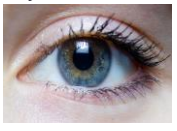
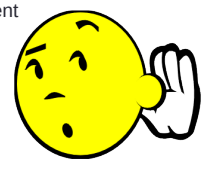
CHILD WITH A SENSORY IMPAIRMENT

Linnard-Palmer & Coats
Chapter 28

Overview

- Development/assessment of visual acuity
  - Conjunctivitis
- Disorders of the eye
  - Retinoblastoma
  - Retinopathy of Prematurity
- Hearing development
- Hearing impairment/assessment
- Disorders of the ear
  - Otitis Media





Development of Visual Acuity

- Eye anatomy fully intact at birth
  - Very poor vision initially
  - Cannot recognize a face
- Structures of the Eye
  - Inner retina
  - Middle layer; iris, choroid, ciliary body
  - Outer sclera, cornea
  - Anterior cavity; filled with aqueous humor
  - Posterior cavity; filled with vitreous humor
  - Optic nerve

Visual Impairment

- Quite common
- Visual impairment: most prescription lens will not correct
- Congenital: hereditary conditions, genetic anomalies and exposure to toxins, infectious diseases, or prematurity
- Acquired: traumatic injury, brain damage, shaken baby syndrome, or disease process
- Post natal condition: trauma, juvenile rheumatoid arthritis, albinism, retinopathy of prematurity, vitamin A deficiency

Visual Impairment

- Causes of eye trauma:
  - Vigorous play
  - Injury associated with fire, car accidents, or exposure to chemicals or sunlight
  - Corneal abrasions: one of the most common causes of eye trauma in childhood (See Box 30-1 Concerns about Corneal Abrasion)
- Refractory error: most common type of visual disturbance leading to visual impairment
- Causes:
  - Near-sightedness: light rays fall in front of the retina (myopia)
  - Far-sightedness: light rays fall beyond the retina (hyperopia)
  - (See Table 28.1 Visual Impairments Found in Childhood)

Interventions for a visually impaired child

- Introduce yourself and speak his name prior to touching
  - Fosters effective communication
- Avoid clutter
- Maintain items in familiar places
- Describe locations of items to the child
- Explain noises to the child

Assessment of Visual Acuity

- Visual acuity:
  - Routine vision screening
  - School vision: partially sighted with a visual acuity of 20/70 to 20/200
  - Legal blindness: visual acuity is measured or approximated to be below 20/200
- Assess for:
  - Strabismus
  - Refractory errors
  - Amblyopia

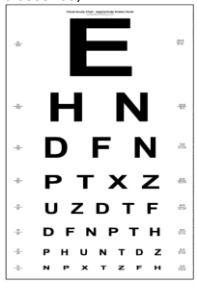
Amblyopia

- AKA “Lazy eye”
  - The “lazy eye” has reduced vision from inadequate use
  - Strabismus (eyes do not align properly) is a leading cause of amblyopia
  - Untreated amblyopia can lead to impaired **depth perception**
  - Usually not reversible once eye is mature
- Treatment
  - Patching the “good eye” completely, 24 hrs/day
  - Glasses
  - Surgery

  - Early treatment = High success rate

Assessment of Visual Acuity

- Assessments:
  - Snellen’s test (6 years of age through adolescence)
  - LEA symbol chart (age 3-6, preschool)
  - Unilateral cover test for infants or young children
  - Corneal light reflex test
  - Inspection of the inner eye if visual disturbance noted in a newborn/infant
  - Most diagnostic tests for sensory alterations are noninvasive/painless



Why Select Sloan Vs. Snellen

- Select letters / design almost equal legibility
  C . D . H . K . O
  N . R . S . V . Z
- Horizontal spacing = to letter size
- Vertical spacing = to height of lower line
- Same number of letters per line
- Geometric progression of line sizes (0.1 log units)
- Sloan required for clinical research (ETDRS)

- Variable and non-standardized letters and legibility
  A . B . C . D . E . F . G . H . K
  L . O . N . P . R . S . T . U . V . Z
- Non-standardized character spacing
- Non-standardized line spacing
- Non-standardized letters per line
- Variable line size progression
- Snellen sarif optotype long-ago obsolete designed in 1862

Also see iPAD app: Flex Visual Acuity
konanmedical.com/konan-apps/flex-acuity/

Eye Infections

- Conjunctivitis “pink eye”
  - Conjunctiva becomes red, inflamed
  - Evaluate for infection, allergy, foreign body, trauma
  - Suspect bacterial contamination if drainage is purulent
  - Bacterial = highly contagious
  - Viral, does not require antimicrobial drops, ointment
- Nursing considerations
  - Prevent spread
  - Educate, how to clean
  - When instilling eye drops, never touch the child’s eye
  - When to call provider

Eye Infections

- Contact lenses and eye infections

- Neonatal conjunctivitis/opthalmia neonatorum
  - newborn passes through the birth canal infected with *Neisseria gonorrhoeae* or *Chlamydia trachomatis*
  - Eryhtromycin-containing eye drops
  - Cleanse eyes with clean cloth soaked in warm water
  - Can cause complete blindness

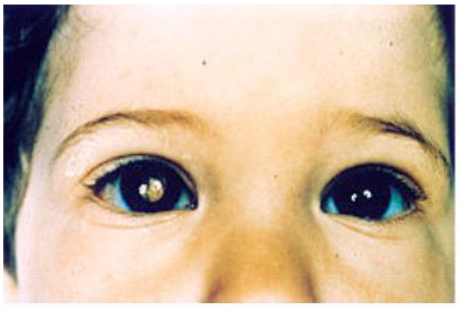
  - Older child with chlamydial or gonorrheal conjunctivitis?

Disorders of the Eye

- Retinoblastoma: malignant tumor of the retina
  - Leukocoria: Whitish glow as light falls on the affected retina
  - Double vision, “crossed eyes,” misalignment, eye pain, redness, and overall visual impairment
- Assessments:
  - Eye evaluation
  - MRI or CT scan
- Treatment:
  - Laser surgery
  - Cryotherapy
  - Radiation
  - Chemotherapy
  - Possible enucleation

Very Uncommon

Retinoblastoma



Retinopathy of Prematurity (ROP)

- Retinopathy of prematurity (ROP):
  - At birth development of vascularity arrests, then proliferates abnormally
  - Retinal blood vessels branch out, increase in number, and hemorrhages occur, leading to scaring
  - Scaring/blood vessel growth pulls the retina away from the basement membranes impairing vision or causing blindness
  - Excessive oxygen has been associated with the development
  - Infants born under 1,250 grams are at the greatest risk
  - Incidence is increasing

ROP

- Assessment:
  - Eye exam
  - Locate disease within the retinal zones
  - Severity: Staged 1 to 5
- Prevention:
  - Judicious use of oxygen
  - Monitor newborns receiving oxygen therapy
  - SpO2 measurement and low-flow oxygen
  - Cause not fully understood

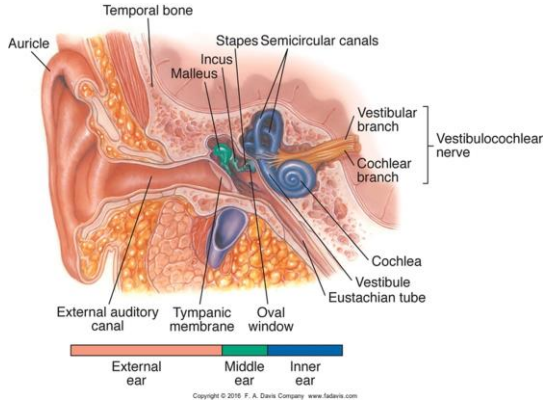
ROP

- Treatment:
  - Cryotherapy; recommended for both eyes if stage 3 or higher
  - ?Anticoagulation therapy
  - ?Laser photocoagulation therapy
- Most cases spontaneously subside
- May develop complete and permanent blindness

- Nursing Considerations;
  - Prevent use of excess oxygen
  - Prevent exposure to light
  - Increase stability

Hearing Development

- Hearing acuity achieved between 22nd and 23rd week
- Sounds heard by the fetus
- At about 19 weeks, fetus moves when exposed to sound
- Ear processes sound with 6-step process
  - Sound waves enter outer ear, pass through ear canal
  - Ear drum vibrates-sends vibrations to three ear bones (malleus, incus, stapes)
  - Bones change sound vibrations to fluid vibrations in cochlea
  - Travel wave forms along basilar membrane, inner ear hair cells (sensory cells) respond to the wave
  - Tiny hair-like projections move up and down and hit against the overlying structures, changing the motion into an electrical signal
  - Electrical signal sent via auditory nerve to brain for processing and recognition

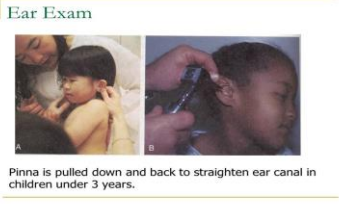


Hearing Impairment

- Any condition interfering with ability to receive auditory communication or information from the environment or verbal communication
- Noise induced hearing loss (NIHL): sounds during hunting, snowmobiling, attending concerts, and ear buds
- Types:
  - Conductive
  - Sensorineural;
    - rubella syndrome
    - ototoxic drugs
  - Combined

Hearing Assessment

- Assessments:
  - Hearing screening should begin early
  - Hearing acuity: expressed in decibels (see Box 30-2 Intensity of Sound Expressed as Decibels)
  - Visually assess tympanic membrane



Hearing Assessment

- Behaviors indicating hearing impairment:
  - Lack of a startle reflex
  - Uses gestures to communicate needs
  - Little or no speech skills
  - Speech garbled and unintelligible
  - Sit closer than expected to speakers
  - Turn the TV louder
  - Declining school performance
  - Few social interactions
- Many states require mandatory newborn hearing screening

Nursing Considerations

- Positive reinforcement for wearing hearing aids
- Protect from harm
- Care of hearing assistive devices
- Promote normal childhood with play, socialization, and academics

Otitis Media (OM)

- Viral or bacterial infection
  - Causes a build-up of fluid behind tympanic membrane
  - Greatest incidence 6-36 months
  - Most common cause of conductive hearing loss
- As children age, position of eustachian tube changes, facilitating drainage
  - Incidence goes down
- Assessment:
  - Irritability, pulling at ears, hitting the side of the head, fever, vomiting, diarrhea; may be asymptomatic
- Diagnosis
  - Visual inspection (otoscope) identifies red, bulging, non-mobile tympanic membrane

OM Treatment/Care

- Treatment:
  - Possible antibiotics
  - Surgery
  - Tympanostomy tubes through a myringotomy
- Nursing care:
  - Ear plugs
  - Teach signs and symptoms of tympanic membrane rupture
  - Medication/antibiotic teaching
  - Avoid smoking around the child
  - Breastfeeding helps to reduce the incidence
  - Help with family response to hearing impairment

Overall Considerations, Sensory Impairment

- Family experiences loss toward the child's productive future
- Assess severity on the family's cultural values
- Mental health referral for family coping
- Never socially isolate the child
- Foster communication skills and independent self-help skills
- Teach prevention of sensory impairment
- Teach how to protect sensory organs
- Refer to national organizations

The End…..