OPTOMETRIC CLINICAL PRACTICE GUIDELINE

Care of the Patient with

Anterior Uveitis

American Optometric Association

OPTOMETRY: THE PRIMARY EYE CARE PROFESSION

Doctors of optometry are independent primary health care providers who examine, diagnose, treat, and manage diseases and disorders of the visual system, the eye, and associated structures as well as diagnose related systemic conditions.

Optometrists provide more than two-thirds of the primary eye care services in the United States. They are more widely distributed geographically than other eye care providers and are readily accessible for the delivery of eye and vision care services. There are approximately 32,000 full-time equivalent doctors of optometry currently in practice in the United States. Optometrists practice in more than 7,000 communities across the United States, serving as the sole primary eye care provider in more than 4,300 communities.

The mission of the profession of optometry is to fulfill the vision and eye care needs of the public through clinical care, research, and education, all of which enhance the quality of life.

Healthy People 2010 Vision

American Optometric Association

OPTOMETRIC CLINICAL PRACTICE GUIDELINE
CARE OF THE PATIENT WITH ANTERIOR UVEITIS

Reference Guide for Clinicians

Prepared by the American Optometric Association Consensus Panel on Care of the Patient with Anterior Uveitis:

Kevin L. Alexander, O.D., Ph.D., Principal Author
Mitchell W. Dul, O.D., M.S.
Peter A. Lalle, O.D.
David E. Magnus, O.D.
Bruce Onofrey, O.D.

Reviewed by the AOA Clinical Guidelines Coordinating Committee:

John F. Amos, O.D., M.S., Chair
Kerry L. Beebe, O.D.
Jerry Cavallerano, O.D., Ph.D.
John Lahr, O.D.
Richard Wallingford, Jr., O.D.

Approved by the AOA Board of Trustees June 23, 1994
Revised March, 1999, Reviewed 2004

Printed in U.S.A.

NOTE: Clinicians should not rely on the Clinical Guideline alone for patient care and management. Refer to the listed references and other sources for a more detailed analysis and discussion of research and patient care information. The information in the Guideline is current as of the date of publication. It will be reviewed periodically and revised as needed.

TABLE OF CONTENTS

INTRODUCTION

Optometrists, through their clinical education, training, experience, and broad geographic distribution, have the means to provide effective primary eye and vision care for a significant portion of the American public and are often the first health care practitioners to diagnose anterior uveitis.

This Optometric Clinical Practice Guideline for the Care of the Patient with Anterior Uveitis provides optometrists with recommendations and protocols for the diagnosis and treatment of the patient with anterior uveitis. This Guideline will assist optometrists in achieving the following goals:

- Accurately diagnose anterior uveitis
- Improve the quality of care rendered to patients with anterior uveitis
- Minimize the adverse effects of anterior uveitis
- Develop a decision making strategy for management of patients at risk for permanent vision loss from anterior uveitis
- Inform and educate patients and other health care practitioners about the visual complications, risk factors, and treatment options associated with anterior uveitis.

I. STATEMENT OF THE PROBLEM

Anterior uveitis is an intraocular inflammation of the uveal structures anterior to the middle of the vitreous cavity.[1] Along with conjunctivitis, keratitis, and acute glaucoma, it is one of a group of ocular conditions commonly termed "red-eye." This disease is associated with ocular trauma as well as many systemic diseases, including juvenile rheumatoid arthritis, ankylosing spondylitis, Reiter's syndrome, sarcoidosis, herpes zoster, and syphilis.[1-5] Common vision-threatening complications of anterior uveitis include cataracts, glaucoma, and macular edema.[2]

Because anterior uveitis may be associated with systemic disease and, when undetected and untreated, can cause loss of vision, the importance of ready access to primary eye care is a public health concern. The differential diagnosis of anterior uveitis can be accomplished by a thorough eye examination and physical assessment. When properly identified, anterior uveitis is treatable, and many of the complications can be avoided. Recognition of the signs and symptoms of systemic causes of anterior uveitis and referral for care result in improved patient health.

A. Description and Classification of Anterior Uveitis

Uveitis is an inflammation of the uveal tract which consists of the choroid, the ciliary body, and the iris. It may be classified as anterior, intermediate (pars planitis), or posterior (choroiditis) uveitis. Anterior uveitis involves the anterior portion of the uvea (i.e., the iris and ciliary body). "Iritis" refers to an inflammation of the iris only, while "iridocyclitis" involves both the iris and the ciliary body. However, the terms anterior uveitis, iritis, and iridocyclitis are often used synonymously. Anterior uveitis is termed "acute" when the inflammation lasts less than 6 weeks or "chronic" when it lasts longer[1] (See Appendix Figure 3 for ICD-9-CM classification of anterior uveitis, iritis, and iridocyclitis).

1. Acute Anterior Uveitis

Among the many conditions that may cause signs and symptoms consistent with the diagnosis of acute anterior uveitis are:

[redacted]

a. Traumatic Anterior Uveitis

Trauma is one of the most common causes of anterior uveitis. There is usually a history of blunt trauma to the eye or adnexa. Other injuries, such as ocular burns, foreign bodies, or corneal abrasions, may also result in anterior uveitis. Visual acuity and intraocular pressure (IOP) may be affected, and there may be blood in the anterior chamber.

b. Idiopathic Anterior Uveitis

The term "idiopathic" applies to anterior uveitis with no obvious systemic or traumatic etiology. A single episode of acute idiopathic anterior uveitis in an otherwise healthy person rarely warrants extensive physical examination, laboratory tests, or imaging studies to search for a systemic etiology.[1] Rather, the diagnosis is established after exclusion of other causes by history and examination.

c. HLA-B27 Associated Uveitis

HLA-B27 refers to a specific genotype on chromosome 6. The trigger mechanism for acute anterior uveitis in patients demonstrating this genotype is unknown. There is a strong association with ankylosing spondylitis, Reiter's syndrome, inflammatory bowel disease, psoriatic arthritis, and recurrent anterior uveitis.[1,6-8]

d. Behcet's Disease/Syndrome

Predominantly a disease of young adult males of Mediterranean or Japanese ancestry, Behcet's disease presents as a triad of acute anterior uveitis and mouth and genital ulcers. Behcet's disease is a rare cause of anterior uveitis.[9]

e. Lens-Associated Anterior Uveitis

Several clinical presentations have in common the finding of anterior chamber inflammation and a lens-related etiology.

[redacted]

- Phaco-anaphylactic endophthalmitis and phacogenic (phacotoxic) uveitis. Both are rare and follow traumatic or surgical disruption of the lens capsule, which allows the release of lens protein into the anterior chamber. They are difficult to differentiate from other forms of postoperative anterior chamber inflammation. If a severe granulomatous inflammation occurs including large keratic precipitates (KPs), cells and flare, and posterior synechiae, it is termed phaco-anaphylactic endophthalmitis. Bilateral phaco-anaphylactic endophthalmitis should be distinguished from sympathetic ophthalmia. A mild nongranulomatous form in which keratic precipitates are rare and inflammation is mild is termed phacogenic (phacotoxic) uveitis. Both forms of uveitis appear to result from an autoimmune response to protein. Although both may respond to topical steroids, the lens usually must be removed.

- Phacolytic glaucoma. Slow leakage of lens protein from the intact lens capsule of a hypermature lens may cause mild anterior chamber inflammation and acute glaucoma. This condition, called phacolytic glaucoma, is treated by reducing intraocular pressure and surgically removing the lens.

- UGH syndrome. The triad of uveitis, glaucoma, and hyphema (UGH syndrome) has been associated with anterior chamber intraocular lenses. The UGH syndrome rarely occurs with posterior chamber intraocular lenses.

f. Masquerade Syndromes

Life-threatening conditions, such as lymphoma, leukemia, retinoblastoma, and malignant melanoma of the choroid, may simulate anterior uveitis.[10] Conditions such as retinal detachment and intraocular foreign body also may present with anterior chamber inflammation.

2. Chronic Anterior Uveitis

Conditions that may result in signs and symptoms consistent with the diagnosis of chronic anterior uveitis include:

[redacted]

a. Juvenile Rheumatoid Arthritis

The association between anterior uveitis and juvenile rheumatoid arthritis (JRA) is well-established.[11-13] Anterior uveitis occurs most often in cases of JRA affecting a few joints.[13] Because most of these patients test positive for antinuclear antibody (ANA), this test may be used as an adjunct procedure to support the clinical findings. JRA occurs more frequently in young girls than in boys.[13] It is recommended that all children with JRA be screened for anterior uveitis.[11,12]

b. Anterior Uveitis Associated with Primary Posterior Uveitis

Systemic diseases such as sarcoidosis, toxoplasmosis, syphilis, tuberculosis, herpes zoster, cytomegalovirus, and AIDS may involve the anterior chamber in either a primary fashion or a "spillover" fashion secondary to posterior inflammation. Other posterior problems such as retinal detachment may result in anterior chamber cells and flare.[14]

c. Fuchs' Heterochromic Iridocyclitis

Fuchs' heterochromic iridocyclitis is a chronic, usually asymptomatic, form of anterior uveitis found in about 2 percent of uveitis patients.[2] Progressive loss of iris stromal pigment often results in a subtle "heterochromia" of the eyes. Inflammation is mild and rarely responds to treatment.

B. Epidemiology of Anterior Uveitis

1. Incidence

Anterior uveitis occurs in 8-12 of every 100,000 people in the United States per year.[2,3] The incidence of uveitis is highest in persons between the ages of 20-50 years with a peak incidence found in the third decade of life.[15]

[redacted]

2. Risk Factors

In addition to the etiologies typically associated with anterior uveitis, there are other risk factors associated with certain types of uveitis. Some types of uveitis are endemic to certain parts of the country including histoplasmosis which is frequently seen in the Ohio and Mississippi River valleys,[15,16] and Lyme disease which is endemic to northeastern, north central, and western states.[16,17] Uveitis caused by toxoplasmosis and toxocariasis is associated with pets. Because sexually transmitted diseases are associated with anterior uveitis, a history of syphilis, Reiter's syndrome, or the human immunodeficiency virus (HIV) indicates significant risk.

C. Clinical Background of Anterior Uveitis

1. Natural History

Two types of processes are classically used to describe the pathology of anterior uveitis, although there is not always a definitive correlation. Nongranulomatous anterior uveitis is characterized by small, white (not mutton-fat) keratic precipitates (KPs) without iris nodules. Nongranulomatous anterior uveitis is not associated with a pathogenic organism and usually is responsive to corticosteroids. In contrast, granulomatous anterior uveitis generally follows a microbial infection, such as tuberculosis or syphilis, and is associated with large mutton-fat KPs and iris nodules.[18]

2. Common Signs, Symptoms, and Complications

Anterior uveitis may be differentiated from more common types of ocular inflammation by its unilateral presentation, pain or photophobia, circumlimbal redness, and anterior chamber cells and flare. Patients with anterior uveitis present with symptoms of pain (ache) in one eye, photophobia, and occasionally blurred vision.[19]

The clinical signs and symptoms of nongranulomatous anterior uveitis are usually acute. There is circumlimbal redness. Marked flare and cells are present due to the increased permeability of inflamed uveal vessels.

[redacted]

Fine, white KPs may be noted on the corneal endothelium. The pupil is usually miotic. Posterior synechia may form by adhesion of the posterior iris to the anterior lens capsule. The intraocular pressure may be low, high, or unaffected. If the IOP is elevated, or if the uveitis is chronic or severe, corneal edema may be observed.

Granulomatous forms of anterior uveitis have a more insidious onset, and include all the clinical findings for the nongranulomatous form. Keratic precipitates associated with granulomatous anterior uveitis are usually large and yellow (mutton-fat). Iris nodules may be found at the pupillary margin (Koeppe) or on the anterior surface of the iris (Busacca). Vitreous haze or cells may be observed if there is associated posterior inflammation.

There are four major complications associated with anterior uveitis: cataracts, glaucoma, band keratopathy, and cystoid macular edema (CME).[19,20]

Posterior subcapsular cataract (PSC) may be associated with chronic anterior uveitis. Unfortunately, PSC is also associated with prolonged topical steroid use, one of the therapies for anterior uveitis.

Secondary glaucoma may develop in anterior uveitis by any of several mechanisms:[19,20]

- Inflammatory cells blocking aqueous outflow
- Posterior synechia resulting in pupillary block
- Progressive peripheral anterior synechia (PAS) closing the angle
- Corticosteroid use resulting in elevated IOP
- Rubeosis iridis causing neovascular glaucoma.

Band keratopathy, a deposit of calcium in the anterior cornea, may develop in cases of longstanding uveitis. CME, which may result from the release of prostaglandins, usually causes reduced visual acuity.

[redacted]

3. Early Detection and Prevention

The acute nature of anterior uveitis in most cases leads the patient to seek care, resulting in early detection of the disease. However, chronic forms of anterior uveitis are more insidious and the patient may be asymptomatic. Regular eye examinations provide the opportunity to screen for chronic anterior uveitis.

With the early detection and treatment of anterior uveitis, sight-threatening complications may be avoided. When a systemic etiology is suspected, the patient should be referred to their primary care physician or other health care provider for evaluation and treatment.

II. CARE PROCESS

This Guideline describes the optometric care provided to a patient with anterior uveitis. The components of patient care described are not intended to be all inclusive because professional judgment and the individual patient's symptoms and findings may have a significant impact on the nature, extent, and course of the services provided. Some components of care may be delegated (See Appendix Figure 1).

A. Diagnosis of Anterior Uveitis

This section of the Guideline provides clinical procedures for examining and managing patients with signs and symptoms suggestive of anterior uveitis or patients with diagnosed anterior uveitis. The evaluation includes the elements of a comprehensive eye and vision examination* with particular emphasis on the following areas:

1. Patient History

Careful attention to the patient history will help direct the examination and supplemental testing and facilitate differential diagnosis. The clinician should elicit information regarding age, gender, and race:[16]

- Age is important in the diagnosis of anterior uveitis. Anterior uveitis associated with JRA and pars planitis is usually found in children. Other forms of uveitis affect young and middle-aged adults. Older patients rarely exhibit uveitis.[15]
- Anterior uveitis associated with JRA most often affects young girls.[13] Ankylosing spondylitis and Reiter's syndrome have a higher frequency in men.[2,3]
- Arthritis, ankylosing spondylitis, and most HLA-B27 related diseases affect predominantly Caucasians.[16] Sarcoidosis occurs in African Americans more often than in Caucasians.[16]

* Refer to the Optometric Clinical Practice Guideline on Comprehensive Adult Eye and Vision Examination.

In addition, the optometrist should review the patient's present and past history of ocular and systemic disease, including:

- Commonly reported symptoms (e.g., pain, photophobia, and blurred vision), their duration, and whether they are unilateral or bilateral
- Prior diagnosis of anterior uveitis and what therapy was successful or unsuccessful
- Patient history of previous eye disease or trauma
- General medical history, including hospitalization, joint pain, lower back pain, and other information related to typical systemic etiologies of anterior uveitis.

2. Ocular Examination

a. General Considerations

Because of the correlation of anterior uveitis with systemic disease, signs of systemic disease such as joint deformities (arthritis), oral lesions (Reiter's and Behcet's syndrome), rash (psoriasis), and nail pitting should be noted.

b. Visual Acuity

The patient's monocular best corrected visual acuity should be obtained. Anterior uveitis may infrequently result in reduced visual acuity due to corneal clouding (edema), high amounts of anterior chamber cells and flare, or associated cystoid macular edema.

c. External Examination

External examination with illumination is useful in determining the pattern of hyperemia, status of pupil size and reactivity, and heterochromia (Fuchs' syndrome).

d. Slit Lamp Examination

The viewing of several eye structures is enhanced by the use of the slit lamp. The examination is optimized by viewing through a dilated pupil. However, assessment of anterior chamber cells and flare should be accomplished prior to dilation.

- Conjunctiva. Examination of the conjunctiva can help rule out diffuse superficial conjunctival hyperemia that would indicate conjunctivitis, as opposed to the circumlimbal redness of anterior uveitis. Blurred vision and photophobia are usually absent with conjunctivitis.
- Cornea. Careful assessment of the cornea should be made to identify KPs on the endothelium. In acute cases KPs may be fine and white; in chronic cases, large and yellowish. Colored or pigmented KPs suggest prior episodes of anterior uveitis. In such cases the optometrist should pursue questions related to prior signs and symptoms of anterior uveitis.
- Anterior Chamber. Examination of the anterior chamber involves observing with high-magnification (25-40x) while directing a small, intense beam obliquely through the aqueous, following relative dark adaptation. Anterior chamber cells and/or flare are visible, owing to the Tyndall effect of the bright beam. A grading system for flare and cells is shown in Table 1.[19] Clinicians should strive to develop consistency in their grading. Grading is useful in determining the patient's response to therapy as well as long-term monitoring.
- Iris. The iris should be examined for the presence of Koeppe nodules at the pupillary margin and Busacca nodules within the iris stroma. Nodules are usually indicative of granulomatous disease. In addition, iris atrophy, which is common in Fuchs' heterochromic iridocyclitis, should be identified by retro-illumination.[21]

Table 1
Grading of Flare and Cells*

Grade	Flare	Cells
0	Complete absence	No cells
1+	Faint flare (barely detectable)	5 to 10 cells per field
2+	Moderate flare (iris and lens details clear)	10 to 20 cells per field
3+	Marked flare (iris and lens details hazy)	20 to 50 cells per field
4+	Intense flare (fixed, coagulated aqueous humor with considerable fibrin)	50+ cells per field

* Adapted from Hogan MH, Kimura SJ, Thygeson P. Signs and symptoms of uveitis: I. Anterior uveitis. Am J Ophthalmol 1959; 47:162-3.

- Lens. Pigment and fibrin deposits on the anterior surface of the lens are suggestive of synechiae. The presence or absence of posterior subcapsular cataract should be well documented because PSC is a frequent complication of both the disease and the therapy.
- Vitreous. When the examination reveals cells in the vitreous, differentiating white blood cells (WBC) from red blood cells (RBC) can be challenging. The RBC may look gray and are generally much smaller than WBC. RBC, as well as pigment cells in the vitreous, may indicate retinal detachment.[14]

e. Tonometry

Accurate measurement of IOP is important for the initial diagnosis of anterior uveitis and as an ongoing monitor of the disease. The IOP may be high, low, or normal in acute anterior uveitis. Chronic forms of uveitis frequently are also associated with elevated IOP. Although IOP is frequently affected by anterior uveitis, other vision-threatening problems, such as retinal detachment, may affect IOP as well.[14]

f. Gonioscopy

Gonioscopy is useful to determine the presence of PAS which is indicative of previous inflammation.

g. Fundus Examination

- Indirect ophthalmoscopy. All patients with anterior uveitis should undergo indirect ophthalmoscopy through dilated pupils because intermediate or posterior uveitis often results in anterior inflammation. The optometrist should attempt indirect ophthalmoscopy on the initial visit, but it may be difficult due to anterior chamber reaction, posterior synechiae, or patient discomfort. In such cases, ophthalmoscopy on followup visits may yield more information. Evidence of posterior inflammation, such as peripheral retinal exudates, may be more readily observed with the aid of maximal pupillary dilation and indirect ophthalmoscopy with scleral indentation.
- Fundus examination with biomicroscope and auxiliary lens. Examination of the posterior pole with the biomicroscope and auxiliary lens (e.g., Volk, Hruby, or contact lens) is helpful in diagnosing CME. The clinician should carefully evaluate the macula when the patient has reduced visual acuity suggestive of CME.

3. Supplemental Testing

A variety of supplemental tests may assist in the diagnosis and mangement of anterior uveitis.

a. Laboratory Testing

Laboratory tests are valuable only when considered in context with the complete clinical picture. Communication and comanagement with the patient's primary care physician are advised.

- Angiotensin converting enzyme (ACE). Because ACE is produced by a variety of cells including granulomatous cells, serum ACE levels reflect the total amount of granulomatous tissue in the body. Elevated levels of ACE are found in cases of sarcoidosis.[22] Although ACE testing is not disease specific for sarcoidosis, it does direct the clinician toward the diagnosis of sarcoidosis in patients with anterior uveitis.
- Antinuclear antibody (ANA) testing. In autoimmune diseases, plasma cells produce antibodies directed against the body's tissues. The results of ANA testing are often positive in systemic lupus erythematosus (SLE) and, with repeated testing, juvenile rheumatoid arthritis.[1,23] However, the ANA may be negative in JRA patients who do not develop anterior uveitis.
- Complete blood count (CBC) with differential. When the patient history suggests a systemic cause for anterior uveitis, a CBC can be useful in identifying an underlying bacterial or viral etiology. Additionally, a CBC can detect a white blood cell malignancy such as leukemia or lymphoma.
- Enzyme-linked immunosorbent assay (ELISA). A multistage test offering identification of disease specific antibodies, the ELISA may be useful in identifying Lyme disease as a possible etiology of anterior uveitis.[17] Although this test may yield false positives, it may be ordered when there appear to be other manifestations of Lyme disease.[23]
- Erythrocyte sedimentation rate (ESR). This is a measurement of the rate at which erythrocytes settle in a standard tube in 1 hour. An elevated ESR indicates general inflammatory activity in the body. Although the ESR can be helpful in identifying some systemic causes of anterior uveitis, it is nonspecific and may have limited value in routine evaluation of uveitis patients.[23]
- Human leukocyte antigen - B27 (HLA-B27) typing. Often positive in ankylosing spondylitis, Reiter's syndrome,

inflammatory bowel disease (e.g., Crohn's or Whipple's), psoriatic arthritis, and Behcet's disease, HLA-B27 typing may yield false positives. The prognostic value of this test is most useful for patients with acute, unilateral anterior uveitis.[23]

- Purified protein derivative (PPD) skin test. The PPD for tuberculosis may be recommended in patients with chronic anterior uveitis where the physical examination or family history suggests tuberculosis.[24]
- Venereal Disease Research Laboratory (VDRL) and rapid plasma reagin (RPR). The VDRL and RPR are nonspecific serology tests for syphilis, which is associated with granulomatous anterior uveitis. Specific treponemal tests, fluorescent treponemal antibody absorption (FTA-ABS) test and microhemagglutination assay for antibodies to Treponema pallidum (MHA-TP), are positive for syphilis. A false-positive FTA-ABS may be associated with various other conditions.[23]

b. Imaging Studies

When symptoms and findings indicate juvenile rheumatoid arthritis, ankylosing spondylitis, tuberculosis, or sarcoidosis, x-ray studies may provide confirmation. Specific x-rays may be helpful for identifying:

- Juvenile rheumatoid arthritis - various joint x-rays may be taken; when there are no symptoms, knee x-rays are recommended.
- Ankylosing spondylitis - An x-ray is taken of the sacroiliac joint.
- Tuberculosis/sarcoidosis - Obtaining a chest x-ray is standard procedure.

c. Fluorescein Angiography

If cystoid macular edema is suspected, fluorescein angiography may show associated late hyperfluorescence.

4. Assessment and Diagnosis

Narrowing the diagnosis of anterior uveitis involves at least three stages:

- Collecting and integrating clinical data
- Identifying the type of anterior uveitis as specifically as possible
- Ordering additional laboratory tests, x-rays, or consultations to rule out systemic etiologies.

Ruling out conjunctivitis, episcleritis, or keratitis is a fairly straightforward procedure. However, a dilemma may exist concerning whether to order additional tests once the diagnosis of anterior uveitis has been established. The clinician should determine whether to pursue a systemic diagnosis or treat the anterior uveitis without further testing. Communication and comanagement with the patient's primary care physician may be appropriate.

Generally, when the anterior uveitis is an initial presentation, is unilateral, and occurs in an otherwise asymptomatic patient, no further testing is indicated. Patients with recurrent, chronic, or bilateral anterior uveitis and those whose signs or symptoms indicate a specific systemic etiology should undergo a disease-specific workup (Table 2).[25]

TABLE 2
Suggested Laboratory Tests, X-Ray Studies, Consults/Referrals or Other Tests to Isolate Systemic Causes of Anterior Uveitis *

Disease Suggested by History and Examination	Laboratory Tests	X-Ray Studies	Consult/Referral	Other Tests
Ankylosing spondylitis	↑ ESR, (+)HLA-B27	Sacroiliac x-rays	Rheumatologist	
Inflammatory bowel disease	(+)HLA-B27		Internist or gastroenterologist	
Reiter's syndrome	↑ ESR, (+)HLA-B27	Joint x-rays	Internist, urologist, rheumatologist	Cultures; conjunctival, urethral, prostate
Psoriatic arthritis	(+)HLA-B27		Rheumatologist, dermatologist	
Herpes	Diagnosed clinically		Dermatologist	
Behcet's disease	(+)HLA-B27		Internist or Rheumatologist	Behcet's skin puncture test
Lyme disease	ELISA or Lyme immunofluorescent assay		Internist, heumatologist	
Juvenile rheumatoid arthritis	↑ ESR, (+)ANA, (-)Rheumatoid factor	Joint x-rays	Rheumatologist or pediatrician	
Sarcoidosis	↑ Angiotensin converting enzyme (ACE)	Chest x-ray	Internist	
Syphilis	(+)RPR or VDRL; FTA-ABS or MHA-TP		Internist	
Tuberculosis		Chest x-ray	Internist	Purified protein derivative (PPD) skin test

* Adapted from Cullen RD, Chang B, eds. The Wills eye manual. Philadelphia: JB Lippincott, 1994:354-5.

[redacted]

For cases in which anterior uveitis is recurrent, chronic, or bilateral and there is no indication of a systemic cause, a nonspecific workup is recommended (Table 3).[25]

Table 3
Suggested Workup for Bilateral, Granulomatous or Recurrent Anterior Uveitis with No Indication of a Systemic Cause *

- Complete blood count (CBC)
- Erythrocyte sedimentation rate (ESR)
- Antinuclear antibody test (ANA)
- Rapid plasma reagin (RPR) or venereal disease research laboratory (VDRL)
- Fluorescent treponemal antibody absorption (FTA-ABS) or microhemagglutination assay for antibodies to Treponema pallidum (MHA-TP)
- Purified protein deriative (PPD) and anergy panel
- Chest x-ray for sarcoidosis and tuberculosis
- Lyme titer in endemic areas
- Consider HLA-B27 testing

* Reprinted with permission. Cullom RD, Chang B, eds. The Wills eye manual. Philadelphia: JB Lippincott, 1994:354.

Patients in whom a systemic disease is suspected should be referred to their primary care physician or other health care practitioner for complete evaluation.
The diagnostic process can usually be completed during the initial evaluation. If additional laboratory tests are ordered, a second visit may be required to correlate clinical data with laboratory findings to establish the diagnosis.

[redacted]

B. Management of Anterior Uveitis

The extent to which an optometrist can provide treatment for anterior uveitis may vary depending on the state's scope of practice laws and regulations and the individual optometrist's certification. Treatment of the patient with anterior uveitis may require consultation with or referral to the patient's primary care physician or an ophthalmologist for those services outside the optometrist's scope of practice.

1. Basis for Treatment

The general goals for therapy in anterior uveitis are:

- To preserve visual acuity
- To relieve ocular pain
- To eliminate the ocular inflammation or identify the source of inflammation
- To prevent formation of synechiae
- To manage intraocular pressure.

The treatment of anterior uveitis is nonspecific, usually involving topical therapy with corticosteroids and cycloplegics. Occasionally oral steroids or nonsteroidal anti-inflammatory drugs (NSAIDs) may be prescribed.

2. Available Treatment Options

a. Corticosteroids

The role of corticosteroids in treating anterior uveitis is to decrease inflammation by reducing the production of exudates, stabilizing cell membranes, inhibiting the release of lysozyme by granulocytes, and suppressing the circulation of lymphocytes.[26] A number of topical ophthalmic corticosteroids are available:[27,28]

- Prednisolone acetate 0.125% and 1%
- Rimexolone 1%
- Prednisolone sodium phosphate 0.125%, 0.5%, and 1%

- Dexamethasone alcohol 0.1%
- Dexamethasone sodium phosphate 0.1% (also available in 0.05% ointment form)
- Fluoromethalone 0.1% and 0.25% (also available in 0.1% ointment form)
- Medrysone 1%.

b. Cycloplegics and Mydriatics

All cycloplegic agents are cholinergic antagonists which work by blocking neurotransmission at the receptor site of the iris sphincter and ciliary muscle. Cycloplegics serve three purposes in the treatment of anterior uveitis:[29]

- To relieve pain by immobilizing the iris
- To prevent adhesion of the iris to the anterior lens capsule (posterior synechia), which can lead to iris bombe and elevated IOP
- To stabilize the blood-aqueous barrier and help prevent further protein leakage (flare).

Cycloplegic agents useful in treating anterior uveitis are:

- Atropine, 0.5%, 1%, 2%
- Homatropine, 2%, 5%
- Scopolamine, 0.25%
- Cyclopentolate, 0.5%, 1%, 2%.

Phenylephrine, 2.5%, is an adrenergic agonist that causes dilation by direct stimulation of the iris dilator muscle. Because phenylephrine has neither a cycloplegic nor anti-inflammatory effect and may cause a release of pigment cells into the anterior chamber, it is generally not recommended as an initial part of the therapeutic regimen. Phenylephrine may, however, help break recalcitrant posterior synechia.

c. Oral Steroids and Nonsteroidal Anti-Inflammatory Drugs

Oral prednisone may be utilized in recalcitrant cases of anterior uveitis in which topical steroids have produced little response. Because of the potential systemic side effects of oral prednisone, it should be used in consultation with the patient's primary care physician.

As prostaglandin inhibitors, NSAIDs (particularly aspirin and ibuprofen) reduce inflammation, thus are sometimes useful. In addition, NSAIDs may play a role in reducing inflammation associated with cystoid macular edema that may accompany anterior uveitis.[26,30]

d. Other Therapies

When topical therapy fails, periocular depot injections are useful. Immunosuppressive therapy represents a "last resort" in the treatment of anterior uveitis. Patients requiring such therapies may require consultation with an ophthalmologist.

*e. Recommended Therapeutic Regimen***

The initial treatment of anterior uveitis may include the use of:

- Cycloplegic agents: Cyclopentolate, 1%, may be used three times per day (t.i.d.) for mild anterior uveitis; or homatropine, 5%, may be used twice daily (b.i.d.) or t.i.d. for moderate anterior uveitis; or atropine, 1%, may be used b.i.d. or t.i.d. for severe anterior uveitis.
- Topical steroids: Prednisolone acetate, 1%, every 1-6 hours depending on severity; the more severe the inflammation, the more frequent the dosage.
- Topical beta blocker: Timolol maleate, 0.5%, or betaxolol may be used b.i.d. if inflammatory glaucoma is present and there are no contraindications to beta blockers.

* Every effort has been made to ensure the drug dosage recommendations are appropriate at the time of publication of the Guideline. However, as treatment recommendations change due to continuing research and clinical experience, clinicians should verify drug dosage schedules with product information sheets.

- Referral: The optometrist should consider referring the patient to the appropriate physician for systemic workup when there is recurrence or bilateral involvement (Table 2).

The classification of the clinical signs of anterior uveitis is based on severity (Table 4). An overview of treatment options is outlined in Table 5.[31]

Table 4

Clinical Degree of Anterior Uveitis **

Mild	Moderate	Severe
Mild to moderate symptoms	Moderate to severe symptoms	Moderate to severe symptoms
VA 20/20 to 20/30	VA from 20/30 to 20/100	VA < 20/100
Superficial circumcorneal flush	Deep circumcorneal flush	Deep circumcorneal flush
No KPs	Scattered KPs	Dense KPs
Trace to 1+ cells and flare	1-3+ cells and flare Miotic, sluggish pupil Mild posterior synechiae Mild iris swelling	3-4+ cells and flare Sluggish or fixed pupil Posterior synechiae (fibrous) Boggy iris (no crypts)
IOP reduced < 4 mmHg	IOP reduced 3-6 mm Hg	Raised IOP
	Anterior virtreous cells	Moderate to heavy anterior cells

* Reprinted with permission. Catania LJ. Primary care of the anterior segment, 2nd ed. Norwalk, CT: Appleton & Lange, 1995:371.

Table 5
Acute Anterior Uveitis: Treatment and Followup *[*]

A. Mild uveitis (Optional depending on symptoms)
   1. Cyclopentolate, 1% (t.i.d.) or homatropine, 5% (b.i.d.-t.i.d.)
   2. Prednisolone, 1% (b.i.d.-q.i.d.)[a]
   3. Oral aspirin or ibuprofen, 2 tablets (q.4h)[b]
   4. Consider beta blockers if IOP is elevated
   5. Re-evaluate 4-7 days (or p.r.n. if worsening)

B. Refer to primary care physician for systemic evaluation (when indicated)

C. Moderate uveitis
   1. Homatropine, 5% (q.i.d.) or scopolamine, 0.25% (b.i.d.)
   2. Prednisolone, 1% (q.i.d.)[a]
   3. Oral aspirin or ibuprofen, 2 tablets (q.4h)[b]
   4. Consider beta blockers if IOP is elevated
   5. Dark glasses
   6. Advise patient carefully (e.g., pain, course, compliance)
   7. Re-evaluate 2-4 days (or p.r.n.)

D. Severe uveitis
   1. Atropine, 1% (b.i.d.-t.i.d.) or homatropine, 5% (q.4h)
   2. Prednisolone, 1% (q.2-4h)[a]
   3. Oral aspirin or ibuprofen, 2 tablets (q.3-4h)[b]
   4. Consider beta blockers if IOP is elevated
   5. Dark glasses
   6. Advise patient carefully
   7. Re-evaluate 1-2 days

a. Shake steroid suspensions well before using. May use dexamethasone or fluoromethalone steroid ointments at bedtime.
b. Contraindicated in the presence of concurrent hyphema.

[*] Adapted from Catania LJ. Primary care of the anterior segment, 2nd ed. Norwalk, CT: Appleton & Lange, 1995:372.

The initial followup of anterior uveitis patients should be scheduled between 1-7 days, depending on severity. The evaluation should include the following procedures: visual acuity, IOP measurement, slit lamp examination, assessment of cells and flare, and evaluation of response to therapy. Ophthalmoscopy is indicated when it was not performed at the initial visit, when there has been no response to treatment, or when there is a flare-up of the inflammation. After the initial workup, the number and frequency of followup visits vary. At a minimum, a patient may expect two to five followup visits after the initial diagnosis (See Appendix Figure 2).

If at followup, the anterior chamber reaction is improving, the clinician may continue or reduce medications, depending on the severity of the initial reaction. Cycloplegics may be discontinued when the cellular reaction is subsiding and flare is absent. Steroids should be continued until the cellular reaction is minimal or absent. Steroids should be withdrawn slowly (tapered). For example, when the patient has been using steroids four times per day (q.i.d.) for one week, the dosage can be reduced to t.i.d. for 4-5 days, then b.i.d. for 3-4 days, then daily (q.d.) for 2-3 days, before stopping. The more potent and frequent the use of steroid drops, and the longer the patient has been using them, the longer the tapering period required. During tapering, the clinician should observe the patient for signs of increased inflammation.

Chronic anterior uveitis may require long-term use of low-dose topical steroids (e.g., 0.125% prednisolone every other day). When the patient is a steroid responder (i.e., increased IOP), concurrent treatment with a beta blocker is advised unless contraindicated.

Once the patient's condition has stabilized, followup should be every 1-6 months. The longer the eye is quiet, the longer the interval between followup visits may be.

3. Patient Education

The patient should be informed about the serious nature of anterior uveitis. Compliance with the therapeutic regimen and keeping all followup appointments are essential to achieve the therapeutic goals.

The optometrist should advise the patient of the potential side effects of long-term corticosteroid use (i.e., glaucoma and posterior subcapsular cataracts). It is important that this advice be well-documented in the medical record, and the patient should be reminded periodically throughout the course of treatment.

4. Prognosis

Most cases of anterior uveitis respond favorably to early diagnosis and treatment. Anterior uveitis may recur, especially when there is a systemic etiology. Therefore, both the clinician and patient must be alert for signs of recurrence and reinstitute therapy promptly.

CONCLUSION

Anterior uveitis is a sight-threatening eye condition that may be diagnosed and treated by optometrists. This Clinical Practice Guideline reviews the etiology, diagnosis, treatment, and followup of anterior uveitis. Through the judicious use of topical steroids and cycloplegics, the treatment of anterior uveitis is usually successful, and sequelae are minimal.

The optometrist plays an important role in the ongoing care of the patient with anterior uveitis, particularly when anterior uveitis is associated with a chronic systemic disease in which recurrences are common. In such cases, regular optometric examinations are essential to preserving eye health and good vision.

III. REFERENCES

1. Weinberg RS. Anterior uveitis. Ophthalmol Clin North Am 1993; 6(1):23-8.

2. Schlaegel TF. Essentials of uveitis. Boston: Little, Brown & Co., 1969.

3. Rothova A, van Veenendaal W, Linssen A, et al. Clinical features of acute anterior uveitis. Am J Ophthalmol 1987; 103(2):137-45.

4. Rosenbaum JT, Nozik RA. Uveitis: many diseases, one diagnosis. Am J Med 1985; 79(5);545-7.

5. Callen JP, Mahl CF. Oculocutaneous manifestations observed in multisystem disorders. Dermatol Clin 1992; 10(4):709-16.

6. Wakefield D, Montanaro A, McCluskey P. Acute anterior uveitis and HLA-B27. Surv Ophthalmol 1991; 36(3):223-32.

7. Rosenbaum JT. Acute anterior uveitis and spondyloarthropathies. Rheum Dis Clin North Am 1992; 18(1):143-9.

8. Brewerton DA, Caffrey M, Nicholls A, et al. Acute anterior uveitis and HLA-B27. Lancet 1973; 2:994-6.

9. Henderly DE, Genstler AJ, Smith RE, et al. Changing patterns of uveitis. Am J Ophthalmol 1987; 103(2):131-6.

10. Badeeb O, Anwar M, Farwan K, et. al. Leukemic infiltrate versus anterior uveitis. Ann Ophthalmol 1992; 24:295-8.

11. Southward TR, Ryder CAJ. Ophthalmological screening in juvenile arthritis: should the frequency of screening be based on the risk of developing chronic iridocyclitis? Br J Rheumatol 1992; 31:633-4.

12. Kanski JJ. Screening for uveitis in juvenile chronic arthritis. Br J Ophthalmol 1989; 73:225-38.

13. Rosenbaum JT. Systemic associations of anterior uveitis. Int Ophthalmol Clin 1991; 31(3):131-52.

14. Mauger TF, Benes SC, Havener WH. Misdiagnosis of iridocyclitis. Ann Ophthalmol 1987; 19(8):310-2.

15. Schlaegel TF, O'Connor GR. Current aspects of uveitis: general considerations. Int Ophthalmol Clin 1977; 17(3):1-42.

16. Heiden D, Nozik RA. A systematic approach to uveitis diagnosis. Ophthalmol Clin North Am 1993; 6(1):13-22.

17. Winterkorn JM. Lyme disease: neurologic and ophthalmic manifestations. Surv Ophthalmol 1990; 35(3):191-204.

18. Woods AC. Endogenous inflammations of the uveal tract. Baltimore: Williams & Wilkins, 1961:9-12.

19. Hogan MJ, Kimura SJ, Thygeson P. Signs and symptoms of uveitis: I. Anterior uveitis. Am J Ophthalmol 1959; 47:155-70.

20. Pavesio CE, Nozik RA. Anterior and intermediate uveitis. Int Ophthalmol Clin 1990; 30(4):244-51.

21. Kimura SJ, Hogan MJ, Thygeson P. Fuchs' syndrome of heterochromic cyclitis. Arch Ophthalmol 1955; 53:179-86.

22. Weinreb RN, Tessler H. Laboratory diagnosis of ophthalmic sarcoidosis. Surv Ophthalmol 1984; 28(6):653-64.

23. Rosenbaum JT, Wernick R. Selection and interpretation of laboratory tests for patients with uveitis. Int Ophthalmol Clin 1990; 30(4):238-43.

24. Abrams J, Schlaegel TF. The tuberculin skin test in the diagnosis of tuberculous uveitis. Am J Ophthalmol 1983; 96:295-8.

25. Cullom RD, Chang B, eds. The Wills eye manual. Philadelphia: JB Lippincott, 1994:353-4.

26. Schlaegel TF, O'Connor GR. Nonspecific treatment. Int Ophthalmol Clin 1977; 17(3):43-63.

27. Jaanus, SD. Anti-inflammatory drugs. In: Bartlett JD, Jaanus SD, eds. Clinical ocular pharmacology, 2nd ed. Boston: Butterworths, 1989:172.

28. Foster CS, Alter G, De Barge LR, et al. Efficacy and safety of rimexolone 1% ophthalmic suspension vs 1% prednisolone acetate in the treatment of uveitis. Am J Ophthalmol 1996; 122:171-82.

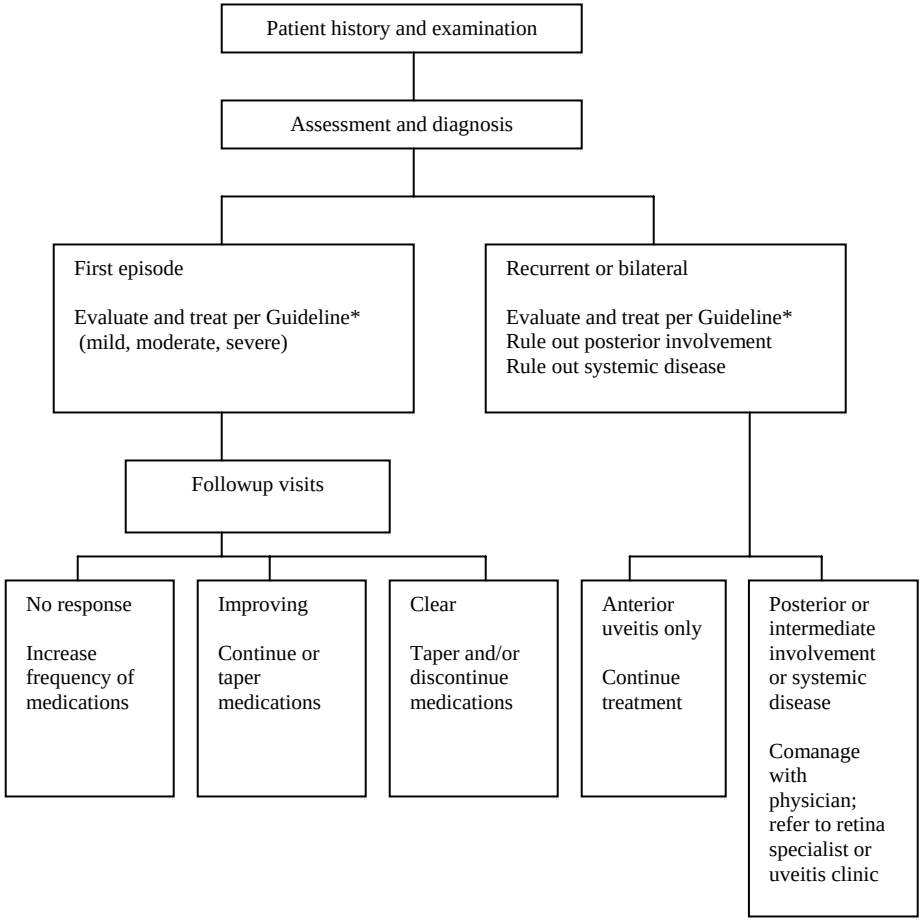
29. Havener WH. Ocular pharmacology. St. Louis: CV Mosby, 1983; 383-5.

30. Olson NY, Lindsley CB, Godfrey WA. Treatment of chronic childhood iridocyclitis with nonsteroidal anti-inflammatory drugs. J Allergy Clin Immunol 1987; 79:220.

31. Catania LJ. Primary care of the anterior segment, 2nd ed. Norwalk, CT: Appleton & Lange, 1995:371-2.

IV. APPENDIX

Figure 1
Optometric Management of the Patient with Anterior Uveitis: A Brief Flow Chart



* If associated elevated IOP, treat with beta blocker unless contraindicated.

Figure 2

Frequency and Composition of Evaluation and Management Visits for Anterior Uveitis

Severity of Anterior Uveitis	Frequency of Follow-up Visits	Visual Acuity	Slit Lamp for Cells and Flare	Tonometry	Ophthalmoscopy	Management Plan
Mild	Every 4-7 days	Yes	Yes	Yes	If not done on initial visit	Treatment per Table 5
Moderate	Every 2-4 days	Yes	Yes	Yes	If not done on initial visit	Treatment per Table 5
Severe	Every 1-2 days	Yes	Yes	Yes	If not done on initial visit	Treatment per Table 5

Figure 3
ICD-9-CM Classification
of Anterior Uveitis, Iritis, or Iridocyclitis

Acute and subacute iridocyclitis **364.0**

Anterior uveitis } acute
Cyclitis } subacute
Iridocyclitis
Iritis
Excludes: gonococcal (098.41)
herpes simplex (054.44)
herpes zoster (053.22)

Acute and subacute iridocyclitis, unspecified **364.00**
Primary iridocyclitis **364.01**
Recurrent iridocyclitis **364.02**
Secondary iridocyclitis, infectious **364.03**
Secondary iridocyclitis, noninfectious **364.04**
Aqueous:
cells
fibrin
flare

Hypopyon **364.05**

Chronic iridocyclitis **364.1**
Excludes: posterior cyclitis (363.21)
Chronic iridocyclitis, unspecified **364.10**
Chronic iridocyclitis in diseases classified elsewhere **364.11**
Code first underlying disease, as:
sarcoidosis (135)
tuberculosis (017.3)
Excludes: syphilitic iridocyclitis (091.52)

Certain types of iridocyclitis **364.2**
Excludes: posterior cyclitis (363.21)
sympathetic uveitis (360.11)

Fuchs' heterochromic cyclitis **364.21**
Glaucomatocyclitic crisis **364.22**
Lens-induced iridocyclitis **364.23**
Vogt-Koyanagi syndrome **364.24**

Unspecified iridocyclitis **364.3**
Uveitis NOS
Allergic Uveitis **360.11**
Granulomatous Uveitis **364.10**
Nongranulomatous Uveitis **364.00**
Sympathetic Uveitis **360.11**
Syphilitic Uveitis
cogenital 090.0 [363.13]
late 095.8 [363.13]

Uveitis due to secondary syphilis **091.5**
Syphilitic uveitis, unspecified **091.50**
Syphilitic iridocyclitis (secondary) **091.52**
Uveitis due to
operation **360.11**
toxoplasmosis (acquired) **130.2**
congenital (active) **771.2**

[redacted]

[redacted]

Abbreviations of Commonly Used Terms

ACE	-	Angiotensin converting enzyme
ANA	-	Antinuclear antibody test
CBC	-	Complete blood count
CME	-	Cystoid macular edema
ELISA	-	Enzyme-linked immunosorbent assay
ESR	-	Erythrocyte sedimentation rate
FTA-ABS	-	Fluorescent treponemal antibody absorption
HIV	-	Human immunodeficiency virus
HLA-B27	-	Human leukocyte antigen-B27
IOP	-	Intraocular pressure
JRA	-	Juvenile rheumatoid arthritis
KP	-	Keratic precipitate
MHA-TP	-	Microhemagglutination assay for antibodies to Treponema pallidum
NSAID	-	Nonsteroidal anti-inflammatory drug
PAS	-	Peripheral anterior synechia
PPD	-	Purified protein derivative
PSC	-	Posterior subcapsular cataract
RBC	-	Red blood cells
RPR	-	Rapid plasma reagin
SLE	-	Systemic lupus erythematosus
UGH	-	Uveitis-glaucoma-hyphema
VDRL	-	Venereal Disease Research Laboratory
WBC	-	White blood cells

Glossary

Anterior chamber The space in the eye filled with aqueous humor that is bordered anteriorly by the cornea and a small portion of the sclera and posteriorly by a small portion of the ciliary body, the iris, and that portion of the lens which presents through the pupil.

Biomicroscopy The examination of ocular tissue using a bright focal source of light with a slit of variable width and height and a binocular microscope with variable magnification.

Cells The white cells released into the anterior chamber due to inflammation of anterior uvea.

Cornea The transparent portion of the outer coat of the eyeball forming the anterior wall of the aqueous chamber.

Cycloplegia A temporary paralysis of the ciliary muscle, resulting in pupillary dilation and loss of accommodation.

Flare The release of plasma protein into the anterior chamber due to inflammation.

Fluorescein angiography A procedure whereby sodium fluorescein dye is injected intravenously and observed as it transits the retina and choroid.

Glaucoma An ocular disease characterized by an elevation in the intraocular pressure, which causes damage to optic nerve fibers entering the optic nerve, leading to loss of vision.

Gonioscopy A technique of examining the anterior chamber, utilizing a corneal contact lens, magnifying device, and light source.

Hyphema Blood in the anterior chamber.

Miosis Pupillary constriction.

Mydriasis Dilation of the pupil.

Ophthalmoscopy Examination of the interior of the eye, using an illumination system involving the light source, lenses, and a prism or mirror, and an observation system involving a peephole and set of lenses.

Photophobia Abnormal sensitivity to light.

Posterior subcapsular cataract Loss of transparency of the eye or its capsule involving the cortex at the posterior of the pole of the lens.

Synechia An adhesion of the iris to the cornea (peripheral anterior synechia) or lens (posterior synechia).

Tonometry A procedure for measurement of the pressure within the eye.

Visual acuity The clearness of vision that depends upon the sharpness of focus of the retinal image and the integrity of the retina and visual pathway.

Sources:

Cline D, Hofstetter HW, Griffin JR. Dictionary of visual science, 4th ed. Radnor, PA: Chilton, 1989.

Coles WH. Ophthalmology: a diagnostic text. Baltimore: Williams & Wilkins, 1989.

Cullon RD, Chang B, eds. The Wills eye manual: office and emergency room diagnosis and treatment of eye diseases, 2nd ed. Philadelphia: J. B. Lippincott, 1994:469-72.

Grosvenor TP. Primary Care Optometry. Anomalies of refraction and binocular vision, 3rd ed. Boston: Butterworth-Heinemann, 1996:575-91.

Stedman's medical dictionary, 26th ed. Baltimore: Williams & Wilkins, 1995.

Vaughan D, Asbury T, Riordon-Eva P. General ophthalmology, 14th ed. Norwolk, CT: Appleton & Lange, 1995:419-22.