

AAO RESIDENTS CONTENT OUTLINE

I. GENERAL MEDICINE

Infectious Diseases

- General microbiology
- Bacterial infections
- Viral infections
- Fungal infections
- Treatment of infectious disease
- Specific infections
 - Lyme disease
 - Acquired immunodeficiency syndrome (AIDS)
 - Tuberculosis
 - Sexually transmitted diseases
 - Hepatitis
 - Varicella zoster
 - Methicillin-resistant staphylococcus aureus (MRSA)
- Metastatic infections
- Diagnosis and Treatment of Infectious Diseases
- Ophthalmological considerations

Hypertension

- Definition
- Classification and prevalence
- Etiology
- Evaluation and Diagnosis
- Laboratory Tests
- Treatment
 - Nonpharmacologic Therapy
 - Pharmacologic Therapy/Antihypertensives
- Special considerations
- Hypertensive crisis
- Ophthalmological considerations

Cerebrovascular Disease

- Cerebral Ischemia and Infarction
- Intracranial Hemorrhage
- Carotid Artery Disease
- Ophthalmological considerations

Acquired Heart Disease

- Congestive Heart Failure
- Ischemic Heart Disease
- Cardiac Rhythm Disorders
- Ophthalmological considerations

Hypercholesterolemia

- Risk Assessment
- Management

- **Statins in acute myocardial infarction**
- **The metabolic syndrome**
- **Ophthalmological considerations**

Pulmonary Diseases

- **Obstructive Lung Disease**
- **Restrictive Lung Disease**
- **Pulmonary Embolism**
- **Evaluation**
- **Treatment**
- **Preoperative and Postoperative Considerations**
- **Ophthalmological considerations**

Hematologic Disorders

- **Blood composition**
- **Erythropoiesis**
- **Diagnostic tests**
- **Anemia**
- **Disorders of hemostasis**
- **Management**
- **Ophthalmological considerations**

Rheumatic Disorders

- **Rheumatoid Arthritis**
- **Spondyloarthropathies**
- **Juvenile Rheumatoid Arthritis**
- **Systemic Lupus Erythematosus**
- **Wegener granulomatosis**
- **Antiphospholipid Antibody Syndrome**
- **Scleroderma**
- **Polymyositis and dermatomyositis**
- **Sjogren Syndrome**
- **Relapsing polychondritis**
- **Vasculitis**
- **Behcet Syndrome**
- **Sarcoidosis**
- **Heritable Disorders of Connective Tissue**
- **Medical Therapy for Rheumatic Disorders**
- **Ophthalmological considerations**

Endocrine Disorders

- **Diabetes Mellitus**
- **Thyroid Disease**
- **Pituitary Dysfunction**
- **Hyperlipoproteinemias**
- **Multiple endocrine neoplasias**
- **Ophthalmological considerations**

Geriatrics

- Physiologic aging and pathologic findings in the aging eye
- Pharmacologic considerations in older patients
- Elder abuse
- Surgical Considerations
- Psychology of aging
- Osteoporosis
- Falls
- Systemic Diseases
- Economic implications
- Ophthalmological considerations

Cancer

- Incidence
- Etiology of Cancer
- Endocrine and Paraneoplastic Manifestations of Cancer
- Mechanisms of growth and spread
- Therapy
 - Chemotherapy
 - Radiation
 - Surgery
- Principles of Chemotherapy and Chemotherapeutic Agents
- Ophthalmologic considerations

Behavioral & Neurologic Disorders

- Behavioral disorders
 - Due to a General Medical Condition
 - Schizophrenia
 - Mood Disorders
 - Somatoform Disorders
 - Substance Abuse Disorders
- Pharmacologic Treatment of Psychiatric Disorders
- Neurologic disorders
 - Parkinson disease
 - Multiple sclerosis and other demyelinating diseases
 - Epilepsy
 - Stroke
- Down Syndrome
- Alzheimer Disease and Dementia
- Myasthenia gravis and other neuromuscular Disorders
- Headache
- Ophthalmologic considerations

Preventive Medicine

- Screening Procedures
- Immunization
- Ophthalmologic considerations

Medical Emergencies

- Cardiopulmonary Arrest

- Shock
- Seizure and Status Epilepticus
- Toxic Reactions to Local Anesthetics and Other Agents
- Malignant hyperthermia
- Ocular Side Effects of Systemic Medication
- Ophthalmologic considerations

Perioperative Management in Ocular Surgery

- Adults
- Children
- Fasting Recommendations
- Management of Medications
- Operative Management
- Postoperative Management

Using Statistics in Practice and Work

- Obtaining Useful Information from Published Studies
- Clinical Studies Design
- Interpretating diagnostic and screening tests
- Risk, Benefit, Probabilities, and Expected Outcomes
- Application of Statistics to Measure and Inform Clinical Practice

II. FUNDAMENTALS AND PRINCIPLES OF OPHTHALMOLOGY

Anatomy

- **Orbit and Ocular Adnexa**
 - Orbital anatomy
 - Cranial nerves
 - Ciliary ganglion
 - Extraocular muscles
 - Eyelids
 - Lacrimal gland and excretory system
 - Conjunctiva
 - Tenon's capsule
 - Vascular supply and drainage of the orbit
- **The Eye**
 - Topography of the globe
 - Precorneal tear film
 - Cornea
 - Sclera
 - Limbus
 - Anterior chamber
 - Uveal tract
 - Iris
 - Ciliary body
 - Choroid
 - Lens
 - Retina

- Vitreous
- Ora serrata
- **Cranial Nerves: Central and Peripheral Connections**
 - CN I
 - CN II
 - CN III
 - CN IV
 - CN V
 - CN VI
 - CN VII
 - Pupillary reflexes
 - Cavernous and other venous sinuses
 - Circle of Willis

Embryology

- **Glossary**
- **Ocular Development**
 - Growth factors
 - Homeobox genes
 - Neural crest cells
 - Embryogenesis
 - Organogenesis
- **Congenital Anomalies**

Genetics

- **Terminology and Glossary**
- **Molecular Genetics**
 - DNA
 - Gene expression
 - Gene translation
 - DNA replication
 - DNA repair
 - Mutations and disease
 - Mitochondrial genome
 - Genes and specific disease
 - Molecular manipulation and DNA analysis
 - Transgenic and knockout models
 - Gene therapy
- **Clinical Genetics**
 - Genes and chromosomes
 - Alleles
 - Mitosis and meiosis
 - Segregation
 - Independent assortment
 - Linkage
 - Chromosomal analysis
 - Mutations
 - Racial and ethnic concentration of genetic disorders

- **Patterns of inheritance**
- **Lyonization**
- **Polygenic and multifactorial inheritance**
- **Pedigree analysis**
- **Genetic counseling**
- **Pharmacogenetics**
- **Clinical management of genetic disease**

Biochemistry & Metabolism

- **Tear Film**
- **Cornea**
- **Iris & Ciliary Body**
- **Aqueous Humor**
- **Lens**
- **Vitreous**
- **Retina**
- **Retinal Pigment Epithelium**
- **Free Radicals & Antioxidants**

Ocular Pharmacology

- **Pharmacologic Principles**
 - **Pharmacokinetics**
 - **Pharmacodynamics**
- **Ocular Pharmacotherapeutics**
 - **Cholinergic agents**
 - **Adrenergic agents**
 - **Carbonic anhydrase inhibitors**
 - **Prostaglandin analogs**
 - **Drugs for dry eye**
 - **Ocular decongestants**
 - **Irrigating solutions**
 - **Anti-inflammatory agents**
 - **Antibiotics**
 - **Anesthetics**
 - **Osmotic agents**
 - **Biologic agents**
 - **Viscoelastics**
 - **Fibrinolytics**
 - **Anti-fibrinolytics**
 - **Diagnostic agents**

III. ORBIT, EYELIDS & LACRIMAL SYSTEM

Orbit

- **Orbital Anatomy**
 - **Dimensions**
 - **Osteology**
 - **Topographic relationships**
 - **Apertures (fissures and foramina)**

- **Evaluation of Orbital Disorders**
 - “The six P’s”
 - **Physical examination and laboratory tests**
 - **Imaging studies**
 - **Pathology**
 - **Laboratory studies**
- **Congenital orbital anomalies**
 - **Anophthalmos**
 - **Microphthalmos**
 - **Microphthalmos with cyst**
 - **Craniofacial clefting**
- **Dermoid cyst**
- **Infectious and inflammatory disorders**
 - **Infections**
 - **Preseptal and orbital cellulitis**
 - **Infectious dacryoadenitis**
 - **Zycomycosis**
 - **Aspergillosis**
 - **Other rare infections**
 - **Inflammations**
 - **Thyroid eye disease**
 - **Idiopathic orbital inflammation**
 - **Sarcoidosis**
 - **Vasculitides**
- **Orbital neoplasms**
 - **Cavernous hemangioma**
 - **Lymphoma and lymphoproliferative disease**
 - **Hemangiopericytoma**
 - **Neurilemmoma**
 - **Neurofibroma**
 - **Rhabdomyosarcoma**
 - **Neuroblastoma**
 - **Metastatic tumors**
 - **Tumors of the optic nerve**
 - **Glioma**
 - **Meningioma**
 - **Neoplasms of the lacrimal gland**
 - **Adenoid cystic carcinoma**
 - **Benign mixed tumor (pleomorphic adenoma)**
 - **Malignant mixed tumor**
- **Orbital trauma**
 - **Orbital blowout fractures**
 - **Orbital medial wall and orbital roof fractures**
 - **“Tripod” (zygomatoco-maxillary complex) fractures**
- **Vascular abnormalities**
 - **Orbital varix**

- Arterio-venous malformations
- Lymphangioma
- Capillary hemangioma
- Sinus disease affecting the orbit
 - Mucocele
 - Sinonasal carcinoma
- Osseous disorders affecting the orbit
 - Fibrous dysplasia
 - Cholesterol granuloma
 - Intraosseous hemangioma
 - Sphenoid wing meningioma
- Orbital surgery

Periocular Soft Tissues

- Anatomy
- Principles of facial and eyelid surgery
- Classification and management of eyelid disorders
 - Congenital anomalies
 - Blepharophimosis syndrome
 - Coloboma of the eyelid
 - Other congenital anomalies (e.g., Treacher-Collins, Goldenhar)
 - Eyelid neoplasms
 - Basal cell carcinoma
 - Squamous cell carcinoma
 - Sebaceous cell carcinoma
 - Melanoma
 - Other benign, premalignant and malignant lesions
 - Inflammation of the eyelid
 - Blepharitis
 - Hordeolum
 - Meibomian gland dysfunction
 - Chalazion
 - Demodecosis
 - Phthiriasis Palpebrarum
 - Other inflammatory processes involving the eyelids
 - Eyelid trauma, including full thickness eyelid laceration and canalicular laceration
 - Eyelid, canthal, and periocular reconstruction
 - Eyelid malpositions and involutional changes
 - Ectropion
 - Entropion
 - Epiblepharon
 - Symblepharon
 - Trichiasis and distichiasis
 - Blepharoptosis
 - Eyelid retraction

- Facial dystonia
- Involutional periorbital changes
- Dermatochalasis
- Brow ptosis
- Cosmetic eyelid surgery and rejuvenation

Lacrimal drainage system

- Embryology, anatomy, and physiology of the lacrimal drainage system
- Congenital abnormalities of the lacrimal drainage system
 - Amniocoele of the lacrimal sac
 - Lacrimal fistula
- Abnormalities of the lacrimal drainage system
 - Agenesis of the lacrimal puncta
 - Congenital nasolacrimal duct obstruction
 - Acquired nasolacrimal duct obstruction
 - Punctal and canalicular stenosis
 - Canaliculitis
 - Acute and chronic dacryocystitis
 - Lacrimal sac neoplasms
- Evaluation and management of epiphora
- Surgical procedures

The anophthalmic socket

- Enucleation, evisceration, and exenteration
- Surgical rehabilitation of the anophthalmic socket

IV. INTRAOCULAR INFLAMMATION & UVEITIS

Anatomy

- Iris
- Choroid
- Sclera

Definitions

- Anterior uveitis
- Intermediate uveitis
- Posterior uveitis
- Panuveitis
- Episcleritis
- Scleritis

Immunology

- Basic Concepts
- Immunization and Adaptive Immunity: The Immune Response Arc
- Ocular Immune Responses
- Mechanisms of Immune Effector Reactivity
- Special Topics in Ocular Immunology
- The eye in the immunosuppressed patient

- **Intraocular Inflammation & Uveitis**
- **Clinical Approach to Uveitis**
 - **Laboratory workup**
 - **Diagnostic tests**
- **Noninfectious (Autoimmune) Uveitis**
- **Infectious Uveitis**
- **Endophthalmitis**
 - **Endogenous**
 - **Post-operative**
 - **Traumatic**
- **Masquerade Syndromes**
- **Complications**
- **Ocular Involvement in AIDS**
- **Ocular surgery in patients with uveitis**
 - **Cataract**
 - **Glaucoma**
 - **Intravitreal implants**
 - **Vitreoretinal**
- **Pharmacologic therapy in patients with uveitis**
 - **Corticosteroids**
 - **Topical**
 - **Regional and intraocular injections**
 - **Sustained release intravitreal implant**
 - **Systemic agents and side effects**
 - **Anti-metabolites**
 - **T-cell inhibitors**
 - **Alkylating agents**
 - **Tumor necrosis factor antagonists**

V. RETINA & VITREOUS

Basic Anatomy

- **The Vitreous**
- **Neurosensory Retina**
- **Retinal Pigment Epithelium**
- **Bruch's Membrane**
- **Choroid**

Diagnostic Approach to Retinal Disease

- **Techniques of Examination**
- **Retinal Angiography Techniques**
 - **Fluorescein Angiography**
 - **Indocyanine Green Angiography**
- **Other Imaging Techniques**
 - **Optical Coherence Tomography**
 - **Scanning Laser Ophthalmoscopy**
 - **Retinal Thickness Analyzer**

- **Autofluorescence**
- **Common Uses of Imaging Technology**
- Retinal Physiology, Psychophysics, and Testing**
- **Electroretinogram**
 - **Recording and Interpreting the**
 - **Specialized Types of ERG**
 - **Applications and Cautions**
- **Electrooculogram and RPE Responses**
 - **Electrooculogram**
 - **Other RPE Tests**
- **Cortical Evoked Potentials**
 - **Visually Evoked Potentials**
 - **Electrically Evoked Potentials**
- **Psychophysical Testing**
 - **Dark Adaptation**
 - **Color Vision**
 - **Contrast Sensitivity**

Disorders of the Retina and Vitreous

- **Acquired Diseases Affecting the Macula.**
 - **Central Serous Chorioretinopathy**
 - **Age-Related Macular Degeneration**
 - **Ocular Histoplasmosis Syndrome (OHS)**
 - **Angioid Streaks**
 - **Pathologic Myopia**
 - **Idiopathic and Other Causes of Choroidal Neovascularization**
 - **Vitreoretinal Interface Abnormalities**
- **Retinal Vascular Disease**
 - **Retinal Effects of Systemic Arterial Hypertension**
 - **Diabetic Retinopathy**
 - **Sickle Cell Retinopathy**
 - **Peripheral Retinal Neovascularization**
 - **Retinopathy of Prematurity**
 - **Venous Occlusive Disease**
 - **Arterial Occlusive Disease**
 - **Ocular Ischemic Syndrome**
 - **Vasculitis**
 - **Cystoid Macular Edema**
 - **Coats Disease and Retinal Telangiectasis**
 - **Phakomatoses**
 - **Retinal Cavernous Hemangioma**
 - **Arterial Macroaneurysms**
- **Choroidal Disease**
 - **Bilateral Diffuse Uveal Melanocytic Proliferation**
 - **Choroidal Perfusion Abnormalities**
 - **Choroidal Hemangioma**

- Uveal Effusion Syndrome
- **Focal and Diffuse Chorioretinal Inflammation**
 - Noninfectious Chorioretinopathies
 - White Dot Syndromes
 - Other Noninfectious Choroidopathies
 - Infectious Chorioretinopathies
- **Congenital and Stationary Retinal Disease ; Color Vision Abnormalities**
 - Color Vision (Cone System) Abnormalities
 - Night Vision (Rod System) Abnormalities
- **Hereditary Retinal and Choroidal Dystrophies**
 - Diffuse Photoreceptor Dystrophies
 - Retinitis Pigmentosa
 - Cone Dystrophies
 - Cone-Rod Dystrophies
 - Macular Dystrophies
 - Stargardt Disease (Fundus Flavimaculatus)
 - Vitelliform Degenerations
 - Familial (Dominant) Drusen
 - Pattern Dystrophies
 - Sorsby Macular Dystrophy
 - Choroidal Dystrophies
 - Diffuse Degenerations
 - Regional and Central Choroidal Dystrophies
 - Inner Retinal and Vitreoretinal Dystrophies
 - X-Linked Retinoschisis
 - Goldmann-Favre Syndrome
- **Retinal Degenerations Associated Other Organ Systems or With Systemic Disease**
- **Metabolic Diseases**
- **Systemic Drug Toxicity**
- **Peripheral Retinal Abnormalities**
 - Retinal Breaks , Evaluation and Treatment
 - Traumatic Breaks
 - Posterior Vitreous Detachment
 - Lesions Predisposing to Retinal Detachment
 - Lesions Not Predisposing to Retinal Detachment
- **Retinal Detachment**
 - Subclinical Retinal Detachment
 - Rhegmatogenous Retinal Detachment
 - Fellow Eye in Patient With Retinal Detachment
 - Traction Retinal Detachment
 - Exudative Retinal Detachment

- **Retinoschisis**

Diseases of the Vitreous

- **Normal Anatomy**
- **Posterior Vitreous Detachment**
- **Developmental Abnormalities**
- **Hereditary Hyaloideoretinopathies**
- **Asteroid Hyalosis, Cholesterolosis (Hemophthalmos, Synchrony Scintillans)**
- **Amyloidosis**
- **Spontaneous Vitreous Hemorrhage**
- **Pigment Granules**
- **Vitreous Abnormalities Secondary to Cataract Surgery**

Valsalva Retinopathy

Purtscher Retinopathy and Purtscher-Like Retinopathy

Terson Syndrome

Posterior Segment Trauma

- **Evaluation of the Patient Following Ocular Trauma**
- **Blunt Trauma, Closed-globe injuries**
- **Open-globe injuries**
- **Intraocular Foreign Bodies**
- **Complications of Posterior Segment Trauma**
- **Shaken Baby Syndrome/Child Abuse**
- **Avulsion of the Optic Disc**

Adverse Effects of Light or Electromagnetic Energy on the Retina

Interventions and Therapy for Posterior Segment Diseases

- **Laser-based Therapy**
 - **Basic Principles**
 - **Photocoagulation**
 - **Transpupillary Thermotherapy**
 - **Photodynamic Therapy**
- **Cryo-based Therapy**
- **Local Pharmacotherapy**
 - **Periocular injections**
 - **Intravitreal injections**
 - **Sustained-release devices**

Scleral Buckling Surgery

Pneumatic Retinopexy

Vitreoretinal Surgery

- **Vitreotomy for Selected Macular Diseases**
- **Vitreotomy for Posterior Segment Complications Anterior Segment Surgery**
- **Vitreotomy for Retinal Detachment**
- **Vitreotomy for Complex Retinal Detachment**
- **Complications of Pars Plana Vitrectomy**

Retinal Prosthetics

VI. CLINICAL OPTICS

Physical Optics

- **Wave Theory**
- **Interference**
- **Coherence**
- **Polarization**
- **Diffraction**
- **Scattering**
- **Reflection**
- **Transmission and Absorption**
- **Illumination**
- **Laser Fundamentals**
- **Ophthalmic Lenses**
- **Ophthalmic Prisms**
- **Mirrors**

Geometrical Optics

- **Pinhole Imaging**
- **Imaging with Lenses and Mirrors**
- **Object Characteristics**
- **Image Characteristics**
- **Light Propagation**
- **First-Order Optics**
- **Higher-order aberrations**

Optics of the Human Eye

- **The Schematic Eye and the Reduced Eye**
- **Pupil Size**
- **Visual Acuity**
- **Refractive States of the Eye**
- **The Biology of the Eye in the Optical System**
- **Correction with Spectacle Lenses**
- **Correction with Contact Lenses**
- **Correction with Intraocular Lenses**
- **Correction with Refractive Corneal Surgery**

Clinical Refraction

- **Objective Refraction: Retinoscopy**
- **Subjective Refraction Technique**
- **Cycloplegic and Noncycloplegic Refraction**
- **Clinical Accommodative Problems**
- **Prescribing Multifocal Lenses**
- **Prescribing Special Purpose Lenses**
- **Special Types of Lenses**
- **Therapeutic Use of Prisms**

Contact lenses

- Terminology
- Effect of Contact Lenses on the Cornea
- Rigid Contact Lens
- Soft Contact Lenses
- Complications of Contact Lens Wear
 - Infectious
 - Non-infectious
- Care of Contact Lenses

Intraocular Lenses

- Optics of Intraocular Lenses
- Optical Quality of Intraocular Lenses
- Optical Results of Intraocular Lenses
- Multifocal Intraocular Lenses
- Intraocular lens material

Optical Considerations in Refractive Surgery

- Corneal Shape
- Angle Kappa
- Pupil Size
- Irregular Astigmatism
 - Wavefront Analysis
 - Causes of Irregular Astigmatism

Vision Rehabilitation

- Epidemiology of Vision Impairment
- Important Definitions in Low vision
- Classification of Functional Visual Deficits
- Patient Assessment
- Helping Patients Function Better
- Contrast Enhancement
- Lighting and Glare Control
- Instruction and Training
- Counseling and Support Groups
- Visual Rehabilitation Professionals and Services
- Levels of Vision Rehabilitation Services
- Pediatric Low Vision Issues

Telescopes & Optical Instruments

- Slit Lamp Biomicroscope
- Lenses for Fundus Biomicroscopy
- Pachymetry
- Applanation Tonometer
- Direct and Indirect Ophthalmoscope
- Fundus Camera
- Geneva Lens Clock
- Trial Lenses
- Keratometer

- Corneal Histology
- Diagnostic Ultrasonography
- Lensometer
- Automated Refraction
- Specular Microscopy
- Macular Function Testing
- Wavefront Aberrometers
- Optical Coherence Tomography

VII. OPHTHALMIC PATHOLOGY & INTRAOCULAR TUMORS

Ophthalmic Pathology

- **Ophthalmic Pathology**
 - History of ophthalmic pathology
 - Topography
 - Wound Repair
 - Specimen Handling
- **Special Procedures**
 - Immunohistochemistry
 - Flow cytometry
 - Molecular pathology
 - Diagnostic electron microscopy
 - Fine needle aspiration biopsy
 - Frozen sections
- **Conjunctiva**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
- **Cornea**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations and dystrophies
 - Neoplasms
 - Pigment deposits
- **Anterior Chamber & Trabecular Meshwork**
 - Topography
 - Congenital anomalies
 - Degenerations
 - Neoplasms
- **Sclera**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations

- Neoplasms
- **Lens**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
 - Abnormalities associated with systemic disorders
 - Pathology of intraocular lenses
- **Vitreous**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
- **Retina & Retinal Pigment Epithelium**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
 - Trauma
- **Uveal tract**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
 - Trauma
- **Eyelids**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
 - Trauma
- **Orbit**
 - Topography
 - Congenital anomalies
 - Inflammations
 - Degenerations
 - Neoplasms
 - Trauma
- **Optic Nerve**
 - Topography
 - Congenital anomalies

- **Inflammations**
- **Degenerations**
- **Neoplasms**
- **Trauma**

Intraocular Tumors: Clinical Aspects

- **Melanocytic Tumors**
 - **nevi**
 - **melanocytoma**
 - **melanoma**
 - **pigmented epithelial tumors of the uvea and retina**
- **Angiomatous Tumors**
 - **Hemangiomas**
 - **Arteriovenous malformations**
- **Retinoblastoma**
 - **Genetic counseling**
 - **Diagnostic evaluation**
 - **Classification**
 - **Associated conditions**
 - **Treatment options**
- **Metastatic and Secondary Tumors of the Eye**
 - **Metastatic carcinoma**
 - **Direct intraocular extension**
- **Lymphomatous Tumors**
 - **Intraocular lymphoma**
 - **Uveal lymphoid infiltration**
- **Ocular Manifestations of Leukemia**
- **Rare tumors**

VIII. NEURO-OPHTHALMOLOGY

Anatomy and physiology

- **Bony anatomy**
- **Anatomy of the orbit, eyelids, and lacrimal system**
- **Afferent visual pathways**
- **Efferent visual pathways**
- **Facial motor anatomy**
- **Sensory anatomy (trigeminal system)**
- **Autonomic anatomy**
- **Vascular anatomy**

Ocular and neurologic evaluation

- **Ocular and neurologic examinations**
 - **Ocular evaluation**
 - **Neurologic evaluation**
 - **Neuro-ophthalmic evaluation of the comatose patient**
 - **Examination of children:**
- **Ancillary tests**

- Visual field testing
- Electrophysiology
- Ocular and orbital ultrasound
- IVFA and ICG
- Nerve fiber layer analysis
- Imaging
- Lumbar puncture

Neuro-ophthalmic symptoms and signs

- Visual loss and visual field loss
- Positive visual phenomena and hallucinations
- Higher cortical dysfunction
- Optic nerve abnormalities
- Oscillopsia and nystagmus
- Double vision and abnormal extraocular movements
- Ptosis and lid retraction
- Proptosis and enophthalmos
- Pupillary changes
- Facial movements and weakness
- Pain

Disorders of the afferent and efferent visual pathways

- Diseases of the optic nerve
 - Ischemic optic neuropathy
 - Inflammation
 - Compression / Infiltration
 - Paraneoplastic
 - Traumatic
 - Toxic or Nutritional
 - Metabolic
 - Hereditary or Congenital
 - Glaucoma
 - Raised intracranial pressure (papilledema)
- Orbital pathology causing neuro-ophthalmic manifestations
 - Trauma
 - Mass lesions
 - Inflammation
 - Infection
- Diseases of the chiasm
 - Chiasmal visual field defects
 - Compression/infiltration
 - Inflammation
 - Trauma
 - Ischemia/hemorrhage
- Diseases of the retrochiasmal visual pathways
 - Optic tract
 - Lateral geniculate
 - Radiations

- Calcarine cortex
- Association areas
- Specialized syndromes
- **Pupillary pathology**
 - Normal pupillary responses
 - Effects of drugs
 - Congenital pupillary abnormalities
 - Traumatic and secondary pupillary changes
 - Evaluation and management
- **Eye movement systems pathology**
 - Vestibular ocular system
 - Optokinetic nystagmus
 - Saccades
 - Pursuit
 - Convergence
 - Divergence
 - Specific syndromes
 - Ocular motility disturbance by location
- **Nystagmus and disorders of ocular stability**
 - Jerk nystagmus
 - Pendular nystagmus
 - Congenital vs acquired nystagmus
 - Central vs peripheral nystagmus
 - Specific types of nystagmus and their localizing value
 - Induced nystagmus
 - Ocular oscillations
- **Eyelid position abnormalities**
 - Eyelid retraction
 - Ptosis
 - Eyelid nystagmus
- **Facial nerve dysfunction**
 - Central and peripheral facial palsy
 - Blepharospasm
 - Hemifacial spasm
 - Facial myokymia, tics, and myotonia
 - Oculomasticatory myorhythmia (Whipple's)

Disorders with neuro-ophthalmic manifestations

- **Developmental and congenital anomalies**
 - Visual maturation
 - Prematurity and birth injuries
 - Cerebral palsy
 - Congenital hydrocephalus
 - Cranial dysostoses (craniosynostosis)
 - Amblyopia
 - Congenital optic nerve anomalies
 - Common malformations of the eye and orbit

- Skull base malformations. Chiari malformation
- Fibrous dysplasia
- Child abuse
- **Systemic disorders**
 - Hereditary
 - Neurocutaneous
 - Vascular
 - Metabolic
 - Autoimmune
 - Neoplastic
 - Infectious
- **Neurologic disorders commonly**
 - Head and ocular injury
 - Increased intracranial pressure
 - Vascular disease of the brain and the eye
 - Seizures
 - Neoplasms
 - Demyelinating disease
 - Infections
 - Metabolic diseases
 - Neuro-degenerative diseases
 - Hereditary ataxias
 - Polyradiculopathies
 - Neuro-muscular transmission deficits
 - Myopathies (involving the extraocular muscles)
 - Headache and facial pain
- **Ocular diseases**
 - Ocular neoplasms
 - Ocular infection or inflammation
 - Retinal disorders
 - Glaucoma
- **Neuro-ophthalmic manifestations of iatrogenic diseases**
 - Radiation
 - Chemotherapy
 - Drugs
 - Surgical procedures
- **Functional disorders**
 - Terminology
 - Clinical presentations
 - Specific techniques of evaluation

Procedures

- **Procedures and their complications**
 - Temporal artery biopsy
 - Strabismus surgery
 - Canthotomy, cantholysis
 - Optic nerve sheath fenestration

- Orbital surgery
- Neurosurgery
- Interventional neuroradiology techniques
- Botulinum toxin therapy
 - Treatment of blepharospasm, hemifacial spasm, Meige syndrome
 - Treatment of strabismus

Counseling patients

- Definition of legal blindness and requirements for driving
- Counseling of the visually impaired patient
- Genetic counseling

Important Studies

- Optic Neuritis Treatment Trial (ONTT)
- Longitudinal Optic Neuritis Study (LONS)
- Controlled High-Risk Subjects Avonex Multiple Sclerosis Prevention Study (CHAMPS)
- Ischemic Optic Neuropathy Decompression Trial (IONDT)

IX. PEDIATRIC OPHTHALMOLOGY & STRABISMUS

Strabismus and Amblyopia

- Introduction to Strabismus
 - Epidemiology
 - Childhood syndromes
 - Acquired
 - Paralytic
 - Restrictive
- Anatomy of the Extraocular Muscles and their Fascia
- Motor Physiology
 - Hering's and Sherrington's Laws
 - Ductions and versions/vergence movements
 - Comitancy
 - Adaptations in strabismus
 - A- & V-Pattern Horizontal Strabismus
 - Dissociated deviations
 - Latent nystagmus
 - Oblique overaction
 - Smooth pursuit/OKN abnormalities
- Sensory Physiology & Pathology
 - Normal binocular sensory physiology
 - Childhood adaptations to strabismus
 - Adult adaptations to strabismus
- Diagnostic Techniques for Strabismus and Amblyopia
 - Vision testing for infants and children
 - Determination of refractive error in infants and children
 - Sensory testing
 - Assessment/quantification of strabismus

- **Amblyopia**
 - **Classification**
 - **Strabismic**
 - **Refractive**
 - **Organic**
 - **Mixed mechanism**
 - **Treatment**
 - **Occlusion**
 - **Pharmacological and optical penalization**
 - **Esodeviations**
 - **Infantile**
 - **Acquired**
 - **Refractive**
 - **Normal AC/A**
 - **High AC/A**
 - **Nonrefractive**
 - **Exodeviations**
 - **Infantile**
 - **Acquired/intermittent exotropia**
 - **Special Forms of Childhood Strabismus**
 - **Duane's syndrome**
 - **Brown's syndrome**
 - **Double elevator palsy**
 - **Generalized fibrosis syndrome**
 - **Acquired Paretic Strabismus**
 - **Cranial nerve palsies**
 - **Myasthenia Gravis**
 - **Ophthalmoplegia syndromes**
 - **Acquired Restrictive Strabismus**
 - **Thyroid/Graves ophthalmopathy**
 - **Orbital trauma**
 - **Childhood Nystagmus**
 - **Congenital Motor Nystagmus**
 - **Secondary/sensory nystagmus**
 - **Surgery of the Extraocular Muscles**
 - **Principles of surgical correction**
 - **Techniques for surgical correction**
 - **Complications of surgical correction**
 - **Special considerations in pediatric anesthesia**
 - **Chemodervation Treatment of Strabismus**
 - **Conservative and Orthoptic Management of Strabismus**
- Pediatric Ophthalmology**
- **Growth & Development of the Eye**
 - **Congenital Anomalies**
 - **Orbital Dysmorphology & Eyelid Disorders**

- Terminology and association of abnormal interocular distance
- Eyelid disorders
- **Infectious & Allergic Ocular Disease**
 - Intrauterine and perinatal infections of the eye
 - Ophthalmia neonatorum
 - Conjunctivitis
 - Orbital and adnexal infections
 - Ocular allergy
 - Stevens-Johnson Syndrome
 - Kawasaki Disease
- **The Lacrimal Drainage System**
 - Developmental anomalies
 - Dacryocoele
 - Nasolacrimal duct obstruction
- **Diseases of the Cornea and Anterior Segment**
 - Embryology of the cornea and anterior segment
 - Congenital corneal anomalies
 - Infantile corneal opacities
 - Systemic diseases with corneal manifestations in childhood
- **Iris Abnormalities**
- **Pediatric Glaucomas**
 - Primary congenital glaucoma
 - Secondary pediatric glaucomas
 - Treatment
 - Prognosis and follow up
- **Childhood Cataracts and Other Pediatric Lens Disorders**
 - Pediatric cataracts
 - Surgery
 - Structural or positional lens abnormalities
 - Dislocated lenses in children
- **Uveitis in the Pediatric Age Group**
 - Classification
 - Anterior uveitis
 - Intermediate uveitis
 - Masquerade syndromes
 - Diagnosis of pediatric uveitis
 - Treatment of pediatric uveitis
- **Vitreous and Retinal Diseases & Disorders**
 - Leukocoria
 - Hereditary retinal disease
 - Hereditary macular dystrophies
 - Hereditary vitreoretinopathies
 - Systemic diseases and disorders with retinal manifestations
 - Screening examination of premature infants for retinopathy of prematurity

- **Optic Disc Abnormalities**
 - **Developmental anomalies**
 - **Optic atrophy**
 - **Optic neuritis**
 - **Papilledema**
 - **Pseudotumor cerebri**
 - **pseudopapilledema**
- **Ocular & Periocular Tumors in Childhood**
 - **Orbital tumors**
 - **Eyelid and epibulbar lesions**
 - **Intraocular tumors**
- **Phakomatoses**
 - **Neurofibromatosis**
 - **Tuberous sclerosis**
 - **Von Hippel-Lindau disease**
 - **Sturge-Weber syndrome**
 - **Ataxia-telangiectasia**
 - **Incontinentia pigmenti**
 - **Wyburn-Mason syndrome**
- **Craniofacial Malformations**
 - **Approach to the child with craniofacial malformations**
 - **Craniosynostosis**
 - **Craniosynostosis syndromes**
 - **Ocular complications**
 - **Management**
 - **Nonsynostotic craniofacial conditions**
- **Ocular Findings in Inborn Errors of Metabolism**
- **Ocular Trauma in Childhood**
 - **Child abuse**
 - **Superficial injury**
 - **Penetrating injury**
 - **Blunt injury**
- **Decreased Vision in Infants and Children**
 - **Normal visual development**
 - **Approach to the infant with decreased vision**
 - **Acquired vision loss later in childhood**

X. EXTERNAL DISEASE & CORNEA

Basic & Clinical Concepts of Corneal & External Eye Disease

- **Anatomy and histology**
 - **Eyelids**
 - **Conjunctiva**
 - **Cornea**
 - **sclera**
- **Pharmacology**
- **Examination Techniques for the External Eye & Cornea**

Ocular Surface Disorders

- **Normal physiology of the Ocular Surface**
- **Diagnostic Approach to Ocular Surface Disease**
 - **Tests of tear production**
 - **Vital dyes and other surface staining techniques**
 - **Impression cytology**
- **Dry Eye Syndrome**
 - **Risk factors**
 - **Clinical features and complications**
 - **Treatment**
 - **Pharmacologic**
 - **Punctal occlusion**

Infectious Diseases of the External Eye & Cornea

- **Basic Concepts**
- **Clinical Aspects**
 - **Viral**
 - **Bacterial**
 - **Fungal**
 - **other**

Immune-mediated Disorders of the External Eye & Cornea

- **Ocular Immunology**
- **Mucous membrane pemphigoid**
- **Mooren ulcer and other forms of peripheral ulcerative keratitis**
- **Scleritis**
- **Clinical Approaches**

Neoplastic Disorders of the Eyelids, Conjunctiva & Cornea

- **Tumor Cell Biology**
- **Diagnostic Approaches to Ocular Surface Neoplasia**
 - **Biopsy techniques**
- **Clinical Approaches**

Congenital Anomalies of the Cornea & Sclera

- **Basic Concepts**
- **Clinical Aspects**

Corneal Dystrophies and Metabolic Disorders involving the Conjunctiva, Cornea & Sclera

- **Molecular Genetics**
- **Clinical Approach**

Degenerative Disorders of the Conjunctiva, Cornea & Sclera

- **Degenerative & Aging Process**
- **Clinical Approach**

Toxic & Traumatic Injuries of the Anterior Segment

- **Wound Healing**
- **Clinical Aspects**

Neurotrophic keratitis

Contact lens-related disease

Corneal complications of eyelid disease

Surgery of the Ocular Surface

- **Introduction**
- **Surgical Procedures**

Corneal Transplantation

- **Basic Concepts**
- **Clinical Approach**

Universal precautions and preventive health

XI. GLAUCOMA

Terminology, Epidemiology and Heredity

- **Definition and classifications**
 - **Primary and Secondary Open Angle Glaucoma**
 - **Primary and Secondary Angle Closure Glaucoma**
 - **Congenital/Developmental Glaucoma**
- **Epidemiology**
 - **Open Angle Glaucoma**
 - **Angle Closure Glaucoma**
- **Hereditary, Genetic and Environmental Factors**
 - **Open Angle Glaucoma**
 - **Angle Closure Glaucoma**
 - **Congenital/Developmental Glaucoma**
 - **Other genes**

Intraocular Pressure and Aqueous Humor Dynamics

- **Aqueous Production**
 - **Rate of formation**
 - **Suppression**
- **Aqueous Outflow**
 - **Trabecular**
 - **Uveoscleral**
- **Episcleral Venous Pressure**
- **Intraocular Pressure**
 - **Distribution**
 - **Factors which influence IOP**
 - **Diurnal variation**
 - **Tonometry**
 - **Technique**
 - **Types**
 - **Relationship with corneal thickness**

Clinical Evaluation

- **Relevant history**
- **External Adnexae and Anterior Segment**
- **Pachymetry**
- **Gonioscopy**
 - **Technique**
 - **Grading the angle**

- **Optic Nerve Evaluation**
 - **Clinical examination**
 - **Normal anatomy**
 - **Glaucomatous findings**
 - **Pathophysiology**
 - **Documentation**
 - **Quantitative Measurements**
 - **Confocal scanning laser ophthalmoscopy**
 - **Optical coherence tomography**
- **Visual Field**
 - **Types of perimetry**
 - **Patterns of loss**
 - **Interpretation and artifacts**
 - **Monitoring**
- **Other tests**
 - **Ultrasound biomicroscopy**
 - **Blood flow measurements**

Open-Angle Glaucoma

- **Definition**
- **Epidemiology**
- **Primary Open-Angle**
 - **Clinical features**
 - **Risk factors and Related Conditions**
 - **Prognosis**
- **Normal or Low-Tension Glaucoma**
 - **Clinical features**
 - **Differential diagnosis**
 - **Work-up**
 - **Related Conditions**
 - **Prognosis**
- **Glaucoma Suspect**
- **Ocular Hypertension**
- **Secondary Open Angle Glaucoma**
 - **Exfoliation syndrome**
 - **Pigmentary**
 - **Lens-induced**
 - **Phacolytic**
 - **Lens particle**
 - **Phacoantigenic**
 - **Tumors**
 - **Inflammation**
 - **Elevated episcleral venous pressure**
 - **Surgery/trauma**
 - **Mediations**
 - **Steroids**
 - **Cycloplegics**

Angle-Closure Glaucoma

- **Definition and anatomy**
- **Epidemiology**
- **Clinical Features**
- **Pathogenesis and Mechanisms of Angle Closure**
- **Primary Angle Closure**
 - **Risk factors**
 - **Gonioscopy and the narrow angle**
 - **Acute, subacute, intermittent**
 - **Chronic**
- **Plateau Iris**
- **Secondary Angle Closure Glaucoma**
 - **With pupillary block**
 - **Lens-induced**
 - **Without pupillary block**
 - **Neovascular**
 - **Iridocorneal endothelial syndrome**
 - **Tumors**
 - **Inflammation**
 - **Aqueous misdirection**
 - **Trauma**
 - **Surgery**
 - **Retinal detachment and uveal effusion**
 - **Epithelial and fibrous downgrowth**
 - **Nanophthalmos**
 - **Drug-induced**

Childhood Glaucoma

- **Definition and classification**
- **Epidemiology and genetics**
- **Clinical features**
- **Pathophysiology**
- **Differential diagnosis**
- **Prognosis and follow-up**
- **Developmental glaucomas**
 - **Associated ocular anomalies**
 - **Associated systemic anomalies**
 - **Other secondary**

Medical Management of Glaucoma

- **General Principles**
- **Topical agents**
 - **Adrenergic agonists**
 - **Beta adrenergic antagonists**
 - **Carbonic anhydrase inhibitors**
 - **Parasympathomimetics**
 - **Prostaglandin analogues**

- **Combined medications**
 - **Systemic agents**
 - **Considerations in Special Cases**
 - **Pregnancy**
 - **Sickle cell**
 - **Uveitis**
 - **Corneal Transplant**
 - **Compliance**
- Surgical Therapy for Glaucoma**
- **General Principles and Indications**
 - **Open-Angle Glaucoma**
 - **Laser**
 - **ALT**
 - **SLT**
 - **Incisional Surgery**
 - **Trabeculectomy**
 - **Antimetabolites**
 - **Full-thickness Sclerostomy**
 - **Angle-Closure Glaucoma**
 - **Laser**
 - **Peripheral iridotomy**
 - **Iridoplasty**
 - **Incisional Surgery**
 - **Peripheral iridectomy**
 - **Cataract extraction**
 - **Goniosynechiolysis**
 - **Other Procedures**
 - **Aqueous Shunts**
 - **Ciliary Ablation**
 - **Nonpenetrating Surgery**
 - **Combined Cataract and Filtering Surgery**
 - **Developmental/Congenital Glaucoma surgery**
 - **Goniotomy**
 - **Trabeculotomy**

XII. LENS & CATARACT

Anatomy

- **Capsule And Epithelium**
- **Nucleus**
- **Cortex**
- **Zonules**

Biochemistry

- **Lens Proteins**
- **Transport And Permeability**
- **Glucose And Carbohydrate Metabolism**

- **Oxidative Damage**

Physiology

- **Accommodation**
- **Transparency, Water, And Electrolyte Balance**
- **Light Transmission Spectrum**
- **Presbyopia**

Embryology

- **Normal Development**

Pathology

- **Congenital Anomalies And Abnormalities**
- **Developmental Defects**
- **Types Of Cataract**
- **Drug-Induced Lens Changes**
- **Trauma**
- **Metabolic Cataract**
- **Intrauterine Infections And Cataract**
- **Cataracts Associated With Uveitis**
- **Exfoliation Syndromes**
- **Cataract And Skin Diseases**
- **Lens-Induced Glaucoma**
- **Ischemia**
- **Cataracts Associated With Degenerative Ocular Disorders**
- **Nutritional Effects**

Epidemiology of Cataracts

Evaluation and Management in Adults

- **Signs And Symptoms**
- **Medical Management**
- **Low Vision Aids For Cataract**
- **Indications For Surgery**
- **Preoperative Evaluation**
- **External Examination**
- **Slit-Lamp Examination**
- **Fundus Evaluation**
- **Measurements Of Visual Function**
- **Special Tests**
- **Preoperative Measurements**
- **Patient Preparation And Informed Consent**

Surgery for Cataracts

- **Historical Development**
- **Anesthesia For Cataract Surgery**
- **Preoperative And Intraoperative Preparation**
- **Wound Construction**
- **Intracapsular Cataract Extraction**
- **Extracapsular Cataract Extraction**

- **Cataract Extraction By Phacoemulsification**
- **Cataract Extraction By Laser Phacolysis**
- **Clear Lens Extraction**
- **Pars Plana Lensectomy**
- **Primary Intraocular Lens Implantation In Adults**
- **Primary Intraocular Lens Implantation In Children**
- **Viscoelastics**
- **Outcomes Of Cataract Surgery**

Complications of Cataract Surgery

- **Shallow Or Flat Anterior Chamber**
- **Corneal Edema**
- **Hemorrhage**
- **Retinal Phototoxicity**
- **Elevated Intraocular Pressure**
- **Cystoid Macular Edema**
- **Retinal Detachment**
- **Endophthalmitis**
- **Macular Infarction**
- **Chronic Uveitis**
- **Capsular Rupture**
- **Corneal Melting**
- **Wound Leak Or Filtering Bleb**
- **Iridodialysis**
- **Cyclodialysis**
- **Ciliary Block Glaucoma**
- **Retained Lens Material**
- **Vitreous Disruption Or Wound Incarceration**
- **Induced Astigmatism**
- **Pupillary Capture**
- **Epithelial Downgrowth**
- **Capsular Opacification And Contraction**
- **Complications Of IOL Implantation**

Cataract Surgery in Special Situations

- **Cataract Surgery In Children**
- **Anticipated Poor Wound Healing**
- **Psychosocial Considerations**
- **Systemic Conditions**
- **Ocular Conditions**
- **Trauma**

XIII. REFRACTIVE SURGERY

Underlying Concepts

- **The Science of Refractive Surgery**
 - **Corneal topography**

- Wavefront analysis
- Corneal biomechanics
- Wound healing
- Laser biophysics
- **The Role of the FDA in Refractive Surgery**
- **Patient Evaluation**
 - Preoperative evaluation
 - Patient examination
 - Diagnostic and ancillary tests
 - Informed consent

Specific Procedures in Refractive Surgery

- **Incisional Corneal Surgery**
 - Radial keratotomy
 - Limbal relaxing incisions
 - Arcuate keratotomy
 - Outcomes
 - complications
- **Onlays & Inlays**
 - Intrastromal corneal ring segments
 - Epikeratoplasty and keratophakia
 - orthokeratology
 - Outcomes
 - complications
- **Photoablation**
 - LASIK
 - LASEK
 - Photorefractive keratectomy
 - Phototherapeutic keratectomy
 - Outcomes
 - complications
- **Thermokeratoplasty**
 - Conductive keratoplasty
 - Outcomes
 - complications
- **Intraocular Surgery**
 - Piggyback lenses
 - Clear lens extraction
 - Phakic intraocular lenses
 - Toric intraocular lenses
 - Multifocal intraocular lenses
 - Accommodating intraocular lenses
 - Investigational techniques
 - Outcomes
 - complications
- **Treatment of Presbyopia**
 - Theories of accommodation

- Accomodative surgery
- Non-accomodative surgery
- Outcomes
- complications

Refractive Surgery in the Setting of Other Conditions

- **Refractive Surgery in patients with ocular diseases**
- **Refractive surgery in and patients with systemic diseases**
- **Considerations after Refractive Surgery**
 - **IOL calculations after refractive surgery**
 - **Retinal detachment**
 - **Corneal transplantation**
 - **Contact lens wear**
 - **glaucoma**
- **Managing complications**
- **Clinical Trials in refractive surgery**
- **Medicolegal aspects of refractive surgery**