

SCLERA

Definition

- Dense, fibrous, collagenous structure forming the posterior 5/6 of the eye

Layers

1. Episclera

- Vascularized connective tissue
- Merges with scleral stroma

2. Scleral stroma

- Mainly collagen fiber bundles

3. Lamina fusca

- Innermost layer next to choroid
- Composed of fine collagen fibers

Blood Supply

- From episcleral and choroidal vascular networks

Nerve Supply

- Posteriorly: short ciliary nerves
- Anteriorly: long ciliary nerves

Functions

- Tough protective coat
 - Provides rigidity and shape to the eyeball
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Episcleritis

Definition

- Benign, self-limiting inflammation of the episclera

Aetiology

1. Idiopathic - many cases
2. Associated conditions:
 - Rheumatoid arthritis
 - Inflammatory bowel disease

- Acne rosacea
- Atopy
- Gout
- Syphilis
- Tuberculosis

3. Infective causes:

- Herpes zoster virus, syphilis, tuberculosis

Types

1. Simple episcleritis

- Sectorial (70%) → only a sector involved
- Diffuse (30%) → entire episclera involved

2. Nodular episcleritis

- Localized movable nodule

Pathology

- Non-granulomatous inflammation
- Vascular dilation + perivascular lymphocyte & plasma cell infiltration

Clinical Features

Symptoms

- Predominantly females
- Peak age: 20–50 years
- Sudden onset
- Redness (usually sectorial)
- Hotness, pricking sensation, discomfort

Signs

- Redness: mild → bright red / pink (sectorial or diffuse)
- Salmon pink lesion in natural light
- Straight inflamed vessels radiating from limbus
- Lesion moves with cotton-tipped applicator (distinguishes from scleritis)

Diagnosis

- Clinical features

- Topical phenylephrine 2.5% → blanches episcleral vessels, not deeper scleral vessels (scleritis)

Differential Diagnosis

- Conjunctivitis
 - Scleritis
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Treatment

- Usually self-limiting: resolves in 1-2 weeks
 - Topical artificial tears → relieve discomfort
 - Topical vasoconstrictors → reduce redness
 - Weak topical steroids 4x daily for 1-2 weeks → usually sufficient
 - Topical NSAIDs → effective but less than steroids
 - Oral NSAIDs (diclofenac, naproxen, flurbiprofen) → if needed
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Scleritis

Definition

- Inflammatory disease of the sclera
 - ~50% of cases are associated with systemic immunological diseases
 - Early diagnosis & treatment of the underlying cause is crucial to prevent ocular complications & vision loss
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Aetiology

Inflammatory (With Systemic Association)

- Rheumatoid arthritis (40%) - most common
- Systemic lupus erythematosus (SLE)
- Wegener's granulomatosis
- Polyarteritis nodosa (PAN)
- Ankylosing spondylitis
- Sarcoidosis

- Giant cell arteritis
- Inflammatory bowel disease
- Syphilis

Infectious

- Virus: Herpes zoster
 - Bacteria: Syphilis, Tuberculosis
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Pathology

- Immune-mediated vasculitis
 - Causes inflammation and destruction of the sclera
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Anatomical Classification

Anterior Scleritis (98%)

- I. Non-necrotizing
 - Diffuse
 - Nodular

2. Necrotizing

- With inflammation
- Without inflammation

Posterior Scleritis (2%)

Anterior Non-Necrotizing Scleritis

Diffuse Scleritis

- Pain: mild
- Redness: sector or entire anterior sclera
- Distortion of normal radial vascular pattern
- Relatively benign → rarely causes visual loss

Nodular Scleritis

- Pain: moderate
 - Red nodule visible, fixed over scleral tissue
 - Visual impairment: ~25% of cases
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Anterior Necrotizing Scleritis 🔥

With Inflammation

- Onset: gradual
- Bilateral: ~60%
- Pain: initially mild → severe & persistent, interferes with sleep
- Strong association with systemic vascular disease
- Mortality: ~25% within 5 years of onset
- Visual prognosis: poor

Examination findings:

- Congested deeper vascular plexus
- Avascular patch due to vascular distortion/occlusion
- Conjunctival ulceration over necrotic sclera
- Thinning sclera appears bluish after resolution

Without Inflammation (Scleromalacia Perforans)

- Typically in women with long-standing rheumatoid arthritis

- Pain: usually less

Examination:

- Yellow necrotic scleral patch
 - Progressive exposure of underlying uvea due to scleral thinning
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Posterior Scleritis

Definition 

- Inflammatory disease of the sclera posterior to the equator
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Clinical Features 

- Pain & visual impairment: most common symptoms
- Lid edema may occur
- Proptosis & ophthalmoplegia possible
- Fundus findings:

- Disc swelling or exudative retinal detachment (~80%)
 - Choroidal detachment
 - Macular edema
 - Choroidal folds
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Diagnosis

- Ultrasonography: shows T-sign (posterior scleral thickening + fluid in Tenon's space)
 - CT scan: posterior scleral thickening
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Investigations

- CBC
- ESR
- Urine analysis
- Circulating immune complexes
- Serology:

- RA factor, ANA, Anti-dsDNA antibodies, ANCA
 - VDRL, FTA-Abs
 - ACE
 - Uric acid
 - Imaging: Chest X-ray, Mantoux test
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Complications

- Corneal involvement (37%):
 - Stromal keratitis
 - Sclerokeratitis
 - Marginal keratolysis (melting)
 - Anterior uveitis (30%)
 - Glaucoma (15%)
 - Cataract (7%)
 - Staphyloma (0%)
 - Course: complications occur in late stage, visual loss in 27-37%, uveitis in >1/3 patients
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Treatment

- Treat associated systemic disease & ocular complications (e.g., glaucoma, cataract)
 - Topical steroids: used in all cases but often inadequate alone
 - Systemic NSAIDs: effective in anterior non-necrotizing scleritis (e.g., indomethacin, flurbiprofen)
 - Systemic steroids: required in anterior necrotizing & posterior scleritis
 - Immunosuppressants: used in steroid-resistant cases
 - Subconjunctival triamcinolone acetonide: effective in anterior non-necrotizing and necrotizing scleritis
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Episcleritis vs Scleritis

Point of Difference	Episcleritis 	Scleritis 
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Frequency	Frequently common	Less common
Onset	Sudden	Gradual
Pain	No pain, mild discomfort	Mild to severe pain
Systemic association	Infrequent	Frequent
Mobility of lesion	Movable over sclera	Not movable
Vision	Unaffected	Frequently affected
Resolution	Frequently resolves without treatment	Requires treatment
Phenylephrine test	Blanches vessels	Will not blanch vessels
Complications	None	Frequent

Anterior vs Posterior Scleritis

Feature	Anterior Scleritis	Posterior Scleritis
Location	Anterior sclera (visible part)	Posterior sclera (behind equator)
Visibility	Visible on clinical exam	Not externally visible
Redness	Marked deep violaceous redness	Usually absent
Pain	Severe, boring ocular pain	Severe deep orbital pain
Tenderness	Present	Present
Visual loss	Mild unless complications	Common and often significant
Fundus findings	Usually normal (unless complications)	Choroidal folds, exudative RD, disc edema
Diagnosis	Clinical slit-lamp exam	B-scan USG, OCT, MRI

Complications	Keratitis, uveitis, glaucoma	Optic nerve edema, macular edema, RD
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Types of Anterior Scleritis

Type	Appearance	Pain	Severity
Non-necrotizing - Diffuse	Widespread scleral inflammation	Severe	Most common, moderate severity
Non-necrotizing - Nodular	Localized tender scleral nodule	Severe	More localized inflammation
Necrotizing - With inflammation	Areas of scleral necrosis with marked inflammation	Very severe	Most destructive, high complication risk
Necrotizing - Without inflammation (Scleromalacia perforans)	Thinned sclera, minimal redness/pain	Mild or absent	Seen in long-standing RA, risk of perforation

-> The End <-