quadrants of this otherwise asymptomatic cat. This nonprogressive condition is recognized more often in companion animals within the southeastern United States. The causative agent or mechanism has yet to be determined.

(Image courtesy of Art J. Quinn, DVM, DACVO.)

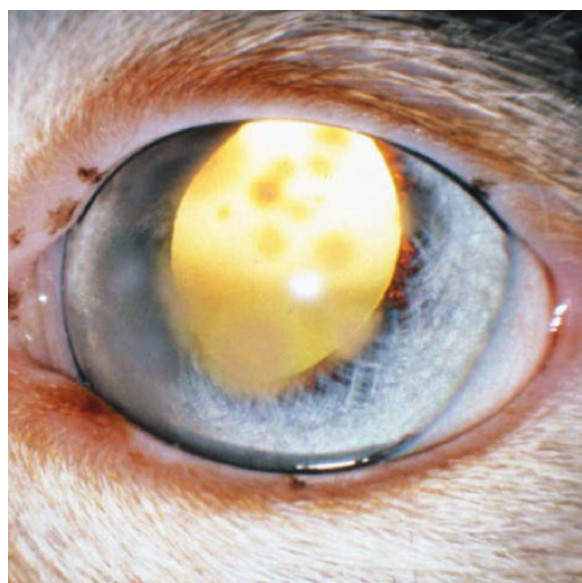


Figure 117
Florida spots

(5.5-year-old domestic shorthair)

The cat showed no signs of discomfort or vision impairment associated with this bilateral condition. Multiple gray-white opacities can be seen in the superficial corneal stroma, the light color more easily appreciated overlying the medial iris. Those lesions overlying the pupillary region appear dark as they obscure the background tapetal reflection. A causative agent was not identified.

(Image courtesy of Kathleen P. Barrie DVM, MS, DACVO.)

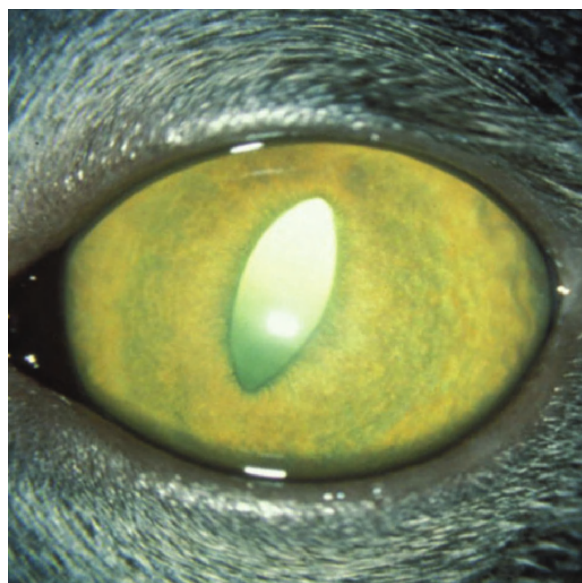


Figure 118
Mucopolysaccharidosis VI

(6-month-old domestic shorthair)

The iris appears dull and relatively featureless because of a diffuse corneal haze. On retroillumination, the corneal clouding appears granular, owing to accumulation of glycosaminoglycans within vacuolated keratocytes. Affected animals also have widely separated palpebral fissures and thickened eyelids. The diagnosis was confirmed by a positive blue toluidine spot test, which signifies an excess of mucopolysaccharide in urine.

(Image courtesy of Art J. Quinn, DVM, DACVO.)

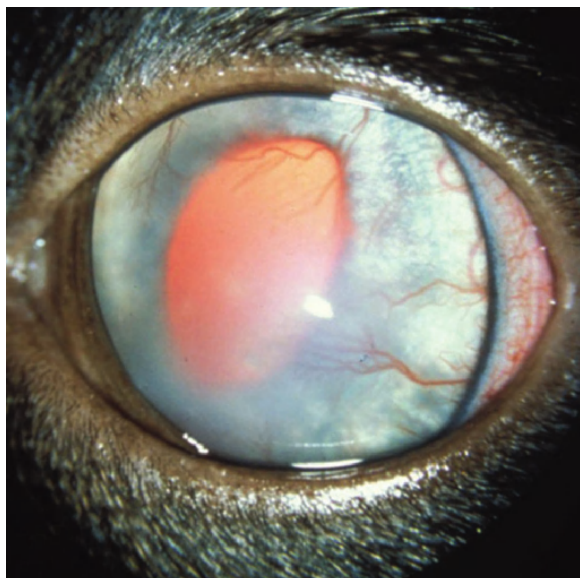


Figure 119
Relapsing polychondritis
(3-year-old Siamese)

Cloudy corneas had been present for several months when owners also noticed progressive curling of the ear tips. Neither eye appeared painful, despite mild conjunctival hyperemia. The corneal surface is diffusely hazy, with focal superficial stromal opacities and vascularization. The array of clinical signs and histopathologic findings were compatible with an inflammatory connective tissue disease, relapsing polychondritis (RPC). Greater than half the human patients with RPC develop ocular signs, including scleritis, conjunctivitis, keratoconjunctivitis sicca, and keratitis.

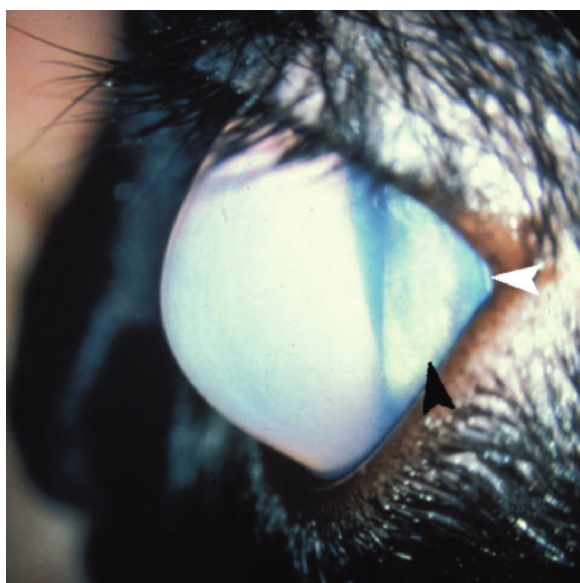


Figure 120
Keratoconus/Corneal edema
(8-year-old domestic shorthair)

This bilateral condition had progressively worsened over the past 6 months. The cat was comfortable and showed no vision deficit despite the severe corneal edema that alters the corneal contour. The intraocular pressure was normal. The limbus (*white arrow*) and the iris (*black arrow*) are marked for orientation. Refer to Figure 5 for a photograph of normal corneal curvature.



Figure 121
Keratoconus
(4-year-old domestic shorthair)

This cat developed a severe anterior uveitis and bullous keratitis of undetermined cause 20 months prior to the photograph. The original problems improved with medication. The cornea subsequently thinned, developing an exaggerated curvature. The drainage angle (*arrow*) appears abnormal because of altered refraction by the cornea. Intraocular pressure and vision remained normal.

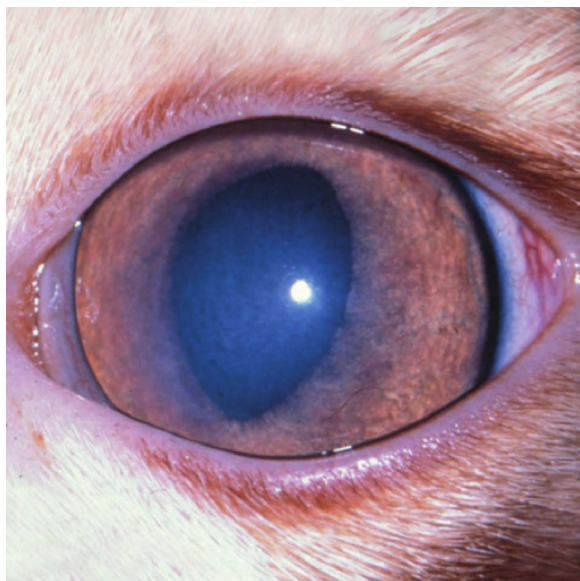


Figure 122
Manx dystrophy
(8-month-old Manx)

This patient demonstrates the early stages of this rare, inherited, and progressive corneal disorder. The central cornea appears blue because of stromal edema, but milder edema is also present peripherally. With time, the edema and corneal opacification worsen. Large coalescing intrastromal bullae and secondary superficial vascularization characterize the more advanced stages of the disease.

(Image courtesy of Steven I. Bistner, DVM, DACVO.)

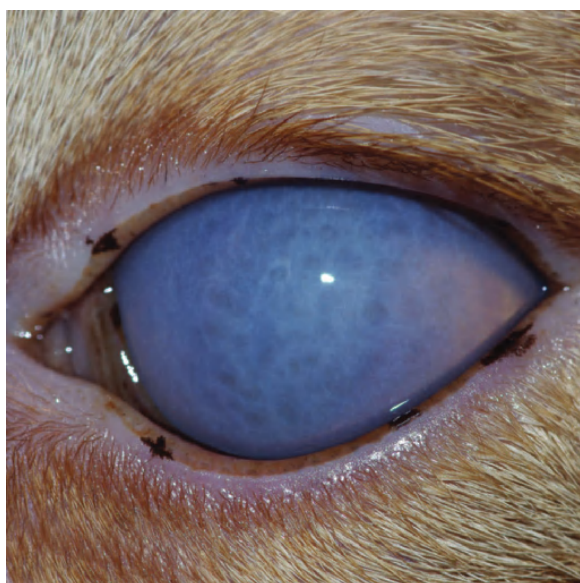


Figure 123
Congenital corneal edema
(3-year-old domestic shorthair)

The referring veterinarian first noted localized corneal cloudiness in both eyes when this cat was 4 months of age. The cloudiness increased to its current level over the subsequent 18 months. The entire corneal surface appears blue, with a stippled character suggestive of corneal endothelial dysfunction. Intraocular examination, performed at an earlier stage of the problem, was normal. Intraocular pressure has remained normal. This cat retained a dazzle reflex and excellent motion detection, but near vision was compromised.

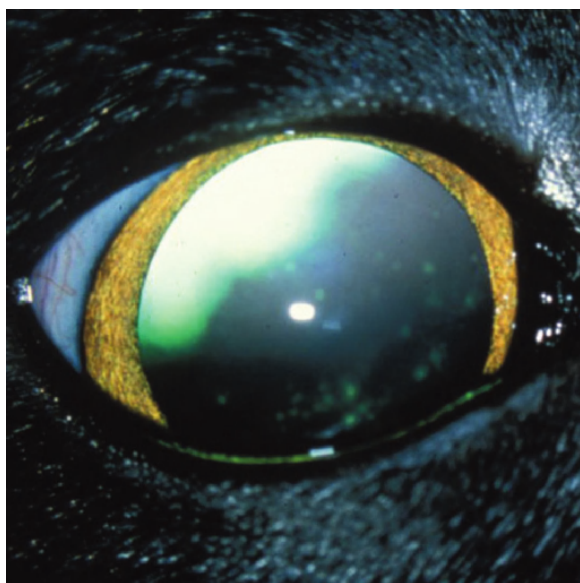


Figure 124
Herpetic keratitis—Punctate
(18-month-old domestic shorthair)

This cat was presented for evaluation of corneal opacity and vascularization in the left eye, subsequently diagnosed as eosinophilic keratitis. The photograph is of the opposite right cornea. Multiple punctate epithelial opacities, stained positively with fluorescein, can be seen against the dark nontapetal background. Notice the lack of conjunctival hyperemia. The punctate lesions cleared quickly in response to a topical antiviral agent.

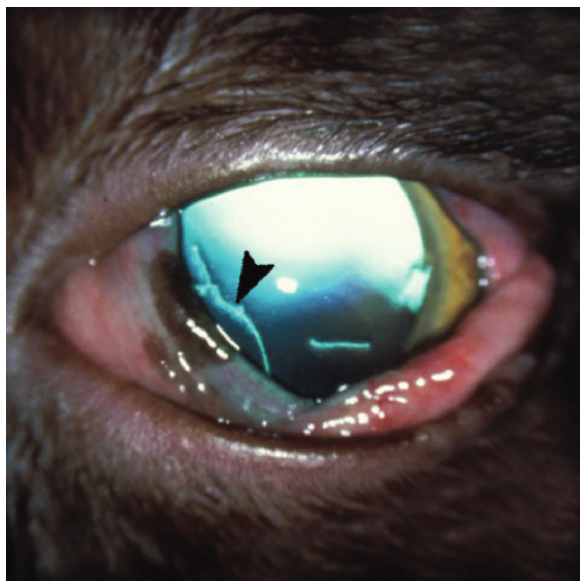


Figure 125
Herpetic keratitis—Dendritic
(18-month-old domestic shorthair)

Bilateral blepharospasm and tearing led the owners to present this cat for examination. The conjunctiva is hyperemic and chemotic. The prominent third eyelid is typical of a painful eye. Linear pathognomonic dendritic ulcers can be seen at the arrow. The lesions cleared when treated with a topical antiviral drug.

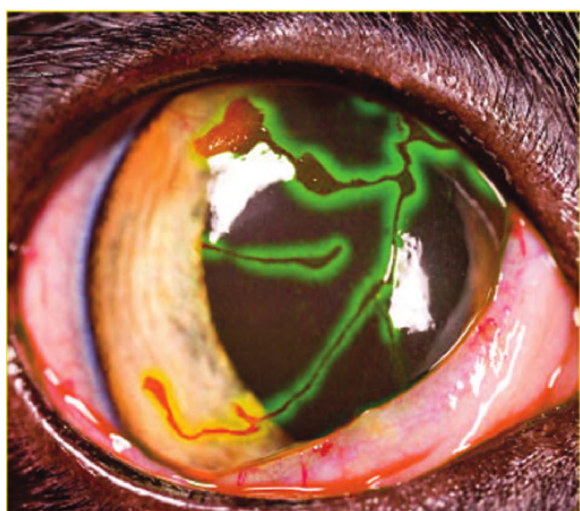


Figure 126
Herpetic keratitis—Dendritic
(4-year-old domestic shorthair)

This dendritic ulcer is stained with both fluorescein and rose bengal, highlighting the linear, branching features that are pathognomonic for herpesvirus infection. The areas of green fluorescein retention indicate loss of the entire epithelial layer, with exposure of the superficial stroma. The pink to red color of the rose bengal vital stain identifies earlier cytopathic effects of herpesvirus infection, i.e., devitalized or necrotic epithelial cells rather than complete loss of the epithelial layer. The bright white opacities are flash artifacts.

(Image courtesy of David T. Ramsey, DVM, MS, DACVO.)

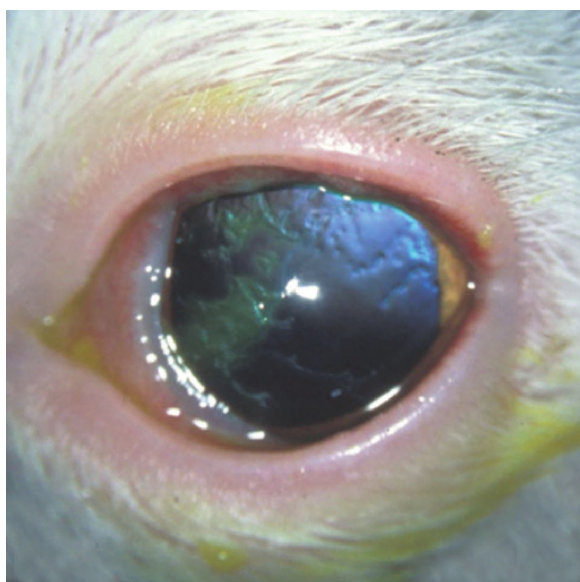


Figure 127
Herpetic keratitis—Early geographic
(1-year-old domestic shorthair)

The left eye is representative of a bilateral problem in this young cat. Multiple linear superficial ulcers are present and are most easily seen against the blue tapetal background. Although some opacities do not stain positively, a large area of fluorescein retention can be seen extending between the leading edge of the third eyelid and the central cornea. Dendrites in this region have coalesced, completely disrupting the epithelial surface.



Figure 128
Herpetic ulcer—Geographic
(8-month-old Persian)

This cat had been treated for a herpetic keratitis in the right eye for 2 months when he was presented with acute pain in the left eye. Severe blepharospasm diminished following application of topical anesthetic to facilitate examination. Conjunctival hyperemia accompanies a large fluorescein-stained superficial ulcer in the ventral cornea. Concurrent signs of anterior uveitis include miosis, subtle aqueous flare, iris swelling, and decreased intraocular pressure. All signs quickly subsided with topical antiviral therapy.

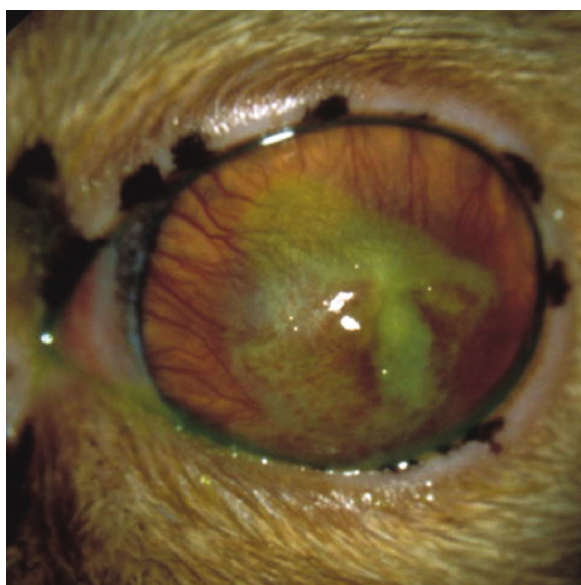


Figure 129
Herpetic keratitis—Geographic
(6-year-old exotic shorthair)

This cat had a history of squinting, excessive tearing, and corneal ulceration of 3 months duration. Both eyes were similarly affected. Severe superficial vascularization is present. The axial cornea is edematous and stains positively with fluorescein dye. Although the immunofluorescent antibody test for herpesvirus was negative, lesions did respond to topical antiviral medication.



Figure 130
Herpetic keratitis—Geographic/Bullous
(1-year-old Somali)

This kitten is one of a litter of three, all demonstrating notable corneal disease. Thickened, hyperplastic epithelium creates a vermiform ridge in the axial cornea. Corneal vascularization is prominent, especially dorsally where a raised granulation bed can be seen. Large fluid bullae (arrow) overlie the edematous central cornea. Dendritic ulcerations were present in the opposite eye.

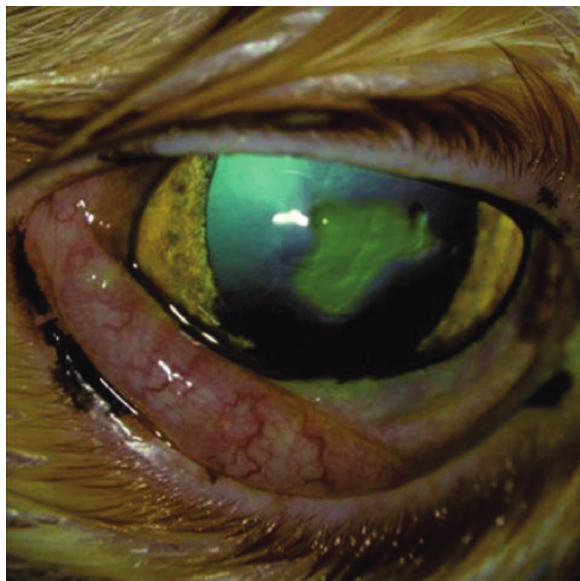


Figure 131
Herpetic keratitis—Recrudescence
(8-year-old exotic shorthair)

First diagnosed with feline herpesvirus-1 (FHV-1) as a 5-year old, this cat relapsed 3 years later after treatment for asthma with oral corticosteroids. Conjunctival hyperemia and chemosis accompany a central irregularly shaped fluorescein-positive geographic ulcer.

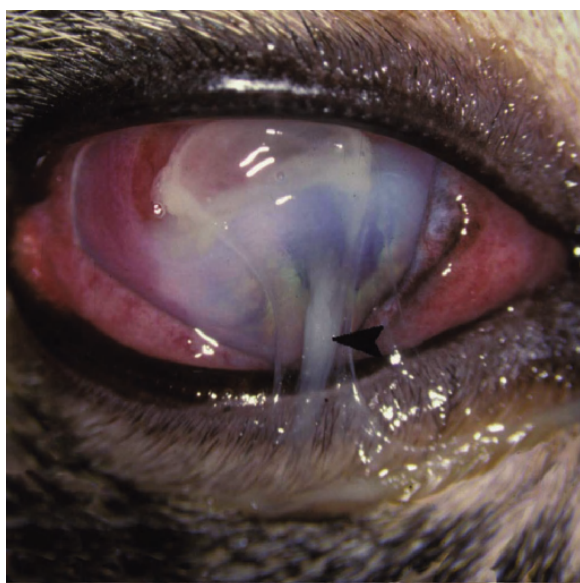


Figure 132
Mycoplasma
(16-year-old domestic shorthair)

Previously diagnosed with herpetic keratitis, this cat also had a long history of upper respiratory disease. One week prior to this photograph, he received a cortisone injection and is now being treated with an antibiotic ointment. Marked conjunctival hyperemia accompanies ulceration and severe keratomalacia ("melting") of the central cornea. Intense corneal edema surrounds a slightly clearer center that suggests greater stromal thinning. Prominent corneal vascularization can be seen temporally. What appears to be mucus overlying the central cornea and lower lid margin (arrow) is actually necrotic stroma. *Mycoplasma* spp was cultured from the axial cornea.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

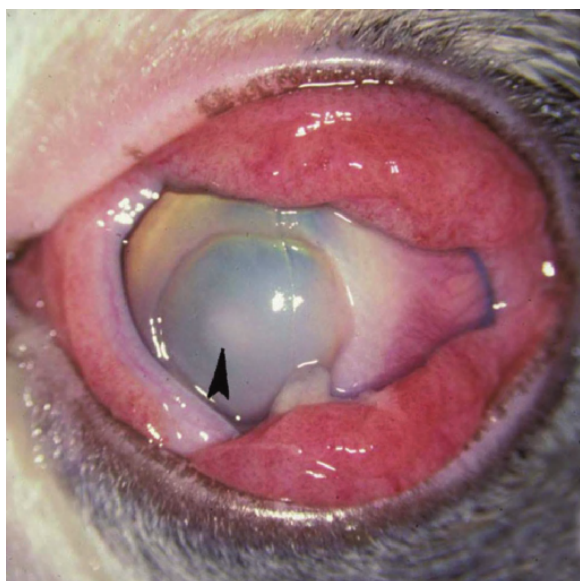


Figure 133
Mycoplasma
(3-year-old domestic shorthair)

This stray cat developed conjunctivitis after its arrival at an animal shelter. Treatment consisted of a triple antibiotic-corticosteroid ointment. Severely chemotic and hyperemic conjunctiva join with a prominent third eyelid to frame the edematous, vascularized cornea. A circular stromal ulcer, with a cream-colored cellular infiltrate (arrow) at its center, occupies the axial cornea. *Mycoplasma* spp was cultured from the ulcer.

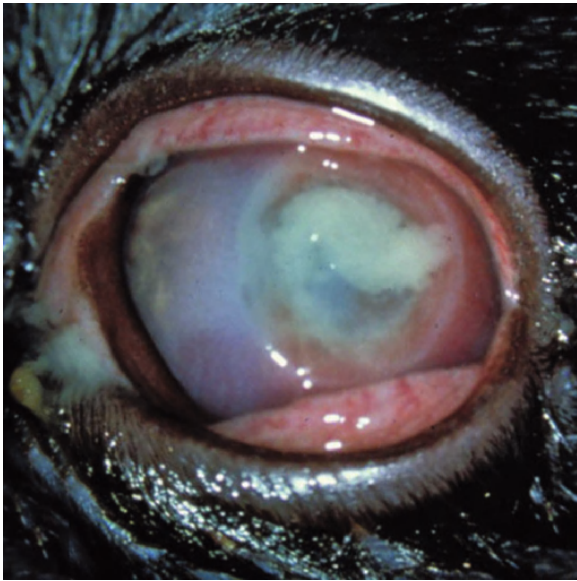


Figure 134
Bacterial keratitis/*Staphylococcus*
(3-month-old Persian)

The conjunctiva is moderately chemotic and hyperemic. Deep and superficial corneal vascularization and diffuse edema are present. A large circular stromal ulcer is evident beneath a thick discharge adhering to the corneal surface. The anterior chamber is difficult to see, but the pupil is miotic and the intraocular pressure is greatly reduced. *Staphylococcus* spp was cultured from the ulcer.

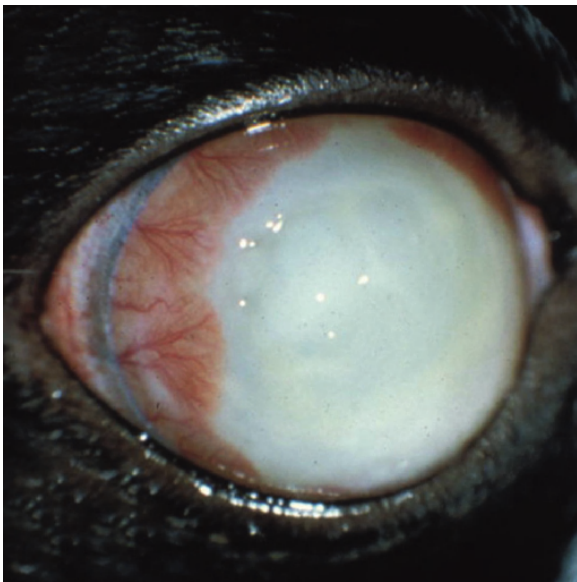


Figure 135
Bacterial keratitis/*Pseudomonas*
(8.5-year-old domestic shorthair)

This cat was being treated for bilateral herpetic keratitis and toxoplasma-induced uveitis with topical antiviral drugs and systemic and topical corticosteroids. He presented with a 2-day history of intense ocular pain and cloudy corneas. The anterior segment cannot be visualized because of severe keratomalacia and superficial corneal vascularization. The left eye was similarly, but less severely, affected. Intraocular pressure was markedly reduced in both eyes. A pure culture of *Pseudomonas aeruginosa* was isolated from both corneas.

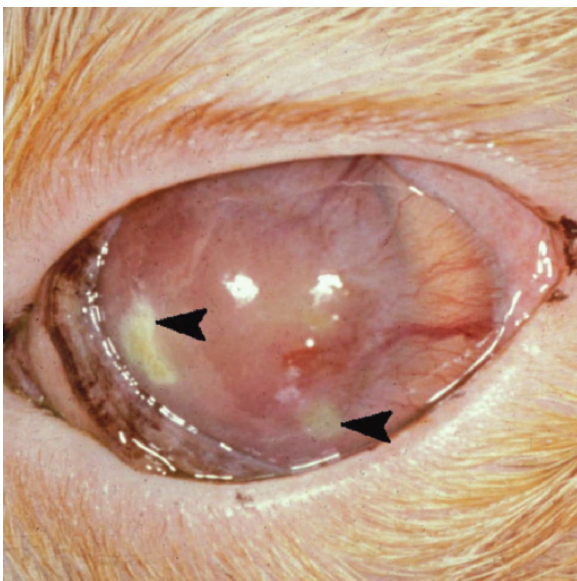


Figure 136
Mycotic keratitis
(8-year-old domestic shorthair)

A variety of antibiotic-corticosteroid ophthalmic preparations had been used to treat a persistent corneal ulcer of 3 weeks' duration. Superficial vessels surround a large central superficial ulcer. The cornea is diffusely edematous, with inflammatory cell infiltrates appearing as yellowish plaques (arrows). The axial defect retained fluorescein. Culture and cytology of the ulcer margin identified *Candida albicans* as the causative agent.

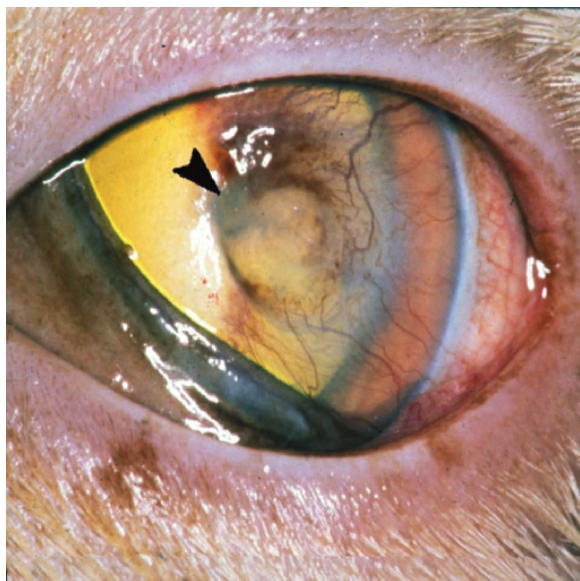


Figure 137
Mycotic keratitis
(8-year-old domestic shorthair)

Subjective signs of pain had increased over the last 10 days, during which a boric acid flush had been used to manage the cat's ocular discharge. Pain was manifest by blepharospasm and protrusion of the third eyelid. The conjunctiva is moderately hyperemic. The temporal half of the cornea is superficially vascularized, with vessels encircling a paraxial stromal ulcer. The margins of the ulcer are necrotic (arrow). A moderate anterior uveitis accompanied the corneal lesion, though signs are difficult to visualize in the photo. Hemolytic *Staphylococcus* spp and *Aspergillus fumigatus* were cultured from the margins of the defect.

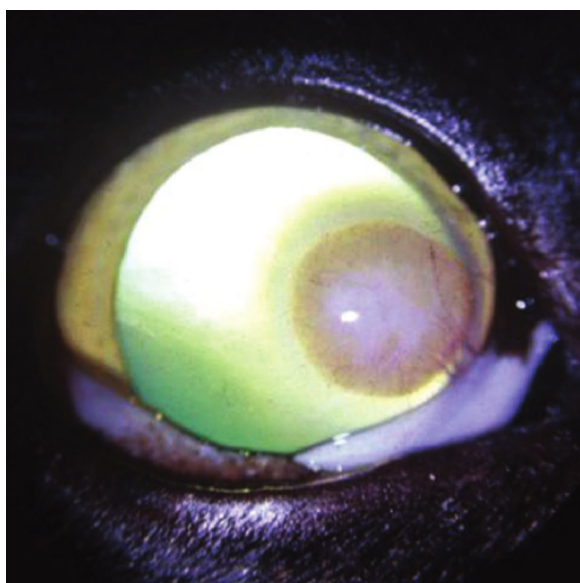


Figure 138
Mycobacterial keratitis
(young adult domestic shorthair)

The duration of the corneal opacity and the presence of additional lesions in this indoor/outdoor cat were unknown. No discomfort was associated with a smooth, elevated, well-vascularized subepithelial and intrastromal granuloma located in the peripheral cornea. Acid fast bacilli within the tissue were identified as *Mycobacterium intracellulare*. The character of the granuloma suggested an early stage of infection.

(Image courtesy of Richard Malik, DVSc, PhD, DipVetAn, MvetClinStud.)

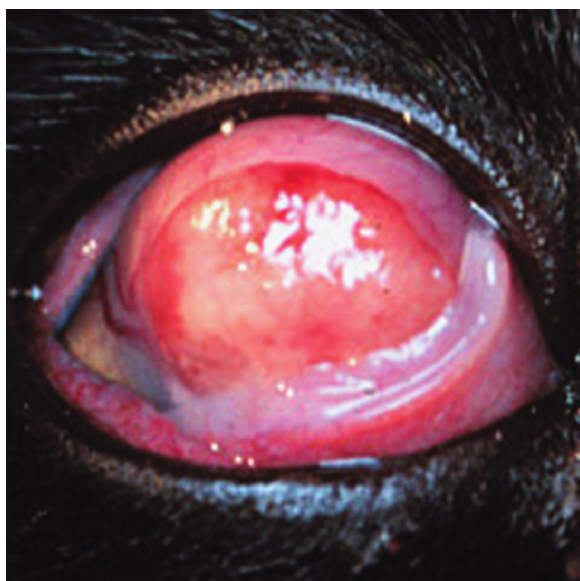


Figure 139
Mycobacterial keratitis
(6-year-old domestic longhair)

This outdoor cat had a history of prior corneal trauma and then a 5-month progression of corneal infiltration. A large granuloma effaces two-thirds of the right cornea, obscuring intraocular detail. The left eye and the cat's general health were unaffected. The cat was FIV positive and FeLV negative. Culture of the corneal lesion was unrewarding. On histopathology, acid fast bacilli were found within macrophages in the deep stromal infiltrate. The organism was identified as a novel *Mycobacterium* spp by PCR amplification.

(Image courtesy of Christina McCowan, BVSc, BSc (Hons), MACVS, PhD, Honorary Fellow Veterinary Ophthalmic Pathology: Novel fastidious *Mycobacterium* causing lepromatous lesions of the skin, subcutis, cornea, and conjunctiva of cats living in Victoria, Australia. *Clin Microbiol* 46(2): 618–626, 2007.)

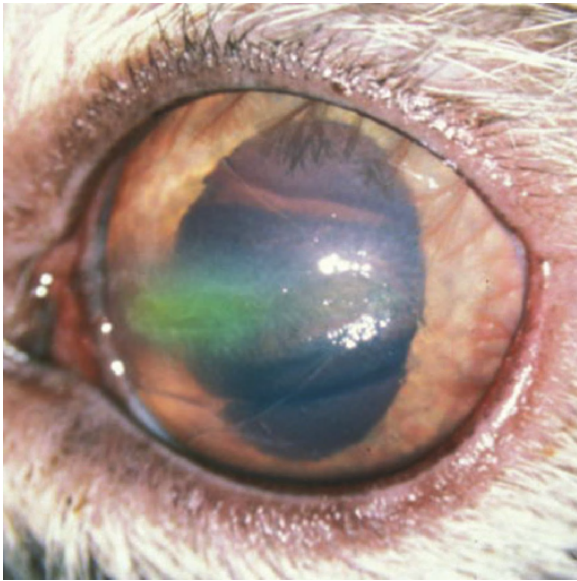


Figure 140
Superficial ulcer/Trigeminal and facial nerve paresis
(13-year-old domestic shorthair)

This cat had a history of a corneal ulcer in the left eye following the surgical removal of an oral squamous cell carcinoma. Superficial corneal vessels are present, most notably in the dorsal quadrant. A horizontally oriented ellipse of dull, roughened axial cornea stains positively with fluorescein. Corneal sensitivity and blink response were poor. The Schirmer tear test measured 5 mm/min. The location and shape of the corneal lesion are often seen with lagophthalmos.

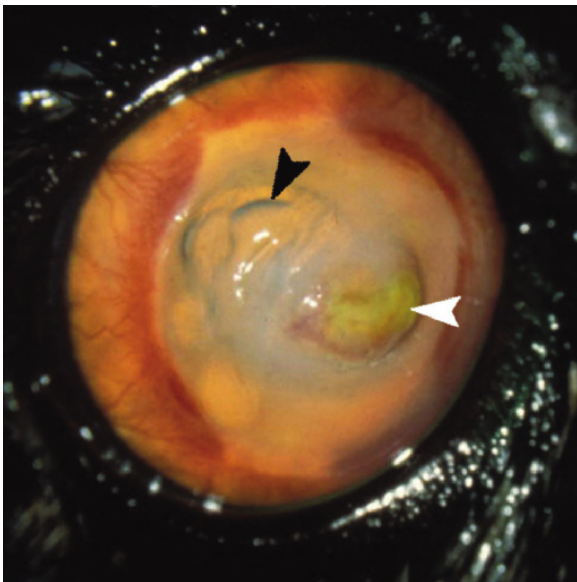


Figure 141
Bullous keratitis
(5-year-old Persian)

One month prior to presentation, this cat survived a house fire, suffering smoke inhalation and developing bilateral corneal ulcers. The left eye had healed without incident. Diffuse corneal edema and superficial vascularization are still present in the right cornea. Multiple stromal bullae (*black arrow*) create an irregular central corneal contour. One large bulla is fluorescein positive (*white arrow*).

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 142
Bullous keratopathy
(2.5-year-old domestic shorthair)

The axial cornea protrudes anteriorly because of extreme stromal edema that developed acutely. The conjunctiva is chemotic and hyperemic, accompanying a mild anterior uveitis. Note the lack of corneal vascularization and surrounding corneal edema. Bacterial culture was negative.

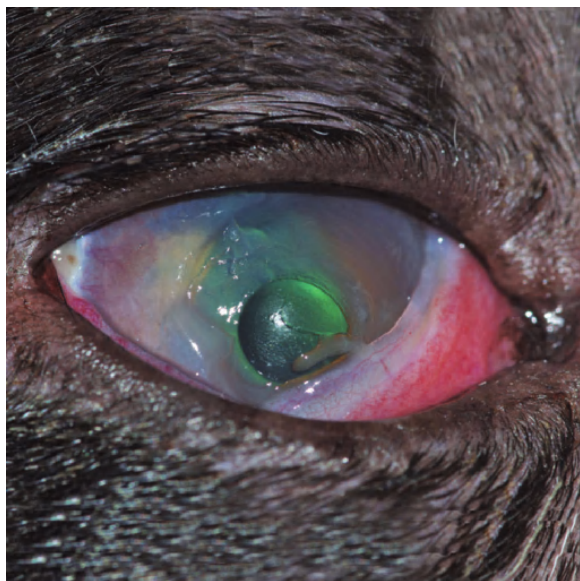


Figure 143
Descemetocoele

(young adult domestic shorthair)

No history was known for this patient presented by an animal rescue group. Conjunctival hyperemia accompanies a prominent third eyelid. The corneal surface is edematous, with active superficial vascularization temporally. The axial cornea is deeply ulcerated. A slight difference in corneal opacity highlights the boundary between the peripheral cornea and the stromal defect. A well-defined descemetocoele at the ulcer's center provides a clear view of the tapetal reflection. Loose epithelium is present near the upper margin of the descemetocoele, while a strand of mucus overlies its lower edge.

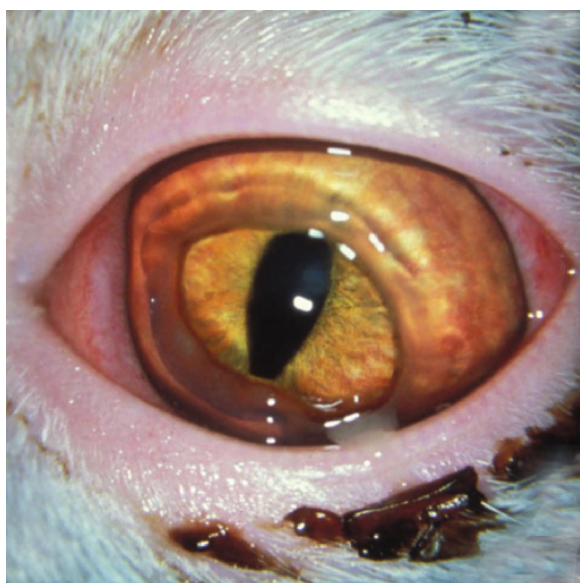


Figure 144
Descemetocoele

(young adult domestic shorthair)

The owner found this stray and presented him immediately for evaluation. The right eye had a large axial staphyloma. This left eye has a large central descemetocoele through which the iris and pupil can easily be seen. The cornea at the margins of the descemetocoele is edematous. Bacterial cultures were negative.

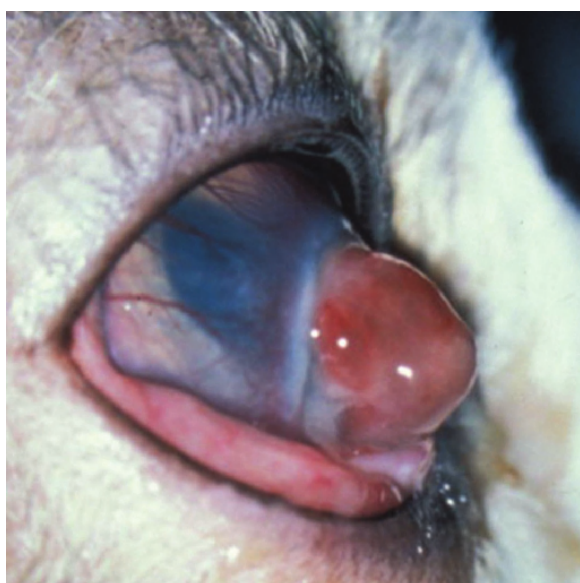


Figure 145
Iris prolapse

(10.5-year-old domestic shorthair)

This patient's cornea deteriorated over a 72-hour period following the appearance of a superficial corneal ulcer. The conjunctiva appears chemotic and hyperemic. Superficial vessels extend from the limbus to the axial cornea. Iris protrudes through a perforated central ulcer and is covered by a fibrinohemorrhagic clot. The anterior chamber is extremely shallow.

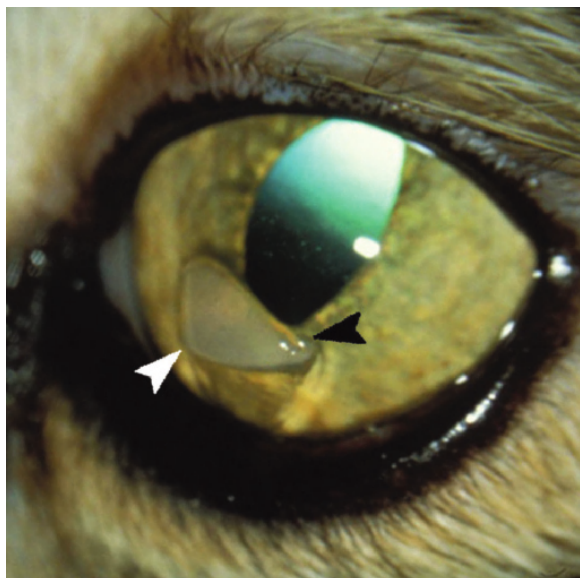


Figure 146
Corneal laceration
(10-year-old domestic longhair)

Acute blepharospasm and tearing were seen following a cat fight. The apex (*white arrow*) of a triangular flap of edematous corneal tissue is displaced dorsally from its origin at 6 o'clock, while its base remains attached axially (*black arrow*).

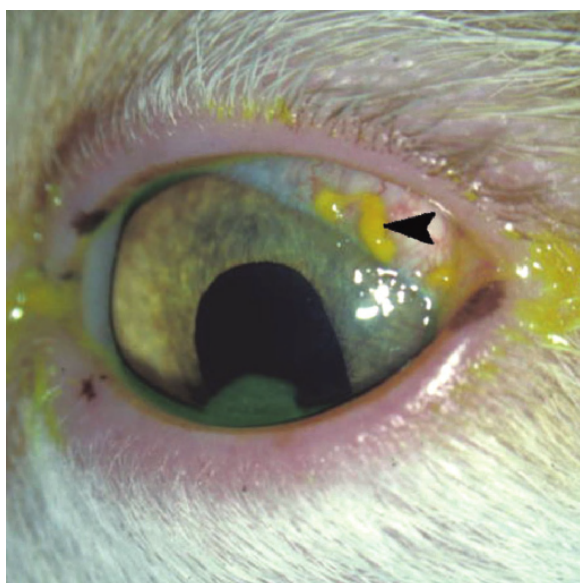


Figure 147
Eosinophilic keratitis/Herpetic keratitis
(18-month-old domestic longhair)

Eight months prior to this photograph, the cat was diagnosed with and successfully treated for herpetic keratitis in the right eye. A large superficial ulcer in the ventral left cornea retains stain. The raised yellow plaques (*arrow*) in the perilimbal bulbar conjunctiva appeared white and grainy prior to fluorescein application, consistent with an early stage of eosinophilic keratitis.

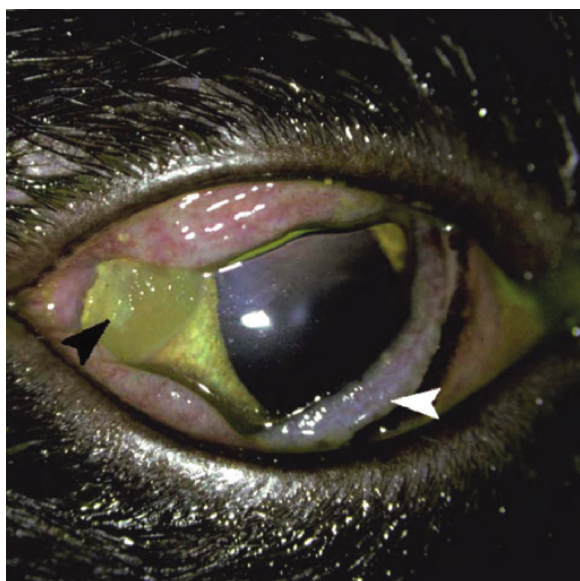


Figure 148
Eosinophilic keratitis/Herpetic keratitis
(3.5-year-old domestic longhair)

This was a bilateral condition that developed in conjunction with an upper respiratory infection of 6 weeks' duration. Oral and topical antibiotics had been administered during that time. Focal gritty deposits present on the hyperemic conjunctiva and nictitans (*white arrow*) lend a subtly nodular appearance to the affected surfaces. The temporal cornea is ulcerated. Cellular infiltrates and the same gritty white precipitates (*black arrow*) found in the conjunctiva contribute to the lesion's dull, matte appearance.

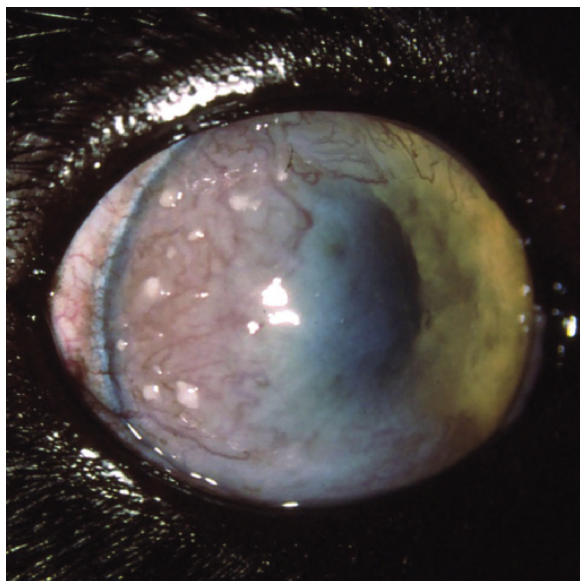


Figure 149
Eosinophilic keratitis
(7-year-old domestic longhair)

This patient was adopted from a shelter at 4–5 weeks of age. No ocular problems had been noted prior to 2 weeks ago, when both eyes became red and cloudy. Neither eye appeared painful. No improvement had been noted with use of a topical antibiotic ointment. The temporal cornea is edematous, with actively branching vessels within the superficial stroma and multiple white-raised plaques scattered across the affected surface. Corneal vascularization extends into the dorsal and ventral cornea. A bright light artifact is present at the leading edge of the vessels. Examination of a scraping of a surface plaque revealed a variety of inflammatory cells, including eosinophils. The opposite eye was less severely affected.

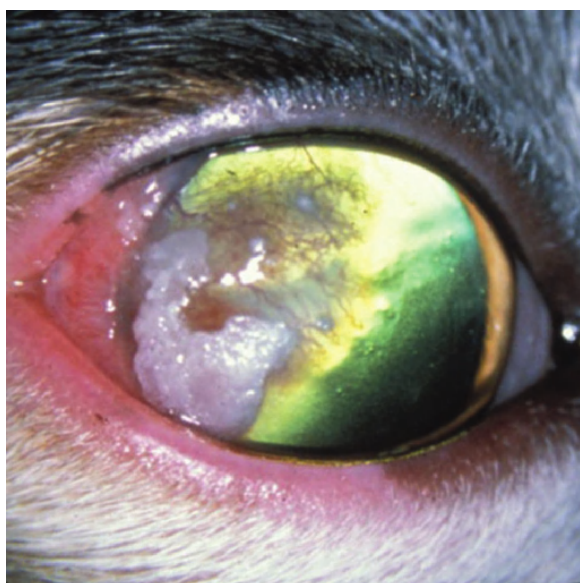


Figure 150
Eosinophilic keratitis
(3-year-old domestic shorthair)

There had been a 3-month history of recurring ulcers and vascularization in both corneas. Response to a topical antibiotic-corticosteroid ointment had been poor. Both eyes were similarly affected at the time of examination. The hyperemic lids were attributed to neomycin sensitivity. The conjunctiva is moderately hyperemic. Prominent blood vessels surround a large white superficial plaque, its grainy surface raised above the surrounding tissue. Smaller plaques are present on the conjunctiva. A fluorescein dye test was negative.



Figure 151
Eosinophilic keratitis/Conjunctivitis
(5-year-old domestic shorthair)

Despite 3 years of treatment with topical antibiotics, the left eye had failed to respond to therapy and was now blind. The palpebral conjunctiva and third eyelid are hyperemic and markedly thickened. The exposed surfaces are friable and bleed easily when manipulated. The corneal surface is irregular; plaques of flesh-colored tissue within the superficial cornea are well vascularized. Diagnosis was based on biopsy of corneal and conjunctival tissues.



Figure 152
Corneal sequestration
(3-year-old Himalayan)

This patient had a lifelong history of ocular discharge and intermittent but self-limiting bouts of squinting affecting the right eye. The most recent episode began 3 weeks ago, persisting despite a week-long regimen of topical antibacterial. The central cornea is ulcerated, with poorly adherent epithelium outlined dorsally by the tapetal reflection. That same reflection is obscured in the lower half of the pupil by ill-defined bronzing of the stroma, indicative of early sequestrum formation. Superficial vessels extend from the dorsal limbus to the ulcer site.

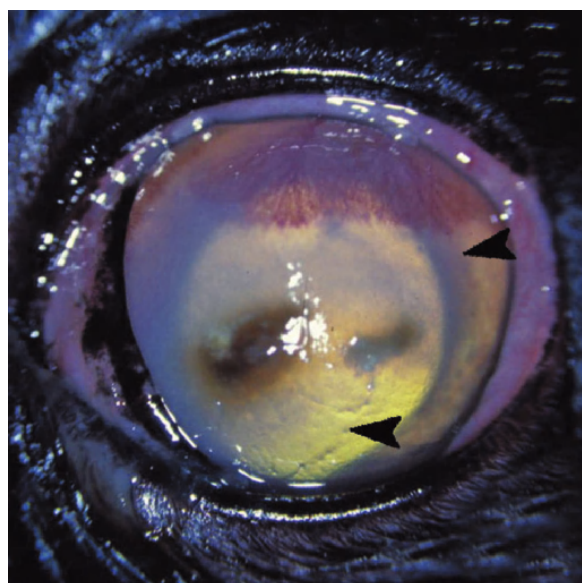


Figure 153
Corneal sequestration/Herpetic keratitis
(9-month-old Persian)

Three months prior to the photograph, this cat was diagnosed with an upper respiratory infection, bilateral ulcerative keratitis, and brown discoloration of the corneas. Both eyes are still affected. The cornea is diffusely edematous and vascularized superiorly. The edge of a large unstained ulcer is present at the arrows. Two focal areas of brown discoloration are present within the ulcer. The Schirmer tear test in both eyes was 5 mm/min.

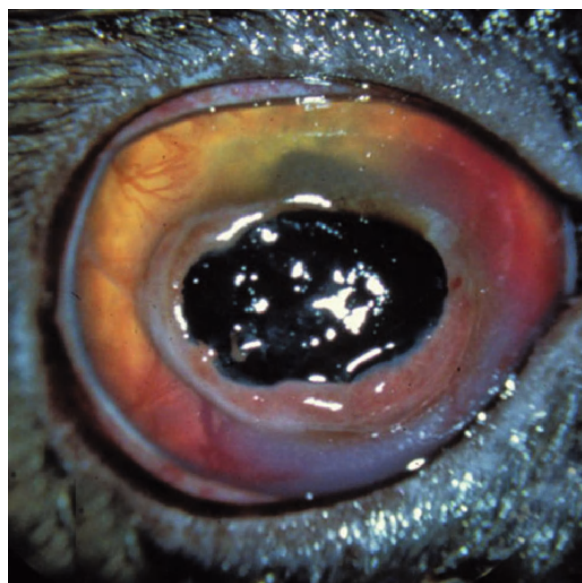


Figure 154
Corneal sequestration/Anterior uveitis
(14-year-old Persian)

History was incomplete in this case. The cat demonstrated severe blepharospasm with miosis and decreased intraocular pressure. The large black plaque in the central cornea has an elevated, loosened edge. The surrounding corneal stroma is edematous and infiltrated by superficial and deep blood vessels.

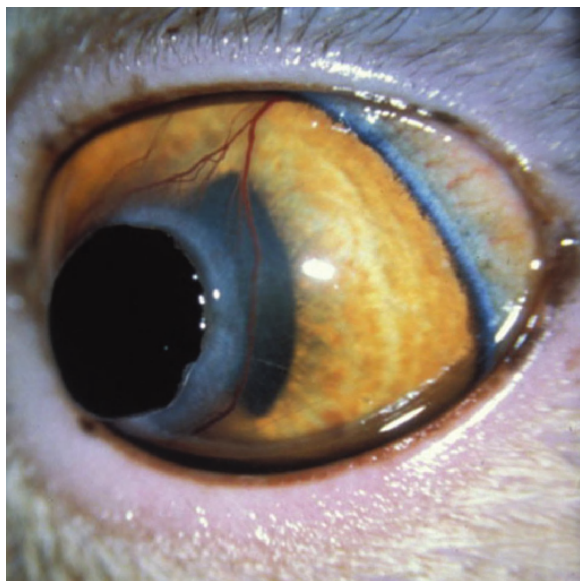


Figure 155
Corneal sequestration
(4.5-year-old Himalayan)

This cat developed bilateral corneal ulcers 6 months prior to the photograph. Both eyes are again similarly affected. A large black plaque is clearly elevated above the underlying tissue and is surrounded by edematous, vascularized stroma. One month later, the plaque spontaneously sloughed.



Figure 156
Corneal foreign body
(3-year-old domestic shorthair)

Owners noted their cat squinting for 2 weeks. Plant material appears as a darkly colored, elevated plaque in the central cornea, with edematous edges and a vascularized upper border. The foreign body was removed with a flat spatula following topical anesthesia.

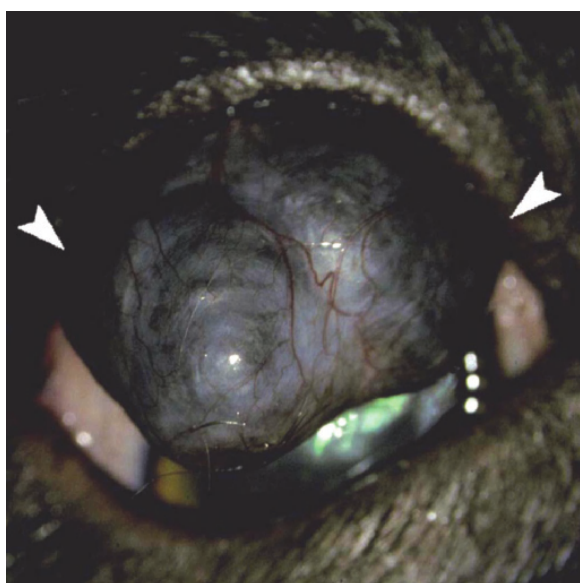


Figure 157
Staphyloma
(6-year-old domestic shorthair)

The owner noticed a black mass growing over the eye for a period of several months. A large, darkly pigmented, irregular subconjunctival mass (between the *arrows*) originates superior to the limbus and obscures a portion of the adjacent cornea. A melanoma was suspected and the globe was enucleated. The histopathologic diagnosis was a staphyloma. The initiating factor was not determined.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

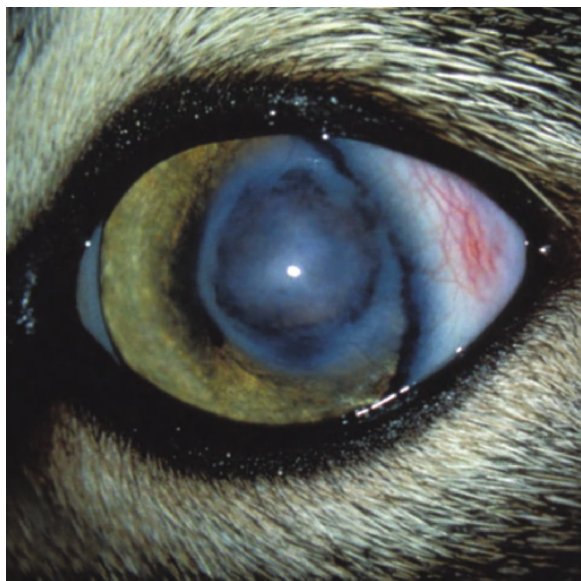


Figure 158
Staphyloma/Adherent leukoma
(8-year-old domestic shorthair)

This was a comfortable eye with no signs of active inflammation. The blue-gray appearance of the cornea is a consequence of scarring and adhesion of the iris to the cornea. The cornea at the scar's center is thin and protrudes anteriorly. Severe corneal disease and anterior uveitis must have preceded this condition.

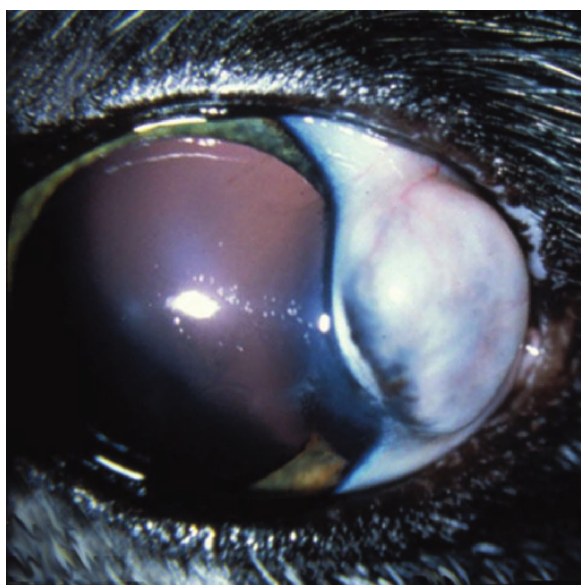


Figure 159
Staphyloma
(7-year-old domestic shorthair)

The owner reported that the appearance of this eye had remained unchanged for several years. The globe's contour is distorted by herniation of the iris and ciliary body into an area of thinned, outwardly stretched sclera. The iridocorneal drainage angle adjacent to the elevation was closed by peripheral anterior synechiae.

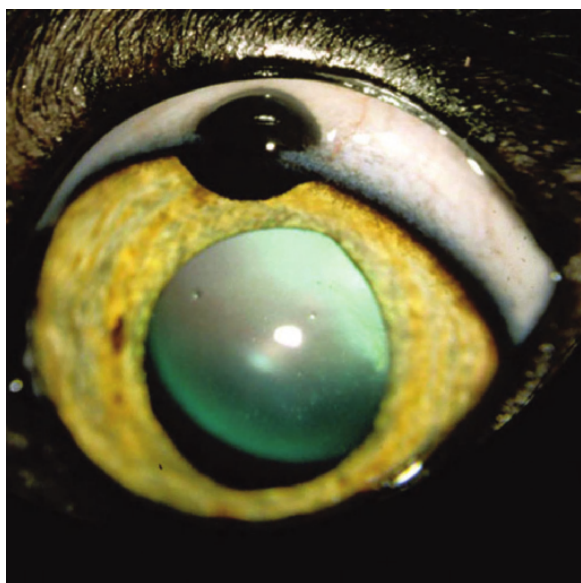


Figure 160
Limbal melanocytoma
(10-year-old domestic shorthair)

This benign tumor originates over the superior sclera and extends into the adjacent corneal stroma but is causing no active inflammation or discomfort. An unrelated lens luxation creates an aphakic crescent visible within the ventral pupil.

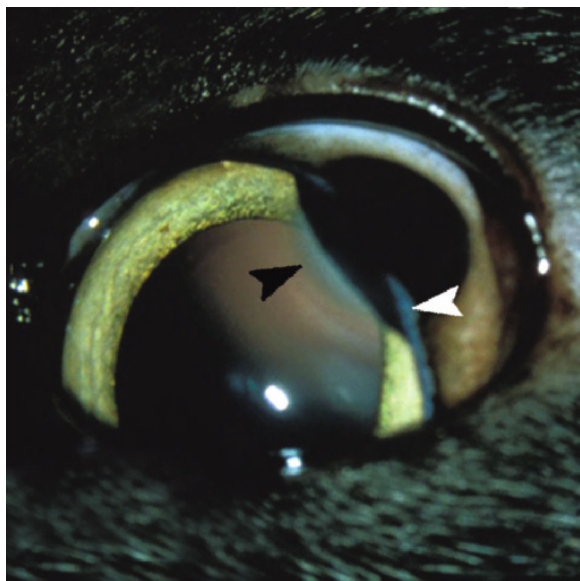


Figure 161
Limbal melanocytoma
(19-year-old domestic shorthair)

The duration of this lesion was unknown. The *white arrow* marks the limbus. Superiorly, a black mass elevated beneath the conjunctiva extends into the corneal stroma. The axial margin of the mass has a white, granular appearance, suggestive of a lipid infiltrate (*black arrow*). These slow-growing tumors originate from the pigmented cells of the scleral shelf.

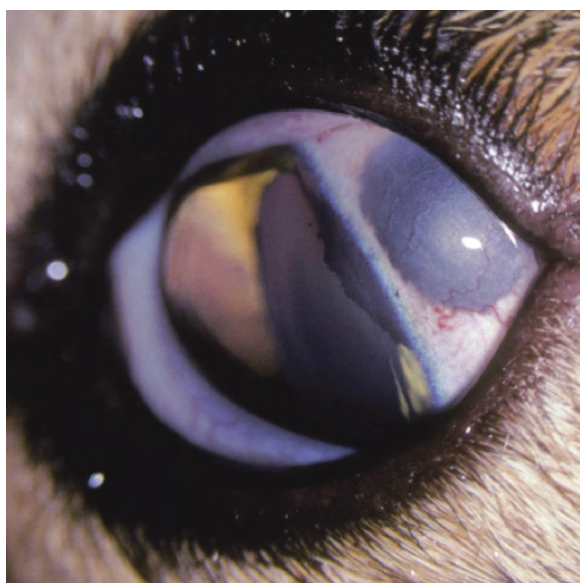


Figure 162
Limbal melanocytoma
(6-year-old domestic shorthair)

The owner was unaware of an ocular problem until the referring veterinarian pointed out a raised pigmented mass in the lateral sclera during a routine health maintenance visit. At examination 2 weeks later, a raised, well-defined pigmented mass overlies the sclera, beneath the temporal conjunctiva. Pigmented tissue also extends into the adjacent cornea but spares the perilimbal sclera, in contrast to the patient in Figure 161. The iridocorneal angle was unaffected gonioscopically. The photo is taken at an angle, with the dark pupil appearing near the tumor site, the yellowish iris seen on the opposite side of the eye, and the third eyelid margin visible as a pale curvilinear area medially.

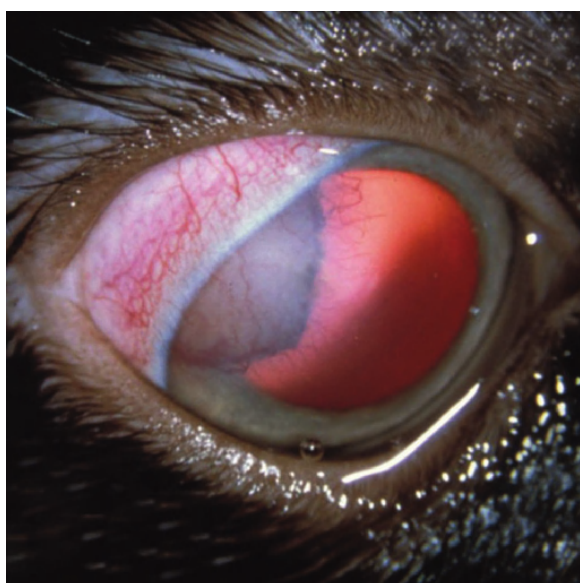


Figure 163
Neuroblastic tumor
(4-year-old Himalayan)

This lesion developed quickly over a 2-week period. A tan to pink mass is present within the deep corneal layers, extending into the adjacent sclera. The overlying cornea is vascularized. The iris was grossly spared based on gonioscopic examination. The tumor was believed to be metastatic and neuroblastic, although the precise origin of the tumor was never determined.

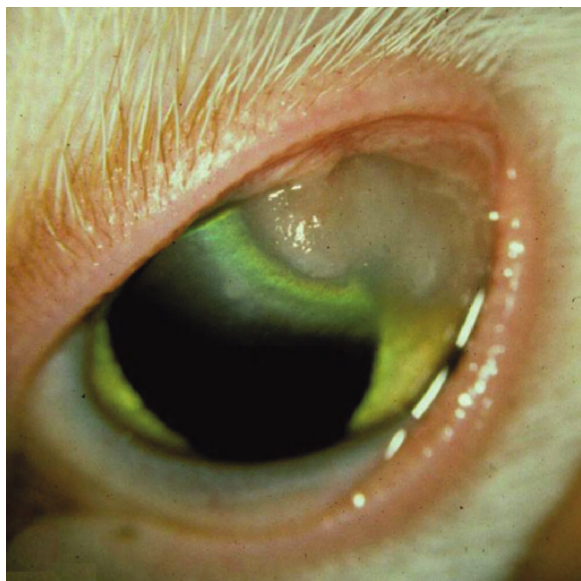


Figure 164
Squamous cell carcinoma
(8-year-old domestic shorthair)

This mass had been slowly progressing from the limbal cornea with minimal detectable involvement of the sclera and only mild conjunctival hyperemia and chemosis. The white-elevated mass was smooth and demonstrated only thin deep vessels and little superficial vascularization. The diagnosis was based on biopsy results.

(Image courtesy of David T. Ramsey, DVM, MS, DACVO.)

SECTION VII

Anterior Uvea

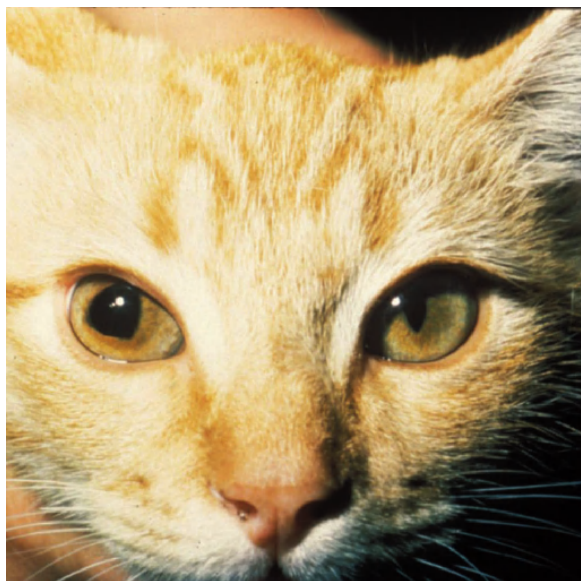


Figure 165
Iris coloboma
(juvenile domestic shorthair)

A temporal notch-like defect in the right pupil compromises its response to light. This developmental defect must be differentiated from pupillary abnormalities caused by neurologic deficits (see Figure 169).

(Image courtesy of Art J. Quinn, DVM, DACVO.)

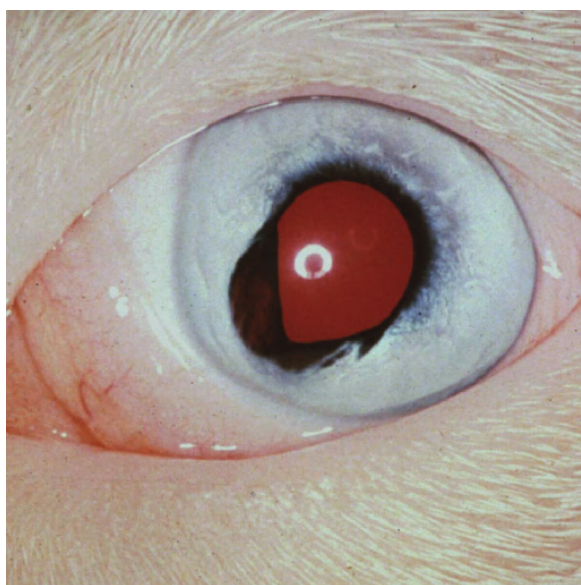


Figure 166
Iris coloboma
(1-year-old domestic shorthair)

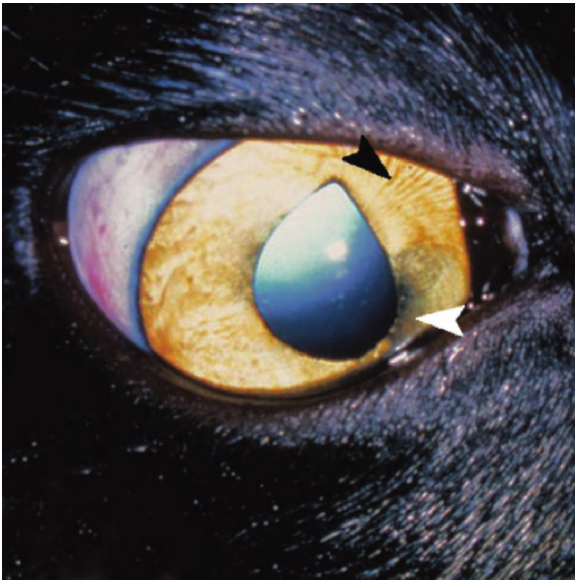
An abnormally shaped pupil led to this cat's examination. The iris stroma, embryologically derived from mesoderm, is poorly developed at the ventronasal pupillary margin. The posterior pigmented layers of the iris that arise from neuroectoderm are present but incomplete. The pupillary light response is essentially normal elsewhere but limited at the coloboma site.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 167
Corectopia
(4-month-old Burmese)

The owner commented on her kitten's cross-eyed appearance during a health maintenance examination. The third eyelid is prominent and mildly hyperemic. The pupil tilts along its vertical axis and is offset nasally. Poor iridal response to mydriatics limited evaluation of the lens and fundus, but gross abnormalities were not apparent. The left eye was also affected. At first glance, the anomaly mimics the convergent strabismus of the Siamese breed.

**Figure 168****Dyscoria**

(1-year-old domestic shorthair)

This cat had a history of seizures. The pupil is irregular, with a reverse D shape and no response to light. The nasal iris is dark in color (*white arrow*); radial bands appear in other iris quadrants (*black arrow*). The left pupil was a small vertical slit that failed to dilate normally. The cause of the dyscoria and seizures was not established.

**Figure 169****D-shaped pupil**

(6-year-old domestic shorthair)

Lack of innervation by the temporal short ciliary nerve is the presumed cause of the abnormal pupil shape. The temporal iris remains in a relatively dilated state, while the nasal iris constricts in response to light.

**Figure 170****Spastic pupil syndrome**

(4-year-old domestic shorthair)

Over the past 6 months, this cat had experienced fluctuations in pupil size and symmetry. On this particular occasion, the right pupil is miotic when compared with the left, but both retained normal pupillary light responses. Anisocoria persisted and neither pupil dilated fully in dim light. No other ocular abnormalities were present. The cat tested positive for FeLV.



Figure 171
Persistent pupillary membranes
(6-week-old domestic shorthair)

Prior to inclusion in a nutritional study, this kitten was presented for routine ophthalmic evaluation. A network of fine pigmented strands originates from the anterior iris surface and spans the pupil. The left eye was similarly affected, as were several siblings. Vision was normal.

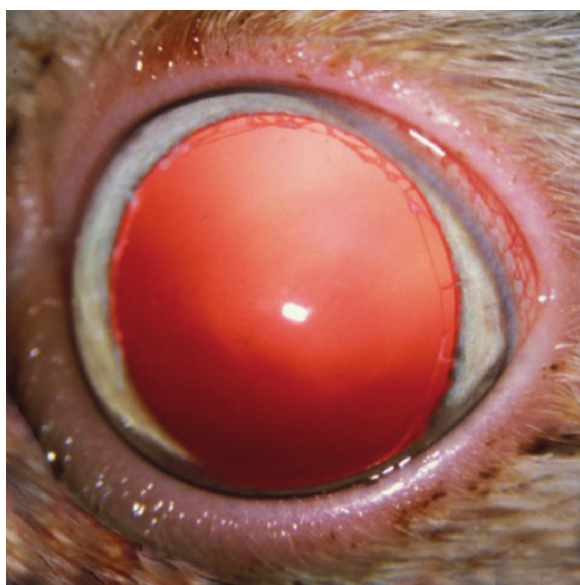


Figure 172
Persistent pupillary membranes
(8-month-old Himalayan)

This cat was presented for evaluation of bilateral conjunctivitis, accompanied by periocular discharge and marginal hyperemia. Bilateral persistent pupillary membranes (PPMs) were noted coincidentally. With the pupil pharmacologically dilated, fine strands can be seen forming a complete collarette just within the pupillary margin. Lack of pigment within the subalbinotic fundus contributes to the red reflection.

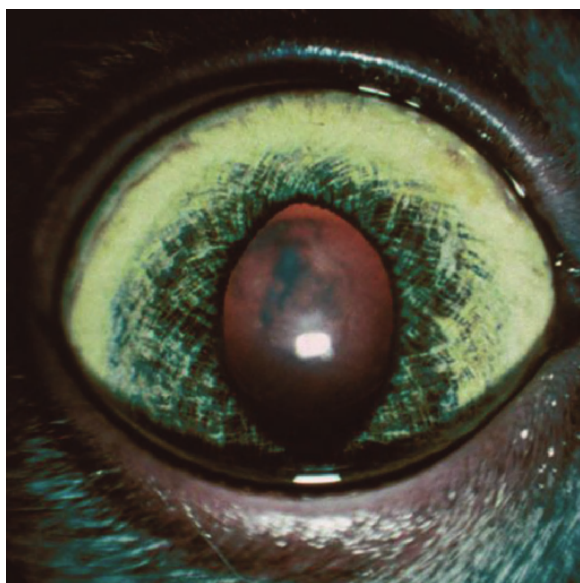


Figure 173
Chediak-Higashi syndrome
(4-year-old Persian)

The pale blue smoke color of this cat's haircoat is typical of the color dilution seen with this disease. The pale yellow iris with the basket weave appearance of the iris stroma is another characteristic of Chediak-Higashi syndrome (CHS). The nuclear and cortical lens opacities are believed to be inherited by a recessive gene other than that responsible for CHS. Figure 367 is typical of a CHS fundus.

(Image courtesy of Linda L. Collier, DVM, PhD, DACVO.)

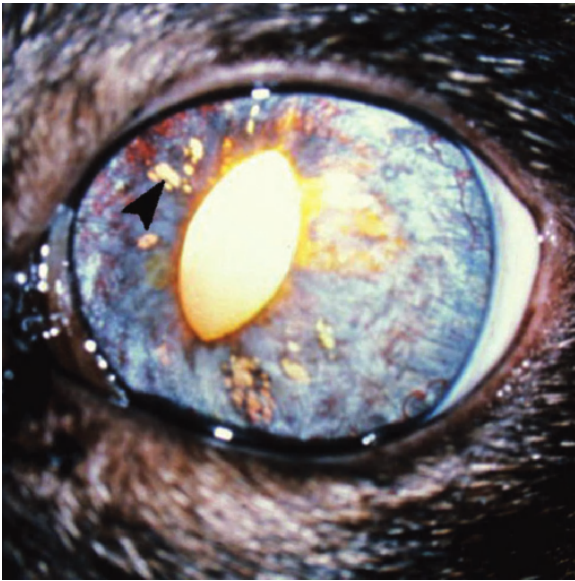


Figure 174
Iris atrophy
(18-year-old Siamese)

The tapetal reflection can easily be seen through the thinned iris. In several areas (*arrow*), the iris stroma is totally absent. The changes were bilateral but had negligible effect on the degree of pupillary excursion or pupillary light response.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 175
Feline dysautonomia
(2.5-year-old domestic shorthair)

Two weeks after arriving in the United States from Ireland, this cat became progressively anorectic and depressed, with clinical signs of weight loss, constipation, and intermittent regurgitation. Both nictitating membranes are prominent. Pupils are dilated and nonresponsive, but the cat can see. Schirmer tear test values were 0–1 mm/min. The oral and nasal mucous membranes were also dry. Megaesophagus, a distended urinary bladder and colonic distention were detected radiographically. Pharmacologic testing confirmed the autonomic dysfunction.

(Image courtesy of David D. Canton, DVM, DACVO.)

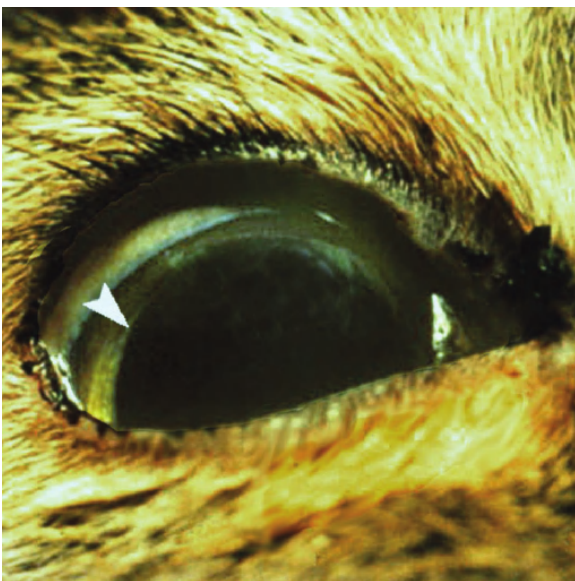


Figure 176
Feline dysautonomia
(3-year-old domestic shorthair)

Vomiting, anorexia, and listlessness developed acutely in this previously healthy animal. The pupils are widely dilated (*arrow*), but vision remained functional. Ophthalmic examination also revealed bilateral blepharospasm and Schirmer tear test values of zero. The diagnosis of dysautonomia was based on clinical signs and radiographic confirmation of megaesophagus. A tenacious mucopurulent discharge was noted on follow-up examinations.

(Image courtesy of Nancy M. Bromberg, VMD, DACVO.)

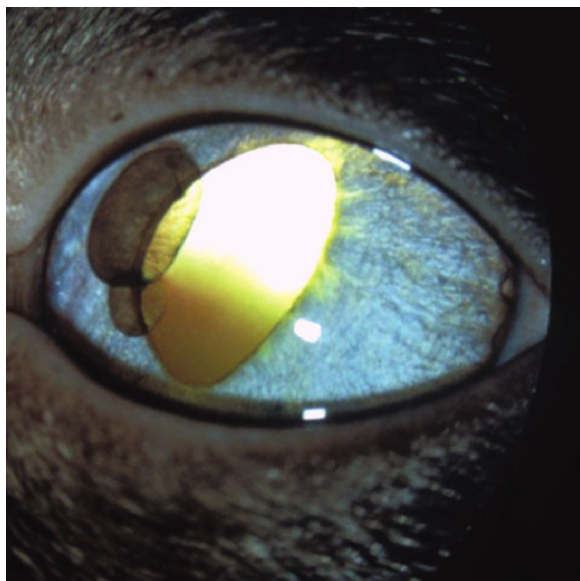


Figure 177
Iris cyst
(9.5-year-old Siamese)

The owners were unaware of the duration of a pigmented mass that originated at the pupil margin. The tapetal reflection can be seen through the lightly pigmented oval cyst, helping to differentiate it from a solid tumor. A smaller cyst is visible inferiorly. These cysts originate from the pigmented epithelium of the posterior iris surface. They are clinically benign, with no associated inflammation or vision loss.

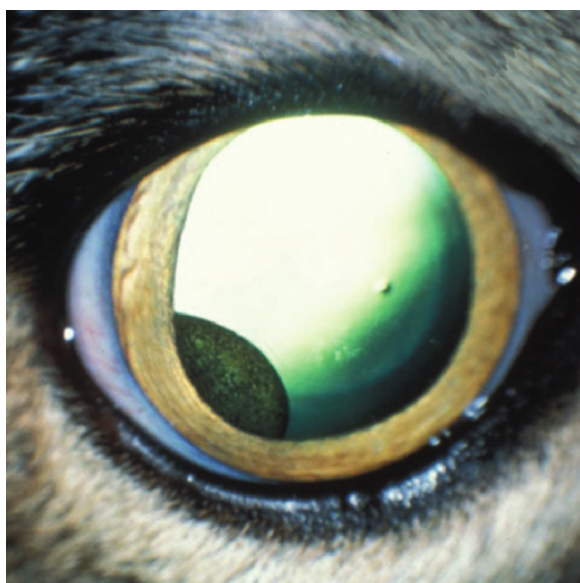


Figure 178
Iris cyst
(8-year-old domestic shorthair)

Approximately 50% of this large cyst can be seen extending beyond the pharmacologically dilated pupillary margin. The diagnosis is based on the ability to visualize the tapetal reflection through the fluid-filled cyst. Feline cysts are more likely to remain attached rather than floating freely in the anterior chamber.

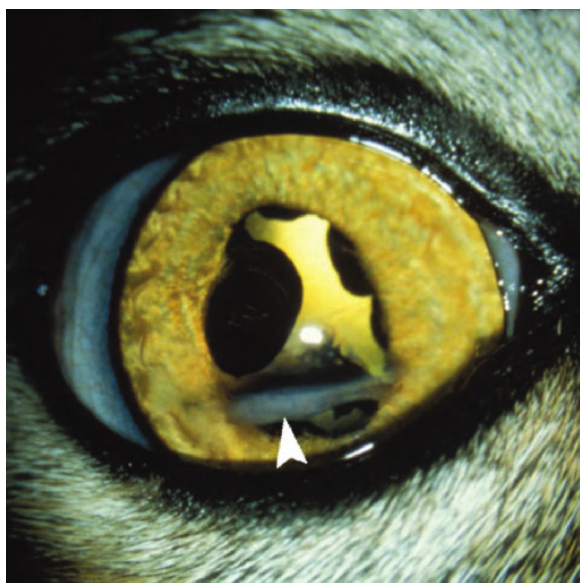


Figure 179
Iris cysts—Post-inflammatory
(2.5-year-old domestic shorthair)

A linear, dense corneal scar is visible at the arrow. The iris adheres to the corneal endothelium at both ends of the scar. A large dark mass can be seen at the pupil margin, extending onto the anterior lens surface. Several smaller masses are seen along the opposite pupillary margin. These cysts transilluminated with a bright focal light beam, although that characteristic is not apparent in the photo. The more heavily pigmented cysts may originate from the ciliary body epithelium.



Figure 180
Anterior uveitis/Feline leukemia complex
(10.5-year-old domestic shorthair)

The owners observed bilateral squinting and ocular discharge prior to examination. A small blood-tinged fibrin clot is visible (*arrow*) in the ventronasal anterior chamber. Temporal iris vessels are congested. Aqueous flare and keratic precipitates contribute to the haze seen through the dilated pupil. The fundus is depicted in Figure 298. The only positive serologic test was that for FeLV.

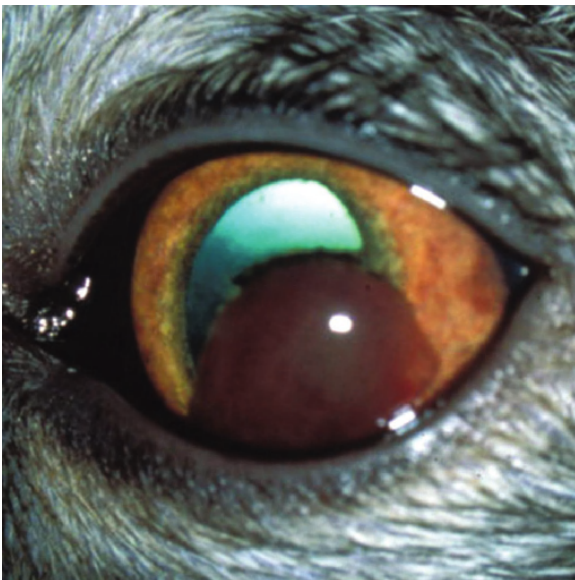


Figure 181
Anterior uveitis/Feline leukemia complex
(8-month-old domestic shorthair)

This cat had a 4-day history of anorexia, lethargy, and bilateral ocular pain indicated by squinting. A large blood-tinged fibrin clot is present in the anterior chamber of the left eye. The entire iris face appears reddened because of dilation of surface vessels. The posterior segment was normal in both eyes. A test for FeLV was positive.

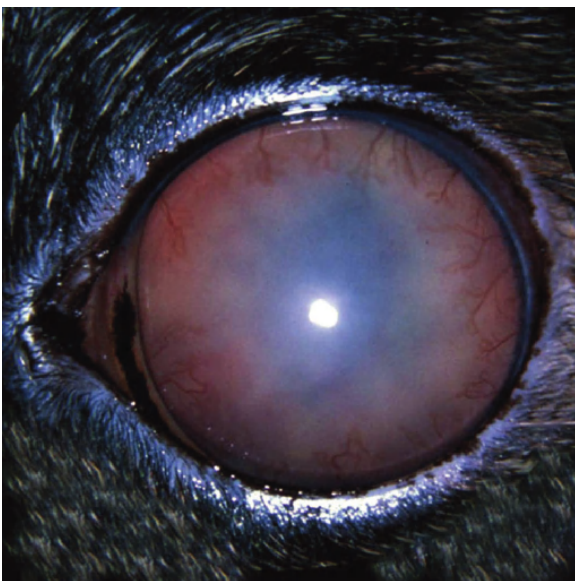


Figure 182
Anterior uveitis/Feline leukemia complex
(2-year-old domestic shorthair)

The owners were unaware of any ocular disease in this outdoor cat until he was observed bumping into objects. Both eyes were similarly affected. The cornea is severely edematous and superficially vascularized 360 degrees. The pupil is miotic and difficult to visualize, but the anterior chamber is shallow because of iris swelling. The posterior segment could not be observed in either eye. The only positive serologic test was for feline leukemia virus.



Figure 183
Anterior uveitis/Feline leukemia complex
(14-year-old domestic shorthair)

The referring veterinarian reported a positive FeLV test on this cat, presented with a 2-day history of a cloudy right eye. This right pupil has been pharmacologically dilated but response is incomplete. The temporal iris is focally thickened and hyperemic. Mild aqueous flare and deposits of pigment and inflammatory cells on the anterior lens capsule indicate breakdown of the blood-aqueous barrier. The left eye and posterior segments of both eyes were normal.

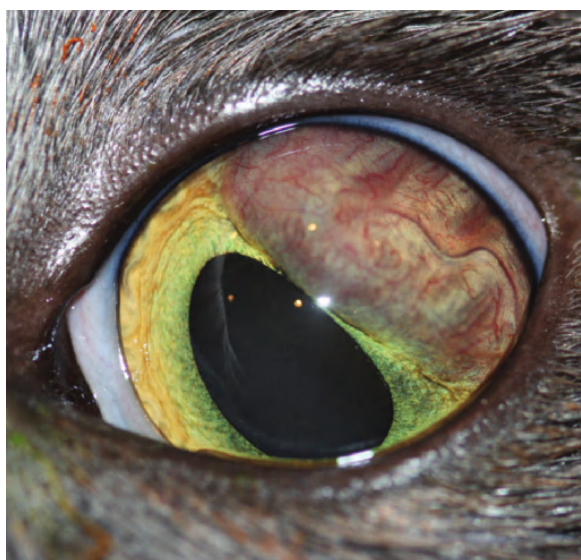


Figure 184
Iris abscess
(8-month-old domestic shorthair)

This young cat was presented with a 3-week history of an enlarging mass affecting the temporal iris. There were no additional ocular abnormalities in either eye. All serologies for FeLV, FIV, toxoplasmosis, and *Bartonella* were negative. An ocular ultrasound confirmed that the mass was limited to the iris. A fine-needle aspirate consisted of small lymphocytes, PMNs, and histocytic cells. No neoplastic cells were identified. With a combination of oral and topical antibiotics and prednisolone, the hyperemia and swelling decreased. The kitten has now been controlled with topical antibiotics/dexamethasone for approximately 7 months. The smooth elevated mass is more vascular and pigment migration at the pupil margin is negligible in comparison to cases of iris neoplasia.

(Image courtesy of Noelle La Croix, DVM, DACVO.)



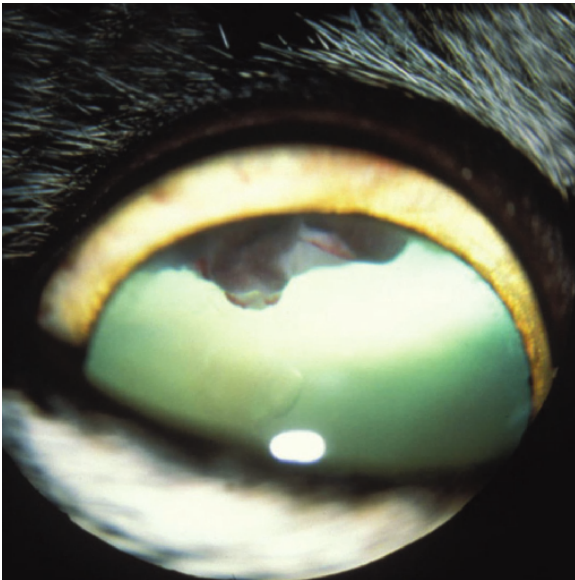
Figure 185
Lymphoma
(15-year-old domestic shorthair)

Duration of this condition was unknown. The iris is diffusely swollen, prominently vascularized, and darker in color than the normal left eye. The dyscoria is due to the neoplastic infiltrate within the iris stroma. Histopathology confirmed the diagnosis of lymphoma.

**Figure 186****Lymphoma**

(7-year-old domestic shorthair)

The owner noticed a progressive change in the right eye over the past 4 months. An isolated lesion in the left eye had gone undetected. The pink to flesh-colored thickening, most obvious in the temporal iris, is typical of this neoplasia. The pigmented swelling at the pupil margin and the misshapen pupil are also common findings. The cat had a faint aqueous flare but showed no subjective signs of pain.

**Figure 187****Lymphoma**

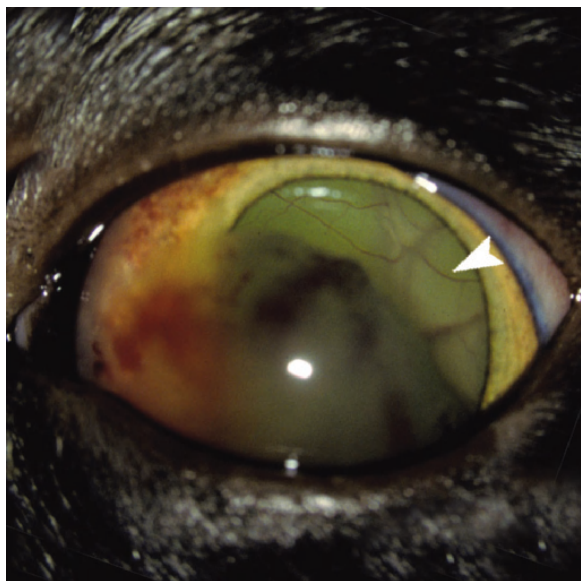
(4-year-old domestic shorthair)

This cat was initially presented for evaluation of a mass in the opposite eye. An irregular, darkly colored, vascularized mass protrudes into the posterior chamber. The mass could be seen only after the pupil was dilated. There was no evidence of active inflammation or posterior segment disease in either eye. A FeLV test was negative. The bilateral masses were diagnosed as lymphoma on the basis of histopathologic examination.

**Figure 188****Lymphoma/Anterior uveitis**

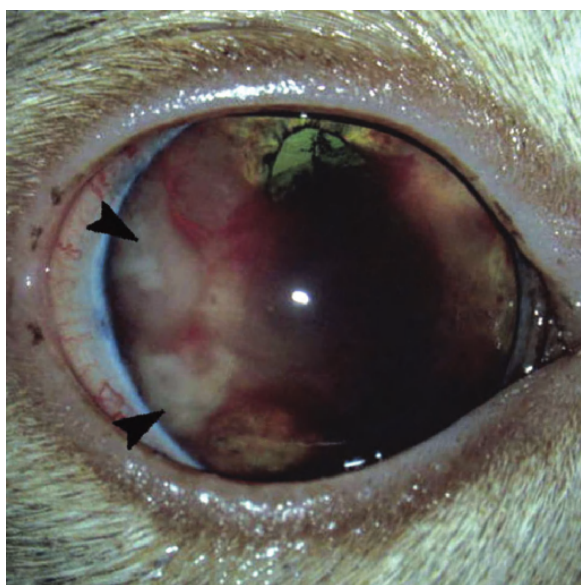
(7-year-old domestic shorthair)

An intraocular mass had been noticed by the owner 1 week prior to examination. A large pale fibrin clot is present in the ventral aspect of the anterior chamber. The pupil shape is distorted by a swollen, prominently vascularized iris and the presence of posterior synechia. The iris swelling also compromises the anterior chamber depth. Intraocular pressure is elevated. No abnormalities were identified in the opposite eye or within the posterior segment of this eye. A feline leukemia virus test was positive. Ocular lymphoma was diagnosed on histopathology.

**Figure 189****Lymphoma**

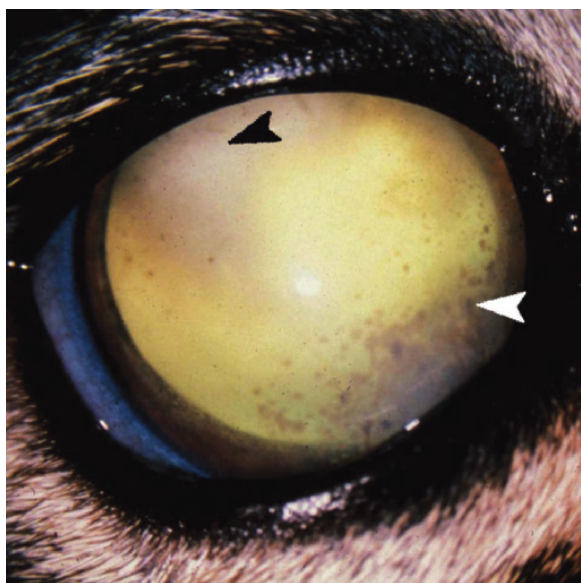
(7-year-old domestic shorthair)

The owners noticed cloudiness of the eye beginning 1 month prior to this photograph. A large fibrinous clot with areas of hemorrhage fills two-thirds of the anterior chamber, obscuring most of the swollen and vascularized nasal iris. Retinal vessels (*arrow*) can be seen through the dilated and unresponsive pupil owing to a complete retinal detachment. Histopathological examination found neoplastic lymphocytes within the ciliary body, choroid and optic nerve.

**Figure 190****Anterior uveitis/Feline leukemia complex/Feline immunodeficiency virus**

(11-year-old domestic shorthair)

This cat had a history of a red eye for 1 week. The anterior chamber contains a large fibrino-hemorrhagic clot. The iris vessels are dilated and a white, fluffy mass occupies the temporal chamber (*arrows*). The pupil is largely obscured but is misshapen because of posterior synechia. The posterior segment could not be visualized. Intraocular pressure was elevated. Tests for FeLV and FIV were both positive.

**Figure 191****Anterior uveitis/Pars planitis/Feline immunodeficiency virus**

(6-year-old domestic shorthair)

The presenting complaint mentioned cloudy eyes and decreasing vision of 2 weeks' duration. Keratic precipitates are prominent in the nasal corneal quadrant (*white arrow*). Inflammatory cells originating from the inflamed ciliary body have accumulated within the anterior vitreous, creating the opacity noted through the pupil (*black arrow*). These cells also diminish the overall tapetal reflection. Serology was positive for FIV but negative for FeLV and Toxoplasma IgM.

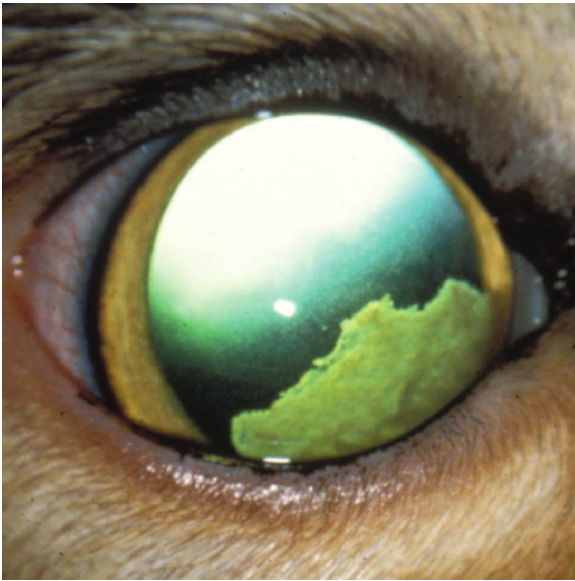


Figure 192
Anterior uveitis/Feline infectious peritonitis
 (1.5-year-old domestic shorthair)

This cat was presented with a 2-day history of a cloudy eye. A large white fibrin clot is visible in the ventral anterior chamber. Mild aqueous flare was present in both eyes, as were focal retinal exudates and perivascular cuffing. Repeated tests for FeLV and toxoplasmosis were negative. The total serum protein was 8.1 g/dl. A presumptive diagnosis of FIP was made on the basis of ocular signs and laboratory findings.

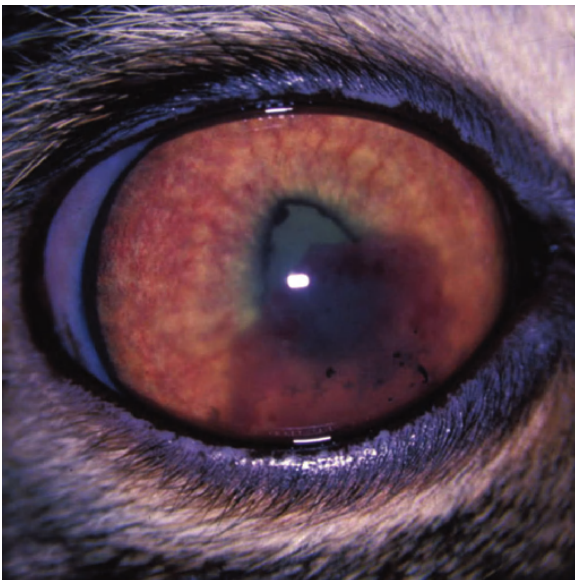


Figure 193
Anterior uveitis/Feline infectious peritonitis
 (7-year-old domestic shorthair)

Anorexia and weight loss had been observed for several weeks. Redness of the eye was noted 3 days prior to this photograph. Aqueous flare is present in this and the opposite eye. A blood-tinged fibrin clot within the anterior chamber contains spots of pigment. The iris appears orange in color because of its vascular congestion. Posterior synechiae are present, with pigment deposits on the anterior lens capsule. The posterior segment is poorly visualized in this eye, but the opposite fundus is shown in Figure 303.

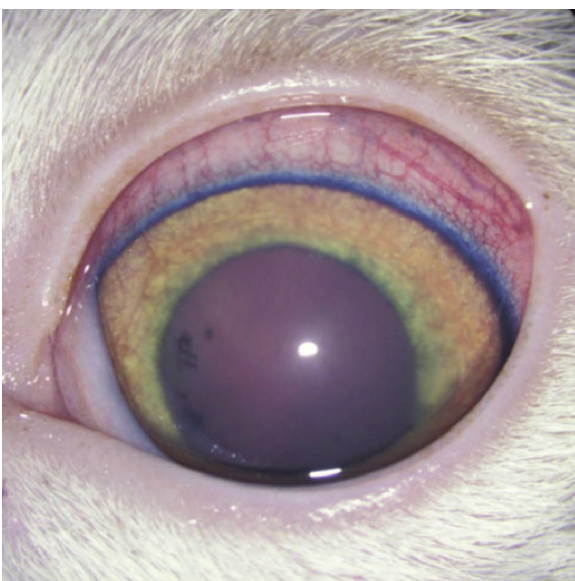


Figure 194
Anterior uveitis/Feline infectious peritonitis
 (3-year-old domestic shorthair)

Initial lesions developed in this left eye. One month later, uveitis also developed in the right eye. Dilation of conjunctival and episcleral vessels contribute to the hyperemia. Aqueous flare mutes the iris detail, with diffuse rubeosis iridis and blood-tinged keratic precipitates at the 9-o'clock position. The red reflex noted through the pupil is caused by massive posterior segment hemorrhage. A total protein of 10.6 g/dl and globulin of 7.4 g/dl were the only notable laboratory findings. Serology failed to identify an infectious cause. At necropsy, ocular lesions and general pathological findings were compatible with FIP.



Figure 195
Anterior uveitis/Feline infectious peritonitis
(6-month-old domestic shorthair)

This adolescent cat presented with a 6-week history of red, cloudy eyes, and intermittent fever. The only hematologic abnormality was an elevated serum protein of 8.4 g/dl. The patient was referred when the eyes failed to improve despite frequent topical corticosteroid therapy. The normally blue iris is discolored by inflammatory cells and prominent iris vessels. A large fibrin clot obscures the medial pupil. Fibrin and cells also obscure the iris surface temporally. Detailed fundus evaluation was hindered both by resistance to pharmacologic dilation and by the anterior chamber debris, but dazzle reflex and menace response were present. The left eye was similarly affected. Over the next few weeks, the anterior chamber exudates increased, completely and permanently covering the pupils and leaving the patient functionally blind. FIP was confirmed on necropsy 4 months after this initial visit.

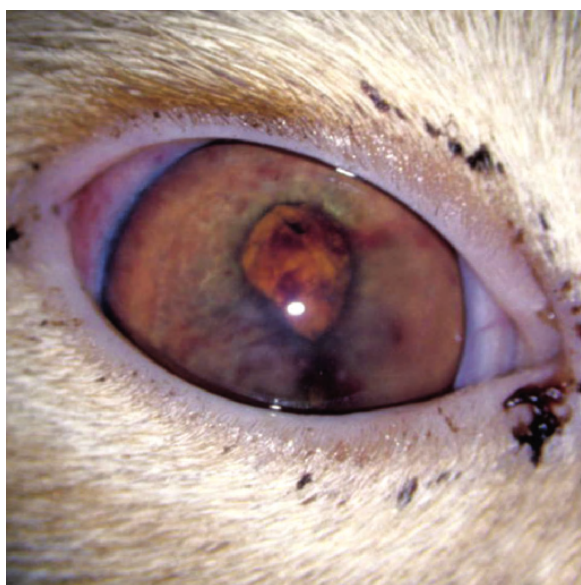


Figure 196
Anterior uveitis/Feline infectious peritonitis
(5-year-old domestic shorthair)

This cat was functionally blind due to severe anterior segment inflammation in this right eye and diffuse posterior segment involvement in the left eye (see Figure 308). The mild corneal edema and a fibrinohemorrhagic exudate in the anterior chamber prevent clear visualization of the swollen hemorrhagic iris. Posterior synechia have altered the pupillary shape. The total protein was 10.8 g/dl, globulin was 8.8 g/dl, and the cat had a profound lymphopenia.



Figure 197
Anterior uveitis/Toxoplasmosis
(6-month-old domestic shorthair)

This cat had been squinting the left eye for 1 month. On examination, blepharospasm and mild conjunctival hyperemia are seen, along with subtle perilimbal edema. The hazy appearance through the dilated pupil is due to moderate aqueous flare. The iris is diffusely swollen. The posterior segment of this eye and the entire right eye were normal. A FeLV test was negative, but the IgM titer for *Toxoplasma gondii* was positive at 1:128.

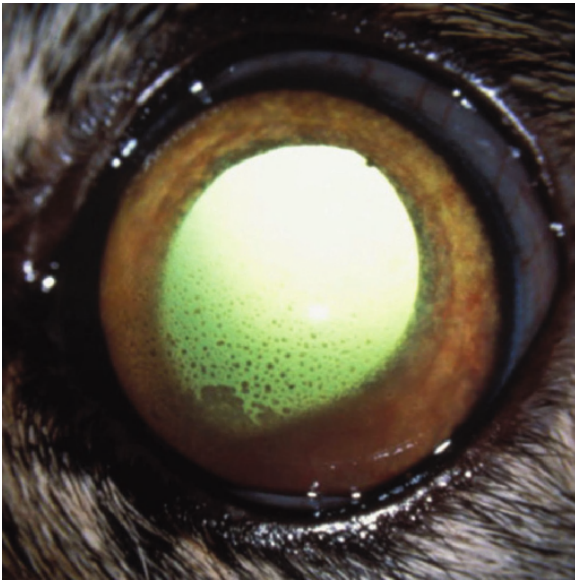


Figure 198
Anterior uveitis/Toxoplasmosis
 (8-year-old domestic shorthair)

The history was vague in this outdoor cat. Both eyes were similarly affected. Many variably sized keratic precipitates can be seen scattered on the inferior corneal endothelial surface. A moderate aqueous flare is present. The iris is swollen and iridal vessels are dilated temporally. Retinitis was present in both eyes. A FeLV test was negative; the *Toxoplasma gondii* titer was positive at greater than 1:400. Toxoplasmosis was the presumptive etiology based on the clinical signs and laboratory tests.

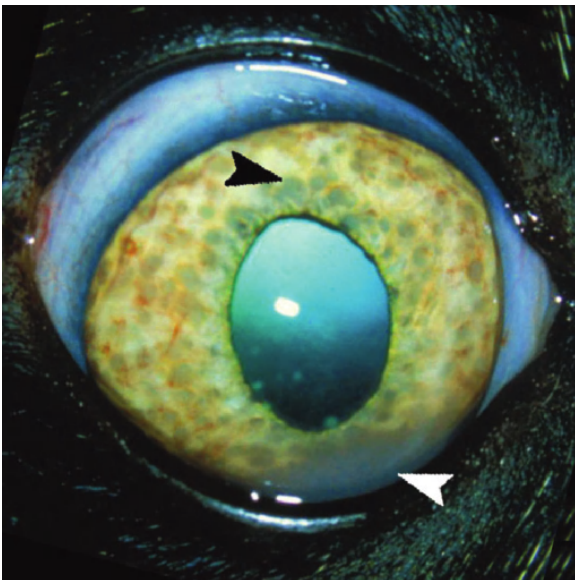


Figure 199
Anterior uveitis/Toxoplasmosis
 (4.5-year-old domestic shorthair)

For several weeks, the owner had noticed her cat squinting. Keratic precipitates and a large fibrin clot (*white arrow*) can be seen in the ventral anterior chamber. Mild aqueous flare is present, along with mild vascularization of the iris face. Small off-white circular swellings scattered across the iris face are referred to as Busacca nodules (*black arrow*) and are the result of focal accumulations of inflammatory cells. Posterior segment findings were limited to a mild hyalitis. FeLV and FIV tests were negative. One month later, the initial *Toxoplasma* IgM titer of 1:128 rose to 1:16,384.



Figure 200
Anterior uveitis/Toxoplasmosis
 (6-year-old domestic shorthair)

This indoor/outdoor cat had been squinting its right eye. The most striking ocular finding consists of multiple dark gray inflammatory nodules dotting the iris surface. Vessels can be easily seen across the temporal iris face. A mild aqueous flare was also present. The left eye was completely normal as was the posterior segment of this eye. The presumptive diagnosis was based on an IgM titer of 1:40 and an IgG titer of 1:2048 for *Toxoplasma gondii*.

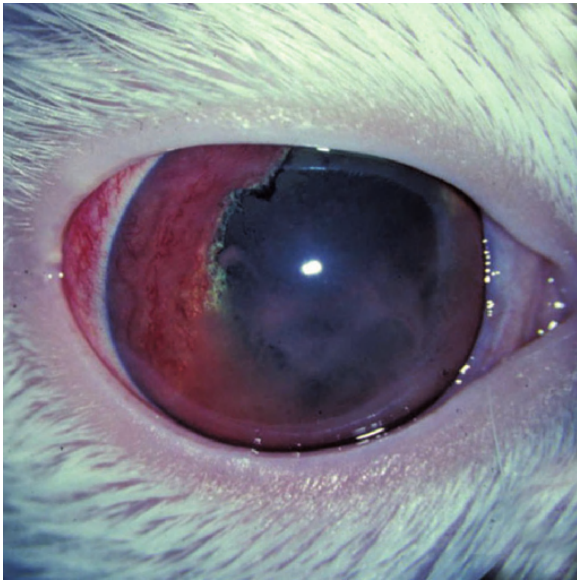


Figure 201
Anterior uveitis/Toxoplasmosis
 (11-year-old domestic shorthair)

Recently lethargic, this cat presented with a reddened right eye of 1 week's duration. The conjunctiva is notably hyperemic. Aqueous flare is present but fibrin is responsible for the ill-defined haze in the ventral anterior chamber. The intensely hyperemic iris is a product of rubeosis iridis, a fine network of new vessels branching across the iris surface. A posterior synechia alters the temporal pupillary margin. The posterior segment could not be visualized. No lesions were found in the left eye. The only positive serology was a 1:400 *Toxoplasma* titer.

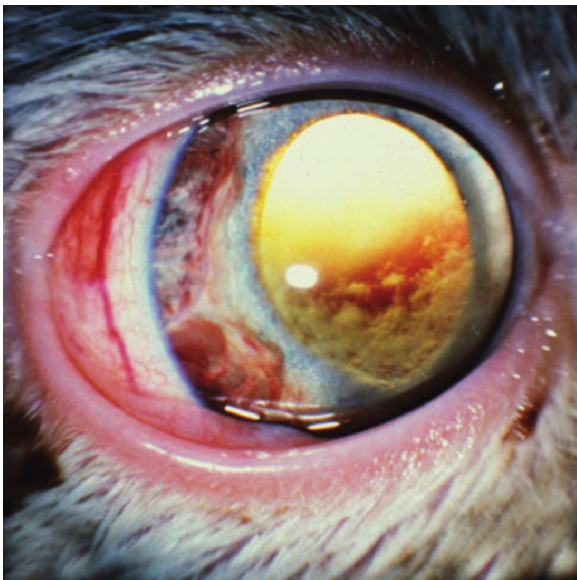


Figure 202
Anterior uveitis/Toxoplasmosis/Histoplasmosis
 (6-month-old Persian)

A veterinarian had treated this cat's bilateral anterior uveitis for 10 days before referral. Both eyes were similarly affected. A white flocculent material composed of fibrin and inflammatory cells spans the ventral pupillary space. The base of the temporal iris is effaced by prominently vascularized nodules. Focal retinal edema was seen in both eyes; a bullous retinal detachment was present in the left eye. *Toxoplasma gondii* titers were positive (IgM 1:1024; IgG 1:256). The cat developed pneumonia and was euthanatized. *Histoplasma capsulatum* was identified in the lung, liver, spleen, kidney, and iris.

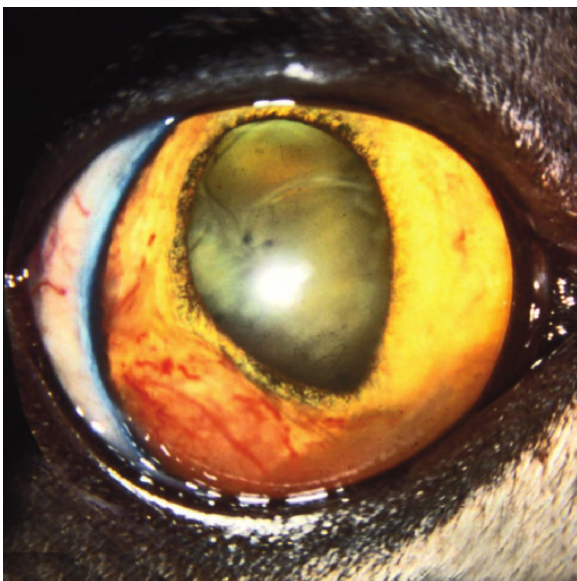


Figure 203
Anterior uveitis/Histoplasmosis
 (3-year-old domestic shorthair)

The pupil is distorted by a vascularized mass in the ventrotemporal iris. Vessels are also prominent in other iris quadrants. The ventral shadow is produced by cellular debris within the anterior chamber. Inflammatory cells in the anterior vitreous give the pupil a cloudy appearance and should be differentiated from cataract and retinal detachment. A diagnosis of histoplasmosis was confirmed on bone marrow aspirate. Ocular signs improved with therapy, but the cat was euthanatized because of systemic complications.

(Image courtesy of Art J. Quinn, DVM, DACVO.)



Figure 204
Anterior uveitis/Histoplasmosis
(8-year-old domestic shorthair)

This farm cat was presented when the owners noted several skin lesions along with squinting of both eyes. The conjunctiva is chemotic and hyperemic. The dark area at the limbus (arrow) is due to corneal edema and vascularization of the underlying iris. Mild aqueous flare is present. The pupil has been dilated to examine the fundus (see Figure 312). The left eye was similarly affected, but also had a large lid granuloma (see Figure 68). *Histoplasma capsulatum* organisms were recovered from the skin lesions, oral ulcers, and the eye. Serology was positive for FeLV but negative for histoplasmosis.

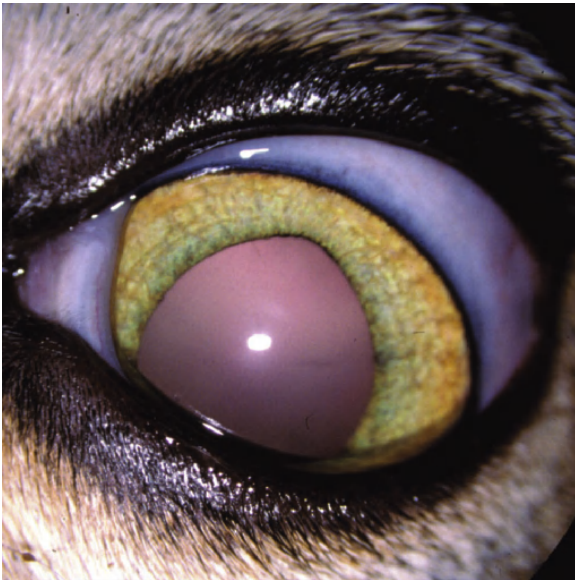


Figure 205
Anterior uveitis/Histoplasmosis
(2-year-old domestic shorthair)

At presentation, this cat had a 5-month history of carpal pain and lameness and had now been blind for 4 weeks. The left eye demonstrates faint aqueous flare, a moderately dilated, nonresponsive pupil, and subtle leukocoria associated with severe retinal disease. Anterior uveitis and a diffuse cataract prevented posterior segment examination of the opposite eye. Serologic tests were negative for common mycoses, toxoplasmosis, FIV, FeLV, and *Bartonella*. Histopathologically, lesions in the right eye were characterized as idiopathic lymphogranulomatous panuveitis with retinitis. No etiologic agents were identified. Progression of the uveitis can be seen in Figure 206.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 206
Anterior uveitis/Histoplasmosis
(2-year-old domestic shorthair)

This is the same eye as that depicted in Figure 205 approximately 6 weeks later. The iris is severely swollen with posterior synechia that limit pupillary size and distort its shape. The intense red color is attributed to free blood that coats the corneal endothelium and iris. In light of the severe hemorrhagic anterior uveitis, this eye was also enucleated. Histopathology results were similar to findings in the right eye, with no apparent etiology. Two months later, a fine-needle aspirate of a swollen submandibular lymph node yielded yeast-like organisms within macrophages compatible with *Histoplasma capsulatum*. This case is compatible with Presumed Ocular Histoplasmosis Syndrome (POHS) reported in man.

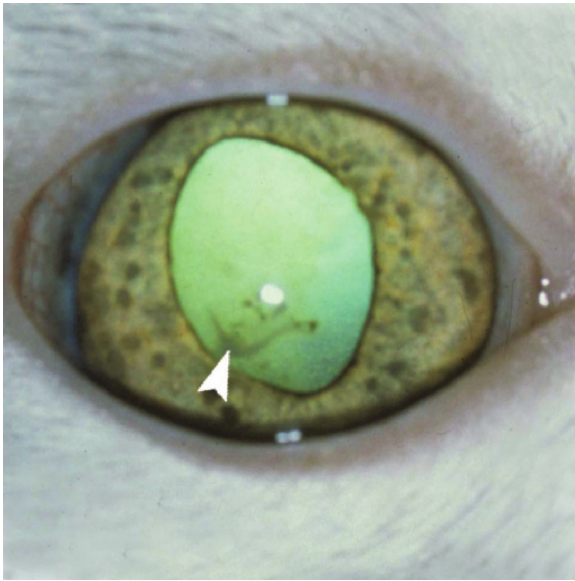


Figure 207
Anterior uveitis/Cryptococcosis
(11-year-old domestic shorthair)

Primary complaints in this case included an enlarged right eye and a tendency to circle to the right. The globe was slightly enlarged in association with a mild intraocular pressure elevation. Faint aqueous flare is present. A fibrin clot is seen (arrow) on the lens surface. Many dark focal inflammatory nodules are present on the iris surface. The tapetal reflection and retinal detail are decreased by inflammatory cells within the anterior vitreous. Focal retinal edema was present along the retinal vessels of the opposite eye (see Figure 314). Serology for FeLV, FIV, and toxoplasmosis were negative. The titer for *Cryptococcus* spp antigen was positive at 1:1024.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

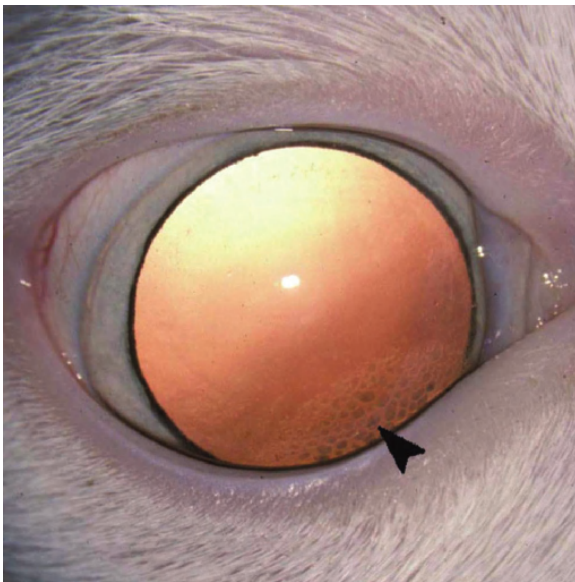


Figure 208
Anterior uveitis/Cryptococcosis
(5-year-old domestic shorthair)

Squinting called attention to this cat's bilateral corneal cloudiness. The normally blue iris is gray in color and mildly swollen. A faint aqueous flare accompanies keratic precipitates seen inferiorly (arrow). Bilateral chorioretinitis was also present (see Figure 317). The only positive serology was a 1:1024 titer for *Cryptococcus neoformans* antigen.

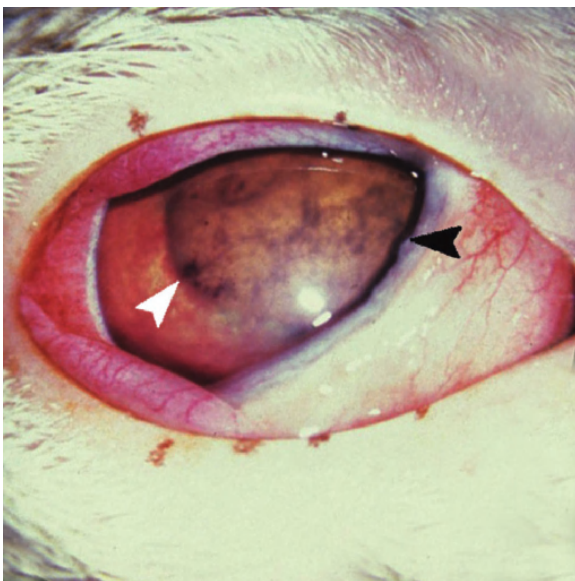


Figure 209
Anterior uveitis/Blastomycosis
(8-year-old domestic shorthair)

The cat was referred when he failed to respond to therapy for severe unilateral anterior uveitis and secondary glaucoma. The right nictitans protrudes as a nonspecific sign of ocular pain; its free margin is identified by the black arrow. The conjunctiva is edematous and severely hyperemic. Fibrin within the anterior chamber (white arrow) obscures the pupil. Temporal iris vessels are prominent. The opposite eye was normal. A thoracic mass was identified radiographically. Blastomycosis was diagnosed when organisms were identified cytologically within a skin nodule on the muzzle. Interestingly, serology for *Blastomyces dermatitidis* was negative using the agar-gel immunodiffusion method.

(Image courtesy of Paul Miller, DVM, DACVO.)

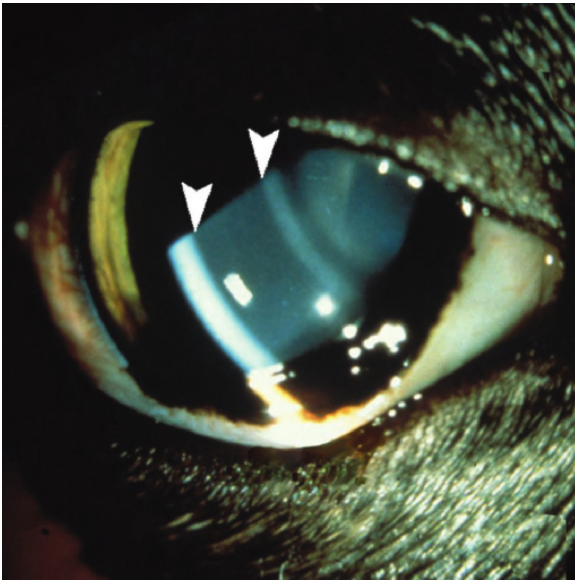


Figure 210
Anterior uveitis/Blastomycosis
 (10-year-old domestic shorthair)

Toxoplasma-associated anterior uveitis had been diagnosed on the basis of positive serology, but the cat was referred when no improvement was seen following appropriate therapy. Lesions were confined to the right eye. The anterior chamber (between the *white arrows*) appears cloudy in the slit lamp image because of an increase in aqueous protein, i.e., flare. A retinal detachment was also present in this eye. Blastomycosis was diagnosed when organisms were identified in a subretinal aspirate.

(Image courtesy of Paul Miller, DVM, DACVO.)

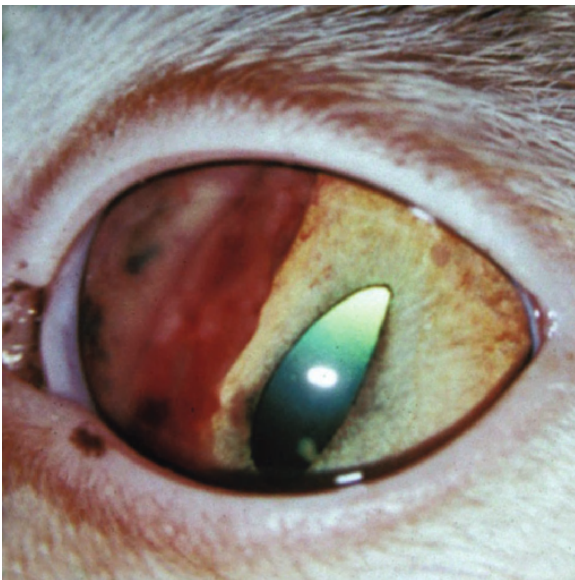


Figure 211
Anterior uveitis/Coccidioidomycosis
 (2-year-old domestic shorthair)

Referred for evaluation of a presumed iris tumor, this cat also had a nail bed infection affecting one paw. Ocular lesions were unilateral and restricted to the anterior segment of the left eye. A large vascularized mass effaces the medial aspect of the iris. Mild aqueous flare and scattered areas of iris vascularization are also present. Histopathology of the globe and nail identified *Coccidioides immitis* spherules within areas of pyogranulomatous inflammation.

(Image courtesy of Paul M. Barrett, DVM, DACVO.)

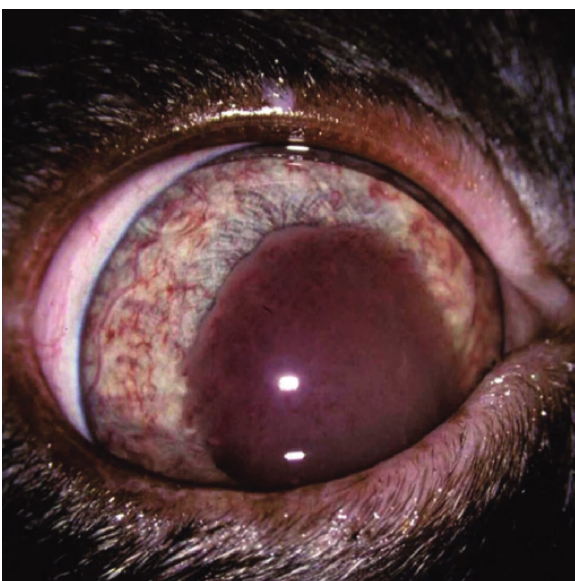


Figure 212
Anterior uveitis/Polymicrobial etiology
 (11-year-old Himalayan)

This patient arrived with a history of weight loss, coupled with the onset of anterior uveitis 4 days beforehand. Severe rubeosis iridis is present, altering the color of the normally blue iris. A large hemorrhagic clot completely occludes the pupil. Pharmacologic dilation afforded a limited view of the posterior segment, where severe chorioretinitis obscured fundus detail. The left eye was normal. Tests for FeLV, FIV, and all common mycoses were negative. Serology for *Bartonella* spp was positive, as was an IgM/IgG titer for toxoplasmosis at 1:1024. Histopathology of the enucleated eye revealed a multifocal lymphoplasmacytic and pyogranulomatous uveitis and retinitis, with yeast-like organisms consistent with *Histoplasma capsulatum*. All three infectious agents were targeted therapeutically. Two months after initial examination, the cat developed mild anterior uveitis in the left eye. Fungal serology remained negative. The post-treatment *Toxoplasma* titer decreased to 1:256 while the *Bartonella* titer decreased fourfold.

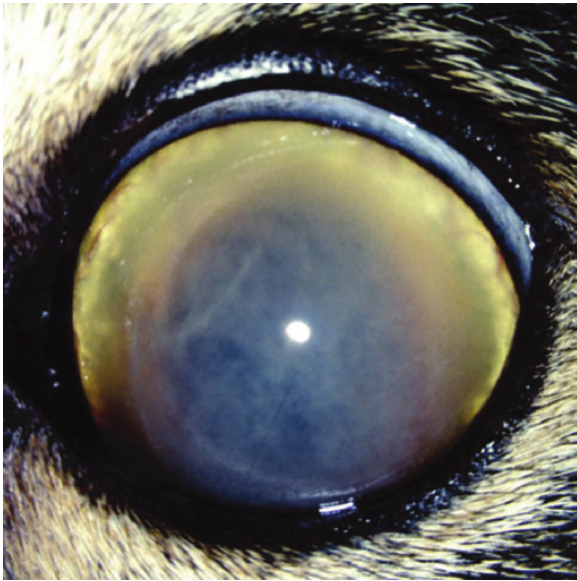


Figure 213
Anterior uveitis/Bartonellosis
(15-year-old domestic shorthair)

The owner noticed the cat squinting both eyes for 2 days prior to examination. Ocular lesions were similar bilaterally. A large gray fibrinous clot in the anterior chamber obscures iris and pupillary detail. Although difficult to view, the posterior segment appeared normal. *Bartonella henselae* was the only infectious agent implicated serologically.

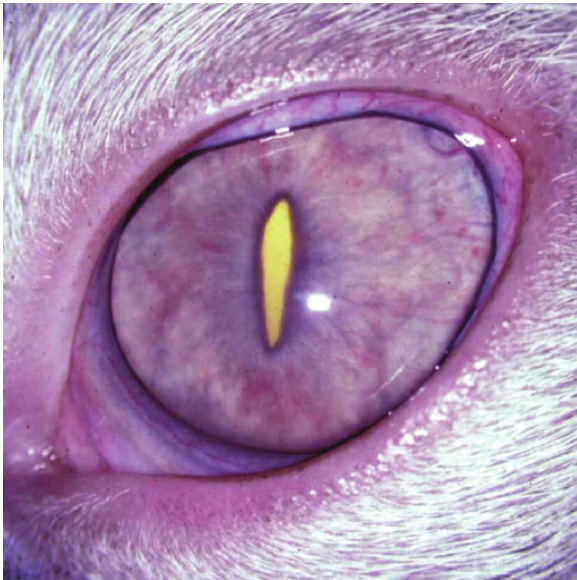


Figure 214
Anterior uveitis/Bartonellosis
(6-month-old Siamese)

Bartonella spp had been serologically implicated in a previous episode of unilateral anterior uveitis and pinnae dermatitis in this kitten. The skin lesions were compatible with bacillary angiomatosis due to Bartonellosis described in humans. This photograph of the once normal left eye was taken 1 month after the initial diagnosis, 2 weeks after the termination of a 10-day treatment regimen, and 24 hours following onychectomy and ovariectomy. The normally blue iris is swollen and flesh-colored. Moderate aqueous flare accompanies severe iris vessel engorgement and a miotic pupil. The previously inflamed right eye and pinnae were normal on this day. All evidence of anterior uveitis resolved within 5 days, using only an oral antibiotic selected for its efficacy against *Bartonella* spp.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

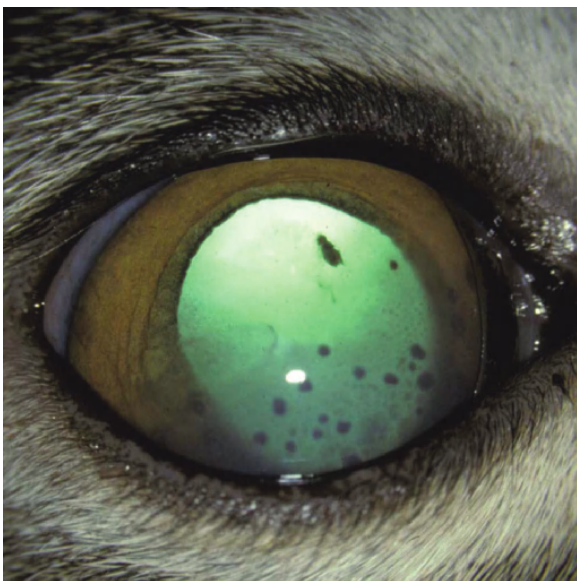


Figure 215
Anterior uveitis/Bartonellosis
(7-month-old domestic shorthair)

Lethargy and fever preceded the onset of bilateral blepharospasm in this young adult patient. Clinical findings were similar in both eyes. There is a diffusely swollen iris, moderate aqueous flare, and numerous keratic precipitates, the larger of which appear dark against the tapetal reflection. Of all serology submitted, only that for *Bartonella henselae* was positive.

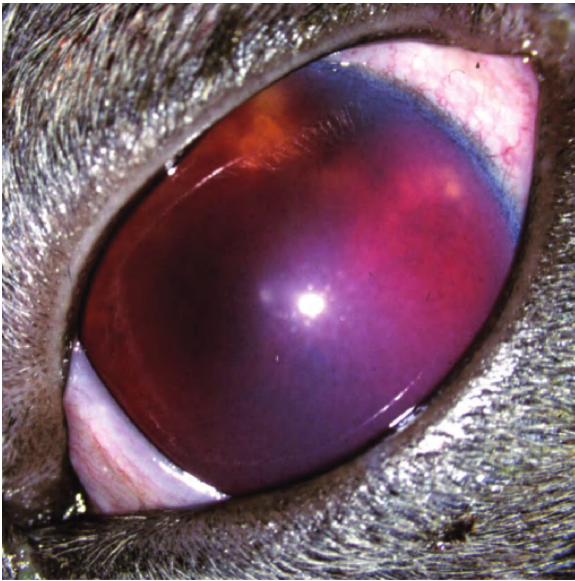


Figure 216
Anterior uveitis/Bartonellosis
 (1-year-old domestic shorthair)

The owner felt this bilateral condition had progressed quickly over the last 5 days. Diffusely dispersed red blood cells within the anterior chamber obscure intraocular detail. The pupil was miotic at presentation but dilated in response to medication. The only significant laboratory finding was a positive serologic test for *Bartonella henselae*.

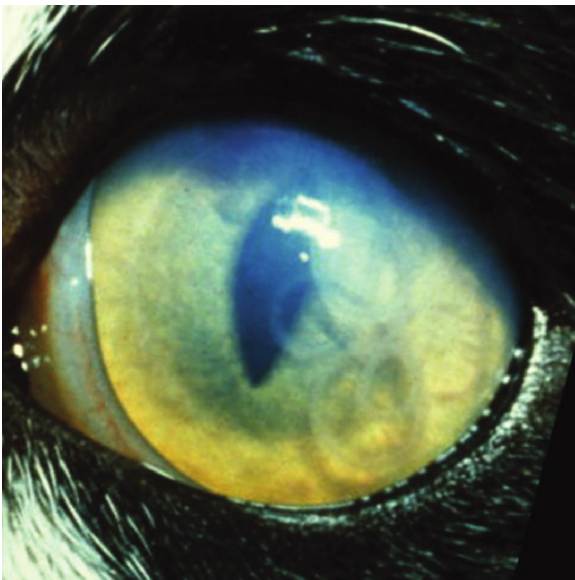


Figure 217
Anterior uveitis/Dirofilariasis
 (2.5-year-old domestic shorthair)

A viable immature adult *Dirofilaria immitis* can be seen in the temporal anterior chamber. Mild corneal edema is present, a sign attributed to altered endothelial function. The parasite's role includes both physical damage to the endothelium as well as toxic effects of its metabolic by-products.

(Image courtesy of Ben W. Johnson, DVM, DACVO.)

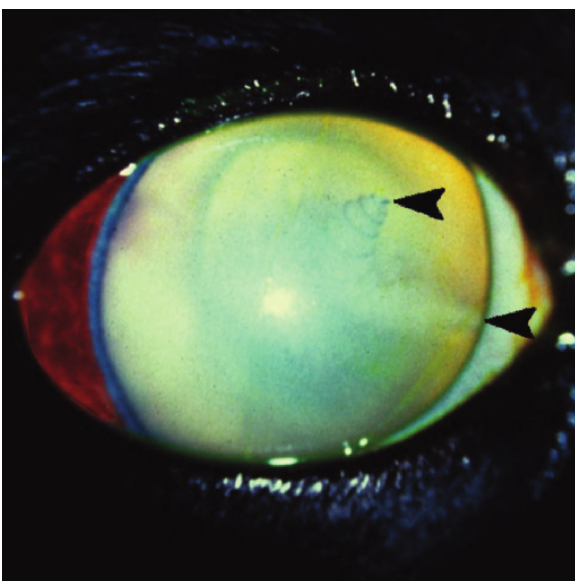


Figure 218
Anterior uveitis/Myiasis
 (1-year-old domestic shorthair)

A cloudy eye was noted in conjunction with the acute onset of tetraparesis. Subconjunctival hemorrhage accounts for the intense red coloration of the temporal conjunctiva. The cornea is diffusely edematous, almost obscuring an intraocular *Cuterebra* larva (arrows). Anterior chamber detail is further obscured by fibrin and cellular debris. The parasite was identified following its surgical removal from the anterior chamber.

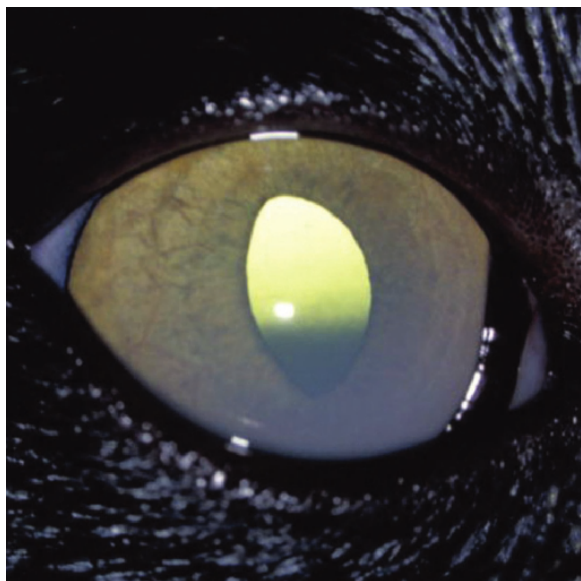


Figure 219
Anterior uveitis/Lipid flare
(9-month-old domestic shorthair)

Presented due to the rapid onset of cloudy eyes, this cat was diagnosed with a mild, bilateral anterior uveitis. A gray haze obscures iris detail, especially in the ventral half of the anterior chamber. The opacity is the result of lipid-laden aqueous, not corneal edema. Lipemia retinalis was also present bilaterally, similar to that in Figure 368. The cat was diagnosed with diabetes mellitus, with an initial blood glucose of 460 mg/dl. The cause of the anterior uveitis was not determined.

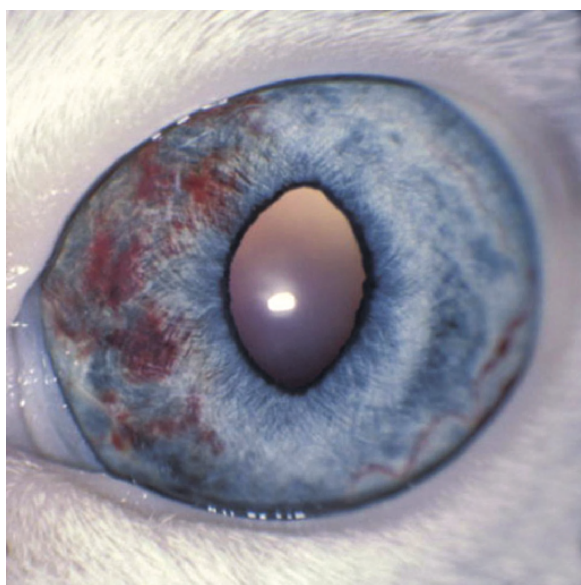


Figure 220
Anterior uveitis/Systemic hypertension
(16.5-year-old domestic shorthair)

Owners noticed red spots recently developing in the left eye. The cat had a history of chronic renal disease but no previous ocular problems. Multiple, poorly defined red foci in the medial iris are the result of hemorrhage within the iris stroma. A lateral bullous retinal detachment was also present in the same eye. The right eye was normal. The mean systolic blood pressure was 220 mm Hg.



Figure 221
Anterior uveitis/Systemic hypertension
(14-year-old domestic shorthair)

This cat was presented with acute complaints of decreased vision and redness in both eyes. Hyphema creates the dark red color within the ventral anterior chamber. The outline of a darker blood clot can be seen just emerging from the hemorrhage over the pupillary space. The retina was partially detached, with subretinal and intraretinal hemorrhage. The right eye had a total hyphema preventing visualization of the posterior segment. The cat's mean systolic blood pressure was greater than 300 mm Hg.

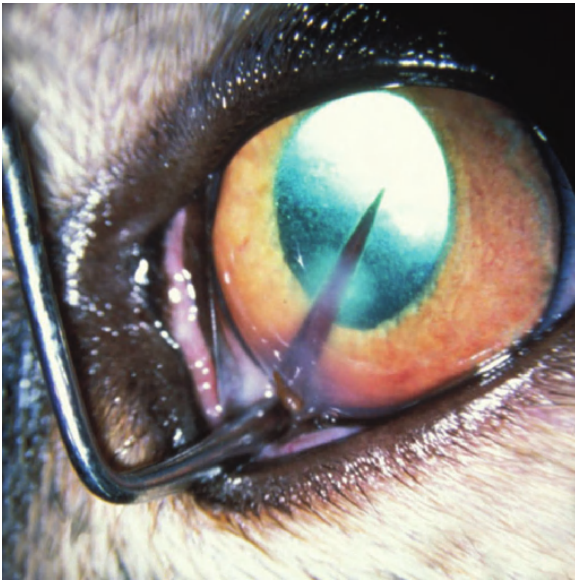


Figure 222
Anterior uveitis/Foreign body
 (2-year-old domestic shorthair)

Several hours after acute onset of ocular pain, this cat was presented for evaluation. A large thorn has penetrated the cornea at the limbus and has also impaled the lens. Corneal edema is present, along with aqueous flare. The iris is swollen and severely hyperemic. This type of lens damage may set the stage for a future post-traumatic sarcoma.

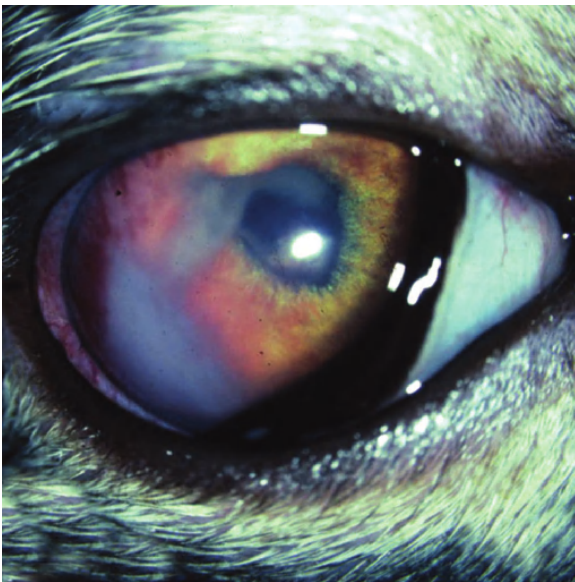


Figure 223
Anterior uveitis/Trauma
 (1-year-old domestic shorthair)

This kitten was notorious for playing with sewing needles and was presented for evaluation of an acutely painful, red and cloudy right eye. The temporal cornea is opaque due to severe edema and deep vascularization. Moderate aqueous flare and fibrin can be seen in the anterior chamber, the latter extending from the temporal pupil margin to the area of edema. Posterior synechia contribute to the small irregular pupil. Severe iritis with neovascularization of the iris surface is most notable temporally. A diffusely opaque lens obscured posterior segment detail. Skull radiographs identified a needle within the orbit. The needle was found lodged in the inferior temporal globe during enucleation.



Figure 224
Septic lens implantation
 (13-year-old domestic shorthair)

This cat was seen 1 year ago with a full-thickness corneal scar, an incipient cataract and a mild uveitis, all attributed to a suspected penetrating injury. Now there is marked conjunctival inflammation surrounding a buphthalmic globe. Iris bombé is easily recognized temporally, where the green iris balloons into the anterior chamber. Hypopyon (arrow) and a reddish brown fibrinous sheet occlude the pupil. IOP was elevated to 43 mm Hg. Histopathologically, gram-positive cocci were found within the lens, accompanied by severe neutrophilic, lymphocytic and plasmacytic infiltrates throughout the globe.

(Image courtesy of Jean Stiles, DVM, MS, DACVO.)

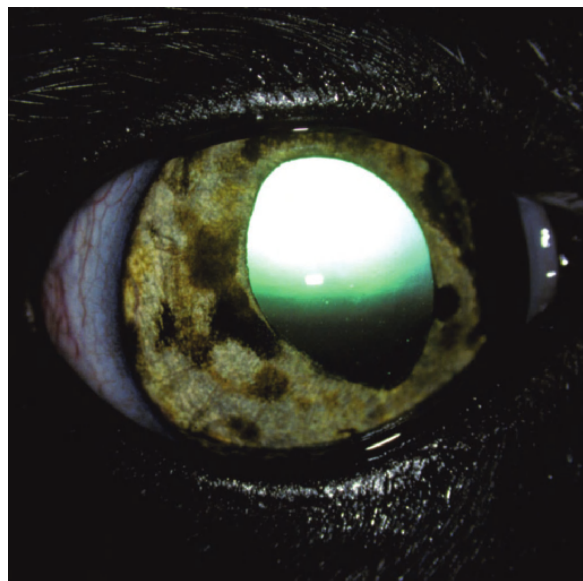


Figure 225
Neoplasia/Feline diffuse iris melanoma
(9-year-old domestic shorthair)

The owners noticed progressive darkening of the iris, but comfort and vision remained unchanged. Multiple flat, pigmented foci are randomly scattered across the iris face. No exfoliated pigment cells were seen within the aqueous or deposited onto the anterior lens capsule. Progression of the pigmentation is illustrated in Figure 226.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)

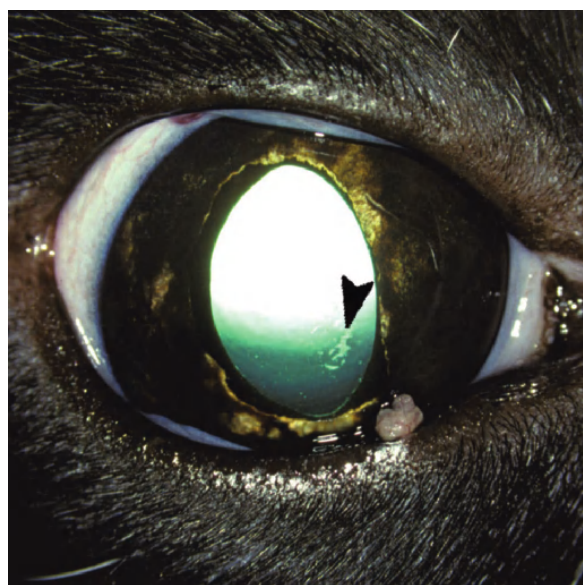


Figure 226
Neoplasia/Feline diffuse iris melanoma
(12.5-year-old domestic shorthair)

This is the same eye as that in Figure 225, examined 3.5 years later. The iris is now diffusely pigmented. Iris thickening is also present in some areas, although the change is not easily appreciated in the figure. Exfoliated cells are present on the anterior lens capsule (arrow). An unrelated papillomatous mass is seen on the lower lid margin.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 227
Neoplasia/Amelanotic melanoma
(4-year-old domestic shorthair)

The owners noticed a red spot in the eye 10 days prior to this photograph. A well-delineated dark red mass can be seen at the base of the iris. Mild aqueous flare accounts for the hazy tapetal reflection. Histopathologic diagnosis was an amelanotic melanoma.

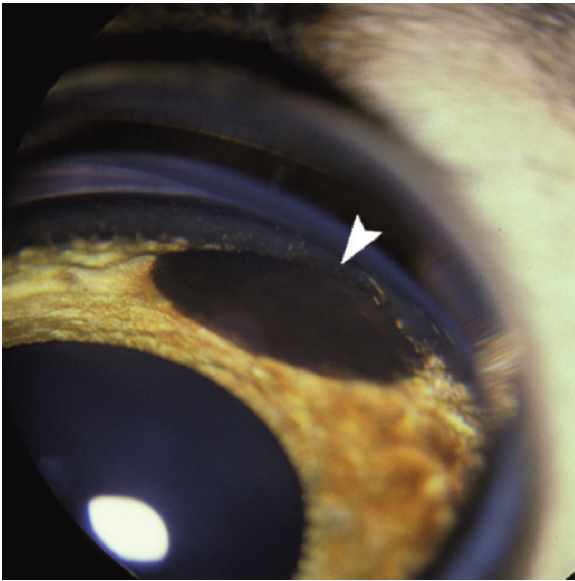


Figure 228
Neoplasia/Melanoma
 (1.5-year-old domestic shorthair)

The owner noticed a dark spot in the eye that had gradually increased in size over the past 6 months. This gonioscopic view shows a well-defined pigmented mass that rises slightly above the surrounding iris. The pigmented tissue extends into the drainage angle and onto the pectinate ligaments (*arrow*).

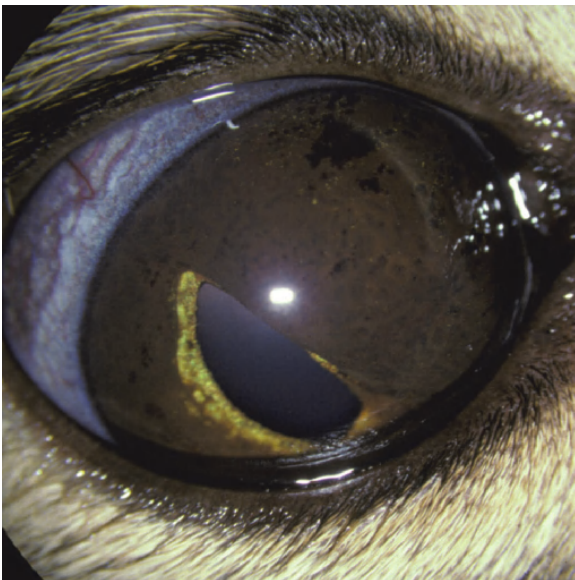


Figure 229
Neoplasia/Feline diffuse iris melanoma
 (9-year-old domestic shorthair)

The owner was unaware of the duration of a color change in the right eye. A heavily pigmented mass fills two-thirds of the anterior chamber and extends into the temporal iridocorneal angle. Only a small area of yellow iris remains along the temporal pupillary margin. The mass could also be seen extending into the posterior chamber and infiltrating the nasal ciliary processes. On histopathology, neoplastic cells were widespread in the anterior uvea while the sclera, retina, and optic nerve were largely spared.



Figure 230
Neoplasia/Amelanotic melanoma
 (3-year-old Siamese)

According to the owner, the cornea and iris in this cat had become vascularized over a 2-week period. The superior temporal cornea is edematous and deeply vascularized. The adjacent scleral vessels are also severely congested. The base of the temporal iris is thickened, prominently vascularized, and its background pale in comparison to the normal blue color. Retinal vessels (*arrow*) are easily seen through the pupil, an indication of a complete retinal detachment caused by subretinal fluid accumulation. Histopathologic diagnosis was iris melanoma, with extension into the ciliary body, choroid, and sclera.

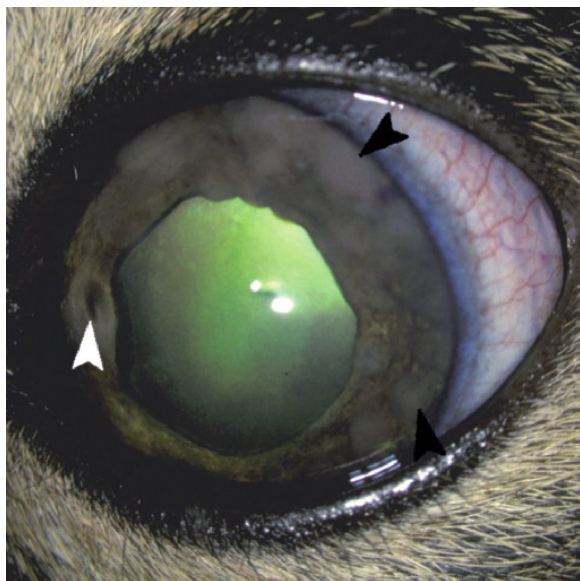


Figure 231
Neoplasia/ Feline diffuse iris melanoma
 (9.5-year-old domestic shorthair)

This cat was presented with a 10-day history of squinting and redness of the left eye. The iris is diffusely discolored. Mild aqueous flare accompanies subtle stippling on the anterior lens capsule that suggests cellular debris. The pupil is irregularly shaped, with increased pigmentation along its margin. Medial iris synechia (both anterior and posterior) are indicated by the white arrow. Multifocal ill-defined cottony gray nodules are scattered throughout the iris, creating an irregular surface contour. The diagnosis was confirmed by histopathology.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)

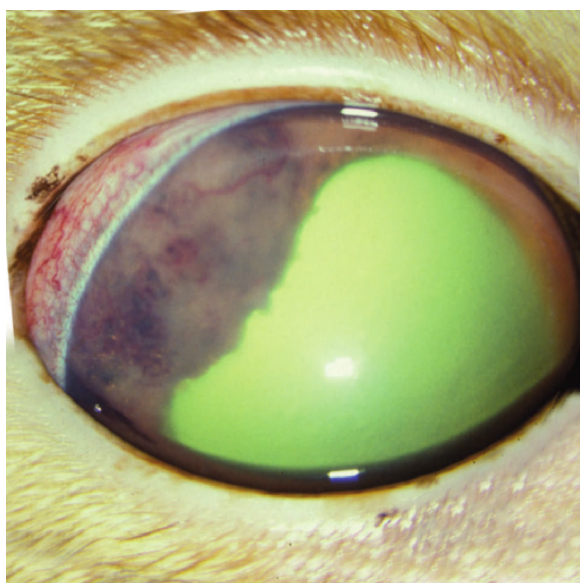


Figure 232
Neoplasia/Amelanotic melanoma
 (12-year-old domestic shorthair)

The owner had been aware of the patient's squinting and cloudiness for 1 week. There is diffuse corneal edema and moderate aqueous flare, both contributing to the hazy view of an intraocular mass. The pupil is dilated and nonresponsive. A vascularized and variably colored flocculent mass can be seen in the temporal and superior iris. Intraocular pressure was elevated to 36 mm Hg. On histopathology, the mass consisted of mainly nonpigmented neoplastic cells, some of which were found in the scleral venous plexus.

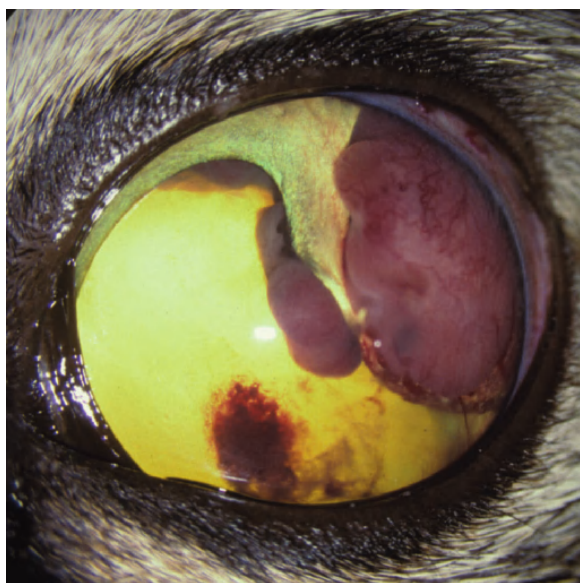


Figure 233
Neoplasia/Iridociliary adenoma
 (9-year-old domestic longhair)

This vascularized, dark pink mass eroded through the iris base and adjacent drainage angle and now extends from the posterior chamber into the pupillary space. Fibrin and clotted blood are present in the ventral anterior chamber. Histopathology confirmed the diagnosis. A tumor also developed in the second eye, depicted in Figure 234.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 234
Neoplasia/Iridociliary adenoma
 (17-year-old domestic longhair)

This is the right eye of the cat seen in Figure 233, examined 8 years later. Its left eye had been enucleated because of an extensive iridociliary adenoma. The owners noticed the cat squinting for several days prior to examination. Prior to dilation of the pupil, the only obvious abnormality was a blood-tinged fibrinous exudate in the anterior chamber. Following dilation, a dark pink, irregular mass can be seen originating from the posterior surface of the iris and the ciliary body.

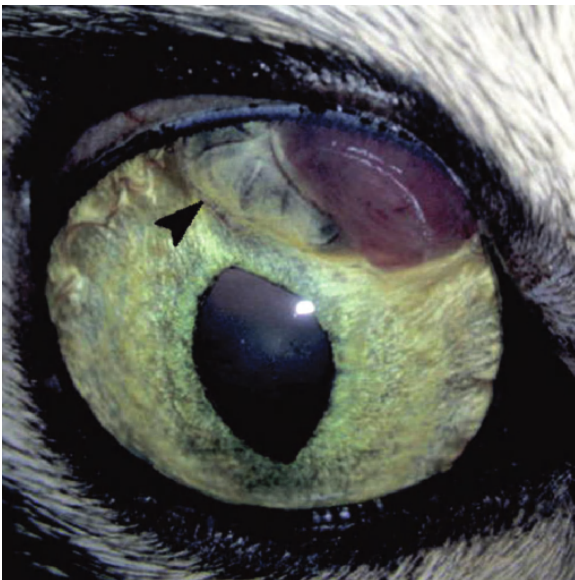


Figure 235
Neoplasia/Iridociliary adenoma
 (12-year-old domestic mediumhair)

The owners only recently noticed a red color developing in their cat's iris. There were no subjective signs of pain. The cornea and aqueous humor remain clear. A dark red neoplasm penetrates the superior iris base. The adjacent 12-o'clock iris (arrow) is elevated and its surface architecture altered by the proliferating mass, but the tumor has not yet broken through the anterior surface in this region.

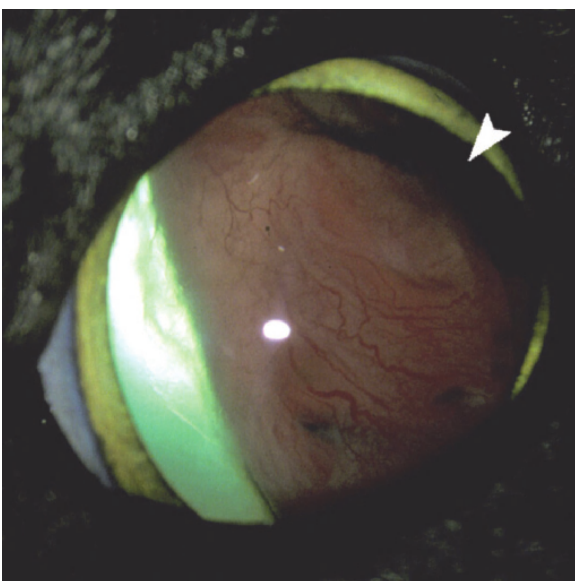


Figure 236
Neoplasia/Iridociliary adenoma
 (10-year-old domestic shorthair)

This patient's pupil has been dilated for the examination. A massive well-vascularized tumor originates in the posterior chamber. Mild fibrin adjacent to the mass distorts what little can be seen of the tapetal reflection. Pigment (arrow) migrating from the posterior iris or ciliary body discolors the peripheral tumor surface. Surprisingly, there is minimal discomfort and only subtle uveitis associated with the tumor.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrung, McLellan, Albert. Elsevier Limited, 2010.)



Figure 237
Neoplasia/Spindle cell tumor
 (12-year-old domestic shorthair)

The owners first noted this enlarging mass 5 days prior to the photograph. A nodular nonpigmented mass in the medial iris is mildly vascularized. The adjacent pupil is dyscoric, with pigment migration and proliferation at the pupil margin. There were no other ocular abnormalities or signs of inflammation. A fine-needle aspirate failed to yield a definitive diagnosis. The cat was reexamined 2 years later with a significant increase in the extent of iris involvement. Secondary abnormalities included corneal edema, retinal and optic nerve atrophy and secondary glaucoma. On histopathology, the tumor was diagnosed as a Schwann cell variant of a peripheral nerve sheath tumor, similar to iridal spindle cell tumors recently described in the dog.

(Image courtesy of Paige M. Evans, DVM; Evans PM, Lynch GI, Dubielzig RR: Anterior uveal spindle cell tumor in a cat. *Vet Ophthalmol* 13(6):387-390, 2010.)

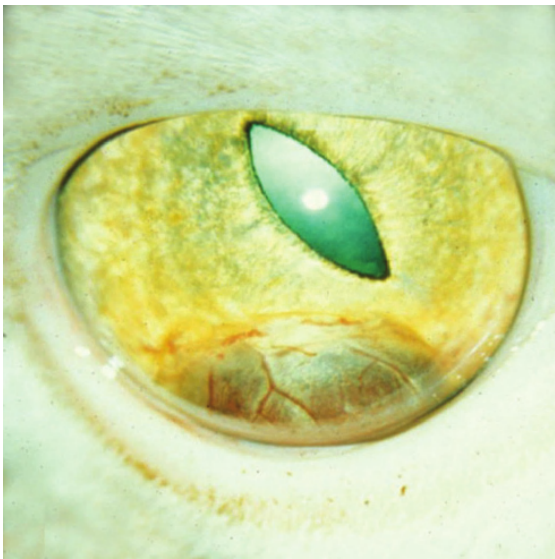


Figure 238
Neoplasia/Iridociliary leiomyoma
 (adult domestic shorthair)

The owners were concerned about a change in iris color, noted a few days prior to examination. No pain or discharge had been noted. The ventrotemporal iris is relatively featureless and gray in color. Compare the surface texture of this area with that of the normal iris. Iris vessels are prominent at the lesion's dorsal margin and throughout the affected area. The iris base is displaced forward, compromising the anterior chamber and iridocorneal angle. Histopathologically, a ciliary body leiomyoma encroached upon the adjacent iris.

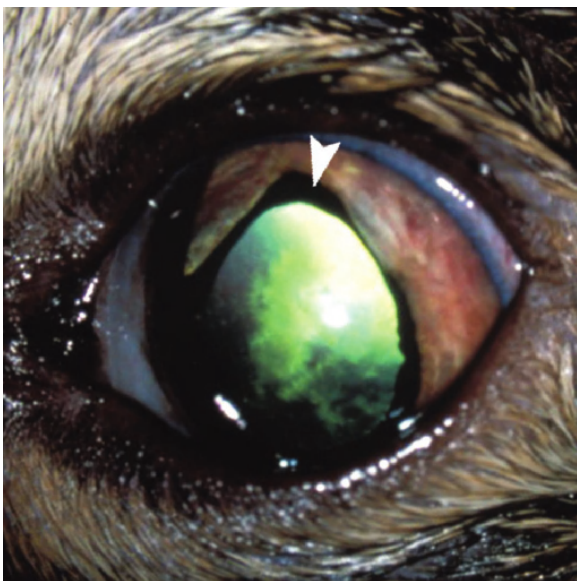


Figure 239
Neoplasia/Iridociliary leiomyosarcoma
 (8-year-old domestic shorthair)

For 1 month, the owner had noticed a mild squint, with progressive depigmentation and swelling of the cat's iris. Normal iris structure is replaced peripherally by an elevated vascularized tissue. The pupillary iris is dark (arrow) and adheres to the lens. Axial anterior and posterior cortical cataracts are present. Direct pupillary light response (PLR) was negative, but the indirect PLR was positive. The fundus was normal. The cellular infiltrate in the iris and ciliary body was identified as a leiomyosarcoma.

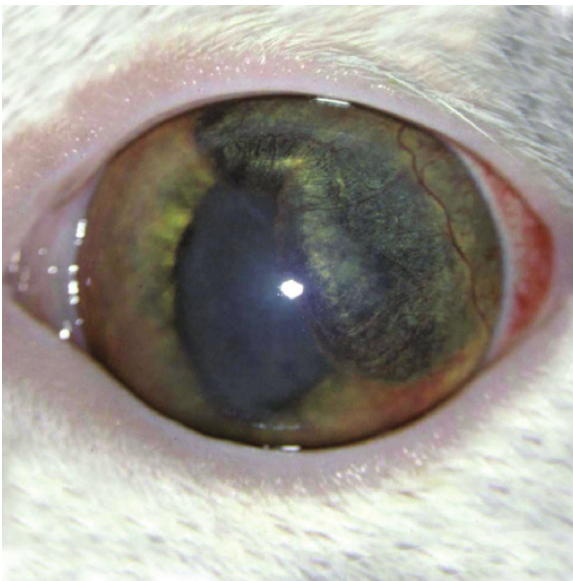


Figure 240
Neoplasia/Iridociliary leiomyosarcoma
 (12-year-old domestic shorthair)

A change in iris color and the onset of squinting were noticed 1 week prior to presentation. From 11 o'clock to 4 o'clock, the iris appears dark gray and swollen, its surface extending well into the anterior chamber. Rubeosis causes the remaining iris to appear hyperemic. Its surface has a velvety appearance. Posterior synechia are accompanied by pigment hypertrophy along the pupillary margin. A moderate aqueous flare and diffuse fibrin formation alter anterior chamber clarity. The posterior segment could not be clearly visualized.



Figure 241
Neoplasia/Metastatic mammary adenocarcinoma
 (16-year-old Siamese)

The cat began to squint its right eye a few days after surgical resection of multiple ulcerated mammary masses. Despite the presence of a mild anterior uveitis, the owner elected to observe the eye during the cat's post-operative convalescence. Over the course of 3 weeks, the eye became increasingly painful, as indicated by the prominent nictitans. A solid pale intraocular mass presses against the cornea at the temporal limbus. Intraocular detail is obscured by hemorrhage and fibrin. Metastatic mammary adenocarcinoma was confirmed histopathologically.

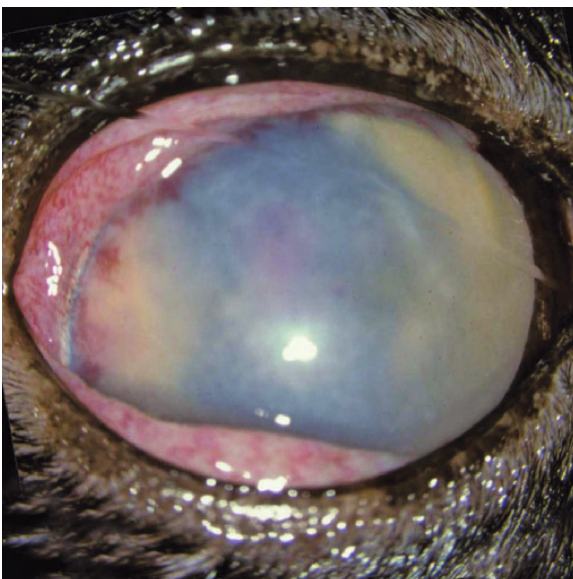


Figure 242
Neoplasia/Squamous cell carcinoma
 (13-year-old domestic longhair)

Recently the eye had been becoming progressively cloudier and then acutely painful. The conjunctiva is hyperemic and chemotic. The severe corneal edema and perilimbal vascularization limit thorough evaluation of the anterior segment and fundus. Severe aqueous flare and fibrin also obscure intraocular detail. Intraocular pressure was moderately elevated. On ultrasound, the retina was totally detached. On histopathology, tumor cells were found in blood vessels throughout the entire uvea and into orbital tissue, leading to a diagnosis of metastatic squamous cell carcinoma. A primary site was not identified.

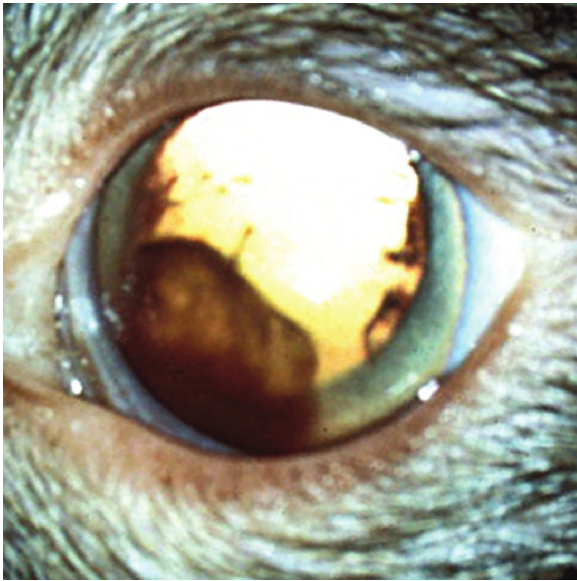


Figure 243
Neoplasia/Metastatic hemangiosarcoma
(1.5-year-old Siamese)

This cat was presented with a history of acute onset of lethargy and a red left eye. Ocular lesions were restricted to the anterior segment of the left eye and the posterior segment of the right (see Figure 377). A large, organized clot is present in the anterior chamber. Dark red tissue can be seen extending from the back of the iris through the dilated pupil. The cat died soon after examination and only the eyes were examined histopathologically. Lesions were due to metastatic hemangiosarcoma.

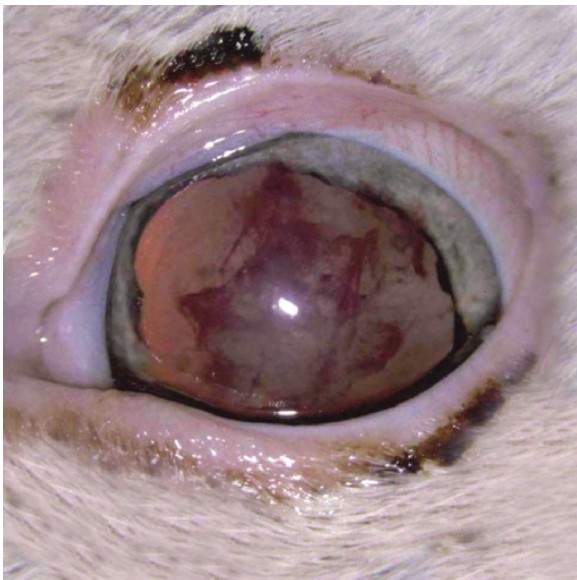


Figure 244
Neoplasia/Primitive neural epithelial tumor
(15-year-old domestic shorthair)

This cat was initially presented and treated for an anterior uveitis characterized by severe hyphema, miosis, and posterior synechia. The posterior segment was difficult to visualize at that time. The only positive laboratory result was a positive serologic test for *Bartonella henselae*. One month later, at the time of this photograph, the resting pupil is dilated and an irregularly shaped blood clot is centered in the pupillary space. It was now possible to detect a retinal detachment and associated atrophy. The globe was enucleated and submitted for histopathology. A mild lymphoplasmacytic inflammatory infiltrate was identified throughout the uvea. A neoplasm was found adjacent to the optic disc, extending the full thickness of the choroid and into the detached retina.

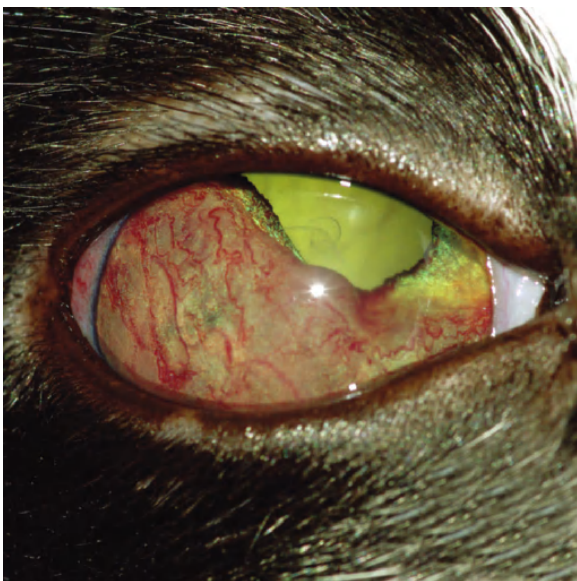


Figure 245
Neoplasia/Post-traumatic sarcoma
(8-year-old domestic shorthair)

This cat was adopted as a young adult. Ocular history prior to that time was unknown. No problems were seen until 4 weeks ago when the owner noted a prominent third eyelid and a localized change in iris color. By the time of examination, the eye had changed dramatically. A flesh-colored, highly vascularized mass effaces the temporal and ventral iris, distorting the pupil shape. Lens vacuoles are highlighted by the tapetal reflection, the latter dulled by inflammatory debris in the anterior vitreous and the presence of an exudative retinal detachment that spared only the mid-tapetal region of the fundus. No lesions suggestive of prior injury were identified. The diagnosis was made following enucleation and histopathologic examination.



Figure 246
Neoplasia/Post-traumatic sarcoma
(12-year-old domestic shorthair)

Intermittent episodes of redness and squinting were reported following onset of a cataract at age 4. The owners seldom applied topical anti-inflammatory agents prescribed to treat lens-induced uveitis. Three years later, the owners relocated and presented the patient for examination. Findings on initial exam included corneal scarring, iritis, and a resorbing cataract. The patient was next seen 2 years later with a blind, painful eye attributed to active uveitis and a seclused pupil that prevented fundus examination. The owners declined enucleation. Eight months later, a fibrinoheorrhagic clot now obscures much of the inflamed iris. Perilimbal corneal scarring is present medially. Intraocular pressure is less than 5 mm Hg. Histopathologic examination of the enucleated globe confirmed the diagnosis. The cat was euthanized 7 months later when a sarcoma developed in the orbit.

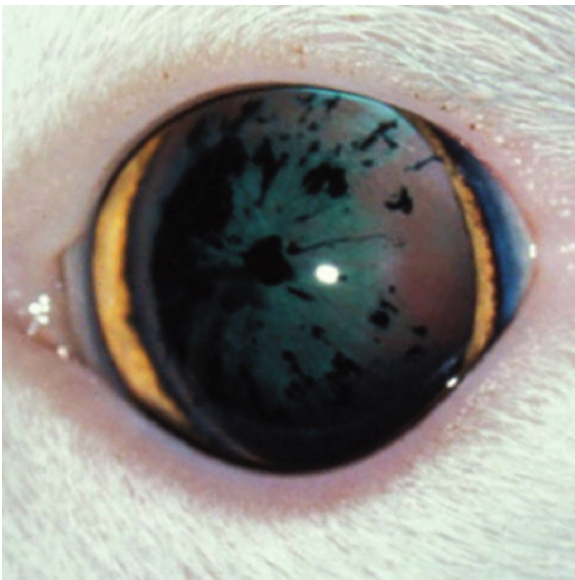


Figure 247
Post-inflammatory capsular cataract
(1-year-old domestic shorthair)

Several months prior to the photograph, this cat was treated for an anterior uveitis of undetermined etiology. Through the dilated pupil, large amounts of pigment can be seen deposited on the anterior lens capsule. There is also an anterior capsular and cortical cataract that further obscures the tapetal reflection.



Figure 248
Posterior synechiae/Iris bombé/Secondary cataract
(16-year-old domestic shorthair)

For 10 months, this FeLV-positive cat had been treated for a bilateral anterior uveitis. The pupil is irregular because of circumferential posterior synechiae. Aqueous, now trapped in the posterior chamber, displaces the iris forward. The anterior chamber is shallow, especially nasally (arrow). Aqueous flare, an anterior capsular cataract and vitreous debris caused the mottled gray tapetal reflection.



Figure 249
Iris bombé
(adult Siamese cross)

History was unknown in this adult stray. Two weeks ago, the foster owner noted an unusual appearing eye but saw no discharge or discomfort. Adhesions of iris to lens obstruct aqueous flow through the pupil, trapping fluid in the posterior chamber and displacing the iris forward. The iris face rests close to the inner corneal surface, effectively eliminating the anterior chamber. Iris vasculature is easily visualized in the thinned tissue. Perilimbal pigmentation is due to peripheral anterior synechiae and post-inflammatory pigment migration. Intraocular pressure (IOP) typically increases in patients with iris bombé, but IOP in this patient was within normal limits.

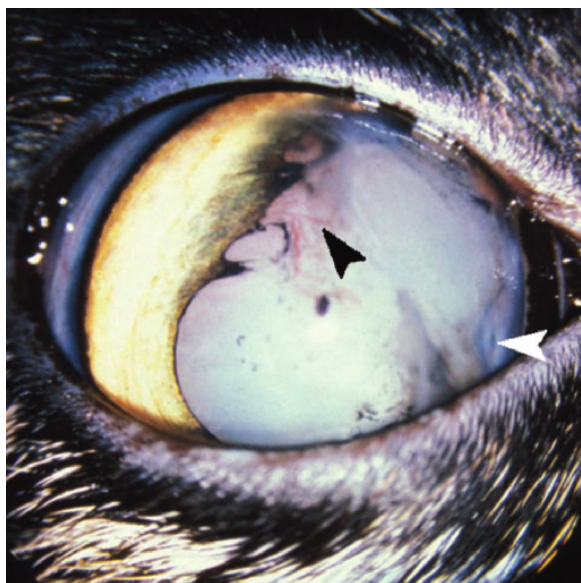


Figure 250
Posterior synechiae/Secondary cataract
(adult domestic shorthair)

After having been shot, several pellets were found in this cat's head and body, but none were identified within the globe or orbit. A dense corneal scar is present where a shot grazed the cornea (*white arrow*). As the inflammation resolved with treatment, a complete cataract formed. Posterior synechiae are present superiorly and nasally. Vascularization (*black arrow*) and pigment from the iris are present on the anterior lens surface.

SECTION VIII

Glaucoma

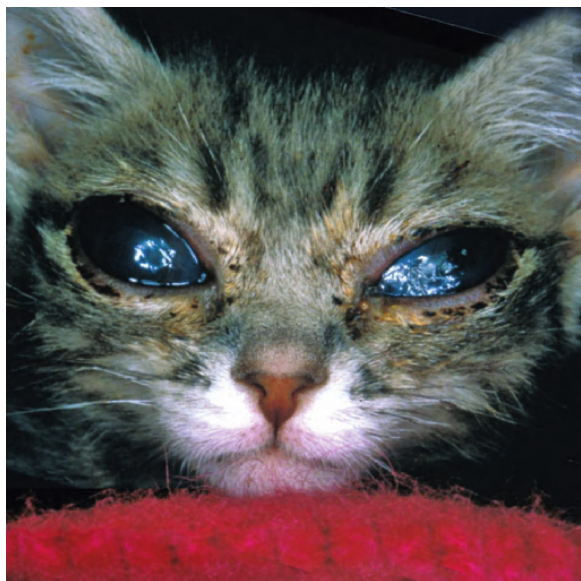


Figure 251
Congenital glaucoma
(4-week-old domestic shorthair)

This kitten was found on a farm by the owner. The kitten was totally blind but appeared otherwise healthy. Both globes are buphthalmic, with intraocular pressures of 60 mm Hg. The axial superficial ulcers are due to lagophthalmos and secondary exposure. Examination of the intraocular structures was difficult, but the pupil in the right eye appeared uniformly dilated with no signs of severe inflammation.

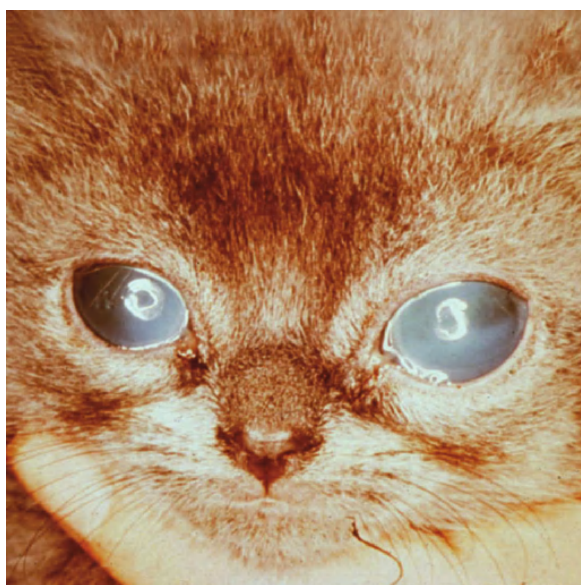


Figure 252
Congenital glaucoma
(4-week-old Persian)

This is one of three kittens in a litter, all buphthalmic at birth. The globes appear large, with generalized corneal opacification. Intraocular evaluation was limited by the corneal edema. The intraocular pressure was significantly elevated. Histopathology identified the expected sequelae of chronic glaucoma, as well as aniridia.

(Image courtesy of Milton Wyman, DVM, MS, DACVO.)



Figure 253
Inherited glaucoma
(12-year-old Siamese)

Presenting complaints included progressive vision loss and tearing over the past 3 months. Mild corneal edema is present superiorly. The pupils are dilated and nonresponsive. Both lenses are subluxated posteriorly and nasally. The optic discs appeared subjectively pale and depressed. The retinas were ophthalmoscopically normal. The intraocular pressure in the right eye was 44 mm Hg; in the left, 54 mm Hg. The cat is functionally blind.



Figure 254
Inherited glaucoma
(4-year-old domestic shorthair)

The owners noted an increased tapetal reflection in both eyes. Both globes are mildly buphthalmic. Mild corneal edema is present bilaterally, especially in the ventral quadrant. The pupils are dilated and have a sluggish response to bright light. Both lenses are luxated posteriorly and inferiorly (see Figure 255). The optic discs were pale and surrounded by a zone of peripapillary retinal atrophy. The intraocular pressure in the right eye was 42 mm Hg; in the left, 26 mm Hg. No evidence of prior inflammation was present.

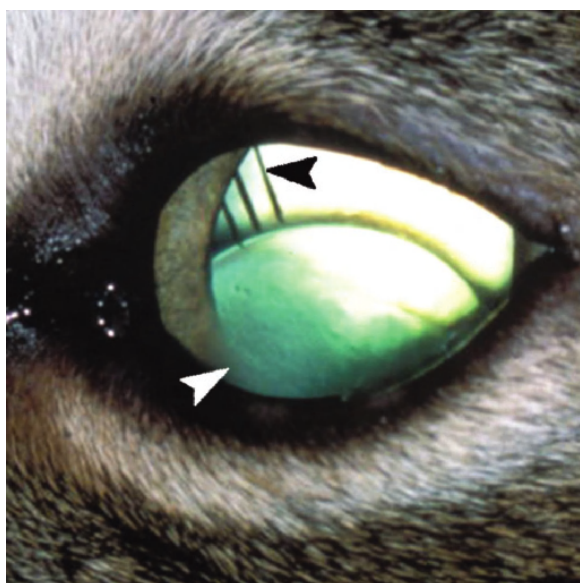


Figure 255
Inherited glaucoma
(4-year-old domestic shorthair)

This is a closer view of the left eye of the cat in Figure 254. Mild corneal edema is evident at the *white arrow*. Elongated ciliary processes (*black arrow*) extend toward the luxated lens. A large aphakic crescent is seen dorsally.

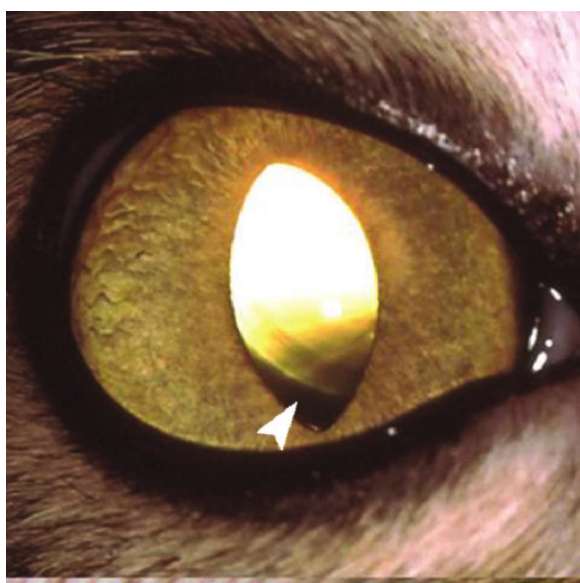


Figure 256
Primary open angle glaucoma (POAG)
(1-year-old domestic shorthair)

The owners noticed that the irises appeared odd and different from one another. A mild anisocoria was present. The remaining clinical signs were similar in both eyes. The anterior chamber is deeper than normal. A partial posterior lens luxation creates an aphakic crescent (*arrow*) in this right eye. Iridodonesis could be appreciated bilaterally. The IOP was 18 mm Hg OD and 19 mm Hg OS.

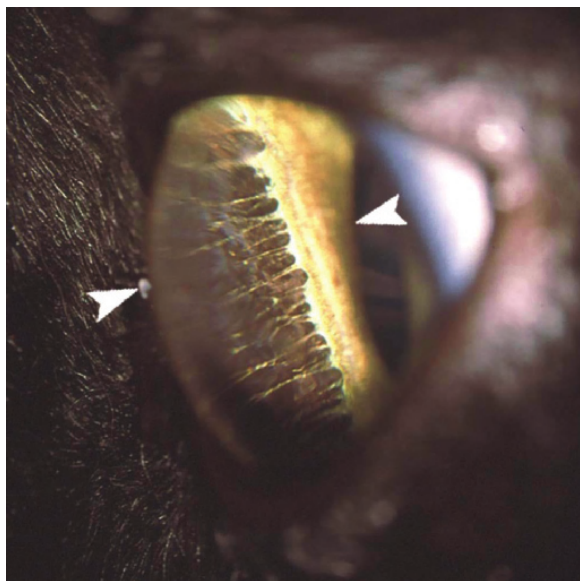


Figure 257
Primary open angle glaucoma (POAG)
 (2-year-old domestic shorthair)

This cat was presented when its owners noted that one pupil was larger than the other. The lateral view of this left eye shows normal pectinate ligaments in an open drainage angle. The deep anterior chamber (between the *arrows*) is secondary to mild buphthalmia and a posterior lens luxation. Iridodonesis accompanied the posterior luxation in both eyes. IOP in the left eye was 32 mm Hg and in the right eye was 24 mm Hg. The right eye was functionally blind due to optic nerve atrophy, but the left eye was still visual at this time.



Figure 258
Feline aqueous humor misdirection syndrome (FAHMS)
 (12-year-old domestic shorthair)

The owners had recently noticed a difference in pupil size and in the pupils' response to bright light. The left pupil is larger than the right, with a sluggish direct and indirect PLR. The right pupil had a normal direct and sluggish indirect PLR. The shallow anterior chamber that serves as a hallmark of FAHMS is not easily visualized in this head-on view of the left eye. There is also an anterior cortical cataract in the left lens. The IOP was 31 mm Hg OS and 18 mm Hg OD.

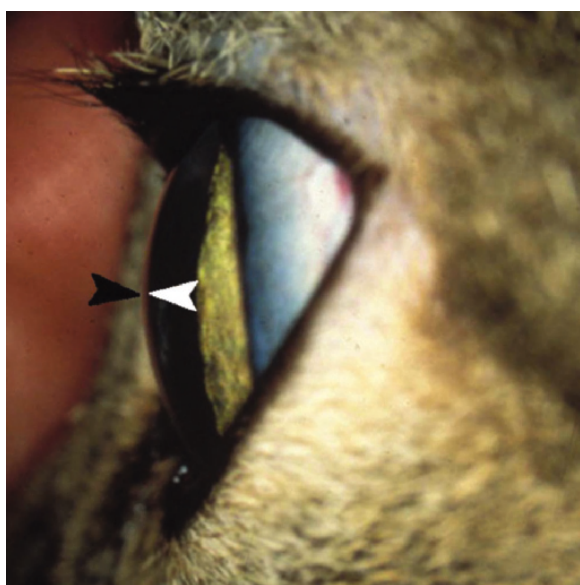


Figure 259
Feline aqueous humor misdirection syndrome (FAHMS)
 (8-year-old Persian)

A veterinarian referred this animal for assessment of anisocoria. The left pupil was slightly larger than the right, but the pupillary reflexes remained within normal limits. The left iris and lens are displaced anteriorly. The anterior chamber between the cornea (*black arrow*) and the anteriorly displaced lens (*white arrow*) is extremely shallow (compare to Figure 5). The posterior segment is normal. Intraocular pressures measured 26 mm Hg in the right eye and 40 mm Hg in the left eye.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

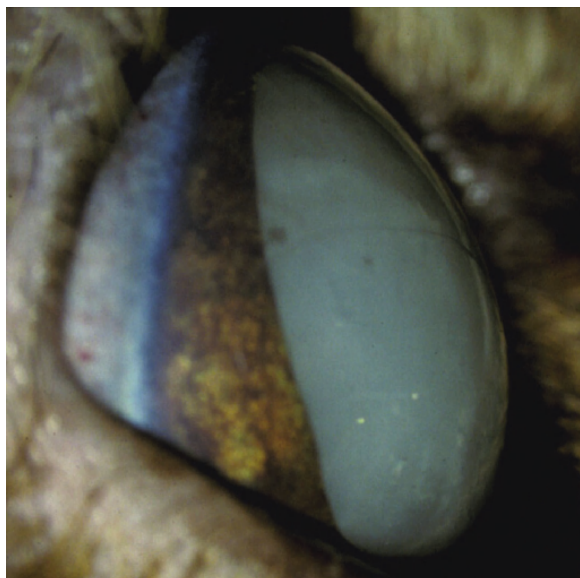


Figure 260
Feline aqueous humor misdirection syndrome (FAHMS)
 (14-year-old domestic shorthair)

The owners were only aware of a progressive cataract in the right eye. The iris and lens are displaced anteriorly, as in Figure 259, although the shift is easier to appreciate with the densely opaque mature cataract. The IOP was difficult to accurately determine due to the proximity of the lens to the inner corneal surface. The right eye was similar in appearance to that of the cat in Figure 258.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

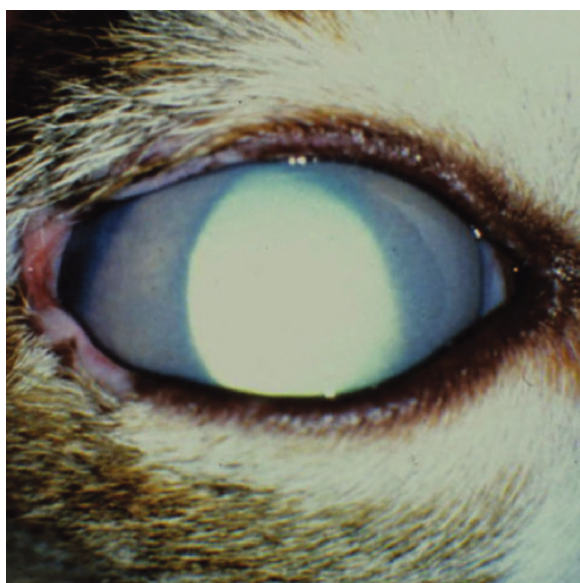


Figure 261
Congenital glaucoma
 (10-week-old domestic shorthair)

The owners noticed a cloudy eye in this kitten. The right cornea is diffusely edematous and the pupil is nonresponsive to light. The posterior segment of both eyes showed no gross abnormalities. The intraocular pressure was 40 mm Hg in this eye and high normal in the opposite globe.

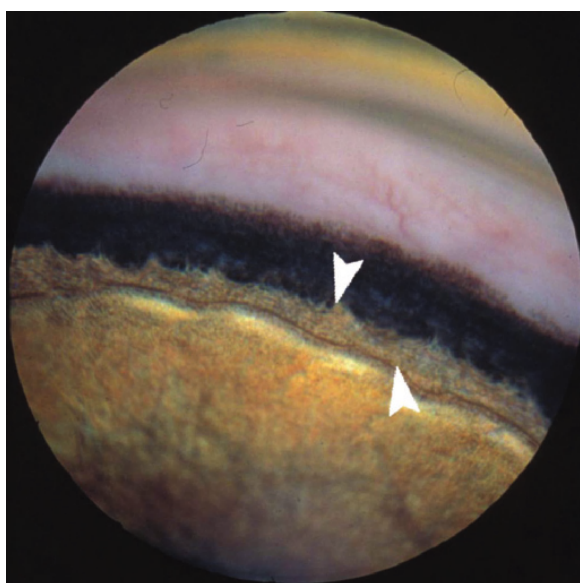


Figure 262
Anterior segment dysgenesis/Glaucoma
 (10-week-old domestic shorthair)

The abnormal drainage angle in the left eye of the kitten in Figure 261 is seen through a Franklin gonioscens. The pupil is located at the 6-o'clock position. The broad pigmented band represents sclera pigment. Normal pectinate ligaments are absent. Broad bands of iris tissue (arrows) span the angle. Compare this appearance to the normal angle in Figure 7.



Figure 263
Secondary glaucoma
(6-month-old domestic shorthair)

Found as a stray, this kitten's right eye was normal. The left eye is buphthalmic with an IOP of 46 mm Hg. The pupil is dilated and nonresponsive and the iris is darkly pigmented. The optic nerve and retina were severely atrophic. On histopathology, a lymphoplasmacytic infiltrate was reported but no definitive etiology was found.



Figure 264
Secondary glaucoma/Post-inflammatory
(3-year-old Russian blue)

Presented due to cloudiness and squinting in the left eye, this cat's right eye was normal on examination. Corneal abnormalities include diffuse edema and keratic precipitates in the inferior quadrant. A moderate aqueous flare contributes to the general haziness. Rubeosis iridis and iris nodules replace the normal iris stroma. Fundus changes included optic disc pallor, generalized retinal atrophy, and perivascular cuffing. IOP at the time of this photograph was 38 mm Hg. The only significant laboratory result was a toxoplasmosis IgG titer of 1:1024. A generalized lymphoplasmacytic inflammatory infiltrate was found in the uvea, retina, and optic nerve head but no specific etiology was determined on histopathologic exam.

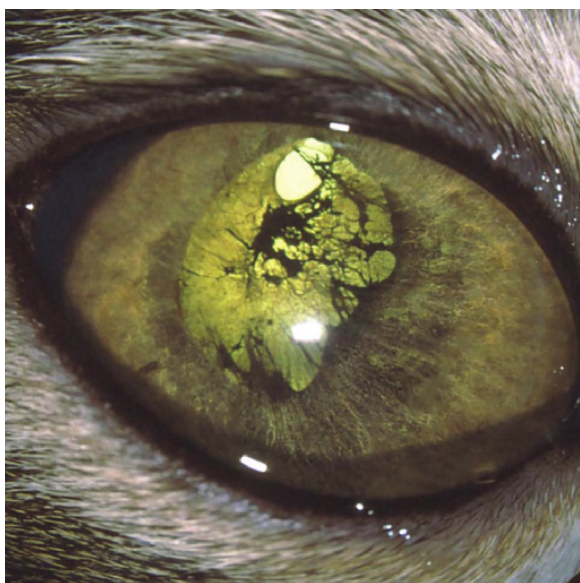


Figure 265
Secondary glaucoma/Post-inflammatory
(6-year-old domestic shorthair)

At 4 years of age, this cat was treated for a bilateral anterior uveitis of undetermined etiology. Excluding the cloudy pupil that resulted from the initial uveitis, no ocular problems had been noted since that time. During the past 6 months, his vision deteriorated and both eyes appeared to be increasing in size. There was no active inflammation at the time of this photograph. The pupils are dyscoric due to posterior synechia remaining from the prior inflammatory disease. The iris and lens in this eye are displaced anteriorly. The iridocorneal angle is further compromised by a broad peripheral anterior synechia. The IOP was 40 mm Hg in both eyes. The detail of the fundus was difficult to view, but atrophy of the optic nerve and retina were suspected.

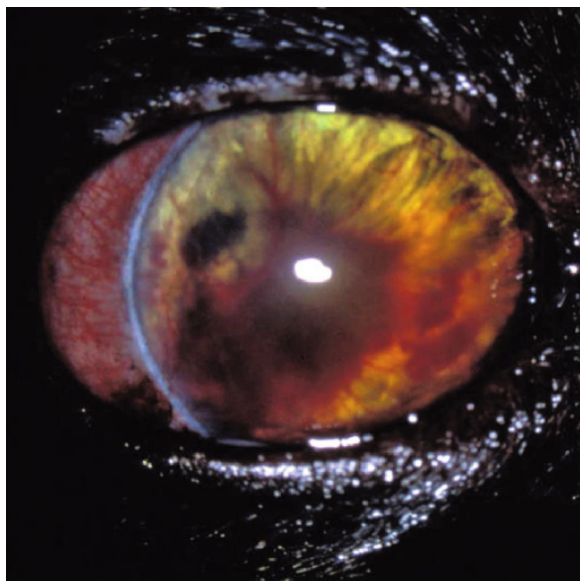


Figure 266
Secondary glaucoma/Hypertension
 (20-year-old domestic shorthair)

Intraocular hemorrhage and blindness were the primary complaints in this patient. The right globe is mildly buphthalmic and the conjunctiva is hyperemic. A large blood clot is present, obscuring the miotic pupil. Circumferential adhesions of iris to lens trap aqueous within the posterior chamber. The resulting iris bombé results in a shallow anterior chamber that compromises iridocorneal angle form and function. The intraocular pressure was 36 mm Hg. The left eye also had hemorrhage in the anterior chamber and massive vitreous hemorrhage. The cat's mean systolic blood pressure was 280 mm Hg.

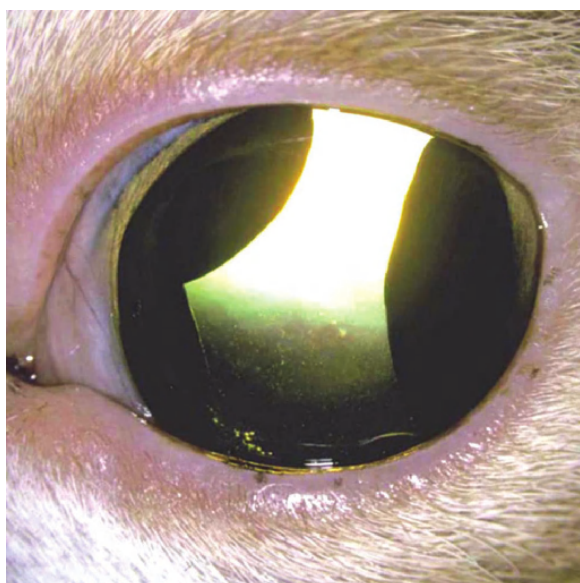


Figure 267
Secondary glaucoma/Iridociliary cysts
 (12-year-old domestic shorthair)

Both eyes were similarly affected. The pupil in the left eye has been dilated with tropicamide to show the heavily pigmented iridociliary cysts. The cysts press the iris forward, decreasing the depth of the anterior chamber and reducing the ease of aqueous access into the iridocorneal angle. Over a 6-month period, the IOP increased to 28 mm Hg in both eyes.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)

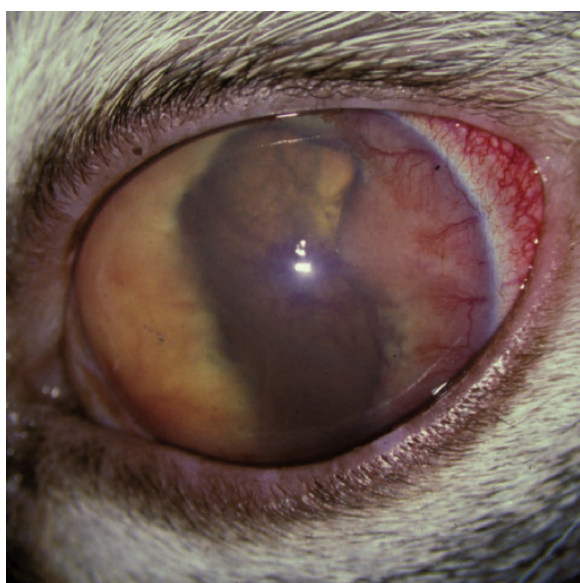


Figure 268
Secondary glaucoma/Lymphoma
 (14-year-old domestic shorthair)

The owners were concerned that the left eye had changed from its normal blue color. Corneal edema and vascularization had progressed over a 3-month period. The iris is now orange in color, a consequence of stromal infiltrates and surface neovascularization. Blood-tinged fibrin obscures the pupil while diffuse posterior synechiae contribute to the dyscoria. The lens is diffusely opaque. Intraocular pressure was mildly elevated. Neoplastic cells were present throughout the uvea. Histopathologic changes in the optic nerve head and retina were compatible with glaucoma.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrting, McLellan, Albert. Elsevier Limited, 2010.)



Figure 269
Secondary glaucoma/Feline diffuse iris melanoma
(12-year-old domestic shorthair)

This cat recently developed glaucoma but had undergone a change in iris color over the last several years. Diffuse iris thickening, increased pigmentation, and scattered surface nodules obscure normal iris detail. The pupillary margin adheres to the anterior lens surface. Both direct and indirect pupillary light reflexes are absent. Pigment can be seen on the anterior lens capsule. The optic disc was atrophic and retinal vessels were attenuated. The drainage angle could not be visualized because of anterior displacement of the iris. The intraocular pressure was greater than 60 mm Hg. Iris melanoma was confirmed histopathologically.

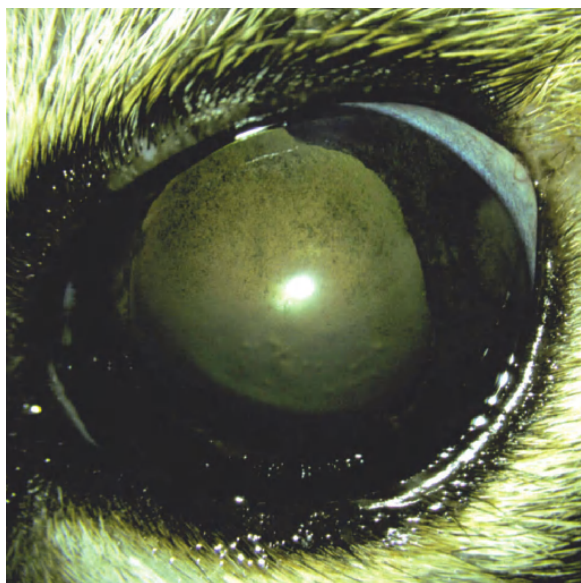


Figure 270
Secondary glaucoma/Feline diffuse iris melanoma
(12-year-old domestic shorthair)

This cat's iris had progressively darkened over a period of 8 years but only recently did the owners recognize a change in vision. Normal iris detail is obscured by the diffuse, dense pigmentation throughout the iris. The pupil is dilated, misshapen, and nonresponsive. Pigmentary debris is present across the anterior lens capsule. IOP was 60 mm Hg.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

SECTION IX

Lens

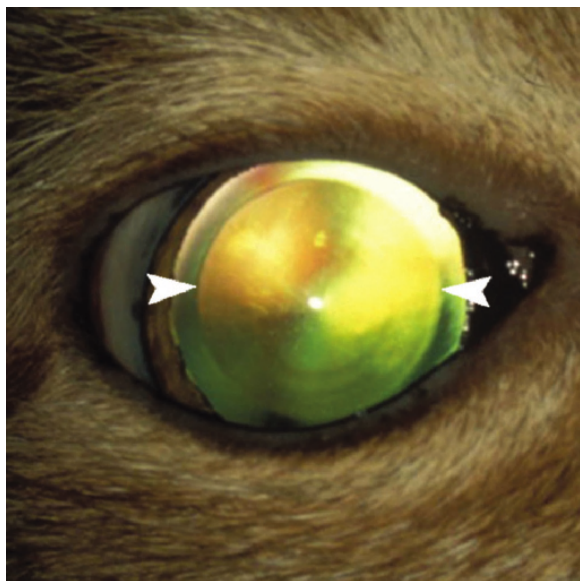


Figure 271
Senile nuclear sclerosis
(18-year-old domestic shorthair)

No visual deficit was noticed by the owners of this cat, presented for evaluation of cataracts. The pupil has been dilated to facilitate examination of the lens. The dense nucleus is clearly delineated (*arrows*) in the center of the lens. The tapetal reflection is easily seen and the fundus easily examined through the density.

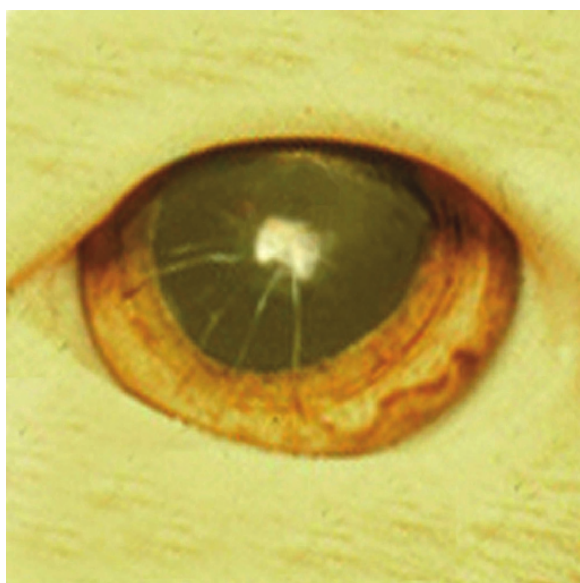


Figure 272
Capsular cataract/Persistent pupillary membranes (PPM)
(1-year-old domestic shorthair)

Multiple persistent pupillary membranes extend from the iris collarette to the anterior lens capsule where a distinct capsular opacity is seen. The PPMs were noted coincidentally when the cat was presented for evaluation of a corneal ulcer in the opposite eye. Progression of the capsular cataract is unlikely.



Figure 273
Nutritional cataract
(6-month-old Persian)

Born with a cleft palate, this kitten was raised on an unsupplemented milk substitute. The kitten has bilateral, posterior cortical, Y-suture opacities, which are difficult to visualize in the photograph. The perinuclear halo (*arrows*) is also compatible with an arginine-deficient diet.

(Image courtesy of J. Philip Pickett, DVM, DACVO.)

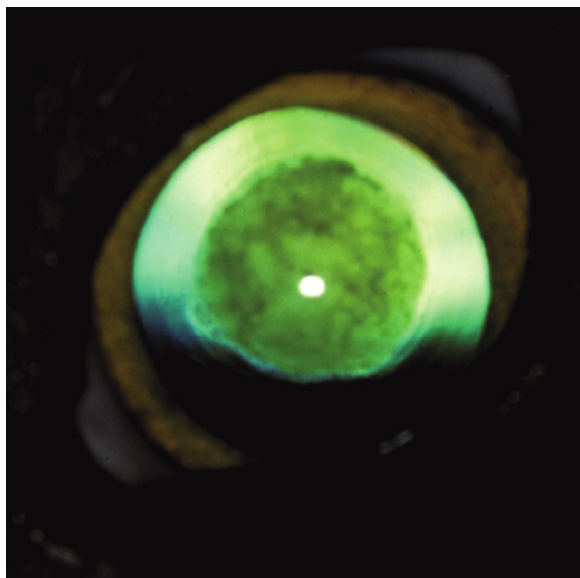


Figure 274
Nuclear cataract

(1.5-year-old domestic shorthair)

The pupil has been dilated for examination. The central cataract involves at least the embryonal and fetal nuclei at the core of the lens. The opacity obscures the tapetal reflection, appearing dark against the bright background. This examination technique, known as retroillumination, is an excellent method for detecting even subtle opacities in the normally clear ocular media. These bilateral cataracts did not progress during a 2-year follow-up.



Figure 275
Immature cataract

(4-month-old Himalayan)

Bilateral cataracts were present in this kitten. Diffuse nuclear and cortical opacities are present, accounting for the decreased vision noted by the owners. The extent of the opacity is easily determined using the technique of retroillumination.

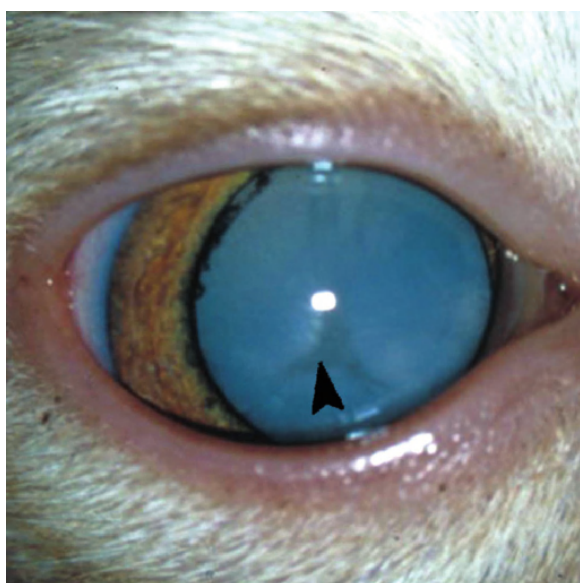


Figure 276
Hypermature cataract/Phacolytic uveitis

(5-month-old domestic shorthair)

This kitten is blind because of dense lens opacities in both eyes. The lens appears swollen and a widely separated suture line is evident (arrow). The iris is slightly hyperemic, and pigment from the posterior iris surface is seen on the lens capsule. Faint aqueous flare is also present.

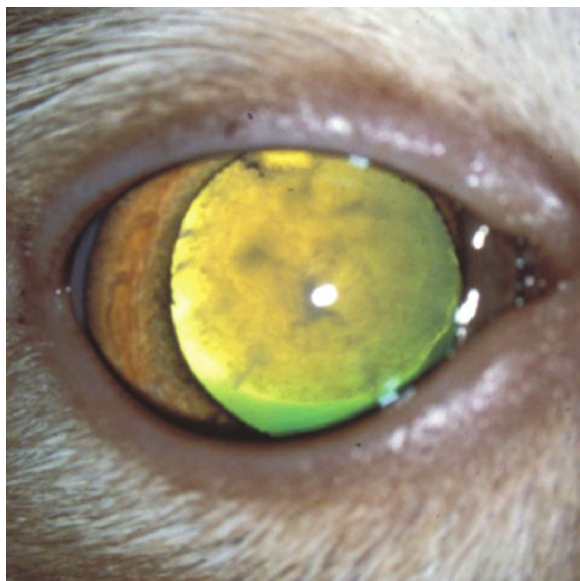


Figure 277
Resorbing cataract
(19-month-old domestic shorthair)

This is the same patient and the same eye as that depicted in Figure 276, only 14 months later. The lens diameter is decreasing as the cataract is resorbed, creating a deep anterior chamber and exposing the tapetal reflection around the lens circumference. Pigment deposits can be seen on the lens capsule. The cat is now able to see from both eyes.

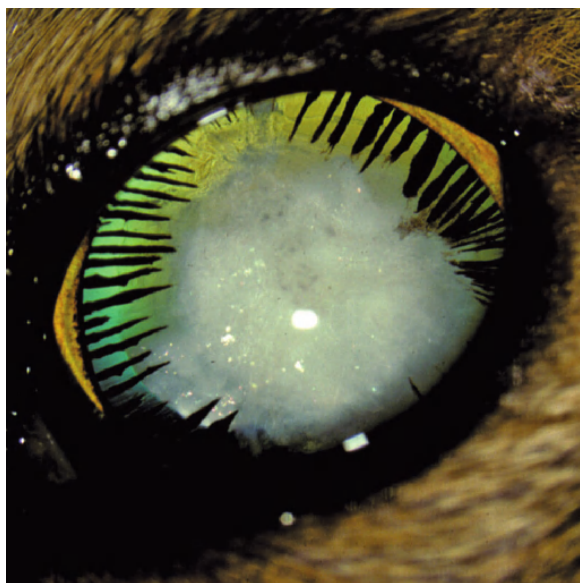


Figure 278
Resorbing cataract
(1-year-old domestic shorthair)

This stray cat had limited vision due to its bilateral ocular opacities. The pupil has been dilated for examination. The shrunken lens has a wrinkled capsule and a crystallized appearance that results from degraded lens fibers and protein within the resorbing cortical material. The ciliary processes encircle the lens and attach directly to the equatorial capsule. The eye shows little active inflammation. The normal retina could be visualized and the cat could follow objects when the pupils were dilated.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

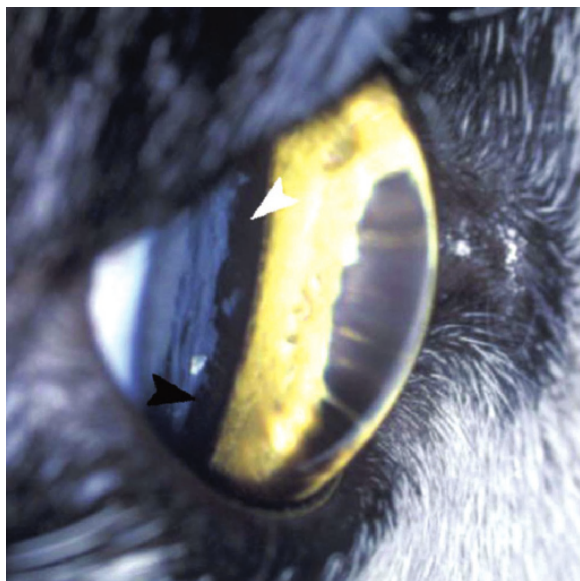


Figure 279
Resorbing cataract
(4-year-old domestic shorthair)

This cat was functionally visual despite a history of bilateral cataracts. This photograph of the right eye shows a deep anterior chamber, a consequence of decreased lens volume secondary to cataract resorption. The *black arrow* points to the anterior lens capsule, which is wrinkled. Although difficult to see in this photograph, the ciliary processes (*white arrow*) could be visualized in the gap created between the lens and iris.

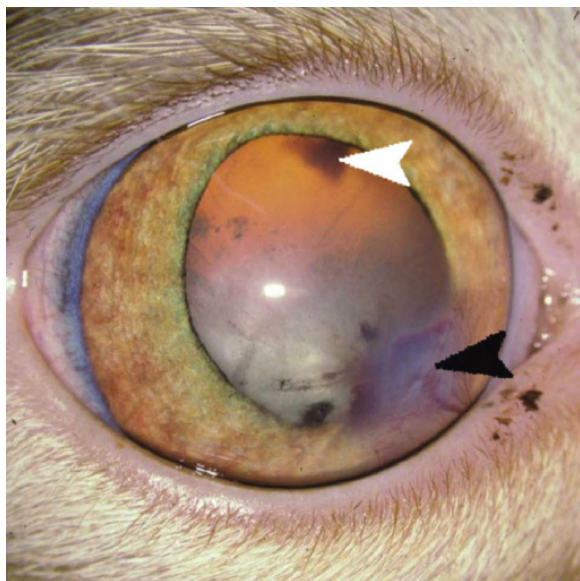


Figure 280
Anterior uveitis/Trauma
(2.5-year-old domestic shorthair)

The leukoma seen at the *black arrow* was thought to be the result of trauma sustained 6 months prior to the photograph. Corneal vascularization persists at the site. Mild aqueous flare accompanies a diffusely but subtly swollen iris. An anterior capsular and cortical cataract is present in the ventral half of the lens, aligned with the corneal lesion. The retina is totally detached and large blood clots can be seen in the vitreous (*white arrow*). Both the leukoma and cataract are presumably due to a penetrating injury. Routine serology failed to identify a cause beyond the presumed trauma. This eye is a prime candidate for post-traumatic sarcoma formation.

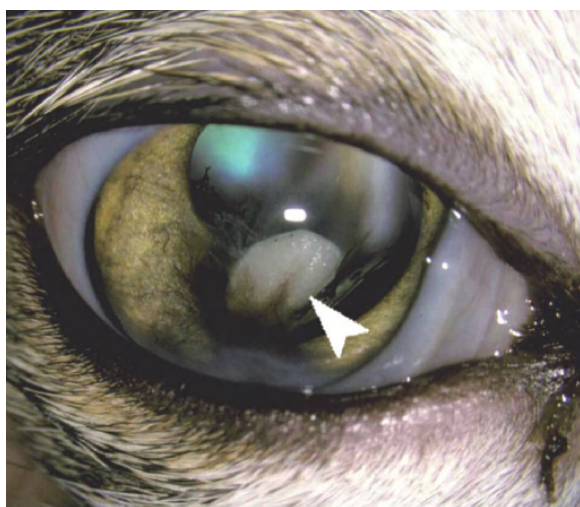


Figure 281
Post-traumatic lens resorption
(1.5-year-old domestic shorthair)

A leukoma at 6 o'clock and accompanying anterior and posterior synechiae were thought to be the result of a penetrating injury in this kitten. All that remains of the lens is a small dense remnant of cortical material (*arrow*). The retina was totally detached. Eleven years after this photograph, the eye was enucleated and diagnosed with a post-traumatic sarcoma.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)



Figure 282
Lenticular foreign body
(adult domestic shorthair)

This cat presented with a complaint of chronic unilateral conjunctivitis. A more intriguing lesion was identified during examination of the opposite "normal" eye. A black, blunt cylindrical object protrudes into the anterior chamber from the central lens. A localized cataract and spots of capsular pigment surround the foreign body. A thin strand of mucus creates a vertical artifact across the corneal surface. No corneal scar could be identified as an entry point. The foreign body extended completely through the lens and also protruded into the anterior vitreous. Although no active inflammation is present in this visual eye, regular examinations were advised to watch for post-traumatic sarcoma formation, a potentially fatal neoplasm linked with lens damage in the cat.

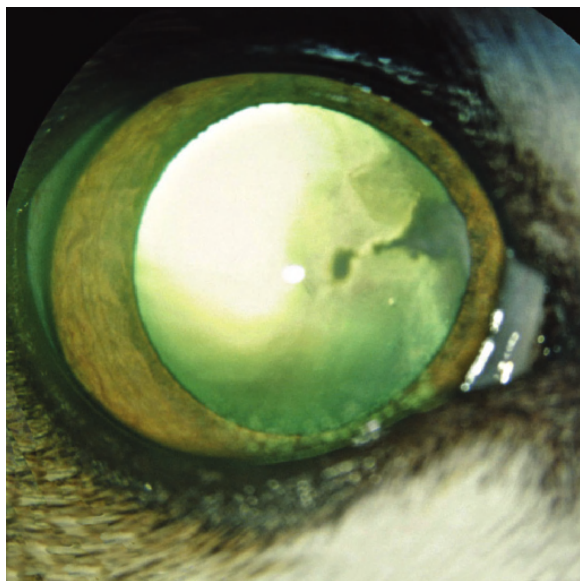


Figure 283
Immature cataract/*Encephalitozoon cuniculi*
 (4-year-old European shorthair)

The owners presented this cat because of a color change in the right eye. A lens opacity extends from the anterior capsule and cortex to the nasal equatorial cortex, then continues into the posterior axial cortex. The cataract obscures the tapetal reflection in those areas. The fundus was normal. A small anterior cortical opacity was also identified in the left eye.

(Image courtesy of Barbara Nell DVM, DECVO; Benz P, MaaB G, Csokai J, Fuchs-Baumgartinger A, Schwendenwein I, Tichy A, Nell B: Detection of *Encephalitozoon cuniculi* in the feline cataractous lens. *Vet Ophthalmol* 14, Suppl 1:37-47, 2011.)

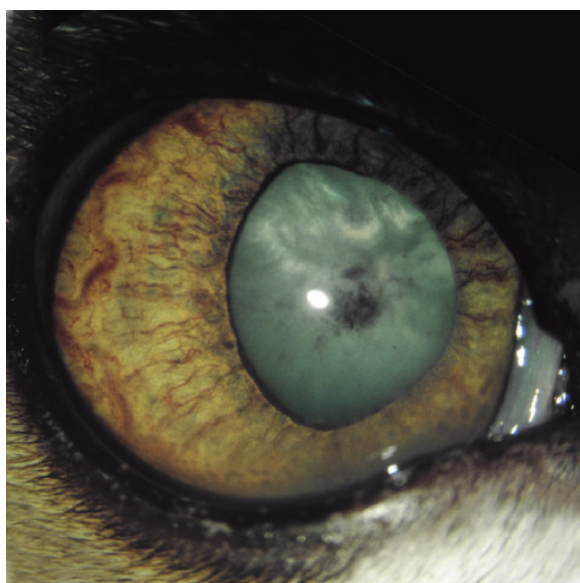


Figure 284
Hypermature cataract/*Encephalitozoon cuniculi*
 (5-year-old European shorthair)

This is the same eye as in Figure 283, photographed 1 year later, and prior to phacoemulsification. Mild corneal edema is present inferiorly. The iris is diffusely swollen and ectropion uvea is present. Subtle aqueous flare accompanies pigmentary debris on the anterior lens capsule. A diffuse cataract obscures the tapetal reflection. *E. cuniculi* was identified histopathologically in the anterior cortex. PCR performed on the lens material was also positive for the parasite.

(Image courtesy of Barbara Nell DVM, DECVO; Benz P, MaaB G, Csokai J, Fuchs-Baumgartinger A, Schwendenwein I, Tichy A, Nell B: Detection of *Encephalitozoon cuniculi* in the feline cataractous lens. *Vet Ophthalmol* 14, Suppl 1:37-47, 2011.)

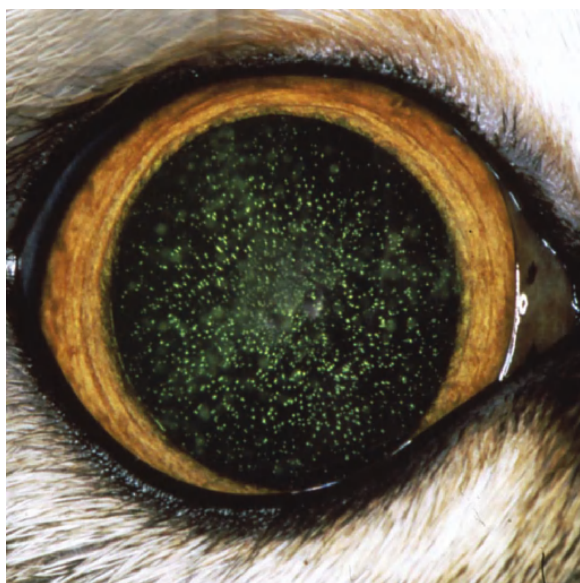


Figure 285
Hypocalcemic cataract
 (2-year-old domestic shorthair)

Although weakness was this cat's primary symptom, initial physical examination also revealed bilateral cataracts. Fine punctate opacities are scattered throughout the anterior and posterior lens cortices. The cataracts were characteristic of those reported in hypocalcemic individuals; serum calcium was low (5.5 mg/dl). The metabolic changes were ultimately attributed to primary hypoparathyroidism.

(Image courtesy of Paul Miller, DVM, DACVO.)



Figure 286
Anterior lens luxation
(9-year-old Siamese)

The owners complained of acute cloudiness and tearing in this patient's left eye. The entire lens is located within the anterior chamber. The localized corneal edema results from endothelial dysfunction following physical contact between the lens and inner corneal surface. Iris vessels are engorged and faint aqueous flare is present. The miotic pupil can be seen as a dark area just behind the upper lens. The intraocular pressure in this eye was subnormal; IOP in the right eye was within normal limits. This cat also had a subluxated lens in the right eye.

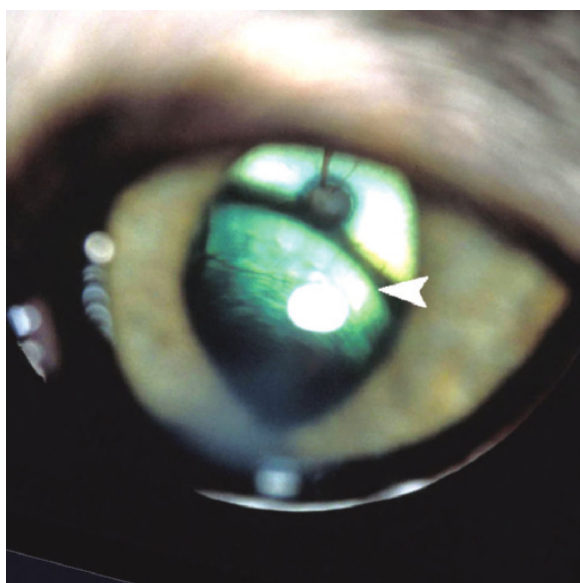


Figure 287
Posterior lens luxation
(4-year-old domestic shorthair)

This photograph is of the same eye depicted in Figures 254 and 255. The camera is focused on the pale optic disc and the surrounding retinal atrophy. The superior equator of the posteriorly luxated lens can be seen just out of the plane of focus (*arrow*).

SECTION X

Vitreous

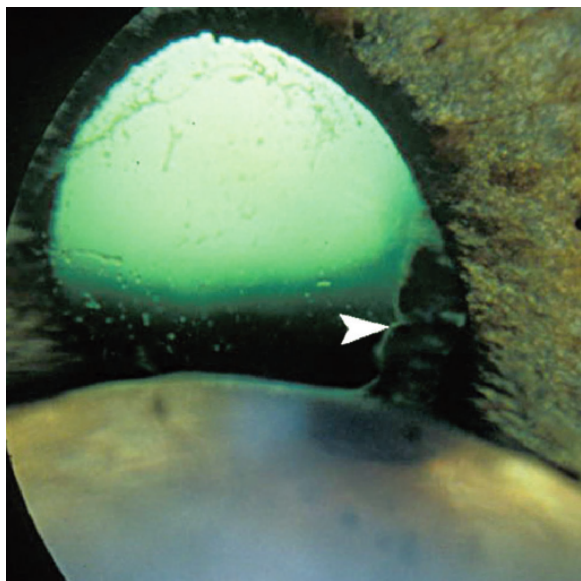


Figure 288
Anterior lens luxation/Persistent hyaloid
 (2-year-old domestic shorthair)

This cat was presented for evaluation of a cloudy left eye. This close-up photograph shows the lens luxated into the anterior chamber. Only a small portion of the cloudy lens can be visualized occupying the lower half of the photo. A persistent hyaloid artery (*arrow*) is attached to the posterior lens surface. Intraocular pressure (IOP) was 20 mm Hg. The right eye was glaucomatous, with an IOP of 34 mm Hg and a posterior lens subluxation. Optic disc cupping was present in the right eye (see Figure 388).



Figure 289
Hyalitis/Anterior lens luxation
 (14-year-old domestic shorthair)

The owners were unaware of any prior ocular or systemic disease. The lens is luxated into the anterior chamber, resulting in mild corneal edema. Although pigmented, the iris appears normal. A mild hyalitis is present (*arrow*). The left eye also had an anteriorly luxated lens and hyalitis. The intraocular pressure was 48 mm Hg in the right eye and 20 mm Hg in the left. The cat was positive for FIV but negative for FeLV and *Toxoplasma gondii*.

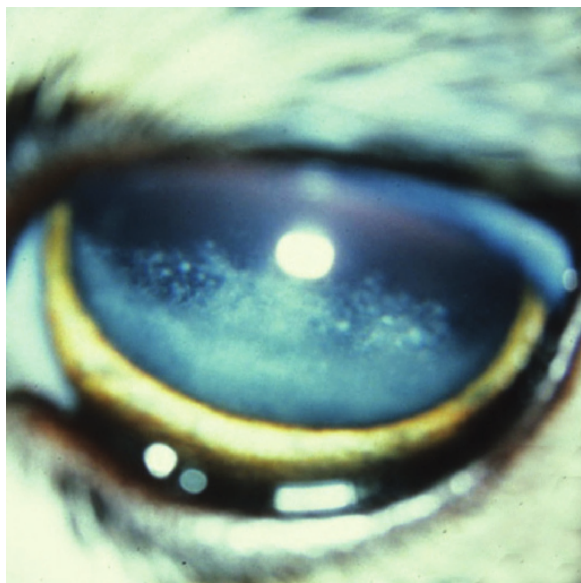
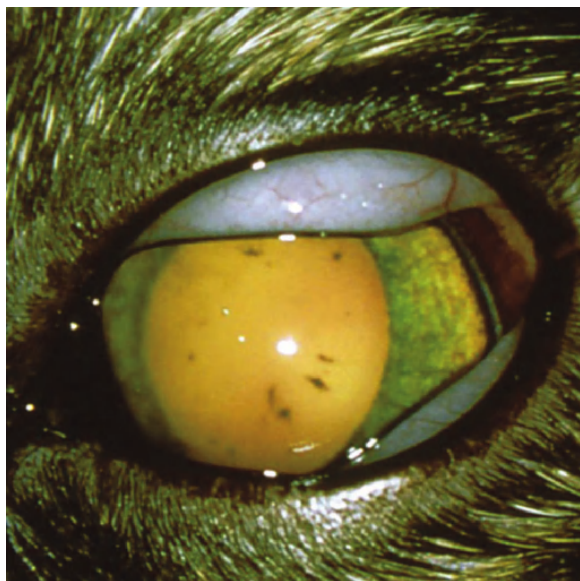


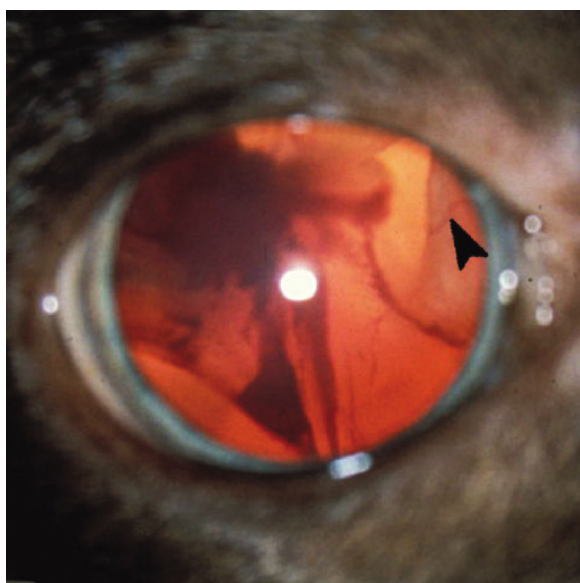
Figure 290
Hyalitis/Pars planitis/Toxoplasmosis
 (6-year-old domestic shorthair)

The owners were concerned about the development of a darker left iris in their cat. All ocular lesions were restricted to the left eye and included mild aqueous flare, keratic precipitates, and iris congestion. The pupil has been dilated in this photograph. Inflammatory cells suspended in the anterior vitreous appear as a white flocculent material posterior to the iris, following the curvature of the posterior lens. Serology for FIV and FeLV was negative. The toxoplasmosis titer was positive at 1:512 IgM and 1:12,048 IgG.

**Figure 291****Hyalitis**

(7-year-old domestic shorthair)

This cat had been treated for anterior uveitis for 3 weeks. The conjunctiva is chemotic. Faint aqueous flare is present, as are pigment deposits on the anterior lens capsule. The dull yellow color seen through the pupil is the result of abundant cellular infiltrates within the vitreous. All serology was negative. Pyogranulomatous panophthalmitis of unknown etiology was identified on histopathologic exam.

**Figure 292****Vitreous hemorrhage/Hypertension**

(14-year-old Siamese)

Presented for acute blindness of 1 week's duration, this cat had bilateral bullous retinal detachments and vitreous hemorrhage. The hemorrhage is easily seen through the dilated pupil. A retinal vessel (*arrow*) can be seen as a consequence of the detached retina. The systolic blood pressure was 240 mm Hg.

SECTION XI

Retina and Choroid

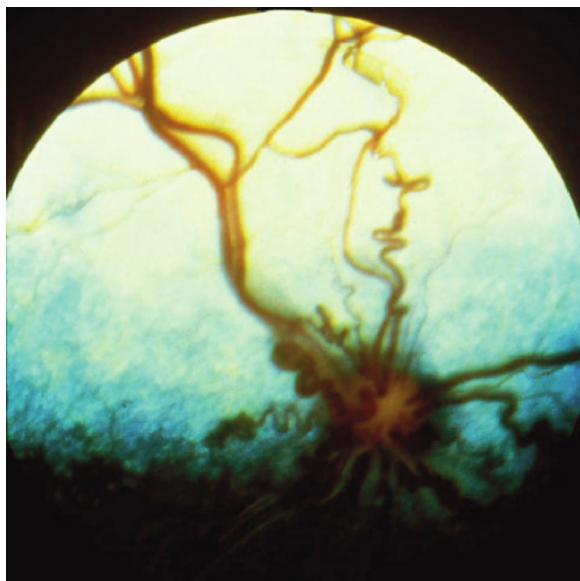


Figure 293
Cardiovascular anomalies
(6-month-old domestic shorthair)

Cyanosis and exercise intolerance were chronic problems for this kitten. On cardiac auscultation, individual heart sounds could not be distinguished because of a continual "machinery" murmur. The retinal vessels are distended and tortuous. Both eyes were similarly affected. Cardiomegaly and multiple septal defects were identified at necropsy.

(Image courtesy of Lorraine G. Karpinski, VMD, DACVO.)

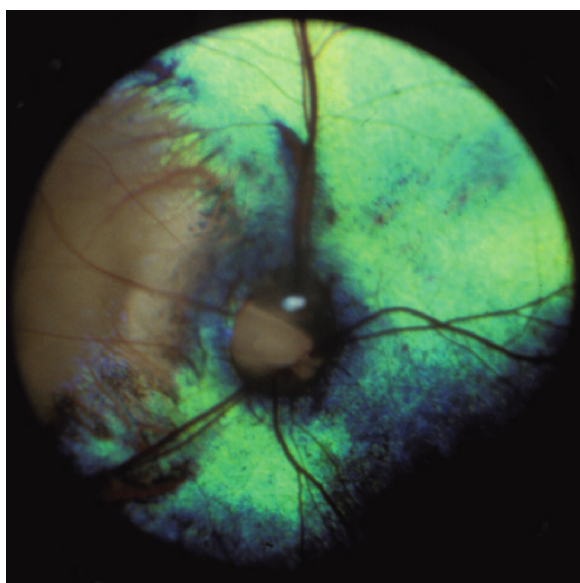


Figure 294
Scleral coloboma
(6-month-old domestic shorthair)

This is the fundus of the eye pictured in Figure 33. A large sclera coloboma appears as a pale area to the left of the optic disc. The defect extends into the area of the lamina cribrosa, also altering the optic nerve head.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

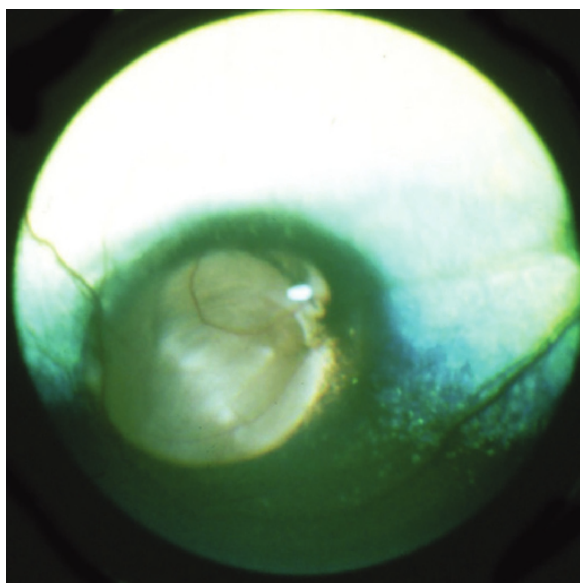


Figure 295
Scleral coloboma
(14-year-old domestic shorthair)

This was a coincidental finding on routine examination. The photograph of the temporal fundus is taken through a 28-diopter lens. The rim of the optic disc is just visible at the 3-o'clock position. The white circular lesion represents a posteriorly recessed scleral pocket. Retinal vessels course over the rim of the depression and across the defect. Although the lesion is surrounded by a border of dark choroidal pigment, the choroid within the defect is hypoplastic.

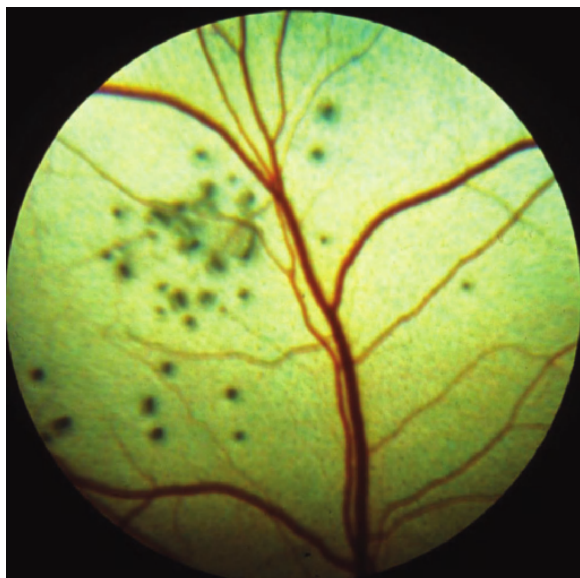


Figure 296
Retinal dysplasia
(5-month-old Abyssinian)

Presented for the evaluation of an extensive symblepharon in one eye, this kitten also had bilateral congenital retinal lesions. The dark foci are the result of folds in the outer retinal layers. In this patient, the lesions have a subtly reflective border and are restricted to the tapetal region.

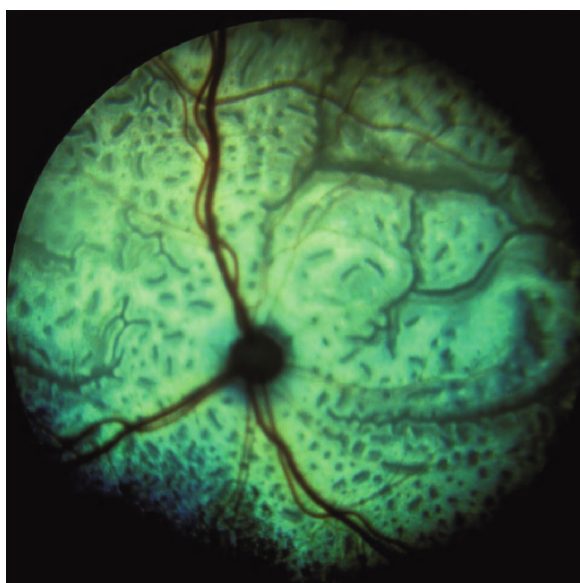


Figure 297
Retinal dysplasia
(4-month-old domestic shorthair)

This cat had bilateral congenital cataracts. The photograph is of the fundus of the now aphakic left eye following lens extraction. Congenital retinal folds appear as dark spots and branching lines that obscure the underlying tapetum. Dysplasia is a common finding in cats with congenital cataracts.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

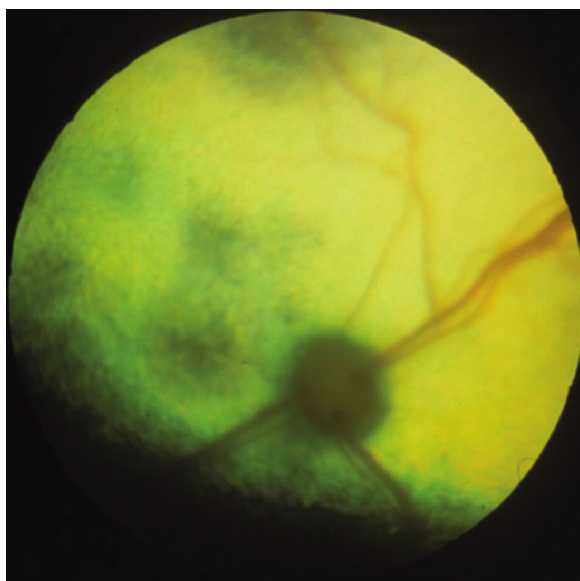


Figure 298
Chorioretinitis/Feline leukemia complex
(10.5-year-old domestic shorthair)

This is the right fundus of the cat with anterior uveitis pictured in Figure 180. Focal areas of abnormal pigment proliferation and edema are present in the tapetal retina. This cat was FeLV positive.

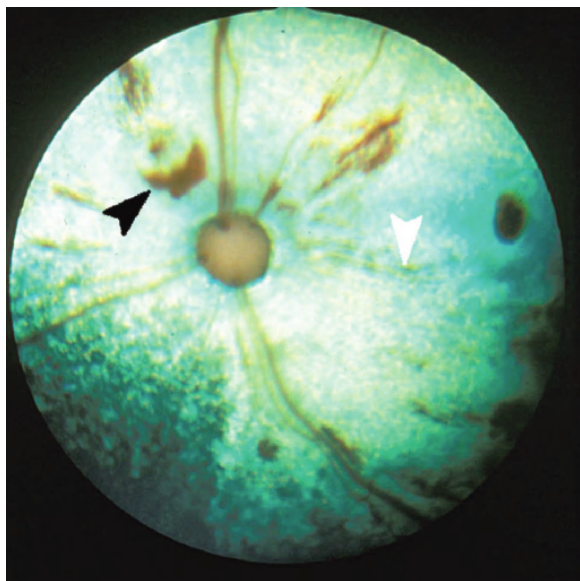


Figure 299
Chorioretinitis/Feline leukemia complex
(4-year-old domestic shorthair)

Bilateral retinal lesions were found in this cat presented with a complaint of lethargy. The retinal vessels appear pale and thready as a consequence of anemia. Deep intraretinal hemorrhage (*black arrow*) and superficial flame-shaped hemorrhage (*white arrow*) within the nerve fiber layer can be seen throughout the fundus. Feline leukemia virus infection was diagnosed by serology.

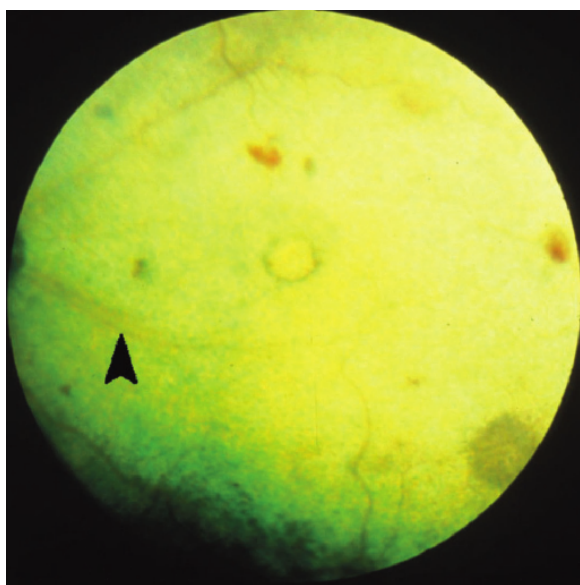


Figure 300
Chorioretinitis/Feline leukemia complex
(2.5-year-old domestic shorthair)

This cat was presented for examination because of listlessness and anorexia. The left temporal tapetal retina has focal retinal hemorrhages. Other areas of abnormal tapetal coloration represent edema or prior hemorrhage. The retinal vessels (*arrow*) are extremely attenuated because of the severe anemia (packed cell volume = 7%). The very edge of the optic disc can be seen at 9 o'clock. Feline leukemia virus infection was diagnosed by serology.

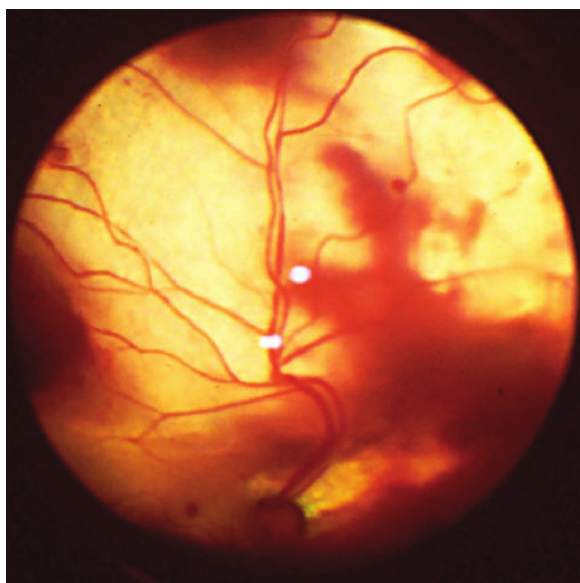


Figure 301
Chorioretinitis/Feline leukemia complex
(6-year-old domestic shorthair)

The sudden onset of poor vision led to this patient's examination. This image of the right fundus was taken through a 28-diopter lens. The optic disc is located at the 6-o'clock position. Massive subretinal hemorrhage elevates the retina superior to the optic disc, altering the course of the overlying vessels. The left eye had a total retinal detachment. The only significant laboratory finding was a positive test for feline leukemia virus.

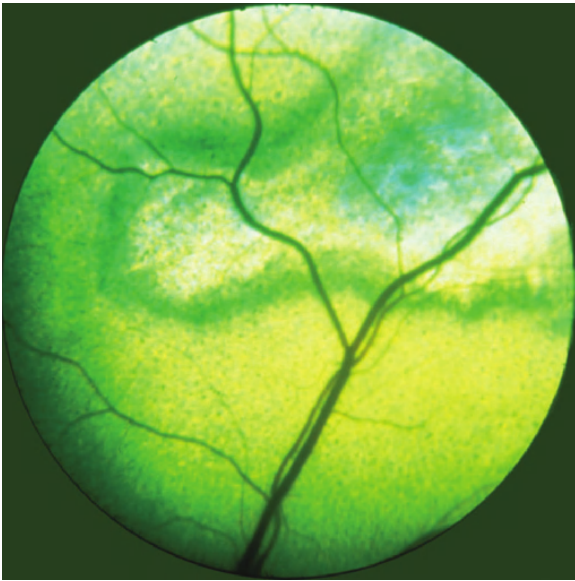


Figure 302
Chorioretinopathy/Panleukopenia
 (2-year-old domestic shorthair)

This adult cat was presented with ataxia due to cerebellar hypoplasia. The well-circumscribed area of altered tapetal reflectivity is reminiscent of the retinal disorganization and degeneration seen as a consequence of experimentally induced feline panleukopenia.

(Image courtesy of Alan D. MacMillan, DVM, PhD, DACVO.)

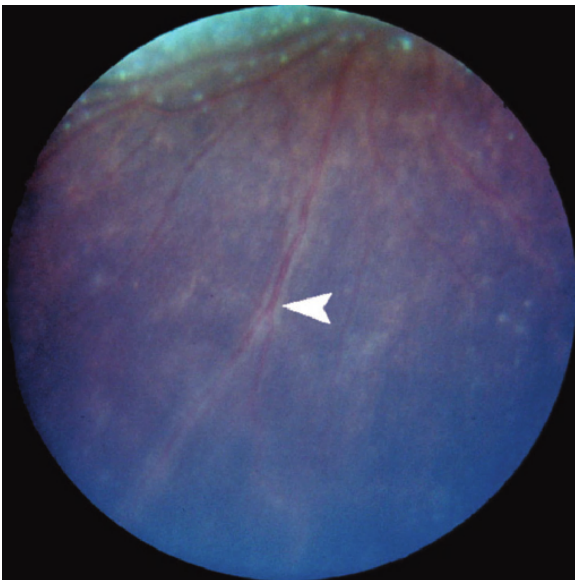


Figure 303
Chorioretinitis/Feline infectious peritonitis
 (7-year-old domestic shorthair)

This is the left posterior segment of the cat featured in Figure 193. Perivascular cuffing (*arrow*) and focal intraretinal exudates are present. The only positive laboratory results were a high titer for feline coronavirus and an elevated total blood protein.

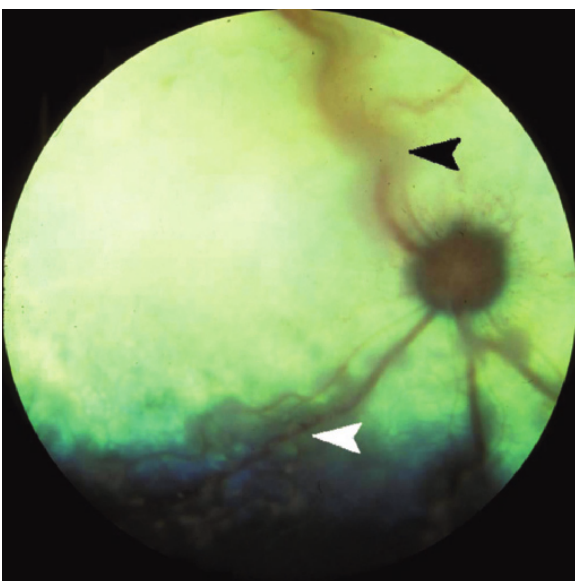


Figure 304
Chorioretinitis/Feline infectious peritonitis
 (3-year-old domestic shorthair)

A painful left eye and a history of lethargy led to this cat's presentation. The left eye had a severe anterior uveitis and its posterior segment could not be visualized. In the right fundus, perivascular exudates (*arrows*) blur the detail of dilated retinal vessels within the nerve fiber layer. Postmortem histopathology confirmed the diagnosis.

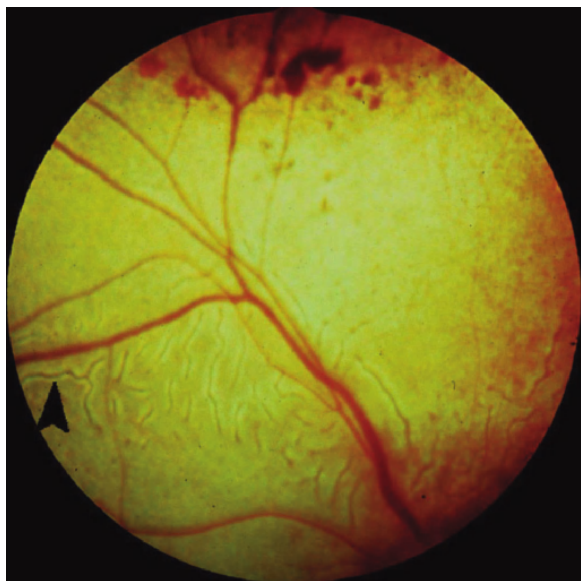


Figure 305
Retinal folds/Feline infectious peritonitis
(10-month-old Himalayan)

The owners reported seizures of increasing frequency and severity over a 6-hour period. The anterior segment was unremarkable with the exception of sluggish, incomplete pupillary light reflexes. The edge of the optic disc can be seen at the ventral limit of the photograph. Multiple retinal folds (*arrow*) appear as thin dark lines throughout the tapetal fundus. The margin of a large subretinal hemorrhage is seen dorsally, flanked by smaller preretinal and intraretinal hemorrhages. The cat's vision was difficult to assess owing to his altered mentation. He was euthanatized as his neurologic status deteriorated. A diagnosis of FIP was confirmed at necropsy.

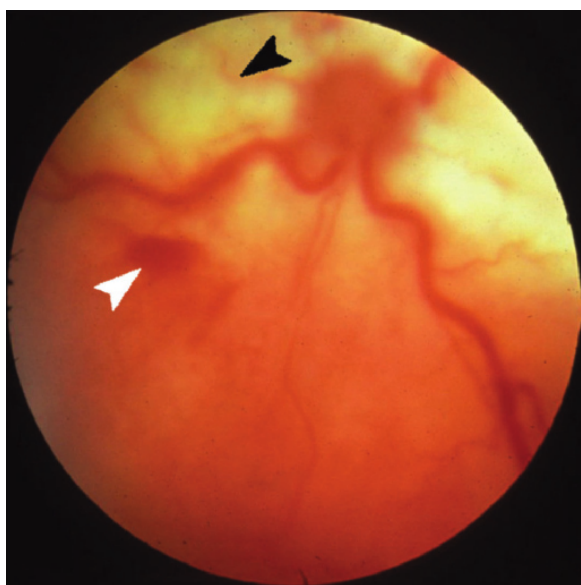


Figure 306
Chorioretinitis/Feline infectious peritonitis
(1.5-year-old Siamese)

For 1 week, this cat had been listless, febrile, and anorectic. Bilateral anterior uveitis was characterized by moderate aqueous flare and large cellular precipitates within the anterior chamber. Retinal vessels are notably dilated on fundoscopic examination. Subretinal edema elevates the retina, blurring underlying structural detail. Subretinal hemorrhage (*white arrow*) and perivascular exudates (*black arrow*) can be seen. The majority of the red color is due to reflection from normal choroidal vessels easily seen in this color-dilute breed. FIP was suspected based on a total plasma protein of 9.9 g/dl with a 4.37 g/dl gamma globulin.

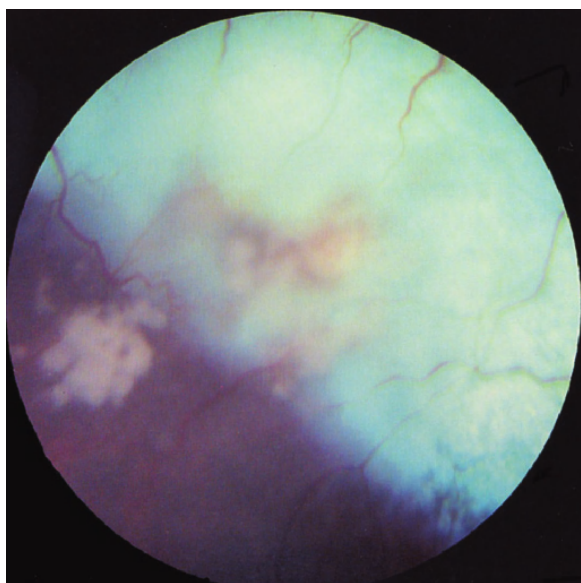


Figure 307
Chorioretinitis/Feline infectious peritonitis
(8-month-old domestic shorthair)

The cat was presented with severe anterior uveitis in the right eye. The temporal retina of the left eye is elevated and white perivascular exudates are present. A 1:1600 coronavirus titer and an elevated total plasma protein level led to the diagnosis, which was confirmed by histopathology at necropsy.

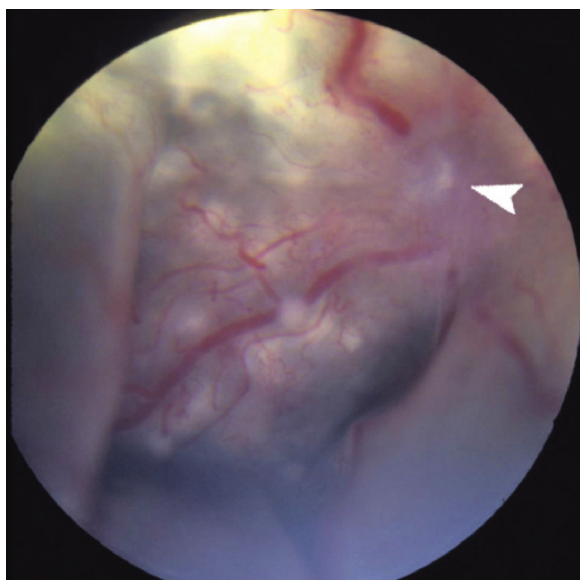


Figure 308
Chorioretinitis/Feline infectious peritonitis
 (5-year-old domestic shorthair)

This is the left eye of the cat in Figure 196. This retina is totally detached and the retinal vessels are dilated. Perivascular and subretinal exudates are present in the center of the photograph. The optic disc (arrow) is obscured by exudates.

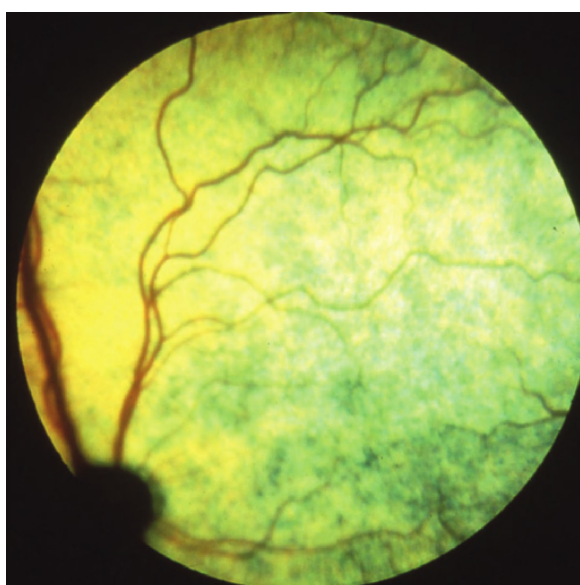


Figure 309
Chorioretinitis/Histoplasmosis
 (5-year-old domestic shorthair)

This cat had respiratory problems for 2 weeks and was increasingly dyspneic. Body temperature was 100.5°F. The spleen and liver were enlarged. This photograph, taken with a neutral density filter, shows a mottled, pigmented tapetum. *Histoplasma capsulatum* organisms were found in the lung, liver, spleen, and outer layers of the retina, choroid, and sclera.

(Image courtesy of Art J. Quinn, DVM, DACVO.)

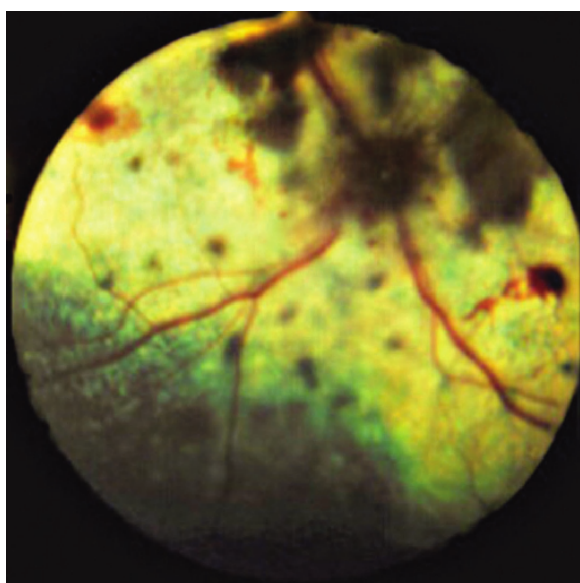


Figure 310
Chorioretinitis/Histoplasmosis
 (2-year-old domestic shorthair)

This young adult cat presented with a 3-week history of lethargy and weight loss. Harsh inspiratory lung sounds and fever were noted on physical examination. Multifocal darkly colored exudates obscure the tapetal reflection near the optic nerve. Smaller pigmented foci and retinal hemorrhages are scattered throughout. The optic disc is dark and poorly defined in this blind eye. The diagnosis was confirmed when *H. capsulatum* was identified in a lymph node aspirate.

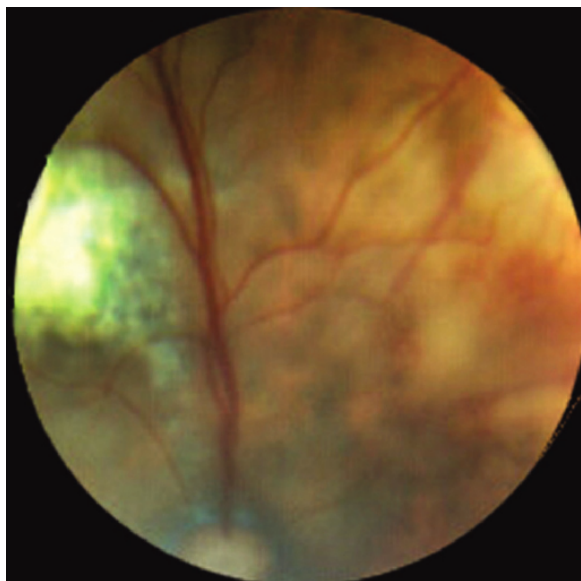


Figure 311
Chorioretinitis/Histoplasmosis
(7-year-old Domestic shorthair)

This cat's pupils had been dilated for several weeks before the owner noted a change in its vision. Occasional sneezing was also reported. Extensive subretinal gray to cream-colored exudates obscure the tapetal reflection. The retina is detached, accounting for the vision loss. Anterior segment inflammation was not present at this initial examination, but severe anterior uveitis accompanied a relapse of ocular signs when antifungal therapy was discontinued 6 months later. Vision never improved.

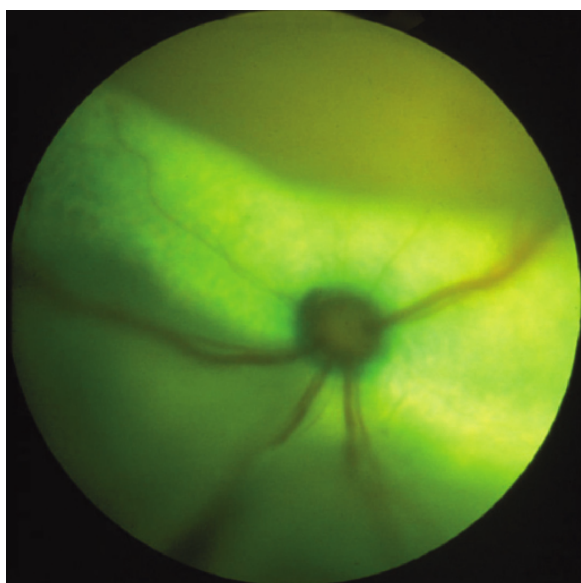


Figure 312
Chorioretinitis/Histoplasmosis
(8-year-old domestic shorthair)

This is the fundus of the cat in Figures 68 and 204. The entire inferior retina is elevated because of subretinal exudates. A large detachment is also present superiorly. *Histoplasma capsulatum* was identified in the subretinal exudate.

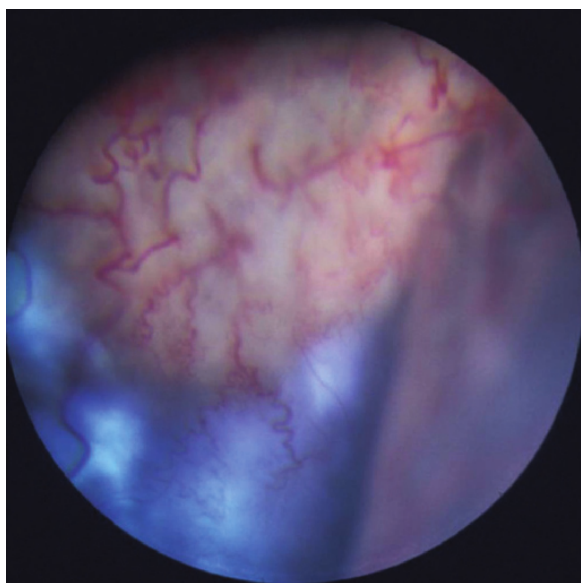


Figure 313
Chorioretinitis/Histoplasmosis
(1.5-year-old domestic shorthair)

This is the right fundus of the cat pictured in Figure 90. The anterior segment in this eye and the posterior segment of the left eye were normal. A large intraretinal and presumed subretinal granuloma is present superiorly, and the remaining retina is detached. The optic disc cannot be visualized. The diagnosis was based on the presence of *Histoplasma* organisms within the biopsy of the left bulbar conjunctival mass.

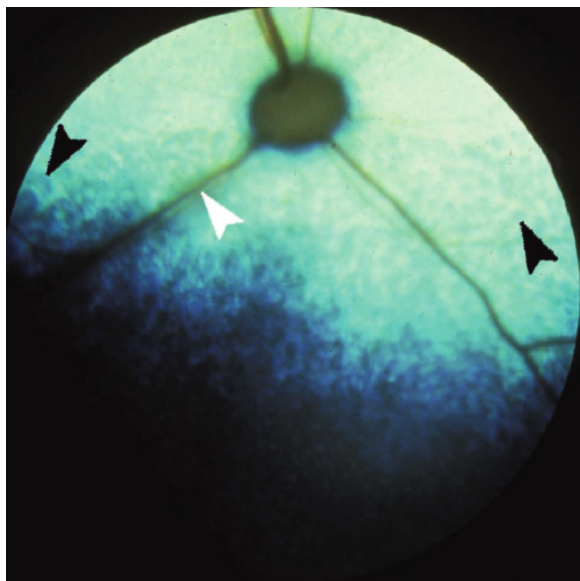


Figure 314
Chorioretinitis/Cryptococcosis
 (11-year-old domestic shorthair)

This is the fundus of the cat in Figure 207. The tapetum has a mottled appearance due to focal edema (*black arrows*). There is one area of perivascular exudate at the white arrow.

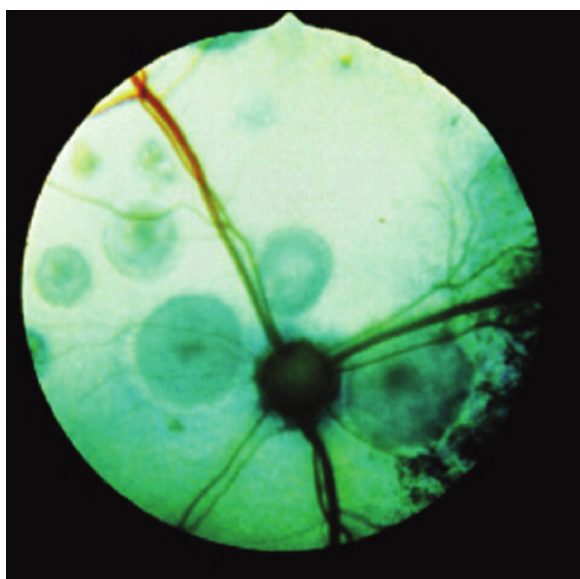


Figure 315
Chorioretinitis/Cryptococcosis
 (6-year-old domestic shorthair)

Lethargy, poor appetite, and chronic nasal discharge were presenting complaints in this patient. The anterior segments of both eyes were normal. Chorioretinitis is characterized by multifocal circles of well-defined subretinal edema that surround darker granulomatous central exudates. An aspirate from a small mass in the left nostril revealed cryptococcal organisms on cytology.

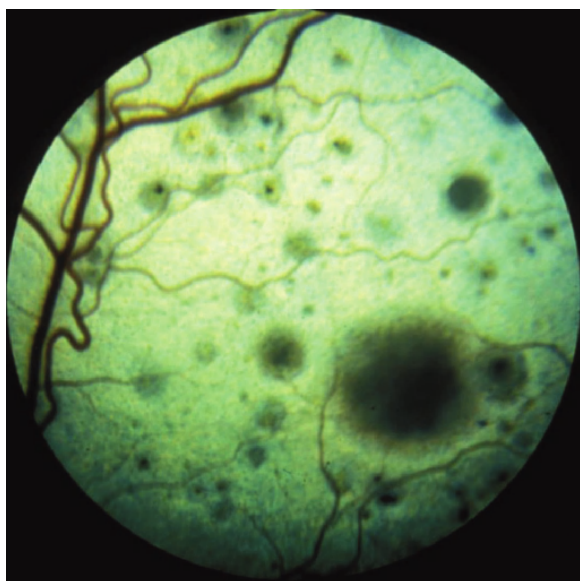


Figure 316
Chorioretinitis/Cryptococcosis
 (5-year-old domestic shorthair)

Broad-spectrum antibiotics had no effect on this cat's nasal discharge of 3 months' duration. The anterior segments of both eyes were normal. The retinal vessels are distended, with notable arteriolar tortuosity. Retinal and subretinal exudates appear as multiple pigmented foci throughout the tapetal fundus. *Cryptococcus neoformans* was detected in a bone marrow aspirate, confirming a positive serologic titer.

(Image courtesy of Art J. Quinn, DVM, DACVO.)

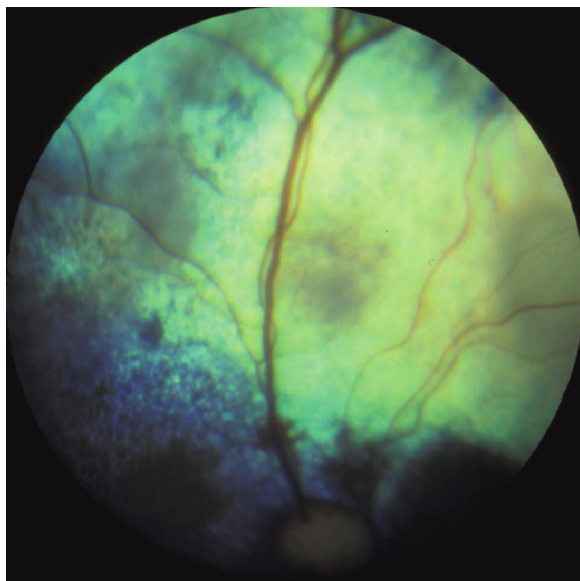


Figure 317
Chorioretinitis/Cryptococcosis

(5-year-old domestic shorthair)

This is the fundus of the cat in Figure 208. Both eyes were similarly affected. The multiple ill-defined grey areas represent subretinal and choroidal granulomatous exudates. Elevation of retinal vessels can be appreciated at the 3-o'clock position. The optic disc appears dark due to photographic technique. Dark areas of abnormal pigmentation can be seen immediately superior to the disc.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

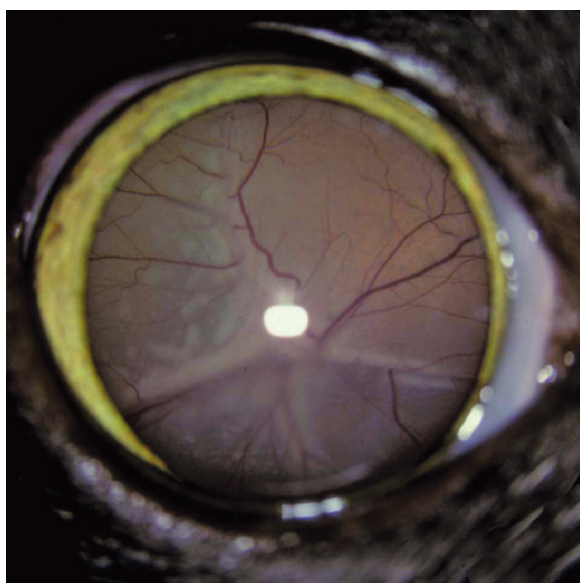


Figure 318
Retinal Detachment/Cryptococcosis

(11-year-old domestic shorthair)

This cat developed multiple cutaneous nodules after being treated with oral prednisolone for 1 month to control its asthma. Acute vision loss occurred shortly thereafter. Both eyes in this cat were similarly affected. The retina is totally detached and retinal vessels are apparent just posterior to the lens. Focal and linear exudates appear pale beneath the retinal vessels. No tapetal reflex can be seen because of the severe choroiditis. The diagnosis was confirmed on histopathology of the skin and ocular lesions.

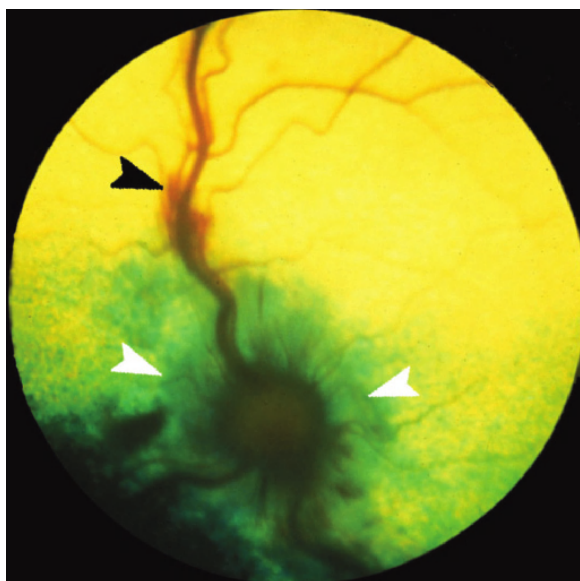


Figure 319
Chorioretinitis/Cryptococcosis

(4-year-old domestic shorthair)

Both eyes were similarly affected in this cat, presented because of lethargy and blindness. Retinal hemorrhages are present below the superior retinal venule (*black arrow*) and in the peripapillary nerve fiber layer. The optic nerve is swollen and the peripapillary retina is elevated (*white arrows*). *Cryptococcus* organisms were identified in the choroid, subretinal space, and meninges surrounding the optic nerve.

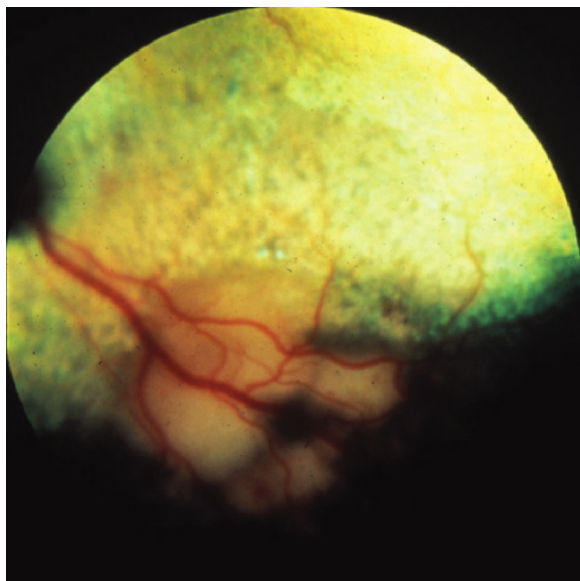


Figure 320
Chorioretinitis/Blastomycosis
(3-year-old domestic shorthair)

Dyspnea, depression, and elevated body temperature accompanied ocular lesions in this cat, which was lost for 5 days and found disoriented 2 days prior to admission. The retina at the tapetal-nontapetal junction is elevated by a cream-colored, granulomatous exudate, suggestive of mycotic chorioretinitis. Scattered pigment and altered reflectivity characterize the tapetum superior to the granuloma. The cat died approximately 24 hours after hospitalization. Large numbers of *Blastomyces dermatitidis* organisms were found within the ciliary body, choroid, and tapetum.

(Image courtesy of Mark Nasisse, DVM, DACVO; Nasisse M: Ocular changes in a cat with systemic blastomycosis. *JAVMA* 187:629, 1985.)

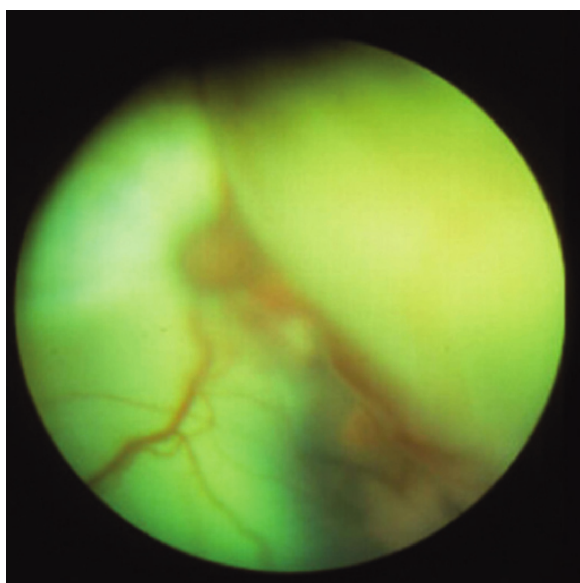


Figure 321
Chorioretinitis/Blastomycosis
(4-year-old domestic shorthair)

This outdoor cat was presented for evaluation when the owner noted its poor appetite and accompanying weight loss. Non-ocular abnormalities included fever, mild dyspnea, and a draining skin lesion on the right hind paw. The anterior segments of both eyes were normal. Posteriorly, the optic disc and one main retinal vessel are recognizable but a complete exudative retinal detachment obscures the remaining fundus detail. A cream-colored subretinal exudate is visible at 5 o'clock. This eye is blind. The opposite eye was less severely affected and remained sighted. The organism was identified cytologically in a sample from the skin lesion.



Figure 322
Chorioretinitis/Blastomycosis
(11-year-old domestic longhair)

Blindness was this cat's presenting complaint. A massive granulomatous exudate appears pinkish white, obscuring fundus detail. The majority of the cellular material is subretinal, separating the retina from the underlying choroid. Preretinal exudates obscure retinal vessels near the optic disc (arrow). Scattered hemorrhages and dilated, tortuous blood vessels are also seen above the exudates. The suspicion of mycotic disease was confirmed at necropsy.

(Image courtesy of Art J. Quinn, DVM, DACVO.)



Figure 323
Chorioretinitis/Coccidioidomycosis
(2-year-old domestic shorthair)

A sibling and housemate of the cat pictured in Figure 211, this cat was presented 2 months later with a complaint of blindness. There were no signs of systemic disease or anterior segment ocular involvement. This photograph, taken through a dilated pupil, shows a complete retinal detachment with subretinal exudates and focal retinal hemorrhage.

(Image courtesy of Paul M. Barrett, DVM, DACVO.)

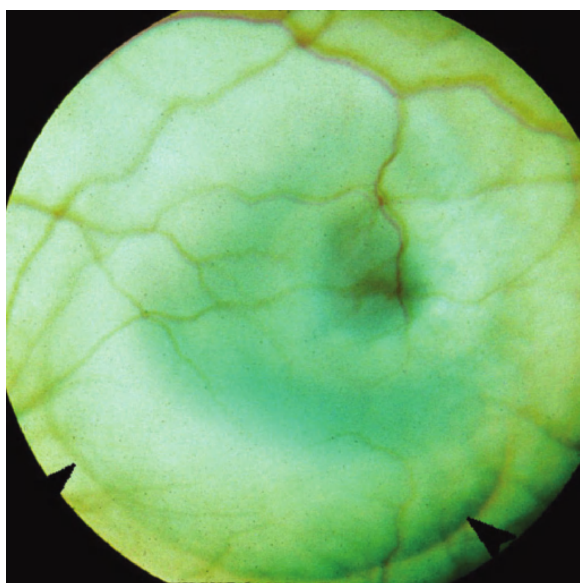


Figure 324
Chorioretinitis/Coccidioidomycosis
(2-year-old domestic shorthair)

This is the opposite fundus of the cat in Figure 323. The darker central area in the peripheral retina represents an early subretinal granuloma. Adjacent changes in tapetal coloration and reflectivity represent retinal edema and the edge of an early bullous detachment (arrows). An immunodiffusion test for *Coccidioides immitis* was positive.

(Image courtesy of Paul M. Barrett, DVM, DACVO.)

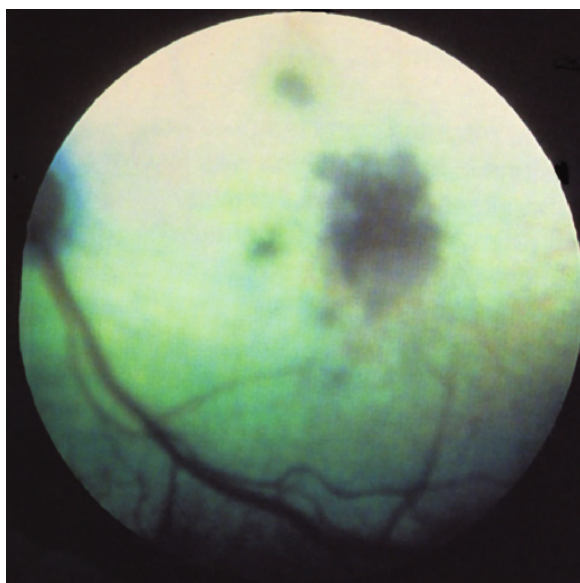


Figure 325
Chorioretinitis/Toxoplasmosis
(5.5-year-old domestic shorthair)

This cat was diagnosed with toxoplasmosis based on an IgG titer of 1:4096. The optic disc is just visible at the photograph's left margin. Near the area centralis is a subretinal exudate with satellite foci of edema and abnormal pigment.

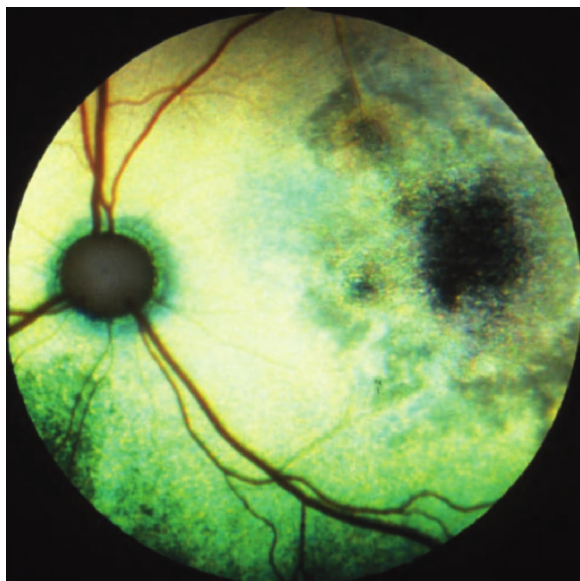


Figure 326
Chorioretinopathy/Toxoplasmosis

(6-year-old domestic shorthair)

This is the same cat in Figure 325, examined 5 months later. Active inflammation has resolved. Pigmentation of the tapetal fundus is a conspicuous sequela. Post-inflammatory retinal atrophy contributes to the surrounding tapetal hyperreflectivity.

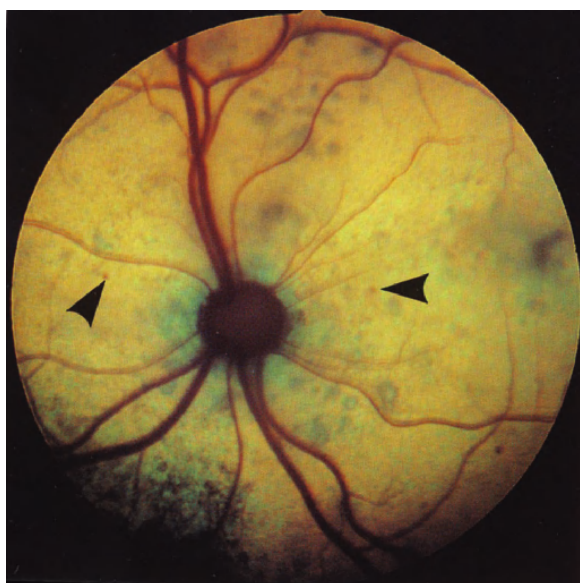


Figure 327
Chorioretinitis/Toxoplasmosis

(12-year-old domestic shorthair)

Presented for unilateral anterior uveitis, this cat also had bilateral retinal lesions. Pinpoint intraretinal hemorrhages are present (*arrows*). Intraretinal and subretinal exudates appear as dark foci adjacent to the optic disc and scattered throughout the tapetal retina. Toxoplasmosis titers were positive: IgM was 1:64 and IgG was 1:256.



Figure 328
Chorioretinitis/Toxoplasmosis

(6-year-old Manx)

Toxoplasmosis had been diagnosed as the cause of a unilateral anterior uveitis 18 months beforehand. Multiple bullous retinal detachments now alter tapetal reflectivity (*arrows*). Fundus structures appear small in this photograph, taken through a 28-diopter lens. The only positive serology was a toxoplasmosis IgM titer of 1:64 and an IgG titer of 1:2048.

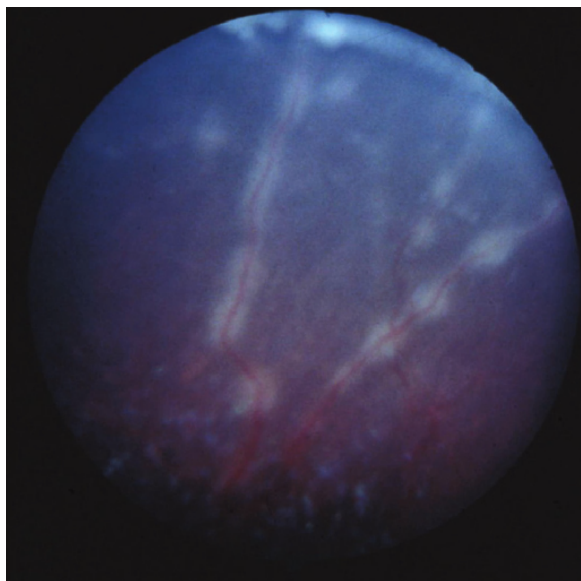


Figure 329
Chorioretinitis/Toxoplasmosis
(9-year-old domestic shorthair)

Presented for evaluation of a cloudy left eye, this cat was diagnosed with an exudative anterior uveitis. The ipsilateral nontapetal retina shows perivascular cuffing and focal intraretinal and preretinal exudates. Tests for FeLV and FIP were negative. A toxoplasmosis titer was positive at 1:256. The right eye was normal.

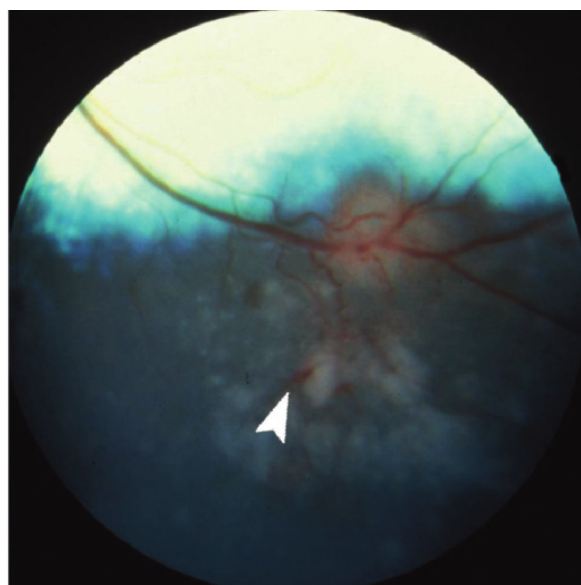


Figure 330
Chorioretinitis/Toxoplasmosis
(5.5-year-old domestic shorthair)

The right eye had a severe anterior uveitis that prevented examination of the retina. In the left eye, a granulomatous exudate obscures retinal vessels in the nontapetal region. Focal intraretinal hemorrhage (*arrow*) is also present. The only positive laboratory finding was a low *Toxoplasma* titer that was not repeated.

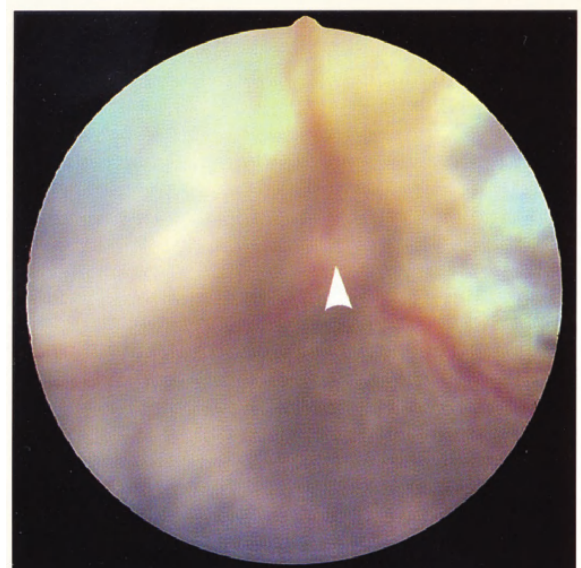


Figure 331
Chorioretinitis/Toxoplasmosis
(9-year-old domestic shorthair)

This cat went acutely blind after a 1-month period of lethargy, anorexia and weight loss. The pupils were dilated and unresponsive. The anterior segments had only a mild aqueous flare. A subretinal exudate elevates the left retina and obscures underlying tapetal detail. Pigment proliferates around the swollen optic disc (*arrow*). Similar changes were present in the right fundus. An FIV test was positive, as were titers for toxoplasmosis (IgM of 1:128; IgG of 1:2048).

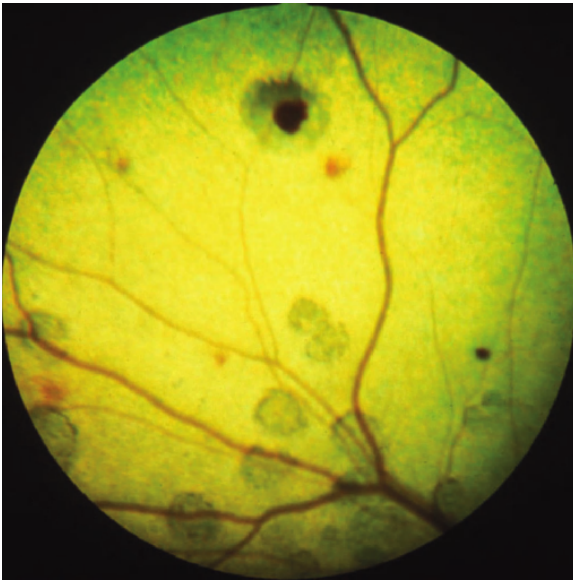


Figure 332
Chorioretinitis/*Feline hemotropic mycoplasmosis*
 (1-year-old domestic shorthair)

This cat was icteric and in respiratory distress when presented for examination. Intraretinal hemorrhages appear as small red dots throughout the tapetal fundus. The dark circular lesions are presumably sites of previous hemorrhage. The cat had a regenerative anemia and was FeLV negative. *Mycoplasma haemofelis* (previously termed *Haemobartonella felis*) was diagnosed on a direct blood smear.

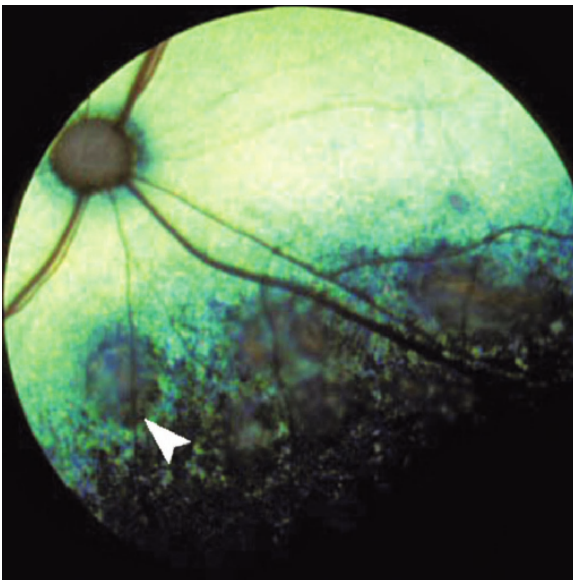


Figure 333
Retinitis/Bacterial meningitis
 (6.5-year-old domestic shorthair)

This cat was presented with a history of acute blindness 48 hours prior to examination. Both pupils were dilated and nonresponsive. The only lesions were rounded areas of altered coloration along the tapetal junction. These areas of retinitis had pink centers, presumably due to cellular infiltrates, with grey and pigmented borders. All routine serology was negative. A cerebral spinal fluid tap yielded a culture of *Enterococcus avium*. Vision returned following antibiotic therapy.

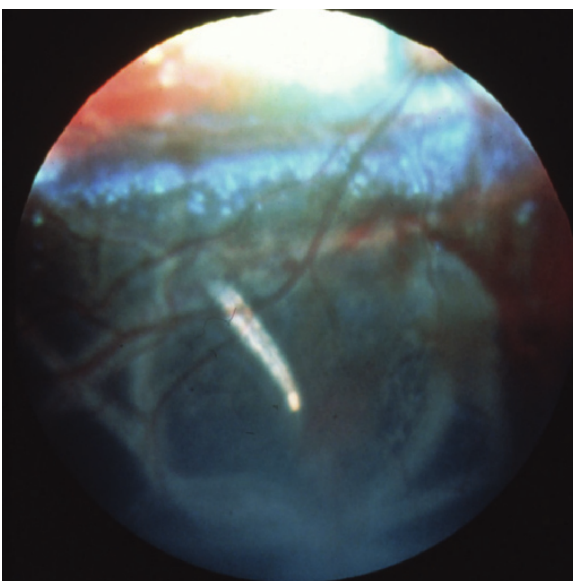


Figure 334
Chorioretinitis/Ophthalmomyiasis
 (18-month-old domestic shorthair)

Presented because of inspiratory dyspnea, this cat had a lack of menace response and incomplete pupillary light reflexes. The white segmented body of a fly larva is located beneath a retinal venule in the nontapetal fundus. Numerous linear gray "tracks" represent sites of larval migration. Retinal hemorrhage is present in both the tapetal and nontapetal areas.

(Image courtesy of Nancy M. Bromberg, VMD, DACVO.)

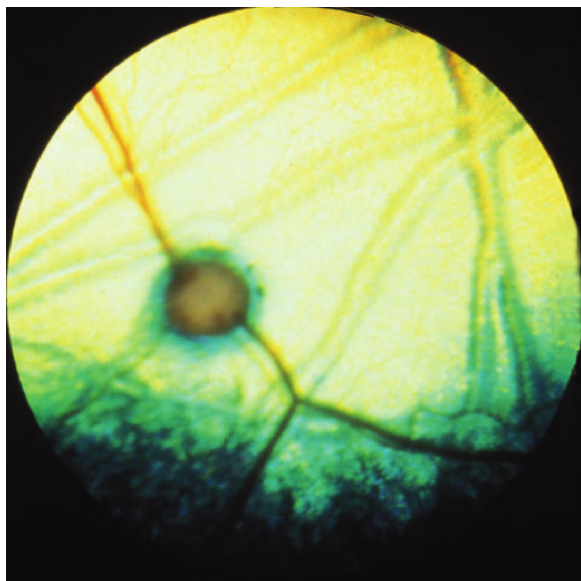


Figure 335
Chorioretinopathy/Ophthalmomyiasis
(2-year-old domestic shorthair)

Missing for 2 days, this cat returned home with a red left eye. A hemorrhagic anterior uveitis prevented evaluation of the posterior segment, but the right eye was normal. Following 1 week of treatment, the anterior uveitis cleared sufficiently to reveal linear, well-demarcated, hyperreflective "tracks" in the tapetal retina. Corresponding tracks appeared light gray within the nontapetal fundus. There were no signs of active chorioretinitis. Although no larvae were observed, the lesions are compatible with subretinal larval migration.

(Image courtesy of B. Keith Collins, DVM, MS, DACVO.)



Figure 336
Chorioretinitis/Traumatic
(2.5-year-old Siamese)

This cat was initially examined for eyelid and nictitans lacerations. The anterior chamber was filled with a large blood clot that prevented examination of the fundus. Ten days after treatment for the uveitis, the optic disc (*arrow*) is surrounded by massive subretinal hemorrhage. Resorbing hemorrhage superior to the disc appears darker in color. The overall appearance of the fundus is red because of tapetal hypoplasia and normal lack of pigment within this color-dilute breed.



Figure 337
Hypertensive retinopathy
(12-year-old domestic shorthair)

Following a diagnosis of hypertension by the primary veterinarian, this cat was referred for ocular examination. This left eye has subtle focal retinal edema and tapetal discoloration. There was no apparent retinal hemorrhage. The right eye had severe intravitreal hemorrhage and a detached retina.

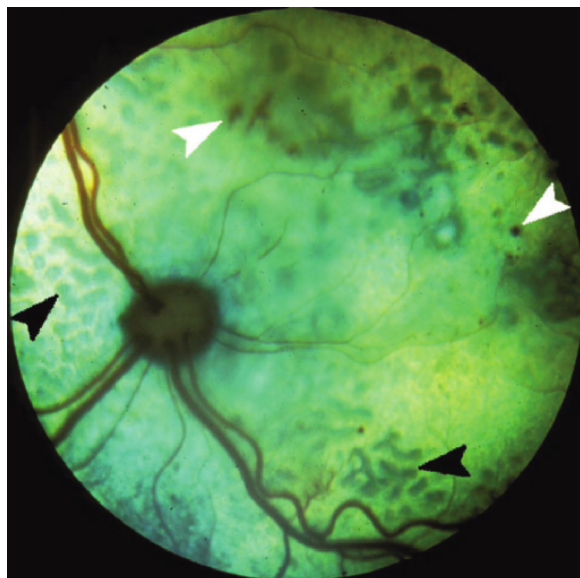


Figure 338
Hypertensive retinopathy/Retinal detachment
 (9-year-old domestic longhair)

Presented for evaluation of dark spots on the iris, this cat had a normal pupillary light reflex and functionally normal vision. Both eyes were similarly affected. The dark linear foci (*black arrows*) represent retinal folds caused by edema. The retina to the right of the disc is detached, blurring the detail of the underlying tissue. Focal intraretinal hemorrhages (*white arrows*) are also present. This cat had a blood urea nitrogen (BUN) of 71 mg/dl, a creatinine of 3.1 mg/dl, a systolic blood pressure greater than 300 mm Hg, and generalized cardiomegaly.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

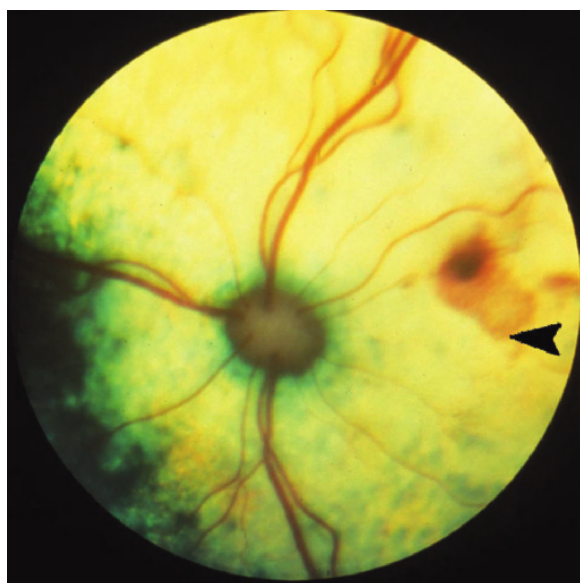


Figure 339
Hypertensive retinopathy
 (12-year-old domestic shorthair)

Intraocular hemorrhage had spontaneously resolved prior to this cat's initial evaluation. Mild aqueous flare and slight iris swelling were present bilaterally. Vision and pupillary light reflexes were normal. The tapetum has a mottled appearance due to abnormal pigmentation and diffuse but mild edema. Intraretinal and subretinal hemorrhages are also present (*arrow*). The physical and laboratory findings confirmed hypertension (systolic blood pressure 230 mm Hg) and hyperthyroidism.

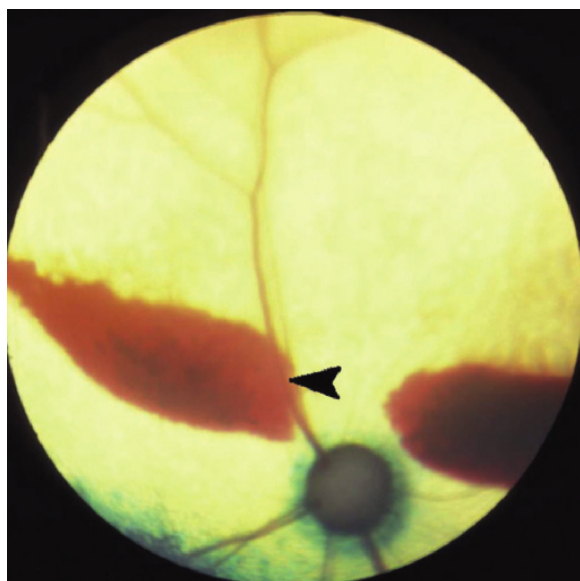


Figure 340
Hypertensive retinopathy
 (13-year-old domestic shorthair)

This hypertensive cat had a systolic blood pressure of 260 mm Hg. The left eye is somewhat atypical with only large areas of subretinal hemorrhage. The superior retinal vessel can be seen coursing over the area of hemorrhage (*arrow*).

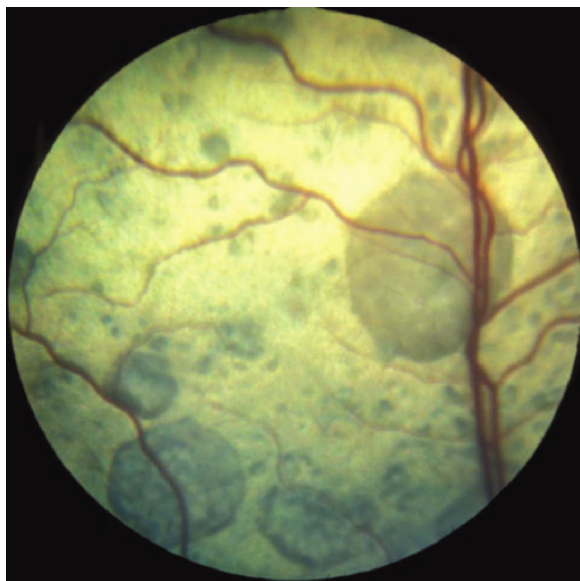


Figure 341
Hypertensive retinopathy
(10-year-old domestic shorthair)

Of a CBC, serum chemistry profile, and routine serologic tests, the only significant abnormality was a mild elevation of BUN in this patient. A subsequent blood pressure measurement documented a mean systolic pressure of 220 mm Hg. Both eyes were similar, with normal vision and normal pupillary reflexes. Multiple rounded foci of edema alter the tapetal reflection. Fluid accumulation is sufficient at some sites to elevate the overlying retina. No retinal hemorrhage was seen.

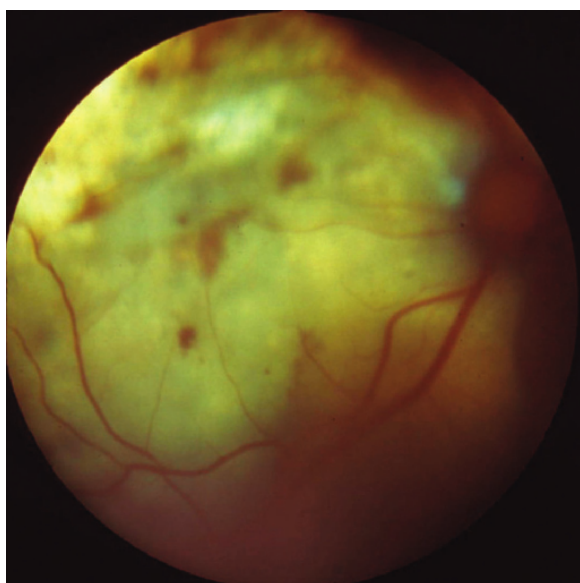


Figure 342
Hypertensive retinopathy/Retinal detachment
(12-year-old domestic shorthair)

This cat was presented for decreased vision of 2 weeks' duration. Mild aqueous flare was noted bilaterally, but pupillary light reflexes were normal. The entire retina is edematous, with an inferior bullous detachment and scattered subretinal hemorrhages. Mild azotemia (BUN 36 mg/dl) accompanied a mean systolic blood pressure of 230 mm Hg.

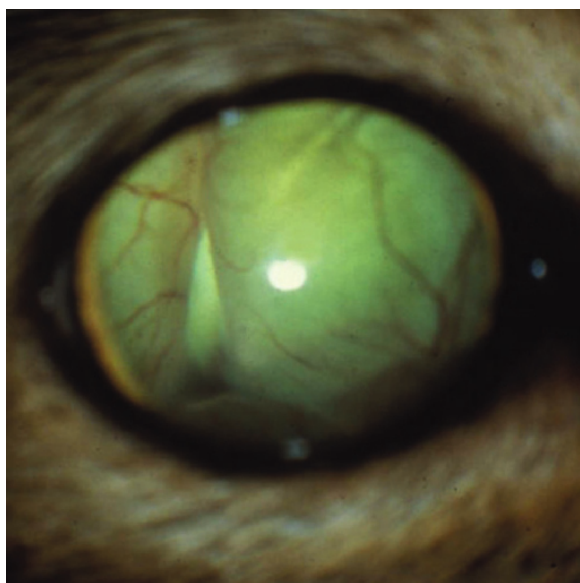


Figure 343
Hypertensive retinopathy/Retinal detachment
(18.5-year-old Somali)

Acute blindness of 2 days' duration was the result of bilateral bullous retinal detachments. Both pupils were dilated and nonresponsive. The retina appears as a semitransparent vascularized membrane through the dilated pupil of the right eye. Some retinal vessels are out of focus because of the detachment. The only abnormal test result was a mean systolic blood pressure of 210 mm Hg.

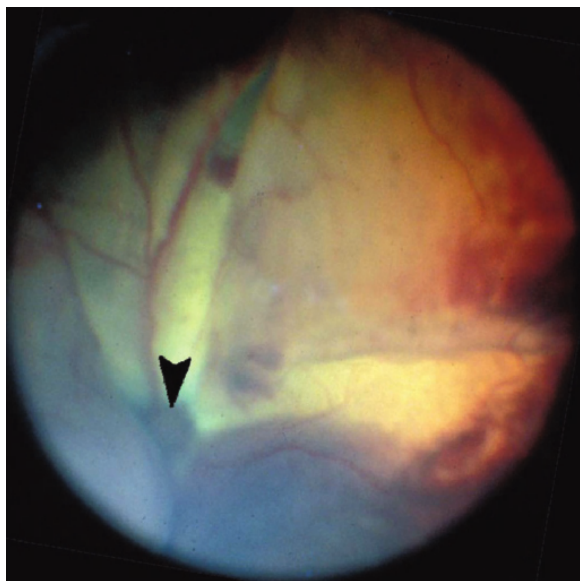


Figure 344
Hypertensive retinopathy/Retinal detachment
(14-year-old domestic longhair)

This cat had a history of progressive vision loss for 2 weeks, resulting in blindness 2 days prior to evaluation. Fundus structures appear small in this photograph, taken through a 28-diopter lens. The optic disc (*arrow*) can be seen at the apex of a large bullous detachment. Intraretinal and subretinal hemorrhages are also present. The only abnormal laboratory or physical finding was a systolic blood pressure of 280 mm Hg.

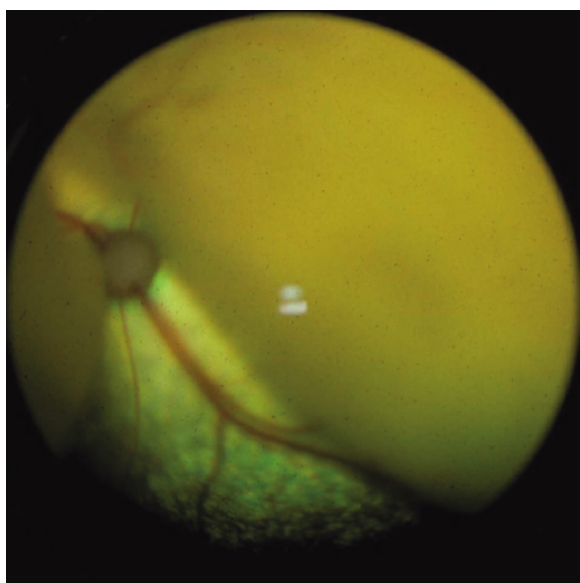


Figure 345
Hypertensive retinopathy/Retinal detachment
(13-year-old domestic shorthair)

This hypertensive cat was referred to determine the likelihood of vision return. At presentation the cat was blind, with fixed, dilated pupils. Large areas of the tapetal fundus appear featureless due to extensive bullous retinal detachment. Only the optic disc and a small diagonal section of edematous retina are recognizable. No hemorrhage was present in either eye. The systolic blood pressure was 260 mm Hg.

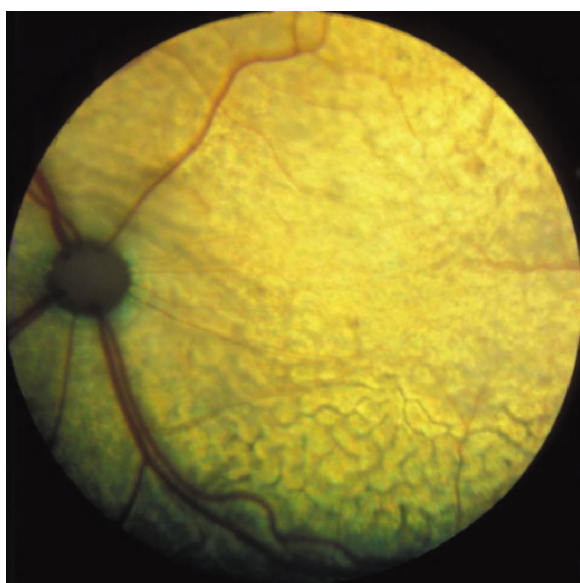


Figure 346
Hypertensive retinopathy/Retinal detachment
(13-year-old domestic shorthair)

This is the same eye of the cat featured in Figure 345 following 1 month of treatment for its hypertension. The pupils are now responsive and the cat is visual. The dark vermiform lesions represent persisting edema in the outer retinal layers, but the bullous detachments have resolved.

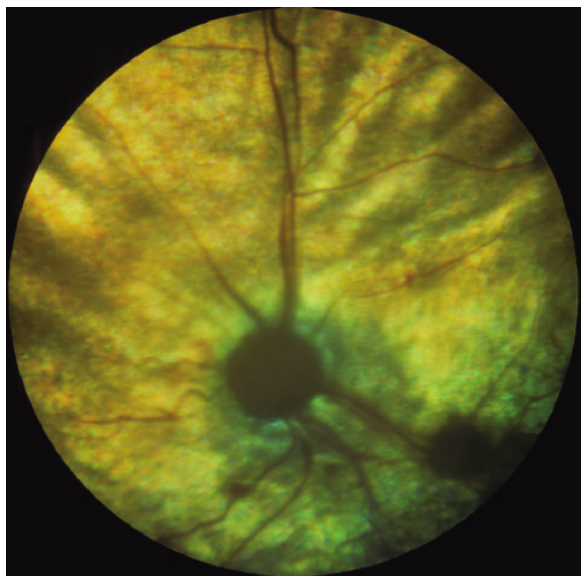


Figure 347
Hypertensive retinopathy/Retinal degeneration
(13-year-old domestic shorthair)

Twenty months prior to examination, this cat was blind with a total bullous retinal detachment and mild intraretinal hemorrhage. Its blood pressure and pupillary light reflexes had returned to normal in response to therapy, and the cat was once again visual. Secondary retinal degeneration is suggested by the hyperreflective tapetum and its furrows of darker coloration that mimic the pattern of the deeper choroidal vessels. The optic disc appears dark because of the neutral density filter used to minimize the tapetal reflectivity for the photograph.

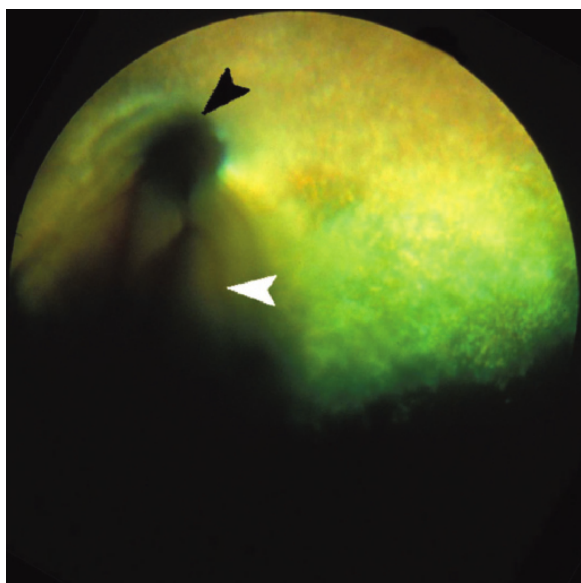


Figure 348
Retinal detachment/Post-traumatic
(4-year-old domestic shorthair)

Examined for decreased vision and a red left eye, this cat had a history of severe head trauma as a kitten. Anterior uveitis and intraocular hemorrhage accounted for the current ocular redness. The right retina hangs from the optic disc (*black arrow*) in an inverted V shape and is no longer attached peripherally at the ora ciliaris. Vessels (*white arrow*) can be seen within the retina, but the adjacent tapetal fundus is notably avascular and hyperreflective.

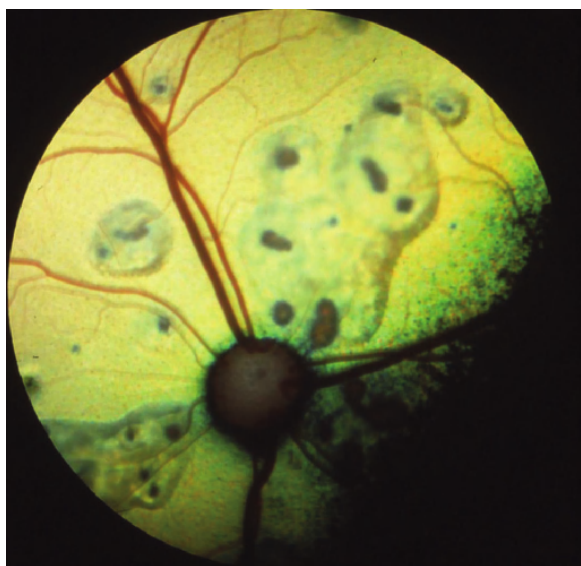


Figure 349
Retinitis/Traumatic
(2-year-old domestic shorthair)

The left globe was proptosed when this cat was hit by a car 24 hours ago. He now appears to be blind in the remaining right eye, the pupil of which is widely dilated and nonresponsive. Multiple deep retinal lesions are scattered throughout the tapetal fundus, with central foci of abnormal pigment surrounded by edema. A few of the lesions appear hyperreflective as the direction of incident light changes.

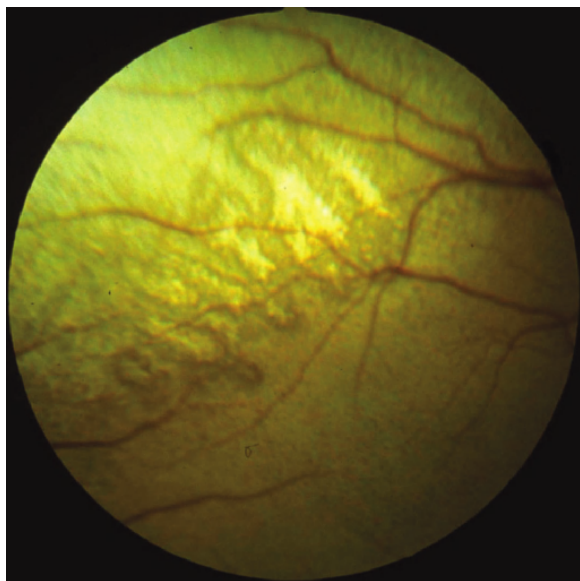


Figure 350
Retinopathy/Traumatic
(4-year-old Siamese)

Anterior uveitis was initially present in the right eye following head trauma. The nasal left fundus appears corrugated, with darkly marginated bands of tapetal hyperreflectivity. This finding is compatible with resolving retinal edema and trauma-induced retinal folds.

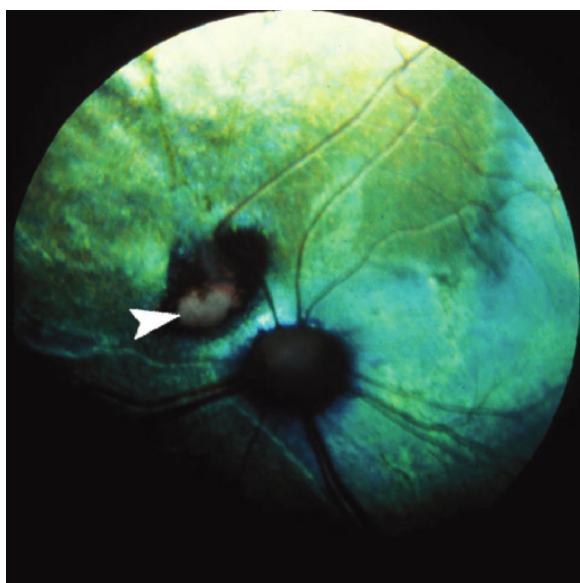


Figure 351
Retinopathy/Post-inflammatory
(6-year-old domestic shorthair)

One year prior to presentation, this cat had been treated for a retrobulbar abscess of the right eye. The owners recently noted pupils of unequal size. The pupil in this eye was dilated with no direct or indirect pupillary light reflexes, while the left reflexes were normal. The optic disc is atrophic. Dorsal retinal vessels are attenuated against the mottled, hyperreflective tapetal background. The sclera (*arrow*) is visible due to loss of overlying choroid and outer retinal layers; surrounding choroidal pigment is hyperplastic. This is a blind eye.

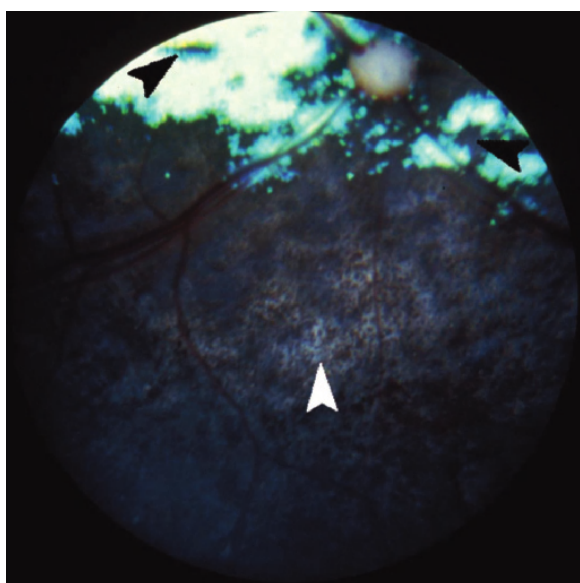


Figure 352
Retinopathy/Post-traumatic
(1.5-year-old domestic shorthair)

This outdoor cat, rarely seen by its owners, was believed to have been hit by a car several months prior to examination. The cat is functionally blind, with dilated and areflexic pupils. The optic disc is subjectively pale and the retinal vessels appear mildly attenuated. Abnormal pigment (*black arrows*) is present at the tapetal-nontapetal junction. Areas of depigmentation interspersed with foci of pigment hypertrophy create a cobblestone appearance (*white arrow*) within the nontapetal fundus. Blindness was attributed to atrophy of the outer retinal layers, a consequence of the cat's initial trauma.

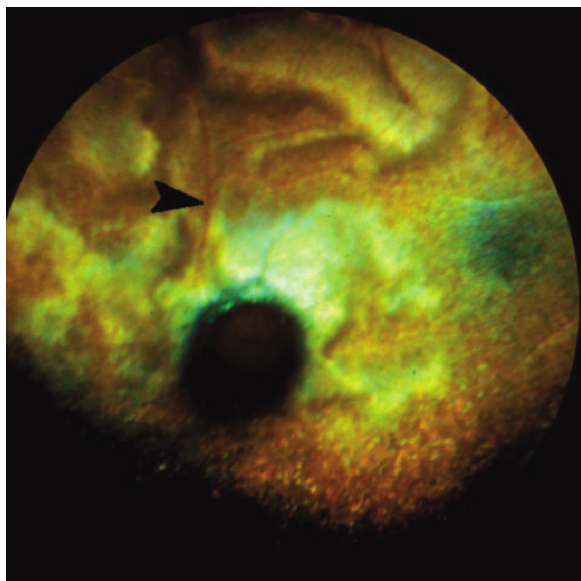


Figure 353
Retinopathy/Idiopathic
(1-year-old domestic shorthair)

The referring veterinarian noticed a mild anisocoria but could appreciate no change in vision. Pupillary light reflexes in the right eye were normal but reflexes in this left eye were sluggish. Few retinal vessels remain (*arrow*). The optic disc is atrophic, although the dark color is primarily an effect of photographic technique. The tapetum is generally hyperreflective, as evident immediately above the dark, circular optic disc. Note that the degree of reflectivity in any one area can vary substantially during the examination, dependent on the angle of incident light. The cause of this retinal atrophy was unknown.



Figure 354
Fluoroquinolone retinopathy
(8-year-old domestic shorthair)

This photograph was taken 6 days after discontinuing a course of enrofloxacin. The cat, now blind, began demonstrating decreased vision on day 4 of treatment. The photograph was taken with a neutral density filter to preserve fundus detail in the face of extreme tapetal hyperreflectivity. As a consequence, the optic disc appears darker than normal. The increased tapetal reflectivity is accompanied by retinal vessel attenuation. A later image of the fundus can be seen in Figure 355.

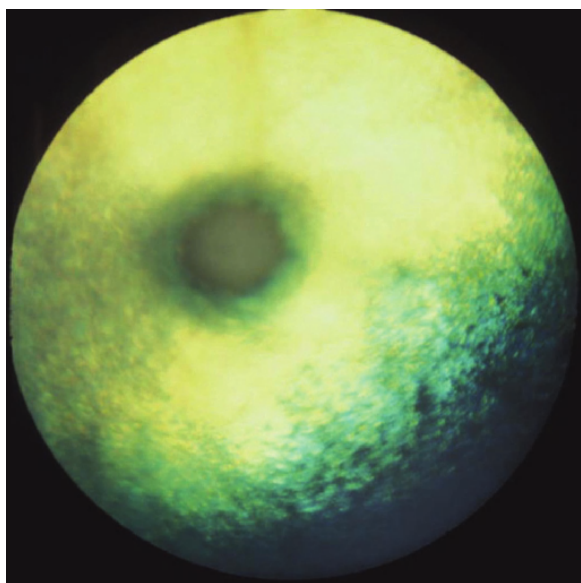


Figure 355
Fluoroquinolone retinopathy
(8-year-old domestic shorthair)

Eight months later, the eye depicted in Figure 354 was reexamined. Even with a neutral density filter, the tapetum appears notably hyperreflective. The retinal vessels are now severely attenuated and difficult to distinguish.

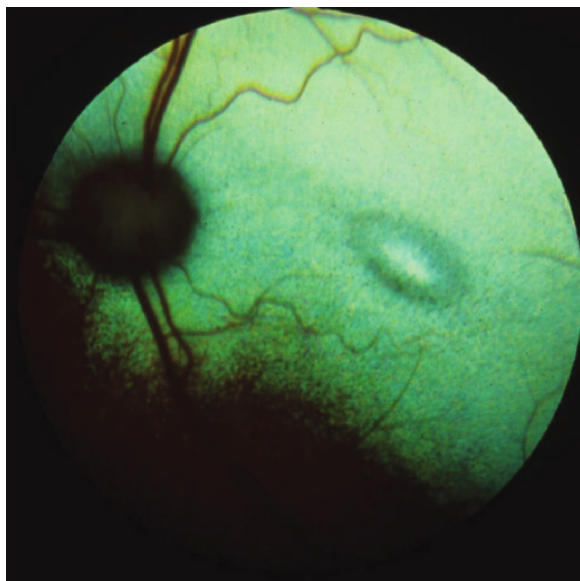


Figure 356
Feline central retinal degeneration
(7.5-year-old Siamese)

As in most cases of feline central retinal degeneration (FCRD), the disorder's bilaterally symmetrical lesions were a coincidental finding. In this left eye, an elliptical area of tapetal hyperreflectivity is evident within the area centralis, the region temporal and superior to the optic disc. The margin of the lesion appears characteristically darker than its reflective center. A neutral density filter causes the normal optic disc to appear unusually dark in color.

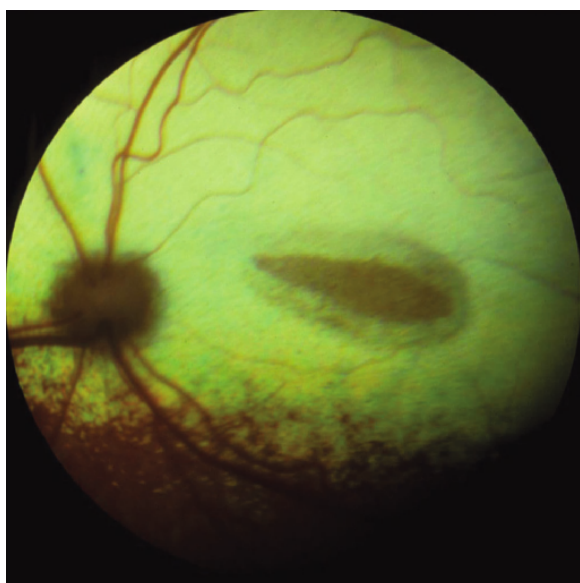


Figure 357
Feline central retinal degeneration
(12-year-old Siamese)

Presented for evaluation of an iris mass in the right eye, this bilateral retinal degeneration was a coincidental finding. The increasing size of the elliptical lesion within the area centralis indicates a more advanced stage of the disorder. The lesion's reflectivity varies as the incidence of the examination beam changes. A slight variation in direction of the light will cause the dark center to appear hyperreflective and its margins to conversely darken, as seen in Figure 356.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

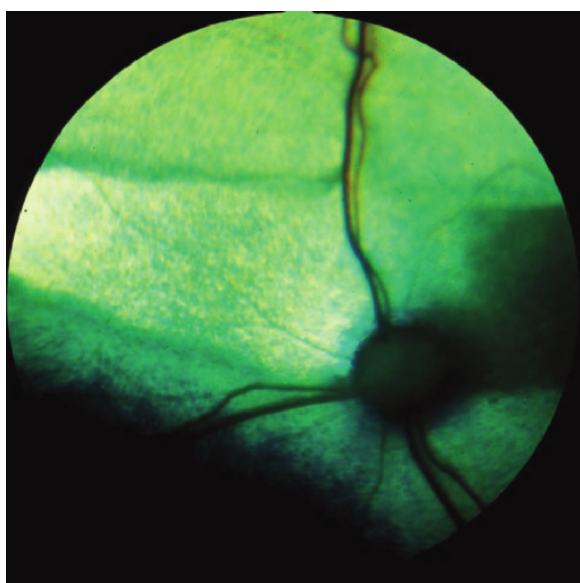


Figure 358
Feline central retinal degeneration
(14-year-old domestic shorthair)

This case was referred for retinal evaluation following a routine physical examination. A large horizontal band of abnormal tapetal reflectivity extends nasally and temporally above the optic disc. As the angle of incident light varies, the appearance of the lesion alternates from light and shiny (left of disc) to dark and dull (right of disc). Although the lesion was bilateral, no vision deficit was detected.

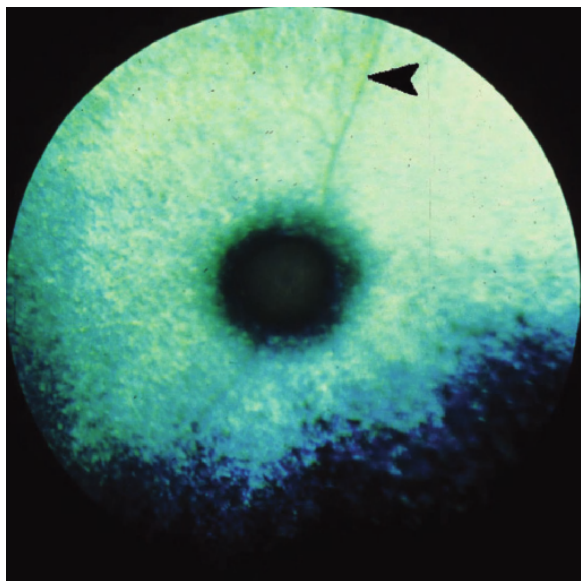


Figure 359
Feline generalized retinal atrophy
(4-month-old domestic shorthair)

The owners had not observed any vision deficit in this kitten until 1 month before examination. The kitten was fed a commercial cat food. Both pupils were dilated, but responded to a bright focal beam. The optic disc is dark because of the use of a neutral density filter. Only one attenuated retinal vessel (*arrow*) persists. The tapetum is brilliantly hyperreflective.

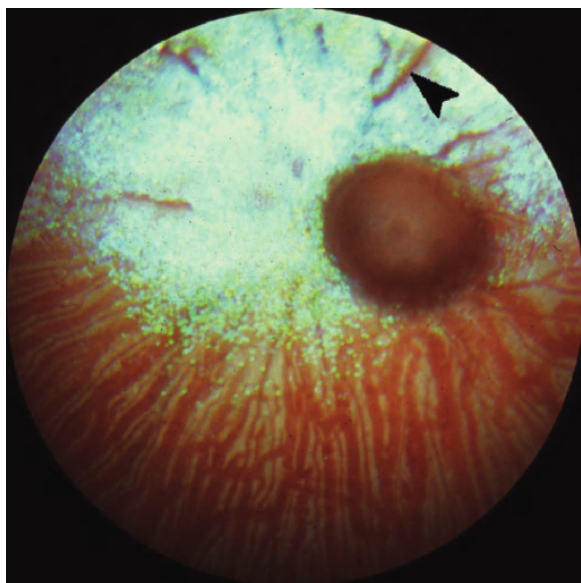


Figure 360
Feline generalized retinal atrophy
(1.5-year-old domestic shorthair)

This cat was examined because of dilated pupils and blindness of 2 weeks' duration. Normal choroidal vessels (*arrow*) are visible within the dorsal fundus because of tapetal hypoplasia and color dilution. The tapetum is hyperreflective, appearing almost white in color. The optic disc is pale, and few retinal vessels can be detected.

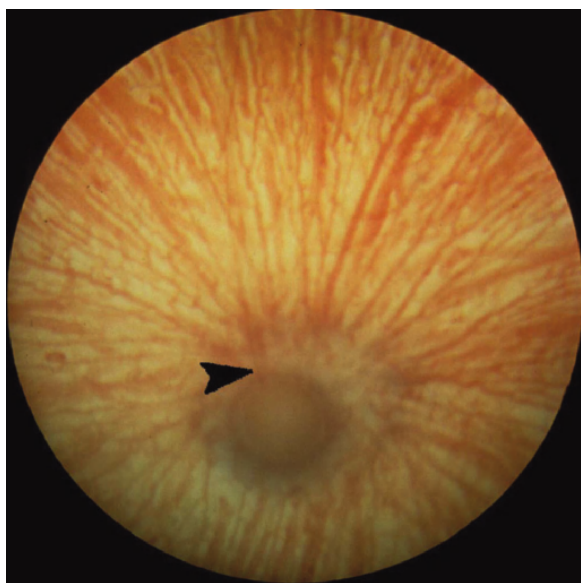


Figure 361
Feline generalized retinal atrophy
(1-year-old domestic shorthair)

The owners noted that the pupils had been dilated for months, but the cat only recently appeared blind. The pupils were responsive only to a bright focal beam. Choroidal vessels and the underlying sclera are normally visible in the atapetal, albinotic white cat. The optic disc is pale. Only a few attenuated retinal vessels can be seen at the superior margin of the disc (*arrow*).

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrings, McLellan, Albert. Elsevier Limited, 2010.)

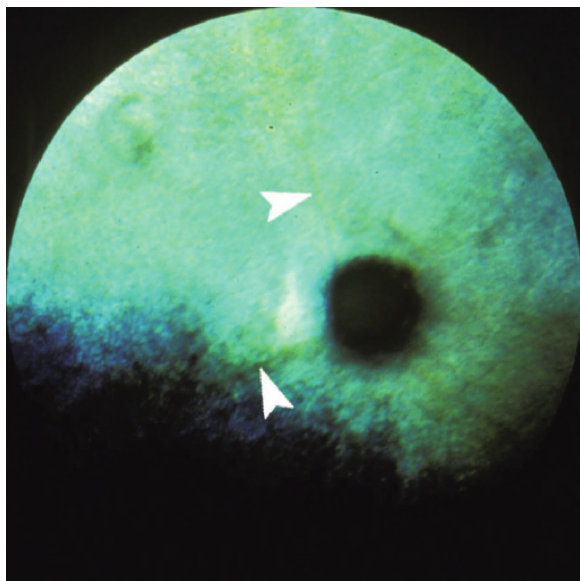


Figure 362
Progressive retinal atrophy
 (7-month-old Abyssinian)

Vision had never been normal according to this cat's owners, but function had definitely deteriorated over the last several months. The cat could now see only in very bright light. Both eyes were similarly affected with sluggish pupillary light reflexes. The tapetum is uniformly hyperreflective. The optic disc was pale in appearance, though its color here is altered by use of a neutral density filter. Severely attenuated vessels can be seen extending from the optic disc (arrows).

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

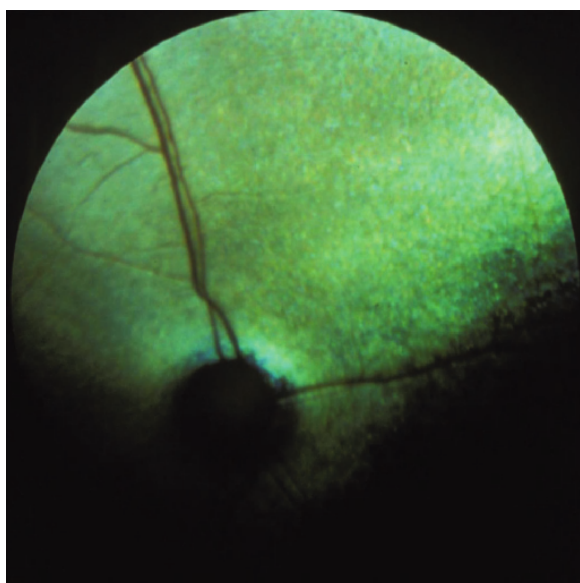


Figure 363
Progressive retinal atrophy
 (6-year-old Abyssinian)

Vision had been equally poor in both bright and dim light for about 1 year. The pupillary light reflexes were sluggish but present in both eyes. Attempts at visual testing were unrewarding because of the cat's uncooperative nature. All retinal vessels are attenuated and the tapetum is generally hyperreflective. The only abnormality in the nontapetal area was the subjective attenuation of retinal vessels. The optic disc appears dark due to the neutral density filter used for photography.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

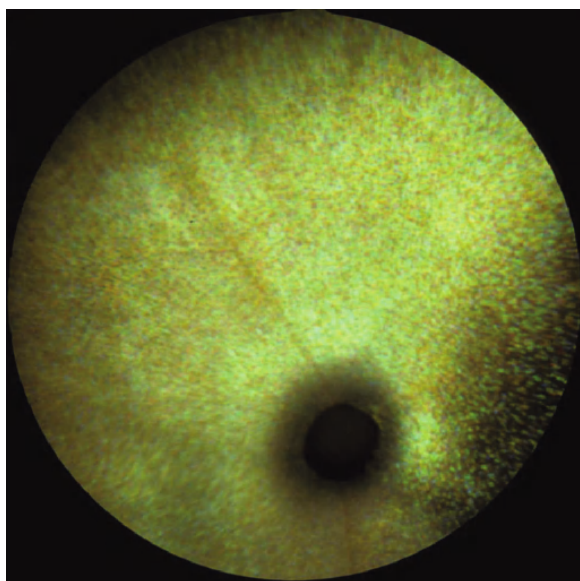


Figure 364
Progressive retinal atrophy
 (3-year-old Tonkinese)

Owners had noticed a decrease in night vision for several months. The dilated pupils responded poorly to bright light. Clinically the optic disc appeared pale; a neutral density filter darkens the disc in the image. The tapetum still appears hyperreflective, even with the dampening effect of the filter. Retinal vessels are severely attenuated.

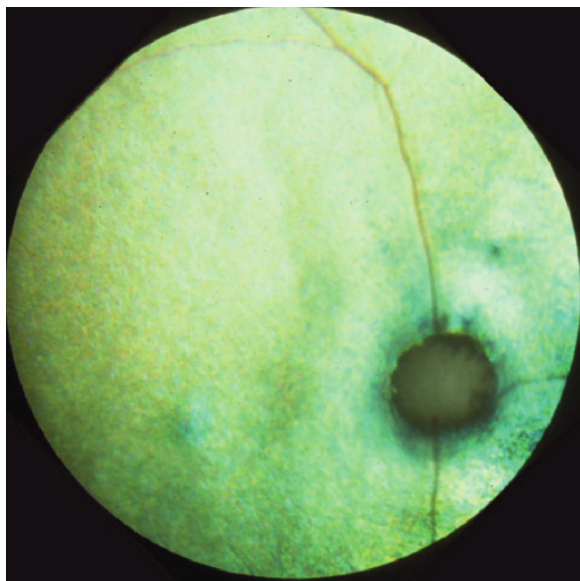


Figure 365
Progressive retinal atrophy
(3-year-old Burmese)

The owners reported gradual vision loss in their cat, which could now see only in bright light. They also noted in the last 6 months that the eyes “glowed.” The pupillary light reflexes, although present, were very sluggish. This photograph, taken with a neutral density filter, shows severely attenuated retinal vessels and diffuse tapetal hyperreflectivity. The optic disc is pale, but appears darker in the photograph because of use of the filter.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

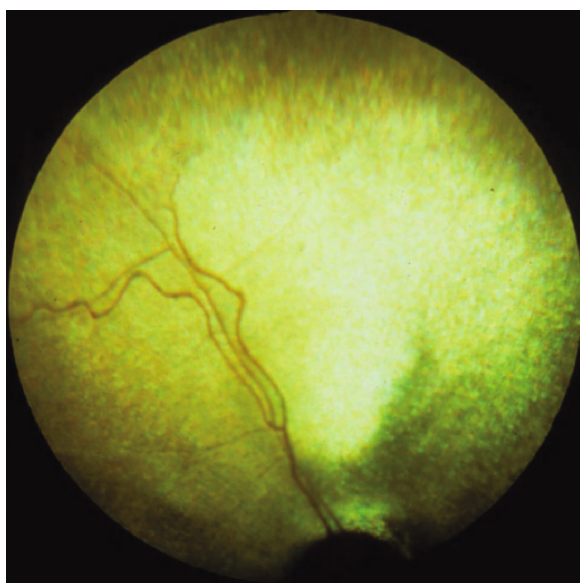


Figure 366
Progressive retinal atrophy
(14-year-old Siamese)

The owners recently noted dilated pupils and cloudy lenses, but acknowledged that vision had been poor for several years. The pupils were dilated and poorly responsive to a bright focal beam. Lenticular nuclear sclerosis was present in both eyes, but no cataract formation was observed. The tapetum is markedly hyperreflective. The retinal vessels are reduced in number, caliber, and degree of branching.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

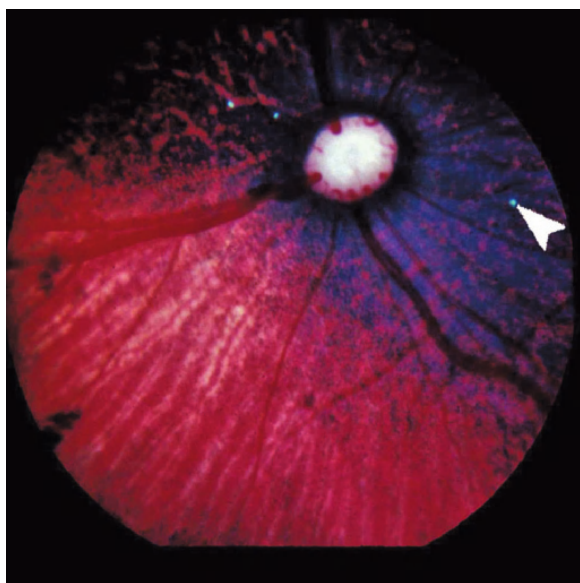


Figure 367
Chediak-Higashi syndrome
(9-month-old Persian)

Coat and iris coloration in this cat were typical of the disease. Only small islands of tapetal cells (arrow) remain following tapetal degeneration. Choroidal vasculature is visible because of the decreased amount of melanin in the retinal pigmented epithelium. This depigmentation may progress to a complete albinotic fundus. This cat’s anterior segment is illustrated in Figure 173.

(Image courtesy of Linda L. Collier, DVM, PhD, DACVO.)

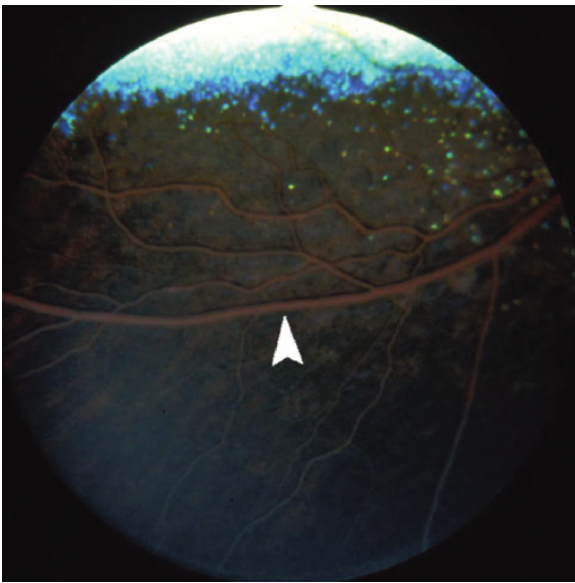


Figure 368
Lipemia retinalis
(5.5-year-old domestic shorthair)

This cat was being treated with oral corticosteroids on alternate days to control an eosinophilic gastritis. She was presented for evaluation of a mild unilateral ocular discharge. The tapetal retina appeared entirely normal. The retinal vessels are cream colored against the pigmented background of the nontapetal fundus. As the vessels decrease in caliber distal to the optic disc (arrow), the cream color is more remarkable. The lipid cleared when the corticosteroids were temporarily discontinued.

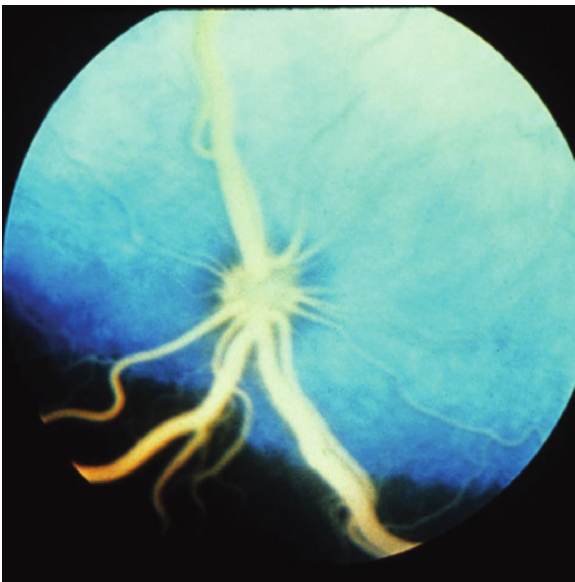


Figure 369
Lipemia retinalis
(domestic shorthair kitten)

This kitten had experimentally induced diabetes mellitus. Even the retinal vessels within the tapetal fundus appear cream colored because of the severity of the associated hyperlipidemia.

(Image courtesy of C. Sue West, DVM, DACVO.)

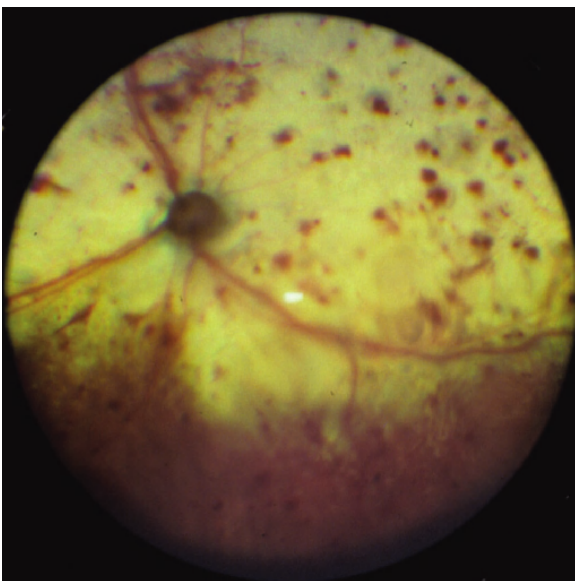


Figure 370
Retinitis/Plasma cell tumor
(13-year-old Himalayan)

Presented to the referring veterinarian for anorexia and lethargy, this cat had widespread bilateral intraretinal hemorrhages throughout the fundus. The small circular ("dot") shape is typical of hemorrhage constrained by the compact nature of the superficial retina. Abnormal laboratory findings included a severe hyperproteinemia, hypergammaglobulinemia, a moderate anemia and severe thrombocytopenia. A fine-needle aspirate of the liver provided the final diagnosis.

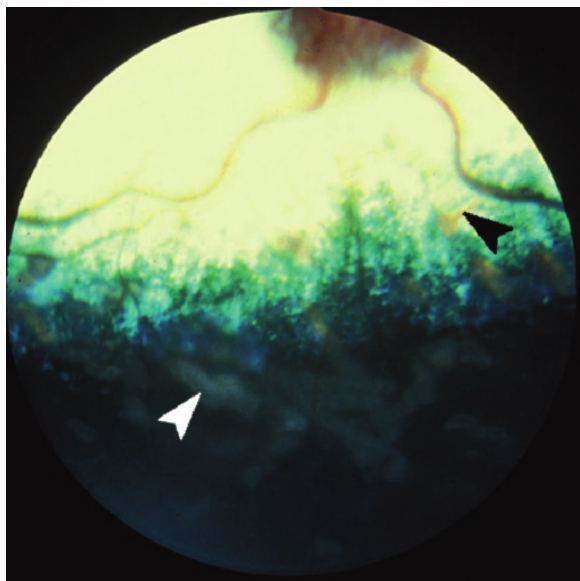


Figure 371
Retinitis/Lymphoma
(2-year-old domestic shorthair)

Lethargy, ataxia, and blindness were present for 1 week in this cat. The pupils were dilated and nonresponsive. Ocular lesions were bilateral and restricted to the fundus. The wide linear gray areas seen in the nontapetal fundus (*white arrow*) are caused by edema in the outer layers of the retina. The associated vessels are not elevated. The orange bands (*black arrow*) represent the same condition in the tapetal region. The optic nerve involvement is better depicted in Figure 391. The feline leukemia virus test was negative, but large abnormal lymphocytes were found in the optic nerve meninges, leading to the diagnosis of lymphoma.

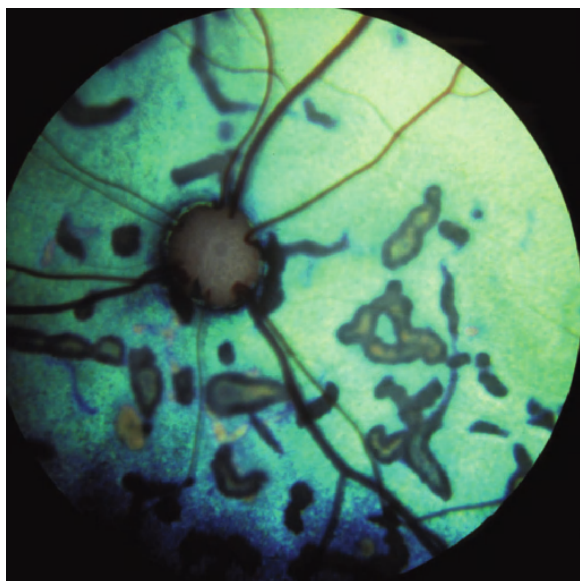


Figure 372
Retinitis/Lymphoma
(15-month-old domestic shorthair)

At 10 months of age, the left eye of this cat was enucleated due to a retrobulbar mass diagnosed as lymphoma. In spite of ongoing therapy, he became acutely blind in the remaining right eye. The pupil was dilated and nonresponsive. Multiple vermiform lesions with pink centers and pigmented margins are scattered throughout the tapetal fundus. These are located in the deeper layers of the retina, since the course of overlying vessels is unaltered.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

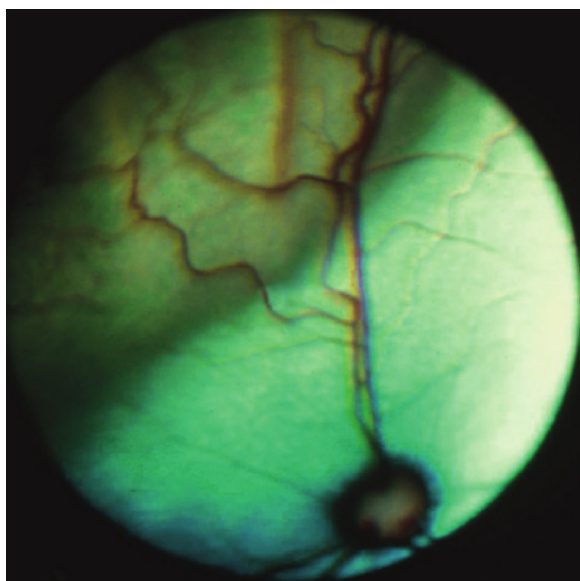


Figure 373
Retrobulbar lymphoma
(7-year-old domestic shorthair)

This is the fundus of the cat in Figure 26, captured through a 28-diopter lens. The dark tapetal area extending from the 8-o'clock to 1-o'clock position is due to the indentation of the globe by a retrobulbar tumor. As the eye moved in relation to the mass, the area of elevation would change. The histologic diagnosis was retrobulbar lymphoma.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

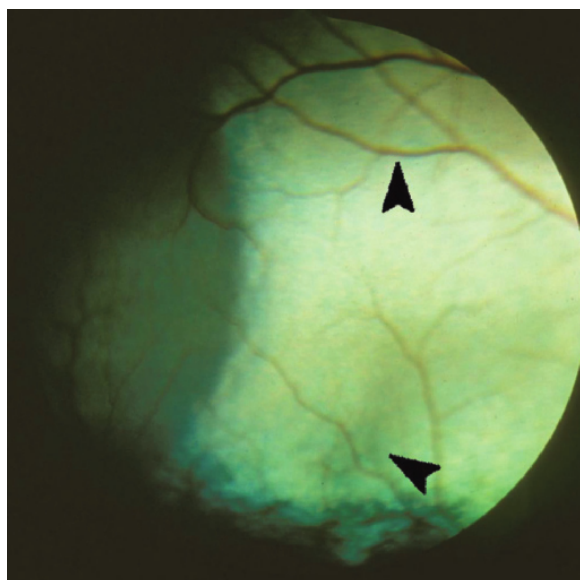


Figure 374
Retinal elevation/Retrobulbar neoplasia
 (3-year-old domestic shorthair)

A firm mass was palpable between the nictitans and orbital rim of the cat first described in Figure 22. The posterior scleral surface is distorted by a retrobulbar mass, creating a dark shadow in the nasal fundus (left side of photograph). The tapetum appears less reflective at adjacent retinal elevations (*arrows*). Shadows would change position relative to the optic disc as the globe moved over the retrobulbar mass. An undifferentiated sarcoma was diagnosed by a fine-needle aspirate of the tumor.



Figure 375
Retinal atrophy/Metastatic intestinal adenocarcinoma
 (14-year-old domestic shorthair)

This cat was presented with anorexia, weight loss, ataxia, and decreased vision; its pupils were dilated and nonresponsive. The extent of the fundic abnormality is apparent in the wide field provided by the 28-diopter lens. The optic disc is located at the ventral margin of the field (*white arrow*). The normal tapetal fundus has been supplanted by well-demarcated gray infiltrates, pigment, hyperreflectivity, and attenuated retinal vessels. On histopathology, tumor cells were identified in the small intestine, spleen, optic nerve meninges, and retinal and choroidal vessels.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrang, McLellan, Albert. Elsevier Limited, 2010.)

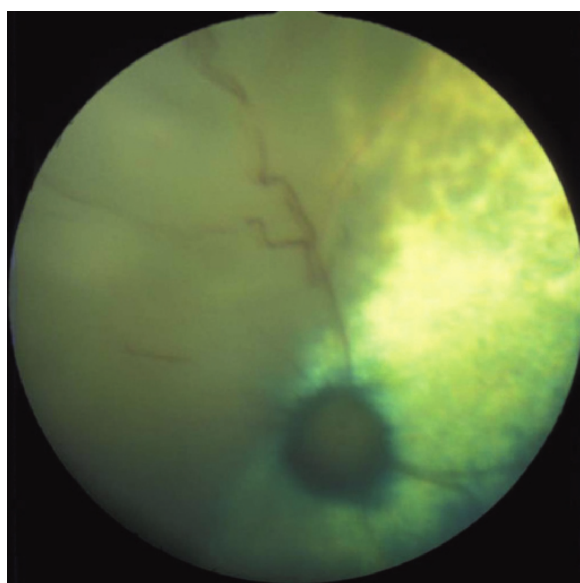


Figure 376
Chorioretinitis/Metastatic adenocarcinoma
 (12-year-old domestic shorthair)

The patient's presenting complaints included a red right eye and a dilated, sluggish pupil in this left eye. A large gray mass within the retina and choroid obscures the tapetal reflection. In some areas, the neoplasm breaches the retinal surface and obscures the retinal vessels. The primary site of this tumor was not identified.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketrang, McLellan, Albert. Elsevier Limited, 2010.)



Figure 377
Retinal detachment/Metastatic hemangiosarcoma
(1.5-year-old Siamese)

This is the right superior temporal retina of the cat in Figure 243. A red, mottled infiltrate is slightly elevated and obscures the tapetum (*arrows*). The lesion remained fixed in relation to adjacent vessels as the globe moved, in contrast to those lesions caused by retrobulbar masses (see Figure 374). Metastatic choroidal hemangiosarcoma was diagnosed on histopathology following enucleation.

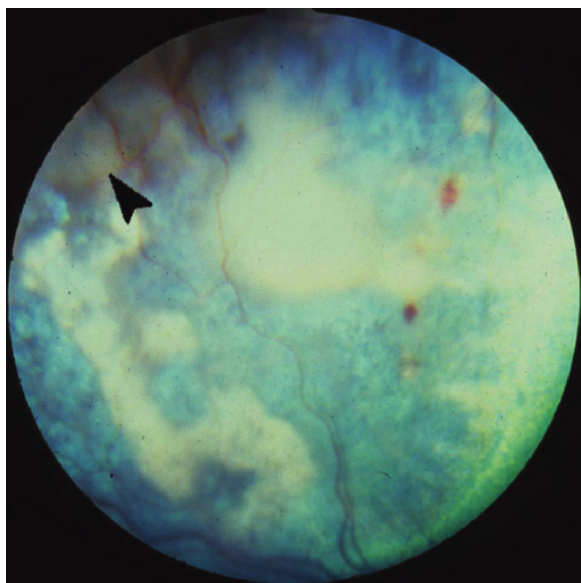


Figure 378
Chorioretinitis/Metastatic adenocarcinoma
(7-year-old domestic shorthair)

A complaint of lameness and erosions of all four paws preceded the onset of anisocoria. Mild aqueous flare was present bilaterally. A well-demarcated zone of altered tapetal reflectivity occupies the dorsonasal quadrant of the left fundus. Subretinal exudates (*arrow*) elevate the retina. Focal hemorrhages are seen near the margin of the lesion. Histopathology of the digits and eye was compatible with adenocarcinoma of sweat gland origin.

SECTION XII

Optic Nerve

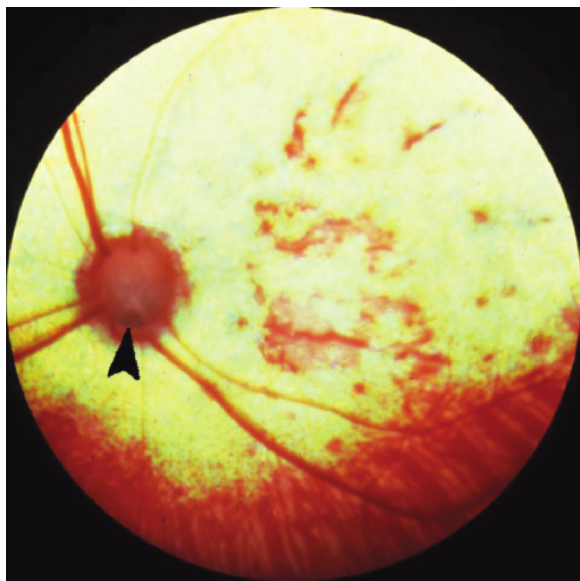


Figure 379
Optic disc coloboma
(4-year-old Siamese)

This cat was presented for an unrelated conjunctivitis. The red streaks are normal choroidal vessels seen in areas of tapetal hypoplasia. A small dark area (arrow) at the edge of the disc represents a gap or fissure in the ocular tissue known as a coloboma.

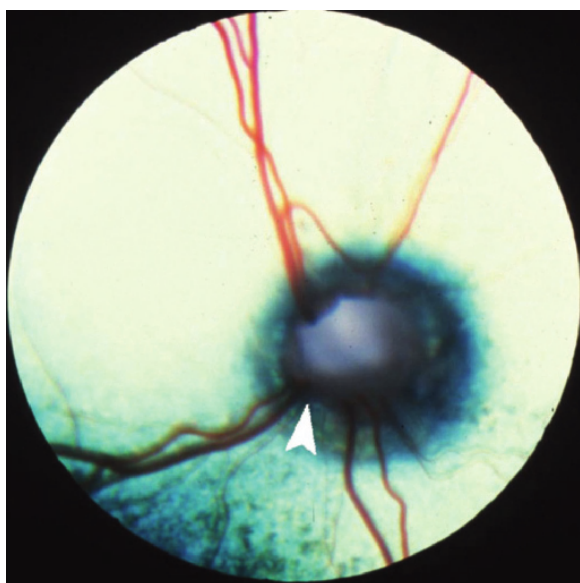


Figure 380
Optic disc coloboma
(8-month-old American shorthair)

To explain the loss of vision in the right eye, the referring veterinarian theorized that unobserved trauma had caused a retinal detachment in this cat at 1 month of age. The cat did appear blind in the right eye. Rapid rotary nystagmus was present bilaterally, but pupillary light reflexes were normal in the left eye. A dark pigmented ring surrounds the left optic disc. The retinal vessels (arrows) disappear from view as they cross the rim of a large coloboma. The size of the defect, its featureless character, and its gray color distinguish this circular congenital defect from the normal optic disc. The right fundus appears in Figure 383.

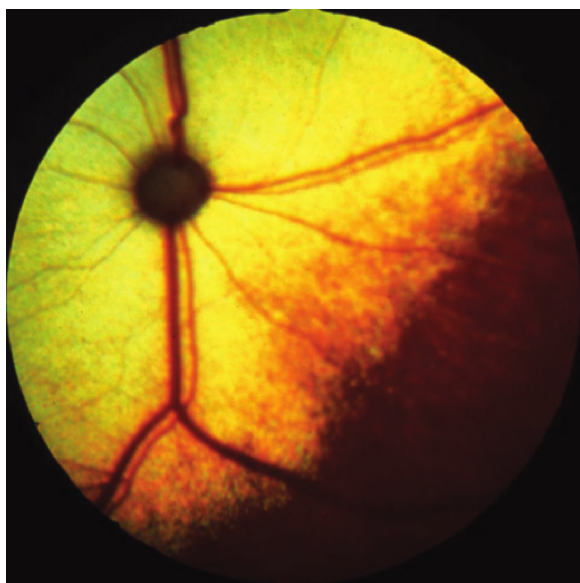


Figure 381
Optic disc hypoplasia
(1.5-year-old Himalayan)

Presented for evaluation of chronic conjunctivitis, this cat had normal pupillary light responses and vision in both eyes. Subjectively, the optic disc appears smaller than normal. This is especially evident when the disc size is compared to the retinal vein. Both eyes were similarly affected. A neutral density filter accounts for the extreme darkness of the disc.

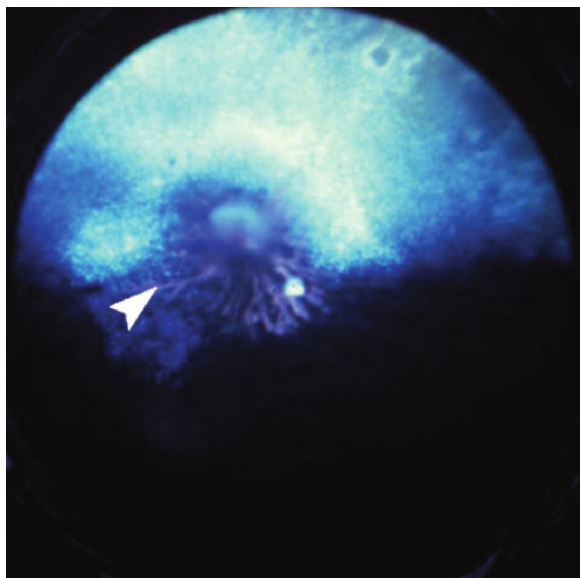


Figure 382
Optic disc aplasia
(9-month-old domestic shorthair)

This blind kitten has had dilated, areflexic pupils since birth. He recently developed an upper respiratory infection that responded to supportive treatment. Although presented for evaluation of entropion, the most remarkable lesions were found within the fundus of both eyes. This photograph, taken through a 28-diopter lens, shows severe tapetal hyperreflectivity with no detectable retinal vessels. In the area that should contain the optic disc, branching white striae (arrow) are evident overlying the tapetum. A gray amorphous mass supplants the optic disc. There were no signs of previous or active inflammation or infection in any part of the eye. The opposite fundus was also hyperreflective and devoid of retinal vessels.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

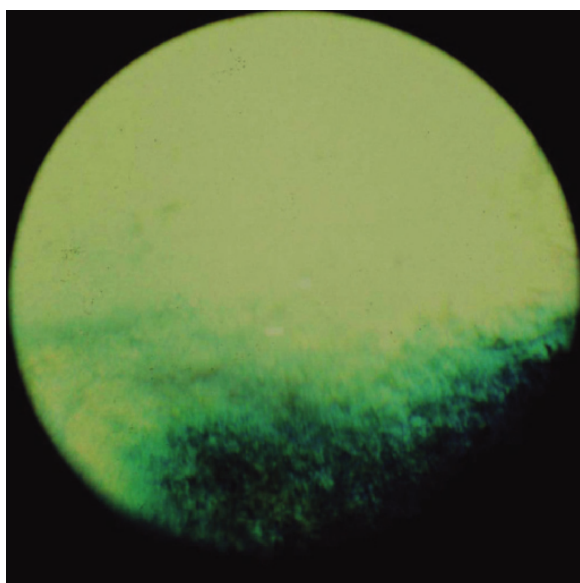


Figure 383
Optic disc aplasia
(8-month-old American shorthair)

The photograph, taken through a 28-diopter lens, is of the right fundus of the cat in Figure 380. The photograph shows the area that should contain the optic disc. The tapetum is hyperreflective. Neither the retinal vessels nor any remnants of the optic disc could be found on ophthalmoscopic examination.

(Reproduced from *Veterinary Ocular Pathology: A Comparative Review*. Dubielzig, Ketring, McLellan, Albert. Elsevier Limited, 2010.)

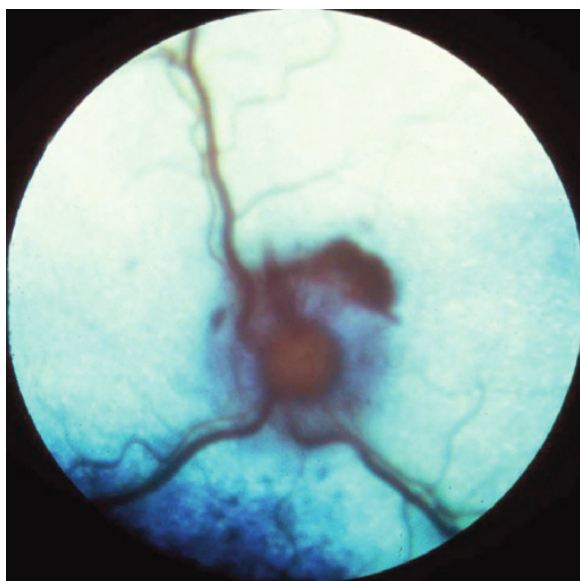


Figure 384
Optic neuritis/Cryptococcosis
(2-year-old domestic shorthair)

This cat had been diagnosed with cryptococcal meningitis on the basis of a cerebrospinal fluid tap. In the last several days, vision had deteriorated. The anterior segment, including pupillary light reflexes, was normal. The cat followed cotton balls, but vision was subjectively poor. Optic disc abnormalities were comparable bilaterally. The dark color around the optic disc is due to hemorrhage in the nerve fiber layer. Subretinal edema and hemorrhage have elevated the peripapillary retina, obscuring detail of the swollen optic disc.

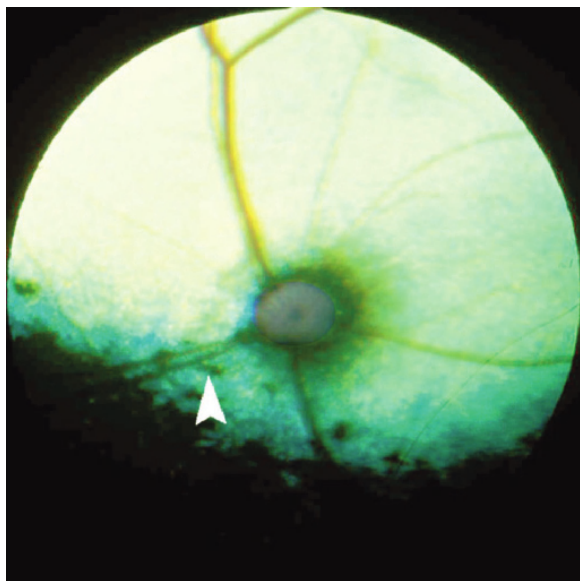


Figure 385
Optic nerve atrophy/Toxoplasmosis
 (4-year-old domestic longhair)

Weight loss was noted in this cat for about 5 months prior to the onset of blindness 5 days ago. Both pupils were fixed and dilated. Optic nerve atrophy is suggested by the gray optic disc and the exaggerated sieve-like appearance of the lamina cribrosa. Abnormal tapetal pigment is present (arrow). Two areas of focal retinal edema were noted but are not visible in this photograph. Laboratory tests were unremarkable and included negative FIV and FeLV results. The owners elected euthanasia. Histopathologic examination showed focal areas of retinal pigment epithelial cells within the sensory retina. Lymphocytes and plasma cells were found infiltrating both optic nerves. Two spherical cysts containing numerous elongated organisms suggestive of *Toxoplasma* were found in one optic nerve. A titer for toxoplasmosis was not available.

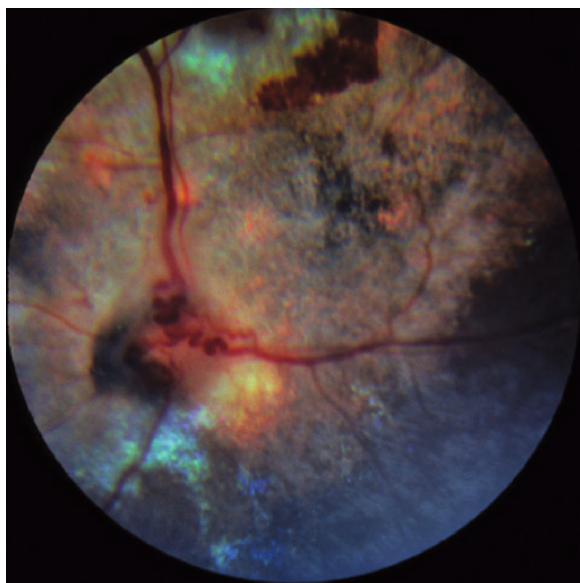


Figure 386
Optic nerve atrophy/Histoplasmosis
 (3-year-old domestic shorthair)

Despite resolution of systemic signs following treatment for histoplasmosis, this patient's optic nerve and retina degenerated as a consequence of the prolonged posterior segment inflammation. The optic disc is darkly pigmented, with an abnormally tortuous vessel at its dorsal margin. Pigment of varying density replaces the tapetum. The pale area near the optic disc represents exposed sclera.

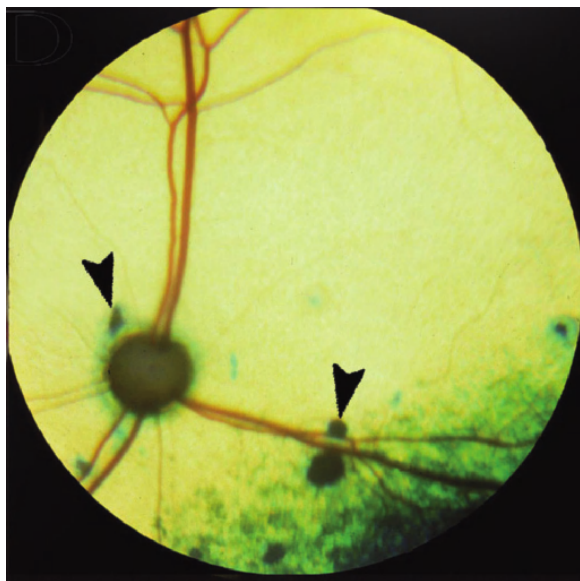


Figure 387
Optic nerve/Retinal atrophy
 (4-year-old domestic shorthair)

This cat was presented acutely blind 2 days after enucleation of the contralateral eye for a ruptured cornea. The optic disc is dark and atrophic. Focal areas of abnormal pigment can be seen in the tapetal area (arrows). These findings are suggestive of a surgical complication caused by excessive traction on the globe during enucleation. The resulting damage to the optic chiasm leads to retrograde atrophy of the contralateral optic nerve.

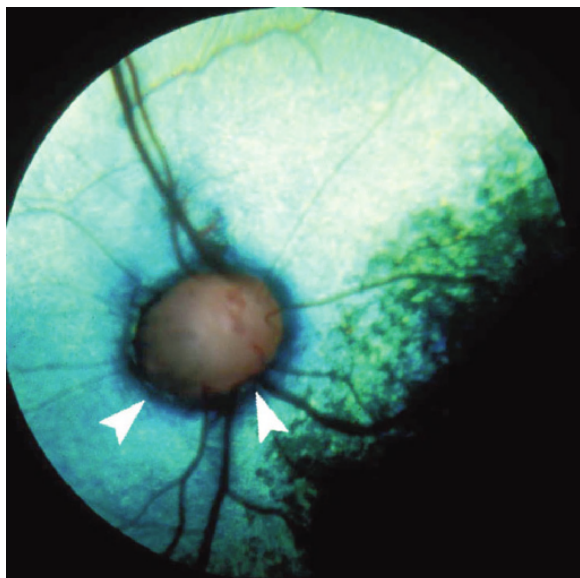


Figure 388
Optic nerve atrophy/Glaucoma
 (2-year-old domestic shorthair)

This cat was presented for evaluation of a cloudy left cornea resulting from an anterior lens luxation (see Figure 288). The anterior chambers were deep in both eyes, with positive pupillary light reflexes and iridodonesis. The lens in the right eye was subluxated. The intraocular pressure was 34 mm Hg in the right eye and 20 mm Hg in the left. Both globes were mildly buphthalmic. The optic disc in the right eye appears larger than normal because of glaucomatous cupping. The cupping is more remarkable temporally and inferiorly (*arrows*), where the vessels can be seen disappearing over the rim of the cup.

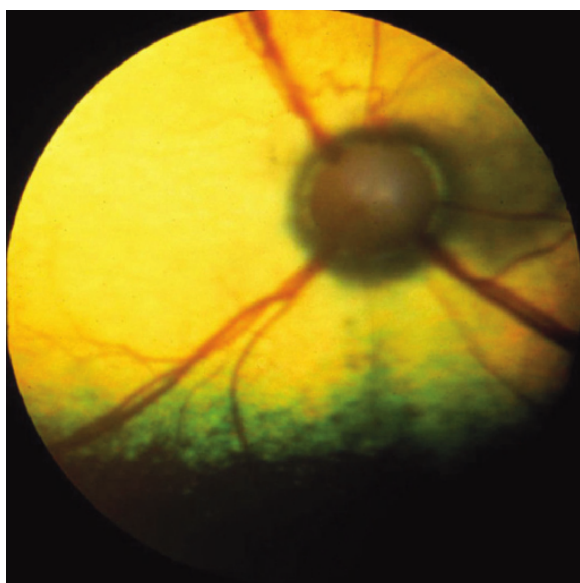


Figure 389
Optic nerve atrophy/Glaucoma
 (10-year-old domestic shorthair)

A progressive darkening of the iris and enlargement of the left globe over the past 2 years preceded this cat's examination. The iris was uniformly thickened and heavily pigmented. The pupil was dilated and pupillary light reflexes were negative. Pigment was present on the anterior lens capsule. The intraocular pressure was greater than 60 mm Hg. The optic disc is uniformly cupped and atrophic, giving the appearance of an enlarged disc. Peripapillary retinal atrophy is present, but the remaining retina appears normal. Histopathology confirmed an iris melanoma and atrophy of the optic nerve.

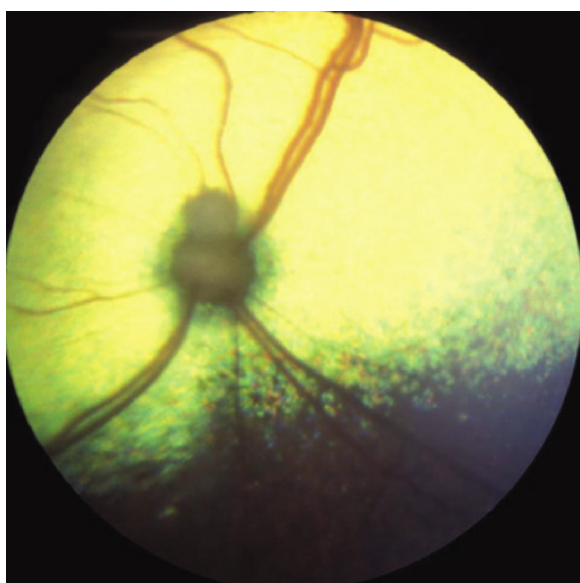


Figure 390
Optic nerve glioma
 (15-year-old domestic shorthair)

During evaluation of a diffuse iris mass in the opposite eye, a discrete gray nodule was noted on and adjacent to the right optic disc. The intraretinal mass surrounds nearby retinal vessels. Vision and pupillary light reflexes were normal. The clinical appearance was suggestive of a glioma, although there was no opportunity for histopathological confirmation of that diagnosis.

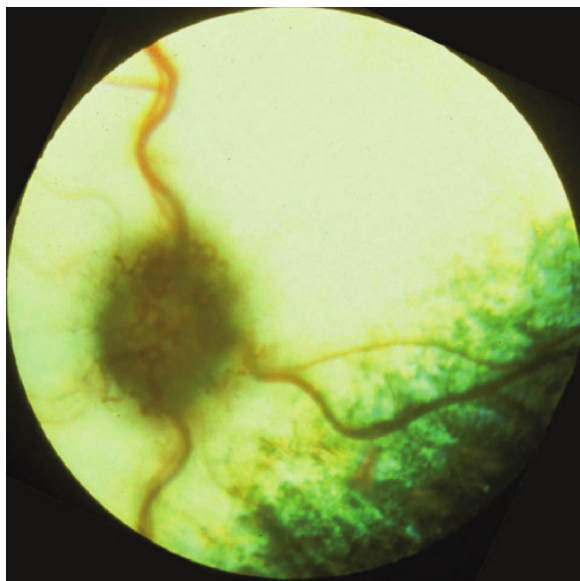


Figure 391
Optic neuritis/Lymphoma
(2-year-old domestic shorthair)

A history of lethargy, ataxia, and blindness of 1 week's duration were complaints voiced at this cat's examination. All laboratory tests were normal, including a negative test for feline leukemia virus. The pupillary light reflexes were absent in both eyes. All lesions were bilateral and limited to the posterior segment. Mild retinal edema is present. The retinal vessels, especially the arterioles, are tortuous and extend over the swollen optic disc. There is also neovascularization of the disc and surrounding retina. Faint areas of hemorrhage are present within the nerve fiber layer. Other fundus lesions are depicted in Figure 371. A diagnosis of lymphoma was based on histopathologic evidence of large neoplastic lymphocytes that infiltrated the meninges of both optic nerves.

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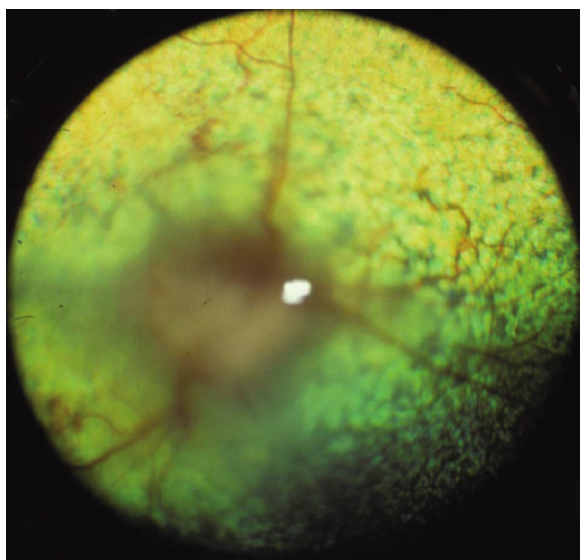


Figure 392
Optic neuritis/Lymphoma
(10-year-old domestic shorthair)

This cat was presented for a progressive decrease in vision over the last month. The cat was functionally blind with no pupillary light reflexes. The right eye had a severe anterior uveitis and a massive retinal detachment with intraretinal hemorrhage. This photograph of the left eye shows a pale, ill-defined mass overlying the optic disc, accompanied by peripapillary retinal edema. Intraretinal hemorrhage is also present. The peripheral retina was edematous and a large temporal bullous detachment was present. Histopathology documented neoplastic cells, primarily within the uveal tract. The optic nerve head contained clusters of neoplastic cells, but the clinical picture was most likely explained by secondary necrosis with an inflammatory cell infiltrate.

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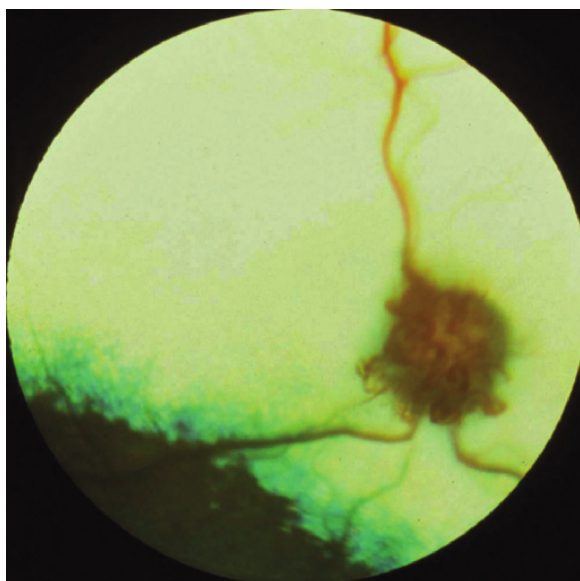


Figure 393
Optic neuritis/Meningioma
(8-year-old domestic shorthair)

Dilated, areflexic pupils and blindness of 1 month's duration were the only clinical abnormalities noted in this cat on initial examination. Ocular lesions were restricted to the optic disc and the immediately adjacent peripapillary area. The optic disc is swollen. Detail is obscured by adjacent retinal edema and tortuous vessels that overlie the disc and extend into the immediate peripapillary retina. Three weeks later, the cat started circling, had several seizures, and was euthanatized. Meningioma was the histopathologic diagnosis.

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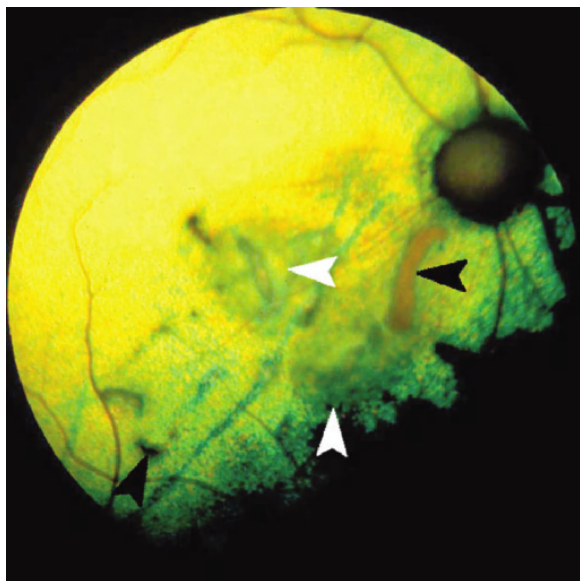


Figure 394 Meningioma

(9-year-old domestic shorthair)

The left eye of this cat had been enucleated 4 months prior to this examination because of blindness and an unresponsive corneal ulcer. Histopathology of the enucleated globe revealed a nonspecific endophthalmitis. The cat was now blind in the remaining eye and had several episodes of head tilt, ataxia, and seizures. The optic disc is light gray and atrophic. Linear areas of abnormal pigmentation are present temporal to the optic disc (*black arrows*). Focal retinal elevations (*white arrows*) are also present. The diagnosis of meningioma was based on histopathologic examination of the optic nerve following euthanasia.

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Neoplasia

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Systemic Disease-Related Images

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