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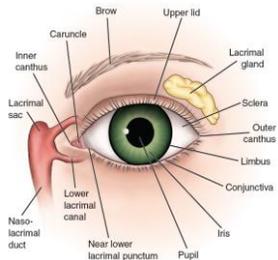
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### External Structures of the Eye



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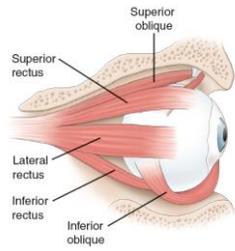
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### Extraocular Muscles



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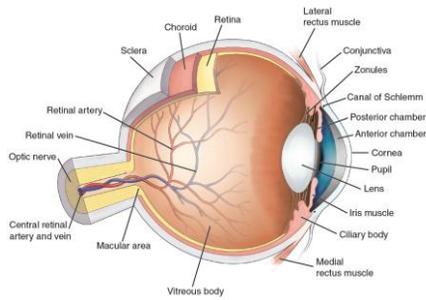
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### Cross-Section of the Eye



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### Assessment and Evaluation of Vision

- ❖ Ocular history
- ❖ Visual acuity
  - Snellen chart: distance
  - Rosenbaum pocket screener: near
- ❖ Finger count or hand motion

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### Examination of the External Structures

- ❖ Note any evidence of irritation, inflammatory process, discharge, and so on
- ❖ Assess eyelids and sclera
- ❖ Assess pupils and pupillary response; use darkened room
- ❖ Note gaze and position of eyes
- ❖ Assess extraocular movements
- ❖ Ptosis: drooping eyelid
- ❖ Nystagmus: oscillating movement of eyeball

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## Diagnostic Evaluation

- ❖ Ophthalmoscopy
  - Direct and indirect
- ❖ Slit-lamp examination
- ❖ Color vision testing
- ❖ Amsler grid
- ❖ Ultrasonography
- ❖ Optical coherence tomography
- ❖ Fundus photography
- ❖ Tonometry
- ❖ Laser scanning
- ❖ Angiography
- ❖ Perimetry testing

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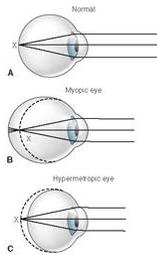
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## Refractory Errors

- Emmetropia
- Myopia
- Hyperopia (hypermetropic)
- Astigmatism
- Blindness
  - Etiologies
  - Surgeries
  - Laser surgery



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## Glaucoma

- Optic nerve damage
- Risk factors
- Types
- Types
  - Wide-angle glaucoma
  - Narrow-angle glaucoma
  - Congenital glaucoma
  - Other

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## Low Vision and Blindness

- ❖ Low vision: visual impairment that requires the use of devices and strategies to perform visual tasks
- ❖ Blindness
  - BCVA 20/400 to no light perception
  - Legal blindness is BCVA that does not exceed 20/200 in better eye or widest field of vision is 20 degrees or less
- ❖ Impaired vision often is accompanied by functional impairment

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## Assessment of Low Vision

- ❖ History
- ❖ Examination of distance and near visual acuity, visual field, contrast sensitivity, glare, color perception, and refraction
- ❖ Special charts may be used for low vision
- ❖ Nursing assessment must include assessment of functional ability and coping and adaptation in emotional, physical, and social areas

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## Management of Low Vision

- ❖ Support coping strategies, grief processes, and acceptance of visual loss
- ❖ Strategies for adaptation to the environment;
  - Placement of items in room
  - "Clock method" for trays
- ❖ Communication strategies
- ❖ Collaboration with low-vision specialist, occupational therapist, or other resources
- ❖ Braille or other methods for reading and communication
- ❖ Service animals

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## Ocular Medication Administration

- ❖ Ability of the eye to absorb medication is limited
- ❖ Barriers to absorption include the size of the conjunctival sac; corneal membrane barriers, blood-ocular barriers; and tearing, blinking, and drainage
- ❖ Intraocular injection or systemic medication may be needed to treat some eye structures or to provide high concentrations of medication
- ❖ Topical medications (drops and ointments) are most frequently used because they are least invasive, have fewest side effects, and permit self-administration

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## Ophthalmic Medications #1

- ❖ Topical anesthetics
- ❖ Mydriatics (dilate) and cycloplegics (paralyze)
  - Contraindicated with narrow angles or shallow anterior chambers and inpatients on monoamine oxidase inhibitors or tricyclic antidepressant
  - May cause CNS symptoms and increased BP, especially in children or older adults
- ❖ Anti-infective medications
  - Antibiotic, antifungal, or antiviral products

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## Ophthalmic Medications #2

- ❖ Medications used for glaucoma
  - Increase aqueous outflow or decrease aqueous production
  - May constrict the pupil and may affect ability to focus the lens of the eye; affects vision
  - May also produce systemic effects
- ❖ Anti-inflammatory drugs; corticosteroid suspensions
  - Side effects of long-term topical steroids include glaucoma, cataracts, and increased risk of infection. To avoid these effects, oral NSAID therapy may be used as an alternate to steroid use

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## Glaucoma

- ❖ A group of ocular conditions in which damage to the optic nerve is related to increased intraocular pressure (IOP) caused by congestion of the aqueous humor
- ❖ Incidence increases with age
- ❖ Risk factors
- ❖ Physiology
  - Aqueous production and drainage are not in balance
  - When aqueous outflow is blocked, pressure builds up in the eye
  - Increased IOP causes irreversible mechanical or ischemic damage

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### Glaucoma

- S/S
  - "silent thief"
- Dx
  - Tonometry to assess IOP
  - Ophthalmoscopy to inspect the optic nerve disc
  - Central visual field testing
- Treatment/Management
  - Pharmacological
    - Miotic eyedrops
    - Beta blockers, alpha 2-agonist
    - Carbonic anhydrase inhibitor
    - Prostaglandins



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## Types of Glaucoma

- ❖ Wide angle
- ❖ Narrow angle
- ❖ Congenital
- ❖ Associated with other conditions
- ❖ May be primary or secondary
- ❖ Refer to Table 58-4

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## Treatment of Glaucoma

- ❖ Goal is to prevent further optic nerve damage
- ❖ Maintain IOP within a range unlikely to cause damage
- ❖ Pharmacologic therapy: miotics, beta-blockers, alpha2-agonists, carbonic anhydrase inhibitors, prostaglandins
- ❖ Laser procedures
- ❖ Surgery

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**Glaucoma**

- Surgery
  - Laser trabeculoplasty
  - Peripheral iridotomy
  - Filtering procedures
    - Trabeculectomy
      - Complications
    - Drainage implants
    - Trabectome

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## Nursing Management of Glaucoma

- ❖ Assess for knowledge level and adherence
- ❖ Education about self-care
- ❖ Focus on maintaining the therapeutic regimen for lifelong control of a chronic condition
- ❖ Provide education regarding use and effects of medications
- ❖ Medications used for glaucoma may cause vision alterations and other side effects. The action and effects of medications need to be explained to promote compliance
- ❖ Provide support and interventions to aid the patient in adjusting to vision loss or potential vision loss

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## Cataracts

- ❖ An opacity or cloudiness of the lens
- ❖ Increased incidence with aging; by age 80 years, more than half of all Americans have cataracts
- ❖ A leading cause of disability in the United States
- ❖ Age: Risk factor
- ❖ Three types
  - Traumatic
  - Congenital
  - Senile cataract

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### Cataracts

- Opaque lens
- Etiologies
- S/S



- ❖ Painless, blurry vision, surroundings dimmer
- ❖ Sensitivity to glare
- ❖ Reduced visual acuity
- ❖ Other effects include myopic shift; astigmatism; diplopia (double vision); and color shifts, including brunescens (color value shift to yellow-brown)
- ❖ Diagnostic findings include decreased visual acuity and opacity of the lens by ophthalmoscope, slit lamp, or inspection

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### Cataracts- Treatment/ Management

- ❖ If reduced vision does not interfere with normal activities, surgery is not needed
- ❖ Surgery is performed on an outpatient basis with local anesthesia
- ❖ Surgery usually takes less than 1 hour, and patients are discharged soon afterward
- ❖ Complications are rare but may be significant
  - Extracapsular extraction
  - Phacoemulsification extraction
  - Intracapsular extraction
  - Lens replacement

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### Clinical Manifestations of Cataracts

- ❖ Painless, blurry vision, surroundings dimmer
- ❖ Sensitivity to glare
- ❖ Reduced visual acuity
- ❖ Other effects include myopic shift; astigmatism; diplopia (double vision); and color shifts
- ❖ Diagnostic findings include decreased visual acuity and opacity of the lens by ophthalmoscope, slit lamp, or inspection

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### Surgical Management of Cataracts

- ❖ If reduced vision does not interfere with normal activities, surgery is not needed
- ❖ Surgery is preformed on an outpatient basis with local anesthesia
- ❖ Surgery usually takes less than 1 hour, and patients are discharged soon afterward
- ❖ Complications are rare but may be significant

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### Corneal Surgeries

- Phototherapeutic keratectomy
- Penetrating keratoplasty and corneal endothelial transplantation
- Descemet stripping endothelial keratoplasty
- Keratoprosthesis
- Nursing Care
  - Complications
  - Graft failure

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## Types of Cataract Surgery

- ❖ Phacoemulsification: an ECCE that uses an ultrasonic device to suction the lens out through a tube; incision is smaller than with standard ECCE
- ❖ Lens replacement: after removal of the lens by ICCE or ECCE, the surgeon inserts an intraocular lens implant (IOL). This eliminates the need for aphakic lenses; however, the patient may still require glasses

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## Nursing Management of Cataracts

- ❖ Preoperative care
- ❖ Usual preoperative care for ambulatory surgery
- ❖ Dilating eye drops or other medications as ordered
- ❖ Postoperative care
- ❖ Patient education
- ❖ Provide written and verbal instructions
- ❖ Instruct patient to call primary provider immediately if vision changes; continuous flashing lights appear; redness, swelling, or pain increase; type and amount of drainage increases; or significant pain is not relieved by acetaminophen

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## Corneal Disorders

- ❖ Treatment of diseased corneal tissue
  - Phototherapeutic keratectomy
  - Keratoplasty
  - Keratoprosthesis
- ❖ Refractive surgery
  - Elective procedures to correct refractive errors and astigmatism by reshaping cornea
  - Patient needs counseling regarding potential benefits, risks, and complications

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## Retinal Disorders

- ❖ Retinal detachment
  - Rhegmatogenous detachment, most common
- ❖ Retinal vascular disorders
  - Central retina vein occlusion
  - Branch retinal vein occlusion
  - Central retinal vein occlusion
  - Macular degeneration

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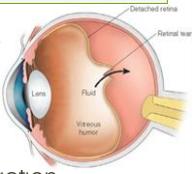
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### Retinal Detachment



- 3 Types
  - Rhegmatogenous
  - Traction
  - Rhegmatogenous & Traction
  - Exudative
- S/S
  - sensation of a shade or curtain coming across the vision of one eye, bright flashing lights, sudden onset of floaters

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### Retinal Detachment

- Diagnostics
  - assess visual acuity, assessment of retina by indirect ophthalmoscope, slit lamp, stereo fundus photography, and fluorescein angiography; tomography and ultrasonography may also be used
- Surgery
  - Scleral buckle
  - Pars Plana Vitrectomy
  - Pneumatic Retinopexy
  - Transconjunctival sutureless vitrectomy
- Nursing Care

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### Retinal Detachment #1

- ❖ Separation of the sensory retina and the RPE (retinal pigment epithelium)
- ❖ Manifestations: sensation of a shade or curtain coming across the vision of one eye, bright flashing lights, sudden onset of floaters
- ❖ Diagnostic findings: assess visual acuity, assessment of retina by indirect ophthalmoscope, slit lamp, stereo fundus photography, and fluorescein angiography; tomography and ultrasonography may also be used

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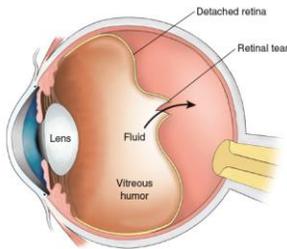
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### Retinal Detachment #2



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### Surgical Treatment of Retinal Detachment

- ❖ Scleral buckle
  - Compresses sclera
- ❖ Vitrectomy
  - Intraocular procedure
  - Gas bubble, silicone oil, perfluorocarbon and liquids may be injected into vitreous cavity

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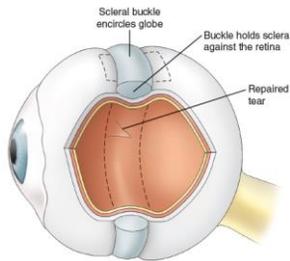
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## Scleral Buckle



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## Nursing Management of Retinal Disorders

- ❖ Patient education
  - Eye surgery is most often done as an outpatient procedure so patient education is vital
  - Signs and symptoms of complications, especially increased IOP and infection
- ❖ Promote comfort
- ❖ Patient may need to lie in a prone position

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## Retinal Vein or Artery Occlusion

- ❖ Loss of vision can occur from retinal vein or artery occlusion
- ❖ Occlusions may result from atherosclerosis, cardiac valvular disease, venous stasis, hypertension, or increased blood viscosity; associated risk factors are diabetes, glaucoma, and aging
- ❖ Patient may report decreased visual acuity or sudden loss of vision

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## Age-Related Macular Degeneration

- ❖ Age-related macular degeneration (AMD)
- ❖ Leading cause of irreversible blindness and visual impairment in the world
- ❖ Types
  - Dry or nonexudative type; most common, 85% to 90%
    - Slow breakdown of the layers of the retina with the appearance of drusen
  - Wet type
    - May have abrupt onset
    - Proliferation of abnormal blood vessels growing under the retina-choroidal revascularization

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### Macular Degeneration

- Older adults
- S/S
  - Drusen
    - "Dry"
      - Slow breakdown of the retina with the appearance of drusen
    - "Wet"
      - May have abrupt onset
      - Proliferation of abnormal blood vessels growing under the retina-choroidal revascularization
- Treatment/ Nursing care
  - Ranibizumab (Lucentis)
  - Amsler grids



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## Retina Showing Drusen and AMD



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## Nursing Management of AMD

- ❖ Patient education
- ❖ Supportive care
- ❖ Promote safety
- ❖ Recommendations to improve lighting, magnification devices, and referral to vision center to improve or promote function

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### Eye Injuries/ Emergencies

- Fractures
- Foreign Body
- Penetrating eye injuries
- Chemical burns

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## Trauma

- ❖ Prevention of injury
- ❖ Patient and public education
- ❖ Emergency treatment
  - Flush chemical injuries
  - Do not remove foreign objects
  - Protect using metal shield or paper cup
- ❖ Potential for sympathetic ophthalmia causing blindness in the uninjured eye with some injuries

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## Safety Measures and Education

- ❖ Patient education is a vital nursing intervention for patient with eye and vision disorders
- ❖ Prevention of eye injuries; education
- ❖ Safety strategies for patients with low vision in the hospital and home setting
- ❖ Patient education after eye surgery or trauma
  - Potential complications
  - Loss of binocular vision with patch or vision impairment of one eye; safety
  - Use of eye patch and shield

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## Infectious and Inflammatory Disorders

- ❖ Dry eyes
- ❖ Conjunctivitis ("pink eye")
  - Classified by cause: bacterial, viral, fungal, parasitic, allergic, toxic
  - Viral conjunctivitis is contagious
- ❖ Uveitis
- ❖ Orbital cellulitis

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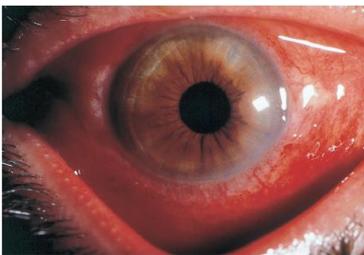
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## Hyperemia in Viral Conjunctivitis



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## **Ocular Consequences of Systemic Disease**

- ❖ Diabetic retinopathy
  - One of most common causes of blindness in adults 40 years and older
- ❖ Ophthalmic complications associated with AIDS
- ❖ Eye changes associated with hypertension

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