

CHAPTER XI
OPHTHALMOLOGY

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VOCABULARY

THE EYE

Accommodation: (adj: accommodative)	Reflex changes in the eyes that enable an object to be focused on the retina
Anterior chamber:	Aqueous-containing space behind the cornea and in front of the lens and iris.
Cataract:	A partial or complete opacity on or in the lens or lens capsule of the eye.
Choroid: (adj: choroidal)	The thin, dark brown, vascular coat investing the posterior five-sixths of the eye ball. It lies between the retina and the sclera.
Ciliary body:	The structure that connects the choroid and iris. It contains the ciliary muscle which controls the shape of the lens. It secretes the aqueous humor which occupies the anterior and posterior chambers of the eye.
Cones:	Photosensitive receptor cells in the retina that transform light energy into a nerve impulse. They are responsible for colors and central vision (6.5 millions).
Conjunctiva: (adj: conjunctival)	The transparent mucus membrane that lines the eyelids (palpebral) and covers the exposed surface of the sclera (bulbar or ocular)
Cornea: (adj: corneal)	The transparent structure forming the anterior part of the fibrous tunic of the eye. It provides most of the refractive power of the eye
Fovea Centralis:	A tiny pit in the center of the macula consisting of slim elongated cones. It is the area of clearest vision.
Fundus of the eye: (pl: fundi)	The posterior inner part of the eye. (adj: fundal; fundic)
Glaucoma:	A group of eye diseases characterized by increase in intraocular pressures
Hyphema: (Hyphemia)	Accumulation of blood in the anterior chamber of the eye

Iris:	The circular pigmented membrane behind the cornea, perforated by the pupil. (adj: iridial, iridian, iridic)
Lens: (adj: lenticular)	A transparent, avascular biconvex body situated behind the iris, forming part of the refracting mechanism of the eye. (n: Biconvexity)
Macula lutea:	An irregular yellowish horizontally oval depression on the retina lateral and slightly below the optic disc (disk)
Optic disc (disk):	The region where the optic nerve emerges from the retina; it has no rods or cones and corresponds to the blind spot in the visual field.
Optic nerve:	The cranial nerve that carries visual impulses from the retina to the brain.
Posterior chamber:	Aqueous-containing space bounded in front by the iris and behind by the lens and suspensory ligament.
Pupil:	The opening at the center of the iris of the eye. (adj: pupillary)
Refraction: (adj: refractive)	The bending of light rays by the cornea, lens and fluids of the eye to bring the rays into focus on the retina.
Retina: (adj: retinal)	The light-sensitive nerve cell layer that contains the receptor cells called rods and cones. It is continuous posteriorly with the optic nerve.
Rods:	Photosensitive receptor cells of the retina that are essential for vision in dim light and for peripheral vision (120 millions).
Sclera: (pl. sclerae)	The tough white outer coat of the eye ball. (adj: scleral)
Vitreous humor: (vitreous body; hyaloid body)	Soft, jelly-like transparent substance that fills the posterior part of the eyeball between the lens and retina. N.B. hyaloid: resembling glass

COMBINING FORMS

COMBINING FORM	DENOTING RELATIONSHIP TO	COMBINED WITH	MEANING	TERM	MEANING
ophthalm/o__	eye	__ia	state or condition	ophthalmia (ophthalmitis)	Severe inflammation of the eye
ophthalm/o__	eye	__algia	pain	ophthalmalgia (ophthalmodynia)	Pain in the eye
ophthalm/o__	eye	__cele	hernia	ophthalmocele (ophthalmoptosis) (exophthalmos; proptosis)	Abnormal protrusion of the eyeball
ophthalm/o__	eye	__copia	fatigue	ophthalmocopia (asthenopia)	Fatigue of the eye
ophthalm/o__	eye	__malacia	abnormal softness	ophthalmomalacia	Abnormal softness of the eye
ophthalm/o__	eye	__plegia	paralysis	ophthalmoplegia	Paralysis of the eye muscles: external / internal
ophthalm/o__	eye	__plasty	surgical repair	ophthalmoplasty	Plastic surgery of the eye or its appendages
ophthalm/o__	eye	__rrhagia	bleeding	ophthalmorrhagia	Hemorrhage from the eye
ophthalm/o__	eye	__rrhea	flow or discharge	ophthalmorrhoea	Oozing of blood from the eye
ophthalm/o__	eye	__rrhexis	rupture	ophthalmorrhexis	Rupture of the eyeball

PREFIXES

PREFIX	MEANING	COMBINED WITH	MEANING	TERM	MEANING
E__	out	nucleus	kernel	Enucleation	Removal of the eyeball
Ec__	out of, eccentric	tropion	To turn	Ectropion (syn: ectropium)	An everted eyelid
En__	in	tropion	To turn	Entropion (entrophe, trichoma, blepharosis)	Turning (inversion) of the margin of the eyelid
En__	in	ophthalmos	Eye	Enophthalmos (Enophthalmus)	Sunken eye
Ex__	outside	ophthalmos	Eye	Exophthalmos (Exophthalmus)	Abnormal protrusion of the eyeball
Exo__	outside	tropia	Squint (Strabismus)	Exotropia (wall eyed) eso__ = within	One eye turned outward (External strabismus) (opp: esotropia)
Hyper__	more than normal, excessive	__opia	Vision, sight	Hyperopia (Hypermetropia) (opp: myopia)	Farsightedness [Individual: Hyperope; Hypermetrope; opp: myope]
-hyper__	excessive	__tropia	Squint (strabismus)	Hypertropia	Permanent upward deviation of the eye
-hyper__	excessive	keratosis	Disease process of the cornea	Hyperkeratosis	Hypertrophy of the cornea
-hypo__	under	pyon	Pus	Hypopyon	Accumulation of pus in the anterior chamber of the eye
intra__	within	ocular	Pertaining to the eye	Intraocular	Within the eye
Retro__	behind	bulbar	Related to the eyeball	Retrobulbar	Posterior to the eyeball

SUFFIXES

SUFFIX	MEANING	COMBINED WITH	MEANING	TERM	MEANING
__adenitis	Inflammation of glands	Blephar(o)__	Relationship to eyelid	Blepharo-adenitis (Blepharadenitis)	Inflammation of the meibomian glands
__ectomy	Excision	Blephar(o)__	Relationship to eyelid	Blepharectomy	Excision of a lesion of the eyelids
__ism	A state or condition	Blephar(o)__	Relationship to eyelid	Blepharism	Spasm of the eyelids; continuous blinking
__itis	Inflammation of	Blephar(o)__	Relationship to eyelid	Blepharitis	Inflammation of the eyelids
__itis	Inflammation of	Blephar(o)__	Relationship to eyelid	Blepharo-conjunctivitis	Inflammation of the eyelid and conjunctiva
__metry	Measurement	Ton(o)__	Relationship to tone or tension	Tonometry (adj: tonometric)	Measurement of tension or pressure (instrument: tonometer)
__plasty	Plastic repair	Blephar(o)__	Relationship to eyelid	Blepharoplasty	Plastic surgery of the eyelid
__plasty	Plastic repair	Kerato__	Relationship to cornea	Keratoplasty	Corneal transplant : Plastic surgery of the cornea.
__plegia	Paralysis	Blephar(o)__	Relationship to eyelid	Blepharoplegia (blepharoptosis)	Paralysis of eyelid
__stenosis	Narrowing	Blephar(o)__	Relationship to eyelid	Blepharostenosis (Blepharophimosis)	Abnormal narrowing of the palpebral fissure

VOCABULARY

Acuity:	Clarity or clearness
Ampulla: (adj: ampullar; ampullary) (pl.: ampullae)	A dilatation of a tubular structure
Applanation:	Undue flatness as of the cornea
Applanometer:	Applanation Tonometer (Applanation Tonometry) An instrument for determining intraocular pressure in the detection of glaucoma.
Arcus Senilis:	Arcus: Arch; Senilis (senile): Pertaining to old age. A gray opaque ring surrounding the margin of the cornea, occurring bilaterally in persons of 50 years or older.
Canaliculus: (adj: canalicular)	An extremely narrow tubular passage or channel. (pl: canaliculi)
Canthus: (pl: canthi)	The angle at either end of the palpebral fissure. Outer: temporal; Inner: nasal
Cataract:	An opacity of the lens of the eye. Opacity: The condition of being opaque.
Cerclage:	Encircling
Chalazion: (pl: chalazia)	Meibomian or tarsal cyst
Chiasma: (pl: chiasmata)	A decussation; x-shaped crossing (adj: chiasmal; chiasmatic; chiasmic)
Commissure:	A site of union of corresponding parts e.g. of eyelids
Conjugate Deviation:	Conjugate: paired The deflection of the eyes in the same direction at the same time
Consensual:	Similar reaction of both pupils to a stimulus applied to one
Convergence:	Is the act of moving the eyes in toward the midline (adj: convergent)

Corona: (pl: coronae)	An encircling structure (adj: coronal)
Dehiscence:	A Splitting open (adj: dehiscent)
Detachment:	Condition of being disconnected
Diopter:	A unit of measurement for refractive power.
Equator: (adj: equatorial)	An imaginary line encircling a spherical organ dividing the surface into two approximately equal parts.
Exudate: (n: exudation) (adj: exudative)	Material which has escaped from blood vessels and is deposited in tissues.
Glaucoma: (adj: glaucomatous)	Increase in intraocular pressure which causes pathological changes in the optic disc and defects in the field of vision.
Icterus:	Jaundice (adj: icteric; icteritious)
Lenticular:	Pertaining to or shaped like a lens.
Miosis: (Meiosis)	Contraction of the pupil (miotic: pertaining to or producing miosis)
Mydriasis:	Dilatation of the pupil: physiologic, morbid or effected by a drug (adj: mydriatic)
Nystagmus: (adj: nystagmic)	An involuntary rapid movement of the eyeball.
Pterygium:	An abnormal fold of conjunctiva extending on the cornea and uniting with it.
Punctum: (pl: puncta)	An extremely small spot or point. (adj: punctual) e.g. lacrimal punctum: The opening of the lacrimal papilla
Saccade: (adj: saccadic)	Rapid involuntary small movements of both eyes simultaneously in changing the point of fixation on a visualized object.
Tortuosity:	The state of being tortuous (twisted)

COMBINING FORMS

COMBINING FORM	DENOTING RELATIONSHIP TO	COMBINED WITH	MEANING	TERM	MEANING
ambly__	dullness	__opia	vision	amblyopia	Dullness of vision without detectable organic lesion of the eye
aniso__ an= not isc = equal/same	unequal; dissimilar	coro__	pupil	anisocoria	Unequal pupils
choro__	Green	Opsia	Vision	Chloropsia (syn:chloropia)	A chromatopsia in which all objects seen appear green
chromato__	Color	Opsia	Vision	Chromatopsia	Disorder of color vision
cyano__	Blue	Opsia	Vision	Cyanopsia	Chromatopsia in which all colors appear blue.
diplo__	double	__opia	sight	diplopia (ambliopia)	Double vision
emmetro__	in proper measure	__opia	sight	emmetropia (adj: emmetropic) (individual: emmetrope)	A state of correlation between the refractive system of the eye and the axial length of the eyeball
eso__	within	tropia	squint	esotropia	One eye turns inward
erythro__	Red	Opsia	Vision	Erythropia (syn:erythroopia)	A chromatopsia in which all objects seen appear red
gonio__	an angle	__scopy	act of examining	gonioscopy [Instrument: gonioscope]	Examination of the angle of the anterior chamber of the eye with a gonioscope
opto__	vision or sight	__metry	act of measuring	optometry (optometrist)	Measurement of the powers of vision and adaptation of lenses for the aid thereof
ortho__	straight	optic	pertaining to the eye	orthoptic (orthoptist)	Correcting obliquity of one or both visual axes
presby__	old or old age	__opia	vision	presbyopia (adj: presbyopic) (Individual: presbyope)	Hyperopia and impairment of vision due to old age

COMBINING FORM	DENOTING RELATIONSHIP TO	COMBINED WITH	MEANING	TERM	MEANING
tarso__	edge of the eyelid	__rrhaphy	suturing	tarsorrhaphy	Operation of suturing together a portion or entire upper and lower eyelids (to narrow or close the palpebral fissure).
xantho__	Yellow	Cyanopsia	All colors appear blue	Xanthocyanopsia (xanthokyanopy)	Ability to recognize yellow and blue colors but not red or green.
xantho__	Yellow	Opsia	Vision	Xanthopsia (syn:xanthopia)	A chromatopsia in which objects seen appear yellow

PREFIXES

PREFIX	MEANING	COMBINED WITH	MEANING	TERM	MEANING
A__	negative	phakos	lens	Aphakia (adj: aphakic)	Congenital absence of the lens or absence as a result of extraction of cataract
A__	negative	kinesis	movement	Akinesia (akinesis)	Absence or poverty of movements
A__	negative	stigma	point	Astigmatism (adj: astigmatic)	Unequal curvature of the refractive surfaces of the eye, as a result light is not sharply focused on the retina
An__	negative	Ophthalmos	Eye	Anophthalmos (anophthalmia) (anophthalmus)	Congenital absence of the eyes or presence of vestigial eyes
An__	negative	opsis opsia	vision vision	Anopsia (anopia)	Nonuse or suppression of vision in one eye
Bi__	two	focus (pl.: foci)	point of convergence of light rays	Bifocal	Having two foci
Bin__	two	oculus	eye	Binocular	Pertaining to both eyes
Epi__	on, upon, over	canthus	the angle at either end of the palpebral fissure	Epicanthus (epicanthal folds)	A fold of skin on either side of the nose, sometimes covering the inner canthus
Ex__	out	enteron	bowel	Exenteration in ophthalmology	Removal of the entire contents of the orbit (adj: exenterative)
Hemi__	one half	anopia	suppression of vision in one eye	Hemianopia (hemianopsia) Binasal; bitemporal [adj: Hemianopic, hemianoptic]	Blindness in half of the visual field
Infra__	below	orbit	the bony cavity that contains the eyeball	Infraorbital [opp: supraorbital]	Lying under or in the floor of the orbit
Intra__	within	Tenon's Capsule (vagina bulbi)	fibrous membrane enclosing the eyeball	Intracapsular [opp: Extracapsular]	Within Tenon's capsule

PREFIX	MEANING	COMBINED WITH	MEANING	TERM	MEANING
Pan__	all	retinal	pertaining to the retina	Panretinal	Pertaining to the whole retina
Retro__	behind	orbital	pertaining to the orbit	Retroorbital	Behind the orbit
Super__	above	cilia	eyelashes	Supercilia	Eyebrow (adj: Superciliary: Pertaining to the eyebrow)

SUFFIXES

SUFFIX	MEANING	COMBINED WITH	MEANING	TERM	MEANING
__ectomy	Excision	Capsule (capsula) (pl: capsulae) (adj: capsular)	Fibrous membrane enveloping a structure (Capsula lentis: Capsule around the lens)	Capsulectomy	Excision of the capsule of the lens
__ectomy	Excision	Iris	The circular pigmented membrane behind the cornea	Iridectomy	Excision of part of the iris
__itis	Inflammation of	Uvea (adj: uveal)	The iris, ciliary body, and choroid - together	Uveitis	Inflammation of the uvea
__oma	Tumor	Retinoblast	Retinal germ cell	Retinoblastoma	A tumor arising from the retinal germ cells
__oma	Tumor	Xero__	Dry	Xeroma (xerophthalmia xerophthalmus)	An abnormally dry condition of the conjunctiva
__oma	Tumor	Xantho__	Yellow	Xanthoma (e.g. xanthelasma) elasma=plate	A yellow nodule in the skin due to deposits of lipids
__pathy	Disease	Kerato__	Denoting relationship to the cornea	Keratopathy	A non-inflammatory disease of the cornea
__pathy	Disease	Retino__	Denoting relationship to the retina	Retinopathy	A non-inflammatory disease of the retina
__tome	An instrument for cutting	Kerato__	Denoting relationship to cornea	Keratome	A knife for incising the cornea
__tomy	Incision	Teno__	Denoting relationship to tendon	Tenotomy	Cutting a tendon for strabismus

ASSIGNMENT # 14

COMBINING FORM	DENOTING RELATIONSHIP TO	SUFFIX	MEANING
Ophthalm(o)	Eye	__osis	Disease process; infection
My(o)	Muscle	__scope	Instrument for observing
Myc(o)	Fungus		
Ton(o)	Tone or tension		
Metr(o) Metry	Measurement	__graph	Instrument for writing or reading
Leuk(o)	White	__itis	Inflammation of
Dynam(o)	Power; pressure	__tomy	Division of
Myia	Fly	__lith	Stone
Phlebo	vein		

Use the above combining forms and suffixes to produce the medical terms for each of the following meanings:

1. Inflammation of muscles of the eye _____
2. An apparatus for testing color perception _____
3. A lacrimal calculus _____
4. Infection of the eye by larvae of a fly _____
5. Division of veins to relieve conjunctival congestion _____
6. An ophthalmoscope for measuring refractive powers and defects of the eye _____
7. Disease of the eye caused by fungus _____
8. An instrument for photographing movements of the eye during reading _____
9. Surgical division of the muscles of the eye _____
10. Measurement of intraocular tension _____

ASSIGNMENT # 15

PREFIX	SUFFIX	ROOTS/COMBINING FORMS
An__ : not	__centesis: tapping	Cry(o): cold
Dys__ : Disordered	__ia: state; condition	Conus: cone
Quadrant: a fourth	__itis: inflammation of	Cycl(o): ciliary body
part	__ous: related to	Dacry(o): tears
	__pathy: disease	Dacryocyst: lacrimal sac
		Hom(o): same
		Kerat(o): cornea
		Metr(o): measurement
		Morph(o): form
		Myope: shortsighted
		Neur(o): nerve
		Onoma
		Onyma
		Ope/Opsis: vision
		Pseudo(o): false
		Retin(o): retina
		Therapy: treatment

Use the above prefixes, suffixes, roots and combining forms to produce the term for each of the following meanings:

1. A non-inflammatory protrusion of the cornea _____
2. Inflammation of the optic nerve and retina _____
3. Defect in the visual appreciation of the measure or size of object _____
4. Puncture of the cornea to aspirate aqueous humor (aqueous paracentesis) _____
5. Defective vision in one ¼ of the eye field _____
6. Having the same or corresponding relation _____
7. A disease of the optic disk and retina _____
8. Defective vision simulating nearsightedness _____
9. Inflammation of the lacrimal sac _____
10. Defective vision with distortion of objects perceived _____
11. Freezing of the ciliary body _____

QUIZ # 26

I. Write the medical term for each of the following meanings:

- | | | |
|-----|--|-------|
| 1. | Accumulation of blood in the anterior chamber of the eye | _____ |
| 2. | One eye turned inward | _____ |
| 3. | Nearsightedness | _____ |
| 4. | Eversion of the margin of the eyelid | _____ |
| 5. | Permanent upward deviation of the eye | _____ |
| 6. | Removal of the eyeball | _____ |
| 7. | Posterior to the eyeball | _____ |
| 8. | Inflammation of the eyelid | _____ |
| 9. | Rupture of the eyeball | _____ |
| 10. | Abnormal softness of the eye | _____ |

II. Produce a term that has similar meaning to each of the following terms (Synonym):

- | | | |
|-----|------------------|-------|
| 11. | Blepharostenosis | _____ |
| 12. | Blepharosis | _____ |
| 13. | Ophthalmocoele | _____ |
| 14. | Asthenopia | _____ |
| 15. | Ophthalmia | _____ |
| 16. | Ophthalmalgia | _____ |

III. Produce the opposite term for each of the following:

- | | | |
|-----|-------------|-------|
| 17. | Proptosis | _____ |
| 18. | Enstrophe | _____ |
| 19. | Emmetrope | _____ |
| 20. | Intraocular | _____ |

DICTATION

A female patient presented to the ophthalmology outpatient department complaining of diplopia.

On examination the patient was found to be well-nourished, alert and oriented. Her orthostatic blood pressure was 120/70. The head was normocephalic. There was bilateral temporal wasting.

A thorough examination of both eyes was undertaken. The epicanthal folds were normal. Severe ectropion was noted on the left eyelid and blepharitis on the right side. The sclerae were non-icteric. There was no conjunctivitis. No esotropia nor exotropia were noted to account for the diplopia. The cornea did not reveal any opacity, keratopathy nor arcus senilis. Applanation tonometry did not show rise in intraocular pressure.

The pupils reacted consensually to light. There was no anisocoria. Accommodation and convergence were normal.

Anterior chamber was deep in both eyes.

Funduscopy with an ophthalmoscope showed mild arteriolar narrowing, but no tortuosities, exudates nor hemorrhages were seen. There was no choroidal nor retinal detachment, and no vitritis nor retinitis.

Examination of the visual fields did not reveal any anopsia. There was no nystagmus. Optometry confirmed the presence of astigmatism, but no hyperopia nor myopia.

The patient was considered to have akinesia of the extraocular muscles due to ophthalmomyositis and possibly amblyopia. The patient was given medicines for the blepharitis and tarsoplasty was recommended to correct the ectropion. She was asked to report to the OPD periodically for follow-up.

Answers to Assignment 14

1. Ophthalmomyitis; Ophthalmomyositis
2. Ophthalmoleukoscope
3. Ophthalmolith
4. Ophthalmomyiasis
5. Ophthalmophlebotomy
6. Ophthalmometroscope; Ophthalmometer;
Ophthalmophacometer; Keratometer
7. Ophthalmomycosis
8. Ophthalmograph
9. Ophthalmomyotomy
10. Ophthalmotonometry (Tonometry)

Answers to Assignment 15

1. Keratoconus
2. Neuroretinitis
3. Dysmetropsia
4. Keratocentesis
5. Quadrantanopsia; Quadrantanopia
6. Homonymous
7. Neuroretinopathy
8. Pseudomyopia
9. Dacryocystitis
10. Dymorphopsia
11. Cyclocryotherapy

Answers to Quiz 26

I. Meanings

1. Hyphema
2. Esotropia
3. Myopia
4. Ectropion
5. Hypertropia
6. Enucleation
7. Retrobulbar
8. Blepharitis
9. Ophthalmorrhhexis
10. Ophthalmomalacia

II. Synonyms

11. Blepharophimosis
12. Entropion/trichoma/enstrophe
13. Ophthalmoptosis/exophthalmos/proptosis
14. Ophthalmocopia
15. Ophthalmitis
16. Ophthalmodynia

III. Opposites

17. Enophthalmos
18. Ectropion
19. Hyperope/myope/hypermetrope
20. Extraocular

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