

Alterations in Perception and Coordination (Visual - Auditory)

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Learning outcomes

1. Use the common abbreviations in visual-auditory system
2. Identify etiologic and predisposing/risk factors related to the common alterations in visual perception - auditory coordination
3. Derive sequence of pathophysiologic events
4. Describe presentations of people with visual-auditory alterations.
5. Summarize the importance of collaboration and communication among interprofessional team when caring for people with these alterations

Common Abbreviations used

OD (oculus dexter) or RE—right eye

OS (oculus sinister) or LE—left eye

OU (oculus unitas)—both eyes

IOP—intraocular pressure

IOL—intraocular lens

EOL—extraocular lens

VA—visual acuity

Definition of Terms

Accommodation: increasing the convexity of the lens (brought about by contraction of the ciliary muscles)

Ametropia: abnormal vision (eye conditions that occur when light does not focus on the retina properly)

a. Myopia: Nearsightedness: rays of light coming from an object at a distance of 20 feet or more are brought to a focus in front of the retina.

b. Hyperopia: Farsightedness: rays of light coming from an object at a distance of 20 feet or more are brought to a focus in back of the retina.

In myopia, or nearsightedness, light rays are focused in front of the retina when the person is looking at a distant object. *Light from a distant object forms an image before it reaches the retina because the cornea lens is too strong*

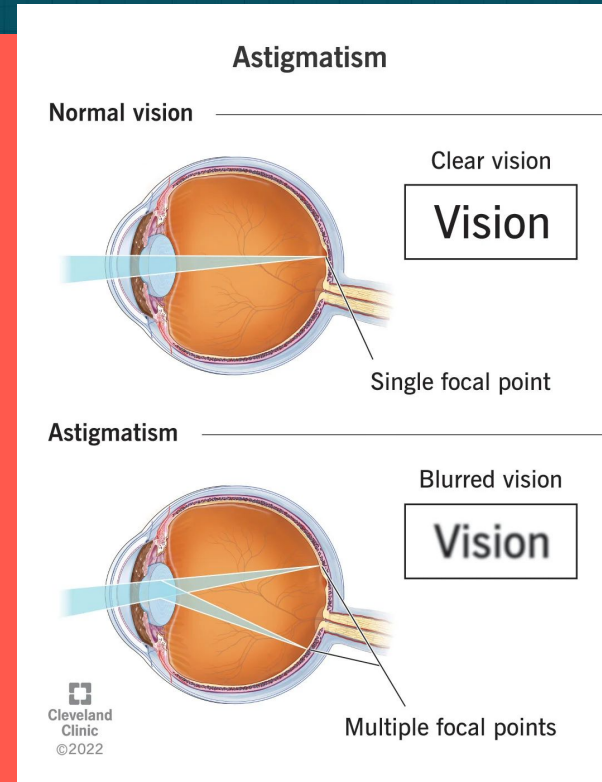
In hyperopia, or farsightedness, light rays are focused behind the retina when the person is looking at a near object. *The cornea/crystalline lens does not refract light enough when trying to view an image*

Definition of Terms

Astigmatism: Uneven curvature of the cornea, causing the patient to be unable to focus horizontal and vertical rays of light on the retina at the same time; light rays are bent unevenly and do not come to a single focus on the retina.

Signs/Symptoms:

- Needing to squint to see clearly.
- Headaches.
- Eye strain.
- Trouble seeing at night



Definition of Terms

Vision: Passage of rays of light from an object through the cornea, aqueous humor, lens, and vitreous humor to the retina and its appreciation in the cerebral cortex.

Visual acuity: Measurement of a person's ability to see at a distance or near (reading distance) and is measured against a standard of a normal person's visual ability.

Definition of Terms

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**EXTERNAL
EYE DISORDERS**

Eyelids: Blepharitis

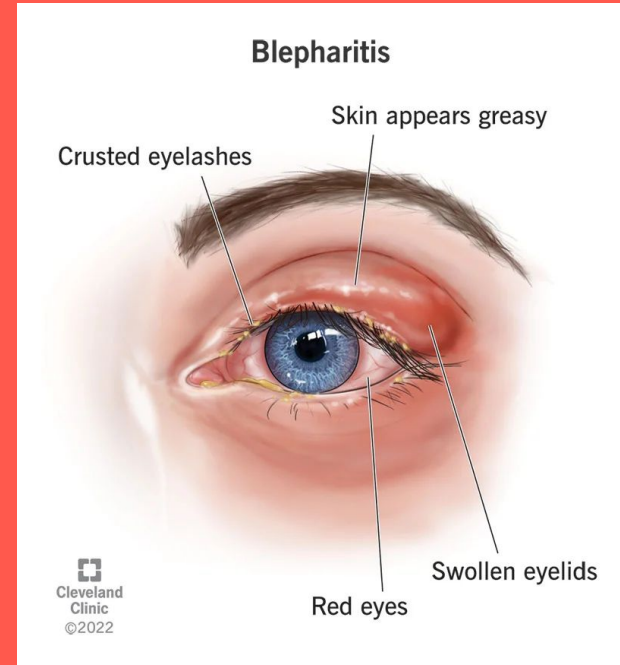
Lens: Astigmatism, Cataracts,

Cornea: Keratitis,

Conjunctivae: Conjunctivitis

Eyelids

Blepharitis is an inflammation of the eyelids caused by staphylococcal infections or seborrheic dermatitis.



Lens

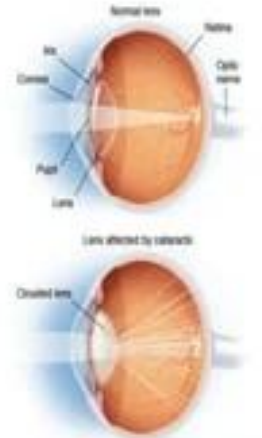
Congenital cataract: lens capsule is formed in 4th or 5th week

Lens becomes milky and white

Blocks light rays

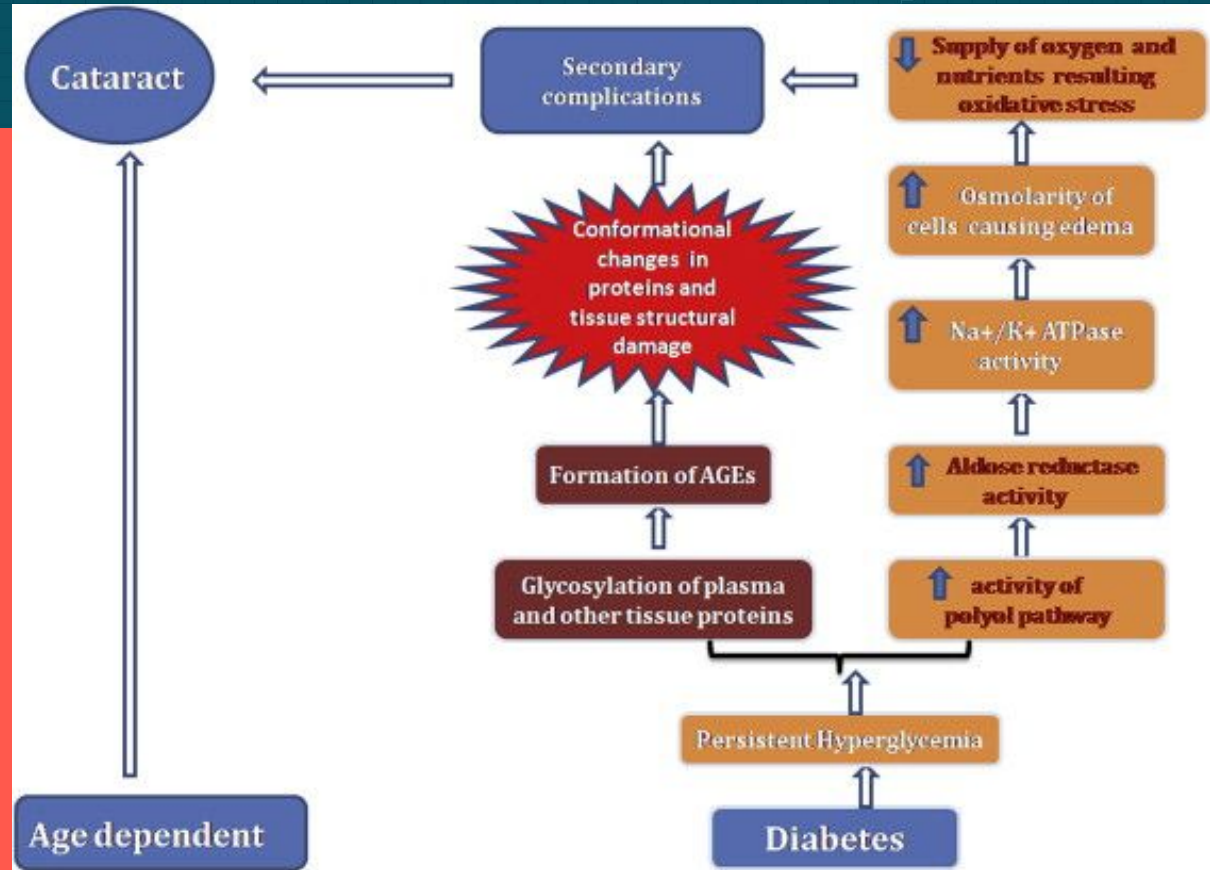
PATHOPHYSIOLOGY

- The lens is made mostly of water and protein fibers.
- Opacity occur when the lens protein (crystallins) clump together
- Ability for lens to refract lights reduce which cause reduce visual acuity.
- Chemical modification of the lens cause it to be thicken and harden



Lens

Cataract as
Diabetes
complications



Cornea

Keratitis: Bacterial (Staphylococcus, Pseudomonas)

Fungal

Parasitic (Acanthamoeba)

Caused by: Contact lenses

Contaminated eye drops

Foreign objects/trauma

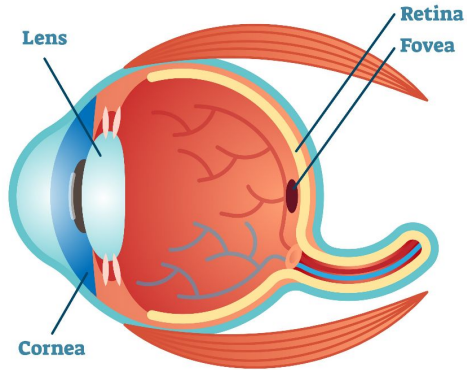
Changes in the cornea

Reduced immunity/diabetes

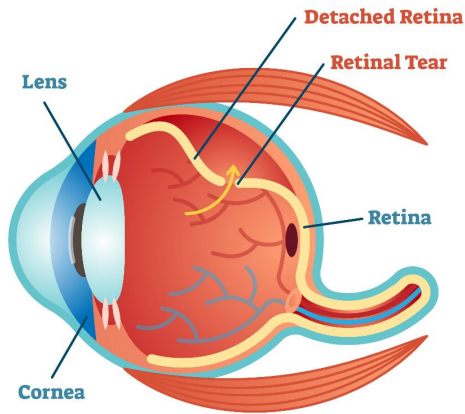
INTERNAL EYE DISORDERS

Retinal Detachment, Retinoblastoma
Eye muscles: Strabismus
Errors Of Refraction
Optic nerve and mesh work system:
Glaucoma

Retinal Detachment



Healthy Eye



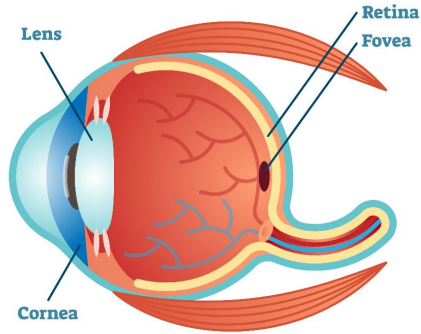
Retinal Detachment

PATHOPHYSIOLOGY:
Ciliochoroidal effusion

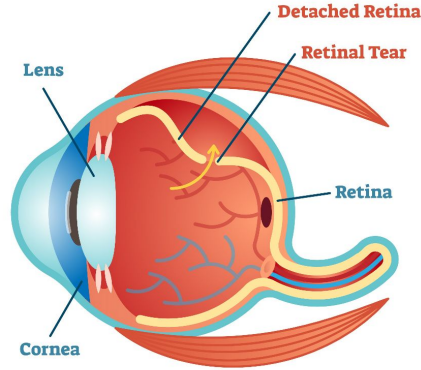
Retinal Pigment
Epithelium pump failure

Subretinal fluid
accumulation

Retinal Detachment



Healthy Eye



Retinal Detachment

Signs/Symptoms:

- A lot of new floaters
- Flashes of light in one eye or both eyes
- Dark shadow in the middle of vision

Causes: trauma, tumor, age-related degeneration, COATS Disease



Retinoblastoma

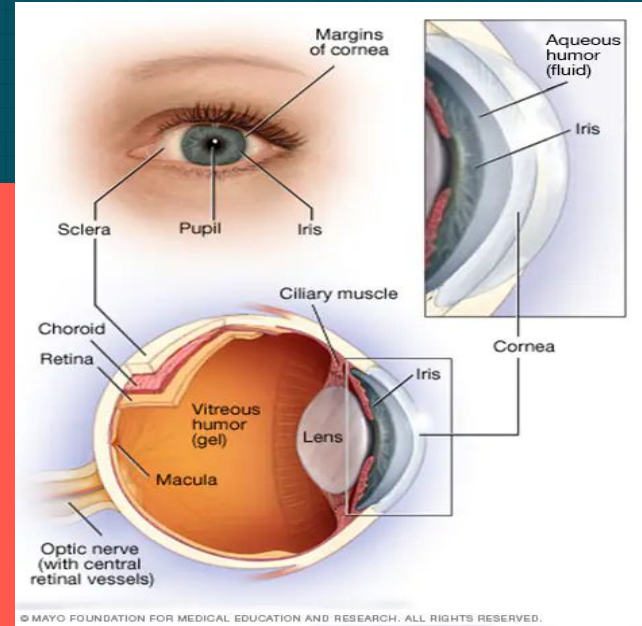
Retinoblastoma is an eye cancer that begins in the retina — the sensitive lining on the inside of the eye.

Causes: inherited gene RB1

Genetic mutations

Signs/symptoms:

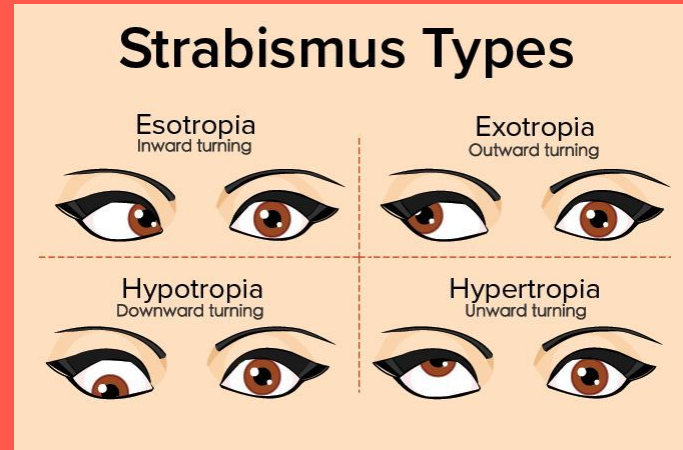
- white color in the center circle of the eye (pupil) when light is shone in the eye, such as when someone takes a flash photograph of the child
- Poor vision
- Eye swelling
- Red eyes



Strabismus

The deviation of one eye from the other when the person is looking directly at an object.

- caused by a weak or hypertonic muscle in one of the eyes, the deviation may be upward, downward, inward, or outward.
- Diplopia (double vision) is a symptom of strabismus.
- Nystagmus is the involuntary lateral, rhythmic movement of the eyes.

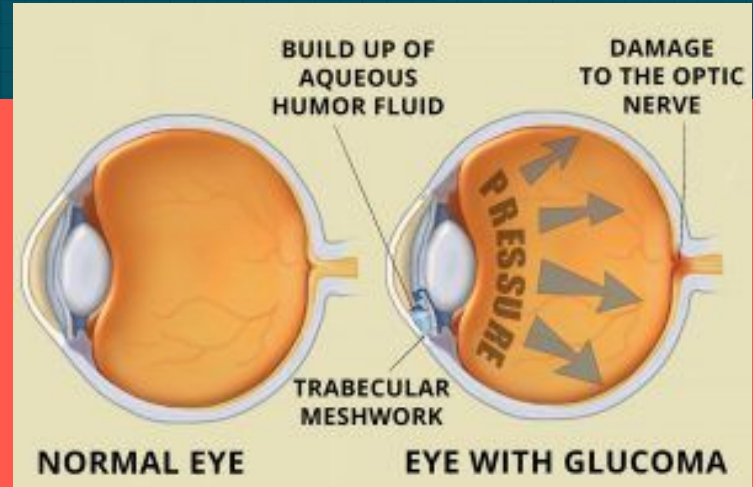


Glaucoma

a group of eye diseases that can cause vision loss and blindness by damaging the optic nerve in the back of your eye;
Tonometry, measurement of IOP, is done periodically among > 55 y/o to facilitate early detection and treatment
to prevent loss of eyesight

Risk Factors:

- High myopia, high hypermetropia, high intraocular pressure (>12 to 20mmHg)
- People on oral or ophthalmic steroids
- Family hx of glaucoma
- Corneas that are thin at the center
- Age 55 and above



Glaucoma

- characterized by intraocular pressures (IOP) > 12 to 20 mmHg
- Maintained by the aqueous fluid in homeostasis
- Intraocular fluid accumulates and blocks the flow of nutrients to optic nerve fibers, leading to nerve death.

Signs/Symptoms:

- Intense eye pain
- Red eye
- Blurring of vision
- n/v
- Seeing rings around lights



Uncontrolled IOP that can lead to optic nerve atrophy and total blindness.

AUDITORY DISORDERS

External Ear

CHONDRITIS

PERICHONDRITIS

OTITIS EXTERNA

Conductive Hearing Loss:

occurs when a change in the outer or middle ear impairs sound conduction from the outer to the inner ear.

Conditions:

- impacted cerumen, foreign bodies lodged in the ear canal, neoplasms of the external auditory canal or middle ear, eustachian tube dysfunction, otitis media, cholesteatoma, and otosclerosis
- Symptoms of conductive hearing loss:
 1. diminished hearing
 2. soft speaking voice

Sensorineural Hearing Loss:

Impairment of the organ of Corti and its hearing receptors or its central connections

Conditions:

- congenital and hereditary factors, noise exposure, aging, ototoxicity, and systemic diseases

OTITIS EXTERNA:

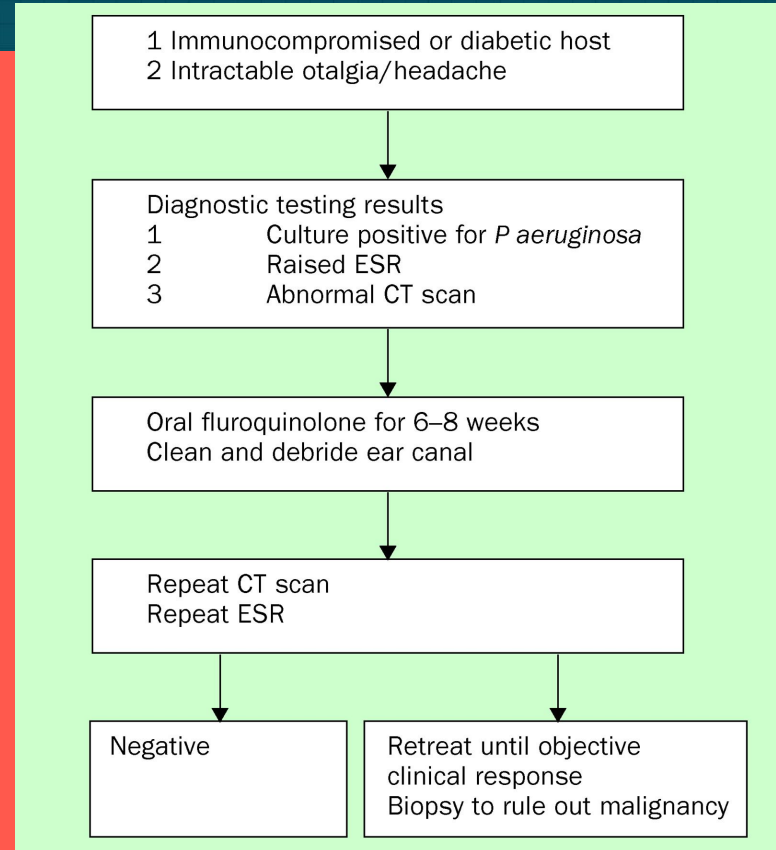
a bacterial infection of the outer

ear (pinnae and ear canal) associated with prolonged exposure to moisture

- Drainage accumulation causes pain
- The buildup of fungal debris in the ear canal epithelium leads to increasing pressure and inflammation

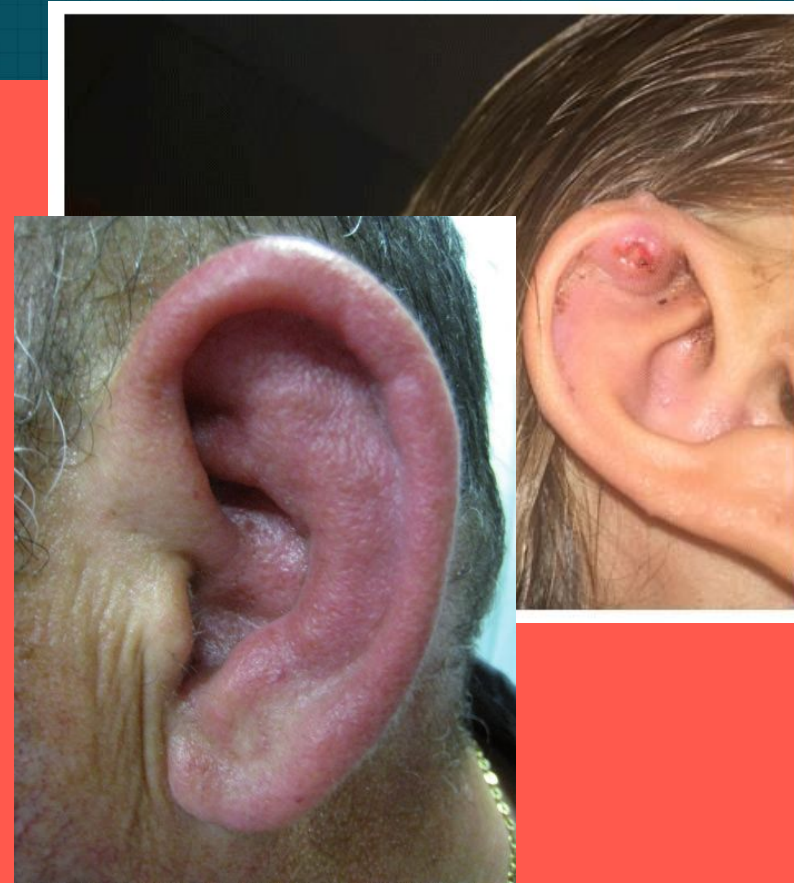
OTITIS EXTERNA:

- Necrotizing malignant otitis externa is a serious infection into deeper tissue adjacent to the ear canal, including cellulitis and osteomyelitis. It is usually caused by *Pseudomonas* and may be seen in diabetic patients, older patients, debilitated patients, or patients with compromised immune systems.
- Methicillin-resistant *Staphylococcus aureus* otorrhea has been a common cause of chronic ear drainage. Treatment is based on culture and sensitivity of the ear drainage.



CHONDRITIS:

- inflammation of cartilage
- It takes several forms, osteochondritis, a lesion has formed within the cartilage layer itself, giving rise to secondary inflammation. It has a complex etiology, and can be caused by genetic, hormonal, environmental and nutritional factor (too little Calcium)
- Also, costochondritis, inflammation of the costal cartilage at the articulation of the ribs and sternum, is another form, the onset of which, is insidious



PERICHONDritis:

- an infection of the skin and tissue surrounding the cartilage of the outer ear
- risk of contracting perichondritis is higher in people with systemic inflammatory diseases and with a debilitated immune system, as well as people with diabetes and granulomatosis with polyangiitis (or Wegener's granulomatosis)
- primarily caused by **pseudomonas aeruginosa** and **staphylococcus aureus** (Ear piercing, sports injury...)
- S/sx: erythematous, swollen, hot external ear, with sparing of the lobule. There may also be a collection of pus present.



AUDITORY DISORDERS

Middle Ear

Otitis Media

Myringitis

OTITIS MEDIA:

- Acute otitis media (AOM), seen in children, is associated with inflamed, bulging tympanic membrane and fluid in the middle ear.
 - The presence of fluid behind the membrane without acute infection is Otitis Media with Effusion (OME)
- Antimicrobial therapy and possible placement of tympanotomy tubes may be required for its treatment and prevention



OTITIS MEDIA:

There is an Acute as there is a Chronic type of OM

- Acute otitis media or acute suppurative otitis media is infection of the middle ear caused by contamination from bacteria from the middle ear fluid through the eustachian tube. Pathogenic organisms (Streptococcus pneumoniae, H. influenzae, and Moraxella catarrhalis, Pseudomonas, etc) gain entry into the normally sterile middle ear, usually through a dysfunctional eustachian tube.
- In Chronic, inflammation is with tissue damage, usually caused by repeated episodes of acute otitis media. It may be caused by an antibiotic-resistant organism or a particularly virulent strain of organism. It may be associated with tympanic membrane perforation.
 - Recurrent rupture lead Conductive Hearing Loss
 - Cholesteatoma (mass of Squamous epithelium and desquamated debris in the middle ear), which may cause erosion of the ossicles or inner ear) may form
- In serous (secretory) otitis media, no purulent infection occurs, but blockage of the eustachian tube causes negative pressure and transudation of fluid from blood vessels and development of effusion in the middle ear

OTITIS MEDIA:

Clinical Manifestations

1. Pain (1st symptom)
2. Fever may rise to 104° F to 105° F (40° C to 40.6° C).
3. Purulent drainage (otorrhea) is present if tympanic membrane is perforated.
4. Irritability may be noted in the young person.
5. Headache, hearing loss, anorexia, nausea, and vomiting may be present.
6. Purulent effusion may be visible behind tympanic membrane or tympanic membrane may be reddened and bulging on otoscopic examination

MYRINGITIS

a bacterial or viral infection of the eardrum

Myringitis is a form of acute otitis media. Acute otitis media often occurs in people with a cold or allergies.

The infected ear is painful

AUDITORY DISORDERS

Inner Ear

MENIERE'S DISEASE

VERTIGO

TINNITUS

MENIERE'S DISEASE

unknown etiology; it is characterized by excessive endolymph and pressure in the membranous labyrinth, disrupts both vestibular and hearing functions.

- Recurring symptoms:
 - profound vertigo, nausea, vomiting with deafness and tinnitus

VERTIGO

- a type of dizziness characterized by the illusion of movement: either a perception that the surroundings are moving while the body remains still, or that one's body is moving while the surroundings remain still.
- It is caused by vestibular dysfunction—either in the peripheral vestibular system (inner ear) or the central vestibular system (brain stem and cerebellum)

TINNITUS

unknown etiology; mostly drug and chemical-induced,
followed by progressive high-tone sensorineural hearing
loss that is permanent

Thank you!

Please send to mcvalera@up.edu.ph

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- Sensory loss (Vision and Hearing) <https://www.youtube.com/watch?v=LX8G0jQwXyA>
- Administration of eyedrops <https://www.youtube.com/watch?v=TLhnsABDtco>
- Administration of eyedrops after surgery <https://www.youtube.com/watch?v=frnD5hbplK0>
- Eye irrigation and application of eye ointment <https://www.youtube.com/watch?v=tJSddh3ign4>
- Cataract Surgery <https://www.youtube.com/watch?v=Go82c4f1emc>
- Glaucoma Surgery (Trabeculectomy) https://www.youtube.com/watch?v=uVOzINI__6c
- Retinal Detachment <https://www.youtube.com/watch?v=HHefZIQzj8Y>

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