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Ophthalmology Study Guide

MBBS Year IV — NUMS 2025–26

Structured Using the AMEE Guide 16 Framework

> **How to use this guide (AMEE Guide 16 note):**
> This guide is built on the AMEE Guide 16 principle that a good study guide is not a textbook summary — it is a **learning navigator**. Each section opens with explicit learning outcomes, moves through structured content, offers active-learning tasks, and closes with self-assessment so you can check your own understanding before moving on.Work through each block in sequence. Attempt the self-assessment questions *before* looking
> at the answers. Use the "Time Budget" at the start of each block to pace yourself.

QUICK REFERENCE: EXAM AT A GLANCE

Component	Marks	Notes
Theory MCQs (Paper 1)	60 raw → rationalized to 40%	60 min, 1 mark each

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Theory SAQs (Paper 2)	8 × 5 marks = 40	120 min
Internal Assessment	20	Continuous + EOB + Pre-annual
Theory Total	**100**	Pass = 50
Practical OSCE (Observed)	5 × 8 marks = 40	5 min/station
Practical OSCE (Non-observed)	8 × 5 marks = 40	5 min/station
Practical Internal Assessment	20	
Practical Total	**100**	Pass = 50

SAQ topics by frequency (from Table of Specifications):

Topic	SAQs Allocated
Eye Lid & Adnexa	1
Uveitis	1
Lens (Cataract)	1
Glaucoma	1
Ocular Trauma	1
Retinal Detachment	1
Common Fundus Pathologies	1
Strabismus & Neuro-Ophthalmology	1

> **Exam tip:** Every topic that carries an SAQ also has the highest MCQ allocation. Prioritise these 8 topics for deep understanding; cover remaining topics for MCQ breadth.

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CURRICULUM MAP

Block I (External Eye)		Block II (Internal Eye)		Block III (Posterior Segment)	
Eyelid & Adnexa	30 %	Corneal Diseases	20 %	Retinal Diseases	40 %
Conjunctiva/Sclera	30 %	Lens & Cataract	30 %	Strabismus/Neuro-Oph	30 %
Orbit	20 %	Refractive Errors	20 %	Ocular Trauma	30 %
Uveitis	20 %	Glaucoma	30 %		

Total contact hours: **150 hours** | Self-directed learning: **10 hours**

BLOCK I: EXTERNAL EYE, ORBIT & UVEA

Suggested time budget: ~4 weeks of focused study

TOPIC 1 — EYELID & ADNEXA *(Weightage 30%)*

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Learning Outcomes

By the end of this topic you should be able to:

1. Identify and differentiate common eyelid conditions on clinical assessment
2. Recognize lid tumours and benign lesions requiring referral
3. Diagnose and manage dry eye and lacrimal system diseases
4. Correlate Vitamin A deficiency with its ocular manifestations
5. Determine which conditions need urgent ophthalmology referral

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Core Content

1.1 Ptosis

- **Definition:** Drooping of upper eyelid; margin covers >2 mm of cornea
- **Classification:**
    - *Congenital* — Levator muscle dysgenesis; may cause amblyopia (treat early)
    - *Acquired:*
        - Neurogenic: CN III palsy (+ diplopia, mydriasis), Horner syndrome (partial ptosis + miosis + anhidrosis)

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    - Myogenic: Myasthenia gravis (fatigable, variable), CPEO
    - Aponeurotic: Most common acquired type; elderly, post-surgery
    - Mechanical: Heavy lid tumour
- **Key sign:** Upper lid margin to corneal light reflex distance (MRD1): normal = 4–5 mm
- **Referral trigger:** Any new-onset ptosis warrants neurological assessment

1.2 Blepharitis

- **Anterior:** Staphylococcal (ulcerative, collarettes), Seborrhoeic (greasy scales)
- **Posterior (Meibomian Gland Dysfunction – MGD):** Most common; frothy tear film, lid margin telangiectasia
- **Management:** Lid hygiene (warm compress → massage → clean), topical/systemic antibiotics, artificial tears
- **Complication:** Hordeolum (stye), Chalazion, Trichiasis

1.3 Entropion & Ectropion

	Entropion	Ectropion
Lid direction	Inward	Outward
Main type	Involutional (elderly)	Involutional (elderly)
Symptom	Corneal irritation/ulcer	Epiphora, conjunctival exposure
Urgent concern	Corneal ulceration	Exposure keratopathy
Treatment	Surgical correction	Surgical correction

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1.4 Lacrimal System & Dry Eye

- **Dacryocystitis:** Infection of lacrimal sac; presents with medial canthal swelling + discharge; treat with antibiotics + DCR surgery
- **Nasolacrimal Duct Obstruction (NLDO):** Congenital (most resolve by 1 year), symptomatic = epiphora
- **Dry Eye / KCS (Keratoconjunctivitis Sicca):**
  - Aqueous-deficient (Sjögren, lacrimal gland disease) or Evaporative (MGD)
  - Schirmer's test: <5 mm in 5 minutes = dry eye
  - TBUT (Tear Break-Up Time): <10 sec = abnormal
  - Treatment: Artificial tears, punctal plugs, Cyclosporin A drops

1.5 Vitamin A Deficiency & Bitot's Spots

- **Stages of VAD:**
  a. Night blindness (earliest)
  b. Conjunctival xerosis (dry, non-wettable conjunctiva)
  c. **Bitot's spots** — Foamy/cheesy triangular white spots on bulbar conjunctiva, nasal > temporal
  d. Corneal xerosis
  e. Keratomalacia (corneal melting — irreversible blindness)
- **Management:** Vitamin A supplementation (WHO protocol); corneal damage is irreversible
- **Clinical context:** Major cause of childhood blindness in Pakistan

1.6 Lid Tumours

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Tumour	Key Feature
Chalazion	Chronic granulomatous; Meibomian gland; painless; I&C surgery
Sebaceous cyst	Smooth, mobile, white
Papilloma	Squamous; pedunculated; benign
Basal Cell Carcinoma	Most common malignant lid tumour; pearly rolled edge; medial canthus; Mohs surgery
Squamous Cell Carcinoma	Less common; scaly, ulcerated
Sebaceous Gland Carcinoma	Masquerades as chalazion; elderly; poor prognosis

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Active Learning Task 1.1

> Take a blank sheet and draw a table of ALL conditions causing a red, watery eye that are covered in this topic (blepharitis, entropion, dry eye, dacryocystitis). For each, note: etiology → key symptom → key sign → 1st line treatment.
> Compare with the core content above.

Self-Assessment — Eyelid & Adnexa

MCQs

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1. A 65-year-old man presents with the lower lid margin rubbing against the cornea. Fluorescein staining shows a corneal abrasion. The most likely diagnosis is:
    - A. Ectropion
    - B. Entropion ✓
    - C. Ptosis
    - D. Blepharospasm
2. A 4-year-old child is brought with watering of the right eye since birth, mucous discharge and swelling near the inner corner of the eye. The most appropriate first step is:
    - A. DCR surgery
    - B. Topical antibiotics only
    - C. Lacrimal sac massage + antibiotic drops ✓
    - D. Probing under GA
3. Bitot's spots are characteristically found on the:
    - A. Cornea
    - B. Bulbar conjunctiva, temporal side ✓
    - C. Tarsal conjunctiva
    - D. Lid margin
4. The most common malignant tumour of the eyelid is:
    - A. Squamous cell carcinoma
    - B. Sebaceous gland carcinoma
    - C. Basal cell carcinoma ✓
    - D. Melanoma

SAQ Practice

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> *Q: A 50-year-old woman complains of persistent bilateral eye irritation, burning and foreign-body sensation, worse in air-conditioned environments. On examination, TBUT is 7 seconds and Schirmer's test is 4 mm/5 min. She also has dry mouth.*a) What is the diagnosis? (1 mark)
> b) Name the underlying systemic condition most likely responsible. (1 mark)
> c) Outline your management. (3 marks)

Model Answer:

> a) Dry Eye / KCS (Keratoconjunctivitis Sicca)
> b) Primary Sjögren's syndrome
> c) Preservative-free artificial tears (frequent), punctal plugs for aqueous conservation, topical Cyclosporin A for inflammation, treat MGD with warm compresses, systemic disease management with rheumatology referral

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TOPIC 2 — CONJUNCTIVA, EPISCLERA & SCLERA *(Weightage 30%)*

Learning Outcomes

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1. Differentiate between the common causes of red eye
2. Identify the type of conjunctivitis from clinical features
3. Recognize serious conditions (scleritis, episcleritis) and systemic associations
4. Manage ophthalmia neonatorum as an emergency

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Core Content

2.1 The Red Eye — Differential Diagnosis Framework

Feature	Conjunctivitis	Episcleritis	Scleritis	Acute Glaucoma	Uveitis
Pain	Minimal	Mild-mod	Severe boring	Severe	Mod-severe
Vision	Normal	Normal	Normal/reduced	Reduced	Reduced
Discharge	Yes	No	No	No	No
Pupil	Normal	Normal	Normal	Mid-dilated fixed	Small
Cornea	Clear	Clear	±	Steamy	± KPs
IOP	Normal	Normal	Normal	Very high	Low-normal

2.2 Conjunctivitis

Bacterial:

- Organisms: *S. aureus*, *S. pneumoniae*, *H. influenzae*, Gonococcus

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- Features: Mucopurulent discharge, lid crusting, papillae on tarsal conjunctiva
- Treatment: Topical antibiotics (chloramphenicol, ciprofloxacin)
- **Gonococcal:** Hyperpurulent, perforates cornea → emergency; systemic ceftriaxone + topical

Viral:

- Organism: Adenovirus (most common), Herpes simplex
- Features: Watery discharge, pre-auricular lymphadenopathy, follicles on tarsal conjunctiva
- **Epidemic keratoconjunctivitis (EKC):** Highly contagious; subepithelial corneal infiltrates
- Treatment: Supportive; isolate patient

Allergic:

- Types: Seasonal, Perennial, Vernal (VKC), Giant Papillary (GPC — contact lens wearers)
- Features: Intense itching, stringy/ropy discharge, cobblestone papillae (VKC — upper tarsal)
- Shield ulcer in VKC — serious complication
- Treatment: Antihistamines (topical/oral), mast cell stabilisers, mild steroids (short course)

Chlamydial (Trachoma):

- *Chlamydia trachomatis* serotypes A–C; leading infectious cause of blindness
- **Follicular** stage → Pannus (corneal vascularisation) → Trichiasis → Corneal scarring
- WHO SAFE strategy: Surgery, Antibiotics (azithromycin), Facial cleanliness, Environmental improvement
- **Inclusion conjunctivitis:** Serotypes D–K; sexually active adults; neonates

2.3 Ophthalmia Neonatorum

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- Conjunctivitis in first 28 days of life
- **Chemical (Day 1):** Silver nitrate prophylaxis reaction
- **Gonococcal (Day 2–5):** *N. gonorrhoeae*; hyperpurulent; EMERGENCY — corneal perforation; systemic ceftriaxone
- **Chlamydial (Day 5–14):** Most common cause; *C. trachomatis*; systemic erythromycin (prevents pneumonia)
- **HSV (Day 7–14):** Rare but serious; aciclovir

2.4 Pterygium & Pinguecula

	Pterygium	Pinguecula
Definition	Fibrovascular growth onto cornea	Degenerative conjunctival lesion; does NOT grow onto cornea
Location	Nasal > temporal; crosses limbus	Nasal/temporal; at limbus but not crossing
Cause	UV exposure	UV exposure/aging
Vision effect	Can reduce VA when near visual axis	No
Treatment	Surgical excision if visually significant	Lubricants; surgery rare

2.5 Episcleritis & Scleritis

	Episcleritis	Scleritis

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Pain	Mild	Severe, boring, nocturnal
Type	Nodular or diffuse	Anterior (diffuse/nodular/necrotising) or Posterior
Systemic association	Less common	RA, SLE, Wegener's, PAN
Treatment	NSAIDs, lubricants	Systemic NSAIDs/steroids; immunosuppression
Risk of vision loss	Rare	Significant (scleral melt)

Self-Assessment — Conjunctiva

MCQs

1. A neonate presents on day 3 with profuse purulent discharge and lid swelling. Emergency treatment should include:
    - A. Topical chloramphenicol
    - B. Systemic aciclovir
    - C. Systemic ceftriaxone ✓
    - D. Topical erythromycin
2. Cobblestone papillae on the upper tarsal conjunctiva and a "shield ulcer" are characteristic of:
    - A. Bacterial conjunctivitis
    - B. Trachoma
    - C. Vernal keratoconjunctivitis ✓

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- D. Epidemic keratoconjunctivitis

3. Which feature best distinguishes scleritis from episcleritis?
    - A. Redness
    - B. Discharge
    - C. Severe nocturnal boring pain ✓
    - D. Presence of follicles

TOPIC 3 — ORBIT *(Weightage 20%)*

Learning Outcomes

1. Define proptosis and describe its assessment
2. Differentiate the common causes of proptosis
3. Identify thyroid eye disease (TED) and its management stages
4. Recognize orbital cellulitis as a life-threatening emergency

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Core Content

3.1 Proptosis (Exophthalmos)

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- **Definition:** Forward displacement of eyeball; measured by Hertel exophthalmometer
- **Normal:** <20 mm; >2 mm difference between sides = significant
- **Unilateral:** More likely tumour/inflammatory; Bilateral: TED
- **Assessment:** Direction of displacement points away from lesion

3.2 Thyroid Eye Disease (TED / Graves' Ophthalmopathy)

- **Most common cause of unilateral AND bilateral proptosis in adults**
- Pathophysiology: GAG accumulation + lymphocytic infiltration of extraocular muscles and orbital fat
- **Clinical features (NOSPECS mnemonic):**
  - No signs/symptoms
  - Only signs (lid retraction, lid lag — Dalrymple's and Von Graefe's signs)
  - Soft tissue involvement (periorbital oedema, conjunctival injection)
  - Proptosis
  - Extraocular muscle involvement (diplopia — inferior rectus most affected → upgaze limitation)
  - Corneal involvement (exposure keratopathy)
  - Sight loss (compressive optic neuropathy — EMERGENCY)
- **Treatment:** Mild: artificial tears, prisms, selenium; Moderate-severe: IV methylprednisolone, radiotherapy; Severe (corneal/optic nerve): orbital decompression

3.3 Orbital Cellulitis

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- **Pre-septal (Preseptal/Periorbital):** Anterior to orbital septum; No proptosis/diplopia/pain on movement; treat with oral antibiotics
- **Post-septal (Orbital):** Posterior to septum; **EMERGENCY**
  - Proptosis + painful ophthalmoplegia + chemosis + systemic fever
  - Usually extends from sinusitis (*S. aureus*, *Strep*, H. influenzae)
  - Complications: Subperiosteal abscess, cavernous sinus thrombosis, meningitis
  - Treatment: IV antibiotics + surgical drainage + ENT collaboration
  - CT scan: Investigation of choice

3.4 Orbital Tumours

Tumour	Key Features
Capillary Haemangioma	Most common orbital tumour in children; grows, then involutes
Cavernous Haemangioma	Most common benign orbital tumour in adults; slow growing
Dermoid Cyst	Children; superotemporal orbit; smooth, non-tender
Rhabdomyosarcoma	Most common primary malignant orbital tumour in children; rapid proptosis; treat urgently
Orbital Lymphoma	Adults; salmon-coloured subconjunctival mass; B-cell NHL
Metastatic	Adults; breast/lung/prostate; rapid onset

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Active Learning Task 3.1

> A 45-year-old woman presents with bilateral proptosis, lid retraction, periorbital puffiness and diplopia on upward gaze. Her TFTs show elevated T3/T4. Construct a management algorithm covering: (i) confirming diagnosis, (ii) assessing severity, (iii) treating mild, moderate, and sight-threatening disease.

TOPIC 4 — UVEITIS *(Weightage 20%)*

Learning Outcomes

1. Define uveitis and classify it anatomically
2. Identify the clinical features of anterior uveitis
3. Recognize systemic associations of uveitis
4. Outline the principles of management

Core Content

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4.1 Classification

Type	Location	Common Causes
Anterior uveitis (Iridocyclitis)	Iris + ciliary body	HLA-B27 diseases (AS, ReA, psoriatic arthritis), Sarcoidosis, Behçet's, Herpes
Intermediate uveitis (Pars planitis)	Pars plana/vitreous	Sarcoidosis, MS, idiopathic
Posterior uveitis	Choroid/retina	Toxoplasma (most common worldwide), CMV (HIV+), TB, Sarcoidosis
Panuveitis	All layers	Behçet's, VKH, Sarcoidosis, Syphilis

4.2 Anterior Uveitis — Clinical Features

- **Symptoms:** Painful red eye, photophobia, blurred vision, lacrimation (the "3 Ps": Pain, Photophobia, watering)
- **Signs:**
  - Circumcorneal (ciliary) injection — redness worst near limbus
  - **Keratic Precipitates (KPs):** WBC deposits on corneal endothelium
    - Fine ("mutton fat" = large = granulomatous: TB, sarcoid, VKH)
  - **Cells and flare** in anterior chamber (Tyndall effect)
  - **Hypopyon:** Pus in AC — Behçet's, HLA-B27, bacterial endophthalmitis
  - **Posterior synechiae:** Iris adhesions to lens → irregular pupil

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- **Rubeosis iridis (NVI):** Neovascularisation of iris (late)

4.3 Systemic Associations

- **HLA-B27 positive:** Ankylosing Spondylitis (most common), Reactive Arthritis, Psoriatic Arthritis, IBD
- **Sarcoidosis:** Bilateral, granulomatous, mutton-fat KPs, Busacca/Koeppe nodules on iris
- **Behçet's disease:** Bilateral, recurrent; hypopyon uveitis; oral ulcers, genital ulcers; poor prognosis
- **Juvenile Idiopathic Arthritis (JIA):** Oligoarticular; WHITE QUIET EYE — insidious; band keratopathy
- **Tuberculosis:** Granulomatous; posterior uveitis; serpiginous choroiditis
- **Toxoplasmosis:** Focal necrotising retinochoroiditis; "headlights in fog"; congenital or acquired

4.4 Management Principles

1. **Cycloplegics:** Dilate pupil → prevent/break posterior synechiae → relieve ciliary spasm (atropine, cyclopentolate)
2. **Topical corticosteroids:** Reduce inflammation (prednisolone acetate 1%)
3. **Systemic steroids:** For severe/bilateral/posterior uveitis
4. **Immunosuppressives:** Methotrexate, mycophenolate, azathioprine — for recurrent/chronic uveitis
5. **Treat underlying cause**

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Self-Assessment — Orbit & Uveitis

MCQs

1. The most common extraocular muscle affected in thyroid eye disease causing restriction is:
    - A. Lateral rectus
    - B. Superior rectus
    - C. Inferior rectus ✓
    - D. Superior oblique
2. A child with rapid-onset unilateral proptosis is most likely to have:
    - A. Cavernous haemangioma
    - B. Dermoid cyst
    - C. Rhabdomyosarcoma ✓
    - D. Capillary haemangioma
3. Mutton-fat keratic precipitates are characteristic of:
    - A. HLA-B27 associated uveitis
    - B. Granulomatous uveitis ✓
    - C. Behçet's disease uveitis
    - D. Juvenile idiopathic arthritis
4. A patient with ankylosing spondylitis presents with a painful red eye, photophobia and a small irregular pupil. The most important initial topical treatment is:
    - A. Antibiotic drops
    - B. Beta-blocker drops

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- C. Cycloplegic drops ✓
- D. Antihistamine drops

BLOCK II: INTERNAL EYE

Suggested time budget: ~4 weeks of focused study

TOPIC 5 — CORNEAL DISEASES *(Weightage 20%)*

Learning Outcomes

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1. Identify corneal ulcers by morphology and staining
2. Differentiate bacterial, fungal and viral corneal ulcers
3. Recognise keratoconus and describe its management options
4. Know contraindications to steroid use in corneal disease

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Core Content

5.1 Corneal Ulcers — Overview

> **Corneal ulcer = epithelial defect with stromal involvement + inflammatory infiltrate**

Feature	Bacterial	Fungal	Viral (HSV)	Acanthamoeba
History	Contact lens, trauma	Vegetative trauma (farm)	Recurrent cold sores, UV exposure	Contact lens + water exposure
Appearance	Dense white/grey stromal infiltrate	Feathery edges, satellite lesions, hypopyon	Dendritic ulcer (branching)	Ring infiltrate, severe pain
Onset	Rapid	Slower	Variable	Slow, painful
Fluorescein	+ ulcer	+ ulcer	Dendritic pattern ✓	+
Treatment	Fortified topical antibiotics	Topical natamycin / voriconazole	Topical aciclovir / ganciclovir	PHMB + propamidine
Steroid caution	Avoid initially	Contraindicated	**ABSOLUTELY contraindicated (worsens)**	Contraindicated

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Key organisms:

- Bacterial: *Pseudomonas* (contact lens), *S. aureus*, *S. pneumoniae*, *Moraxella*
- Fungal: *Aspergillus*, *Fusarium* (filamentous), *Candida* (yeast — immunocompromised)
- Viral: HSV type 1 most common; Zoster (Hutchinson's sign = tip of nose involvement)

5.2 Keratoconus

- Progressive corneal ectasia (thinning and anterior protrusion)
- Onset in puberty; bilateral but asymmetric
- **Munson's sign:** V-shaped indentation of lower lid on downgaze
- **Fleischer ring:** Iron ring at base of cone (slit lamp)
- **Vogt's striae:** Stress lines in deep stroma
- **Acute hydrops:** Sudden Descemet's membrane rupture → acute painful vision loss
- Management progression:
    a. Spectacles
    b. Rigid gas-permeable (RGP) contact lenses
    c. **Corneal collagen cross-linking (CXL)** — halts progression
    d. Intrastromal corneal ring segments (ICRS)
    e. Penetrating Keratoplasty (PKP) — when above fail

TOPIC 6 — LENS & CATARACT *(Weightage 30%*

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— HIGH PRIORITY)

Learning Outcomes

1. Classify cataract by type and morphology
2. Correlate the type of cataract with the visual symptom
3. Compare ICCE, ECCE and Phacoemulsification
4. Enumerate complications of cataract surgery
5. Define ectopia lentis and its causes

Core Content

6.1 Classification of Cataract

By Aetiology:

Type	Key Feature
—	—
Age-related (Senile)	Most common; >50 years
Congenital	TORCHES infections, galactosaemia, Down syndrome, rubella
Traumatic	Rosette/stellate opacity; Vossius ring (pigment on lens after blunt trauma)
Secondary	Uveitis, Steroid use (posterior subcapsular — PSC), Diabetes (snowflake/true), Myotonic dystrophy
Metabolic	Diabetes (sorbitol pathway), Galactosaemia, Hypoparathyroidism

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| Radiation | PSC |

By Morphology (Age-related):
Type	Location	Visual Symptom
—	—	—
Nuclear sclerosis	Nucleus	Gradual blurring; myopic shift (“second sight”); worse in bright light
Cortical	Cortex (spokes)	Glare, monocular diplopia
Posterior Subcapsular (PSC)	Posterior lens capsule	Early near vision difficulty; glare/haloes; worst in PSC

6.2 Surgical Management

Procedure	Description	Key Points
ICCE (Intracapsular Cataract Extraction)	Entire lens + capsule removed	Historical; no IOL in bag; risk of vitreous loss
ECCE (Extracapsular Cataract Extraction)	Nucleus expressed; posterior capsule retained	IOL implanted in capsular bag; still used in hard cataracts
Phacoemulsification	Ultrasound probe emulsifies nucleus through small incision (<3 mm)	Gold standard; faster recovery; astigmatism-free; day-case surgery

Indications for surgery:

- Visual acuity impairs daily life (subjective)
- Intumescent cataract (risk of phacolytic glaucoma)
- Subluxated lens
- Fellow eye safety in monocular patient

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6.3 Complications of Cataract Surgery

Intraoperative:

- Posterior capsule rupture (PCR) — vitreous loss, nucleus drop
- Suprachoroidal haemorrhage

Early Postoperative:

- Endophthalmitis (EMERGENCY — severe pain, vision loss, hypopyon); treat with intravitreal antibiotics
- Wound leak
- Raised IOP
- Corneal oedema

Late Postoperative:

- **Posterior Capsule Opacification (PCO)** — Most common late complication; "after-cataract"; treat with Nd:YAG laser capsulotomy
- Cystoid Macular Oedema (CMO)
- Retinal detachment
- IOL dislocation

6.4 Ectopia Lentis

- **Definition:** Displacement of crystalline lens

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- **Causes:**
  - **Marfan syndrome** — Lens displaced **upward** (superotemporal)
  - **Homocystinuria** — Lens displaced **downward** (inferonasal); risk of systemic thrombosis
  - **Weill-Marchesani syndrome** — Small spherical lens (microspherophakia) + short stature
  - Trauma (most common acquired cause)
  - Syphilis

> **Mnemonic: "Marfan goes UP (to heaven), Homocystinuria goes DOWN (to hell)"**

Self-Assessment — Lens & Cataract

MCQs

1. A 70-year-old man complains of difficulty reading and severe glare when driving at night. Slit lamp shows opacity in the posterior subcapsular region. His visual acuity is 6/18. The best surgical option is:
   - A. ICCE
   - B. ECCE
   - C. Phacoemulsification ✓
   - D. Nd:YAG laser
2. The most common late complication of cataract surgery is:
   - A. Endophthalmitis

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- B. Posterior capsule opacification ✓
- C. Cystoid macular oedema
- D. Retinal detachment

3. In Marfan syndrome, the direction of lens subluxation is:
   - A. Downward
   - B. Inward
   - C. Upward ✓
   - D. Lateral

SAQ Practice:

> *Q: A 55-year-old diabetic patient develops sudden-onset severe eye pain, redness, and markedly reduced vision 3 days after uncomplicated cataract surgery. On examination, hypopyon is present.*a) What is the most likely diagnosis? (1 mark)
> b) What is the most urgent investigation? (1 mark)
> c) How would you treat this patient? (3 marks)

Model Answer:

> a) Post-operative endophthalmitis
> b) Vitreous/aqueous tap for Gram stain and culture
> c) Intravitreal antibiotics (vancomycin + ceftazidime); topical and systemic antibiotics; vitrectomy if severe; steroids after antibiotic coverage; urgent ophthalmology review

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TOPIC 7 — REFRACTIVE ERRORS & REFRACTIVE SURGERY *(Weightage 20%)*

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Learning Outcomes

1. Define and differentiate myopia, hypermetropia, astigmatism and presbyopia
2. Describe optical corrections and their mechanisms
3. Summarize refractive surgical options

Core Content

7.1 Refractive Errors

Error	Definition	Image focus	Correction	Common symptom
Myopia	Eye too long / cornea too steep	In front of retina	Concave (−) lens / diverging	Blurred distant vision
Hypermetropia	Eye too short / cornea too flat	Behind retina	Convex (+) lens / converging	Blurred near vision (young) + Eye strain
Astigmatism	Unequal corneal curvature	Different focal points	Cylindrical lens	Distortion at all distances
Presbyopia	Reduced accommodation	—	Reading (convex) glasses	Near vision difficulty

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	(age >40)		/ bifocals	

> **Myopia in Pakistan:** Rapidly increasing; progressive myopia associated with outdoor activity reduction; high myopia (>6D) = risk of retinal detachment, glaucoma, macular degeneration

7.2 Refractive Surgery Options

Procedure	Full Name	Mechanism	Key Points
LASIK	Laser-Assisted In-Situ Keratomileusis	Flap + excimer laser ablation	Most popular; fast recovery; not if thin cornea
DALEK / DALK	Deep Anterior Lamellar Keratoplasty	Partial thickness corneal transplant	Keratoconus; retains patient's endothelium
PKP	Penetrating Keratoplasty	Full-thickness corneal transplant	Last resort; best visual outcomes in keratoconus
Excimer Laser (PRK)	Photorefractive Keratectomy	Surface ablation	No flap; slower healing
ICL	Implantable Collamer Lens	Phakic IOL implanted	High myopia; reversible

Contraindications to LASIK: Thin cornea (<500 µm), keratoconus, dry eye, pregnancy, unstable refraction, autoimmune disease

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TOPIC 8 — GLAUCOMA & OCULAR THERAPEUTICS *(Weightage 30% — HIGH*

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PRIORITY)

Learning Outcomes

1. Define glaucoma and explain the mechanism of optic nerve damage
2. Classify glaucoma and distinguish POAG from PACG
3. Identify visual field defects characteristic of glaucoma
4. Describe anti-glaucoma medications by mechanism
5. Recognise acute angle closure glaucoma as an emergency
6. Know contraindication of mydriatics in shallow anterior chamber

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Core Content

8.1 Definition & Mechanism

- **Glaucoma:** Progressive optic neuropathy characterised by optic disc cupping and visual field loss, usually (but not always) associated with raised IOP
- Normal IOP: 10–21 mmHg; measured by Goldmann Applanation Tonometry (GAT)
- Mechanism: Raised IOP → axonal compression at lamina cribrosa → retinal ganglion cell death → irreversible vision loss

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8.2 Classification

	POAG (Primary Open Angle)	PACG (Primary Angle Closure)
Prevalence	Most common in Europe/Africa	More common in Asians; common in Pakistan
Onset	Insidious	Acute (emergency) or chronic
Angle	Open (trabecular meshwork disease)	Closed (iris obstructs outflow)
Pain	None	Severe
IOP	Gradually elevated	Acutely very high
Pupil	Normal	Mid-dilated, fixed
Cornea	Clear	Steamy/oedematous
Vision	Late peripheral field loss first	Sudden severe reduction
Risk factors	Family Hx, myopia, Black race, age	Hypermetropia, small eye, female, Asian

8.3 Optic Disc Changes in Glaucoma

- **Cup:Disc ratio (CDR):** Normal <0.5; suspicious >0.6; pathological >0.7
- **Asymmetry:** >0.2 difference between eyes is significant
- **ISNT rule:** Inferior > Superior > Nasal > Temporal (normal rim width); glaucoma breaks ISNT
- **Disc haemorrhage:** Flame-shaped; bad prognostic sign

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- **Visual field defects:**
  - Paracentral scotoma (early)
  - Arcuate (Bjerrum) scotoma
  - Nasal step
  - Altitudinal defect
  - Tunnel vision (late)
  - Temporal island (very late)

8.4 Anti-Glaucoma Medications

Drug Class	Examples	Mechanism	Key Side Effect
Prostaglandin analogues	Latanoprost, Bimatoprost	↑ Uveoscleral outflow	Iris pigmentation, eyelash growth; 1st line
Beta-blockers	Timolol, Betaxolol	↓ Aqueous production	Bradycardia, bronchospasm (C/I: asthma)
Carbonic anhydrase inhibitors	Dorzolamide (topical), Acetazolamide (oral)	↓ Aqueous production	Metallic taste, renal stones (oral)
Alpha-2 agonists	Brimonidine	↓ Aqueous production + ↑ uveoscleral outflow	Allergy, fatigue; avoid in children
Miotics	Pilocarpine	↑ Trabecular outflow (pupil constriction)	Brow ache, dim vision, retinal detachment risk

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8.5 Acute Angle Closure Glaucoma — EMERGENCY

- **Precipitants:** Dim lighting (pupil dilates), mydriatic drops, emotional stress
- **Symptoms:** Sudden severe eye pain, headache, nausea/vomiting, halos around lights, blurred vision
- **Signs:** Conjunctival injection, steamy cornea, mid-dilated fixed pupil, shallow AC, very high IOP (>50 mmHg)
- **Emergency Treatment:**
    a. IV acetazolamide 500 mg stat
    b. Topical beta-blocker + pilocarpine (after IOP starts to fall)
    c. Hyperosmotic agents (IV mannitol 20% if needed)
    d. Definitive: Laser peripheral iridotomy (LPI) in both eyes

> ⚠ **CRITICAL EXAM POINT:** NEVER give mydriatic (dilating) drops to a patient with a shallow anterior chamber — it can precipitate acute angle closure glaucoma. Always check AC depth before dilating.

Self-Assessment — Glaucoma

MCQs

1. The first-line medication for newly diagnosed primary open angle glaucoma is:
    - A. Timolol

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- B. Pilocarpine
- C. Latanoprost ✓
- D. Acetazolamide

2. Which of the following is an absolute contraindication to topical beta-blocker use in glaucoma?
   - A. Hypertension
   - B. Diabetes
   - C. Bronchial asthma ✓
   - D. Renal failure
3. A patient presents with sudden severe eye pain, vomiting and halos around lights after sitting in a dark cinema. Visual acuity is hand movements. What is the FIRST drug treatment?
   - A. Topical latanoprost
   - B. IV acetazolamide ✓
   - C. Topical pilocarpine
   - D. Oral prednisolone

SAQ Practice:

> *Q: A 60-year-old hypertensive woman is diagnosed with Primary Open Angle Glaucoma on routine screening. Her IOP is 28 mmHg bilaterally, CDR is 0.7 with inferior notching, and automated perimetry shows arcuate scotomas.*a) What is the target IOP you would aim for? (1 mark)
> b) Name three classes of anti-glaucoma medications and their mechanisms. (3 marks)
> c) What surgical procedure would you consider if medical therapy fails? (1 mark)

Model Answer:

> a) Target IOP: 30% reduction from baseline, i.e., aim for ~18–20 mmHg (depends on severity

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> and optic nerve status)
> b) Prostaglandin analogues (↑ uveoscleral outflow); Beta-blockers (↓ aqueous production); Carbonic anhydrase inhibitors (↓ aqueous production); Miotics (↑ trabecular outflow)
> c) Trabeculectomy (filtration surgery); or Laser trabeculoplasty (SLT) as less invasive option

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BLOCK III: POSTERIOR SEGMENT & NEURO-OPHTHALMOLOGY

Suggested time budget: ~4 weeks of focused study

TOPIC 9 — RETINAL VASCULAR DISEASES & FUNDUS PATHOLOGIES *(Weightage 40% — HIGHEST PRIORITY)*

Learning Outcomes

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1. Correlate fundoscopic findings with systemic diseases

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2. Diagnose diabetic retinopathy and grade its severity
3. Differentiate CRVO, BRVO, CRAO and BRAO
4. Understand the management of AMD and retinal detachment
5. Interpret fundus photograph findings

Core Content

9.1 Diabetic Retinopathy (DR) — Most important retinal disease in Pakistan

Classification (International Scale):

Stage	Features	Action
No apparent DR	Normal	Annual screening
Mild NPDR	Microaneurysms only	Annual review
Moderate NPDR	+ Haemorrhages, hard exudates, CWS	6-monthly review
Severe NPDR	4-2-1 rule: 4 quadrants haemorrhages, 2 quadrants venous beading, 1 quadrant IRMA	3-monthly; consider laser
PDR (Proliferative)	New vessels (NVD/NVE); vitreous haemorrhage;	Urgent panretinal photocoagulation (PRP)

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	tractional RD	
DMO (Diabetic Macular Oedema)	Retinal thickening within 500μm of fovea	Anti-VEGF injections; macular laser

Key features:

- Microaneurysms: earliest sign
- Hard exudates: lipid deposits; circinate pattern near macula = maculopathy
- Cotton Wool Spots (CWS): nerve fibre layer infarcts = pre-proliferative sign
- New vessels (NVD = neovascularisation of disc; NVE = elsewhere) = proliferative

9.2 Hypertensive Retinopathy

Keith-Wagener-Barker (KWB) Classification:

Grade	Features
I	Mild arteriolar narrowing, increased light reflex (copper/silver wiring)
II	AV nipping (Keith-Wagener sign)
III	Flame haemorrhages, CWS, hard exudates
IV	Grade III + **papilloedema** = Hypertensive emergency

9.3 Retinal Vascular Occlusions

Condition	Occlusion	Presentation	Fundus	Treatment
CRAO (Central Retinal Artery	Central artery	Sudden, painless, profound vision	Pale retina + **cherry red spot**	Emergency (<4h): ocular massage, AC

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Occlusion)		loss	at fovea	paracentesis, thrombolytics
BRAO	Branch artery	Altitudinal field loss	Sector pallor	Investigate for embolic source
CRVO	Central retinal vein	Sudden painless vision loss (variable)	"Blood and thunder" fundus: 4-quadrant haemorrhages, dilated tortuous veins, disc oedema	Anti-VEGF; treat glaucoma (neovascular glaucoma)
BRVO	Branch retinal vein	Field defect/blurring	Sector of haemorrhages at AV crossing	Laser, anti-VEGF for macular oedema

> **Mnemonic for CRAO fundus:** "Cherry Red Spot on a White Plate" — cherry red fovea (choroid visible) against pale ischaemic retina

9.4 Age-Related Macular Degeneration (AMD)

Type	Feature	Treatment
Dry AMD (Atrophic)	Drusen → Geographic atrophy; slow; central vision loss	AREDS vitamins, low vision aids
Wet AMD (Neovascular/Exudative)	Choroidal neovascularisation (CNV); rapid vision loss; distortion	**Anti-VEGF** (ranibizumab, bevacizumab, aflibercept) — gold standard; PDT

Symptoms: Central scotoma, metamorphopsia (distorted lines on Amsler grid)

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9.5 Retinal Detachment (RD)

Type	Mechanism	Cause	Feature
Rhegmatogenous	Retinal break/hole → fluid under retina	Most common; high myopia, trauma, post-cataract surgery	Curtain/shadow, floaters, flashes
Tractional	Fibrovascular membranes pull retina	Proliferative DR, SCD, trauma	No break; concave detachment
Exudative (Serous)	Fluid accumulates under retina without break	Tumours, VKH, severe HTN, posterior scleritis	Shifting fluid; no break

Symptoms: Flashes (photopsia) → floaters (vitreous haemorrhage/"shower of floaters") → shadow/curtain (RD)

Treatment:

- Small breaks/lattice: Laser photocoagulation or cryotherapy (prophylactic)
- Established RD: Scleral buckling, pneumatic retinopexy, pars plana vitrectomy (PPV)

9.6 Other Retinal Conditions

Retinitis Pigmentosa (RP):

- Hereditary (AD, AR, X-linked)
- Night blindness (earliest) → peripheral field loss → tunnel vision → central loss

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- Fundus: Bone-spicule pigmentation, attenuated vessels, pale disc, waxy pallor
- ERG: Reduced/absent (diagnostic)

ROP (Retinopathy of Prematurity):

- Premature infants (<32 weeks, <1500 g)
- Abnormal retinal vessel development; screen at 4–6 weeks post birth
- Treatment: Laser photocoagulation, anti-VEGF, scleral buckle for advanced stages

Retinoblastoma:

- Most common intraocular malignancy in children
- Presents as **leukocoria** (white pupillary reflex) + strabismus
- Bilateral in 40% (hereditary — RB1 gene mutation)
- Treatment: Enucleation (advanced), chemo, laser, brachytherapy

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Self-Assessment — Retina

MCQs

1. A 45-year-old diabetic presents with fundus showing new vessels at the disc and vitreous haemorrhage. The most appropriate immediate treatment is:
    - A. Intravitreal anti-VEGF
    - B. Focal laser to macula
    - C. Panretinal photocoagulation ✓

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- D. Vitrectomy

2. A patient presents with sudden painless profound visual loss. Fundoscopy shows a pale retina with a cherry red spot at the fovea. The diagnosis is:
   - A. CRVO
   - B. CRAO ✓
   - C. BRVO
   - D. Wet AMD
3. The earliest symptom of retinitis pigmentosa is:
   - A. Central scotoma
   - B. Colour vision loss
   - C. Night blindness ✓
   - D. Daytime glare

SAQ Practice:

> *Q: A 68-year-old man notices distortion of straight lines and a central blurring in his right eye over 2 weeks. Amsler grid shows a central scotoma with wavy lines. Fundoscopy shows subretinal fluid and haemorrhage at the macula.*a) What is the diagnosis? (1 mark)
> b) What is the pathological process occurring? (1 mark)
> c) What is the most effective treatment? (3 marks)

Model Answer:

> a) Wet (Neovascular/Exudative) Age-Related Macular Degeneration
> b) Choroidal neovascularisation (CNV) with subretinal fluid and haemorrhage causing photoreceptor damage
> c) Intravitreal anti-VEGF injections (ranibizumab/aflibercept) given monthly for 3 loading doses then PRN; monitor with OCT; PDT (photodynamic therapy) if anti-VEGF fails

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TOPIC 10 — STRABISMUS & NEURO-OPHTHALMOLOGY *(Weightage 30%)*

Learning Outcomes

1. Classify squint and differentiate comitant from non-comitant
2. Perform and interpret cover/uncover test
3. Understand management principles including amblyopia treatment
4. Know cranial nerve palsies affecting the eye
5. Identify papilloedema and optic atrophy on fundoscopy

Core Content

10.1 Strabismus (Squint)

	Comitant	Incomitant

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		(Paralytic)
Deviation	Same in all directions	Varies with gaze direction
Cause	Idiopathic, refractive, accommodative	CN III, IV, VI palsy; thyroid eye disease; MG
Diplopia	Usually absent (suppression)	Present (new-onset)
Onset	Childhood	Can be any age

Types of comitant:

- **Esotropia:** Eye turns inward; infantile (<6m) or accommodative (treat hypermetropia)
- **Exotropia:** Eye turns outward; intermittent common; surgical treatment

Cover Test:

- Cover/uncover test: detects manifest squint (tropia)
- Alternate cover test: detects latent squint (phoria)
- Corneal light reflex (Hirschberg): quick screening; 1 mm = 7° deviation

Amblyopia ("lazy eye"): Reduced vision without organic cause due to abnormal visual development; treat up to age 7–8

- Causes: Strabismus, anisometropia, deprivation (cataract)
- Treatment: Correct cause + occlusion therapy (patch good eye)

10.2 Cranial Nerve Palsies

CN	Muscle	Presenting	Common

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	affected	sign	causes
CN III (Oculomotor)	All except LR and SO	Ptosis, eye down and out, mydriasis (external CN III)	PCOA aneurysm (surgical — painful); diabetes (medical — pupil spared)
CN IV (Trochlear)	Superior Oblique	Head tilt (away from lesion), vertical diplopia on downgaze	Closed head trauma; most common isolated CN palsy in adults
CN VI (Abducens)	Lateral Rectus	Esotropia, horizontal diplopia on lateral gaze	Raised ICP (false localising sign), microvascular (DM, HTN), trauma

> ⚠ **HIGH YIELD:** CN III palsy with pupil involvement → suspect posterior communicating artery aneurysm → EMERGENCY neuroimaging. Pupil-sparing CN III → likely microvascular (diabetes/HTN).

10.3 Papilloedema vs Optic Atrophy

	Papilloedema	Optic Atrophy
Disc appearance	Swollen, blurred margins, hyperaemic, haemorrhages	Pale/white disc, sharp margins, loss of small vessels
Vision	Usually preserved early	Reduced
Cause	Raised ICP (bilateral), malignant HTN, CRVO	End-stage optic nerve disease, glaucoma, MS, optic neuritis sequelae
Vision	Enlarged blind spot	Central scotoma / field defects

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10.4 Visual Field Defects & Their Localisation

Lesion site	Visual field defect
Optic nerve (one side)	→ Unilateral blindness
Optic chiasm (centre)	→ Bitemporal hemianopia
Optic tract	→ Contralateral homonymous hemianopia
Temporal lobe (Meyer's loop)	→ Superior quadrantanopia ("pie in the sky")
Parietal lobe	→ Inferior quadrantanopia ("pie on the floor")
Occipital lobe	→ Homonymous hemianopia with macular sparing

TOPIC 11 — OCULAR TRAUMA *(Weightage 30%)*

Learning Outcomes

1. Classify ocular injuries
2. Manage chemical injuries as a first-line emergency
3. Remove conjunctival foreign body
4. Differentiate penetrating from non-penetrating injuries
5. Recognise traumatic hyphaema and its management

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Core Content

11.1 Classification of Ocular Trauma

Birmingham Eye Trauma Terminology (BETT):

- **Closed globe:** No full-thickness scleral/corneal wound
  - Contusion: Blunt force
  - Lamellar laceration: Partial thickness wound
- **Open globe:** Full-thickness wound
  - Rupture: Inside-out (blunt force exceeds ocular tensile strength)
  - Laceration: Outside-in (sharp object)
    - Penetrating: Single wound, no exit
    - Perforating: Entry + exit
    - IOFB: Intraocular foreign body

11.2 Chemical Injuries — OPHTHALMIC EMERGENCY #1

	Alkali Burns	Acid Burns
Agents	Lime/calcium hydroxide (most common), ammonia, NaOH	Battery acid (sulphuric), HCl, glacial acetic acid
Mechanism	Liquefactive necrosis;	Coagulative necrosis; self-

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	penetrates deeply into AC	limiting (protein barrier)
Severity	**More severe**	Less severe
Treatment	**Same for both — IMMEDIATE COPIOUS IRRIGATION**	Same

> **FIRST AID RULE:** Do NOT wait for examination — start irrigation IMMEDIATELY with any available water/saline. Continue for at least 30 minutes. Measure pH — aim for neutralisation (pH 7–7.5).

Assessment of chemical burns:

- Grade I (Roper-Hall): Corneal epithelial erosion; no limbal ischaemia → excellent prognosis
- Grade IV: Total limbal ischaemia; complete corneal opacification → very poor prognosis

11.3 Traumatic Hyphaema

- Blood in anterior chamber after blunt trauma
- Risk: Rebleeding (day 3–5), sickle cell patients (drainage obstruction), raised IOP
- Treatment: Bed rest (head elevated 30°), avoid aspirin/NSAIDs, cycloplegics, topical steroids, monitor IOP; surgery if IOP uncontrolled

11.4 Sympathetic Ophthalmia

- Rare but serious: Penetrating injury to one eye → bilateral granulomatous uveitis (both eyes)
- Mechanism: Autoimmune reaction to uveal antigens
- **Timing:** 2 weeks to years after injury

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- Treatment: Systemic steroids/immunosuppression; enucleation of injured (exciting) eye ONLY if within 2 weeks

11.5 Corneal & Conjunctival Foreign Bodies

- **Conjunctival FB:** Evert upper lid (cobblestone + FB); remove with cotton bud
- **Corneal FB:** Slit lamp removal under topical anaesthesia; check for rust ring (metallic FB)
- **Post-removal:** Topical antibiotic + patch

Self-Assessment — Strabismus & Trauma

MCQs

1. A 6-year-old child presents with an inward deviation of the right eye. Cover test reveals the eye straightens when the left eye is covered. To prevent amblyopia, the MOST important intervention after correcting any refractive error is:
    - A. Prisms
    - B. Patching of the right (squinting) eye
    - C. Patching of the left (fixing) eye ✓
    - D. Botulinum toxin injection
2. A factory worker splashes industrial cleaner (pH 12) into his eye. The MOST IMMEDIATE first step is:
    - A. Apply antibiotic drops
    - B. Examine visual acuity

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- C. Copious irrigation with water ✓
- D. Refer to ophthalmology

3. A patient presents with painful third nerve palsy with a dilated pupil. The most urgent investigation is:
   - A. MRI brain
   - B. CT angiogram or MR angiogram of the brain ✓
   - C. Lumbar puncture
   - D. Carotid Doppler

CLINICAL COMPETENCIES GUIDE

Required Skills for End-of-Rotation Assessment

Competency	Key Steps	Common Mistakes to Avoid
Visual Acuity	Snellen chart at 6m; one eye at a time; pinhole test; children: Cardiff cards/Kay pictures	Not testing each eye separately; not using pinhole

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Visual Fields (confrontation)	Position face-to-face; compare patient's fields to yours; test all 4 quadrants; check central scotoma	Moving target too fast; examiner's field must be normal
Colour Vision	Ishihara plates (38 plates); 2 of first 4 = screening; record plate number passed	Not in good natural light
Pupil Examination	Direct, consensual, RAPD (swinging flashlight test); accommodation	Not testing RAPD which is the most sensitive sign of optic nerve disease
Fundoscopy (Direct)	Darken room; approach from 15°; focus disc first → vessels → periphery → macula last	Not looking at macula (causes discomfort if looked at first)
Slit Lamp	Adjust height/width; check cornea (epithelium, stroma, endothelium); AC (cells/flare); iris/lens	Not checking angle with gonioscopy lens when needed
Tonometry (Goldmann)	Requires topical anaesthetic + fluorescein; read mires; measure at least twice	Air puff tonometer less accurate
Cover/Uncover Test	Cover one eye → watch other eye for movement; uncover → watch covered eye	Not fixing on a small target (use letter, not light)
Amsler Grid	30 cm from eye; each eye separately; patient reports wavy/missing squares	Not correcting near vision before testing

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EXAMINATION STRATEGY

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Theory Paper Approach

MCQ Strategy (Paper 1 — 60 marks, 60 min)

- Time: 1 minute per MCQ maximum
- NUMS MCQs often test:
  - "Most common" and "most appropriate first step"
  - Emergency recognition (chemical burns, acute glaucoma, endophthalmitis)
  - Drug mechanisms and contraindications
  - Fundoscopic findings matched to disease
- Eliminate clearly wrong options first; use clinical reasoning not memorization

SAQ Strategy (Paper 2 — 8 × 5 marks, 120 min)

- ~15 minutes per SAQ
- Structure your answer:
  a. Diagnosis (with justification from case)
  b. Investigations (most relevant first)
  c. Management (emergency → definitive → follow-up)
- Keywords the examiner is looking for: Be precise (e.g., "intravitreal anti-VEGF" not just "injection")
- Draw a diagram where applicable (disc changes, visual field defects)

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Practical OSCE Approach

Observed stations (8 marks each — 5 minutes):

- History station: Use systematic scheme (complaint → duration → onset → associated → systemic → drugs → FH)
- Short cases: "I would like to examine Mr. X's eyes; may I please have… " — state what you want (pen torch, snellen chart, etc.)
- Counselling: Introduce yourself → establish understanding → explain in simple terms → check back

Non-observed stations (5 marks each):

- Data interpretation: ECG-style approach — name the disease → grade severity → management
- Picture identification: Describe what you see before naming (systematic approach impresses)
- Instrument identification: Name → purpose → key complication
- X-ray/CT: Systematically — name projection, quality, obvious abnormality, differential

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MNEMONICS & HIGH-YIELD SUMMARY TABLE

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Mnemonics

- **"TORCHES"** for congenital cataract: Toxoplasma, Rubella, CMV, HSV, Syphilis, Others
- **"DANISH"** for causes of papilloedema: DM complications, Abscess/abscess intracranial, Neoplasm, Infection, Stroke, Hypertension (malignant)
- **"RAPD"** = Relative Afferent Pupillary Defect = Optic nerve or severe retinal disease
- **"Marfan UP, Homocystinuria DOWN"** for lens dislocation direction
- **Cherry red spot** = CRAO; **Blood and thunder** = CRVO; **Bone spicules** = RP

One-Page High-Yield Summary

Topic	#1 High-Yield Point
Ptosis	Horner = partial ptosis + miosis; CN III = complete ptosis + mydriasis + down-out
Blepharitis	Posterior/MGD most common; warm compress = first treatment
Dry eye	Schirmer <5mm + TBUT <10sec; KCS in Sjögren's
Conjunctivitis	VKC = cobblestone papillae upper tarsus; EKC = pre-auricular lymph node
Ophthalmia neonatorum	Day 2–5 = gonorrhoea (emergency); Day 5–14 = chlamydia
TED	Most common cause of proptosis; inferior

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	rectus → upgaze restriction
Orbital cellulitis	CT scan; IV antibiotics; optic nerve compression = surgical emergency
Uveitis	HLA-B27 + anterior; granulomatous = sarcoid/TB; JIA = white quiet eye
Corneal ulcer	HSV = dendritic; NO steroids in HSV/fungal
Cataract	PSC = glare/near difficulty; PCO = most common late complication; Nd:YAG treats PCO
Glaucoma	POAG = insidious; PACG = acute emergency; prostaglandins = 1st line; NO mydriatics in shallow AC
DR	Microaneurysm = earliest; NVD/NVE = PDR = urgent PRP
CRAO	Cherry red spot; emergency (<4h); embolic cause
AMD	Wet = anti-VEGF; Amsler grid for monitoring
RD	Rhegmatogenous most common; flashes → floaters → curtain
RP	Night blindness earliest; bone spicules; ERG diagnostic
Strabismus	Amblyopia → patch good eye; CN III + pupil = PCOA aneurysm
Chemical injury	Irrigation IMMEDIATELY regardless of agent; alkali worse than acid

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RECOMMENDED RESOURCES

Primary Textbooks

1. **Kanski's Clinical Ophthalmology** — 9th Edition (Bowling) — Comprehensive; use for understanding
2. **Parson's Diseases of the Eye** — Most relevant for NUMS exam; standard South Asian text
3. **Manual of Ophthalmology** by Renu Jogi — Concise; good for quick review

Revision Resources

- **Ophthalmology MCQs** by Ayesha Qamar (local text) — Exam-focused
- **AAO Basic and Clinical Science Course (BCSC)** — Online; excellent for depth
- **EyeRounds.org** (University of Iowa) — Free online atlas with fundus images
- **Cybersight.org** (Orbis) — Free ophthalmology education platform

Practical Preparation

- YouTube channels: "ICO Ophthalmology," "Kanski Ophthalmology" for slit lamp, fundoscopy demonstrations
- Practice fundoscopy on a model eye in skills lab before clinical rotation

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- Learn to interpret: Fundus photographs, OCT images, visual field prints, Goldmann tonometry

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STUDY SCHEDULE SUGGESTION

Week	Focus	Target
1	Block I: Eyelid, Conjunctiva, Orbit	Master red eye differentials + emergency conditions
2	Block I: Uveitis + Block II: Cornea	Systemic associations + corneal ulcer types
3	Block II: Lens, Refractive Errors	Cataract surgery details + refractive error correction
4	Block II: Glaucoma	Drug mechanisms + PACG emergency
5	Block III: Retinal diseases	DR grading + vascular occlusions + AMD
6	Block III: RD, Strabismus, Trauma	Emergency management + CN palsies
7	Clinical skills revision	Practice OSCE stations; slit lamp, fundoscopy, VA
8	Full revision + MCQ practice	Complete SAQ practice papers; past papers

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Compiled for MBBS Year IV, NUMS 2025–26 | Based on AMEE Guide 16 Framework

Always cross-reference with your college study guide and lecture handouts