

Aristotle University Thessaloniki
Medical School
I. & II. Departments of Ophthalmology

**90 DIAGNOSTIC & THERAPEUTIC
APPROACHES IN OPHTHALMOLOGY**

The medical student should be able to...

I. Pathophysiology of vision

1.a. Define the visual acuity as the resolving power of the eye and understand the mechanism of resolution based on the stimulation / non-stimulation of adjacent photoreceptor cells.

1.b. Define the visual acuity as the resolving power of the eye, whereby normal acuity corresponds to the state at which 2 separate points of light subtend an angle of 1 minute of arc on the retina and can therefore be recognized as separate. Relate other levels of visual acuity to this state.

1.c. Recognize the difference between visual acuity and vision. Relate the visual acuity to a level of function. Recognize the difference of measuring visual acuity in a decimal or logarithmic scale

1.d. Estimate what the visual acuity level is from elements of the history.

1.e. Recognize what the full visual field represents.

2.a. Define refraction as a function of the refractive power of the eye in relation to its axial length

2.b. Define emmetropia, hyperopia, astigmatism, and describe the principles of their management.

3.a. Understand the mechanism of accommodation and its results in near vision.

3.b. Describe how the hyperopic eye can see clearly at distance and at what cost. Explain the symptoms of eye strain, secondary to hyperopia.

3.c. Know that parasympatheticolytic agents (atropine, tropicamide) cause loss of accommodation

4. Define presbyopia as the result of loss of lenticular elasticity secondary to advancing age , describe the symptoms of presbyopia, and the range of ages at which it appears. Relate presbyopia to eye strain secondary to hyperopia.

Eye movements- Strabismus – Binocular vision

5. Recognize the concept of retinal correspondence and describe the states of binocular vision (simultaneous perception, fusion, stereopsis)

6. Describe pseudostrabismus and accommodative strabismus

7. Differentiate paralytic from concomitant strabismus and describe the clinical signs and symptoms, e.g. diplopia and dependence of the angle of squint on the gaze position

8. Describe the etiology of amblyopia and recognize the importance of early diagnosis and intervention

II. Ophthalmic Symptoms

A. Pain

9.a. Recognize ocular surface pain characteristics, from dry eye symptoms to the sharp pain in corneal epithelial erosions, and describe its management

9.b. Distinguish ocular surface pain characteristics from deep pain and localize the potential insults leading to it (conjunctival, corneal, scleral or uveal disease).

10. Describe refractive error (hyperopia) or latent squint as possible causes of a headache that increases with ocular strain (near work) during the course of the day

11. Recognize other forms of headache, such as migraine, temporal migraine, cluster headache, and describe possible ocular symptoms

12. Describe that in visual disturbances...

a) ... that are accompanied by headache in advanced age, one must suspect temporal arteritis

b) ... that are accompanied by nausea and vomiting, one must suspect acute glaucoma (in the differential diagnosis of acute cholelithiasis/cholecystitis)

13. Recognize retrobulbar neuritis as a possible cause of visual loss accompanied by retrobulbar pain especially when this pain is increased with eye movements

B. Visual function Disturbances

14.a. Recognize myopia or early cataract as conditions that may reduce distance vision while preserving near visual acuity

14.b. Recognize presbyopia as the commonest cause of visual acuity reduction for near (after a certain age)

- 14.c. Recognize the possible cause of recent visual acuity loss both in distance and near
- 15.a. Name the vascular retinal diseases and optic nerve diseases that may cause sudden visual field loss of the hemi-field or totality of the field
- 15.b. Distinguish the acute onset of visual loss from gradual visual field loss (in the form of a curtain that falls or a wall that rises)
- 16. Suspect a peripheral retinal tear and possible accompanying retinal detachment in the presence of photopsiae and/or floaters
- 17. Recognize diseases of the posterior pole of the eye as causes of metamorphopsia and selective loss of the central visual field
- 18. Name causes of binocular diplopia (which is relieved when one eye is covered), especially paralytic strabismus
- 19. Name possible causes of red eye accompanied by visual disturbance and pain: diseases of the cornea, iris, ciliary body, but not of the conjunctiva or sclera.

III. Eyelids – Orbit

Function – Position

- 20.a. Describe the role of lids in mechanical protection and lubrication of the cornea
- 20.b. Describe the elements of lid anatomy (conjunctiva, tarsus, levator muscle, skin, lacrimal glands etc.)
- 20.c. Name the two cranial nerves that are responsible for lid movements
- 21.a. Recognize lagophthalmus, upper lid ptosis, entropion and ectropion, and list their commonest causes
- 21.b. Describe possible corneal complications and their management
- 21.c. Recognize the element of emergency in managing upper lid ptosis in children

Eyelid skin

- 22.a. Describe ocular lesions in herpes zoster ophthalmicus, possible complications and management of the condition
- 22.b. Recognize the localization of ophthalmic zoster features and the location of residence of the virus

Eyelid glands

- 23.a. Recognize the features of stye and describe its management
- 23.b. Recognize the features of chalazion and describe its management

Orbit

- 24.a. Recognize exophthalmos. List most frequent causes: inflammation in the orbit, venous stasis in the cavernous sinus, thyroid eye disease, orbital tumors.
- 24.b. List diagnostic features of inflammatory globe proptosis versus a non-inflammatory globe proptosis, and describe first measures to be taken in managing this condition
- 25.a. List characteristic features of thyroid eye disease
- 25.b. Distinguish preseptal from orbital cellulitis

Lacrimal apparatus

- 26. List the tear film layers, describe what they consist of and what their function is
- 27.a. Recognize congenital nasolacrimal duct obstruction: features and management
- 27.b. Describe dacryocystitis and its relation to stenosis or obstruction of the nasolacrimal duct, and describe its management

IV. Conjunctiva

Inflammation

- 28.a. List symptoms of acute and of chronic conjunctivitis, how this condition presents and how symptoms differ depending on cause
- 28.b. Describe the relationship between chronic conjunctivitis and chronic blepharitis and dacryocystitis
- 29. List common causes of conjunctivitis: bacteria, chlamydia, viruses, physical or chemical irritations, allergy, refractive error, and local or systemic autoimmune diseases

30. Describe the epidemiological aspects of conjunctivitis neonatorum and epidemic keratoconjunctivitis. Suggest the proper management for each one of them.

31. Explain the rationale about the use of antibiotics in bacterial conjunctivitis and name at least two of the commonest antibiotics used in adults and children respectively.

32. List the criteria for differential diagnosis between conjunctivitis, scleritis, keratitis, iritis and acute angle-closure glaucoma

Tumors

33. Distinguish the conjunctival tumors from other benign conditions (i.e. pterygium, pinguecula)

V. Cornea

Function

34.a. Describe the physiological functions of the cornea with regards to its anatomical architecture and consider it as part of the optical system of the eye and vital structure of the anterior segment

34.b. Understand the pivotal role that the normal tear film plays in the corneal physiology and refraction and describe how the dry eye syndrome affects the cornea

35. Describe features of neuroparalytic keratitis as well as of lagophthalmos-induced keratitis

Malformations

36. Describe the clinical features of megalocornea and buphthalmos and the criteria that differentiate these two entities

Inflammations

37. Distinguish corneal infiltrates from ulcers, epithelial defects and corneal scars and suggest appropriate treatments for all these entities

Apoptosis

38. Describe the symptoms and clinical signs of ultraviolet keratitis as well as its pathophysiology, complications and management

39. Mention the common clinical manifestations of Herpes Simplex Virus (HSV) keratitis (dendritiform, stromal, disciform) and the usual complications. Suggest a proper management and point out frequent mistakes that may lead to mistreatments

Degenerations

40. Recognize arcus senilis as a totally benign condition

41. List the contact lens-related complications

Ocular Trauma

Thermal and Chemical burns

42. Describe the pathophysiological and clinical features of chemical and thermal burns. Describe the primary emergency care in such cases.

Injuries

43. Recognize lacerations of the lid margins and the upper lacrimal duct and suggest a proper management

44.a. Recognize the mechanisms involved in a blunt or penetrating ocular injury (with or without the presence of an intraocular foreign body) and seek relevant information from the patient's history.

44.b. Describe the methods of tracking and investigating intraocular foreign bodies.

44.c. Recognize the possible complications related to a residual metallic foreign body in the eye

45. Recognize the anterior chamber haemorrhage (hyphema) and the distorted pupil as signs of a recent blunt ocular trauma and refers to the late possible complications of this condition.

Crystalline lens

Cataract

46.a. Describe causes, types, symptoms and progression stages of cataract.

46.b. Describe complications related to mature cataracts and their management

47.a. List indications for the surgical management of cataract. Recognize the importance of early management of infantile cataract in avoiding amblyopia.

47.b. Describe the current cataract operation technique and its complications

VI. Pupil

Function

- 48.a. Understand the factors and mechanisms that determine the size of the pupil
- 48.b. Describe the afferent and efferent nerve fibres controlling the pupil size depending on imminent light
- 48.c. Understand why in a IIIrd nerve palsy pupillary dysfunction is an early manifestation

Reflexes

- 49. Describe the direct and indirect pupillary reaction to light as a result of the pupillary reflex pathway.
- 50. Recognize anisocoria as a result of either sympathetic or parasympathetic route dysfunction.
- 51. Describe the symptoms, causes and lesion locations of Cl. Bernard-Horner syndrome

Pharmacodynamics

- 52.a. Describe the pharmacodynamics of myotic and mydriatic drugs. Name at least one from each category
- 52.b. Understand the possible complications that may derive from mydriasis in an eye with narrow angle

Shape irregularities

- 53. Name common causes that may lead to an irregular pupil, such as anterior and posterior synechiae, iris trauma, previous surgery etc., and describe the form of irregularity.

VII. Glaucoma

Pathophysiology

- 54. Understand how the aqueous humor is produced and circulates in the eye and explains the roles of the ciliary body, the pupil, Schlemm's channel and episcleral veins in this process
- 55.a. Describe the early, characteristic functional defects as well as the morphological changes of the nerve fibre layer following a longstanding rise of the intraocular pressure.
- 55.b. Describe the course of functional decline in primary open angle glaucoma.
- 56. Name the clinical and paraclinical tools for early detection, diagnosis and monitoring of glaucoma
- 57. Name the symptoms, signs and management of acute angle-closure glaucoma

Clinical forms

- 58. Describe the clinical appearance of congenital glaucoma and buphthalmos. How does the photophobia relate to it?
- 59. List commonest causes of secondary glaucomas

VIII. Optic disc and nerve

Papilledema

- 60.a. Distinguish the ischemic swollen disk from true papilledema and make the differential diagnosis based on the functional defects
- 60.b. List common causes of a swollen disk: intracranial hypertension, optic nerve inflammation and ischemic diseases

Atrophy – Excavation

- 61.a. Diagnose optic disk atrophy and set it apart from normal or glaucomatous cupping
- 61.b. Describe retinal, optic nerve, chiasmatic, optic and pre-geniculate body disorders as possible causes of optic disk atrophy
- 62. Make the differential diagnosis between glaucomatous and ischaemic optic nerve defects based upon the changes in visual acuity and visual fields and the time of their appearance

Optic Pathway and Cortex

- 63. Distinguish intraocular from extraocular disorders that may affect the visual pathway based on the type of visual field defects (altitudinal-vertical defects or scotomas etc.)
- 64. Track down lesions/defects across the visual pathway by studying the visual field defects

IX. Vitreous body

- 65. List common causes of endoptical phenomena (floaters). In which cases must they be taken into serious consideration?

66. Describe 3 causes of sudden vitreous opacification and distinguish them from posterior pole disorders

Retina

Function

67. Describe the anatomy and physiology of the central and peripheral retina, and compare between the two.

Vascular diseases

68. Describe the vascular changes seen in atheromatosis, diabetes, and systemic hypertension

69. Describe the consequences of blockage and leakage from the retinal capillaries, understand the etiopathogenesis of edema, hard exudates, hemorrhages, and ischemia seen in diabetic retinopathy, and is able to project these changes in other tissues and organs of the diabetic patient.

70. Describe the clinical manifestations of different forms of retinal artery and vein occlusion and distinguish their forms.

71. Report findings in diabetic retinopathy and describe its stages, its prevention, and its management plan (follow-up and treatments).

Degenerations

72. Describe the pathophysiology, epidemiology, initial symptoms and modern treatment of age-related macular degeneration.

Retinal Detachment

73. Describe the initial and later symptoms of a retinal detachment, and describe its ultimate course.

74. Recognize a retinal detachment involving the macula, from history taking and ophthalmoscopy

Tumors

75. Describe retinoblastoma features and actions that need to be taken upon its suspicion or diagnosis, as well as basic principles of family counseling.

X. Uvea (choroid, iris, ciliary body)

Inflammations

76. Describe signs and symptoms of acute iritis and differentiate it from acute conjunctivitis and acute glaucoma

77. List diseases that may cause endogenous uveitis and rank them

78. Describe complications of iridocyclitis and ways to avoid them

79. Describe features of ocular toxoplasmosis, prevention measures and treatments

Tumors

80. Name symptoms, signs and management of choroidal melanoma

Eye and Systemic Disease

81. Know that premature babies, especially those who had treatment with oxygen, are at risk of retinopathy of prematurity

82. Know ocular and visual complications of multiple sclerosis

83. Know that large facial hemangiomas may be accompanied by ocular hemangiomas and secondary glaucoma

84. Know the course of Herpes Zoster Virus infection of the eye, its signs, symptoms and treatment

85. Recognize Sjögren syndrome, either primary or secondary, as causative of dry eye syndrome

86. Know that collagen autoimmune diseases may affect the sclera and episclera

87. Understand that Adamandias-Behçet syndrome is a systemic vasculitis and describe its possible ocular manifestations

88. Name the possible ocular complications of systemic treatment with quinine, rezokine, ethambutol, amiodarone, heavy metals, corticosteroids, and poisoning from methylic alcohol

89. Recognize signs of and suspect ocular metastatic lymphomas or solid metastases from lung or breast cancer

90. Know the possible ocular complications in a patient after crush injury