Assisting with Eye and Ear Care

Lesson 1: The Study of the Eye
Lesson Objectives

Upon completion of this lesson, students should be able to:

1. Define the terms to learn in this chapter.

2. Explain procedures to evaluate distance vision, near vision, color vision, and contrast sensitivity.

3. Explain procedures to irrigate the eye and instill eye medications.
Lesson Objectives

Upon completion of this lesson, students should be able to:

4. Name three causes of blindness.

5. Explain the procedure for assisting visually-impaired patients to prepare for physical examinations.

6. List and explain five age-related changes in the eye.
Study and Care of the Eye

- Eye is the organ of sight
- Ophthalmology
  - The branch of medical science that deals with the structure, function, and diseases of the eye
Study and Care of the Eye

• Ophthalmologists
  ▪ Perform eye examinations and eye surgery
  ▪ Prescribe medications, eyeglasses, and contact lenses
Study and Care of the Eye

- Optometrist
  - Doctor of *optometry*; not a medical doctor
  - Performs eye examinations
  - Prescribes medications needed for an eye examination
  - Writes prescriptions for eyeglasses and contact lenses
Study and Care of the Eye

- Optician
  - Specializes in grinding lenses and preparing eyeglasses and contact lenses
Critical Thinking Question

1. If you were having vision problems would you go to an ophthalmologist, an optometrist, or an optician? Explain.
Study and Care of the Eye

Eye Examination

Before every eye examination the overall appearance of the eye is evaluated for symptoms:

- Redness
- Pus-like discharge
- Excessive tearing
Study and Care of the Eye

• Eye Examination
  ▪ Physician evaluates status of the patient's pupils
    • PERRLA stands for Pupils Equal, Round, React to Light and Accommodation.
    • Normally the pupils of the eyes are the same size and change or accommodate when a beam of light is focused on the eye and is then removed.
Study and Care of the Eye

- Eye Examination
  - Physician evaluates status of the patient's pupils
  - Injuries to the brain may result in the patient having pupils of unequal size.
Study and Care of the Eye

• Visual Acuity and Refractive Errors
  ▪ Normal visual acuity (clearness of vision) is referred to as 20/20 vision (the eye should see an object 20 feet away clearly).
Study and Care of the Eye

• Visual Acuity and Refractive Errors
  ▪ Errors of refraction occur when:
    • The eyeball is too long
    • The eyeball is too short
    • The lens loses its elasticity
    • The lens or cornea has an irregular curvature
Study and Care of the Eye

- Myopia
  - When the eye sees near objects well but distant objects appear blurry
  - Occurs either because the eyeball is too long or because the lens is too thick, and the light rays do not reach the retina
Study and Care of the Eye

- **Myopia**
  - Shape of the eyeball and lens are hereditary
  - Myopic eye requires a concave lens to correct vision
Study and Care of the Eye

- Hyperopia
  - Farsightedness; when the eyes see distant objects well, but near objects are blurry
  - The eyeball is too short or the lens too thin.
  - Hyperopic eye requires a convex lens to correct the visual defect
Study and Care of the Eye

- Presbyopia
  - Term associated with farsightedness that occurs with aging
  - Lens loses its elasticity and glasses are needed for reading
Study and Care of the Eye

- Astigmatism
  - Refractive disorder where the lenses or cornea are uneven and light is not bent or refracted evenly
  - Images may be clear in the center of the field and blurry at the outer edges of the visual field
FIGURE 39-1  How lenses correct visual problems: (A) emmetropia; (B) myopia; (C) hyperopia; (D) corrected myopia; (E) corrected hyperopia.
Strabismus

- Eye disorder caused by weakness in the external eye muscles resulting in the eyes looking in different directions.
- Normally the eyes focus on a subject in coordination; otherwise double vision results.
Study and Care of the Eye

- Strabismus
  - Children with strabismus appear "cross-eyed" and may need to wear a patch over the "good" eye to strengthen the weaker eye.
Study and Care of the Eye

• Strabismus
  ▪ MA may need to teach the patient basic eye exercises as part of the treatment plan
  ▪ It is important that treatment begin at an early age to prevent permanent damage to the eye.
  ▪ Surgery on eye muscle may be necessary if the patch and exercise plan are ineffective
Study and Care of the Eye

• Assessing Visual Acuity
  ▪ Distance acuity measured using the Snellen chart
  ▪ Snellen charts place the largest symbols on the top line and each line after is of decreasing size.
Study and Care of the Eye

- Assessing Visual Acuity
  - Person with normal vision would be able to read the top line at 200 feet.
  - To the right of each line is a ratio indicating that a person with normal vision could read at decreasing distances of 100, 70, 50, 40, 30, and 20 feet.
Study and Care of the Eye

• Assessing Visual Acuity (Distance Acuity)
  ▪ Result of 20/20 vision means that a person with normal distance acuity could read that line at a distance of 20 feet
Study and Care of the Eye

- Assessing Visual Acuity (Distance Acuity)
  - Abbreviation for the right eye is OD (oculus dexter)
  - Abbreviation for the left eye it is OS (oculus sinister)
  - Abbreviation for both eyes is OU (oculus uterque)
Study and Care of the Eye

- Assessing Visual Acuity (Distance Acuity)
  - ISMP recommends that complete words instead of abbreviations be used to avoid misinterpretation and error
Study and Care of the Eye

• Assessing Visual Acuity (Distance Acuity)
  - Snellen E, the Landolt C, or pictorial charts are used for preschool children or patients who are illiterate or have a language barrier
  - Verify patient's ability by using a demonstration chart prior to testing
FIGURE 39-2  Different types of Snellen eye charts.
Testing Distance Visual Acuity Using a Snellen Eye Chart

1. Assemble equipment.
2. Review physician's order.
3. Perform hand hygiene and identify the patient.
4. Explain the procedure.
Testing Distance Visual Acuity
Using a Snellen Eye Chart

5. Determine the patient's ability to recognize letters. If the patient is unable to read letters, use the necessary chart to accommodate the patient's abilities.

6. Place the patient 20 feet from the chart, either seated or standing, as long as the Snellen eye chart is at eye level.
7. Follow office policy regarding testing with or without corrective lenses.

8. Following office policies regarding which eye to test first, have the patient cover the other eye with a cup or occluder. The occluder should be held in such a way so as not to interfere with the normal position of a patient's glasses.
PROCEDURE 39-1  Testing Distance Visual Acuity Using a Snellen Eye Chart

FIGURE A  Test of distance vision using the Snellen eye chart.
9. Instruct the patient to keep both eyes open even though one eye is covered. Have the patient read the lines with both eyes first at a distance of 20 feet.

10. Use a pointer and point to letters or appropriate symbols in random order.
Testing Distance Visual Acuity Using a Snellen Eye Chart

11. Starting with the 20/70 line, ask the patient to identify each line and proceed down the chart to the last line the patient can read without error. Observe for signs of squinting or tilting the head, which indicate difficulty identifying letters.
12. Record the ratio numbers adjacent to the line the patient can read without error. If there is an error, note it (e.g., "Right eye 20/40—1"; or "Right eye 20/40—1 with correction," meaning glasses were worn during testing).
Testing Distance Visual Acuity Using a Snellen Eye Chart

13. Repeat the procedure with the other eye and record the result, noting any unusual symptoms such as squinting or blinking excessively.

14. Clean the occluder with gauze and alcohol.

15. Remove gloves and perform hand hygiene.

16. Document the results accurately.
Study and Care of the Eye

- Near Vision Acuity
  - Test if the patient complains of difficulty reading or performing other close range tasks
  - Done to test for hyperopia or presbyopia
  - Testing is done by using the Jaeger card
Study and Care of the Eye

• Near Vision Acuity
  ▪ Patient reads a card held at normal reading distance (14 to 16 inches)
  ▪ Card has a series of paragraphs decreasing in size of print with a number above each
Study and Care of the Eye

• Near Vision Acuity
  - Number one (J1) is next to the paragraph with the smallest text and as the text becomes larger the number increases.
  - Paragraph J2 represents 20/20 vision.
• Near Vision Acuity
  ▪ Patient's result is the number above the last paragraph he or she can read easily
  ▪ Test should always be performed in a well-lit room.
Screening for Near Vision Acuity

1. Perform hand hygiene.
2. Review physician's order.
3. Assemble equipment.
4. Identify the patient and introduce yourself.
5. Explain procedure.
6. In a well-lit room, have the patient hold the Jaeger card at a distance of 14 to 16 inches.
Screening for Near Vision Acuity

7. Ask the patient to read aloud, with both eyes open, the smallest paragraph or line possible without error.

8. Document the results accurately, noting any unusual symptoms, such as squinting.
PROCEDURE 39-2  Screening for Near Vision Acuity

FIGURE A  A patient using a near vision acuity card.
Study and Care of the Eye

- Color Vision Impairment
  - The inability to distinctly differentiate colors of the spectrum
  - Defects in color vision are either congenital, inherited, or acquired through disease or injury.
Study and Care of the Eye

- Color Vision Impairment
  - Congenital color blindness is more prevalent in males.
  - Changes in color vision may indicate diseases of the retina, optic nerve, or thyroid.
• Color Vision Impairment
  ▪ Ability to distinguish colors depends on the cones of the retina, which react to light and permit us to see shades of red, green, and blue
  ▪ Inability to see any colors is rare; most likely due to a defect or absence of the cones in the retina
Study and Care of the Eye

• Color Vision Impairment
  ▪ Most common type of color vision defect, which is inherited, is the inability to distinguish red and green
  ▪ Other types of color blindness prevent patients from distinguishing shades of various colors.
Study and Care of the Eye

• Color Vision Impairment
  ▪ Ishihara Test
    • Used to screen for color vision acuity
    • Printed in either card or booklet form with a single color-dot illustration containing a number or curved lines and shapes
Study and Care of the Eye

• Color Vision Impairment
  ▪ Ishihara Test
    • Patient is shown 14 color plates or pages and must correctly identify 10 of them to be considered to have color vision within normal limits
    • Ishihara booklet or cards should be stored out of direct light to prevent fading of the color plates
Screening for Color Vision Acuity

1. Perform hand hygiene.
2. Review physician's order.
3. Assemble equipment.
4. Identify the patient and introduce yourself.
5. Explain the procedure.
6. Have the patient assume a comfortable position, and ask the patient to keep both eyes open.
Screening for Color Vision Acuity

7. In a well-lit room, have the patient identify, at a distance of 30 inches, the number that is formed by the colored dots on each card or page within 3 seconds per page or card.

8. If the patient is unable to identify the numbers, have the patient trace the number with his or her finger.
Screening for Color Vision Acuity

9. Score each plate as it is read. If the patient is able to identify the number, then record the number seen after the plate number. If the patient was unable to identify a number on a plate, record the plate number and mark an X next to it.

10. Note any unusual symptoms.

11. Document the results accurately.
FIGURE 39-3  One page of color vision chart.
Study and Care of the Eye

• Contrast Sensitivity
  ▪ Measures the patient's ability to distinguish faint differences in shades of grey
  ▪ Tested with Vistech Consultant system and the Pelli-Robson chart
Study and Care of the Eye

• Contrast Sensitivity
  ▪ Adhere to manufacturer's directions and observe the usual procedural steps for appropriate patient care
  ▪ Affected by most major eye conditions such as macular degeneration, cataracts, glaucoma, and diabetic retinopathy
FIGURE 39-4  Pelli-Robson contrast sensitivity chart.
FIGURE 39-5  Patient having glaucoma test.  
Tyler Olson/Shutterstock
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Corneal Transplant
    - Surgical process of transferring the cornea from a donor to a patient
  - Electroretinogram
    - Record of the electrical response of the retina to light stimulation
Study and Care of the Eye

• Procedures and Diagnostic Tests
  ▪ Fluorescein Angiography
    • Process of injecting fluorescein (a dye) followed by a series of photographs of the retina through dilated pupils
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Fluorescein Angiography
    - Provides diagnostic information about the blood flow in the retina, detecting vascular changes in diabetic and hypertensive retinopathy, and identifies lesions in the macular area of the retina, determining if there is detachment of the retina.
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Gonioscopy
    - Use of gonioscope to examine the anterior chamber of the eye to determine ocular motility and rotation
  - Keratometry
    - Measurement of the cornea using a keratometer
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Keratoplasty
    - Surgical repair of the cornea (corneal transplant)
  - Laser Surgery
    - Surgical procedure performed with a laser handpiece that transfers light into intense, small beams capable of destroying or fixing tissue in place
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Optomyometer
    - Instrument used to measure the strength of the muscles of the eye
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Phacoemulsification
    - Process of using ultrasonic vibrations to disintegrate a cataract
    - A needle is inserted through a small incision and the disintegrated cataract is aspirated. (The ophthalmic surgeon uses a small, self-sealing scleral-tunnel incision.)
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Radial Keratotomy
    - Surgical procedure that may be performed to correct nearsightedness (myopia)
    - Delicate spoke-like incisions are made in the cornea to flatten it, thereby shortening the eyeball so that light reaches the retina.
Study and Care of the Eye

• Procedures and Diagnostic Tests
  ▪ Radial Keratotomy
    • Not all patients have their vision improved, and complications could lead to blindness.
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Slit-lamp microscopy
    - Instrument used in ophthalmology for examining the posterior surface of the cornea
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Tonometry
    - Measurement of intraocular pressure (IOP) of the eye using a tonometer to check for glaucoma; an air puff tonometer records the cornea's resistance to pressure.
Study and Care of the Eye

- Procedures and Diagnostic Tests
  - Visual acuity
    - Measurements of the sharpness of a patient's vision; usually a Snellen eye chart is used, and the patient identifies letters from a distance of 20 feet.
  - Vitrectomy
    - Surgical procedure for replacing the contents of the vitreous chamber of the eye
Study and Care of the Eye

- **Irrigation of the Eye**
  - Necessary to remove foreign substances or chemicals
  - Requires the use of sterile technique and equipment
Study and Care of the Eye

• Irrigation of the Eye
  ▪ MA must first explain the procedure to the patient and answer any questions
  ▪ Never try to remove a foreign object from the eye using an applicator stick as this may cause corneal abrasions.
Irrigation of the Eye

1. Identify the patient and explain the procedure.
2. Review the physician's order.
3. Assemble the equipment. Check the label to ensure it is the correct solution. Check expiration date. Bring solution to room temperature by wrapping the bottle in a dry heating pad or standing the bottle in a warm water bath.
Irrigation of the Eye

4. Perform hand hygiene and apply gloves.

5. Ask the patient which position he or she would prefer, sitting or lying down.
Irrigation of the Eye

6. Place a towel over the patient's shoulder. If both eyes are to be irrigated, then two separate sets of equipment must be used to prevent cross-infection.

7. Open the irrigating solution and fill the syringe.
8. Ask the patient to tilt the head to the affected side if seated, and hold the basin.

9. Open the patient's eye using the index finger and thumb of the nondominant hand.

10. Hold a tissue on the patient's cheekbone below the lower lid and pull down and expose the conjunctiva.
Irrigation of the Eye

11. Hold the syringe 1/2 inch from the eye.
PROCEDURE 39-4  Irrigation of the Eye

FIGURE A  Irrigation of the eye.
Irrigation of the Eye

12. Gently irrigate from inner to outer canthus (corner of eye), aiming at the lower conjunctiva.

13. Continue irrigating until the solution is used up.

14. Dry the area around the eye with sterile gauze.

15. Dispose of the equipment properly.
Irrigation of the Eye

16. Perform hand hygiene.
17. Document information in the patient's chart in the appropriate manner.
Study and Care of the Eye

• Instillation of Eye Medications
  ▪ Only ophthalmic or optic medications can be used in the eye and they must be sterile.
  ▪ Emphasize the need for sterile medications with patients.
Study and Care of the Eye

• Instillation of Eye Medications
  ▪ Encourage patients to discard eye medications when the prescribed treatment time has been completed.
  ▪ Explain to patients that eye medications should never be shared with others or even used in their other eye if treatment is needed.
Instilling Eye Medication

1. Perform hand hygiene.
2. Check the physician's orders.
3. Identify the patient, introduce yourself, and explain the procedure.
4. Check the name of the medication, expiration date, and concentration three times.
5. Ask the patient if he or she has any known allergies to the medication.
Instilling Eye Medication

6. Give the patient a tissue to blot cheeks.
7. Put on gloves.
8. Position the patient with head tilted back and looking up.
9. Pull down the lower eyelid exposing the conjunctiva.
PROCEDURE 39-5  Instilling Eye Medication

FIGURE A  Instilling eye medication.
Damrong Sirottamaphorn/Shutterstock
10. Place the dropper about 1/2 inch above the eyeball with the dominant hand. Insert the proper amount of drops to the center of the conjunctiva, or if ointment is used, apply as a thin strip from inner to outer canthus.
Instilling Eye Medication

11. Do not touch the dropper or ointment tube to the eye.
12. Ask the patient to gently close the eye and rotate the eyeball.
13. Using sterile gauze, dry the excess medication from the inner canthus to the outer canthus.
14. Explain to the patient that vision may be blurry.
Instilling Eye Medication

15. Clean the area and dispose of unused medication.

16. Remove gloves and perform hand hygiene.

17. Document the procedure appropriately.
Study and Care of the Eye

• Eye Safety Guidelines
  ▪ Schedule regular physical examinations on a yearly basis.
  ▪ An eye examination every 1 to 2 years is important to monitor changing conditions in vision.
Study and Care of the Eye

• Eye Safety Guidelines
  ▪ Wear sunglasses to protect eyes from ultraviolet rays, which can damage the cornea.
  ▪ For minor eye problems, avoid rubbing and apply cold compress.
Study and Care of the Eye

- Eye Safety Guidelines
  - Wear protective eyewear when using tools or machinery that can cause flying objects.
  - If chemicals splash in the eye, flood the eye with water for 20 minutes and seek immediate medical attention.
  - Maintain sterility of optic medications.
Study and Care of the Eye

• Changes in the Aging Eye
  ▪ The eye ages just like the rest of the body.
  ▪ Eye changes may impair vision; care must be taken to instruct the elderly on safety issues.
  ▪ Decreasing depth perception and difficulty seeing at night make the elderly more vulnerable to falling.
Study and Care of the Eye

- Changes in the Aging Eye
  - Eyelids droop because of decrease in amount of fatty tissue in the lids
  - Quantity and quality of tears decrease
  - Cornea develops a ring of fat around it
Study and Care of the Eye

• Changes in the Aging Eye
  ▪ Whites of eyes may develop brown spots
  ▪ Conjunctiva becomes thinner and drier
  ▪ Irises become smaller and less light enters eye
Study and Care of the Eye

• Changes in the Aging Eye
  ▪ Retinal changes may make vision fuzzy.
  ▪ Night vision may be impaired.
  ▪ Eyes become more sensitive to glare.
  ▪ Depth vision is diminished.
  ▪ Floaters or wavy lines or spots may appear in the visual field.
  ▪ Lenses lose elasticity and impair patient's ability to focus.
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Blindness occurs due to accident, birth defect, injury, or disease.
  ▪ Some people are totally blind and have been that way since birth.
Study and Care of the Eye

- Assisting the Visually-Impaired Patient
  - Frame of reference to the world depends on descriptions from others
  - Some individuals can sense light and dark but may not be able to discern anything else.
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Some have some vision but cannot read.
  ▪ Legally blind - a person must only be able to see at 20 feet what a normal person would see at 200 feet
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Those who have lost their sense of sight need special training and education.
  ▪ Special equipment may be needed to help the visually impaired person to function more adequately.
Assisting the Visually-Impaired Patient

- Service animals can help those who are visually impaired.
- Blindness is a devastating impairment, both physically and psychologically.
- MA should keep a list of local resources for people with disabilities to best serve those with impairments.
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Call the patient by name and identify yourself.
  ▪ Face the patient and speak clearly.
  ▪ Ask if the patient needs assistance and offer your arm to him or her.
Study and Care of the Eye

- Assisting the Visually-Impaired Patient
  - Guide the patient to the examining room.
  - Explain specifically what you would like the patient to do.
Study and Care of the Eye

- Assisting the Visually-Impaired Patient
  - Again offer your assistance to help the patient disrobe, put on the gown, sit on the examination table, and so on.
  - Describe what will be happening, how long the procedure will take, and what level of discomfort the patient is likely to experience.
Assisting the Visually-Impaired Patient

- Ask the patient if he would like you to remain in the room with him until the physician arrives.
Study and Care of the Eye

- Assisting the Visually-Impaired Patient
  - After the examination is complete, offer your assistance to help the patient get off the examination table, dress, and speak with the physician.
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Ask the patient if he or she has any questions or concerns.
  ▪ Relay any concerns to the physician.
  ▪ Offer your arm to escort the patient from the examination room.
Study and Care of the Eye

• Assisting the Visually-Impaired Patient
  ▪ Locate the patient's coat and belongings for him or her.
  ▪ Ask the patient if he or she would like you to arrange for transportation.
  ▪ Speak to the patient with respect and empathy.
Questions?