Syllabus

**OPHTHALMOLOGY - FIFTH YEAR - 96809**

*Last update 21-01-2014*

**HU Credits:** 3

**Degree/Cycle:** 2nd degree (Master)

**Responsible Department:**

**Academic year:** 1

**Semester:** Yearly

**Teaching Languages:** Hebrew

**Campus:**

**Course/Module Coordinator:** Hadas Mechoulam, MD

**Coordinator Email:** hadasm@gmail.com

**Coordinator Office Hours:** By appointment

**Teaching Staff:**
  - Itay Chowers
  - Dr. Hadas Mechoulam
Dr. Hana Leibm

Course/Module description:
A 3 week clinical course.

Course/Module aims:
1. To identify and describe common eye diseases and life or sight threatening eye diseases
2. Be familiar with eye manifestations of systemic diseases
3. To treat common eye diseases such as conjunctivitis

Learning outcomes - On successful completion of this module, students should be able to:
- Obtain the skills of
  o Eye exam using resources available in the community: evaluate pupils (with a flash light), eye movements, visual fields (confrontation), visual acuity, anterior segments (for inflammation, foreign body, trauma, angle closure glaucoma, etc.)
  o Evaluate fundus with direct ophthalmoscopy to identify common pathologies such as optic disc edema and hemorrhage
- Learn to take relevant history from the ophthalmic patient
- Practice the use of a slit lamp
- Prepare and present one case to the student group including history, clinical findings, differential diagnosis, treatment, course of the disease, relevant literature

Attendance requirements(%):
80%

Teaching arrangement and method of instruction: Comprehensive lectures are given by senior ophthalmologists in all subspecialties. Clinical work will take place in the operating rooms and the general ophthalmology clinic, the subspecialty referral clinics and a community clinic.

Course/Module Content:
Anatomy of the Anterior Segment

The eye as an optical device
The eyeball
The Extraocular Muscles
Eyewall

Lids and Tear film
Tear films
Glands
Conjunctiva
Sclera
Tenon's capsule

The anterior segment
A/C borders

Cornea
Corneal layers
The limbus

Iris
Iris muscles

Lens
Lens development

The A/C angle
Trabecular meshwork

Ciliary body and Aqueous humor
Ciliary epithelium
Ciliary muscles and accommodation

Anatomy of the Posterior Segment

Vitreous body
Areas of attachment
Posterior vitreous detachment

Retina
Neural tissue
Ora serrata
Histological layers
Retinal cell types
Macula

Blood supply and drainage
Choroid
Central retinal artery
Vortex veins
Superior and inferior ophthalmic veins

Optic nerve
Intraocular
Intraorbital
Intracanalicular
Intracranial

Orbit
Bones
Apertures
optic canal
superior orbital fissure
inferior orbital fissure

Extraocular muscles
Rectus muscles
Oblique muscles

Cornea and External Eye Diseases

Infectious diseases
Blepharitis
Seborrheic, Staphylococcal
Chalazion, Hordeolum
Conjunctivitis
Viral, Bacterial, allergic
Papillary vs. follicular reaction
Microbial Keratitis
Herpes Simplex Keratitis
Epithelial
Stromal
Ophthalmic Herpes Zoster
Trachoma

Keratoconus

Pterygium and Pinguecula

Inflammatory diseases
Dry Eye Syndromes
Classification
Pathophysiology
Clinical tests (Schirmer, TBUT, dye staining)
Management
Tear substitutes (preserved, non-preserved)
Anti-inflammatory
Punctal occlusion

Allergic Eye Disorders
Contact dermatitis
Giant papillary conjunctivitis
Seasonal allergic conjunctivitis
Vernal keratoconjunctivitis
Cicatrizng conjunctivitis
Stevens-Johnson Syndrome
Atopic keratoconjunctivitis
Ocular cicatricial pemphigoid

Limbal stem cell deficiency
Diagnosis
Surgical procedures

Red Eye

Symptoms and Signs
Differential Diagnosis

Retinal Disorders

Posterior segment imaging
Fluorescein angiogram
Optical coherence tomography
Ophthalmic echography

Vascular retinal diseases
Diabetic retinopathy
Definition
Prevalence
Pathogenesis
Clinical findings
Classification
Diagnosis
Systemic factors associated with diabetic retinopathy
Treatment
Laser- focal, PRP
Anti-VEGF compounds
Surgery
Steroids

Retinal vein and artery occlusions - clinical findings, risk factors, diagnosis, treatment
Central retinal vein occlusion
Branch retinal vein occlusion
Central retinal artery occlusion
Branch retinal artery occlusion

Hypertensive retinopathy - clinical findings, grading

Age related macular degeneration (AMD)
Definition
Prevalence
Pathogenesis
Clinical findings
Classification
Treatment
Modifiable factors
Oral supplements
Photodynamic therapy (PDT)
Anti-VEGF compounds

Retinal Detachment
Etiology (rhegmatogenous, tractional, exudative)
Risk factors
Posterior vitreous detachment
Peripheral retinal degenerations, retinal tears
Signs and Symptoms of retinal detachment
Vitreo-retinal surgical procedures
Complications of vitreo-retinal surgery

Visual Function testing:

1. Main Electrophysiological tests:
   - Electroretinography (ERG) (retinal function)
   Physiologic basis of retinal response
   Rod versus cone systems in the retina
   Main components of the ERG waveform
   Diseases and conditions in which the ERG is helpful

   - Electro-oculography (EOG) (function of retinal pigment epithelium)
- Visual Evoked Potentials (VEP) (conductance of optic nerve and response of visual cortex)
  Flash and pattern VEPs,
  VEP in demyelinating diseases
  Pattern VEP (evaluation of visual acuity)

2. Main Psychophysical Tests:
   - Visual field testing (perimetry)

   - Contrast sensitivity

   - Color Vision testing
     Physiology of color vision
     Congenital versus acquired color vision deficiencies
     The Ishihara and Farnsworth-Munsell D-15 color tests

   - Dark adaptation
     The normal course of dark adaptation
     Conditions with impaired night vision
     Work-up of night blindness

Hereditary retinal degenerations:

Retinitis pigmentosa (RP):
  Prevalence
  Modes of inheritance
  Symptoms and signs
  Funduscopic findings
  Electoretinographic findings
  Genetics
  Treatment

Cone-rod dystrophies:
  Symptoms and signs
  Funduscopic findings
  Electoretinographic findings

Congenital stationary night blindness (CSNB):
  Symptoms and signs
  Funduscopic findings
  Electoretinographic findings
  Genetics
  Pathophysiology
  Comparison to RP

Congenital color blindness:
Prevalence
Mode of inheritance
Pathophysiology

Acquired color blindness

Acute Visual loss

Causes:
Corneal diseases
Anterior chamber diseases
Lens diseases
Vitreous disorders
Retinal detachment
Retinal vascular diseases
Optic nerve diseases

Cataract

Lens anatomy
Classification of cataract
By age
By anatomy
Metabolic cataract
Indications for surgery
Cataract surgery: ICCE, ECCE, phacoemulsification
Intra-ocular lenses
Complications of cataract surgery

Neuro-Ophthalmology

Neuroanatomy of the visual pathway

The Neuro-ophthalmological History
Symptoms & Signs
Visual disturbances
Double vision
Medications
Past Medical History
Review of Systems
Hereditary Diseases

Differential Diagnoses - etiological processes

The Neuro-ophthalmological Exam
Visual Acuity
Color Vision
Contrast Sensitivity
Visual Fields
Visual field abnormalities due to visual pathway lesions
Pupils
RAPD
Horner's syndrome

Ocular Motility
Neuroanatomy of Eye Movements
Examination
Internuclear Ophthalmoplegia
Third Cranial Nerve Palsy
Fourth Cranial Nerve Palsy
Sixth Cranial Nerve Palsy
Nystagmus

Papilledema
Pseudotumor Cerebri

Optic Disc Edema
Idiopathic & primary demyelinating optic neuritis
Atypical Optic Neuritis
Ischemic Optic Neuropathy
Non-arteritic
Arteritic

Glaucoma

The triad of glaucoma
Intraocular pressure
Optic nerve damage
Visual field damage

Relevant Anatomy
Anterior chamber angle
Outflow channels
Optic nerve head

The characteristic damage in glaucoma
Optic nerve head cupping
Glucomatous visual field defects

Epidemiology and risk factors of glaucoma
Relevant topics
Measuring intraocular pressure,
Gonioscopy,
Visual field examination,
Optic nerve head cupping,
Open versus closed anterior chamber angle.

Glaucoma subtypes
Open versus Closed angle glaucoma,
Primary versus Secondary glaucoma.

Diagnosing glaucoma
Normal
Ocular hypertension
Glaucoma

Imaging in Glaucoma

Medical treatment of glaucoma
Different groups: beta blockers, alpha agonists, cholinergic agonists, carbonic anhydrase inhibitors, prostaglandin analogs, hyperosmotic agents
Effects and side effects

Laser treatment of glaucoma
Trabeculoplasty
Iridotomy

Surgical treatment of glaucoma
Trabeculectomy
Other surgical procedures.

Pediatric Ophthalmology

Why is pediatric ophthalmology a separate entity?
Characteristics of the infant eye
Infant vision - Developmental milestones

How do we determine vision in infants?
Visual acuity in preverbal children
Fixation behavior
Teller Preferential Looking
Spatial Sweep VEP
Optokinetic nystagmus
Visual acuity in verbal children
Picture cube – single optotypes vs linear optotypes
Illiterate "E"
Snellen

Clinical signs of poor vision

Amblyopia
Definition
Classification (anisometropic, strabismic, ametropic, deprivation, iatrogenic)
Pathophysiology of amblyopia
Assessment of amblyopia
Treatment of amblyopia – penalization, patching

Selective topics in pediatric ophthalmology:
1. Ophthalmia neonatorum – etiology, diagnosis and treatment
2. Childhood ptosis – differential diagnosis, complications and treatment
3. Congenital dacryostenosis – pathophysiology, diagnosis and treatment
4. Periorbital and orbital cellulites (in children) – clinical diagnosis, complications and treatment
5. Childhood cataract – unilateral vs. bilateral, etiology, work-up and treatment, aphakia vs. pseudophakia – pros and cons
6. Childhood glaucoma – difference from adult glaucoma, signs and symptoms, treatment
7. Retinopathy of prematurity – etiology, who is at risk, staging (brief version) and treatment
8. Congenital anomalies

Strabismus
1. Definition – when is it pathologic?
2. Anamnesis: onset, family history, medical history
3. Differential diagnosis: epicanthus
4. Eyes movements: ductions, versions, diagnostic position of gaze
5. Clinical characteristics: laterality, intermittent, alternating,
6. Comitant vs. incomitant
7. Association amblyopia and strabismus.
8. Clinical tests: Hirschberg test, cover test, alternating cover test, phorias/tropias,
10. Types of Exotropias: Sensory, intermittent, convergence insufficiency, divergence excess
11. Vertical strabismus: SO palsy, TED, MS, MG, orbital fractures
12. Treatment of strabismus: glasses, prisms and surgical treatments

Intraocular tumors
Uveal melanoma (iris, ciliary body and choroid)
Epidemiology
Clinical aspects, signs and symptoms
Diagnostic methods
Histopathology
Prognostic factors and metastasis
Treatment
Differential diagnosis (including metastatic tumors to the eye)
Retinoblastoma
Epidemiology
Genetics
Clinical aspects, signs and symptoms
Diagnostic methods
Histopathology
Prognosis and metastasis
Treatment
Retinoma/retinocytoma
Differential diagnosis:
- PHPV
- Coat's disease
- Ocular toxocariasis
- Retinopathy of prematurity

Oculoplastics
Eyelids
Inflammations
Sty
Chalazion
Blepharitis
Trichiasis
Malposition of eyelids
Ptosis
Entropion
Ectropion
The aging face – Dermatochalasis
Blepharospasm
Facial nerve palsy
Congenital eyelid disorders
Blepharophymosis syndrome
Eyelid coloboma

Tumors of the eyelids
Benign lid tumors (papilloma, cysts, xanthelasma, verucca, nevus, molluscum)
Malignant lid tumors (Keratosis, BCC, SCC, sebaceous gland carcinoma, melanoma)

Basic eyelid reconstruction

Eye / orbital Prosthesis
Socket reconstruction

Lacrimal system
Anatomy
Physiology
Clinical examination, tests, imaging, treatment including surgery of:
Canaliculitis
Naso Lacrimal Obstruction
Inflammations
Neonatal dacryostenosis
Surgery ☑️ DCR, endonasal surgery, Jone's tubes

Orbital diseases
Anatomy
Orbital symptoms Examination, Imaging, Evaluation,
Inflammations
Infections ☑️ Preseptal / Orbital cellulitis
Orbital pseudotumor

Vascular abnormalities
AV malformation
Orbital Varices
Carotid cavernous fistula

Thyroid eye disease ☑️ Graves orbitopathy
Signs, symptoms, treatment, surgery

Tumors
Dermoid cyst
Lipodermoid
Capillary hemangioma
Cavernous hemangioma
Lymphangioma
Lymphoma
Rhabdomyosarcoma
Lacrimal gland tumors – Adenoma / Carcinoma
Optic nerve Glioma, Meningioma
Orbital Metastasic Dis

Orbital trauma
Blowout fracture mechanism and surgical repair

Refractive Surgery

The excimer laser

Laser ablation in myopia, hyperopia, astigmatism

Surgical procedures:
Incisional procedures (RK)
Surface procedures (PRK, LASEK)
Lamellar procedures (LASIK)
Intra-corneal ring segments
Phacik IOLs
Clear lens extraction

Results of refractive surgery

Indications and contraindications in refractive surgery

Imaging of the cornea (Corneal topography, Orbscan)

Wavefront technology (high order aberrations, aberrometer)

Complications of refractive surgery

Uveitis

1. Definition

2. Classification
   a. Anatomical
   b. Clinical
   c. Etiological
   d. Pathological

3. Symptomatology
4. Clinical signs

5. Clinical presentation of the different uveitic subtypes

6. Diagnosis and differential diagnosis:
   Implications of diagnosis on:
   Management, visual outcome, systemic outcome

7. Clinical entities
   a. Anterior uveitis:
      ▪ HLA-B27 related diseases
      ▪ Juvenile idiopathic arthritis
      ▪ Herpetic uveitis
   b. Intermediate uveitis:
      ▪ Pars Planitis
      ▪ Toxoplasmosis
   c. Posterior uveitis:
      ▪ Behcet’s disease
      ▪ CMV retinitis
   d. Panuveitis :
      ▪ Sarcoidosis
      ▪ Sympathetic ophthalmia

8. Management
   a. Importance of prompt management
   b. Treatment of the different anatomical types of uveitis
   c. Treatment of the different clinical entities
   d. Systemic treatment: steroids and immunosuppressive agents.

Eye Trauma

Introduction
International classification of eye trauma
Natural eye protection mechanisms
Trauma prevention
Eye injuries in a multiple trauma setting
Assessment of eye trauma

Ocular burns:
Thermal, UV, Chemical - diagnosis and treatment

Minor ocular trauma
Erosions and superficial foreign bodies - diagnosis and treatment
Open globe injuries, anterior and posterior
Diagnosis and treatment
Penetrating eye injuries - eye lacerations
Intraocular foreign bodies
Ruptured globe

Closed globe injuries, anterior and posterior
Diagnosis and treatment
Hyphema
Post-traumatic hypotony, glaucoma
Traumatic retinal detachment

Eye affected by a distant trauma
Shaken Baby syndrome

Introduction to Eye Surgery

Pre-op assessment and doctor-patient interaction
Evaluating the goals of the eye surgery
General health considerations
Choice of procedure [patient-related considerations
Choice of anesthesia and ocular anesthesia techniques

Principles of the eye surgery
Sterility and aseptic techniques
Maintenance of the intraocular pressure
Self-sealing wounds
Principles of eye suturing
Ophthalmic lasers [principles and practice
Viscoelastic materials
Vitreous substitutes: intraocular gas and silicone oil
Antimetabolites in the eye surgery

Post-op care
Evaluating the outcomes and monitoring for complications
Prevention of postoperative infection and inflammation
Ocular pain management
Functional rehabilitation after the eye surgery

Post-op care
Evaluating the outcomes and monitoring for complications
Prevention of postoperative infection and inflammation
Ocular pain management
Functional rehabilitation after the eye surgery
Low vision

1-Low vision: epidemiology, definition and causes
2-Low vision aids: for near and distance, the use of digital systems
3-Rehabilitation of low vision – a multidisciplinary approach
   Integration into special or regular schools/kindergarten/university, the need for
   familiar support, what governmental support is offered, the blind certificate and it's
   implications
4- Nystagmus: epidemiology, definition, types, clinical characteristics, treatment
5-Albinism: epidemiology, definition, types, clinical characteristics,
6-Genetic Counseling in ocular hereditary disorders. Update. What's new in pre-
   natal diagnosis.

Required Reading:
Kanski, Clinical Ophthalmology

Additional Reading Material:

Course/Module evaluation:
End of year written/oral examination 60 %
Presentation 10 %
Participation in Tutorials 15 %
Project work 0 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 15 %
Other 0 %

Additional information:
An oral exam is held in the form of colloquium. Student will have to discuss at least
2 pathologies based on clinical findings presented in slides.