Chapter 19 Diseases of the Eyes, Ears, Nose, and Throat

Unit Summary

This chapter provides knowledge of the anatomy, physiology, epidemiology, pathophysiology, psychosocial impact, presentations, prognosis, and management of diseases of the eyes, ears, nose, and throat.

National EMS Education Standard Competencies

**Medicine**

Integrate assessment findings with principles of epidemiology and pathophysiology to formulate a field impression and implement a comprehensive treatment/disposition plan for a patient with a medical complaint.

***Diseases of the Eyes, Ears, Nose, and Throat***

Knowledge of the anatomy, physiology, epidemiology, pathophysiology, psychosocial impact, presentations, prognosis, and management of

• Common or major diseases of the eyes, ears, nose and throat, including nose bleed (pp 1094-1102, 1103-1106, 1107-1108, 1110-1115)

Knowledge Objectives

1. Explain facial anatomy, and relate physiology to facial injuries. (pp 1091-1092, 1102, 1106, 1108-1110)
2. Differentiate between the following types of facial injuries, highlighting the defining characteristics of each:
	1. Eye (pp 1094-1102)
	2. Ear (pp 1103-1106)
	3. Nose (pp 1107-1108)
	4. Throat (pp 1110-1115)
	5. Mouth (pp 1110-1115)
3. Explain the pathophysiology of eye injuries. (pp 1094-1102)
4. Relate assessment findings associated with eye injuries and disorders to pathophysiology. (pp 1094-1102)
5. Integrate pathophysiologic principles to the assessment of a patient with an eye injury or eye disorder. (pp 1092-1102)
6. Formulate a field impression for a patient with an eye injury based on the assessment findings. (pp 1092-1094)
7. Develop a patient management plan for a patient with an eye injury based on the field impression. (pp 1092-1094)
8. Explain the pathophysiology of ear injuries and disorders. (pp 1103-1106)
9. Relate assessment findings associated with ear injuries and disorders to pathophysiology. (pp 1102-1106)
10. Integrate pathophysiologic principles to the assessment of a patient with an ear injury. (pp 1102-1106)
11. Formulate a field impression for a patient with an ear injury based on the assessment findings. (pp 1102-1106)
12. Develop a patient management plan for a patient with an ear injury based on the field impression. (pp 1102-1106)
13. Explain the pathophysiology of nose injuries and disorders. (pp 1107-1108)
14. Relate assessment findings associated with nose injuries and disorders to pathophysiology. (pp 1106-1108)
15. Integrate pathophysiologic principles to the assessment of a patient with a nose injury. (pp 1106-1108)
16. Formulate a field impression for a patient with a nose injury based on the assessment findings. (pp 1106-1108)
17. Develop a patient management plan for a patient with a nose injury based on the field impression. (pp 1106-1108)
18. Explain the pathophysiology of throat and mouth injuries and disorders. (pp 1110-1115)
19. Relate assessment findings associated with throat and mouth injuries and disorders to pathophysiology. (pp 1108-1115)
20. Integrate pathophysiologic principles to the assessment of a patient with a throat or mouth injury. (pp 1108-1115)
21. Formulate a field impression for a patient with a throat or mouth injury based on the assessment findings. (pp 1108-1115)
22. Develop a patient management plan for a patient with a throat or mouth injury based on the field impression. (pp 1108-1115)

Skills Objectives

There are no skills objectives for this chapter.

Readings and Preparation

Review all instructional materials including Chapter 19 of *Nancy Caroline’s Emergency Care in the Streets*, Seventh Edition, and all related presentation support materials.

Review all instructional materials including Chapter 7 of *Nancy Caroline’s Emergency Care in the Streets*, Seventh Edition, and all related presentation support materials.

Support Materials

• Lecture PowerPoint presentation

• Case Study PowerPoint presentation

• Blank structure diagrams for the eye, ear, nasal cavity and throat for student reference

Enhancements

• Direct students to visit the companion website to *Nancy Caroline’s Emergency Care in the Streets*, Seventh Edition, at http://www.paramedic.emszone.com for online activities.

• Invite a local ENT physician or an opthamologist to present specific lessons relating to their specialty.

• **Content connections:** Chapter 7 of *Nancy Caroline’s Emergency Care in the Streets*, Seventh Edition, and all related presentation support materials, provide a detailed presentation of anatomy.

Teaching Tips

This topic area provides an opportunity to expose students to what it would be like to suddenly lose visual acuity or hearing. Fog glasses and noise cancelling headphones are a great way to develop empathy for how frightening these types of problems are for their patient.

Unit Activities

**Writing activities:** Assign students a disease process that affects the eye, ear, nose, or throat. The student will provide a discussion of any newly published research concerning the disease.

**Student presentations:** Direct students to present the findings of their written assignment.

**Group activities:** After dividing students into groups, have the students wear fog glasses and noise cancelling headphones. While one student is wearing one of the devices, have other students assess them and direct them as they would a real patient. At the end of the assignment, have students discuss their experience.

**Visual thinking:** Provide students with blank anatomical diagrams of the eye, ear, nose, and throat. Describe a disease process, and have the students draw where the process originates.

Pre-Lecture

### You are the Medic

 “You are the Medic” is a progressive case study that encourages critical-thinking skills.

### Instructor Directions

Direct students to read the “You are the Medic” scenario found throughout Chapter 19.

• You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question. Facilitate a class dialogue centered on the discussion questions and the Patient Care Report.

• You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Paramedics may respond to calls involving disorders of the eyes, ears, nose, and throat (EENT).

1. Familiarity of these conditions will help when assessing the patient.

2. Familiarity will also allow you to educate the patient on prevention or potential care.

3. Patients may need to be transported to an emergency department with access to an eye specialist or an ear, nose, and throat specialist.

II. The Eye

A. Anatomy and physiology of the eye

1. The globe (eyeball)

a. A spherical structure measuring about 1 inch in diameter

b. Housed within the eye socket (orbit)

2. The eyes are held in place by loose connective tissue and several muscles.

a. These muscles control eye movement.

3. Oculomotor nerve (third cranial nerve)

a. Innervates the muscles that cause motion of the eyeballs and upper eyelids

b. Carries parasympathetic nerve fibers that cause constriction of the pupil and accommodation of the lens

4. Optic nerve (second cranial nerve)

a. Provides the sense of vision

5. Structures of the eye

a. Sclera (“white of the eye”)

i. A tough, fibrous coat that helps maintain the shape of the eye and protect the contents of the eye

b. Cornea

i. The transparent anterior portion of the eye that overlies the iris and pupil

ii. Cataract: Clouding of the cornea during aging

c. Conjunctiva

i. A delicate mucous membrane that covers the sclera and internal surfaces of the eyelids but not the iris

d. Iris

i. The pigmented part of the eye that surrounds the pupil

e. Pupil

i. The circular adjustable opening within the iris through which light passes to the lens

ii. Should dilate in dim light and constrict in bright light

f. Lens

i. A transparent structure behind the pupil and iris that can alter its thickness to focus light on the retina

g. Retina

i. A delicate, 10-layered structure of nervous tissue in the posterior aspect of the interior globe

ii. Receives light impulses and converts them to nerve signals

(a) Interpreted as vision

6. Anterior chamber: Portion of the globe between the lens and the cornea

i. Filled with aqueous humor

(a) A clear watery fluid

(b) Will gradually replenish if lost

7. Posterior chamber: Portion of the globe between the iris and the lens

i. Filled with vitreous humor

(a) A jelly-like substance that maintains the shape of the globe

(b) Will not replenish; loss may result in blindness

8. Light rays enter the eyes through the pupil.

a. Focused by the lens

b. Image formed by the lens is cast on the retina

c. The optic nerve transmits the image to the brain.

d. The visual cortex of the brain coverts the image into a conscious image.

9. Two types of vision

a. Central vision

i. Facilitates visualization of objects directly in front of you

ii. Processed by the macula (the central portion of the retina)

b. Peripheral vision

i. Enables visualization of lateral objects while a person is looking forward

10. Lacrimal apparatus

a. Secretes and drains tears from the eye

b. Tears drain into lacrimal ducts then into lacrimal sacs.

c. Lacrimal sacs pass into the nasal cavity via the nasolacrimal duct.

d. Tears moisten the conjunctivae.

B. Patient assessment

1. Ensure scene safety.

2. Keep your patient calm.

3. Form a general impression.

a. Note environmental clues at the scene.

b. Note the approximate age and sex of the patient.

c. Note the patient’s degree of distress.

4. Assess airway and breathing.

a. Rule out life threats.

b. Do not be distracted by a swollen, irritated eye and miss priorities.

5. Early transport may improve outcomes.

6. Cover both eyes to limit damage to the affected eye through sympathetic movement.

7. Consider pain management.

8. Cardiac monitoring is recommended.

a. Ocular pressure can stimulate the vagus nerve.

b. Eye drops/medication can cause side effects such as low or high blood pressure.

9. Obtain chief complaint and history.

a. OPQRST

i. How and when did symptoms begin?

ii. What symptoms are experienced?

iii. Are both eyes affected?

iv. Any underlying diseases or conditions of the eye?

b. Diabetes is the leading cause of new cases of blindness in adults.

i. Diabetic retinopathy

(a) Affects the small blood vessels in the retina

10. Symptoms that may indicate a serious ocular condition:

a. Visual loss that does not improve when the patient blinks

b. Double vision

c. Severe eye pain

d. Foreign body sensation

11. Perform a thorough examination.

a. Use standard precautions.

b. Avoid aggravating the affected area.

c. Assess for:

i. Pain or tenderness

ii. Swelling

iii. Abnormal or loss of movement

iv. Sensation changes

v. Circulatory changes

vi. Deformity

vii. Visual changes

viii. Airway compromise

12. Assess visible ocular structures for:

a. Orbital rim

i. Ecchymosis, swelling, lacerations, and tenderness

b. Eyelids

i. Ecchymosis, swelling, lacerations, or any abnormalities

c. Corneas

i. Foreign bodies

d. Conjunctivae

i. Redness, pus, inflammation, and foreign bodies

e. Globes

i. Redness, abnormal pigmentation, and lacerations

f. Pupils

i. Size, shape, equality, and reaction to light

13. When assessing ocular function, perform the following:

a. Visual acuity

i. Assess ability to see large and small letters.

ii. Test each eye separately, and document results.

b. Peripheral vision

i. Test the ability to recognize an object entering the extremes of the visual field.

c. Ocular motility

i. Check the ability to move the eyes in all directions.

ii. Check for paralysis of gaze or discoordination between the movements of the two eyes (dysconjugate gaze)

14. Obtain a full set of baseline vital signs.

a. Reassess every 5-15 minutes depending upon the patient’s condition.

15. The patient may experience side effects if:

a. He or she uses more than one eye medication

b. He or she uses too much medication

16. Ask the patient how he or she administered the medication.

a. Generally recommended to wait five minutes between the first and second drop

17. Eye drops and lubricants can be applied by:

a. Gently squeezing the lower eyelid to make a pouch

b. Applying the medication into the lower lid

c. Have the patient close the eyes and roll them downward.

d. Apply gentle pressure to the corner of the eyes to prevent drainage of the medication from the eye.

18. Irrigation may be necessary for chemical or thermal burns.

a. Use sterile water or isotonic saline solution.

b. Flush liquid from the inside corner to the outside of the eye (except when a Morgan lens is being used).

19. Eye injuries should be seen in the emergency department.

20. Eye injuries may be irreversible.

a. Communication is key to keeping your patient calm and informed.

b. Early decisions to transport can improve some outcomes.

c. Early communication with medical control can help direct your care.

C. Pathophysiology, assessment, and management of specific conditions

1. Burns of the eye and adnexa

a. Account for between 7% and 15% of eye injuries

b. Can be caused by:

i. Chemicals

ii. Heat

iii. Light rays

c. Adnexa: surrounding structures and accessories of the eyes

d. Thermal burns

i. Occur when a patient is burned in the face during a fire

ii. The eyes usually close quickly due to heat.

iii. Eyelids remain exposed and are frequently burned.

e. Retinal injuries caused by exposure to extremely bright light:

i. Can be caused by infrared rays, eclipse light, and laser burns

ii. Are generally not painful

iii. May result in permanent damage to vision

f. Superficial burns of the eye:

i. Can result from:

(a) Ultraviolet rays from an arc welding unit

(b) Prolonged exposure to a sunlamp

(c) Reflected light from a bright snow-covered area (snow blindness)

ii. May not be painful initially but may become so 3 to 5 hours later

iii. Symptoms include:

(a) Conjunctivitis

(b) Redness

(c) Swelling

(d) Excessive tear production

g. Assessment and management

i. If MOI suggests a high index of suspicion for spinal injury, all spinal precautions must be followed.

ii. Assess for and treat life threats.

iii. Assessment of the eye may be difficult because the patient may forcibly keep his or her eyes closed.

(a) Open the eye and irrigate with sterile water or sterile saline solution.

(b) Pain may have to be managed before assessment.

iv. If full examination is possible, assess whether the eye can move to the following six cardinal positions of gaze:

(a) Right

(b) Right up

(c) Right down

(d) Left

(e) Left up

(f) Left down

v. Check pupil dilation to light.

vi. Check patients vision when looking to the left or right.

vii. Check peripheral vision.

viii. Cover an eye burned by ultraviolet light with a sterile, moist pad and an eye shield.

(a) Transport in a supine position.

(b) Protect the patient from further exposure to bright light.

ix. Chemical burns require immediate care.

(a) Begin *immediate* irrigation with sterile water or saline solution.

(b) Never use chemical antidotes.

(c) Direct as much irrigation fluid into the eye as gently as possible.

(d) You may have to force the eyelids open to irrigate adequately.

(e) Use a bulb or irrigation syringe, a nasal cannula, or some other device that will allow you to control the flow.

(f) Do not allow contaminated fluid to enter the other eye.

(g) Irrigate for at least five minutes.

(1) If burn was caused by an alkali or strong acid, irrigate the eye continuously for 20 minutes.

x. Use of the Morgan lens (eye irrigation device)

(a) Administer a topical anesthetic.

(b) Connect the Morgan lens to the bag of IV fluid of choice and let it begin to drip.

(c) Pull tension on the upper eyelid, and slide the Morgan lens under the upper eyelid.

(d) Cup the lower eyelid, and slide the Morgan lens under the lower eyelid.

(e) Run the fluid at the desired rate.

(f) Continue to run the fluid while the Morgan lens is in place.

(1) Do not stop the fluid.

(g) Morgan lens should generally not be removed in the field

xi. Transport considerations for eye burn patients:

(a) Prevent one eye from draining into the unaffected eye.

(1) Protect the unaffected eye during irrigation.

(b) Specialized treatment for burns to the eyes can be found at level-1 trauma centers.

xii. Contact lenses

(a) The only indication for removing contact lenses in the prehospital setting is a chemical burn of the eye.

(b) Three types of contact lenses:

(1) Hard

(2) Rigid gas-permeable

(3) Soft (hydrophilic)

(c) To remove a hard contact lens:

(1) Use a small suction cup, moistening the end with saline.

(d) To remove soft lenses:

(1) Place one to two drops of saline in the eye.

(2) Gently pinch the lens between your gloved thumb and index finger, and lift it off the surface of the eye.

(e) Advise emergency department staff if a patient is wearing contact lenses.

xiii. Eye prosthesis (artificial eye)

(a) Suspect if:

(1) Does not respond to light

(2) Does not move in concert with the opposite eye

(3) Does not appear quite the same as the opposite eye

2. Conjunctivitis (“pink eye”)

a. A condition where the conjunctiva becomes inflamed and red

b. Most often starts in one eye and spread to the other eye

c. Most often caused by bacteria, viruses, allergies, or foreign bodies

i. Allergic conjunctivitis is caused by a trigger or irritating allergen.

ii. Viral conjunctivitis is often associated with an upper respiratory virus.

iii. Bacterial conjunctivitis is caused by bacterial infections.

d. Newborns are susceptible from:

i. Sexually transmitted diseases passed on by mother

ii. Irritation to antibiotic eye drops at birth

iii. Infection from a clogged tear duct

e. Assessment and management

i. Rule out life threats or dangers to the crew.

ii. Perform general assessment of the patient’s vision.

(a) Visual acuity

(b) Assessment of external eye

(c) Assessment of the pupils

(d) Assessment of peripheral vision

(e) Assessment of eye movement

iii. Viral conjunctivitis normally resolves on its own.

iv. Bacterial conjunctivitis requires a topical antibiotic.

v. Allergic conjunctivitis may need a topical antihistamine.

3. Corneal abrasion

a. Can be quite painful

b. The most common eye injury seen in emergency departments

c. Due to superficial trauma to the cornea

d. If discomfort does not resolve after object has been removed or has been flushed, patient should be seen in the emergency department.

e. Assessment and management

i. Symptoms include:

(a) Pain

(b) Sensitivity to light

(c) Tearing

ii. Lubrication with irrigation or a lubricant can alleviate some pain.

iii. Taping the injured eyelid closed with paper tape can keep the injured eye from drying out.

iv. Examine the eyelids by inverting the upper and lower eyelids to expose the source of the corneal abrasion.

v. Carefully look for a foreign body in the eye.

vi. A topical anesthetic can relieve some symptoms.

vii. If movement of the eye causes discomfort, cover both eyes.

viii. Injuries may need to be examined under a special microscope.

ix. In-hospital treatment includes:

(a) Removing the fragment

(b) Treating the eye with topical antibiotics

(c) Patching the eye

4. Foreign body

a. Can cause significant pain

b. Commonly caused by machines such as:

i. Grinders

ii. Sanders

iii. Nailers

iv. Weed whackers

c. Assessment and management

i. Evaluate the entire eye using a light.

(a) Note blood or discoloration of the sclera.

ii. Gentle irrigation usually will not wash out foreign bodies that are stuck to the cornea or lying under the upper eyelid.

iii. To examine the undersurface of the upper eyelid, pull the lid upward and forward.

(a) If you spot a foreign object on the surface of the eyelid, you may be able to remove it with a moist, sterile, cotton-tipped applicator.

(b) Never attempt to remove a foreign body that is stuck or imbedded in the cornea.

iv. To ease pain and assist with dislodging the foreign body:

(a) Irrigate the eye with a sterile saline solution.

(1) Flush from the nose side toward the outside to avoid flushing material into the other eye.

(b) After removal, a foreign body will often leave a small abrasion on the conjunctiva.

(c) Transport the patient to the hospital for further assessment and treatment.

v. Do not remove a foreign body impaled in the globe.

(a) Stabilize the object in place.

(b) Cover the eye with a moist, sterile dressing.

(c) Place a cup or other protective barrier over the object.

(1) Secure it in place with a bulky dressing.

(d) Cover the unaffected eye to prevent damage by sympathetic eye movement.

(e) Transport promptly.

5. Inflammation of the eyelid (chalazion and hordeolum)

a. Oil glands and oil ducts provide a protective film across the eye.

i. Occasionally they become blocked, and may cause:

(a) A small swollen bump or pustule on the external eyelid (chalazion)

(b) A red tender lump in the eyelid or at the lid margin (hordeolum)

(1) Commonly known as a stye

b. Assessment and management

i. Infection is often painful.

ii. Can progress to become systemic

iii. Perform a thorough assessment of vital signs and history.

iv. Treat eyelid inflammation with a warm, moist washcloth over the affected area.

v. Transport to the emergency department for topical antibiotics and pain management.

6. Glaucoma

a. A group of conditions that lead to increased intraocular pressure

i. One of the leading causes of blindness

b. Usually treated with eye drops to reduce ocular pressures

c. Assessment and management

i. Patient complaints may involve:

(a) Loss of field of vision

(b) Blind spot toward the center of vision

ii. Rule out trauma or physical injury.

iii. Perform a general eye assessment.

(a) Document pertinent negatives and abnormal findings.

(b) An ophthalmologist will perform a more comprehensive assessment.

(1) All patients with eye injuries or conditions should be taken to the emergency department for follow-up.

iv. Ask patients what medications they have taken or used prior to your arrival.

v. Treatment in the pre-hospital setting is usually limited to:

(a) Administering tetracaine for pain relief

(b) Irrigating for the removal of a damaging or irritating substance

7. Hyphema

a. Bleeding into the anterior chamber of the eye that obscures vision, partially or completely

b. May be the result of trauma or a medical condition

i. May indicate damage to other structures of the eye

ii. Blood clotting in the canal connecting the anterior chamber to the posterior chamber is a concern.

(a) Can cause a rise in intraocular pressure

c. Assessment and management

i. Patient is likely to experience pain and blurred vision.

ii. Blood may be directly visible.

iii. If rupture of the globe is suspected, take spinal motion restriction precautions.

(a) Elevate the head of the backboard 40° to decrease intraocular pressure.

(b) Encourage patient to avoid performing activities that may increase IOP (eg, coughing).

iv. If no contraindications, the patient should be transported sitting as upright as possible.

(a) Both eyes should be patched.

v. Manage pain with acetaminophen with or without codeine or aspirin.

(a) Other medications with antiplatelet effects should be avoided.

vi. An anxiolytic may facilitate transport.

8. Iritis

a. Inflammation of the iris

b. Also called anterior uveitis

i. The third leading preventable cause of blindness

c. Can be acute or chronic.

i. Acute—caused by trauma or irritants and usually affects only one eye

ii. Chronic may be caused by:

(a) Autoimmune diseases

(b) Different types of arthritis

(c) Irritable bowel disease

(d) Crohn’s disease

iii. Infectious causes include:

(a) Lyme disease

(b) Tuberculosis

(c) Sexually transmitted diseases

d. Assessment and management

i. Presents as a red area surrounding the iris, cloudy vision, or an unusually shaped pupil

ii. Focus on history.

(a) Patients should be directed to a uveitis specialist or an ocular immunologist.

iii. Acute iritis usually responds well to topical corticosteroids as long as the cause is not fungal, viral, or bacterial.

iv. Ninety different pathogens or autoimmune processes can cause chronic or recurrent iritis.

(a) Patients should be referred to a specialist.

(b) Can result in permanent disability if left untreated

9. Papilledema

a. Results from swelling or inflammation of the optic nerve at the rear part of the eye

b. Patients experience:

i. Headaches

ii. Nausea with possible vomiting

iii. Temporary vision loss or narrowing vision fields

iv. A “graying” in the field of vision

c. Can be caused by:

i. Abscess

ii. Tumor

iii. Inner ear infection

iv. Lung infection

v. Dental infection

vi. Other causes:

(a) Meningitis

(b) Fever

(c) Hypertensive crisis

(d) Chronic high blood pressure

(e) Guillain-Barré syndrome

d. Assessment and management

i. Diagnosis will be made by an ophthalmologist or physician.

ii. Prehospital management consists of:

(a) Treat symptoms.

(b) Transport.

(c) Assess ABCs.

(d) Assess for life threats.

(e) Administer analgesics or a mild sedative, if needed.

10. Retinal detachment and defect

a. Potential result of blunt eye trauma

b. Separation of the inner layers of the retina from the underlying choroid

c. Often seen in sport injuries

d. Assessment and management

i. Generally painless

ii. Produces flashing lights, specks, or “floaters” in the field of vision and a cloud or shade over the patient’s vision

iii. Requires immediate medical attention

11. Cellulitis of the orbit: Periorbital and orbital cellulitis

a. Commonly caused by staphylococcus and streptococcus bacterial infections

b. Periorbital cellulitis

i. More prevalent in children than adults

ii. Also known as preseptal cellulitis or eyelid cellulitis

iii. Presents as a painful, red, swollen eyelid

iv. Fever may be present.

v. There may be redness of part of the white part of the eyes.

vi. Predisposed risk factors:

(a) Insect bites

(b) Upper respiratory disorders

(c) Trauma

c. Orbital cellulitis

i. An infection within the eye socket

ii. Considered a medical emergency

iii. Goal of treatment is to avoid the formation of an abscess

iv. Predisposed risk factors:

(a) Sinusitis

(b) Tooth infections

(c) Facial or middle ear infections

(d) Trauma

(e) Sinus infections

d. Assessment and management

i. Treatment in children is usually IV antibiotics.

ii. Adults are generally treated with oral antibiotics.

iii. Prehospital management includes:

(a) Ruling out life threats

(b) Obtaining a thorough history

(c) Transporting the patient to the appropriate care

III. The Ear

A. The ear is the primary structure for hearing and balance.

1. Disorders and injuries can leave a person unable to communicate, react, and maintain equilibrium.

B. Anatomy and physiology of the ear

1. Divided into three anatomic parts:

a. External ear

i. Pinna

ii. External auditory canal

iii. External portion of the tympanic membrane (eardrum)

b. Middle ear

i. Inner portion of the tympanic membrane

ii. Ossicles

c. Inner ear

i. Cochlea

ii. Semicircular canals

2. Sound waves enter the ear through the auricle, or pinna.

a. They then travel through the external auditory canal to the tympanic membrane.

b. Vibration of sound waves against the tympanic membrane sets up vibration in the ossicles.

i. Ossicles: Three small bones on the inner side of the tympanic membrane

c. Vibrations are transmitted to the cochlear duct at the oval window.

i. Oval window: Opening between the middle ear and the vestibule

d. Movement of the oval window causes fluid within the cochlea to vibrate.

i. Cochlea: Shell-shaped structure in the inner ear

e. At the organ of Corti, vibration stimulates hair movements that form nerve impulses that travel to the brain via the auditory nerve.

f. The brain converts these impulses into sound.

C. Patient assessment

1. Observe the scene to rule out hazards to EMS personnel and crew.

2. As you approach, assess:

a. The approximate age and sex of the patient

b. Environmental conditions

c. Patient’s degree of distress

d. Whether the patient is wearing a hearing aid

3. Ensure airway patency, breathing adequacy, and circulation.

4. Manage life threats.

5. Take a complete history.

6. Observe ears for:

a. Drainage

b. Excess cerumen

c. Inflammation

d. Swelling

7. Have patient rate his or her pain.

8. OPQRST

a. Include pertinent negatives.

9. Ask the patient about:

a. Changes in hearing

b. Tinnitus (ringing in the ears)

c. Dizziness

10. Inspect and palpate for:

a. Wounds

b. Swelling

c. Drainage

i. Pus

ii. Blood

iii. Cerebrospinal fluid

d. Mastoid process of the skull

i. Battle sign: Discoloration and tenderness

11. Transport the patient.

12. Document and communicate your findings.

D. Pathophysiology, assessment, and management of ear injuries

1. Foreign body

a. Usually seen in pediatric patients

b. Assessment and management

i. Determine the nature of the object and the urgency of treatment.

ii. Look for bleeding, redness, or inflammation, and symptoms associated with infection.

(a) Serious symptoms or discomfort must be considered an emergency.

iii. Probing for foreign bodies in the ear is discouraged.

iv. Stabilize impaled objects in place.

v. Transport in a position of comfort.

vi. Pain may be managed with analgesics and/or mild sedation.

2. Impacted cerumen

a. The yellowish oily substance found in the outer ear canal

i. Helps prevent dirt and water from entering the middle ear canal and may protect the ear from bacteria or fungus

ii. May present as:

(a) “Wet”—a sticky brown color

(b) “Dry”—a grayish flaky substance

iii. Can become impacted and cause pressure against the eardrum

b. More common in the elderly

c. More common in men and people with mental behavior disorders

d. Other risk factors:

i. Abnormal ear canal shape

ii. Diseases that cause increased production of cerumen

(a) Keratosis

iii. Improper use of cotton swabs

e. Assessment and management

i. Symptoms:

(a) Sensation of pressure or fullness in the ears

(b) Dizziness

(c) Ringing in the ears

(d) Loss of hearing

(e) Pain or itching in the ears

f. Prehospital treatment includes:

i. Thorough history

ii. Visual inspection of the ear

g. Treatment is aimed at removing the excess cerumen.

i. If left untreated, infection and irritation can occur.

ii. Follow-up is necessary.

3. Labyrinthitis

a. Most recognized as the feeling of vertigo or loss of balance after an ear infection or upper respiratory infection

b. Irritation and swelling of the inner ear affects the nerves of the inner ear and produces a loss of balance

c. Other symptoms include:

i. Ringing in the ears

ii. Dizziness

iii. Loss of hearing

iv. Nausea

v. Vomiting

d. Assessment and management

i. Prehospital treatment is directed at:

(a) Reducing the severity of the nausea and vomiting

(b) Transporting the patient in a position of comfort

ii. Serious disorders will need to be ruled out by a CT scan and an MRI.

iii. Hospital treatment includes:

(a) Antiemetic for nausea and vomiting

(b) Antihistamine for swelling

(c) Antivertigo medicine

(d) Diazepam as sedative

4. Meniere’s disease

a. An inner ear disorder in which endolymphatic rupture creates increased pressure in the cochlear duct

i. Leads to damage to the organ of Corti and the semicircular canal

b. May have an abrupt onset

c. Patients will likely experience:

i. Severe vertigo

ii. Tinnitus

iii. Sensorineuronal hearing loss

d. Assessment and management

i. Assessment not likely to be performed in the field

ii. Prehospital care includes treating the nausea and vomiting with an antiemetic.

iii. Physician may treat with diuretics and an antiemetic

5. Otitis externa and media

a. An infection that results from bacterial growth in the ear canal

i. Externa—outer ear

ii. Media—middle ear

b. More common in children than adults

c. Otitis externa can also be an allergic or fungal reaction.

d. Otitis media can be virally induced.

e. Assessment and management

i. Signs and symptoms:

(a) Pain

(b) Itching

(c) Edema and erythema

(d) Diminished hearing acuity

(e) Inflamed, bulging tympanic membrane on exam with otoscope

ii. Prehospital treatment should be directed at relieving unbearable symptoms.

(a) Monitor the patient’s condition, and administer pain medication when necessary.

iii. In the hospital setting, antibiotics may be administered.

(a) If symptoms do not improve, tympanocentesis (needle aspiration) may be performed.

6. Perforated tympanic membrane

a. Ruptured eardrum

b. Results from foreign bodies in the ear or from pressure-related injuries or diving-related injuries

c. Assessment and management

i. Signs and symptoms include:

(a) Loss of hearing

(b) Blood drainage from the ear

(c) Pain

ii. Typically heals spontaneously

iii. Assess and treat other injuries.

iv. Transport for evaluation.

v. Consider pain management medications.

IV. The Nose

A. The nose is susceptible to injury because of its prominent location on the face.

1. Allergens, particles, and chemicals can cause inflammation, infection, and injury.

a. Complications from nasal disorders are common.

i. Can lead to systemic infections

2. Inside of the nose is extremely vascular.

a. Excellent route for some medicines

i. Faster than intravenous administration

3. Loss of smelling sensation has many causes.

a. Smelling disorders include:

i. Anosmia (total loss of sense of smell)

ii. Dysosmia (distorted sense of smell)

iii. Hyperosmia (increased sensitivity to smell)

iv. Hyposmia (decreased sense of smell)

v. Presbyosmia (loss of smell from normal aging)

B. Anatomy and physiology of the nose

1. One of two primary entry points for oxygen

2. Nasal septum: The separation between the nostrils

3. External portion is mostly formed of cartilage.

4. Turbinates: Layers of bone within each nasal chamber

a. Covered in a moist lining

b. Both chambers have:

i. Superior turbinate

ii. Middle turbinate

iii. Inferior turbinate

c. Air moves through each chamber and is humidified as it moves over the turbinates.

5. Frontal sinuses are directly above the nose.

6. Paranasal sinuses: Cavities within several bones associated with the nose

a. Lined with mucous membranes

b. Decrease the weight of the skull

c. Provide resonance for the voice

**C. Patient assessment**

1. Look for environmental clues.

2. Ensure that the scene is safe.

3. Determine whether airway and breathing are sufficient.

4. Determine the patient’s level of distress.

5. The vascular nature of the nasal cavities make them susceptible to bleeding.

a. A severe nosebleed or condition that blocks the airway with swelling or blood is a life-threatening condition.

6. Insert an airway adjunct as needed.

a. Do not insert a nasopharyngeal airway or attempt nasotracheal intubation in any patient with:

i. Suspected nasal fractures

ii. CSF or blood leakage from the nose

7. Inquire about a previous history of nose conditions or bleeding.

8. Always consider a hypertensive crisis when an elderly person has a nosebleed.

D. Pathophysiology, assessment, and management of specific conditions

1. Epistaxis

a. Nosebleed

b. Most common cause is digital trauma.

c. Other causes include:

i. Dryness

ii. Hypertension

d. Two types

i. Anterior

(a) Usually originate from the area of the septum and bleed fairly slowly

(b) Usually self-limiting and resolve quickly

ii. Posterior

(a) Usually more severe

(b) Often cause blood to drain into the patient’s throat, causing nausea and vomiting

e. Assessment and management

i. Place a nontrauma patient in a sitting position, leaning forward, and pinch his or her nostrils together.

ii. Direct the patient not to sniff or blow his or her nose.

2. Foreign body

a. Most likely to be seen in pediatric patients

b. Pressure in the nasal passage can cause:

i. Tissue necrosis

ii. Inflammation

iii. Swelling

c. Inflammation can cause tissue ulceration and epistaxis.

d. Nasal blockage can lead to sinusitis.

e. Assessment and management

i. Determine if the foreign body presents a life-threatening condition.

ii. You may be able to see only one end of the object.

iii. Any persistent, foul-smelling, purulent discharge from the nares should lead to suspicion of a foreign body.

(a) If you note discharge from the nose, let it drain.

iv. Transport the patient in a position of comfort.

(a) Limit the ability of gravity to introduce the object further into the cavity.

(b) Prevent aspiration.

v. Pain management or sedation may be necessary.

(a) Consultation with medical control is advised.

3. Rhinitis

a. A nasal disorder that is most common during childhood and adolescence

b. Generally caused by allergens

c. Can also be caused by:

i. Viruses

ii. Certain medications

iii. Low humidity

iv. Cold temperatures

v. Foreign bodies

vi. Irritants in the air

vii. The “common cold”

viii. Hormonal changes in pregnancy

d. Assessment and treatment

i. Signs and symptoms include:

(a) Nasal congestion

(b) Sneezing

(c) Itchy runny nose

(d) Itchy eyes

(e) Postnasal drip

(f) Possibly cough

ii. Keep the patient in the Fowler position.

iii. Provide transport.

4. Sinusitis

a. Patients experience thick nasal discharge, sinus and facial pressure, headache, and fever.

b. One of the most common conditions in the United States

c. Young children and the elderly are more susceptible.

d. Infection occurs when an obstruction or growth blocks the paranasal sinus.

i. Causes include:

(a) Nasal congestion from cold or allergy

(b) Abnormal passages or growths

(c) Changes in atmospheric pressures

e. Assessment and management

i. Condition can be chronic, acute, or recurrent

ii. Treatment is aimed at reducing inflammation and draining the sinuses.

(a) Mild to moderate symptoms can be treated with a saline rinse and decongestant.

(b) Antibiotics are typically prescribed after 7 to 10 days.

iii. Complications occur when the infection moves into the brain or bone.

(a) IV antibiotics will need to be administered.

iv. Prehospital management should include treatment of any respiratory compromise and transport.

V. The Throat

A. Disorders of the pharynx and larynx may represent acute inflammation and infections, chronic inflammation, or abnormal growths.

1. Specific disorders include:

a. Vocal cord polyps and nodules

b. Contact ulcers

c. Vocal cord paralysis

d. Laryngoceles

e. Laryngeal papillomas

f. Cancer

2. Throat infections are common in children.

3. Throat problems can be exacerbated by swallowing problems.

a. Cranial nerves VI, VII, IX, and XII all play a role in swallowing.

b. Aspiration pneumonia is a life-threatening condition.

i. Prehospital treatment of aspiration involves maintaining a patent airway.

ii. Intubation may be necessary.

4. Esophageal disorders can affect the throat.

a. Valve at the end of the esophagus keeps acidic stomach contents from coming back up the throat

b. Esophageal reflux: Valve only partially closes or opens too much

i. Symptoms include:

(a) Burning sensation in the chest

(b) Indigestion

(c) Change in voice tone

ii. Can cause a precancerous condition

B. Anatomy and physiology of the throat

1. Normal adult mouth contains 32 permanent teeth

a. Distributed about the maxillary and mandibular arches

b. The teeth on each side of the arch are mirror images of each other and form four quadrants

i. Each quadrant contains:

(a) One central incisor

(b) One lateral incisor

(c) One canine

(d) Two premolars

(e) Three molars

c. The top portion of the tooth is the crown, containing one or more cusps.

i. Below the crown lie the neck and the root.

ii. The pulp cavity fills the center of the tooth

(a) Contains blood vessels, nerves, and specialized connective tissue (pulp)

iii. Dentin forms the principal mass of the tooth.

iv. Alveoli are the bony sockets for the teeth.

(a) Alveolar ridges: Ridges between the teeth that are covered by gums

d. Teeth are attached to the alveolar bone by a periodontal membrane.

2. The mouth

a. Digestion begins with mastication (chewing of food).

b. Tongue: The primary organ of taste

i. Also important in the formation of speech, chewing and swallowing

ii. Attached at the mandible and hyoid bone

iii. Covered by a mucous membrane

iv. Extends from the back of the mouth upward and forward to the lips

c. Nerves supplying the mouth and its structures:

i. Hypoglossal

(a) Provides motor function to the muscles of the tongue

ii. Glossopharyngeal

(a) Provides taste sensation to the posterior portions of the tongue

(b) Carries parasympathetic fibers to the salivary glands

iii. Trigeminal

(a) Mandible branch provides motor innervation to the muscles of mastication

iv. Facial

(a) Supplies motor activity to all muscles of facial expression

(b) Provides the sense of taste to the anterior two thirds of the tongue

(c) Provides cutaneous sensations to the tongue and palate

3. The neck

a. Anterior part of the neck include:

i. Thyroid and cricoid cartilage

ii. Trachea

iii. Numerous muscles and nerves

iv. Major blood vessels

(a) Internal and external carotid arteries

(b) Internal and external jugular veins

b. The major arteries of the neck supply oxygenated blood directly to the brain.

i. Injury may cause:

(a) Massive bleeding and hemorrhagic shock

(b) Cerebral hypoxia

(c) Infarct

(d) Air embolism

(e) Permanent neurologic impairment

c. Other key structures that may sustain injury include:

i. Vagus nerves

ii. Thoracic duct

iii. Esophagus

iv. Thyroid and parathyroid glands

v. Lower cranial nerves

vi. Brachial plexus

vii. Soft tissue and fascia

viii. Various muscles

C. Patient assessment

1. Patients with swallowing abnormalities or copious mucous production should be placed in a position to allow drainage.

a. Lateral recumbent or recovery position

2. Assessing stroke patients must include early recognition of airway threats.

3. Assessments should consider epiglottitis if there are symptoms of:

a. Sore throat

b. Drooling

c. Head that is hung forward

D. Pathophysiology, assessment, and management of specific conditions

1. Dentalgia and dental abscess

a. Dentalgia (toothache) can be the start of a dental abscess.

b. Dental abscess: Occurs when a bacteria growth spreads directly from a cavity into the gums, facial tissue, bones, and/or neck

i. May have to be drained surgically

c. Assessment and management

i. Infection may have become systemic if the patient has:

(a) Fever

(b) Chills

(c) Nausea

(d) Vomiting

ii. An abscess in the throat, neck, or under the tongue can affect the ability to breathe.

iii. Prehospital treatment is aimed at relieving the symptoms.

(a) Drainage into the mouth should be rinsed with warm water.

iv. Encourage transport.

2. Diseases of oral soft tissue

a. Can be the root cause to other health problems

i. 90% of diseases affecting the human body may have oral manifestations.

b. Some common mouth disorders include the following:

i. Cold sores

(a) Painful sores on the lips and around the mouth

ii. Canker sores

(a) Painful sores in the mouth or on the gums

iii. Thrush

(a) Yeast infection that causes white patches in the mouth or on the tongue

iv. Leukoplakia

(a) Smoker’s disease

(b) Causes excess cell growth in mouth, cheek, or gums

(c) Presents as white patches

v. Gingivitis

(a) Red swollen gums

vi. Bad breath

(a) Usually linked to plaque and poor oral hygiene

c. Assessment and management

i. Rule out urticaria and allergic reactions.

3. Oral candidiasis (thrush)

a. A condition in which the fungus *Candida albicans* accumulates on the lining of the mouth

b. The patient will have creamy white lesions on the tongue and inner cheeks.

i. May be painful and may bleed as they are scraped

c. Assessment and management

i. Most likely to be found in:

(a) Babies

(b) Patients with compromised immune systems

(c) Patients who wear dentures

(d) Patients who use inhaled corticosteroids

ii. Additional symptoms:

(a) Pain

(b) Cracking and redness at the corners of the mouth

(c) Loss of taste

(d) A “cottony” feeling in the mouth

(e) In severe cases, can move down the esophagus, causing the sensation that food is getting stuck in the throat when swallowing.

iii. Patients at increased risk:

(a) HIV/AIDS

(b) Cancer

(c) Diabetes

(d) Vaginal yeast infections

iv. Treat higher priorities.

v. Make the patient comfortable.

vi. Encourage the patient to follow up with a physician.

vii. Always use standard precautions.

4. Ludwig’s angina

a. A type of cellulitis caused by bacteria from an infected tooth root or mouth injury

b. Occurs on the floor of the mouth under the tongue

c. Rapid swelling may cause airway obstruction.

d. Physical exam may show redness and swelling of the neck or under the chin.

i. The tongue may be swollen.

e. You may have to provide an airway through the nasal passages.

f. Assessment and management

i. Symptoms may include:

(a) Difficulty breathing

(b) Difficulty swallowing

(c) Neck pain

(d) Neck swelling

(e) Fever

(f) Drooling

(g) Altered speech sounds

ii. Prehospital treatment requires aggressive management of the airway in severe cases.

iii. Contact medical control physician early on.

iv. Remain calm and organized.

v. Attend to basic ABCs.

vi. Pay particular attention to the condition and smells originating in the mouth.

5. Foreign body in the throat

a. Assessment and management

i. Keep the patient calm.

ii. Transport in a position where if the object becomes dislodged, gravity will allow it to fall out.

6. Epiglottitis

a. Inflammation of the epiglottis

i. Blocks the trachea and obstructs the airway

ii. Often a result of the *H. influenzae* type b virus

b. Assessment and management

i. Symptoms include:

(a) Fever

(b) Sore throat

(c) Painful swallowing

(d) Stridor

(e) Respiratory distress

ii. Signs include:

(a) Patient will look sick and anxious.

(b) Patient will sit upright in the classic “tripod” position or in the sniffing position.

(c) Patient may be drooling.

(d) Work of breathing is increased.

(e) Pallor or cyanosis may be evident.

iii. Transport to an appropriate hospital while maintaining the airway.

(a) Minimize scene time.

(b) Do not attempt procedures that might agitate the patient.

(c) Do not attempt to look in the mouth.

(d) Alert receiving personnel of suspected diagnosis and patient’s condition.

7. Laryngitis

a. Swelling and inflammation of the larynx associated with hoarseness or loss of voice

b. Can be the result of overuse

c. Most common form is caused by a virus

i. Can also be caused by:

(a) Pneumonia

(b) Irritants

(c) Chemicals

(d) GERD

(e) Bronchitis

(f) Allergies

(g) Bacterial infections

d. Assessment and management

i. Symptoms include:

(a) Fever

(b) Hoarseness

(c) Swollen lymph nodes or glands in the neck

ii. Obtain a good history to rule out evolving upper airway obstruction or an allergic reaction.

iii. Consider fracture of the hyoid bone.

iv. Have the patient follow up with a physician.

8. Tracheitis

a. A bacterial infection of the trachea caused by *Staphylococcus aureus*

b. Frequently occurs in young children following a recent viral upper respiratory infection

i. Trachea is easily blocked by swelling.

ii. Can be a life-threatening condition

c. Assessment and management

i. Symptoms include:

(a) Deep “croup-like” cough

(b) Difficulty breathing

(c) High fever

(d) High-pitched stridor with breathing

ii. Patients may exhibit:

(a) Tripod positioning

(b) Intercostal retractions

(c) Can proceed from respiratory distress to respiratory failure if not addressed

iii. Prehospital care is supportive.

(a) Minimize stress to the patient.

(b) Administer 100% oxygen.

(c) Use pulse oximetry.

(d) Monitor vital signs.

(e) Be prepared for difficult intubation.

(1) Have the correct size ET tube as well as the next smaller size available.

(f) Transport promptly to an appropriate facility.

9. Tonsillitis

a. Swelling and inflammation of the tonsils

b. Usually caused by viral infections

i. Can also be caused by bacteria

c. Assessment and management

i. Symptoms include:

(a) Swollen tonsils

(b) Sore throat

(c) Difficulty swallowing

ii. Patients will present with:

(a) Red, swollen tonsils

(b) White or yellow coating or patches on the tonsils

(c) Fever

(d) Sore throat

(e) May also have:

(1) Pain when swallowing

(2) Enlarged or tender lymph nodes in the neck

(3) Bad breath

(4) Headache

(5) Stiff neck

(6) Drooling

iii. Transport for further evaluation.

10. Pharyngitis

a. Inflammation of the pharynx

b. Often due to a rapid onset of sore throat without discomfort or pain with swallowing

c. Assessment and management

i. Symptoms include:

(a) Sore throat

(b) Discomfort or pain on swallowing

(c) Fever

(d) Pharyngeal erythema

(e) Headache

(f) Purulent patchy yellow, gray, or white exudate

(g) Nasal congestion

(h) Hoarseness

(i) Cough

(j) Ulcers on the soft palate

ii. Treatment involves follow up with the emergency department.

iii. Major prehospital concern is assessment for partial airway obstruction

11. Peritonsillar abscess

a. A collection of infected material around the tonsils

b. Complication of tonsillitis

c. Assessment and management

i. One or both tonsils are infected

ii. The roof of the mouth and neck or chest may be infected.

iii. The patient may have:

(a) Chills

(b) Difficulty opening the mouth

(c) Pain with opening the mouth

(d) Facial swelling

(e) Fever

(f) Drooling or inability to swallow saliva

(g) Headache

(h) Muffled voice

(i) Sore throat

(j) Tender glands of the jaw and throat

iv. Treatment involves antibiotics and draining the abscess.

(a) May include tonsillectomy

v. Transport patient to the hospital.

(a) In some cases, the condition may be life threatening.

12. Temporomandibular joint disorders

a. Temporomandibular joint (TMJ): Where the posterior condyle of the mandible articulates with the temporal bone

i. Allows movement of the mandible

ii. Allows a patient to talk, chew, and yawn

b. Causes of temporomandibular joint disorders include:

i. Arthritis damage to the joint’s cartilage

ii. Jaw injury

iii. Jaw muscle fatigue from grinding or clenching of the teeth

c. Assessment and management

i. Symptoms include:

(a) Headache

(b) Jaw pain

(c) Aching around the ear

(d) An uneven bite and/or painful bite

(e) Difficulty chewing

(f) Locking of the joint causing difficulty either opening or closing the mouth

ii. Usually managed by the patient’s physician or dentist

VI. Summary

A. A patient may call EMS with an emergency related to a disorder of the eye, ear, nose, or throat (EENT), or paramedics may encounter patients with these disorders while assessing an unrelated emergency. Paramedics should be familiar with these important structures and the diseases that affect them.

B. Be sure to assess the eye for pain or tenderness, swelling, abnormal or loss of movement, sensation changes, circulatory changes, deformity, and visual changes. Obtain a thorough history including when the problem began, whether both eyes are affected, and a description of the symptoms.

C. An early transport decision to the right facility can improve outcomes. Consider transport to a facility that has skilled services necessary to treat a serious eye problem. Consider pain management and mild sedation during transport.

D. Remember to provide emotional care to patients with eye conditions. Fear and panic from loss of vision can cause dangerous and bizarre behavior, which may be alleviated if you practice good, calming communication skills.

E. Flush burns to the eye with copious amounts of sterile saline or sterile water. Never use chemical antidotes when treating burn injuries to the eye.

F. Specific conditions of the eye include conjunctivitis, corneal abrasion, foreign body, inflammation, glaucoma, hyphema, iritis, papilledema, retinal detachment and defect, and cellulitis of the orbit. Become familiar with these conditions so you can recognize them in the field and transport the patient as needed.

G. The ear is the primary structure for hearing and balance. Disorders of the ear can leave a person unable to communicate, react, and maintain equilibrium.

H. Adequate assessment of the external ear canal and middle ear cannot be performed in the field. Treatment is to transport the patient so he or she can be evaluated at the receiving facility.

I. Specific conditions of the ear include foreign body, impacted cerumen, labyrinthitis, Meniere’s disease, otitis, and perforated tympanic membrane.

J. The nose is a vascular structure and contains nasal mucosa that is a short route to the brain.

K. Never insert a nasopharyngeal airway or attempt nasotracheal intubation in any patient with suspected nasal fractures or in patients with cerebrospinal fluid or blood leakage from the nose. It could penetrate the brain and cause further damage.

L. Specific problems related to the nose include epistaxis, foreign body, rhinitis, and sinusitis.

M. Disorders of the throat (pharynx and larynx) may represent acute inflammation and infections, chronic inflammation, or abnormal growths. Throat infections are particularly common among children.

N. When you are assessing a patient with a throat complaint, note whether the patient is able to swallow. If not, position the patient to allow drainage. Be sure to assess for threats to the airway and breathing.

O. Specific disorders include dentalgia, dental abscess, Ludwig’s angina, foreign body, epiglottitis, laryngitis, tracheitis, oral candidiasis, peritonsillar abscess, pharyngitis/tonsillitis, and temporomandibular joint disorders.

Post-Lecture

This section contains various student-centered end-of-chapter activities designed as enhancements to the instructor’s presentation. As time permits, these activities may be presented in class. They are also designed to be used as homework activities.

## Assessment in Action

This activity is designed to assist the student in gaining a further understanding of issues surrounding the provision of prehospital care. The activity incorporates both critical thinking and application of paramedic knowledge.

### Instructor Directions

**1.** Direct students to read the “Assessment in Action” scenario located in the Prep Kit at the end of Chapter 19.

**2.** Direct students to read and individually answer the quiz questions at the end of the scenario. Allow approximately 10 minutes for this part of the activity. Facilitate a class review and dialogue of the answers, allowing students to correct responses as may be needed. Use the quiz question answers noted below to assist in building this review. Allow approximately 10 minutes for this part of the activity.

**3.** You may want to ask students to complete the activity on their own and turn in their answers on a separate piece of paper.

### Answers to Assessment in Action Questions

**1.** **Answer:** B. Make sure the patient can maintain his airway.

**Rationale:** The first step in the care of this patient is to ensure that the airway is open and the patient is maintaining it on his own. If the patient is having trouble maintaining his airway, have him sit upright and lean slightly forward to allow the blood to flow out of the nose. This will prevent the blood from flowing back into the patient’s oropharynx.

**2.** **Answer:** A. Anticoagulant

**Rationale:** Warfarin is an anticoagulant. This medication is commonly prescribed to prevent blood clotting. In this scenario, the fact that the patient is taking warfarin is significant because it will prevent clotting from occurring.

**3.** **Answer:** B. Pinch the nares closed and hold for a minimum of 15 minutes.

**Rationale:** Direct pressure by pinching the nares closed for 15 minutes is the preferred method of controlling a nosebleed. The patient can usually do this for you while you complete your assessment and start an IV line if warranted.

**4.** **Answer:** D. Epistaxis

**Rationale:** The medical term for a nosebleed is *epistaxis*. Hemophilia is a genetic bleeding disorder in which clotting does not occur or occurs insufficiently. The term *hematemesis* is another way of referring to vomited blood. Anisocoria is the presence of unequal pupils that are normal for the patient and are not associated with any injury or condition.

**5.** **Answer:** B. The patient may vomit.

**Rationale:** The patient may become nauseous and vomit if he swallows blood from an active nosebleed. The blood that may be vomited will appear to have a coffee-ground appearance. This coffee-ground appearance is also a result of internal bleeding when stomach acids work to digest the blood.

### Additional Questions

**6. Rationale:** Conjunctivitis is inflammation of the conjunctiva of the eye, commonly referred to as “pink eye” in the case of an infection. Conjunctivitis can also be caused by an allergic response or irritation caused by debris in the eye. Common signs of conjunctivitis include a thick drainage especially on awakening from sleep. If the conjunctivitis is caused by an infection, it is highly contagious. All items that come in contact with the eyes should be considered contaminated and disposed of properly.

## Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (date to be determined by instructor).

B. Read Chapter 20, *Abdominal and Gastrointestinal Emergencies*, for the next class session.

## Unit Assessment Keyed for Instructors

1. What is anisocoria?

**Answer:** Anisocoria, a condition in which the pupils are not of equal size, is a significant finding in patients with ocular injuries or closed head trauma. However, simple or physiologic anisocoria occurs in approximately 20% of the population. Therefore, about one out of five people has some degree of difference in the size of their pupils. Usually, the patient’s pupils differ in size by less than 1 mm; however, approximately 4% of people have pupils that vary in size by more than 1 mm. This is not a clinically significant finding. Unilateral cataract surgery may also cause inequality of pupil size. The pupil of the eye affected by the cataract will be nonreactive to light.

p 1094

2. What is the recommended irrigation time for chemical burns to the eye(s)?

**Answer:** Chemical burns, which are usually caused by acid or alkali solutions, require immediate emergency care because they can rapidly lead to blindness. The most important prehospital treatment in such cases is to begin immediate irrigation with sterile water or saline solution. Never use any chemical antidotes (such as vinegar, baking soda) when you are irrigating the patient’s eye; use sterile water or saline only. Irrigate the eye for at least 5 minutes. If the burn was caused by an alkali or a strong acid, irrigate the eye continuously for 20 minutes because these substances can penetrate deeply.

p 1095

3. What is conjunctivitis?

**Answer:** Conjunctivitis or “pink eye” is a condition in which the conjunctiva becomes inflamed and red. Conjunctivitis most often starts in one eye and spreads to the other eye. The conjunctiva is a thin layer that lines the inside of the eyelids and the white part of the eye. Inflammation causes the white part of the eye to take on a red or pink tint. Most often this is caused by bacteria, viruses, allergies, or foreign bodies present in the eye.

p 1097

4. Bleeding into the anterior chamber of the eye that obscures vision, partially or completely, is known as?

**Answer:** Blunt trauma can cause serious eye injuries, ranging from swelling and ecchymosis to rupture of the globe. Hyphema is bleeding into the anterior chamber of the eye that obscures vision, partially or completely. It may be the result of blunt trauma to the eye or a medical cause. It may be a marker of damage to other structures of the eye and, therefore, requires a full ophthalmologic examination. One of the concerns is blood clotting in the canal connecting the anterior chamber to the posterior chamber, causing an acute rise in intraocular pressure. Approximately 25% of hyphemas are associated with globe injuries.

p 1100

5. In general, should a foreign object be removed from a pediatric patient’s ear?

**Answer:** The ear canal is narrow and angulated. Probing for foreign bodies in the ear is discouraged. In some areas the paramedic may use an otoscope to look further into the ear; however, that is outside the scope of practice in most regions. As is the case with almost all foreign bodies, observe and document, but do not pull the impaled object out. Rather, simply stabilize it in place. The pediatric ear canal is small, and any effort to retrieve the foreign object may do more harm. Due to the potential for infection and damage to the ear drum, these patients should be seen by a physician in the ED. Management of both adults and children is to transport to the appropriate facility in the position of comfort. Severe pain or anxiousness can be treated with pain management medication and/or mild sedation.

p 1104

6. What is the suggested prehospital care for otitis externa and otitis media?

**Answer:** Otitis is an infection that results from bacterial growth in the ear canal. It can be categorized into otitis externa and otitis media. These are infections of the outer and middle ear cavity, respectively. Both otitis externa and media are painful conditions. Allergic or fungal otitis externa may be accompanied by itching, and examination of the external ear canal will show edema and erythema. Patients with otitis media may experience diminished hearing acuity, and examination with an otoscope will reveal an inflamed, bulging tympanic membrane (eardrum). Prehospital treatment should be directed at relieving unbearable symptoms.

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7. What is epistaxis, and what is the recommended prehospital care?

**Answer:** Epistaxis, or nosebleed, is a common problem that can occur spontaneously or from trauma. One of the most common causes of nosebleeds is digital trauma (picking the nose with a finger); other causes include dryness and hypertension. Nosebleeds are further classified into anterior and posterior epistaxis. Anterior nosebleeds usually originate from the area of the septum and bleed fairly slowly. These are usually self-limiting and resolve quickly. Posterior nosebleeds are usually more severe and often cause blood to drain into the patient’s throat, causing nausea and vomiting. For a nontrauma patient who is bleeding from the nose, you should place the patient in a sitting position, leaning forward, and pinch his or her nostrils together. Direct the patient not to sniffle or blow his or her nose.

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8. Which cranial nerve problems could cause additional problems with a throat issue?

**Answer:** Throat problems can be exacerbated by swallowing problems (dysphagia). Cranial nerves VI, VII, IX, and XII all play a role in swallowing. Neurologic problems associated with stroke or trauma can cause swallowing difficulty. Facial nerve paralysis (nerve VII) can cause unilateral facial and gag reflex paralysis.

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9. What is the suggested care for patients with swallowing issues?

**Answer:** Patients with swallowing abnormalities or copious mucous production should be placed in a position to allow drainage. A lateral recumbent position or recovery position will allow mouth drainage and help protect the airway. Stroke patients may not be able to swallow as a result of neurologic deficit. Assessing these patients must include early recognition of threats to their airway and prompt action to alleviate the risks. Abscesses can develop rapidly and block the airway. Medical problems of the mouth, neck, and throat can have serious consequences to breathing. Assessments should consider epiglottitis if there are symptoms of sore throat, drooling, and a head that is hung forward.

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10. What are the symptoms of tonsillitis?

**Answer:** The symptoms of tonsillitis include swollen tonsils, a sore throat, and difficulty swallowing. The patient will have red, swollen tonsils, white or yellow coating or patches on the tonsils, a fever, and a sore throat. Patients may also present with pain when swallowing, enlarged and tender lymph nodes in the neck, bad breath, headache, and a stiff neck. In severe cases, drooling indicates difficulty swallowing. You should transport all patients with suspected tonsillitis to the emergency department for further evaluation.

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## Unit Assessment

1. What is anisocoria?

2. What is the recommended irrigation time for chemical burns to the eye(s)?

3. What is conjunctivitis?

4. Bleeding into the anterior chamber of the eye that obscures vision, partially or completely, is known as?

5. In general, should a foreign object be removed from a pediatric patient’s ear?

6. What is the suggested prehospital care for otitis externa and otitis media?

7. What is epistaxis, and what is the recommended prehospital care?

8. Which cranial nerve problems could cause additional problems with a throat issue?

9. What is the suggested care for patients with swallowing issues?

10. What are the symptoms of tonsillitis?