CHAPTER 13
SPECIAL SENSES: THE EYE AND EAR

CHAPTER CONTENTS

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MEDIA LIBRARY

Student DVD-ROM
- Twelve different interactive learning games
- Flash card generator
- Audio Glossary
- Professional Profile videos
  - Optometry
  - Audiology
- Body Rhythms
- Terminology Translator

Companion Website
- Multiple Choice, True/False, and Fill-in-the-Blank practice questions
- Labeling exercises
- Case study
- Additional Professional Profile information
- New York Times link for research into specific pathologies
- Web Destination activities
- Audio Glossary
- Link to VangoNotes
- Link to drug updates

IRDVD
- Animations
  - 3D interactive animation of Eye anatomy
  - 3D interactive animation of Ear anatomy
- How we hear
- Drag-and-drop labeling
  - Eye structures
  - Ear structures
OBJECTIVE 1
Identify and define the combining forms and suffixes introduced in this chapter.
Text pages: 424; 439; PowerPoint slides: 6–10; 89–91

LECTURE NOTES
Eye Combining Forms
- ambly/o dull, dim
- aque/o water
- blephar/o eyelid
- chrom/o color
- conjunctiv/o conjunctiva
- core/o pupil
- corne/o cornea
- cycl/o ciliary muscle
- dacr/o tear, tear duct
- dipl/o double
- glauc/o gray
- ir/o iris
- irid/o iris
- kerat/o cornea
- lacrim/o tears
- ocul/o eye
- ophthalm/o eye
- opt/o eye, vision
- optic/o eye
- nyctal/o night
- papill/o optic disk
- phac/o lens
- phot/o light
- presby/o old age
- pupil/o pupil
- retin/o retina
- scler/o sclera
- uve/o choroid
- vitre/o glassy

Eye Suffixes
- -metrist one who measures

TEACHING STRATEGIES
- Encourage/remind students to add new word parts to their flash cards.

Medical Terminology Bee
- Create PowerPoint flash cards of new combining forms and suffixes presented in this chapter; have all students stand and then define word part; if student is correct, he or she remains standing; if student is wrong, he or she sits down; continue until only one student is standing.

LEARNING ACTIVITIES
Worksheet 13A
- New Combining Forms and Suffixes Handout

Worksheet 13B
- Medical Term Analysis

Quiz 13A
- May be used as a worksheet

Text
- Practice Exercises

Student DVD-ROM
- Learning games
- Make flash cards

CW
- Practice questions

ASSESSMENTS
Quiz 13A—New Word Parts Quiz
Test Bank—Fill-in-the-Blank questions
OBJECTIVE 2
Correctly spell and pronounce medical terms and major anatomical structures relating to the eye and ear.

LECTURE NOTES
Pronunciation for medical terms in this chapter can be found:
• In parentheses following key terms
• In the Audio Glossary on Student DVD-ROM
• In the Audio Glossary at Companion Website

TEACHING STRATEGIES
Emphasize to students:
• Importance of correctly spelling terms.
• How sounding out terms can assist in learning how to spell the terms.
Say each new term in class and have students repeat it.

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension of spelling strategies.

LEARNING ACTIVITIES
Worksheet 13B
• Medical Term Analysis

Terminology Checklist
• Can be used to practice pronunciation using the Audio Glossary as reference

Text
• Practice Exercises

Flash cards
• Look at the definition and write out/pronounce terms

Ear Combining Forms
- opia vision
- tropia to turn

Ear Suffixes
-cusis hearing
- otia ear condition

Ear Combining Forms
acous/o hearing
audi/o hearing
audit/o hearing
aur/o ear
auricul/o ear
cerumin/o cerumen
cochle/o cochlea
labyrinth/o labyrinth (inner ear)
myring/o eardrum
ot/o ear
salping/o eustachian tube
staped/o stapes
tympan/o eardrum, middle ear

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OBJECTIVE 3
Locate and describe the major structures of the eye and ear and their functions.


LECTURE NOTES
Anatomy and Physiology of Eye

• Ophthalmology (Ophth)—study of eye
• Eyeball—organ of sight; transmits external image by way of optic nerve to brain; brain translates sensory impulses into image
• Several external structures also play role in vision: eye muscles, eyelids, conjunctiva, and lacrimal apparatus

Eyeball
• Eyeball is composed of three layers: sclera, choroid, and retina

Sclera
• Outer layer
• Tough protective coating for inner structures
• Also called white of eye
• Cornea—anterior portion of sclera (see Figure 13.1); clear, transparent area; allows light to enter interior of eyeball; bends, or refracts, light rays

TEACHING STRATEGIES
Visual Aids
• Use full-size anatomical charts and models to illustrate eye and ear structures.

IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for drag-and-drop activities for both eye and ear structures; display on screen and have students discuss and place labels during class
• See PowerPoint presentation on the Instructor’s Resource DVD for 3D animations of both eye and ear structures.

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.
Choroid
• Middle layer of eyeball
• Opaque layer provides blood supply for eye
• Anterior portion of choroid layer consists of the iris, pupil, and ciliary body (see Figure 13.1)
  • Iris—colored portion of eye; contains smooth muscle
  • Pupil—opening in center of iris; allows light rays to enter eyeball; iris muscle contracts or relaxes to change size of pupil, controlling how much light enters interior of eyeball
  • Lens—behind iris; not actually part of choroid layer, but is attached to muscular ciliary body; by pulling on edge of lens, ciliary body muscles change shape of lens so it can focus incoming light onto retina

Retina
• Innermost layer of eyeball
• Contains sensory receptor cells, rods and cones, that respond to light rays
  • Rods—active in dim light and see in gray tones
  • Cones—active only in bright light and are responsible for color vision
  • When lens projects image onto retina, it strikes area called macula lutea, or yellow spot (see Figure 13.1); in center of macula lutea is depression called fovea centralis, meaning central pit; pit contains high concentration of sensory receptor cells; point of clearest vision
  • Optic disk—point where retinal blood vessels enter and exit eyeball and where optic nerve leaves eyeball (see Figure 13.2); no sensory receptor cells in optic disk; it causes blind spot in each eye's field of vision
  • Interior spaces of eyeball are not empty; space between cornea and lens filled with aqueous humor, a watery fluid; large open area between lens and retina contains vitreous humor, a semisolid gel.

Muscles of Eye
• Six muscles connect eyeball to skull (see Figure 13.3)
• Change direction of each eye's sightline
• Provide support for eyeball in eye socket
• Children may be born with weakness in some muscles and may require treatments such as eye exercises or even surgery to correct problem; commonly referred to as crossed eyes or strabismus (see Figure 13.4)
• Four rectus and two oblique muscles; rectus muscles (meaning straight) pull eye up, down, left, or right in straight line; oblique muscles are on angle and produce diagonal eye movement

Eyelids
• Pair of eyelids over each eyeball (see Figure 13.1)
• Provide protection from foreign particles, injury from sun and intense light, and trauma
• Eyelids have eyelashes or cilia
• Sebaceous glands located in eyelids secrete lubricating oil onto eyeball

Conjunctiva
• Mucous membrane
• Forms continuous covering on underside of eyelid and across anterior surface of eyeball (see Figure 13.1)
• Protection for eye by sealing off eyeball in socket

Learning Activities
Worksheet 13C
• Chapter Review
Text
• Practice Exercises
Student DVD-ROM
• Labeling exercise
• Learning games
CW
• Labeling exercise
• Practice questions
Quizzes 13C & 13D
• May be used as worksheets
Lacrimal Apparatus

- **Lacrimal gland**—located under outer upper corner of eyelid
- Produces tears; serves important function of washing and lubricating anterior surface of eyeball
- **Lacrimal ducts**—located in inner corner of eye socket; collect tears and drain them into nasolacrimal duct; duct ultimately drains tears into nasal cavity (see Figure 13.5)

Anatomy and Physiology of Ear

- **Otology** (Oto)—study of ear
- **Audiology**—study of hearing disorders
- Responsible for two senses: hearing and equilibrium (sense of balance); hearing and equilibrium sensory information is carried to brain by cranial nerve VIII, vestibulocochlear nerve; nerve is divided into two major branches; cochlear nerve carries hearing information and the vestibular nerve carries equilibrium information
- Ear is subdivided into three areas:
  1. External ear
  2. Middle ear
  3. Inner ear

External Ear

- Consists of three parts: auricle, auditory canal, and tympanic membrane (see Figure 13.14)
- Auricle or pinna—commonly referred to as the ear because is only visible portion; funnel to capture sound waves as go past outer ear; channels them through external auditory meatus.
- Sound moves along auditory canal and causes tympanic membrane (eardrum) to vibrate; tympanic membrane separates external ear from middle ear.
- Ear wax or cerumen produced in oil glands in auditory canal; protects and lubricates ear; barely liquid at body temperature; cerumen slowly flows out of auditory canal, carrying dirt and dust with it; auditory canal is self-cleaning.

Middle Ear

- Located in cavity in temporal bone of skull (see Figure 13.15)
- Air-filled cavity contains three tiny bones called ossicles—malleus, incus, and stapes; amplify vibrations in middle ear and transmit them to inner ear from malleus to incus and finally to stapes
- Stapes, last of three ossicles, is attached to very thin membrane that covers opening to inner ear called oval window
- **Eustachian tube** or auditory tube—connects nasopharynx with middle ear (see Figure 13.14); each time person swallows eustachian tube opens; allows pressure to equalize between middle ear cavity and atmospheric pressure

Inner Ear

- Located in cavity within temporal bone (see Figure 13.14)
- Fluid-filled cavity is referred to as labyrinth because of its shape; contains hearing and equilibrium sensory organs; cochlea for hearing and semicircular canals, utricle, and saccule for equilibrium
- Each organ contains hair cells, actual sensory receptor cells; in cochlea, hair cells referred to as organs of Corti

ASSSESSMENTS

Quiz 13C & 13D—Labeling Diagrams
Test Bank—questions
OBJECTIVE 4
Describe how we see.
Text pages: 429–430; PowerPoint slides: 40–44

LECTURE NOTES
• When light rays strike eye, first pass through cornea, pupil, aqueous humor, lens, and vitreous humor (see Figure 13.6)
• Then strike retina and stimulate rods and cones
• Upside-down image sent along optic nerve (see Figure 13.7); optic nerve transmits impulses to brain, where upside-down image is translated into right-side-up image
• Vision requires proper functioning of four mechanisms:
  1. Coordination of external eye muscles so that both eyes move together
  2. Correct amount of light admitted by pupil
  3. Correct focus of light on retina by lens
  4. Optic nerve transmitting sensory images to brain

TEACHING STRATEGIES
Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES
Worksheet 13C
• Chapter Review

Text
• Practice Exercise

Student DVD-ROM
• Learning games

CW
• Practice questions

ASSESSMENTS
Quiz 13G—Chapter Review
Test Bank—questions

OBJECTIVE 5
Describe the path of sound vibration.
Text page: 443; PowerPoint slides: 110–115

LECTURE NOTES
• Path of sound through outer ear and middle ear and into cochlea of inner ear
• Sound waves traveling down external auditory canal strike eardrum, causing it to vibrate
• Ossicles conduct vibrations across middle ear from eardrum to oval window
• Oval window movements initiate vibrations in fluid that fills cochlea
• When fluid vibrations strike hair cell, it bends small hairs and stimulates nerve ending
• Nerve ending sends electrical impulse to brain on cochlear portion of vestibulocochlear nerve
• See Figure 13.16
• Hearing loss divided into two main categories: conductive hearing loss and sensorineural hearing loss
• Conductive refers to disease or malformation of outer or middle ear; all sound is weaker and muffled since it is not conducted correctly to inner ear

TEACHING STRATEGIES
IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for an animation showing how we hear

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture

LEARNING ACTIVITIES
Worksheet 13C
• Chapter Review

Text
• Practice Exercises
• Sensorineural hearing loss is result of damage or malformation of inner ear (cochlea) or cochlear nerve; sounds are distorted and heard incorrectly
• Can be combination of both conductive and sensorineural hearing loss

**ASSESSMENTS**
Quiz 13G—Chapter Review
Test Bank—questions

**OBJECTIVE 6**
Build and define eye and ear medical terms from word parts.

**LECTURE NOTES**

Eye Word Building

<table>
<thead>
<tr>
<th>Combining Form</th>
<th>Medical Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>blephar/o</td>
<td>blepharitis</td>
<td>eyelid inflammation</td>
</tr>
<tr>
<td></td>
<td>blepharoplasty</td>
<td>surgical repair of eyelid</td>
</tr>
<tr>
<td></td>
<td>blepharoptosis</td>
<td>drooping eyelid</td>
</tr>
<tr>
<td></td>
<td>blepharectomy</td>
<td>removal of eyelid</td>
</tr>
<tr>
<td>conjunctiv/o</td>
<td>conjunctival</td>
<td>pertaining to conjunctiva</td>
</tr>
<tr>
<td></td>
<td>conjunctivitis</td>
<td>conjunctiva inflammation (pink eye)</td>
</tr>
<tr>
<td></td>
<td>conjunctivoplasty</td>
<td>surgical repair of conjunctiva</td>
</tr>
<tr>
<td></td>
<td>corneal</td>
<td>pertaining to cornea</td>
</tr>
<tr>
<td>cycl/o</td>
<td>cycloplegia</td>
<td>paralysis of ciliary body</td>
</tr>
<tr>
<td>dacr/o</td>
<td>dacryocystitis</td>
<td>tear bladder inflammation</td>
</tr>
<tr>
<td>dipl/o</td>
<td>diplopia</td>
<td>double vision</td>
</tr>
<tr>
<td>iri/o</td>
<td>iritis</td>
<td>iris inflammation</td>
</tr>
<tr>
<td>irid/o</td>
<td>iridal</td>
<td>pertaining to iris</td>
</tr>
<tr>
<td></td>
<td>iridectomy</td>
<td>removal of iris</td>
</tr>
<tr>
<td></td>
<td>iridoplegia</td>
<td>paralysis of iris</td>
</tr>
<tr>
<td></td>
<td>iridosclerotomy</td>
<td>incision into iris and sclera</td>
</tr>
<tr>
<td>kera/t/o</td>
<td>keratitis</td>
<td>cornea inflammation</td>
</tr>
<tr>
<td></td>
<td>keratometer</td>
<td>instrument to measure (curve of) cornea</td>
</tr>
<tr>
<td></td>
<td>keratotomy</td>
<td>incision into cornea</td>
</tr>
<tr>
<td>lacrim/o</td>
<td>lacrimal</td>
<td>pertaining to tears</td>
</tr>
<tr>
<td>ocul/o</td>
<td>ocular</td>
<td>pertaining to eye</td>
</tr>
<tr>
<td></td>
<td>intraocular</td>
<td>pertaining to within eye</td>
</tr>
<tr>
<td></td>
<td>oculomycosis</td>
<td>abnormal condition of eye fungus</td>
</tr>
<tr>
<td>ophthalm/o</td>
<td>ophthalmalgia</td>
<td>eye pain</td>
</tr>
<tr>
<td></td>
<td>ophthalmic</td>
<td>pertaining to eye</td>
</tr>
<tr>
<td></td>
<td>ophthalmologist</td>
<td>specialist in eye</td>
</tr>
<tr>
<td></td>
<td>ophthalmoplegia</td>
<td>eye paralysis</td>
</tr>
<tr>
<td></td>
<td>ophthalmorrhagia</td>
<td>rapid bleeding from eye</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**

• Reinforce how many eye and ear terms can be constructed from word parts.
• Read aloud chapter terms that are made up of word parts; have students identify parts and define terms, either aloud or individually on paper.
• Write sentences on the board using common words; have students substitute correct medical terms.

**Pop Questions**
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**

Worksheet 13A
• New Combining Form and Suffix Handout

Worksheet 13B
• Medical Term Analysis

Worksheet 13C
• Chapter Review

Quiz 13E
• May be used as worksheet

Text
• Practice Exercises
• Terminology Checklist

Student DVD-ROM
• Learning games
• Flash cards

CW
• Practice questions
## Ear Word Building

### Combining Form

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Medical Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>acous/o</td>
<td>acoustic</td>
<td>pertaining to hearing</td>
</tr>
<tr>
<td>audi/o</td>
<td>audiogram</td>
<td>record of hearing</td>
</tr>
<tr>
<td>audito/o</td>
<td>auditory</td>
<td>pertaining to hearing</td>
</tr>
<tr>
<td>aur/o</td>
<td>aural</td>
<td>pertaining to ear</td>
</tr>
<tr>
<td>auricul/o</td>
<td>auricular</td>
<td>pertaining to ear</td>
</tr>
<tr>
<td>cochl/o</td>
<td>cochlear</td>
<td>pertaining to cochlea</td>
</tr>
<tr>
<td>labyrinth/o</td>
<td>labyrinthectomy</td>
<td>removal of labyrinth</td>
</tr>
<tr>
<td>myring/o</td>
<td>myringitis</td>
<td>eardrum inflammation</td>
</tr>
<tr>
<td>myringectomy</td>
<td>surgical repair of eardrum</td>
<td></td>
</tr>
<tr>
<td>ot/o</td>
<td>otalgia</td>
<td>ear pain</td>
</tr>
<tr>
<td>ot/o</td>
<td>otic</td>
<td>pertaining to ear</td>
</tr>
<tr>
<td>ot/o</td>
<td>otitis</td>
<td>ear inflammation</td>
</tr>
<tr>
<td>otomycosis</td>
<td>abnormal condition of ear fungus</td>
<td></td>
</tr>
<tr>
<td>otolog/o</td>
<td>otolog</td>
<td>ear specialist</td>
</tr>
<tr>
<td>otopyr/o</td>
<td>otopyr/o</td>
<td>pus discharge from ear</td>
</tr>
<tr>
<td>otorr/o</td>
<td>otorr/o</td>
<td>bleeding from ear</td>
</tr>
<tr>
<td>otoscope</td>
<td>instrument to view inside ear</td>
<td></td>
</tr>
<tr>
<td>otoplasty</td>
<td>surgical repair of (external) ear</td>
<td></td>
</tr>
<tr>
<td>salping/o</td>
<td>salpingitis</td>
<td>eustachian tube inflammation</td>
</tr>
<tr>
<td>salpingotomy</td>
<td>incision into eustachian tube</td>
<td></td>
</tr>
<tr>
<td>tympan/o</td>
<td>tympanic</td>
<td>pertaining to eardrum</td>
</tr>
<tr>
<td>tympan/o</td>
<td>tympanitis</td>
<td>eardrum inflammation</td>
</tr>
<tr>
<td>tympanom/o</td>
<td>tympanometer</td>
<td>instrument to measure eardrum</td>
</tr>
<tr>
<td>tympanoplasty</td>
<td>surgical repair of eardrum</td>
<td></td>
</tr>
<tr>
<td>tympano/hexis</td>
<td>eardrum rupture</td>
<td></td>
</tr>
<tr>
<td>tympanotomy</td>
<td>incision into eardrum</td>
<td></td>
</tr>
<tr>
<td>tympanectomy</td>
<td>removal of eardrum</td>
<td></td>
</tr>
</tbody>
</table>

### Suffix

<table>
<thead>
<tr>
<th>Suffix</th>
<th>Medical Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>-otia</td>
<td>microtia</td>
<td>(abnormally) small ears</td>
</tr>
<tr>
<td>-otia</td>
<td>macrotia</td>
<td>(abnormally) large ears</td>
</tr>
</tbody>
</table>

### Assessments

- **Quiz 13E**—New Word Building quiz
- **Quiz 13G**—Chapter Review
- **Test Bank**—questions
OBJECTIVE 7
Identify and define eye and ear vocabulary terms.

Text pages: 432; 445; PowerPoint slides: 53–55; 123–125

**LECTURE NOTES**

**Eye Vocabulary**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>emmetropia (EM)</td>
<td>state of normal vision</td>
</tr>
<tr>
<td>legally blind</td>
<td>person with severely impaired vision; usually defined as having visual acuity of 20/200 that cannot be improved with corrective lenses or having visual field of less than 20 degrees</td>
</tr>
<tr>
<td>nyctalopia</td>
<td>difficulty seeing in dim light; also called <em>night-blindness</em>; usually due to damaged rods</td>
</tr>
<tr>
<td>ophthalmology</td>
<td>branch of medicine involving diagnosis and treatment of conditions and diseases of eye and surrounding structures; physician is <em>ophthalmologist</em></td>
</tr>
<tr>
<td>optician</td>
<td>specialist in grinding corrective lenses</td>
</tr>
<tr>
<td>optometry</td>
<td>medical profession specializing in examining eyes, testing visual acuity, and prescribing corrective lenses; doctor of optometry is <em>optometrist</em></td>
</tr>
<tr>
<td>papilledema</td>
<td>swelling of optic disk; often as result of increased intraocular pressure; also called <em>choked disk</em></td>
</tr>
<tr>
<td>photophobia</td>
<td>term translates into <em>fear of light</em>; it actually means strong sensitivity to bright light</td>
</tr>
<tr>
<td>presbyopia</td>
<td>visual loss due to old age; resulting in difficulty focusing for near vision (such as reading)</td>
</tr>
<tr>
<td>xerophthalmia</td>
<td>dry eyes</td>
</tr>
</tbody>
</table>

**Ear Vocabulary**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Sign Language (ASL)</td>
<td>nonverbal method of communicating in which hands and fingers are used to indicate words and concepts; used by both persons who are deaf and persons with speech impairments</td>
</tr>
<tr>
<td>binaural</td>
<td>referring to both ears</td>
</tr>
<tr>
<td>decibel (dB)</td>
<td>measures intensity or loudness of sound; zero decibels is quietest sound measured and 120 dB is loudest sound commonly measured</td>
</tr>
<tr>
<td>hertz (Hz)</td>
<td>measurement of frequency or pitch of sound; lowest pitch on audiogram is 250 Hz; measurement can go as high as 8000 Hz, which is highest pitch measured</td>
</tr>
<tr>
<td>monaural</td>
<td>referring to one ear</td>
</tr>
<tr>
<td>otorhinolaryngology (ENT)</td>
<td>branch of medicine involving diagnosis and treatment of conditions and diseases of ear, nose, and throat; also referred to <em>ENT</em>; physician is <em>otorhinolaryngologist</em></td>
</tr>
<tr>
<td>presbycusis</td>
<td>normal loss of hearing that can accompany aging process</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**

**Jeopardy Game**
- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Pathology, Diagnostic, and Therapeutic terms.

**IRDVD**
- See PowerPoint presentation on the Instructor’s Resource DVD for a video showing the duties of an optometrist.
- Write sentences on the board using common words; have students substitute correct medical terms.

**Pop Questions**
- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**

**Worksheet 13C**
- Chapter Review

**Text**
- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

**Student DVD-ROM**
- Learning games
- Flash cards

**CW**
- Practice questions
- Case Study

**ASSESSMENTS**

**Quiz 13G**—Chapter Review

**Test Bank**—questions
OBJECTIVE 8
Identify and define selected eye and ear pathology terms.
Text pages: 433–435; 447; PowerPoint slides: 56–69; 126–130

LECTURE NOTES
Eye Pathology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyeball</td>
<td>achromatopsia—color blindness—unable to perceive one or more colors; more common in males</td>
</tr>
<tr>
<td>amblyopia</td>
<td>loss of vision not as result of eye pathology; usually occurs in patients who see two images; in order to see only one image, brain no longer recognizes image being sent to it by one of eyes; may occur if strabismus is not corrected; this condition is not treatable with prescription lens; commonly called <em>lazy eye</em></td>
</tr>
<tr>
<td>astigmatism (Astigm)</td>
<td>condition in which light rays are focused unevenly on retina, causing distorted image; due to abnormal curvature of cornea</td>
</tr>
<tr>
<td>cataract</td>
<td>damage to lens causing it to become opaque or cloudy; results in diminished vision; treatment usually surgical removal of cataract or replacement of lens</td>
</tr>
<tr>
<td>corneal abrasion</td>
<td>scraping injury to cornea; if it does not heal, it may develop into ulcer</td>
</tr>
<tr>
<td>glaucoma</td>
<td>increase intraocular pressure; if untreated, may result in atrophy (wasting away) of optic nerve and blindness; glaucoma is treated with medication and surgery; an increased risk of developing glaucoma in persons over age 60, of African ancestry, who have sustained serious eye injury, and in anyone with family history of diabetes or glaucoma</td>
</tr>
<tr>
<td>hyperopia</td>
<td>person can see things in distance but has trouble reading material at close range; also known as <em>farsightedness</em>; corrected with converging or biconvex lenses</td>
</tr>
<tr>
<td>macular degeneration</td>
<td>deterioration of macular area of retina of eye; may be treated with laser surgery to destroy blood vessels beneath macula</td>
</tr>
<tr>
<td>monochromatism</td>
<td>unable to perceive one color</td>
</tr>
<tr>
<td>myopia (MY)</td>
<td>person can see things close up but distance vision is blurred; also known as <em>nearsightedness</em>; corrected with diverging or biconcave lenses</td>
</tr>
</tbody>
</table>

TEACHING STRATEGIES
• Select two students to do 5-minute presentations of their Internet research in class.
• Write sentences on the board using common words; have students substitute correct medical terms

Jeopardy Game
• Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Diagnostic, and Therapeutic terms.

IRDVD
• See PowerPoint presentation on the Instructor’s Resource DVD for videos on:
  • Conjunctivitis
  • Cataracts
  • Macular degeneration
  • Otitis media

Pop Questions
• Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

LEARNING ACTIVITIES
Internet research
• Have students select a specific pathology and use Internet resources to research its symptoms, diagnosis, and treatments

Worksheet 13C
• Chapter Review

Text
• Practice Exercises
• Terminology Checklist
• Medical Record Analysis
• Chart Note Transcription

Student DVD-ROM
• Learning games
• Flash cards
retinal detachment occurs when retina becomes separated from choroid layer; separation seriously damages blood vessels and nerves, resulting in blindness; may be treated with surgical or medical procedures to stabilize retina and prevent separation

retinitis pigmentosa progressive disease of eye resulting in retina becoming hard (sclerosed), pigmented (colored), and atrophying (wasting away); no known cure

retinoblastoma malignant eye tumor occurring in children, usually under the age of 3; requires enucleation

Conjunctiva
pterygium hypertrophied conjunctival tissue in inner corner of eye

trachoma chronic infectious disease of conjunctiva and cornea caused by bacteria; occurs more commonly in those living in hot, dry climates; untreated, leads to blindness when scarring invades cornea; treated with antibiotics

Eyelids
hordeolum refers to stye (or sty), small purulent inflammatory infection of sebaceous gland of eyelid; treated with hot compresses and/or surgical incision

Eye Muscles
esotropia (ST) inward turning of eye; also called cross-eyed; example of form of strabismus

exotropia (XT) outward turning of eye; also called wall-eyed; example of strabismus

strabismus eye muscle weakness commonly seen in children resulting in eyes looking in different directions at same time; corrected with glasses, eye exercises, and/or surgery

Brain-Related Vision Pathologies
hemianopia loss of vision in half of visual field; stroke patient may suffer from this disorder

nystagmus jerky-appearing involuntary eye movements, usually left and right; often indication of brain injury

Ear Pathology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing Loss</td>
<td></td>
</tr>
<tr>
<td>anacusis</td>
<td>total absence of hearing; inability to perceive sound; also called deafness</td>
</tr>
<tr>
<td>deafness</td>
<td>inability to hear or having some degree of hearing impairment</td>
</tr>
<tr>
<td>External Ear</td>
<td></td>
</tr>
<tr>
<td>ceruminoma</td>
<td>excessive accumulation of ear wax; results in hard wax plug; sound becomes muffled</td>
</tr>
</tbody>
</table>
otitis externa (OE)  
external ear infection; commonly caused by fungus; also called otomycosis and commonly referred to as swimmer's ear

Middle Ear  
otitis media (OM)  
frequently seen in children; commonly referred to as middle ear infection; often preceded by upper respiratory infection during which pathogens move from pharynx to middle ear via eustachian tube; fluid accumulates in middle ear cavity; fluid may be watery, serous otitis media, or full of pus, purulent otitis media

otosclerosis  
loss of mobility of stapes bone, leading to progressive hearing loss

Inner Ear  
acoustic neuroma  
benign tumor of eighth cranial nerve sheath; pressure causes symptoms such as tinnitus, headache, dizziness, and progressive hearing loss

labyrinthitis  
affects both hearing and equilibrium portions of inner ear; also called inner ear infection

Ménière's disease  
abnormal condition within labyrinth of inner ear; can lead to progressive loss of hearing; symptoms are dizziness or vertigo, hearing loss, and tinnitus

**OBJECTIVE 9**

Identify and define selected eye and ear diagnostic procedures.

Text pages: 435–436; PowerPoint slides: 70–75; 131–137

**LECTURE NOTES**

**Eye Diagnostic Procedures**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>color vision tests</td>
<td>use of polychromic (multicolored) charts to determine ability to recognize color</td>
</tr>
<tr>
<td>fluorescein angiography</td>
<td>process of injecting dye (fluorescein) to observe movement of blood and detect lesions in macular area of retina; used to determine if there is detachment of retina</td>
</tr>
<tr>
<td>fluorescein staining</td>
<td>applying dye eye drops that are bright green fluorescent color; used to look for corneal abrasions or ulcers</td>
</tr>
<tr>
<td>keratometry</td>
<td>measurement of curvature of cornea using instrument called keratometer</td>
</tr>
<tr>
<td>ophthalmoscopy</td>
<td>examination of interior of eyes using instrument called ophthalmoscope; physician dilates pupil in order to see cornea, lens, and retina; used to identify abnormalities in blood vessels of eye and some systemic diseases</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**

- Write sentences on the board using common words; have students substitute correct medical terms.

**IRDVD**

- See PowerPoint presentation on the Instructor's Resource DVD for videos on the topics of using a Snellen chart, audiology, audiometry, and tympanometry.

**Jeopardy Game**

- Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, and Therapeutic terms.

**Pop Questions**

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**Guest speaker**

- Invite an optometrist or optician to speak to the class about different eye tests and corrective lenses.
- Invite an audiologist to speak to the class about hearing tests and assistive devices.
Audiology Tests

- audiometry: test of hearing ability by determining lowest and highest intensity (decibels) and frequencies (hertz) that person can distinguish; patient sits in soundproof booth and receives sounds through earphones as technician decreases sound or lowers tones.

- Rinne and Weber tuning-fork tests: tests assess both air and bone conduction of sound; physician holds tuning fork against or near bones on side of head.

Otology Tests

- otoscopy: examination of ear canal, eardrum, and outer ear using otoscope.

- tympanometry: measurement of movement of tympanic membrane; indicates presence of pressure in middle ear.

Balance Tests

- falling test: test used to observe balance and equilibrium; patient balances on one foot, then with one foot in front of other, and then walking forward with eyes open; same test is conducted with patient’s eyes closed; swaying and falling with eyes closed can indicate ear and equilibrium malfunction.

**LEARNING ACTIVITIES**

**Worksheet 13C**
- Chapter Review

**Text**
- Practice Exercises
- Terminology Checklist
- Medical Record Analysis
- Chart Note Transcription

**Student DVD-ROM**
- Learning games
- Flash cards

**CW**
- Practice questions
- Case Study
- *New York Times* link for research into specific diagnostic procedures

**ASSESSMENTS**

**Quiz 13G**—Chapter Review

**Test Bank**—questions
**OBJECTIVE 10**
 Identify and define selected eye and ear therapeutic procedures.

Text pages: 436–437; 447–448; PowerPoint slides: 76–79; 138–140

<table>
<thead>
<tr>
<th>Terms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical Procedures</td>
<td></td>
</tr>
<tr>
<td>cryoextraction</td>
<td>cataract is lifted from lens with extremely cold probe</td>
</tr>
<tr>
<td>cryoretinopexy</td>
<td>surgical fixation of retina by using extreme cold</td>
</tr>
<tr>
<td>enucleation</td>
<td>surgical removal of eyeball</td>
</tr>
<tr>
<td>keratoplasty</td>
<td>surgical repair of cornea is simple translation of term; utilized to mean corneal transplant</td>
</tr>
<tr>
<td>laser-assisted in-situ keratomileusis (LASIK)</td>
<td>correction of myopia using laser surgery to remove corneal tissue</td>
</tr>
<tr>
<td>laser photocoagulation</td>
<td>laser beam to destroy very small precise areas of retina; treats retinal detachment or macular degeneration</td>
</tr>
<tr>
<td>phacoemulsification</td>
<td>high-frequency sound waves to emulsify (liquefy) lens with cataract, which is then aspirated (removed by suction) with needle</td>
</tr>
<tr>
<td>photorefractive keratectomy (PRK)</td>
<td>laser to reshape cornea and correct errors of refraction</td>
</tr>
<tr>
<td>radial keratotomy (RK)</td>
<td>spoke-like incisions around cornea result in its becoming flatter; surgical treatment for myopia</td>
</tr>
<tr>
<td>scleral buckling</td>
<td>placing band of silicone around outside of sclera that stabilizes detaching retina</td>
</tr>
<tr>
<td>strabotomy</td>
<td>incision into eye muscles in order to correct strabismus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audiology Procedures</td>
<td></td>
</tr>
<tr>
<td>hearing aid</td>
<td>apparatus used by persons with impaired hearing to amplify sound; also called amplification device</td>
</tr>
<tr>
<td>Surgical Procedures</td>
<td>mechanical device surgically placed under skin behind outer ear; converts sound signals into magnetic impulses to stimulate auditory nerve; can be beneficial for those with profound sensorineural hearing loss</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**
- Write sentences on the board using common words; have students substitute correct medical terms.
- Jeopardy Game
  - Have students create questions for terms in this section for a Jeopardy game to be played in class—may be combined with Vocabulary, Pathology, and Diagnostic terms.
- Pop Questions
  - Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture

**LEARNING ACTIVITIES**
- Worksheet 13C
  - Chapter Review
- Text
  - Practice Exercises
  - Terminology Checklist
  - Medical Record Analysis
  - Chart Note Transcription
- Student DVD-ROM
  - Learning games
  - Flash cards
- CW
  - Practice questions
  - Case Study
  - New York Times link for research into specific treatment procedures

**ASSESSMENTS**
- Quiz 13G—Chapter Review
- Test Bank—questions
myringotomy  surgical puncture of eardrum with removal of fluid and pus from middle ear; eliminates persistent ear infection and excessive pressure on tympanic membrane; pressure equalizing tube is placed in tympanic membrane to allow for drainage of middle ear cavity; falls out on its own

depressed  small tube surgically placed in eardrum to assist in drainage of trapped fluid and to equalize pressure between middle ear cavity and atmosphere

stapedectomy  removal of stapes bone to treat otosclerosis; prosthesis or artificial stapes may be implanted

**OBJECTIVE 11**

Identify and define selected medications relating to the eye and ear.

Text pages: 437–438; 448; PowerPoint slides: 80–81; 141

**LECTURE NOTES**

**Eye Pharmacology**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Action</th>
<th>Generic and Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>anesthetic ophthalmic solution</td>
<td>eye drops for pain relief associated with eye infections, corneal abrasions, or surgery</td>
<td>proparacain, Ak-Taine, Opticaine, Pontocaine</td>
</tr>
<tr>
<td>antibiotic ophthalmic solution</td>
<td>eye drops for treatment of bacterial eye infections</td>
<td>erythromycin, Del-Mycin, Ilotycin Ophthalmic</td>
</tr>
<tr>
<td>antiglaucoma medications</td>
<td>drugs that reduce intraocular pressure by lowering amount of aqueous humor in eyeball; either reducing the production of aqueous humor or increasing its outflow</td>
<td>timolol, Betimol, Timoptic; acetazolamide, Ak-Zol, Dazamide; prostaglandin analogs, Lumigan, Xalatan</td>
</tr>
<tr>
<td>artificial tears</td>
<td>medications to treat dry eyes</td>
<td>buffered isotonic solutions, Akwa Tears, Refresh Plus, Moisture Eyes</td>
</tr>
<tr>
<td>miotic</td>
<td>substance causes pupil to constrict; also used to treat glaucoma</td>
<td>physostigmine, Eserine Sulfate, Isopto Eserine; carbachol, Carbastat, Miostat</td>
</tr>
</tbody>
</table>

**TEACHING STRATEGIES**

**Pop Questions**

- Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture.

**LEARNING ACTIVITIES**

- Have students use a PDR and/or the Internet to look up additional information regarding these medications, such as dosage, side effects, and contraindications.

**Worksheet 13C**

- Chapter Review

**Text**

- Practice Exercises
- Terminology Checklist

**Student DVD-ROM**

- Learning games
- Flash cards

**CW**

- Practice questions

**ASSESSMENTS**

**Quiz 13G—Chapter Review**

**Test Bank—questions**
mydriatic causes pupil to dilate by paralyzing iris and/or ciliary body muscles; useful during eye examinations and eye surgery
ophthalmic decongestants medications constrict arterioles of eye, reduce redness and itching of conjunctiva

atropine sulfate, Atropine-Care Ophthalmic, Atropisol Ophthalmic
tetrahydrozoline, Visine, Murine

Ear Pharmacology

Classification

<table>
<thead>
<tr>
<th>Generic and Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>antibiotic otic solution</td>
</tr>
<tr>
<td>cardrops treat otitis externa</td>
</tr>
<tr>
<td>neomycin, polymyxin B, and hydrocortisone solution, Otocort, Cortisporin, Otic Care</td>
</tr>
<tr>
<td>meclizine, Antivert, Meni-D; phenothiazine, Compazine</td>
</tr>
<tr>
<td>antipyrine and benzoaine, Allergan Ear Drops, A/B Otic</td>
</tr>
<tr>
<td>antiemetics medications to treat nausea associated with vertigo</td>
</tr>
<tr>
<td>meclizine, Antivert, Meni-D; phenothiazine, Compazine</td>
</tr>
<tr>
<td>anti-inflammatory otic solution reduces inflammation, itching, and edema associated with otitis externa</td>
</tr>
<tr>
<td>antipyrine and benzoaine, Allergan Ear Drops, A/B Otic</td>
</tr>
<tr>
<td>wax emulsifiers soften ear wax to prevent build-up within external ear canal</td>
</tr>
<tr>
<td>carbamide peroxide, Debrox Drops, Murine Ear Drops</td>
</tr>
</tbody>
</table>

OBJECTIVE 12

Define selected abbreviations associated with the eye and ear.

Text pages: 438; 448; PowerPoint slides: 82–85; 142–143

LEARNING STRATEGIES

• Emphasize the importance of learning abbreviations and their full meanings; point out how some abbreviations, such as EENT, LASIK, ASL, and PERRLA are typically used rather than full terms.
• Encourage students to add abbreviations to their flash cards.
• Write sentences on the board using common words; have students substitute correct abbreviations.

Memory Game

• Have students assist in creating a memory game to be played in class.
OD  right eye
Ophth.  ophthalmology
OS  left eye
OU  each eye/both eyes
PERRLA  pupils equal, round, react to light and accommodation
PRK  photorefractive keratectomy
REM  rapid eye movement
s.gl.  without correction or glasses
SMD  senile macular degeneration
ST  esotropia
VA  visual acuity
VF  visual field
XT  exotropia

**Ear Abbreviations**
AD  right ear
AS  left ear
ASL  American Sign Language
AU  both ears
BC  bone conduction
dB  decibel
EENT  eyes, ears, nose, throat
ENT  ear, nose, and throat
HEENT  head, ears, eyes, nose, throat
Hz  hertz
OM  otitis media
Oto  otology
PE tube  pressure equalizing tube
PORP  partial ossicular replacement prosthesis
SOM  serous otitis media
TORP  total ossicular replacement prosthesis

**Pop Questions**
* Use Clicker questions as either a pretest or posttest quiz to gauge student comprehension during lecture

**Learning Activities**

**Worksheet 13C**
* Chapter Review

**Quiz 13F**
* May be used as worksheet

**Text**
* Practice Exercises

**Student DVD-ROM**
* Learning games
* Flash cards

**CW**
* Practice questions

**Assessments**

**Quiz 13F**—Abbreviations Quiz
**Quiz 13G**—Chapter Review
**Test Bank**—questions
## Worksheet 13A

### New Combining Form and Suffix Handout

Directions: For each combining form below, write out its meaning and then locate a new term from the chapter that uses the combining form or suffix.

<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ambly/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. aque/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. blephar/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. chrom/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. conjunctiv/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. core/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. corne/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. cycl/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. dacry/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. dipl/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. glauc/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. ir/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. irid/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. kerat/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. lacrim/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. ocul/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. ophthalm/o</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>18. opt/o</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>19. optic/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. nyctal/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. papill/o</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>22. phac/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. phot/o</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
<table>
<thead>
<tr>
<th>Combining Forms</th>
<th>Meaning</th>
<th>Chapter Term</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. presby/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. pupill/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. retin/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. scler/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. uve/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. vitre/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. acous/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. audi/o</td>
<td></td>
<td></td>
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<tr>
<td>32. audit/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. aur/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. auricul/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. cerumin/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. cochle/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. labyrinth/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. mying/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39. ot/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40. salping/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41. staped/o</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. tympan/o</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Suffixes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. -metrist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44. -opia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45. -tropia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46. -cusis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47. -otia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Worksheet 13B  
Medical Term Analysis

Directions: Below are terms built from word parts used in this chapter that are not analyzed in the Word Building Table. Many are built from word parts you have learned in previous chapters. Analyze each term presented below and list and define the word parts used to build each term.

<table>
<thead>
<tr>
<th>Medical Term</th>
<th>Word Part Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. aqueous</td>
<td>____________________</td>
</tr>
<tr>
<td>2. vitreous</td>
<td>____________________</td>
</tr>
<tr>
<td>3. nyctalopia</td>
<td>____________________</td>
</tr>
<tr>
<td>4. optometry</td>
<td>____________________</td>
</tr>
<tr>
<td>5. presbyopia</td>
<td>____________________</td>
</tr>
<tr>
<td>6. amblyopia</td>
<td>____________________</td>
</tr>
<tr>
<td>7. monochromatism</td>
<td>____________________</td>
</tr>
<tr>
<td>8. exotropia</td>
<td>____________________</td>
</tr>
<tr>
<td>9. hemianopia</td>
<td>____________________</td>
</tr>
<tr>
<td>10. keratometry</td>
<td>____________________</td>
</tr>
<tr>
<td>11. ophthalmoscopy</td>
<td>____________________</td>
</tr>
</tbody>
</table>

(Continued)
12. cryoretinopexy

13. keratoplasty

14. otorhinolaryngology

15. presbycusis

16. ceruminoma

17. otosclerosis

18. labyrinthitis

19. otoscopy

20. tympanometry
Worksheet 13C
Chapter Review

Anatomy and Physiology

1. The ___________ carries image to the brain.
2. The opening in the center of the iris is the ___________.
3. The ___________ is the blind spot on the retina.
4. ___________ see in gray tones and ___________ see in color.
5. The ___________ produces tears.
6. The ___________ eye muscles produce diagonal eye movements.
7. The inner ear is responsible for the senses of ___________ and ___________.
8. The ___________ divides the outer ear from the middle ear.
9. The incus, malleus, and stapes are collectively called the ___________.
10. The ___________ is a fluid-filled cavity within the temporal bone.

Word Building

Directions: Build a term that means:

1. drooping eyelid ________________________________________________
2. paralysis of ciliary body ________________________________________
3. double vision ________________________________________________
4. pertaining to within eye _________________________________________
5. softening of sclera _____________________________________________
6. retina disease ________________________________________________
7. incision into eardrum __________________________________________
8. surgical repair of ear __________________________________________
9. instrument to measure hearing _________________________________
10. eustachian tube inflammation __________________________________

(Continued)
Matching

1. nyctalopia  a. dry eyes
2. presbyopia  b. ringing in the ears
3. optician  c. eye tumor in children
4. papilledema  d. sensitivity to strong light
5. xerophthalmia  e. middle ear infection
6. achromatopsia  f. increase in intraocular pressure
7. photophobia  g. procedure to treat myopia
8. amblyopia  h. night-blindness
9. myopia  i. sharpness of vision
10. glaucoma  j. lazy eye
11. cataract  k. looks for corneal abrasions
12. retinoblastoma  l. grinds corrective lens
13. hordeolum  m. dizziness
14. trachoma  n. a stye
15. strabismus  o. loss of vision with aging
16. fluorescein staining  p. ear wax
17. visual acuity  q. chronic infection of conjunctiva
18. binaural  r. allows drainage of fluid from middle ear
19. tinnitus  s. choked disk
20. cerumen  t. opaque lens
21. vertigo  u. dilates the pupil
22. PE tubes  v. near-sighted
23. OM  w. referring to both ears
24. LASIK  x. color blindness
25. mydriatic  y. caused by eye muscle weakness
Quiz 13A

New Word Parts Quiz

Directions: Define the combining form or suffix in the spaces provided.

1. blepharo ____________________________
2. chrom/o ____________________________
3. core/o ______________________________
4. cycl/o ______________________________
5. dipl/o ______________________________
6. glauc/o _____________________________
7. irid/o ______________________________
8. kerat/o _____________________________
9. lacrim/o ____________________________
10. ocul/o ______________________________
11. papill/o ____________________________
12. phac/o ______________________________
13. presby/o ____________________________
14. uve/o ______________________________
15. vitre/o ______________________________
16. audi/o ______________________________
17. aur/o ______________________________
18. acous/o ____________________________
19. myring/o ____________________________
20. staped/o ____________________________
21. salping/o ____________________________
22. tympan/o ____________________________
23. -opia ______________________________
24. -metrist ____________________________
25. -cusis ______________________________

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Quiz 13B
Spelling Quiz
Directions: Write each term as your instructor pronounces it.

1. ____________________________________________

2. ____________________________________________

3. ____________________________________________

4. ____________________________________________

5. ____________________________________________

6. ____________________________________________

7. ____________________________________________

8. ____________________________________________

9. ____________________________________________

10. ____________________________________________

11. ____________________________________________

12. ____________________________________________

13. ____________________________________________

14. ____________________________________________

15. ____________________________________________

16. ____________________________________________

17. ____________________________________________

18. ____________________________________________

19. ____________________________________________

20. ____________________________________________
Quiz 13C
Labeling Diagram

Directions: Label the structures of the eye.
Quiz 13D
Labeling Diagram

Directions: Label the structures of the ear.

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________
6. __________________
7. __________________
8. __________________
9. __________________
10. _________________
11. _________________
12. _________________
13. _________________
Quiz 13E
New Word Building Quiz

Directions: Build a single medical term for each phrase below.

1. pertaining to the conjunctiva ____________________________
2. pertaining to the cornea ____________________________
3. pertaining to the iris ____________________________
4. pertaining to tears ____________________________
5. pertaining to the eye ____________________________
6. pertaining to the pupil ____________________________
7. pertaining to the retina ____________________________
8. pertaining to the sclera ____________________________
9. inflammation of the choroid ____________________________
10. retina disease ____________________________
11. one who measures vision ____________________________
12. eye paralysis ____________________________
13. double vision ____________________________
14. removal of eyelid ____________________________
15. softening of the sclera ____________________________
16. pertaining to hearing ____________________________
17. hearing specialist ____________________________
18. pertaining to the ear ____________________________
19. pertaining to the cochlea ____________________________
20. pertaining to the eardrum ____________________________
21. small ear ____________________________
22. ear pain ____________________________
23. surgical repair of eardrum ____________________________
24. incision into the labyrinth ____________________________
25. pus flow from ear ____________________________
Quiz 13F
Abbreviations Quiz

Directions: Write the medical term for which each abbreviation stands.

1. Astigm ________________________________
2. EM ________________________________
3. EOM ________________________________
4. IOP ________________________________
5. LASIK ________________________________
6. PRK ________________________________
7. REM ________________________________
8. ST ________________________________
9. VA ________________________________
10. XT ________________________________
11. VF ________________________________
12. OD ________________________________
13. PERRLA ________________________________
14. Ophth ________________________________
15. OS ________________________________
16. AD ________________________________
17. ASL ________________________________
18. EENT ________________________________
19. Oto ________________________________
20. PE tube ________________________________
21. OM ________________________________
22. Hz ________________________________
23. BC ________________________________
24. AS ________________________________
25. AU ________________________________
Quiz 13G
Chapter Review

PART I: Multiple Choice

Directions: Circle the correct answer.

1. The outermost layer of the eye, referred to as the “white” of the eye, is the
   a. sclera.
   b. choroid.
   c. iris.
   d. pupil.

2. The medical term for nearsightedness is
   a. astigmatism.
   b. hyperopia.
   c. myopia.
   d. presbyopia.

3. The condition characterized by an increase in intraocular pressure is
   a. cataract.
   b. strabismus.
   c. trachoma.
   d. glaucoma.

4. The term for involuntary, jerky movements of the eye is
   a. glaucoma.
   b. nystagmus.
   c. myopia.
   d. strabismus.

5. The medical term for pinkeye is
   a. retinitis.
   b. scleritis.
   c. blepharitis.
   d. conjunctivitis.

6. The medical term for normal vision is
   a. hyperopia.
   b. myopia.
   c. emmetropia.
   d. presbyopia.

7. Which of the following is NOT one of the ossicles of the ear?
   a. utricle.
   b. malleus.
   c. incus.
   d. stapes.

8. The medical term anacusis means
   a. pain in the ear.
   b. impairment of hearing.
   c. absence of hearing.
   d. hearing loss due to aging.

9. In conductive hearing loss,
   a. the sound is conducted normally through the external and middle ear but defective in the inner ear.
   b. sound transmission is blocked in the middle and outer ear.
   c. sound transmission is blocked in the middle and inner ear.
   d. sound is conducted normally through the external ear but defective in the middle and the inner ear.

10. The medical term for ringing in the ears is
    a. vertigo.
    b. tinnitus.
    c. hertz.
    d. hordeolum.

(Continued)
PART II: Matching
Directions: Match the term with its definition.

____ 1. enucleation  a. treatment for sensorineural hearing loss
____ 2. antiemetic  b. treatment for myopia
____ 3. cochlear implant  c. hypertrophied conjunctiva
____ 4. labyrinthitis  d. surgical removal of eyeball
____ 5. otosclerosis  e. treatment for detached retina
____ 6. radial keratotomy  f. loss of half the visual field
____ 7. Snellen chart  g. inner ear infection
____ 8. hemianopia  h. test for visual acuity
____ 9. scleral buckling  i. treats nausea
____ 10. pterygium  j. loss of mobility of stapes

PART III: Abbreviations
Directions: Write the full meaning of the following abbreviations.

1. EENT __________________________________________
2. XT ____________________________________________
3. VA ____________________________________________
4. OM ____________________________________________
5. PE tube ________________________________________
Chapter 13 Answer Keys

Worksheet 13A Answer Key
1. dull, dim 25. pupil
2. water 26. retina
3. eyelid 27. sclera
4. color 28. choroid
5. conjunctiva 29. glassy
6. pupil 30. hearing
7. cornea 31. hearing
8. ciliary muscle 32. hearing
9. tear, tear duct 33. ear
10. double 34. ear
11. gray 35. cerumen
12. iris 36. cochlea
13. iris 37. labyrinth
14. cornea 38. eardrum
15. tears 39. ear
16. eye 40. eustachian tube
17. eye 41. stapes
18. eye, vision 42. eardrum
19. eye 43. one who measures
20. night 44. vision
21. optic disk 45. to turn
22. lens 46. hearing
23. light 47. ear condition
24. old age

Suffixes
1. aque/o = water; -ous = pertaining to
2. vitre/o = glassy; -ous = pertaining to
3. nyctal/o = night; -opia = vision
4. opt/o = vision; -metry = process of measuring
5. presby/o = old age; -opia = vision
6. ambly/o = dull, dim; -opia = vision
7. mono- = one; chromat/o = color; -ism = state of
8. exo- = outward; -tropia = to turn
9. hemi- = half; an- = lack of; -opia = vision
10. kerat/o = cornea; -metry = process of measuring
11. ophthalm/o = eye; -scopy = process of viewing
12. cry/o = cold; retin/o = retina; -pexy = surgical fixation
13. kerat/o = cornea; -plasty = surgical repair
14. ot/o = eye; rhin/o = nose; laryng/o = voice bos; -logy = study of
15. presby/o = old age; -cusis = hearing
16. cerumen/o = cerumen; -oma = tumor
17. ot/o = ear; -sclerosis = hardening
18. labyrinth/o = labyrinth; -itis = inflammation
19. ot/o = ear; -scopy = process of viewing
20. tympan/o = eardrum; -metry = process of measuring

Worksheet 13B Answer Key
1. aque/o = water; -ous = pertaining to
2. vitre/o = glassy; -ous = pertaining to
3. nyctal/o = night; -opia = vision
4. opt/o = vision; -metry = process of measuring
5. presby/o = old age; -opia = vision
6. ambly/o = dull, dim; -opia = vision
7. mono- = one; chromat/o = color; -ism = state of
8. exo- = outward; -tropia = to turn
9. hemi- = half; an- = lack of; -opia = vision
10. kerat/o = cornea; -metry = process of measuring
11. ophthalm/o = eye; -scopy = process of viewing
12. cry/o = cold; retin/o = retina; -pexy = surgical fixation
13. kerat/o = cornea; -plasty = surgical repair
14. ot/o = eye; rhin/o = nose; laryng/o = voice bos; -logy = study of
15. presby/o = old age; -cusis = hearing
16. cerumen/o = cerumen; -oma = tumor
17. ot/o = ear; -sclerosis = hardening
18. labyrinth/o = labyrinth; -itis = inflammation
19. ot/o = ear; -scopy = process of viewing
20. tympan/o = eardrum; -metry = process of measuring

Worksheet 13C Answer Key
Anatomy and Physiology
1. optic nerve
2. pupil
3. optic disk
4. rods; cones
5. lacrimal gland
6. oblique

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7. hearing, equilibrium (balance)  
8. tympanic membrane (eardrum)  
9. ossicles  
10. labyrinth  

Word Building  
1. blepharoptosis  
2. cycloplegia  
3. diplopia  
4. intraocular  
5. scleromalacia  
6. retinopathy  
7. myringotomy  
8. otoplasty  
9. audiometer  
10. salpingitis  

Matching  
1. h  
2. o  
3. l  
4. s  
5. a  
6. x  
7. d  
8. j  
9. v  
10. f  
11. t  
12. c  
13. n  
14. q  
15. y  
16. k  
17. i  
18. w  
19. b  
20. p  
21. m  
22. r  
23. c  
24. g  
25. u  

Quiz 13A Answer Key  
1. eyelid  
2. color  
3. pupil  
4. ciliary muscle  
5. double  
6. gray  
7. iris  
8. cornea  
9. tears  
10. eye  
11. optic disk  
12. lens  
13. old age  
14. choroid  
15. glassy  
16. hearing  
17. ear  
18. hearing  
19. eardrum  
20. stapes  
21. eustachian tube  
22. eardrum  
23. vision  
24. one who measures  
25. hearing  

Quiz 13B Answer Key  
1. sclera  
2. aqueous  
3. nasolacrimal  
4. blepharoptosis  
5. dacryocystitis  
6. ophthalmalgia  
7. emmetropia  
8. xerophthalmia  
9. achromatopsia  
10. astigmatism  
11. amblyopia  
12. pterygium
13. vestibulocochlear
14. eustachian
15. labyrinthotomy
16. otopyorrhea
17. presbycusis
18. otosclerosis
19. myringotomy
20. tinnitus

Quiz 13C Answer Key
1. iris
2. lens
3. conjunctiva
4. pupil
5. cornea
6. suspensory ligaments
7. ciliary body
8. fovea centralis
9. optic nerve
10. retina
11. choroid
12. sclera

Quiz 13D Answer Key
1. pinna
2. external auditory meatus
3. auditory canal
4. tympanic membrane
5. malleus
6. incus
7. semicircular canals
8. vestibular nerve
9. cochlear nerve
10. cochlea
11. round window
12. stapes
13. Eustachian tube

Quiz 13E Answer Key
1. conjunctival
2. corneal
3. iridial
4. lacrimal
5. ocular, optic, or ophthalmic
6. pupillary
7. retinal
8. scleral
9. uveitis
10. retinopathy
11. optometrist
12. ophthalmoplegia
13. diplopia
14. blepharectomy
15. scleromalacia
16. acoustic or auditory
17. audiologist
18. aural, auricular, or otic
19. cochlear
20. tympanic
21. microtia
22. otalgia
23. myringoplasty or tympanoplasty
24. labyrinthotomy
25. otopyorrhea

Quiz 13F Answer Key
1. astigmatism
2. emmetropia
3. extraocular movement
4. intraocular pressure
5. laser-assisted in-situ keratomileusis
6. photorefractive keratectomy
7. rapid eye movement
8. esotropia
9. visual acuity
10. exotropia
11. visual field
12. right eye
13. pupils equal, round, react to light and accommodation
14. ophthalmology
15. left eye
16. right ear
17. American Sign Language
18. eyes, ears, nose, throat
19. otology
20. pressure equalizing tube

21. otitis media
22. hertz
23. bone conduction
24. left ear
25. both ears

Quiz 13G Answer Key

Multiple Choice
1. A 6. C
2. C 7. A
3. D 8. C
5. D 10. B

Matching
1. d 6. b
2. i 7. h
3. a 8. f
4. g 9. e
5. j 10. c

Abbreviations
1. eye, ear, nose, and throat
2. exotropia
3. visual acuity
4. otitis media
5. pressure equalizing tube